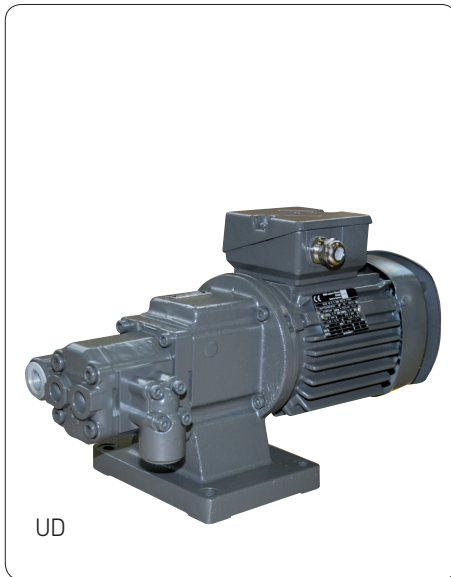


UC and UD Gear pump unit for hydraulic or circulating-oil lubrication systems

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

EN



UD and UC Gear pump unit

Masthead

These 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 have been prepared in accordance with the established standards and rules for technical documentation, VDI 4500 and EN 292.

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Subject to changes in contents and technical information.

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Information concerning EC Declaration of Conformity and EC Declaration of Incorporation

The product:
multi-line pump unit,

of the series: **UC/UD**

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 neither designed nor approved for use in conjunction with fluids of Group 1 (Dangerous Fluids) as defined in Article 2, Para.

2 of Directive 67/548/EEC of 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
Danger!	Danger of bodily injury
Warning!	Danger of damage to property and the environment
Note!	Provides additional information

Informational symbols



Note

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

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

The assembly instructions fulfill the Machinery Directive indicated above 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 UC and UD gear pump units are vertically or horizontally arranged units that are used in hydraulic or circulating-oil lubrication systems. All off-the-shelf lubricants and hydraulic oils in the viscosity range of between 20 and 1000 mm²/s are conveyed.

The use of synthetic oils requires prior approval from SKF Lubrication Systems Germany AG.

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 identify and perform necessary actions while avoiding any risks which may arise.

The definition of qualified personnel and the prohibition against 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.

1.5 Compressed air hazard



The described product is pressurized during operation. The product must therefore be depressurized before starting assembly, maintenance or repair work, or any system modifications or system repairs.

Depending on the model design, the product may be able to be operated with compressed air. Through the use of the appropriate compressed air quality class, compressed air preparation can be optimized and machine downtime and higher maintenance costs avoided. The compressed air to be used here must comply with at least quality class 5 as defined by ISO 8573-1:

- Max. particle size 40 μm
- Max. particle density 10mg/m³
- Pressure dew point 7°C
- Water content max. 7800 mg/ m³
- Residual oil content max. 25 mg/ m³

1.6 Hydraulic pressure hazard



The described product is pressurized during operation. The product must therefore be depressurized before starting assembly, maintenance or repair work, or any system modifications or system repairs.

1.7 Explosion protection information




Danger!

- Only the pump models tested and approved by SKF Lubrication Systems Germany AG in accordance with ATEX Directive 94/9/EC are permitted to be used in areas with explosion protection. The relevant class of protection is engraved on the pump's nameplate.
- When filling lubricant into the pump, make sure the lubricant is clean. The reservoir must be filled in good time (pay attention to fill level monitoring). Lubricant must be filled only via the filler socket G 3/8" (FF) or G 1/2" (FB) on the pump flange. Lubricant may only be filled via the "reservoir cover" if absolutely certain that no potentially explosive atmosphere exists.
 - In case of overfilling, the excessive amount of lubricant must be removed. Make sure there is no potentially explosive atmosphere when doing this.
 - The switching circuits of the fill level monitor must be supplied by an intrinsically safe circuit, e.g., through the installation of an ATEX-compliant isolating switch by the customer. The unit must be grounded via a ground connection. The customer must install adequate overload protection for the power consumption of the motor.
 - To avoid electrostatic discharge, lay hydraulic connecting lines in corrosion-resistant metal tubing, e.g., stainless steel pipe.
 - When setting up the pump, make sure the setup location is level and not subject to vibrations or jolts.
 - During maintenance work, use only tools intended for use in potentially explosive spaces or else make certain that there is no potentially explosive atmosphere present.
 - The service life of the oil lubrication pump is limited. It must therefore undergo a function and leak test at regular intervals. Perform appropriate repairs in the event of malfunctions, leaks, or rust. Replace the pump if necessary.
 - The user must make sure through the choice of the lubricant to be delivered that no chemical reactions capable of serving as ignition sources will occur in conjunction with the explosive atmospheres expected. The lubricant's ignition temperature has to be at least 50 kelvin above the pump's maximum surface temperature (temperature class).

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 Germany AG.

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 Germany AG. SKF Lubrication Systems Germany AG 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.

2.2 Selection of lubricants

 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 in the company's laboratory for their suitability for pumping in centralized lubrication systems (e.g., "bleeding"). 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.

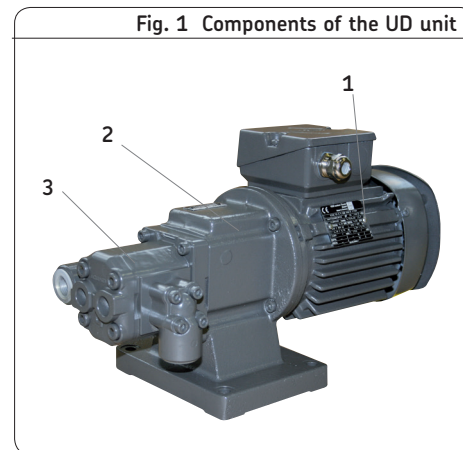


Follow the safety instructions on the lubricant's safety data sheet.

Lubricants are hazardous substances. 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

Fig. 1 Components of the UD unit



Components of the unit

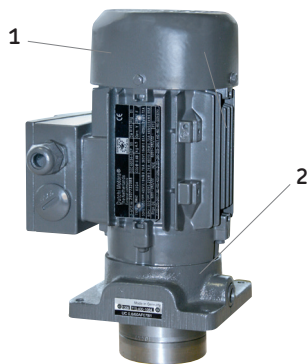
Item description

- 1 Electric motor with terminal box
- 2 Pump skirt with coupling
- 3 Gear pump

4. Assembly

4.1 Setup and attachment

Fig. 2 Components of the UC unit



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."

There are no restrictions with regard to the mounting position of all the units.

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.

Components of the unit

Item description

- 1 Electric motor with terminal box
- 2 Gear pump with coupling

4.1.1 Assembly of the gear pump unit

The gear pump unit must be installed on a level surface. The base plate must not be under stress. Sufficient space must be provided during installation for later servicing and maintenance work.



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.

There are no restrictions with regard to the mounting position of all the units.



When UC units are to be mounted lower than the maximum liquid level, additional sealing of the flange face is required (refer to version key).

