

Gear Pump Units of Product Series MKU, MKF, MKL

for oil and fluid grease for use in SKF MonoFlex
single-line and oil+air centralized lubrication systems

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

EN



Version 04



EC Declaration of Incorporation according to Machinery Directive 2006/42/EC, Annex II Part 1 B

The manufacturer SKF Lubrication Systems Germany GmbH, Berlin Motzener Strasse 35/37, DE - 12277 Berlin hereby declares that the partly completed machinery:

Designation: **Gear Pump Unit with reservoir**
 Type: **MKU (F) (L) 1 (2) (5)-... ; MKU11-...**
 Part no.: **MKU (F) (L) 1 (2) (5)-... ; MKU11-...**

Year of construction: See type identification plate

complies with the following basic requirements of the EC Machinery Directive 2006/42/EC at the time when first being launched in the market.

1.1.2 · 1.1.3 · 1.3.2 · 1.3.4 · 1.5.1 · 1.5.6 · 1.5.8 · 1.5.9 · 1.6.1 · 1.7.1 · 1.7.3 · 1.7.4

The special technical documents were prepared following annex VII part B of this directive. Upon justifiable request, these special technical documents can be forwarded electronically to the respective national authorities. The person empowered to assemble the technical documentation on behalf of the manufacturer is the head of standardization; see manufacturer's address.

Furthermore, the following directives and harmonized standards were applied in the respective applicable areas:

2011/65/EU RoHS II
 2014/30/EU Electromagnetic compatibility | Industry

Standard	Edition	Standard	Edition	Standard	Edition	Standard	Edition
DIN EN ISO 12100	2011	DIN EN 60947-5-1	2010	DIN EN 61000-6-2	2006	DIN EN 61000-6-4	2011
DIN EN 809	2012	DIN EN 61131-2	2008	Amendment	2011	DIN EN 60947-5-1	2010
DIN EN 60204-1	2007	Amendment	2009	DIN EN 61000-6-3	2011		
Amendment	2010	DIN EN 60034-1	2015	Amendment	2012		
DIN EN 50581	2013	DIN EN 61000-6-1	2007				

The partly completed machinery must not be put into service until the final machinery into which it is to be incorporated has been declared in conformity with the provisions of the EC Machinery Directive 2006/42/EC and any other applicable directives.

Berlin 2015/20/04

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Masthead

These assembly instructions pursuant to EC Machinery Directive 2006/42/EC are an integral part of the product described here and must be kept for future use.

Warranty

The instructions do not contain any information on the warranty. This can be found in the General Conditions of Sale, which are available at:
www.skf.com/lubrication.

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Table of contents

Assembly instructions

Assembly instructions acc. to EC Dir. 2006/42/EC for partly completed machinery, with associated operating instructions	1	2. Lubricants	17	4.3.2 MKU/MKF/MKL gear pump units with 3-liter plastic reservoir for oil and fluid grease	30
EC Declaration of Incorporation	2	2.1 General information	17	4.3.3 MKU/MKF/MKL gear pump units with 3-liter metal reservoir for oil and fluid grease	31
Explanation of symbols and signs	7	2.2 Selection of lubricants	17	4.3.4 MKU/MKF/MKL gear pump units with 6-liter plastic reservoir for oil and fluid grease	32
1. Safety instructions	9	2.3 Approved lubricants	18		
1.1 General safety instructions	9	2.4 Lubricants and the environment	19		
1.2 General behavior when handling the product	9	2.5 Lubricant hazards	19		
1.3 Qualified technical personnel	10	3. Overview	20		
1.4 Electric shock hazard	11	3.1 Description of designs	20	<i>Example hydraulic connection</i>	
1.5 System pressure or hydraulic pressure hazard	11	3.2 Equipment of a MKx gear pump unit	21	4.3.5 Example MKF	33
1.6 Operation	11	<i>Order code</i>		4.3.6 Example hydraulic connection MKU	34
1.7 Assembly/maintenance/malfunction/decommissioning/disposal	12	3.3 MKU gear pump units	22	4.3.7 Example hydraulic connection MKL	35
1.8 Intended use	12	3.4 MKF gear pump units	24	4.4 Attachment of a gear pump unit	36
1.9 Foreseeable misuse	13	3.5 MKL gear pump units	26	4.5 Electrical connection	37
1.10 Disclaimer of liability	13	4. Assembly	27	4.5.1 Electric motor connection	37
1.11 Referenced documents	14	4.1 General information	27	4.5.2 Electric motor connection with cable socket and circular plug	38
1.12 Warning labels on the product	14	4.2 Setup and attachment	27	4.5.3 Electric motor connection with cable glands	39
1.13 Residual risks	15	4.2.1 Minimum mounting dimensions	28	4.6 Terminal diagrams	40
		4.3 Assembly drawing with minimum installation dimensions	29	4.6.1 Legend to the terminal diagrams	40
		4.3.1 MKU/MKF gear pump units with 2-liter plastic reservoir for oil and fluid grease	29		




4.7	Terminal diagrams for MKU/MKF, without control unit	41					
	MKU, 2-liter reservoir,						
4.7.1	Voltage design 230/115 VAC, without pushbutton	41	4.7.11	Voltage design 24 VDC, without pushbutton	50	MKF, 3- or 6-liter reservoir,	
4.7.2	Voltage design 230/115 VAC, with pushbutton	42	4.7.12	Voltage design 24 VDC, with pushbutton	51	4.8.4	IG/IZ38 control unit, voltage design 230/115 VAC
4.7.3	Voltage design 24 VDC, without pushbutton	43			52	4.8.5	IGZ36 control unit, voltage design 230/115 VAC
4.7.4	Voltage design 24 VDC, with pushbutton	44			53	4.8.6	IGZ36 control unit, voltage design 24 VDC
	MKF, 2-liter reservoir,						
4.7.5	Voltage design 230/115 VAC, without pushbutton	45			54	MKL, 3- or 6-liter reservoir,	
4.7.6	Voltage design 230/115 VAC, with pushbutton	46			55	4.8.7	IG54 control unit, voltage design 230/115 VAC
4.7.7	Voltage design 24 V DC, without pushbutton	47			56	4.8.8	IG54 control unit, voltage design 24 VDC
4.7.8	Voltage design 24 VDC, with pushbutton	48				4.9	Technical connection data
	MKU, 3- or 6-liter reservoir,				57	4.10	Lubrication line connection
4.7.9	Voltage design 230/115 VAC, without pushbutton	49				4.11	Assembly of the main lubrication line with tapered sleeve union
4.7.10	Voltage design 230/115 VAC,					4.12	Assembly of the lubrication lines using plug connectors
						4.13	System criteria for MKL gear pump unit
						4.14	General information on lubrication line arrangement
						4.15	Venting centralized lubrication system
						4.16	Note on the rating plate
						4.17	Notes on the CE marking

Operating instructions associated with assembly instructions	71				
1. Safety instructions	72	5.5	Control unit designs with their basic settings	79	8. Maintenance
2. Lubricants	72	5.6	Lubrication systems		8.1 General
3. Delivery, returns, and storage	73	5.6.1	General	81	8.2 Maintenance schedule
3.1 Checking the delivery	73	5.6.2	Total-loss lubrication systems	81	8.3 Service
3.2 Returns	73	5.6.3	Single-line systems with piston distributors	81	9. Malfunctions, causes, and remedies
3.3 Storage	73	5.6.4	Lubricating cycle sequence	82	9.1 Prior to beginning troubleshooting
3.3.1 Lubrication units	73	5.6.5	Lubricating cycle of prelubrication distributor	82	9.2 Replacing a defective fuse (24 VDC)
3.3.2 Electronic and electrical devices	73	5.6.6	Lubricating cycle of relubrication distributor	83	9.3 Commissioning, product, and system malfunctions
3.3.3 General notes	73				10. Technical data
4. Assembly	74	6. Commissioning		84	11. Spare parts
4.1 Information on assembly	74	6.1	General	84	12. Accessories
5. Functional description	74	6.2	Interim lubrication pushbutton	84	
5.1 General	74	6.3	Commissioning	85	
5.2 Structure of a gear pump unit	75	7. Operation/shutdown and disposal		86	
5.3 Gear pump unit without control unit	77	7.1	Operation	86	
5.4 Gear pump unit with control unit (IG/IZ38, IGZ36, IG54)	78	7.2	Temporary shutdown		
		7.3	Recommissioning	87	
		7.4	Shutdown and disposal	87	















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.

Read the instructions completely and follow all operating instructions and the warning and safety instructions.

Warning level		Consequence	Probability
	DANGER	Death / serious injury	Immediate
	WARNING	Serious injury	Possible
	CAUTION	Minor injury	Possible
	NOTE	Property damage	Possible

Information symbols within the text	
Symbol	Meaning
●	Prompts an action
○	Used for itemizing
☞	Refers to other facts, causes, or consequences
→	Provides additional information within procedures

Possible symbols	
Symbol	Meaning
	Note
	Electrical component hazard, electric shock hazard
	Slipping hazard
	Hazard from hot components
	Hazard from hot surface
	Risk of being drawn into machinery
	Crushing hazard
	Danger from suspended load
	Pressure injection hazard
	Explosion-proof component
	Electrostatic sensitive components
	Wear personal safety equipment (goggles)
	Secure (lock) the closing device against accidental starting of the machine
	Environmentally sound disposal

Instructions placed on a unit, machine, or equipment, such as:

- o Rotation arrow
- o Fluid connection labels must be followed and kept in fully legible condition.
- o Warnings

Abbreviations and conversion factors

Abbreviations

re	regarding
approx.	approximately
°C	degrees Celsius
s	seconds
dB (A)	sound pressure level
i.e.	that is
etc.	et cetera
poss.	possibly
<	less than
±	plus or minus
>	greater than
e.g.	for example
if necessary	if necessary
etc.	et cetera
usually	usually
Ø	diameter
incl.	including
K	Kelvin
kg	kilogram
RH	relative humidity
kW	kilowatt
l	liter
Min.	minute
max.	maximum
min.	minimum
mm	millimeter
ml	milliliter
N	Newton
Nm	Newton meter

oz.	ounce
psi	pounds per square inch
hp	horsepower
lb.	pound
sq.in.	square inch
cu.in.	cubic inch
mph	miles per hour
fpsec	feet per second
°F	degrees Fahrenheit
fl.oz.	fluid ounce
in.	inch
gal.	gallon

Conversion factors

Length	1 mm = 0.03937 in.
Area	1 cm ² = 0.155 sq.in.
Volume	1 ml = 0.0352 fl.oz.
	1 l = 2.11416 pints (US)
Mass	1 kg = 2.205 lbs
	1 g = 0.03527 oz.
Density	1 kg/cm ³ = 8.3454 lb./gal. (US)
	1 kg/cm ³ = 0.03613 lb./cu.in.
Force	1 N = 0.10197 kp
Speed	1 m/s = 3.28084 fpsec
	1 m/s = 2.23694 mph
Acceleration	1 m/s ² = 3.28084 ft./s ²
Pressure	1 bar = 14.5 psi
Temperature	°C = (°F-32) x 5/9
Power	1 kW = 1.34109 hp

1. Safety instructions

1.1 General safety instructions

The operator must ensure that the assembly instructions/operating instructions are read by all persons tasked with working on the product or who supervise or instruct such persons. The operator must also ensure that the staff fully understands the content of the instructions.

The assembly instructions/operating instructions must be kept readily available together with the product.

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

The product described here was manufactured according to the state of the art. Risks may, however, arise from its usage and may result in personal injury or damage to material assets.

Any malfunctions which may affect safety must be remedied immediately. In addition to the assembly instructions/operating instructions, statutory regulations and other

regulations for accident prevention and environmental protection must be observed and applied.

1.2 General behavior when handling the product

- o The product may only be used in awareness of the potential dangers, in proper technical condition, and according to the information in this manual.
- o Personnel must familiarize themselves with the function and operation of the product. The specified assembly and operating steps and their sequences must be observed.
- o Any unclear points regarding proper condition or correct assembly/operation must be clarified. Operation is prohibited until issues have been clarified.
- o Unauthorized persons must be kept away from the product.

- o All safety instructions and in-house instructions relevant to the particular activity must be observed.
- o Responsibilities for different activities must be clearly defined and observed. Uncertainty seriously endangers safety.
- o Protective and safety mechanisms must not be removed, modified, or disabled during operation and must be checked for proper function and completeness at regular intervals.
If protective and safety mechanisms must be removed, they must be installed immediately following conclusion of work and checked for proper function.
- o Any malfunctions that occur must be resolved according to responsibility. The supervisor must be notified immediately in case of malfunctions outside one's individual scope of responsibility.

1.3 Qualified technical personnel

- o Wear personal protective equipment.
- o Observe the relevant safety data sheets when handling lubricants/equipment.

Only qualified technical personnel may install, operate, maintain, and repair the products described here.

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 qualified to carry out the required activities and in doing so recognize and avoid any potential hazards. The definition of qualified personnel and the prohibition against employing non-qualified personnel are laid down in DIN VDE 0105 and IEC 364.

Relevant country-specific definitions of qualified technical personnel apply for countries outside the scope of DIN VDE 0105 or IEC 364.

The operator is responsible for assigning tasks and the area of responsibility.

The personnel must be trained and instructed prior to beginning work if they do not possess the requisite knowledge.

Product training can also be performed by SKF in exchange for costs incurred.

1.4 Electric shock hazard

	<div data-bbox="212 255 276 316"></div> <div data-bbox="276 255 558 316">WARNING</div> <div data-bbox="129 328 204 393"></div> <div data-bbox="212 328 558 621"> <p>Electric shock</p> <p>Assembly, maintenance, and repair work may only be performed by qualified technical personnel. De-energize the product prior to beginning work. Local conditions for connections and local regulations (e.g., DIN, VDE) must be observed.</p> </div>
--	--

1.5 System pressure or hydraulic pressure hazard

	<div data-bbox="676 255 740 316"></div> <div data-bbox="740 255 1024 316">WARNING</div> <div data-bbox="593 328 668 393"></div> <div data-bbox="676 328 1024 621"> <p>System pressure Hydraulic pressure</p> <p>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.</p> </div>
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1.6 Operation

The following must be observed while working on the product.