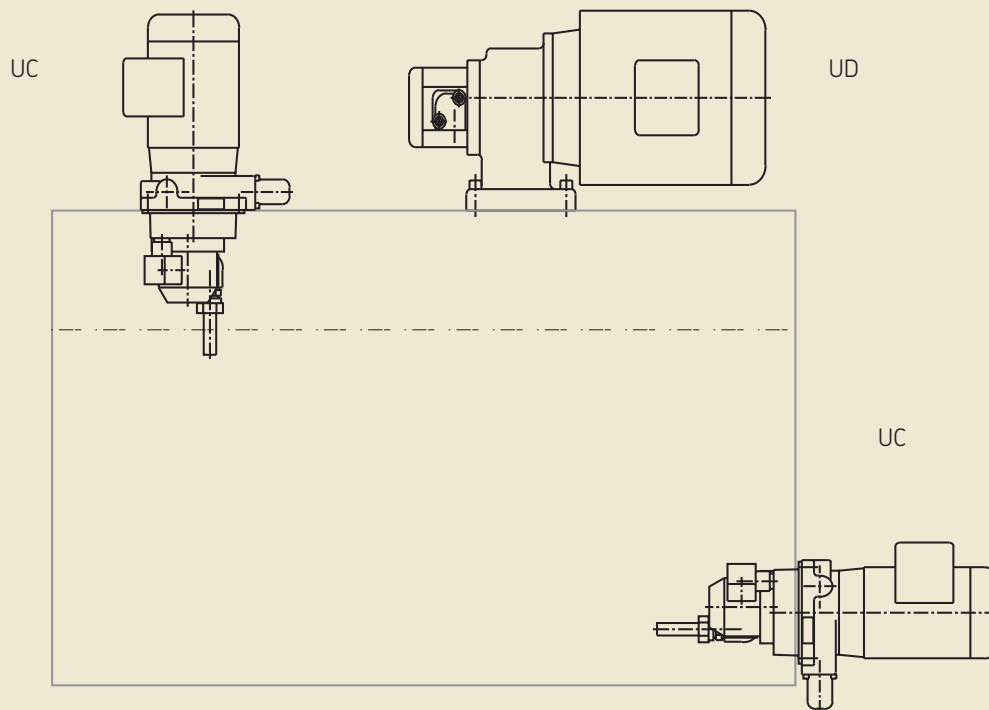


Warning!

The torque of the fastening screws depends on the customer's installation. Make sure that torque is adequate when installing the base plate!

4.2 UC/UD Assembly drawing

UC and UD Gear pump unit



4.2.4 Use

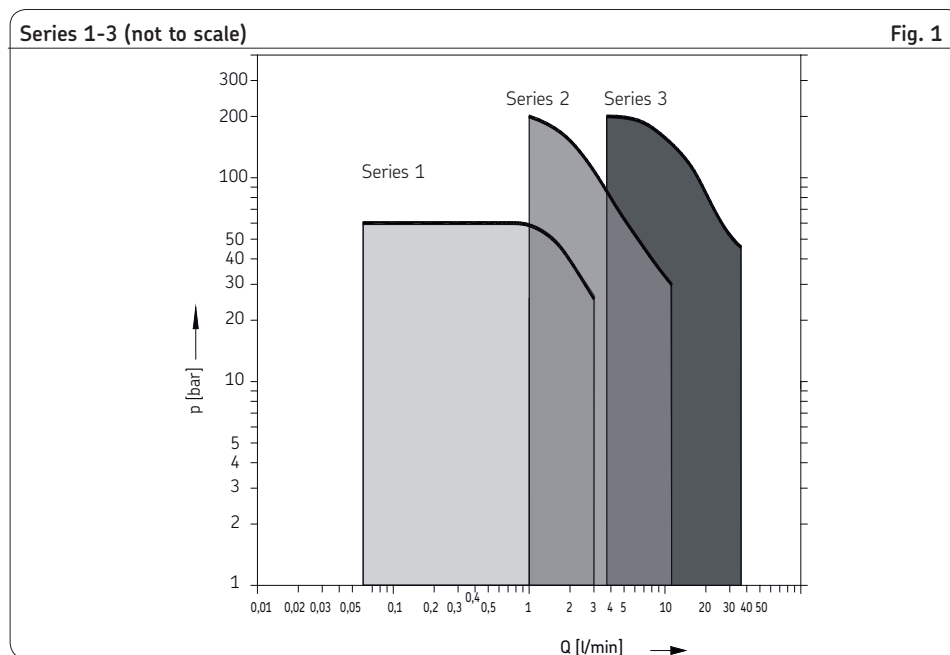
The gear pump units are manufactured in 3 assemblies:

Series 1 is approved for very high viscosities up to 1.000 mm²/s. They are characterized by their simple and small design, and are accordingly inexpensive. They are particularly suited for small hydraulic and lubrication systems that require volumetric flows between 0.06 l/min and 3 l/min for operating pressures between 25 bar and 60 bar.

Series 2 and series 3 meet high requirements in terms of volumetric flow, operating pressure and efficiency. While series 2 has been designed for volumetric flows of between 1 l/min and 10.8 l/min, series 3 covers the range between 3.8 l/min and 36 l/min. Within the series, the permissible operating pressure is greater the smaller the nominal volumetric flow.

Due to the overlapping volumetric flow ranges, it is possible, for instance, to convey 9 l/min using a series 2 pump in the low-pressure range, whereas a corresponding series 3

pump can achieve this volumetric flow in the high-pressure range for the same efficiency. The respective ranges of the series are shown in a simple form in Fig. 1.



4.2.5 Design

The gear pump units consist of motor, coupling, flange and gear pump.

Series 1:

Rated motor output 0.18 kW.

Delivery volume between 0.06 l/min at 60 bar and 3 l/min at 25 bar.

Flange size:

116 x 116 mm (vertical position) and
80 x 120 mm (horizontal position).

Note!

There is the series 1 still in more customised implementation with an engine rated power of 0.25 kW. Calculation current is according to him to lay out type plate.

Series 2:

Rated motor output 0.18; 0.37; 0.55 or 0.75 kW.

By combination with gear pump units of different sizes (1.2 cm³/revolution to 8 cm³/revolution), a wide spectrum with regard to the selection criteria volumetric flow and operating pressure is achieved.

Delivery volume from 1 l/min at 200 bar up to 10.8 l/min at 30 bar.

Flange size:

150 x 150 mm (vertical position) and
120 x 150 mm (horizontal position).

Series 3:

Rated motor output from 0.75 kW to 4 kW.
The gear pump unit has a displacement between 4.5 cm³/revolution and 26 cm³/revolution.

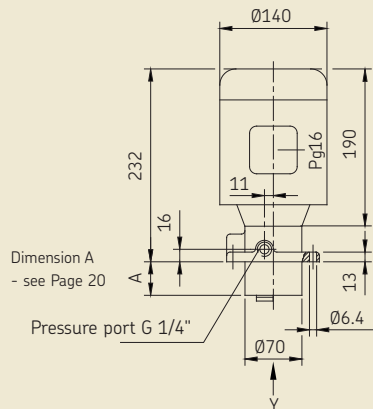
Delivery volume 3.8 l/min at 200 bar up to 36 l/min at 45 bar.

Flange size:

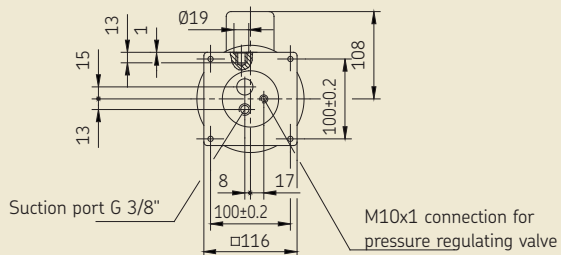
205 x 205 mm (vertical position) and
180 x 220 mm (horizontal position).

4.2.6 Series 1: Q_{nominal} up to 3 l/min

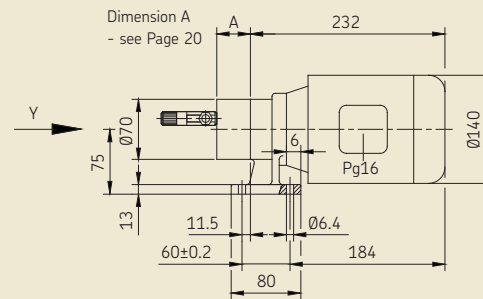
UC gear pump unit, Series 1



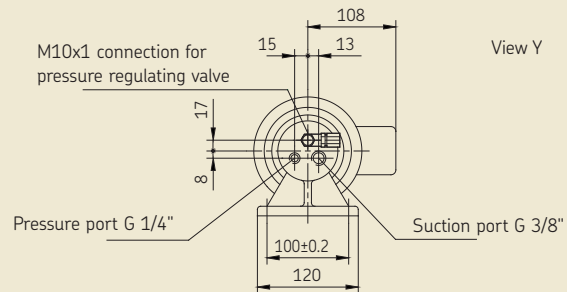
View Y



UD gear pump unit, Series 1



View Y



4.2.6 Series 1: Q_{nominal} up to 3 l/min

Technical data

Units

Mounting position: Discretionary (where UC units are installed lower than the maximum oil level, the customer must seal flange/machine)

Ambient temperature: -15 to +40 °C
 (-15 bis +55 °C ²⁾)
 (At higher ambient temperatures, note that there is a reduction in performance of approx. 1% per Kelvin)

Pump

Nominal volumetric flow: See page 20

Type: Gear pump

Design:

B 1 Standard gasket FPM

B 3018 Pump with standard sealing for outlet under lubricant level (only for UC)

Operating pressure:

Admission pressure Max. 2 bar (special design 5 bar)

Outlet p_{max} See page 20

Lubricant Mineral oils, synthetic and environmentally friendly oils with an operating viscosity between 20 and 1.000 mm²/s

Suction height Max. 700 mm (for max. tube Ø)

Motor

Rated power: 0.18 kW/ customized 0.25 kW

Rated voltage at 400 V 0.65 A with 0.18 kW/ 0.91 A with 0.25 kW

Frequency 50 Hz ¹⁾

Type: IM V18/B14 (motor can be shifted by 90°)

Frame size: 63 C 90

Type of voltage: 3-phase AC voltage

Rated speed 1.500 min⁻¹

Voltage tolerance: ± 10%

Rated power See nameplate (motor)

Protection class: IP 55

Temperature class: F

1) The motors are suited for a frequency of 50 or 60 Hz.
 For connection with a frequency of 60 Hz, the speed and the volumetric flow are increased by 20% (compared to the table specifications, basis 50 Hz).

2) On request -special marine application only

4.2.6 Series 1: Q_{nominal} up to 3 l/min

Technical data				
Nominal volumetric flow $q=0$ [l/min]	Operating pressure P_{max} [bar]	Dim. A see DWG page 18 [mm]	UC weight [kg]	UD weight [kg]
0.06	60	45	7.9	6.5
0.12				
0.18				
0.25				
0.35		39	7.9	6.5
0.50		40	8	6.6
0.75		45	8.2	6.8
1.00				
1.50	50	47	8.3	6.9
2.00	35		8.4	7.0
2.5	30		8.5	7.1
3.00	25		51	8.6

4.2.6 Series 1: Q_{nominal} up to 3 l/min

Technical data

Example: UC 0.06 / 60 AF 07 B1

Gear pump unit	
Vertical	UC
Horizontal	UD

Design key	
Standard gasket FPM	B1
Techn. data, see page 19	B 3018
with 0.25 kW	B 4039
Protection class	Order codes
IP55	07

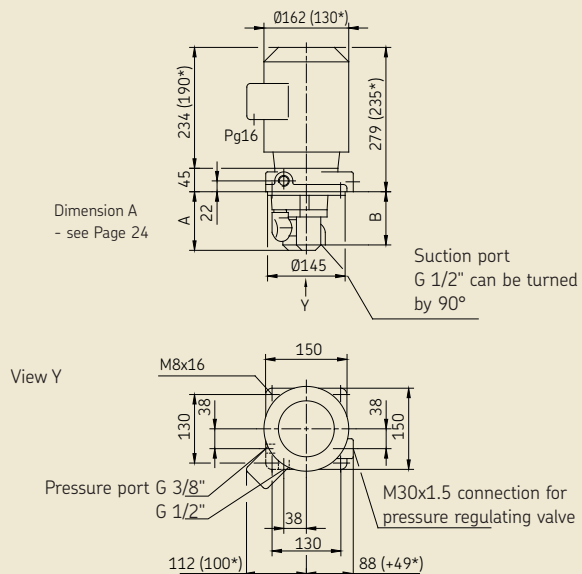
Nominal volumetric flow $p=0$ [l/min]	Continuous volumetric flow $p=p_{\text{max}}$ [l/min]	Operating pressure [bar]
0.06	0.048	60
0.12	0.096	
0.18	0.144	
0.25	0.20	
0.35	0.28	
0.50	0.40	
0.75	0.60	
1.00	0.80	
1.50	1.35	50
2.00	1.80	35
2.50	1.90	30
3.00	2.40	25

Motor output data ¹⁾		
Rated speed ¹⁾ [rpm]	Rated voltage [V]	Order code
1500	230 / 400	AF
	290 / 500	AK
	400 / 690	A0

¹⁾ This data refers to three-phase motors from VEM.
There may be differences with motors from other manufacturers.
Other specifications available on request.