- o All information within this manual and the information within the referenced documents
- o All laws and regulations that the operator must observe

1.7 Assembly/maintenance/malfunction/decommissioning/disposal

All relevant persons (e.g., operating personnel, supervisors) must be informed of the activity prior to the start of work. Precautionary operational measures / work instructions must be observed.

- o Take appropriate measures to ensure that moving/detached parts are immobilized during the work and that no body parts can be pinched by unintended movements.
- o Assemble the product only outside the operating range of moving parts, at an adequate distance from sources of heat or cold.
- o Prior to performing work, the product and the machine/system in which the product is integrated must be de-energized and depressurized and secured against unauthorized activation.
- o All work on electrical components may be performed only with voltage-insulated tools.
- o Fuses must not be bridged. Always replace fuses with fuses of the same type.
- o Ensure proper grounding of the product.
- o Drill required holes only on non-critical, non-load bearing parts.
- o Other units of the machine/the vehicle must not be damaged or impaired in their function by the installation of the centralized lubrication system.
- o No parts of the centralized lubrication device may be subjected to torsion, shear, or bending.
- o Use suitable lifting gear when working with heavy parts.
- o Avoid mixing up/incorrectly assembling disassembled parts. Label parts.

1.8 Intended use

Gear pump units of SKF series MKU, MKF, and MKL are for supplying centralized lubrication systems with lubricant and are intended for use in centralized lubrication systems. They feed mineral and synthetic oils and greases that are compatible with plastic and NBR elastomers.

Gear pump units of product series MKU and MKL are suitable for supplying oil with a viscosity range from 20 to 1500 mm²/s. Gear pump units of product series MKF are for supplying fluid greases of NLGI grades 000 and 00.

The permissible operating temperature range is +10 to +40°C on all three series. The Technical Data in Chapter 4 as well as Chapter 10 must be observed.

Only media approved for the gear pump units may be used. Unsuitable media may result in pump unit failure and potentially severe bodily injury or death and property damage.

The use of synthetic and biodegradable oils or greases requires prior approval from SKF.

Unless specially indicated otherwise, gear pump units of SKF series MKU, MKL, and MKF are not approved for use in potentially explosive areas as defined in the ATEX Directive 2014/34/EC.

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

1.9 Foreseeable misuse

Any usage of the product differing from the aforementioned conditions and stated purpose is strictly prohibited. Particularly prohibited are:

- o Use in another, more critical explosion protection zone, if applied as ATEX
- o to supply, transport, or store hazardous substances and mixtures in accordance with annex I part 2-5 of the CLP regulation (EC 1272/2008), which have been marked with hazard pictograms GHS01-GHS 09
- o Use to feed / forward / store gases, liquefied gases, dissolved gases, vapors, or fluids whose vapor pressure exceeds normal atmospheric pressure (1013 mbar) by more than 0.5 bar at their maximum permissible operating temperature

1.10 Disclaimer of liability

The manufacturer shall not be held liable for damage resulting from:

- o Failure to comply with these instructions
- o The use of lubricants/media not approved for the unit type
- o Contaminated or unsuitable lubricants
- o Installation of non-original SKF components
- o Inappropriate usage
- o Resulting from improper assembly, configuration, or filling
- o Improper response to malfunctions
- o Non-observance of maintenance intervals
- o Independent modification of system components

1.11 Referenced documents

In addition to this manual, the following documents must be observed by the respective target group:

- o Operational instructions/approval rules
- o Instructions from suppliers of purchased parts
- o Manual for the insulation resistance tester
- o Safety data sheet of the lubricant/equipment used
- o Project planning documents and other relevant documents

For pumps with control unit:

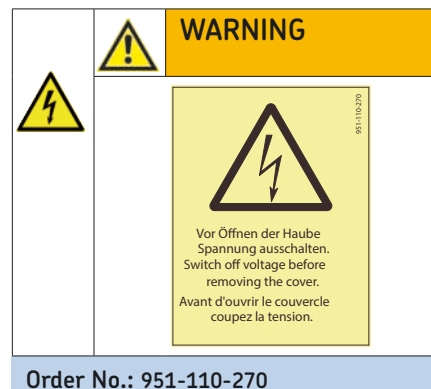
- Control unit: IG38-30-I or IZ38-30-I
Operating instructions: 951-180-000-EN
- Control unit: IGZ36-20-S6-I or
IG54-20-S4-I
Operating instructions: 951-180-001-EN

The operator must supplement these documents with applicable regulations for the country of use. The documentation must be included if the product is transferred to a new operator.

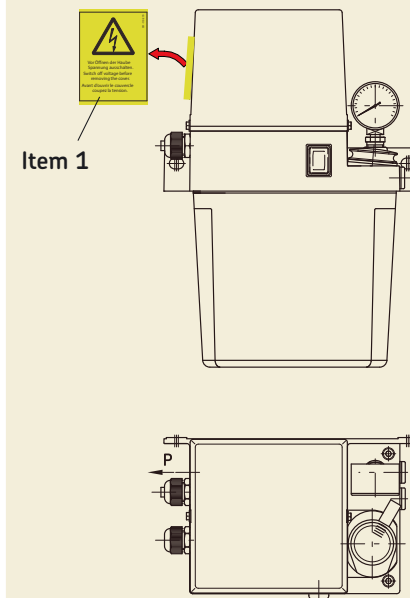
1.12 Warning labels on the product

The following information labels are affixed to the product. Before commissioning, check that the labels are present and intact. Immediately replace warning labels if damaged or missing. The product must not be operated until then. See the positioning diagram for the order number and position on the product.

Warning label, item 1



Positioning of warning labels, Fig 1



1.13 Residual risks

Residual risk	Remedy
Life cycle: Assembly	
Electric shock due to defective power lead/mains plug	<ul style="list-style-type: none"> • Inspect the power lead/mains plug for damage before starting the product
People slipping due to floor contamination with spilled/leaked lubricant	<ul style="list-style-type: none"> • Exercise caution when connecting the product's hydraulic connections • Promptly apply suitable binding agents and remove the leaked/spilled lubricant • Follow operational instructions for handling lubricants and contaminated parts
Tearing/damage to lines when installed on moving machine components	<ul style="list-style-type: none"> • If possible, do not install on moving parts; if this cannot be avoided, use flexible hose lines
Life cycle: Commissioning / operation	
Electric shock due to defective power lead/mains plug	<ul style="list-style-type: none"> • Inspect the power lead/mains plug for damage before starting the product
Lubricating oil spraying out due to faulty component fitting / faulty line connection	<ul style="list-style-type: none"> • Securely tighten all components with a suitable tool or using the specified torques. Use hydraulic screw unions and lines suitable for the indicated pressures. These must be checked for proper connection and for damage prior to commissioning
Life cycle: Setup, retrofit	
People slipping due to floor contamination with spilled/leaked lubricant	<ul style="list-style-type: none"> • Exercise caution when undoing or connecting the product's hydraulic connections • Promptly apply suitable binding agents and remove the leaked/spilled lubricant • Follow operational instructions for handling lubricants and contaminated parts

Residual risk	Remedy
Life cycle: Malfunction, troubleshooting, maintenance, repair	
Electric shock due to defective power lead/ mains plug	<ul style="list-style-type: none"> • Inspect the power lead/mains plug for damage before starting the product
Electric shock from open electric motor or active energized components	<ul style="list-style-type: none"> • Disconnect the mains plug (cut power) before performing any work on electrical components. • Exercise caution when winding and unwinding the power lead and when operating the product
Strong heating of the electric motor due to a motor jam or continuous duty	<ul style="list-style-type: none"> • Turn off the pump motor and let it cool down. Remedy the cause
People slipping due to floor contamination with spilled/leaked lubricant	<ul style="list-style-type: none"> • Exercise caution when undoing or connecting the product's hydraulic connections • Promptly apply suitable binding agents and remove the leaked/spilled lubricant • Follow operational instructions for handling lubricants and contaminated parts
Life cycle: Decommissioning, disposal	
People slipping due to floor contamination with spilled/leaked lubricant	<ul style="list-style-type: none"> • Exercise caution when disconnecting the product's hydraulic connections • Promptly apply suitable binding agents and remove the leaked/spilled lubricant • Follow operational instructions for handling lubricants and contaminated parts
Environmental contamination by lubricants and wetted parts	<ul style="list-style-type: none"> • Dispose of contaminated parts according to the applicable legal/company rules

2. Lubricants

2.1 General information

NOTE

All products from SKF Lubrication Systems may be used only for their intended purpose and in accordance with the information in the product's operating 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., operating instructions and the product descriptions, e.g., technical drawings and catalogs. We expressly point to the fact that hazardous substances and mixtures in accordance with annex I part 2-5 of the CLP regulation (EC 1272/2008) may be filled into SKF centralized lubrication systems and components and delivered and/or distributed with such systems only after consulting with and obtaining written approval from SKF.

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 lubricant nor hazardous substance may only be fed after consultation with and written approval from SKF Lubrication Systems. SKF Lubrication Systems considers lubricants to be an element of system design that must always be factored into the selection of components and the design of centralized lubrication systems. The lubricating properties of the lubricants are critically important in making these selections.

2.2 Selection of lubricants

NOTE

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

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. When selecting a lubricant, the type of bearings/friction points, the expected load during operation, and the anticipated ambient conditions must be taken into account. All economic and environmental aspects must also be considered.

2.3 Approved lubricants

NOTE

If necessary, SKF Lubrication Systems can help customers to select suitable components for feeding the selected lubricant and to plan and design their centralized lubrication system.

Please contact SKF Lubrication Systems if you have further questions regarding lubricants. It is possible for lubricants to 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.

NOTE

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

NOTE

Different lubricants must not be mixed together. Doing so can cause damage and require 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 the permissible limits 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

NOTE

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

It is important to note that lubricants are environmentally hazardous, flammable substances which 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

	 WARNING
	Lubricants Products 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, or repair of centralized lubrication systems. Leaks must be sealed off without delay.

Leaking lubricant is a serious hazard. Leaking lubricant can create risks that may result in physical harm to persons or damage to other material assets.

NOTE

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

3. Overview

3.1 Description of designs

MKU gear pump unit

Units of product series MKU are suitable for supplying oil with a viscosity range from 20 to 1500 mm²/s.

The units are optionally equipped with a pressure switch and/or fill level switch. The electrical connection is established via DIN connection plugs or cable glands.

Units with a reservoir capacity of 2, 3, or 6 liters are optionally available with an integrated control unit.

MKF gear pump unit

Units of product series MKF are suitable for supplying fluid greases of NLGI grades 000 and 00.

The units are optionally equipped with a pressure switch and/or fill level switch. The electrical connection is established via DIN connection plugs or cable glands.

Units with a reservoir capacity of 2, 3, or 6 liters are optionally available with an integrated control unit.

MKL gear pump unit

Units of product series MKL are designed for oil+air centralized lubrication systems and supply oil with a viscosity range from 20 to 1500 mm²/s.

The units are equipped with a pressure switch and a fill level switch whose signals are evaluated using an integrated control unit. The control unit also provides the ability to evaluate the signal from an external air pressure switch to monitor the oil+air system. The electrical connections are established via DIN connection plugs or cable glands.