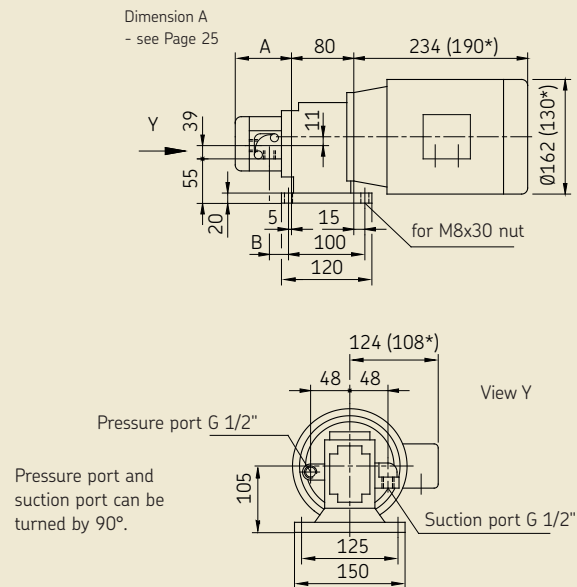
4.2.7 Series 2: Q_{nominal} up to 10.8 l/min

UC gear pump unit, Series 2



Specification (*) = 0.18 kW motor

UD gear pump unit, Series 2



Specification (*) = 0.18 kW motor

4.2.7 Series 2: Q_{nominal} up to 10.8 l/min

Technical data

Units

Mounting position: Discretionary (where UC units are installed lower than the maximum oil level, the customer must seal flange/machine)

Ambient temperature: -15 to +40 °C
 (-15 bis +55 °C ³⁾)
 (At higher ambient temperatures, note that there is a reduction in performance of approx. 1% per Kelvin)

Pump

Nominal volumetric flow: . . See page 24

Type: Gear pump

Design:

B 1 Standard gasket FPM

B 3018 Pump with standard sealing for outlet under lubricant level (only for UC)

Operating pressure:

Admission pressure max. 2 bar

Outlet p_{max} See page 24

Lubricant Mineral oils, synthetic and environmentally friendly oils with an operating viscosity between 20 and 1.000 mm²/s

Suction height Max. 1200 mm (for max. tube Ø)

Rated motor power ¹⁾	0.18 [KW]	0.37 [KW]	0.55 [KW]	0.75 [KW]
Rated voltage at 400 V	0.65 [A]	1.22 [A]	1.73 [A]	2.1 [A]
Size	63C90	80C120		
Type	IM V18 or IMB14 Motor can be shifted by 90°			
Type of voltage	3-phase AC voltage			
Frequency ²⁾	50 Hz			
Voltage and rated power	See table page 26			
Protection class	IP 55			
Temperature class	F			

1) The motors are suited for a frequency of 50 or 60 Hz.
 2) For connection with a frequency of 60 Hz, the speed and the volumetric flow are increased by 20% (compared to the table specifications, basis 50 Hz).
 3) On request -special marine application only

4.2.7 Series 2: Q_{nominal} up to 10.8 l/min

1) see DWG page 22

UC, Series 2					Technical data
Nominal volumetric flow ¹⁾ $Q_{p=0}$ [l/min]	Operating pressure P_{max} [bar]	Flange	Dim. A ¹⁾ [mm]	Dim. B ¹⁾ [mm]	Weight [kg]
1.0	140	80C120	116.5	90.5	10.0
	200				11.2
1.6	45	63C120	118.5	91.5	7.5
	180	80C120			13.5
2.3	30	63C120	122	93	7.5
	100	80C120			11.5
	130	80C120			13.5
3.5	20	63C120	126	95.5	7.5
	65	80C120			11.5
	90				13.5
4.8	15	63C120	132.5	98.5	7.5
	45	80C120			11.5
	65				13.5
7	10	63C120	137.5	101	7.6
	30	80C120			11.6
	45				13.6
9	8	63C120	143	104	7.6
	25	80C120			11.6
	35				13.6
10.8	7	63C120	143	104	7.7
	20	80C120			11.7
	30				13.7

4.2.7 Series 2: Q_{nominal} up to 10.8 l/min

UD, Series 2					Technical data
Nominal volumetric flow $q_{p=0}$ [l/min]	Operating pressure P_{max} [bar]	Flange	Dim. A [mm]	Dim. B [mm]	Weight [kg]
1.0	140	80C120	82.5	33.5	10.0
	200				11.2
1.6	45	63C120			7.5
	180	80C120			13.5
2.3	30	63C120	84.5	34.5	7.5
	100	80C120			11.5
	130				13.5
3.5	20	63C120	88	36	7.5
	65	80C120			11.5
	90				13.5
4.8	15	63C120	92	38.5	7.5
	45	80C120			11.5
	65				13.5
7	10	63C120	98.5	41.5	7.6
	30	80C120			11.6
	45				13.6
9	8	63C120	103.5	44	7.6
	25	80C120			11.6
	35				13.6
10.8	7	63C120	109	47	7.7
	20	80C120			11.7
	30				13.7

4.2.7 Series 2: Q_{nominal} up to 10.8 l/min

Technical data

Example: **UC** **1** / **140** **A** **AG** **07** **B1**

Gear pump unit	
Vertical	UC
Horizontal	UD

Series 2	A
----------	---

Design key	
Standard gasket FPM	B1
Techn. data, see page 23	B 3018
Protection class	Order codes
IP55	07

Motor output data ¹⁾		
Rated speed ¹⁾ [rpm]	Rated voltage [V]	Order code
1000	230 / 400	AG
	290 / 500	AL
	400 / 690	AP
1500	230 / 400	AF
	290 / 500	AK
	400 / 690	AO

Nominal volumetric flow ²⁾ $p=0$ [l/min]	Operating pressure [bar]	Rated speed [rpm]	Rated power [kW]	Rated current at 400 V [A]
1.0	140	1000	0.37	1.22
	200		0.55	1.73
1.6	45	1500	0.18	0.65
	180		0.75	2.10
2.3	30	1500	0.18	0.65
	100		0.55	1.6
	130		0.75	2.10

Continued on page 27 ->

4.2.7 Series 2: Q_{nominal} up to 10.8 l/min

Continued from page 26

Technical data

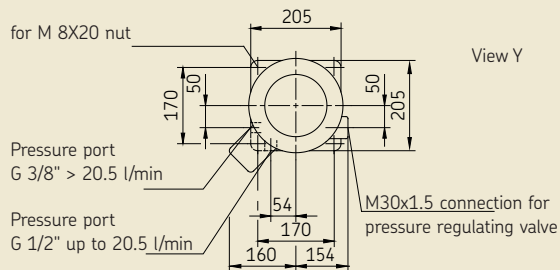
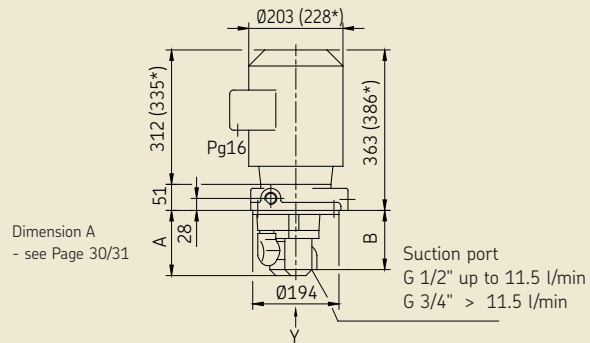
Nominal volumetric flow ²⁾ p=0 [l/min]	Operating pressure [bar]	Rated speed [rpm]	Rated power [kW]	Rated current at 400 V [A]
3.5	20	1500	0.18	0.65
	65		0.55	1.6
	90		0.75	2.10
4.8	15	1500	0.18	0.65
	45		0.55	1.6
	65		0.75	2.10
7	10	1500	0.18	0.65
	30		0.55	1.6
	45		0.75	2.10
9	8	1500	0.18	0.65
	25		0.55	1.6
	35		0.75	2.10
10.8	7	1500	0.18	0.65
	20		0.55	1.6
	30		0.75	2.10

1) This data refers to three-phase motors from VEM. There may be differences with motors from other manufacturers.

2) A by 30% decreased volumetric flow must be expected for a service viscosity < 100 mm²/s and max. operating pressure.

4.2.8 Series 3: Q_{nominal} up to 36 l/min

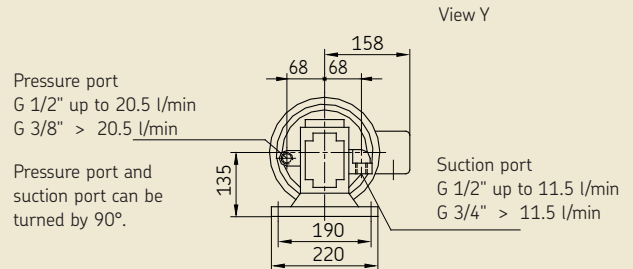
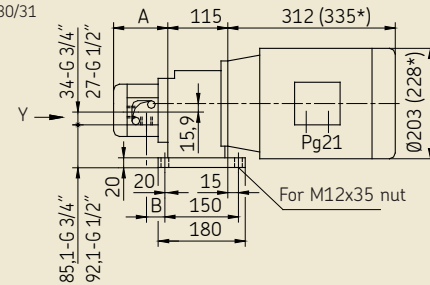
UC gear pump unit, Series 3



(*) For 4 kW or 2.2 kW motors

UD gear pump unit, Series 3

Dimension A
- see Page 30/31



(*) For 4 kW or 2.2 kW motors

4.2.8 Series 3: Q_{nominal} up to 36 l/min

Technical data, Series 3

Units		Motor	
Mounting position:	Discretionary (where UC units are installed lower than the maximum oil level, the customer must seal flange/machine)	Rated power:	Page 32
Ambient temperature:	-15 to +40 °C (-15 bis +55 °C ²⁾) (At higher ambient temperatures, note that there is a reduction in performance of approx. 1% per Kelvin)	Type:	V18/B14 (motor can be shifted by 90°)
		Type of voltage:	3-phase AC voltage
		Rated speed	1.500 min ⁻¹
		Voltage tolerance:	± 10%
		Rated current	See rating plate (motor)
		Frequency	50 Hz ¹⁾
		Protection class:	IP 55
		Temperature class:	F
Pump		1) <i>The motors are suited for a frequency of 50 or 60 Hz. For connection with a frequency of 60 Hz, the speed and the volumetric flow are increased by 20% (compared to the table specifications, basis 50 Hz).</i>	
Nominal volumetric flow:	Page 30	2) <i>On request -special marine application only</i>	
Type:	Gear pump		
Design:			
B 1	Standard gasket FPM		
B 3018	Pump with standard sealing for outlet under lubricant level (only for UC)		
Operating pressure:			
Admission pressure	Max. 2 bar (overpressure)		
Outlet p_{max}	See page 30		
Lubricant	Mineral oils, synthetic and environmentally friendly oils with an operating viscosity between 20 and 1.000 mm ² /s		
Suction height	Max. 1.200 mm (for max. tube Ø)		

4.2.8 Series 3: Q_{nominal} up to 36 l/min

UC/UD technical data, Series 3

Nominal volumetric flow $p=0$ [l/min]	Operating pressure P_{max} [bar]	Flange	UC			UD		
			Dim. A [mm]	Dim. B [mm]	Weight [kg]	Dim. A [mm]	Dim. B [mm]	Weight [kg]
3.8	80	90C200	153	123.8	15.5	88	20.3	14.5
	120				16.5			15.5
	160	100C200			18.5			17.5
	200	112C200			20			19
6.0	75	90C200			16.5			15.5
	100				18.5			17.5
	150	100C200			20			19
	200				26			25
8.5	50	90C200			16.5			15.5
	70				18.5			17.5
	100	100C200			20			19
	140	112C200			26			25
	180		31	30				
11.5	40	90C200	17	16				
	50		19	18				
	80	110C200	20.5	19.5				
	100	100C200	26.5	25.5				
	140	112C200	31.5	30.5				

Continued on page 31 ->

Continued from page 30

UC/UD technical data, Series 3

Nominal volumetric flow $p=0$ [l/min]	Operating pressure P_{max} [bar]	Flange	UC			UD		
			Dim. A [mm]	Dim. B [mm]	Weight [kg]	Dim. A [mm]	Dim. B [mm]	Weight [kg]
13.7	20	90C200	169	149.3	16	104	28.3	15
	35				17			16
	40	19			16.8			
	70	20.5			19.5			
15.0	30	90C200	179	155.3	17	114	34.3	16
	40				19			18
	60	100C200			20.5			19.5
	80				26.5			25.5
110	112C200	31.5	30.5					
20.5	20	90C200	183	157.3	17	118	36.55	16
	30				19			18
	40	100C200			20.5			19.5
	60				26.5			25.5
80	112C200	31.5	30.5					
26	17	90C200	183	157.3	17.5	118	36.55	16.5
	22				19.5			18.5
	35	100C200			21			20
	45				27			26
60	112C200	32	31					
30	15	90C200	183	157.3	17.5	118	36.55	16.5
	20				19.5			18.5
	30	100C200			21			20
	40				27			26
50	112C200	32	31					
36	12	90C200	183	157.3	17.7	118	36.55	16.7
	17				19.7			18.7
	25	100C200			21.2			20.2
	35				27.2			26.2
45	112C200	32.2	31.2					

4.2.8 Series 3: Q_{nominal} up to 36 l/min

Example: UC 3.8 / 80 B AG 07 B1

Gear pump unit	
Vertical	UC
Horizontal	UD

Design key	
Standard gasket FPM	B1
Techn. data, see page 29	B 3018
Protection class	Order codes
IP55	07

Series 3 B

Motor output data ²⁾		
Rated speed ¹⁾ [rpm]	Rated voltage [V]	Order code
1000	230 / 400	AG
	290 / 500	AL
	400 / 690	AP
1500	230 / 400	AF
	290 / 500	AK
	400 / 690	AO