MKU



MKF

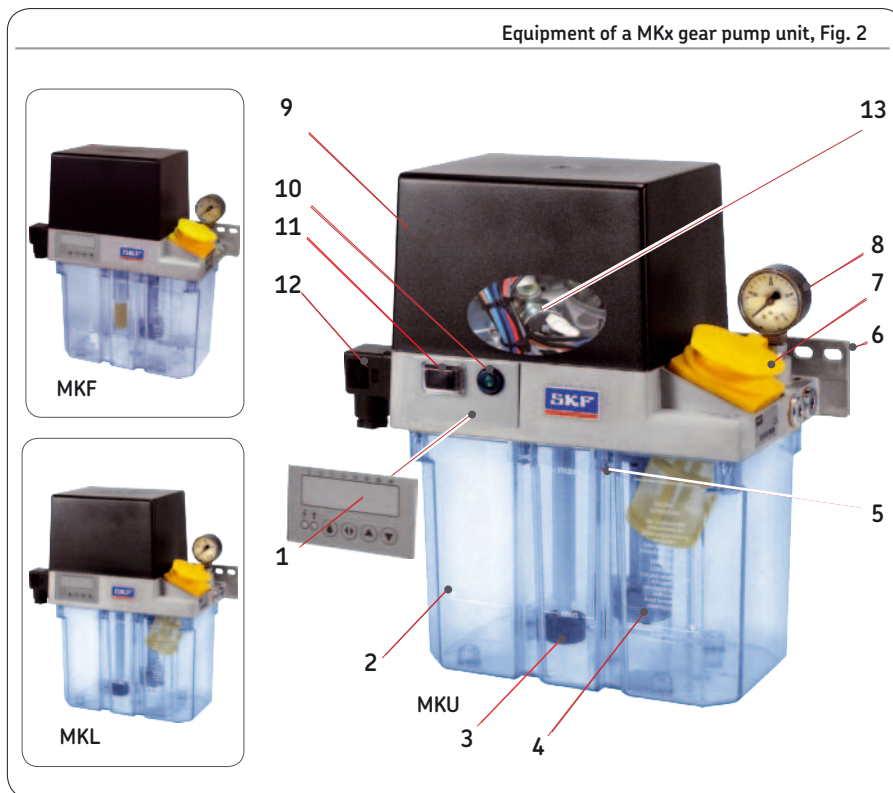


MKL



3.2 Equipment of a MKx gear pump unit

Equipment of a MKx gear pump unit, Fig. 2

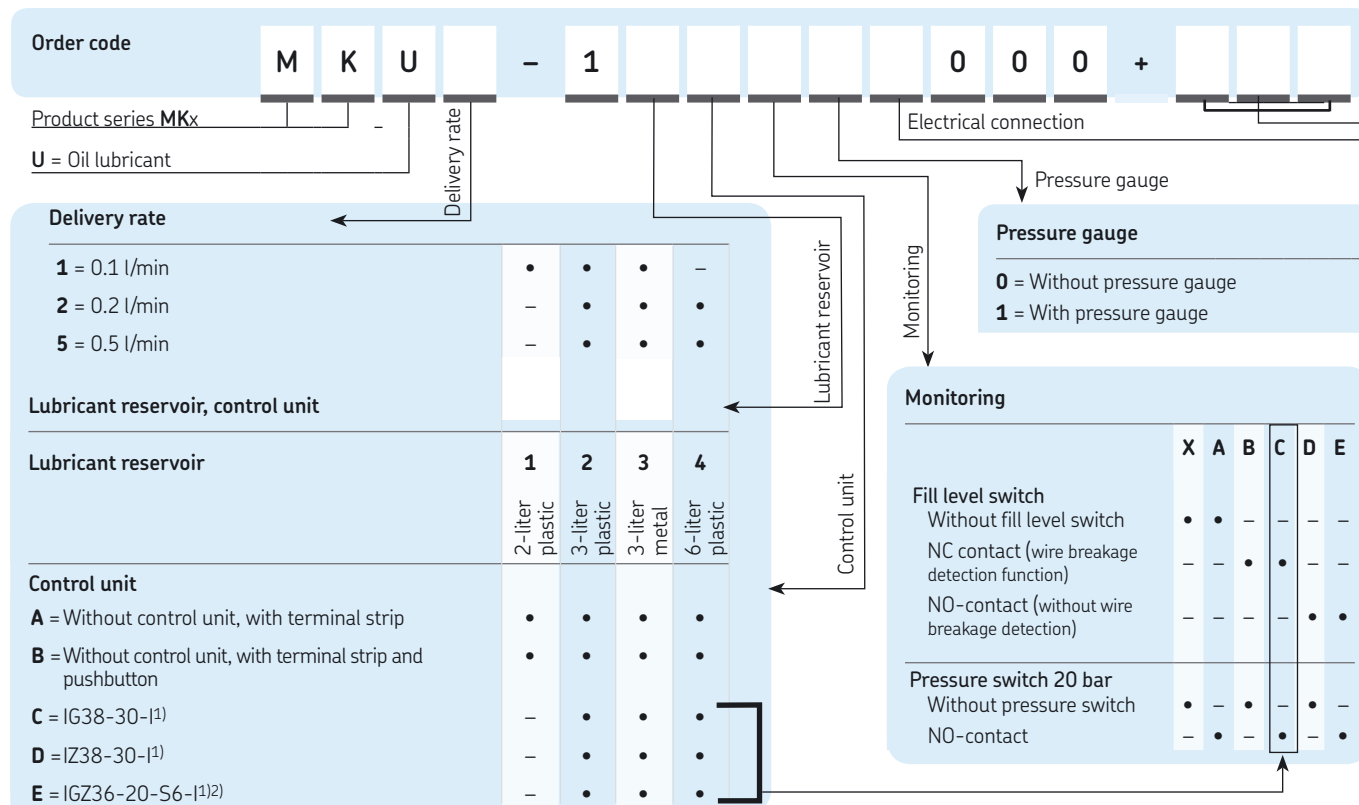


Components of a MKx gear pump unit

Item Description

- 1 Gear pump unit without control unit (optionally with control unit with 3- or 6-liter lubricant reservoir)
- 2 Lubricant reservoir
- 3 Fill level switch (float switch)
- 4 Gear pump unit
- 5 Pressure regulating valve/pressure relief valve
- 6 Pump unit retaining ring
- 7 Filler socket with strainer (for oil)
Filler socket without strainer (for grease)
- 8 Pressure gauge
- 9 Electric motor cover cap
- 10 Indicator light (only on 3- or 6-liter reservoir)
- 11 Pushbutton (DK)
- 12 Supply voltage plug
- 13 Pressure switch

3.3 Order code for MKU gear pump units



Voltage code 24 VDC, 320 VAC, 115 VAC

Electrical connection

Control unit	A, B	A, B				C, D, E	
Monitoring	X	A	B	C	D	E	C
Electrical connection							
0 = 2 cable glands	–	•	•	•	•	•	–
1 = Cable gland; 1 square connector	–	•	•	•	•	•	•
2 = Circular connector M12×1; 1 Square connector ⁴⁾	–	•	•	•	•	•	–
3 = 1 plug; 1 cable gland	•	–	–	–	–	–	–
4 = 1 plug; 1 square connector	•	–	–	–	–	–	–

Voltage code

	Voltage	Frequency	Control unit
924 ³⁾	24 V DC	–	A, B, E
428	230 V AC	50/60 Hz	A, B, C, D, E
429	115 V AC		

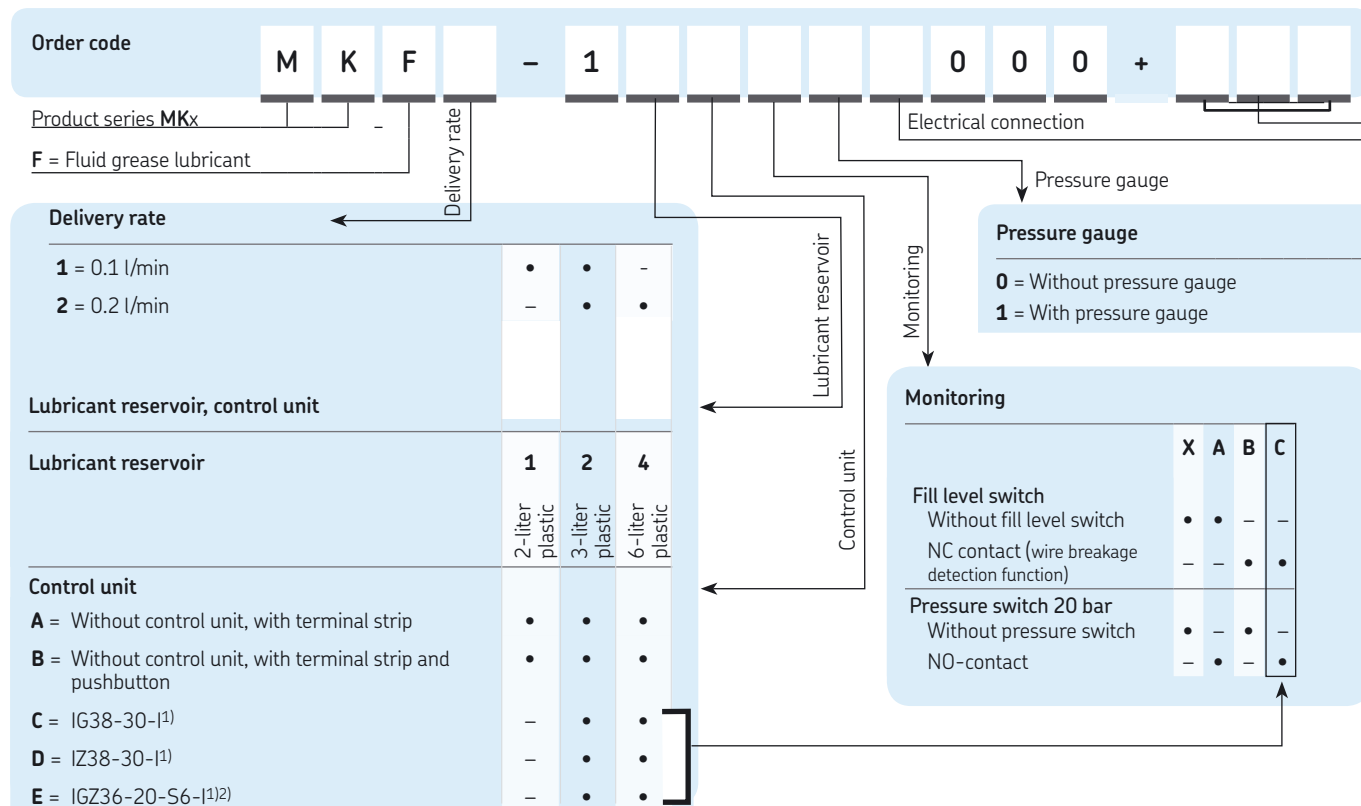
- 1) If selecting control unit **C–E**, only monitoring **C** can be selected.
- 2) If selecting control unit **E**, only electrical connection **1** can be selected.
- 3) Only possible with delivery rate **0.1**- and **0.2** l/min.
- 4) Only on design without control unit.

Order example

MKU1-11AC10000+924

- o Gear pump unit for oil
- o Delivery rate 0.1 l/min
- o 1st generation
- o 2-liter plastic reservoir
- o Without control unit, with terminal strip
- o Fill level switch NC contact, pressure switch NO-contact
- o With pressure gauge
- o 2 cable glands
- o Voltage 24 V DC

3.4 Order code for MKF gear pump units



Voltage code 24 VDC, 320 VAC, 115 VAC

Electrical connection

Control unit	A, B	A, B			C, D	E
Monitoring	X	A	B	C	C	C

Electrical connection

0 = 2 cable glands	–	•	•	•	•	–
1 = Cable gland; 1 square connector	–	•	•	•	•	•
2 = Circular connector M12×1; 1 Square connector ⁴⁾	–	•	•	•	•	–
3 = 1 plug; 1 cable gland	•	–	–	–	–	–
4 = 1 plug; 1 square connector	•	–	–	–	–	–

Voltage code

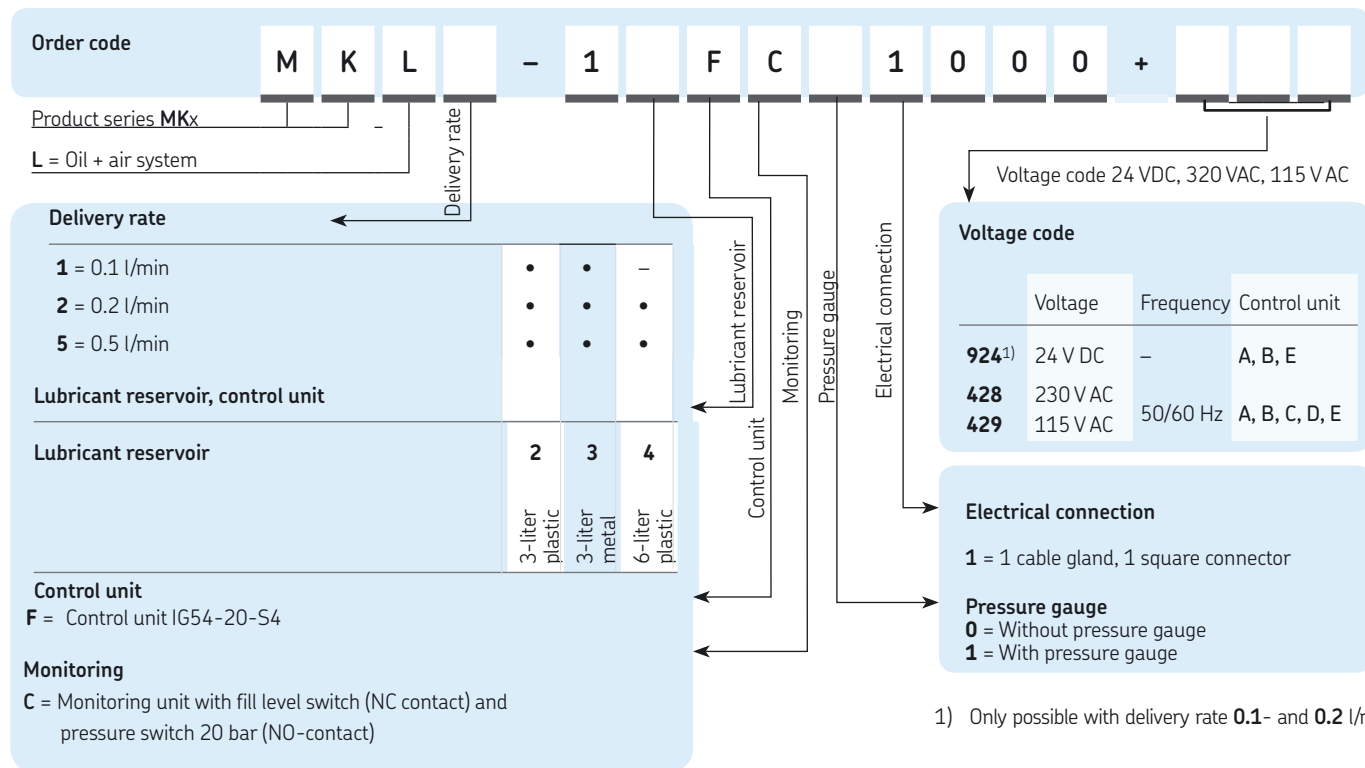
	Voltage	Frequency	Control unit
924 ³⁾	24 V DC	–	A, B, E
428	230 V AC	50/60 Hz	A, B, C, D, E
429	115 V AC		A, B, C, D, E

- 1) If selecting control unit **C–E**, only monitoring **C** can be selected.
- 2) If selecting control unit **E**, only electrical connection **1** can be selected.
- 3) Only possible with delivery rate **0.1**- and **0.2** l/min.
- 4) Only on design without control unit.

Order example**MKF1-11AC10000+924**

- o Gear pump unit for fluid grease
- o Delivery rate 0.1 l/min
- o 1st generation
- o 2-liter plastic reservoir
- o Without control unit, with terminal strip
- o Fill level switch NC contact, pressure switch NO-contact
- o With pressure gauge
- o 2 cable glands
- o Voltage 24 V DC

3.5 Order code for MKL gear pump units




4. Assembly

4.1 General information

Only qualified technical personnel may install, operate, maintain, and repair the gear pump units 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 gear pump unit is incorporated. Such persons are familiar with the relevant standards, rules, accident prevention regulations, and operating conditions as a result of their training, experience, and instruction. They are qualified to carry out the required activities and in doing so recognize and avoid potential hazards.

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

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

		WARNING
Personal injury/property damage Do not tilt or drop gear pump units.		

NOTE

Observe the technical data (Chapter 4) and chapter 10 of the operating instructions.

4.2 Setup and attachment

The gear pump unit 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.

Ensure that there is adequate air circulation to prevent excessive heating of the gear pump unit. For the maximum permissible ambient temperature, see "Technical data." Ensure adequate space for refilling lubricant into the lubricant reservoir.

See the technical data for the gear pump unit in these assembly instructions or the brochure.

These documents can be downloaded from the homepage of SKF Lubrication Systems Germany GmbH.