Nominal volumetric flow ²⁾ $p=0$ [l/min]	Operating pressure [bar]	Rated speed ¹⁾ [rpm]	Rated power ¹⁾ [kW]	Rated current at 400 V [A]
3.8	80	1000	0.75	2.43
	120		1.1	3.15
	140		1.5	3.40
	200		2.2	5.35

Note 1 - See page 34

Continued on page 33 ->

Continued from page 32

Nominal volumetric flow ²⁾ p=0 [l/min]	Operating pressure [bar]	Rated speed ¹⁾ [rpm]	Rated power ¹⁾ [kW]	Rated current at 400 V [A]
6.0	75	1500	1.1	2.62
	100		1.5	3.40
	150		2.2	5.15
	200		3	6.70
8.5	50	1500	1.1	2.62
	70		1.5	3.40
	100		2.2	5.15
	140		3	6.70
	180		4	8.80
11.5	40	1500	1.1	2.62
	50		1.5	3.40
	80		2.2	5.15
	100		3	6.70
	140		4	8.80
13.7	20	1000	0.75	2.43
	35		1.1	3.15
	40		1.5	3.40
	70		2.2	5.35
15.0	30	1500	1.1	2.62
	40		1.5	3.40
	60		2.2	5.15
	80		3	6.70
	110		4	8.80

Note 1 - See page 34

Continued on page 34 ->

Continued from page 33

Nominal volumetric flow ²⁾ p=0 [l/min]	Operating pressure [bar]	Rated speed ¹⁾ [rpm]	Rated power ¹⁾ [kW]	Rated current at 400 V [A]
20.5	20	1500	1.1	2.62
	30		1.5	3.40
	40		2.2	5.15
	60		3	6.70
	80		4	8.80
26.0	17	1500	1.1	2.62
	22		1.5	3.40
	35		2.2	5.15
	45		3	6.70
	60		4	8.80
30	15	1500	1.1	2.62
	20		1.5	3.40
	30		2.2	5.15
	40		3	6.70
	50		4	8.80
36	12	1500	1.1	2.62
	17		1.5	3.40
	25		2.2	5.15
	35		3	6.70
	45		4	8.80

1) This data refers to three-phase motors from VEM. There may be differences with motors from other manufacturers.

2) Other specifications available on request.

4.3 Electrical motor connection

Electric shock hazard

Electrical connections for the product may only be established by qualified and trained personnel authorized to do so by the operator.

The local conditions for connections and local regulations (e.g., DIN, VDE) must be observed. Significant bodily injury and property damage may result from improperly connected products.

Warning!

Connect lines in accordance with the technical specifications and the local conditions for connections and local regulations (e.g., DIN, VDE).

Consult the motor's rating plate for the electrical characteristics of the motor, such as rated power, rated voltage, and rated current. Observe the guidelines in EN 60034-1 (VDE 0530-1) for operation at the limits of the ranges A (combination of $\pm 5\%$ voltage deviation and $\pm 2\%$ frequency deviation) and B (combination of $\pm 10\%$ voltage deviation and $+3/-5\%$ frequency deviation). This applies especially with regard


to heating and deviations in operating parameters from the ratings on the motor's nameplate. The limits must never be exceeded.

Warning!

The available mains voltage (supply voltage) must be in accordance with the specifications on the rating plate of the motor or of the electrical components. Check the fuse protection of the electrical circuit. Use only fuses with the prescribed amperage, else bodily injury and property damage may result.

Be sure to connect the motor so as to guarantee a continuously safe electrical connection (no protruding wire ends); use the assigned cable end fittings (e.g. cable lugs, wire end ferrules). Select connecting cables conforming to DIN VDE 0100 taking into account the rated current and the conditions of the specific system (e.g. ambient temperature, type of routing etc. in accordance with DIN VDE 0298 or IEC / EN 60204-1). Details regarding electrical connection of the motor to the power supply, especially terminal and connector pin assignment, can

be taken from the customer's drawing for the reservoir unit.

Warning!
 When establishing electrical connection of the pump motor, be mindful of the correct direction of rotation of the motor.

If the direction of rotation of a motor is marked on the product by a rotation arrow, the motor's direction of rotation must match the arrow.

- Connect the pump unit motor according to the specifications on the motor rating plate and the motor characteristics.

4.4 Lubrication line connection

The lubrication line must be connected to the lubrication unit in such a way that no forces can be transferred to the assembled lubrication unit (stress-free connection).



Danger!

The fittings used to connect the lubrication line should be rated for the maximum operating pressure of the lubrication unit. If they are not, the lubrication line system needs to be protected from excessive pressure by means of a pressure-limiting valve.

For operating pressures up to 45 bar as can occur especially in single-line piston distributor systems, SKF fittings for solderless pipe unions can be used (double tapered sleeves or tapered sleeves). For higher operating pressures up to 250 bar as can occur especially in progressive centralized lubrication systems, SKF cutting-sleeve screw unions conforming to DIN 2353 can be used.

If using fittings from other manufacturers, pay careful attention to the assembly instructions and technical specifications provided by the manufacturer.

4.4.1 Lubricant filling

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. 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 excessive pressure by means of a pressure-limiting valve.

All components of the lubrication line system such as pipes, tubes, shutoff valves, 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!**

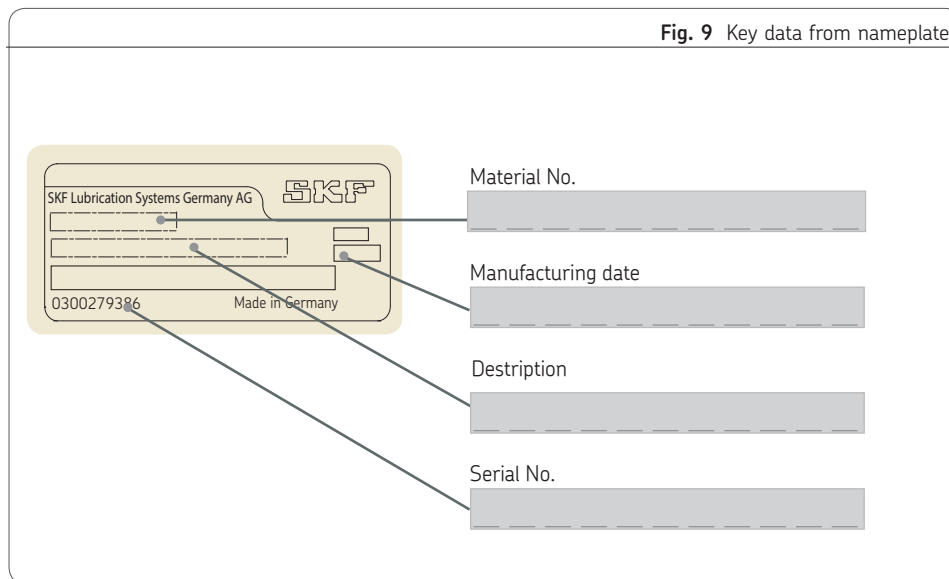
Follow the safety instructions on the lubricant's safety data sheet. Lubricants are hazardous substances. The safety instructions on the lubricant's safety data sheet must be strictly followed. The safety data sheet for a lubricant can be requested from the lubricant manufacturer.