The mounting position of the gear pump unit is vertical as shown in this documentation. The fill level of the lubricant reservoir, pressure gauges, oil level glasses, and other visual monitoring equipment must be clearly visible.

Any assembly holes must be made according to the diagram on the following page.



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

- o Existing supply lines must not be damaged by assembly work.
- o Other units must not be damaged by assembly work.
- o The gear pump unit must not be installed within range of moving parts.

- o The gear pump unit must be installed at an adequate distance from sources of heat.
- o Maintain safety clearances and comply with local regulations for assembly and accident prevention.

Fastening material to be provided by the customer:

- see the respective assembly drawing

		WARNING
	<p>System pressure</p> <p>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.</p>	

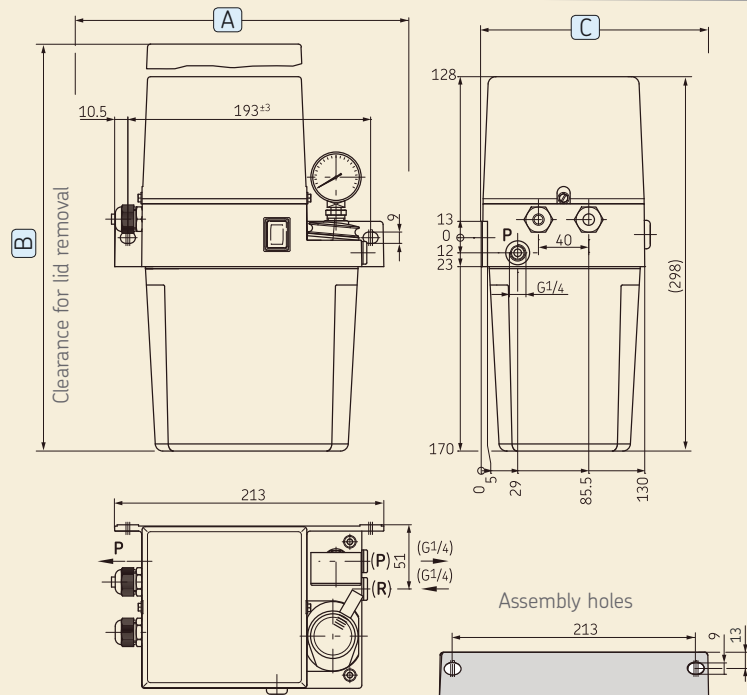
4.2.1 Minimum mounting dimensions

To ensure enough space for maintenance work and possible disassembly of the gear pump unit, ensure that the minimum mounting dimensions (Figs. 3 to 6) are maintained.

4.3 Assembly drawing with minimum installation dimensions

4.3.1 MKU/MKF gear pump units with 2-liter plastic reservoir for oil and fluid grease

MKU/MKF gear pump unit with 2-liter plastic reservoir for oil and fluid grease, Fig. 3



Recommended fastening hardware:

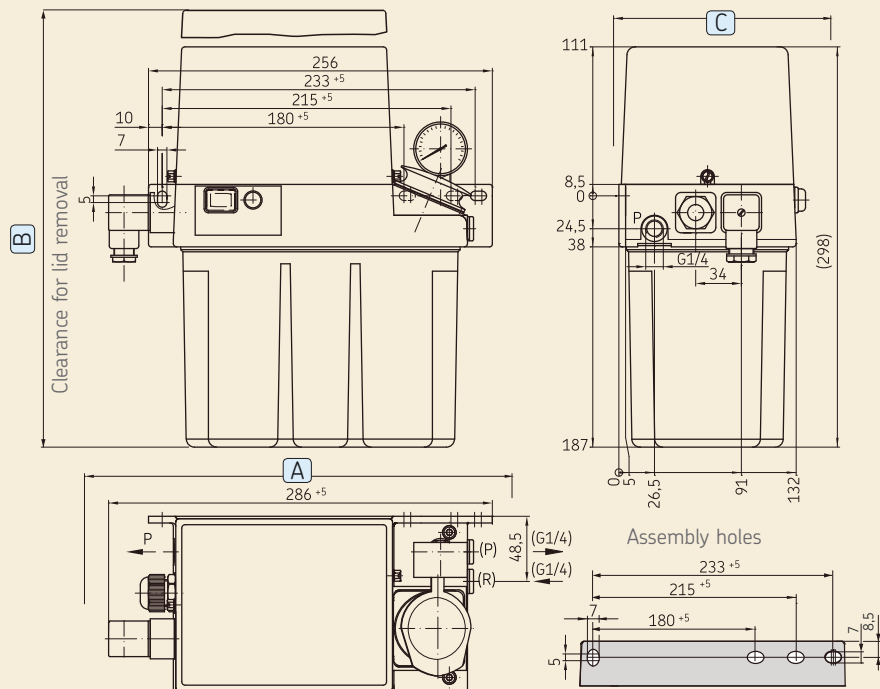
- o Hexagon head bolts (2x) acc. to ISO 4017-M8x25-8.8
 - o Washers (4x) acc. to ISO 7090- 8-200-HV
 - o Hexagon nuts (2x) acc. to ISO 4032-M8-8
- Tightening torque: 25 Nm

Minimum mounting dimensions

A = width:	350 mm
B = height:	380 mm
C = depth:	140 mm

4.3.2 MKU/MKF/MKL gear pump units with 3-liter plastic reservoir for oil and fluid grease

Gear pump unit with 3-liter plastic reservoir for oil and fluid grease, Fig. 4



Recommended fastening hardware:

- o Hexagon head bolts (2x) acc. to ISO 4017-M6x25-8.8
- o Washers (4x) acc. to ISO 7090- 6-200-HV
- o Hexagon nuts (2x) acc. to ISO 4032-M6-8

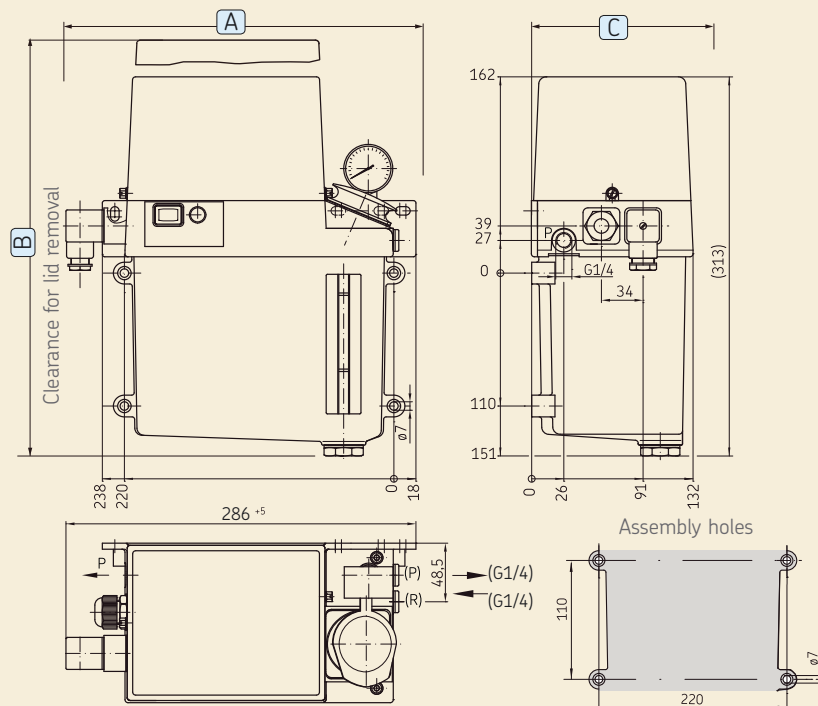
Tightening torque: 10 Nm

Minimum mounting dimensions

A = width:	390 mm
B = height:	400 mm
C = depth:	140 mm

4.3.3 MKU/MKF/MKL gear pump units with 3-liter metal reservoir for oil and fluid grease

Gear pump unit with 3-liter metal reservoir for oil and fluid grease, Fig. 5



Recommended fastening hardware:

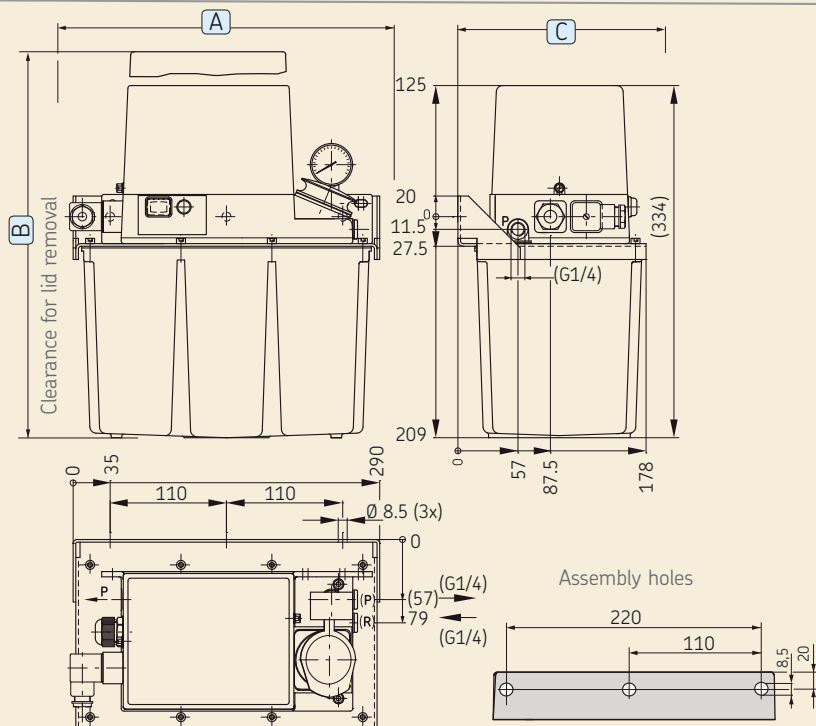
- o Hexagon head bolts (2x) acc. to ISO 4017-M6x25-8.8
 - o Washers (4x) acc. to ISO 7090- 6-200-HV
 - o Hexagon nuts (2x) acc. to ISO 4032-M6-8
- Tightening torque: 25 Nm

Minimum mounting dimensions

A = width:	390 mm
B = height:	400 mm
C = depth:	140 mm

4.3.4 MKU/MKF/MKL gear pump units with 6-liter plastic reservoir for oil and fluid grease

Gear pump unit with 3-liter plastic reservoir for oil and fluid grease, Fig. 6



Recommended fastening hardware:

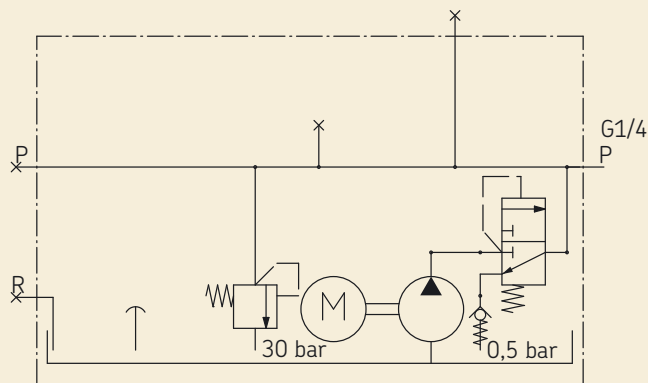
- o Hexagon head bolts (2x) acc. to ISO 4017-M8x25-8.8
 - o Washers (4x) acc. to ISO 7090- 8-200-HV
 - o Hexagon nuts (2x) acc. to ISO 4032-M8-8
- Tightening torque: 25 Nm

Minimum mounting dimensions

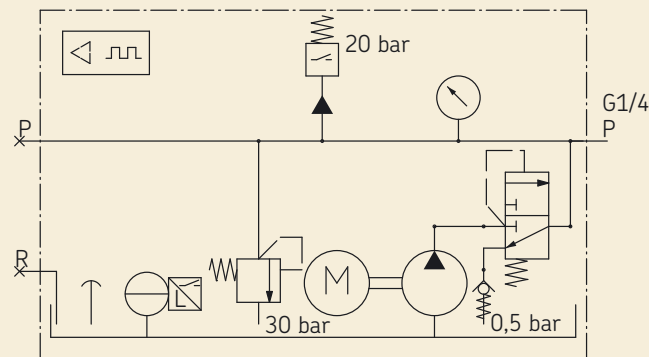
A = width:	390 mm
B = height:	440 mm
C = depth:	190 mm

4.3.5 Example hydraulic connection MKF

Example for Hydraulic connection MKF, Fig. 7

MKF_{x-1}AX0x000+xxx

- without optional Pressure gauge
- [without optional Fill level switch (NC)
- [without optional Pressure switch (20 bar)
- with control unit A
- for Fluid grease lubricant

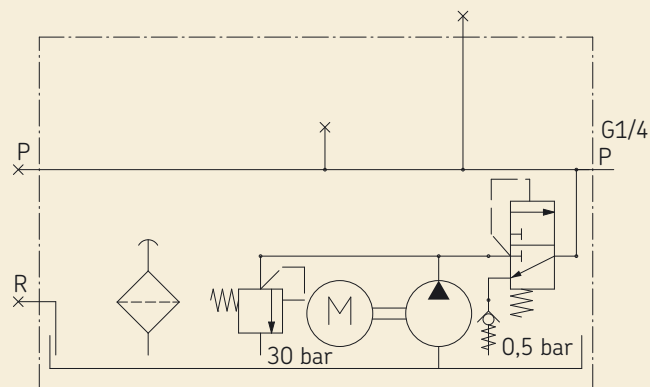


MKF_{x-1}CC1_{x000}+xxx

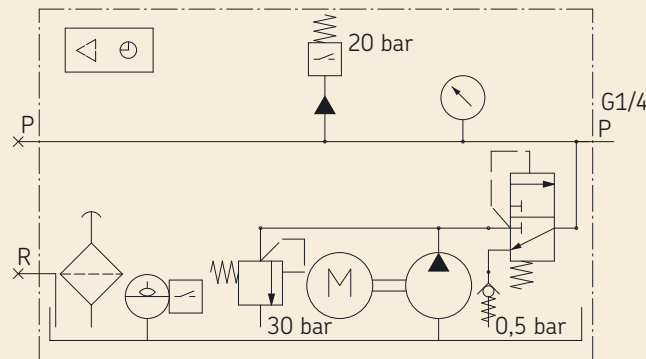
- with Pressure gauge
- [with Fill level switch (NC)
- [with Pressure switch (20 bar)
- with control unit A
- for Fluid grease lubricant

4.3.6 Example hydraulic connection MKU

Example for Hydraulic connection MKU, Fig. 8

MKU_x-1xAx0x000+xxx

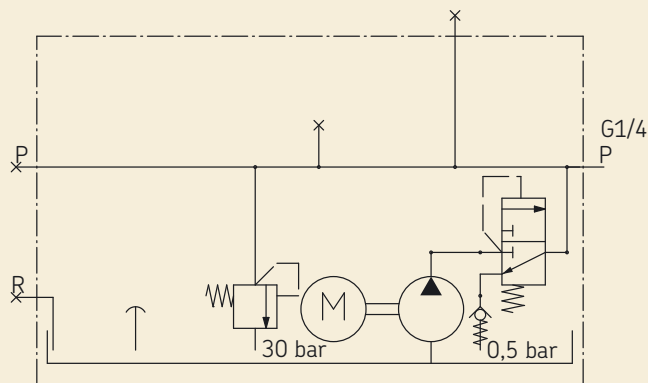
- without optional Pressure gauge
- without optional Fill level switch (NC)
- without optional Pressure switch (20 bar)
- with control unit A
- for Oil lubricant

MKU_x-1xEC1x000+xxx

- with Pressure gauge
- with Fill level switch (NC)
- with Pressure switch (20 bar)
- with control unit A
- for Oil lubricant

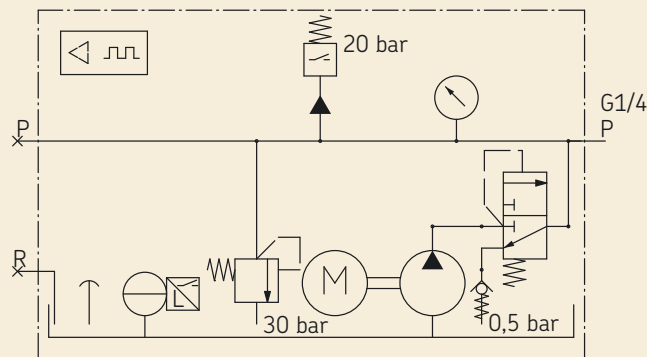
4.3.7 Example hydraulic connection MKL

Example for Hydraulic connection MKL, Fig. 9



MKLx-1xFC0x000+xxx

- without optional Pressure gauge
- with Fill level switch (NC)
- with Pressure switch (20 bar)
- with control unit F
- for Oil + air system



MKLx-1xFC1x000+xxx

- with Pressure gauge
- with Fill level switch (NC)
- with Pressure switch (20 bar)
- with control unit F
- for Oil + air system

4.4 Attachment of a gear pump unit



WARNING

Personal injury/property damage

Drill assembly holes in such a way that no lines, units, or moving parts are damaged or their function impaired. Maintain safety clearances and comply with regulations for assembly and accident prevention.



WARNING

Risk of slipping

Mark areas that are moist or contaminated with lubricant with appropriate warning signs. Immediately bind/remove lubricants.



☞ See Figures 3 to 6

- Drill assembly holes on the surface according to the assembly drawing (assembly holes, Figs. 3 - 6)
- Clean surface to remove drilling chips; prime the boreholes if necessary
- Lift the gear pump unit and align it to the assembly holes
- Pass hexagon head bolts with associated washers through the fixing holes on mounting plate
- Apply hexagon nuts (4x) with associated washers and tighten gently
- Align the gear pump unit horizontally and vertically

- Tighten hexagon head screws with the following tightening torque

Torque	M6 = 10 Nm
	M8 = 25 Nm

4.5 Electrical connection

4.5.1 Electric motor connection

☞ See Figure 10



Consult the motor's rating plate for the electrical characteristics of the motor. 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 $\pm 3\%$ frequency deviation). This applies especially with regard to deviations in operating parameters from the ratings on the motor's rating plate.



The limits must never be exceeded. 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 EC / 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 following motor data table or customer's drawing (if available).

When establishing the gear pump unit's electrical connection, ensure that appropriate measures prevent interference between signals due to inductive, capacitive, or electro-magnetic couplings.

Shielded cables must be used if electrical interference fields affect signal transmissions despite separate laying of cables. Ensure that cables are arranged in an "EMC-compliant" manner.

	 WARNING
	Electric shock Electrical connections for the product may only be established by qualified and trained personnel authorized to do so by the operator. The local electrical operating conditions and local regulations (e.g., DIN, VDE) must be observed.

	 WARNING
	Overvoltage 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 an appropriate amperage.

Gear pump units (1) are driven by electric motors. Depending on the model design, AC motors or DC motors are used. The basic design of AC motors is a capacitor motor for 230 V 50/60 Hz and 115 V 50/60 Hz single-phase alternating current; the basic design for DC motors is for 24 V direct current. On a gear pump unit with or without a control unit, the electrical connection is established by the following depending on the control/monitoring:

- o 2 cable glands
- o 1 cable gland and a rectangular connector (XS1) acc. to DIN EN 175301-803-A
- o 1 circular connector M12x1 (XS2) and a rectangular connector acc. to DIN EN 175301-803-A
- o 1 plug and a cable gland
- o 1 plug and a rectangular connector acc. to DIN EN 175301-803-A

In the design with a control unit, the motor is connected to the electronic control unit.

The wiring is connected in accordance with the electrical circuit diagrams in Chapters 4.7 to 4.8.8.

The electrical circuit diagram of the gear pump unit is affixed inside the unit's cover cap (2) and can be accessed by removing the cap.



For a gear pump unit with control unit, also consult the operating instructions for the control unit. This is included in the accompanying documentation.

In the case of electric switches with inductive loads, the inductivity of the switch must be low in order to keep wear on contact surfaces to a minimum. Otherwise, there is a risk of damaging the contact surfaces on the switch elements. Appropriate measures must be taken to protect the contacts of the switch elements.

4.5.2 Electric motor connection with cable socket and circular plug

☞ See Figure 10

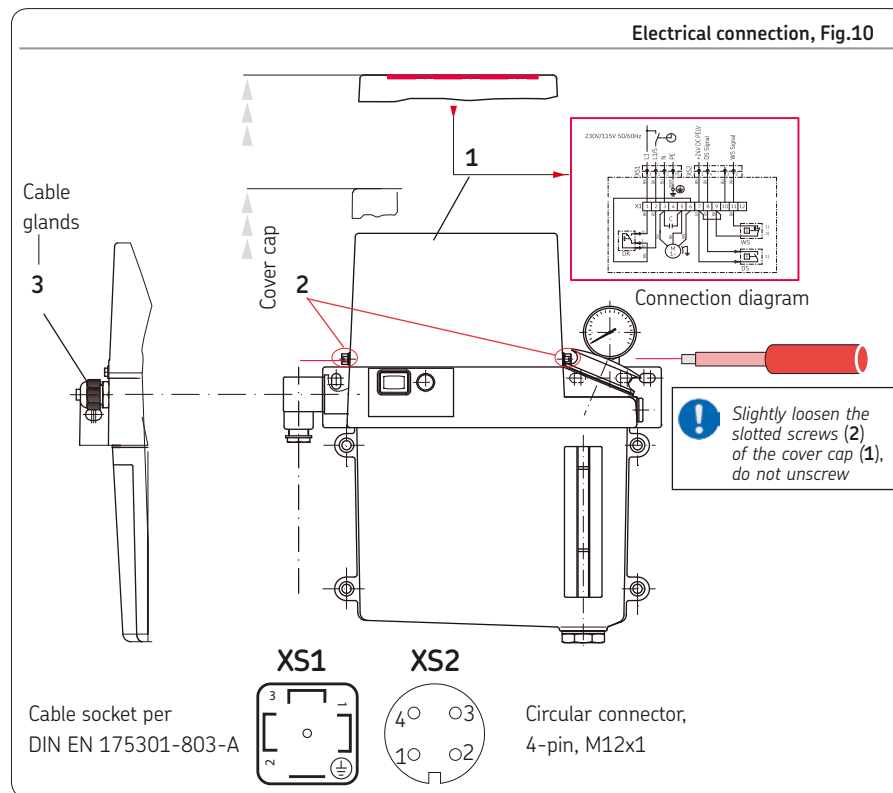
- Connect the connector plug for the cable socket (XS1) and circular connector (XS2) provided by customer in accordance with the wiring diagram affixed to the inside of the cover cap (see Fig. 7) or the figure (Fig. 8 to 31) for the type number
- Mount and tighten connector plugs
- Lay the connection cable provided by customer in a stress-free position

4.5.3 Electric motor connection with cable glands

☞ See Figure 10

☞ The cover cap (1) is secured by two slotted screws (2).

- Loosen but do not unscrew (!) the slotted screws (2) from the cover cap (1) using a screwdriver.
- Carefully lift the cover cap (1) and put it aside
- Loosen the cable gland (3)
- Insert the connection cable provided by the customer into the cable gland (3)
- Connect the connection cable provided by customer in accordance with the wiring diagram affixed to the inside of the cover cap (see Fig. 7) or the figure (Fig. 8 to 31) for the type number
- Tighten the cable gland (3)
- Carefully apply the cover cap (1) and fasten the slotted screws (2) finger-tight with equal force
- Lay the connection cable provided by customer in a stress-free position



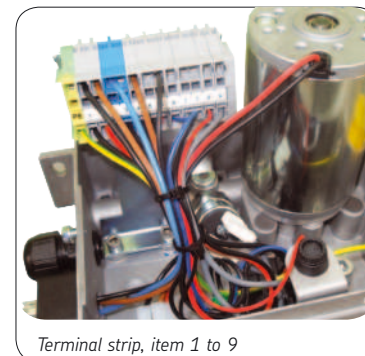
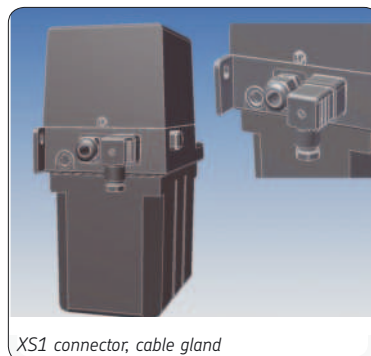
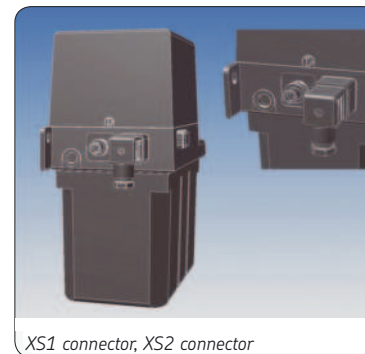
4.6 Terminal diagrams

4.6.1 Legend to the terminal diagrams

Description and legend

Legend:

M	= Pump motor
C	= Capacitor
L1/S/N	= Connection for operating voltage
PE	= Protective earth conductor
WS	= Fill level switch
DS	= Pressure switch
DK	= Pushbutton for interim lubrication
SL	= Indicator lamp (green) "Operation"
SL1	= Indicator lamp (green) "Operation"
SL2	= Indicator lamp (red) "Fault"
XS1	= Plug connector acc. to DIN EN 175301-803 A
XS2	= Plug connector M12×1X1
MK	= Machine contact
DL	= Air pressure switch
Y1	= Compressed air valve
F	= Fuse (on 24 VDC designs)



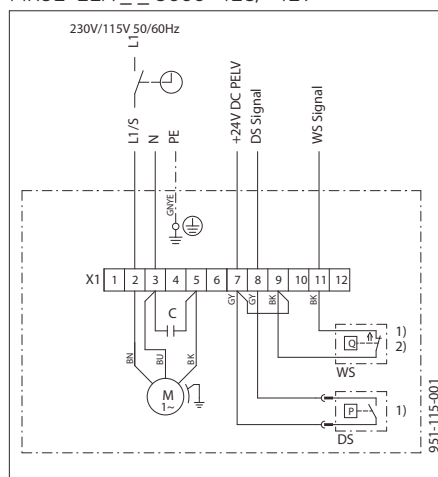
4.7 Terminal diagrams for MKU/MKF, without control unit

4.7.1 MKU, 2-liter reservoir, voltage design 230/115 VAC, without pushbutton

MKU, 2-liter reservoir, voltage design 230 VAC/115 VAC, without pushbutton, Fig. 11

MKU1-11A __ 0000+428/+429

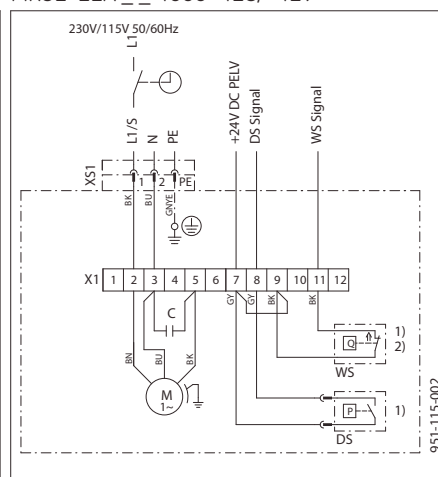
MKU1-11A __ 3000+428/+429



Connections via:
2x cable glands

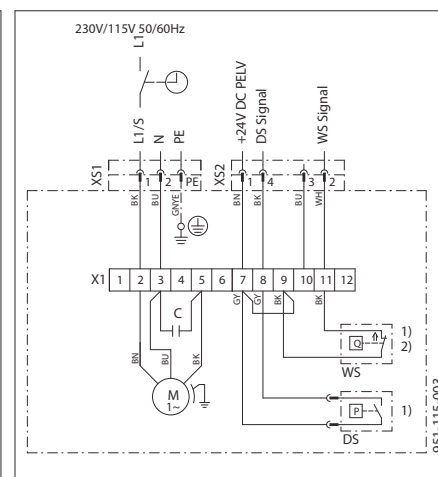
MKU1-11A __ 1000+428/+429

MKU1-11A __ 4000+428/+429



1x XS1 connector (DIN EN 175301-803 A)
1x cable gland

MKU1-11A __ 2000+428/+429



XS1 connector (DIN EN 175301-803 A)
XS2 plug (M12x1)