4.5 Note on the nameplate

The nameplate 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 nameplate becomes illegible, these characteristics should be entered in the following table.

- Enter key data from nameplate in the table.



UC and UD Gear pump unit

for hydraulic or circulating-oil lubrication systems

Operating instructions associated with assembly instructions

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

1. Safety instructions



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 Germany AG 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.



Warning!

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

2. Lubricants

3. Transport, delivery, and storage

SKF Lubrication Systems Germany AG 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 Germany AG 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 gear pump units is described in detail in the assembly instructions associated with these operating instructions. Information/instructions about assembling the gear pump unit beyond the scope of the assembly instructions are contained later in this chapter.

4.2 Assembly of 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 UC and UD gear pump units are vertically or horizontally arranged units that are used in hydraulic or circulating-oil lubrication systems. All off-the-shelf lubricants and hydraulic oils in the viscosity range of between 20 and 1000 mm²/s are conveyed.

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

5.1 General information

The gear pump units are manufactured in 3 assemblies:

Series 1 is approved for very high viscosities up to 1.000 mm²/s. They are characterized by their simple and small design, and are accordingly inexpensive. They are particularly suited for small hydraulic and lubrication systems that require volumetric flows between 0.06 l/min and 3 l/min for operating pressures between 25 bar and 60 bar.

Series 2 and **series 3** meet high requirements in terms of volumetric flow, operating pressure and efficiency. While series 2 has been designed for volumetric flows of between 1 l/min and 10.8 l/min, series 3 covers the range between 3.8 l/min and 36 l/min. Within the series, the permissible operating pressure is greater the smaller the nominal volumetric flow.

Due to the overlapping volumetric flow ranges, it is possible, for instance, to convey 9 l/min using a series 2 pump in the low-pressure range, whereas a corresponding series 3 pump can achieve this volumetric flow in the

high-pressure range for the same efficiency. The respective ranges of the series are shown in a simple form in Fig. 1.

There are no restrictions with regard to the mounting position of all the units. When UC units are to be mounted lower than the maximum liquid level (oil reservoir), additional sealing of the flange face is required, which must be provided by the customer (refer to version key).

5.2 Design and mode of operation of the gear pump unit

The gear pump units consist of motor, coupling, flange and gear pump.

Electronic motors of performance class 0.18 kW are exclusively used for series 1. The flange size is 116x116 mm for vertical pump units (UC) and 80x120 mm for horizontal pump units (UD).

In series 2, different motor classes are used (0.18; 0.37; 0.55 and 0.75 kW). By combination with gear pump units of different sizes (1.2 cm³/revolution to 8 cm³/revolution), a wide spectrum with regard to the selection

criteria volumetric flow and operating pressure is achieved. This means that this series begins with a pump for 1 l/min at 200 bar and extends to a pump for 10.8 l/min at 30 bar.

The flange size is 150x150 mm for vertical pump units (UC) and 120x150 mm for horizontal pump units (UD).

In series 3, electronic motors up to a nominal output of between 0.75 and 4 kW are used. The gear pumps have a pump constant of between 4.5 cm³/revolution and 26 cm³/revolution. Series 3 begins with a pump of 3.8 l/min at 200 bar and extends to the biggest pump, which delivers 36 l/min at 45 bar.

The flange size is 205x205 mm for vertical pump units (UC) and 180x220 mm for horizontal pump units (UD).

6. Commissioning



Note

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



Warning!

Only fill using clean lubricant and an appropriate device. Contaminated lubricants can result in severe system malfunction. The lubricant reservoir must be filled without introducing bubbles.



Warning!

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.

6.1 Condition on delivery

The oil reservoir provided by the customer must be filled before commissioning. Then check (with the lubrication lines disconnected) 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

- Observe the following points when commissioning the unit/oil supply system:
- Fill the reservoir with the prescribed oil.
- Open cocks and valves in suction and delivery lines.
- Start drive motors slowly; while doing so, check the direction of rotation again (fan impeller).
- Measure delivery rate at the pressure outlet.



Warning!

The UC/UD pump units do not contain a dedicated filler socket and must therefore run dry when being started and primed.

In order to protect the pump seals, the priming process must not extend indefinitely. If the pump does not feed lubricant, the unit must be switched off until the cause has been remedied.

Leaking screw connections must never be tightened under pressure or when the pump is switched on.

- Check intake filter (if present) after 15-minute warm-up time.
- Check temperature of all components.

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," in 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.

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.

8.1 General information

The gear pumps function without maintenance in principle. Upstream and downstream filters must be cleaned in time or replaced on a regular basis. Observe the readings on visual and electrical contamination indicators, if present.




Dirt deposits on the surface of the motor impair cooling and must be removed regularly.



Only fill with clean oil. The purity of the lubricants used is the decisive factor in the service life of the pump and the lubricated machinery elements.
Only add oil via the filler socket.

9. Malfunction

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



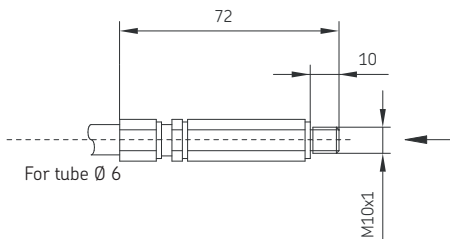
Warning!

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

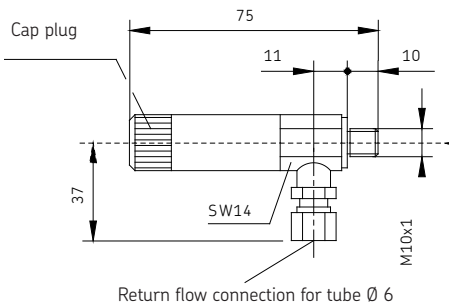
Malfunction	Cause	Remedy
Pump does not deliver medium	<ul style="list-style-type: none"> Motor stopped Motor rotating in wrong direction Coupling defective Air drawn in (cavitation) Oil too viscous Check valve installed incorrectly 	<ul style="list-style-type: none"> – Check electrical connections and reverse if necessary – Check electrical connections and reverse if necessary – Replace coupling – Check fill level or oil feed – Check proper sealing of suction line – Fill with oil of permissible operating viscosity – Rectify installation
Pump delivers too little medium	<ul style="list-style-type: none"> Motor speed too low Air drawn in Leakage 	<ul style="list-style-type: none"> – Check electrical connections and reverse if necessary – See above – Remedy leaks – Check setting of pressure regulating valve – Check screw connection and suction line
Pump noises too loud	<ul style="list-style-type: none"> Intake pipe \emptyset too small 	<ul style="list-style-type: none"> – Increase intake pipe \emptyset or shorten suction line – Fill with oil of permissible operating viscosity