1) Optional

2) Optional: Contact closes at minimum level (N0)

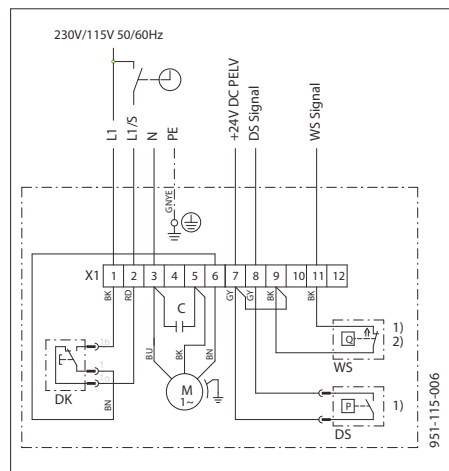
See Chapter 4.6.1 for legend to the terminal diagrams

4.7.2 MKU, 2-liter reservoir, voltage design 230/115 VAC, with pushbutton

MKU, 2-liter reservoir, voltage design 230 VAC/115 VAC, with pushbutton, Fig. 12

MKU1-11B __ 0000+428/+429

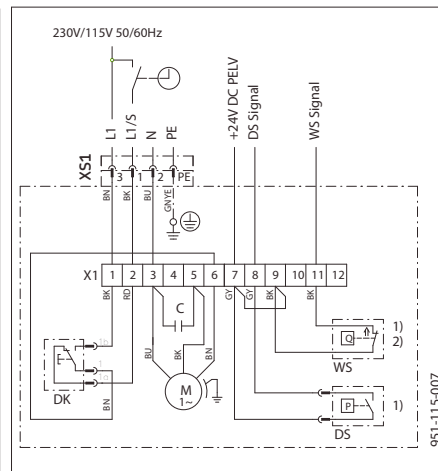
MKU1-11B __ 3000+428/+429



Connections via:
2x cable glands

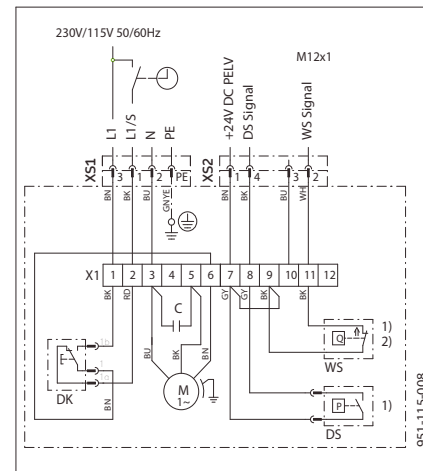
MKU1-11B __ 1000+428/+429

MKU1-11B __ 4000+428/+429



1x XS1 connector (DIN EN 175301-803 A)
1x cable gland

MKU1-11B __ 2000+428/+429



XS1 connector (DIN EN 175301-803 A)
XS2 plug (M12x1)

See Chapter 4.6.1 for legend to the terminal diagrams

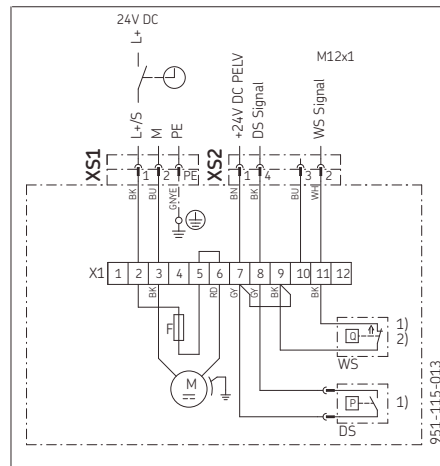
- 1) Optional
- 2) Optional: Contact closes at minimum level (NO)

4

4

MKU1-11A 2000+924

MKU1-11A 4000+924



XS1 connector (DIN EN 175301-803 A)
XS2 plug (M12x1)

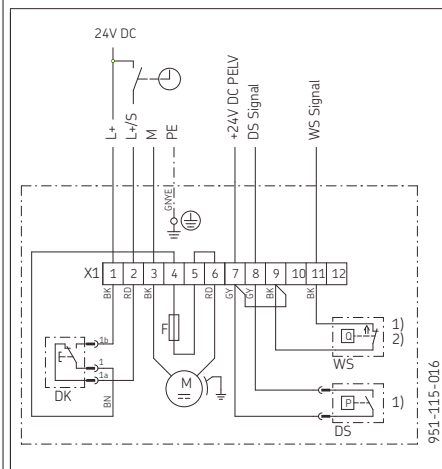
See Chapter 4.6.1 for legend to the terminal diagrams

4.7.4 MKU, 2-liter reservoir, voltage design 24 VDC, with pushbutton

MKU, 2-liter reservoir, voltage design 24 VDC, with pushbutton, Fig. 14

MKU1-11B __ 0000+924

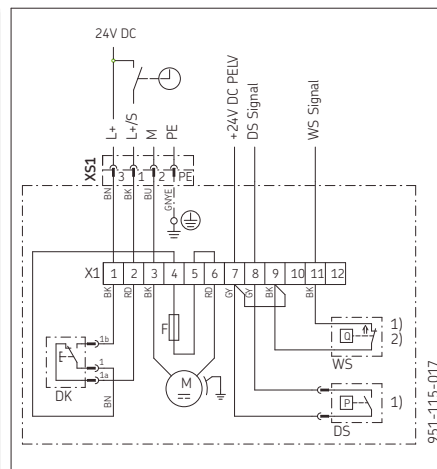
MKU1-11B __ 3000+924



Connections via:
2x cable glands

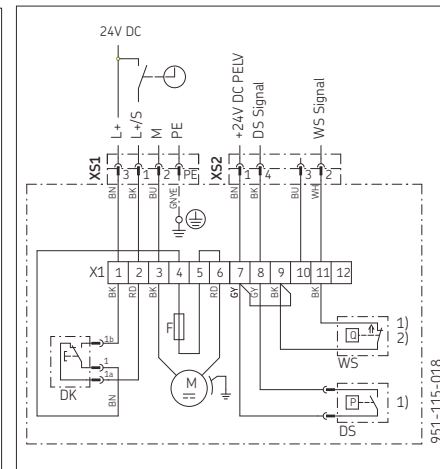
MKU1-11B __ 1000+924

MKU1-11B __ 4000+924



1x XS1 connector (DIN EN 175301-803 A)
1x cable gland

MKU1-11B __ 2000+924



XS1 connector (DIN EN 175301-803 A)
XS2 plug (M12x1)

See Chapter 4.6.1 for legend to the terminal diagrams

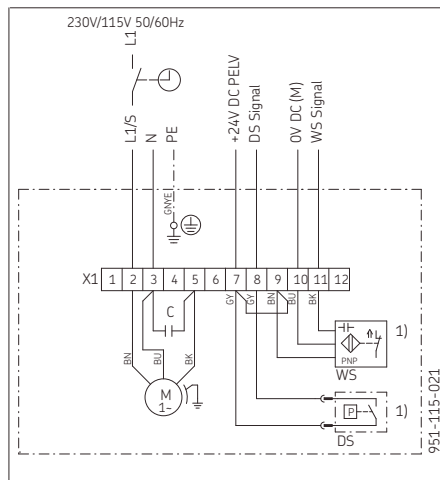
- 1) Optional
- 2) Optional: Contact closes at minimum level (NO)

4.7.5 MKF, 2-liter reservoir, voltage design 230/115 VAC, without pushbutton

MKF, 2-liter reservoir, voltage design 230/115 VAC, without pushbutton, Fig. 15

MKF1-11A __ 0000+428/+429

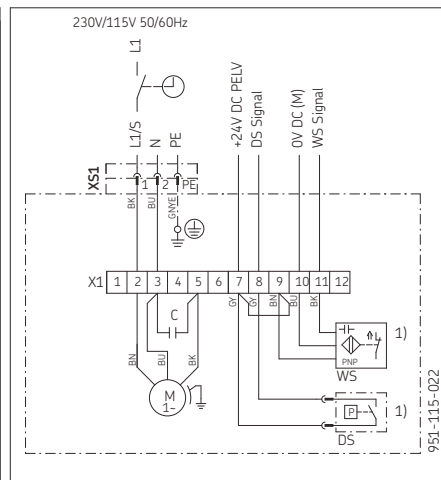
MKF1-11A __ 3000+428/+429



Connections via:
2x cable glands

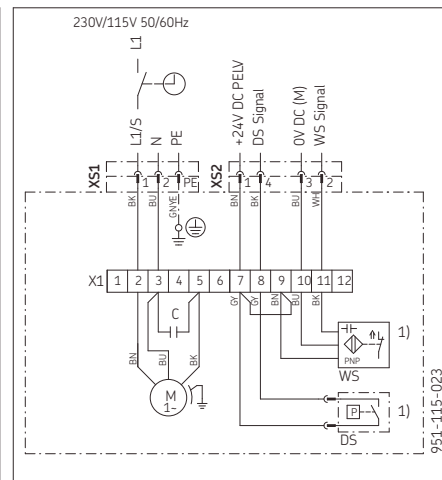
MKF1-11A __ 1000+428/+429

MKF1-11A __ 4000+428/+429



1x XS1 connector (DIN EN 175301-803 A)
1x cable gland

MKF1-11A __ 2000+428/+429



XS1 connector (DIN EN 175301-803 A)
XS2 plug (M12x1)

1) Optional

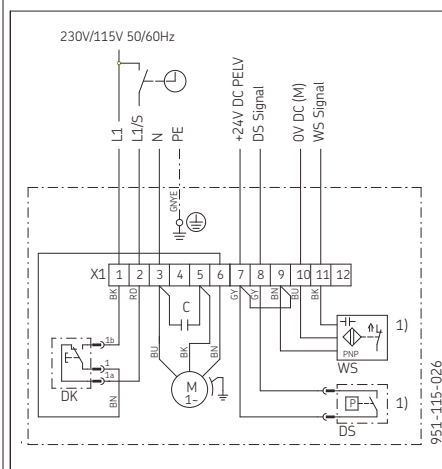
See Chapter 4.6.1 for legend to the terminal diagrams

4.7.6 MKF, 2-liter reservoir, voltage design 230/115 VAC, with pushbutton

MKU, 2-liter reservoir, voltage design 230/115 VAC, with pushbutton, Fig. 16

MKF1-11B 0000+428/+429

MKF1-11B 3000+428/+429

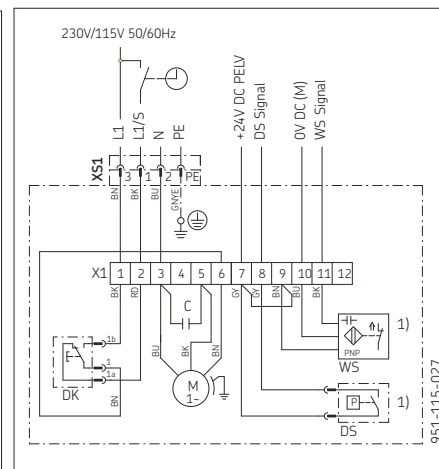


Connections via:

2x cable glands

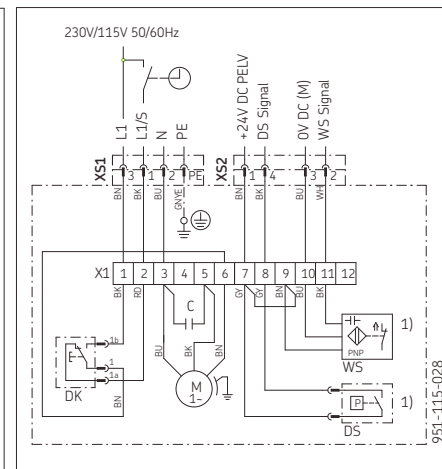
MKF1-11B 1000+428/+429

MKF1-11B 4000+428/+429



1x XS1 connector (DIN EN 175301-803 A)
1x cable gland

MKF1-11B 2000+428/+429



XS1 connector (DIN EN 175301-803 A)
XS2 plug (M12x1)

1) Optional

See Chapter 4.6.1 for legend to the terminal diagrams

4.7.7 MKF, 2-liter reservoir, voltage design 24 V DC, without pushbutton

MKF, 2-liter reservoir, voltage design 24 VDC, without pushbutton, Fig. 17

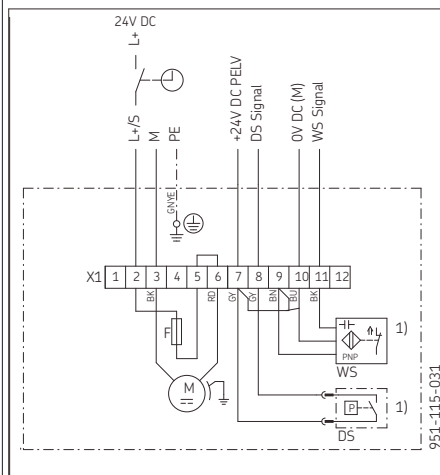
MKF1-11A__ 0000+924

MKF1-11A__ 3000+924

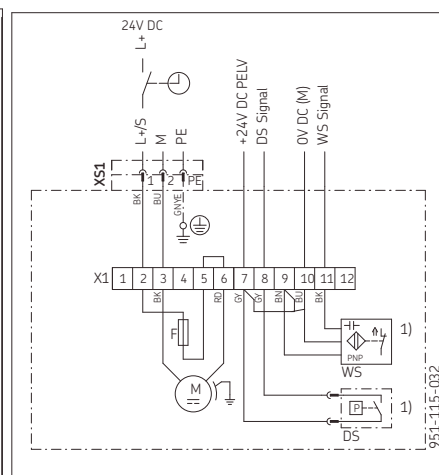
MKF1-11A__ 1000+924

MKF1-11A__ 4000+924

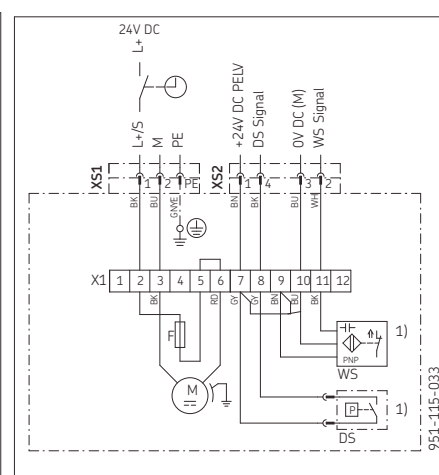
MKF1-11A__ 2000+924



Connections via:
2x cable glands



1x XS1 connector (DIN EN 175301-803 A)
1x cable gland



XS1 connector (DIN EN 175301-803 A)
XS2 plug (M12x1)