10. Accessories

Series 1, UC and UD, non-adjustable



Series 1, UC and UD, adjustable

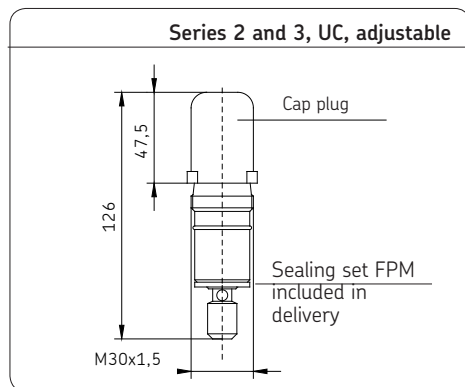


Pressure regulating valve, Series 1, fixed setting

Application	Cracking pressure	Order no.
UC/UD	10 bar	24-2103-2382
	15 bar	24-2103-2383
	25 bar	24-2103-2384
	30 bar	24-2103-2384
	35 bar	24-2103-2385
	50 bar	24-2103-2386
	60 bar	24-2103-2401
Sealing ring		95-1021-7603

Pressure regulating valve, Series 1, adjustable

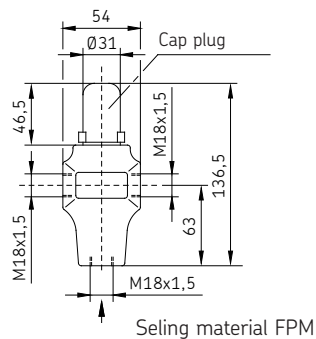
Application	Operating pressure	Order no.
UC/UD	0 - 20 bar	24-2103-2121
	20 - 60 bar	24-2103-2122



Pressure regulating valve, Series 2 and 3, adjustable

Application	Operating pressure	Order no.
UC	3 - 10 bar	24-2103-3076
	10 - 15 bar	24-2103-3077
	15 - 50 bar	24-2103-3078
	40 - 100 bar	24-2103-3079
	70 - 180 bar	24-2103-3080
	100 - 250 bar	24-2103-3081

**Series 2 and 3,
UC and UD, for line installation, adjustable**



Warning!

When the pressure regulating valve is used for line installation, the pump-side mounting hole (M30x1.5) must be closed with a plug Order number 44-1821-2194.

Pressure regulating valve, Series 2 and 3, for line installation

Application	Operating pressure	Order No.
UC/UD	3 - 10 bar	24-2103-3088
	10 - 15 bar	24-2103-3089
	15 - 50 bar	24-2103-3090
	40 - 100 bar	24-2103-3091
	70 - 180 bar	24-2103-3092
	100 - 250 bar	24-2103-3093
Screw unions	Dimensions	Order no.
GE screw connection	M 18 x 1.5 (Ø 12)	412-433
GE screw connection	M 18 x 1.5 (Ø 15)	96-0315-0058
Sealing ring	A 18 x 22	DIN7603-A18x22-Cu
Screw	M 18 x 1.5	95-1518-0908

UC/UD gear pump unit, Series 1

(ordered separately)

Description		Order no.
Suction port:		
GE screw connection	G 3/8" - Ø 12	412-403W
GE screw connection	G 3/8" - Ø 15	415-433W
Sealing ring	G 3/8"	DIN7603-A17x21-Cu
Pressure port:		
GE screw connection	G 1/4" - Ø 6	406-413W
GE screw connection	G 1/4" - Ø 8	408-403W
GE screw connection	G 1/4" - Ø 10	410-403W
GE screw connection	G 1/4" - Ø 12	412-423W
Sealing ring	G 1/4"	DIN7603-A14x18-Cu
Fastening screw	M6x20 DIN 912	DIN912-M6x20-8.8
Sealing ring for pressure regulating valve	A10x13.5	95-1021-7603

UC/UD gear pump unit, Series 2

(ordered separately)

Description		Order no.
Suction port:		
GE screw connection	G 1/2" - Ø 18	96-0218-0058
Sealing ring	G 1/2"	DIN7603-A21x26-Cu
Pressure port:		
GE screw connection	G 1/2" - Ø 12	412-453W
GE screw connection	G 1/2" - Ø 15	96-0215-0058
GE screw connection	G 1/2" - Ø 18	96-0218-0058
GE screw connection	G 3/8" - Ø 12	412-403W
GE screw connection	G 3/8" - Ø 15	415-433W
GE screw connection	G 3/8" - Ø 18	96-0220-0058
Fastening screw	M8x16 DIN 912	DIN912-M6x16-8.8
Fastening screw	M8x30 DIN 912	DIN912-M8x30-8.8
Screw plug for unused pressure port:		
Screw plug	G 1/2"	95-0012-0908
Sealing ring		DIN7603-A21x26-Cu
Screw plug	G 3/8"	95-0038-0908
Sealing ring		DIN7603-A17x21-Cu

UC/UD gear pump unit, Series 3

(ordered separately)

Designation	Dimension	Size [l/min]	Order No.
Suction port:			
GE screw connection	G 1/2" - Ø 22	UC/UD: 6; 8; 11.5	96-0223-0058
G screw connection	G 3/4" - Ø 28	UC/UD: 13.7 to 36	96-0229-0058
Pressure port:			
GE screw connection	G 1/2" - Ø 12	UD: 6 to 20.5	412-453W
G screw connection	G 1/2" - Ø 15	UC: 3.8 to 36	96-0215-0058
GE screw connection	G 1/2" - Ø 18		96-0218-0058
GE screw connection	G 3/4" - Ø 12	UD: 26; 30; 36	412-463W
G screw connection	G 3/4" - Ø 15		96-0246-0058
GE screw connection	G 3/4" - Ø 18		412-413W
G screw connection	G 3/4" - Ø 22		96-0222-0058
Fastening screw	M 10 x 30 DIN 912		95-1030-0912
Fastening screw	M 12 x 35 DIN 912		DIN912-M12x35-8.8
Screw plug for unused pressure port			
Screw plug	G 1/2"		95-0012-0908
Sealing ring			DIN7603-A21x26-Cu
Screw plug	G 3/4"		95-0034-0908
Sealing ring			DIN7603-A27x32-Cu

11. 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.

			FPM pump gasket sets
Series	Type	Size	Order No.
1	UC/UD	0.06 ... 3 l/min	24-0404-2294
	UC/UD	1.5; 2.0; 2.5 and 3 l/min	24-0404-2299 ¹⁾
2	UC	1 ... 10.8 l/min	24-0404-2334
	UD	1 ... 10.8 l/min	24-0404-2337
3	UC	3.8 ... 11.5 l/min	24-0404-2320
	UC	13.7 .. 20.5 l/min	24-0404-2321
	UC	26 ... 36 l/min	24-0404-2322
	UD	3.8 ... 11.5 l/min	24-0404-2328
	UD	13.7 ... 20.5 l/min	24-0404-2329
	UD	26 ... 36 l/min	24-0404-2330

1) Only applicable to pumps with keys 2847 B to 2850 B

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