1) Optional

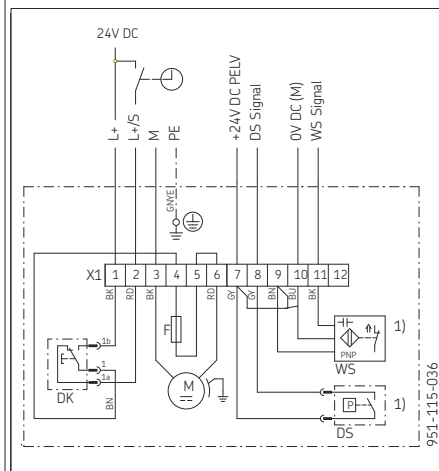
See Chapter 4.6.1 for legend to the terminal diagrams

4.7.8 MKF, 2-liter reservoir, voltage design 24 VDC, with pushbutton

MKF, 2-liter reservoir, voltage design 24 VDC, with pushbutton, Fig. 18

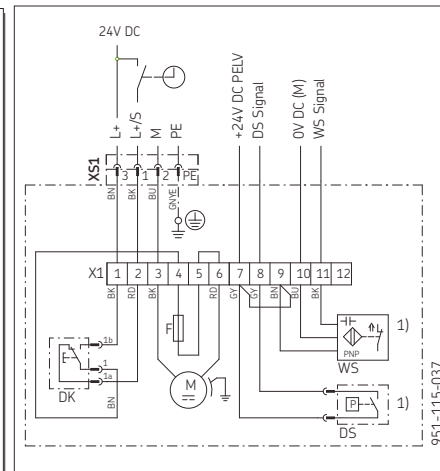
MKF1-11B __ 0000+924

MKF1-11B __ 3000+924

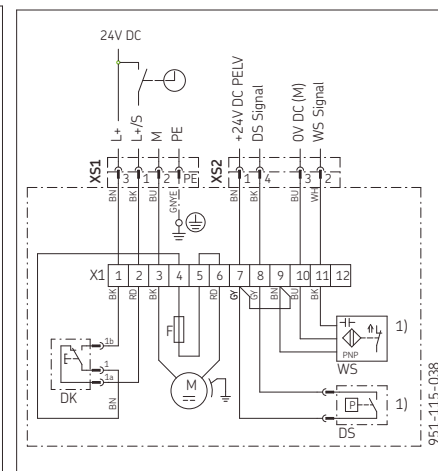


MKF1-11B __ 1000+924

MKF1-11B __ 4000+924



MKF1-11B __ 2000+924



Connections via:
2x cable glands

1x XS1 connector (DIN EN 175301-803 A)
1x cable gland

XS1 connector (DIN EN 175301-803 A)
XS2 plug (M12x1)

1) Optional

See Chapter 4.6.1 for legend to the terminal diagrams

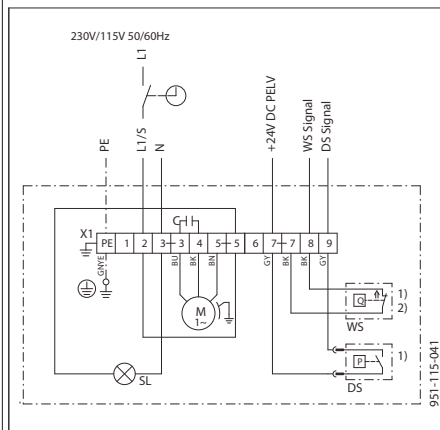
4.7.9 MKU, 3- or 6-liter reservoir, voltage design 230/115 VAC, without pushbutton

MKU, 3- or 6-liter reservoir, voltage design 230/115 VAC, without pushbutton, Fig. 19

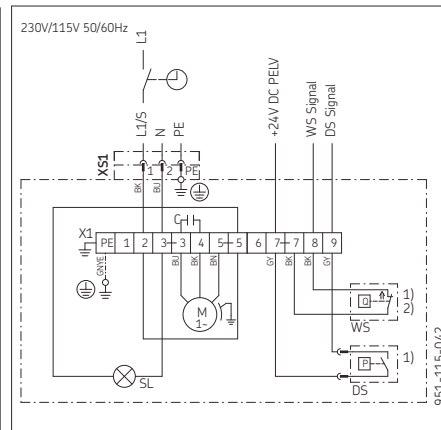
MKU1 -12(3) A __ 0000+428/+429
 MKU2(5)-12(3)(4)A __ 0000+428/+429
 MKU2(5)-12(3)(4)A __ 3000+428/+429

MKU1 -12(3) A __ 1000+428/+429
 MKU2(5)-12(3)(4)A __ 1000+428/+429
 MKU2(5)-12(3)(4)A __ 4000+428/+429

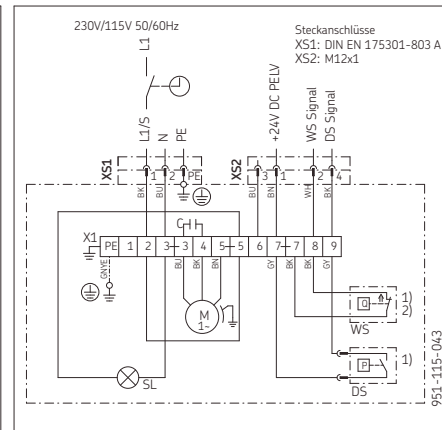
MKU1 -12(3) A __ 2000+428/+429
 MKU2(5)-12(3)(4)A __ 2000+428/+429



Connections via:
 2x cable glands



1x XS1 connector (DIN EN 175301-803 A)
 1x cable gland



XS1 connector (DIN EN 175301-803 A)
 XS2 plug (M12x1)

- 1) Optional
 2) Optional: Contact closes at minimum level (N0)

See Chapter 4.6.1 for legend to the terminal diagrams

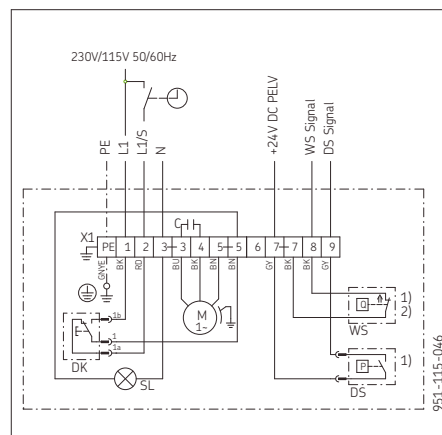
4.7.10 MKU, 3- or 6-liter reservoir, voltage design 230/115 VAC, with pushbutton

MKU, 3- or 6-liter reservoir, voltage design 230/115 VAC, with pushbutton, Fig. 20

MKU1 -12(3) B __ 0000+428/+429
 MKU2(5)-12(3)(4)B __ 0000+428/+429
 MKU2(5)-12(3)(4)B __ 3000+428/+429

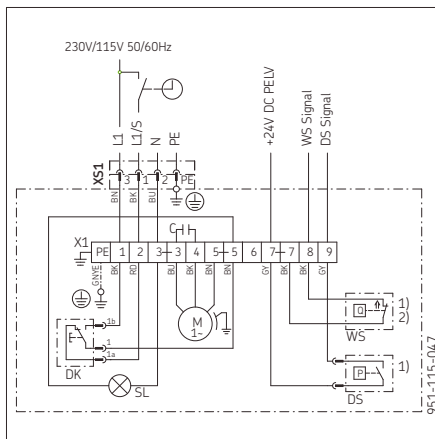
MKU1 -12(3) B __ 1000+428/+429
 MKU2(5)-12(3)(4)B __ 1000+428/+429
 MKU2(5)-12(3)(4)B __ 4000+428/+429

MKU1 -12(3) B __ 2000+428/+429
 MKU2(5)-12(3)(4)B __ 2000+428/+429

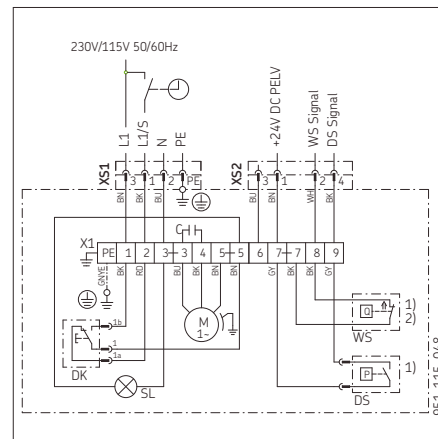


Connections via:

2x cable glands



1x XS1 connector (DIN EN 175301-803 A)
 1x cable gland



XS1 connector (DIN EN 175301-803 A)
 XS2 plug (M12x1)

- 1) Optional
 2) Optional: Contact closes at minimum level (NO)

See Chapter 4.6.1 for legend to the terminal diagrams

4.7.11 MKU, 3- or 6-liter reservoir, voltage design 24 VDC, without pushbutton

MKU, 3- or 6-liter reservoir, voltage design 24 VDC, without pushbutton, Fig. 21

MKU1-12(3) A __ 0000+924

MKU2-12(3)(4)A __ 0000+924

MKU2-12(3)(4)A __ 3000+924

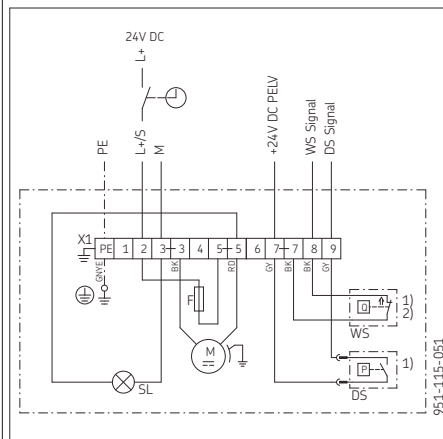
MKU1-12(3) A __ 1000+924

MKU2-12(3)(4)A __ 1000+924

MKU2-12(3)(4)A __ 4000+924

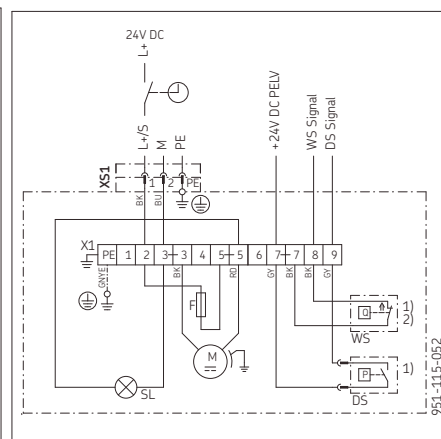
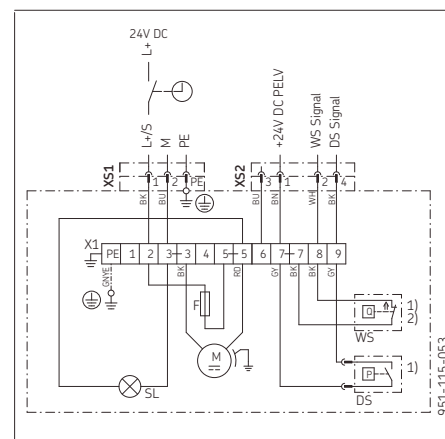
MKU1-12(3) A __ 2000+924

MKU2-12(3)(4)A __ 2000+924



Connections via:

2x cable glands

1x XS1 connector (DIN EN 175301-803 A)
1x cable glandXS1 connector (DIN EN 175301-803 A)
XS2 plug (M12x1)

1) Optional

2) Optional: Contact closes at minimum level (NO)

See Chapter 4.6.1 for legend to the terminal diagrams

4.7.12 MKU, 3- or 6-liter reservoir, voltage design 24 VDC, with pushbutton

MKU, 3- or 6-liter reservoir, voltage design 24 VDC, with pushbutton, Fig. 22

MKU1-12(3) B __ 0000+924

MKU2-12(3)(4)B __ 0000+924

MKU2-12(3)(4)B __ 3000+924

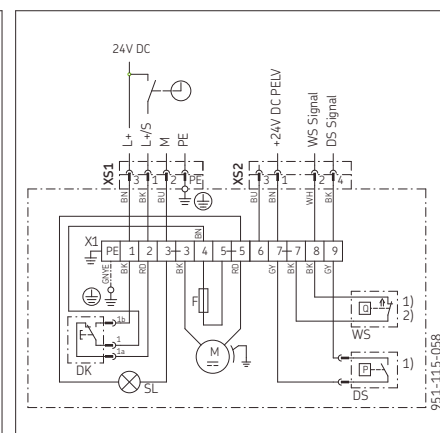
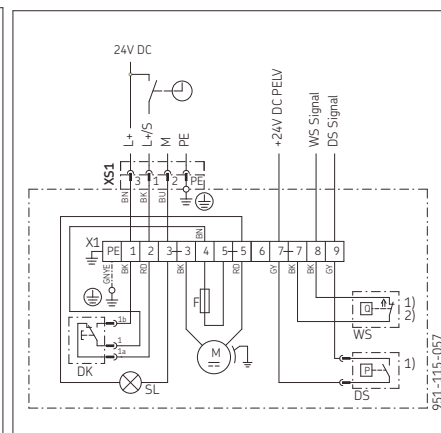
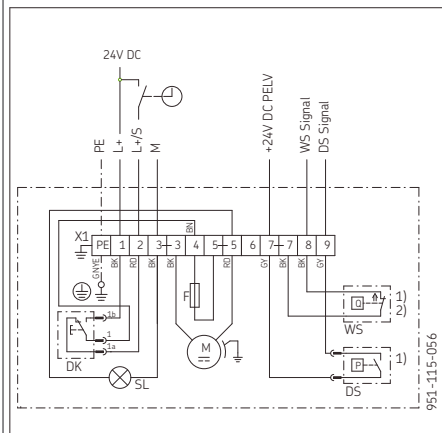
MKU1-12(3) B __ 1000+924

MKU2-12(3)(4)B __ 1000+924

MKU2-12(3)(4)B __ 4000+924

MKU1-12(3) B __ 2000+924

MKU2-12(3)(4)B __ 2000+924



Connections via:

2x cable glands

1x XS1 connector (DIN EN 175301-803 A)
1x cable gland

XS1 connector (DIN EN 175301-803 A)
XS2 plug (M12x1)

1) Optional

2) Optional: Contact closes at minimum level (NO)

See Chapter 4.6.1 for legend to the terminal diagrams

4.7.13 MKF, 3- or 6-liter reservoir, voltage design 230/115 VAC, without pushbutton

MKF, 3- or 6-liter reservoir, voltage design 230/115 VAC, without pushbutton, Fig. 23

MKF1-12 A__ 0000+428/+429

MKF2-12(4)A__ 0000+428/+429

MKF2-12(4)A__ 3000+428/+429

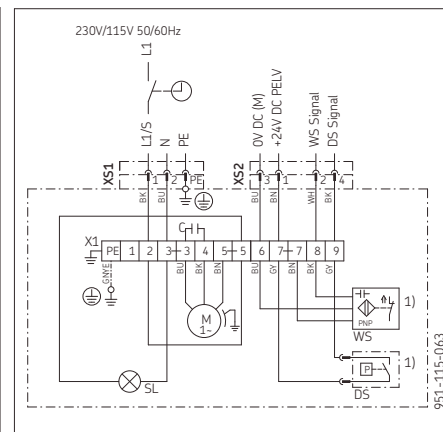
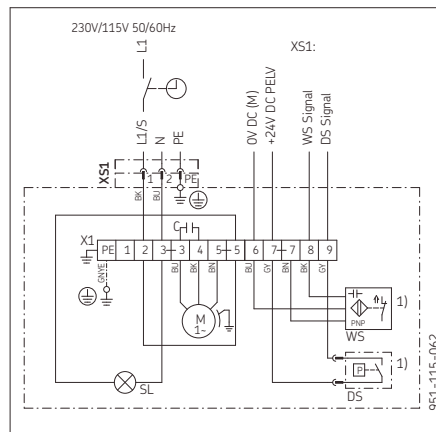
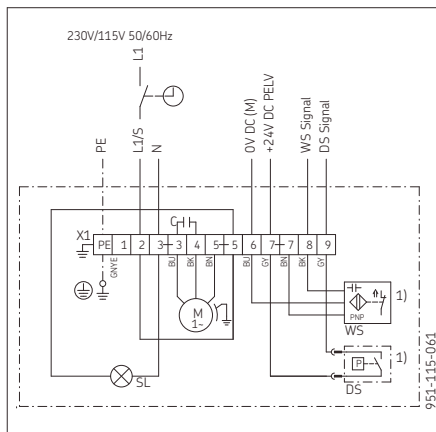
MKF1-12 A__ 1000+428(+429)

MKF2-12(4)A__ 1000+428(+429)

MKF2-12(4)A__ 4000+428(+429)

MKF1-12 A__ 2000+428(+429)

MKF2-12(4)A__ 2000+428(+429)



Connections via:

2x cable glands

1x XS1 connector (DIN EN 175301-803 A)

1x cable gland

XS1 connector (DIN EN 175301-803 A)

XS2 plug (M12x1)

1) Optional

See Chapter 4.6.1 for legend to the terminal diagrams

4.7.14 MKF, 3- or 6-liter reservoir, voltage design 230/115 VAC, with pushbutton

MKF, 3- or 6-liter reservoir, voltage design 230/115 VAC, with pushbutton, Fig. 24

MKF1-12 B __ 0000+428/+429

MKF2-12(4)B __ 0000+428/+429

MKF2-12(4)B __ 3000+428/+429

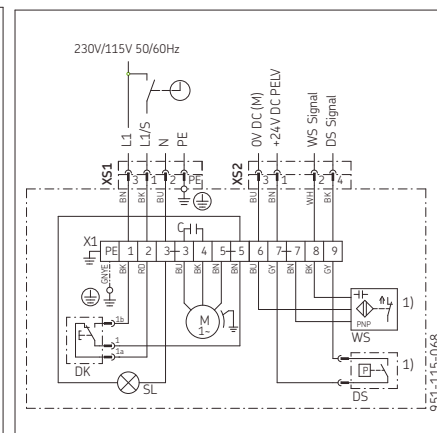
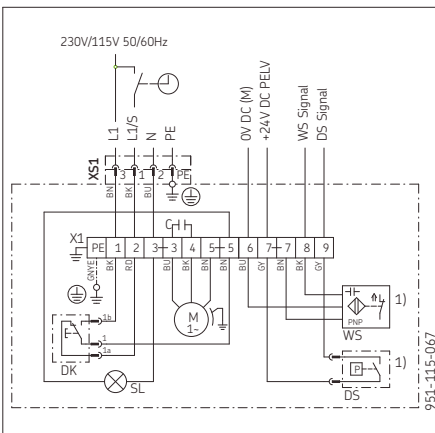
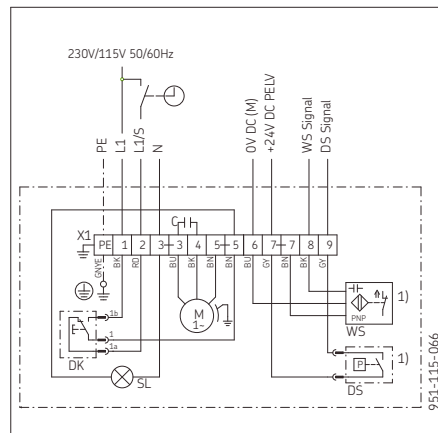
MKF1-12 B __ 1000+428/+429

MKF2-12(4)B __ 1000+428/+429

MKF2-12(4)B __ 4000+428/+429

MKF1-12 B __ 2000+428/+429

MKF2-12(4)B __ 2000+428/+429



Connections via:

2x cable glands

1x XS1 connector (DIN EN 175301-803 A)
1x cable gland

XS1 connector (DIN EN 175301-803 A)
XS2 plug (M12x1)

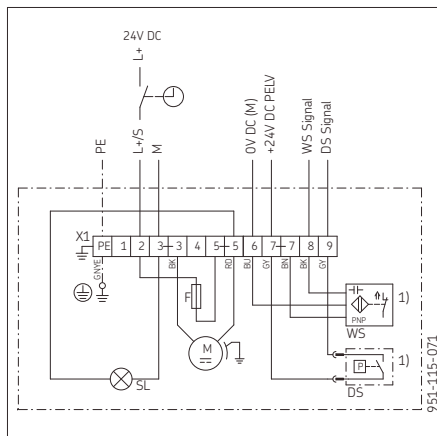
1) Optional

See Chapter 4.6.1 for legend to the terminal diagrams

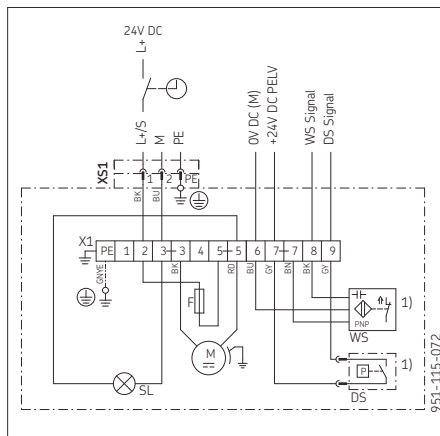
4.7.15 MKF, 3- or 6-liter reservoir, voltage design 24 VDC, without pushbutton

MKU, 3- or 6-liter reservoir, voltage design 24 VDC, without pushbutton, Fig. 25

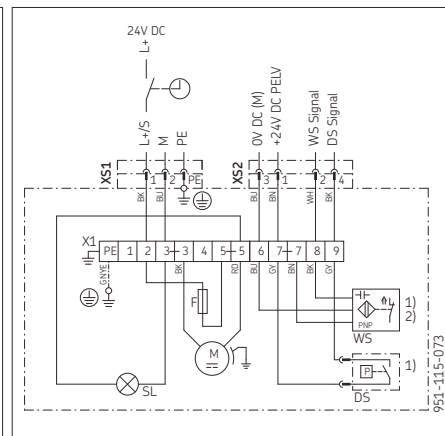
MKF1-12 A__ 0000+924
 MKF2-12(4)A__ 0000+924
 MKF2-12(4)A__ 3000+924



MKF1-12 A__ 1000+924
 MKF2-12(4)A__ 1000+924
 MKF2-12(4)A__ 4000+924



MKF1-12 A__ 2000+924
 MKF2-12(4)A__ 2000+924



Connections via:
 2x cable glands

1x XS1 connector (DIN EN 175301-803 A)
 1x cable gland

XS1 connector (DIN EN 175301-803 A)
 XS2 plug (M12x1)

1) Optional

See Chapter 4.6.1 for legend to the terminal diagrams

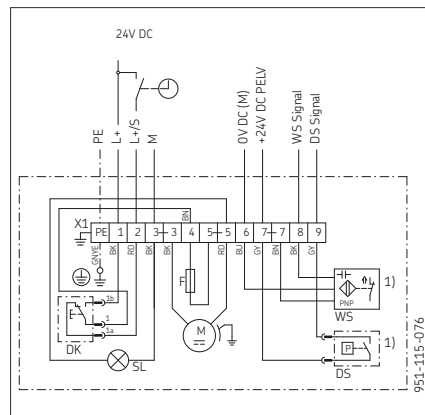
4.7.16 MKF, 3- or 6-liter reservoir, voltage design 24 VDC, with pushbutton

MKU, 3- or 6-liter reservoir, voltage design 24 VDC, with pushbutton, Fig. 26

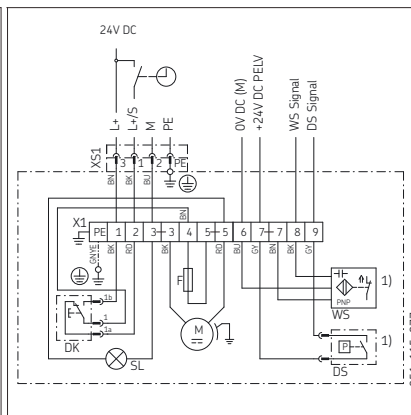
MKF1-12 B __ 0000+924
 MKF2-12(4)B __ 0000+924
 MKF2-12(4)B __ 3000+924

MKF1-12 B __ 1000+924
 MKF2-12(4)B __ 1000+924
 MKF2-12(4)B __ 4000+924

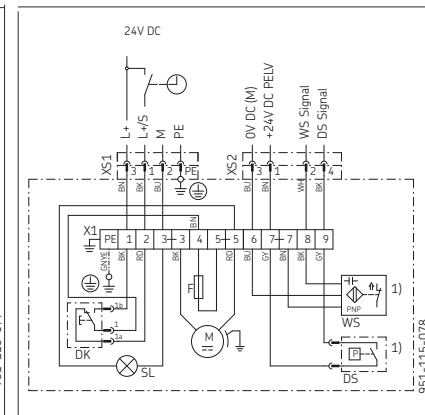
MKF1-12 B __ 2000+924
 MKF2-12(4)B __ 2000+924



Connections via:
 2x cable glands



1x XS1 connector (DIN EN 175301-803 A)
 1x cable gland



XS1 connector (DIN EN 175301-803 A)
 XS2 plug (M12x1)

1) Optional

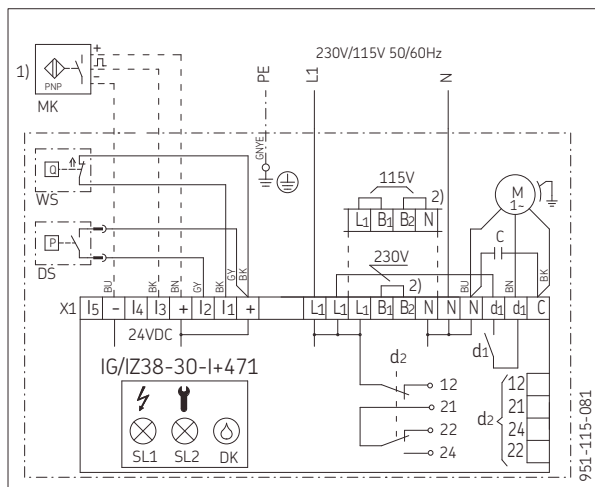
See Chapter 4.6.1 for legend to the terminal diagrams

4.8 Terminal diagrams for MKU/MKF/MKL, 3- or 6-liter reservoir, with control unit

4.8.1 MKU, IG/IZ38 control unit, voltage design 230/115 VAC

MKU, IG/IZ38 control unit, voltage design 230/115 VAC, Fig. 27

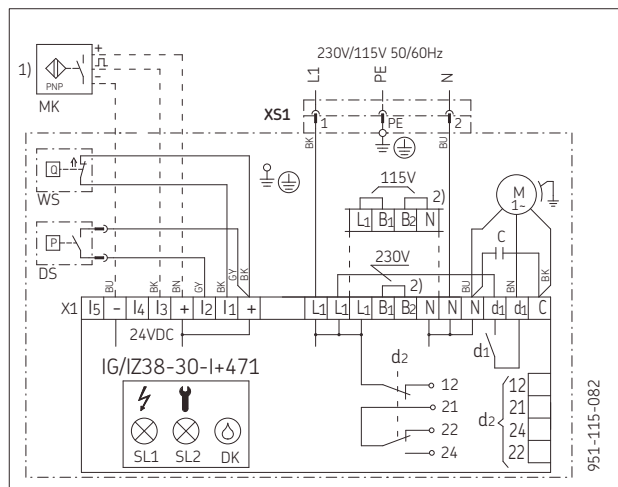
MKU2/5-12/3/4C/D __ 0000+428/+429



Connections via:
2x cable glands

d2:12 = Fault
d2:24 = Normal operation
d2:22 = Fault

MKU2/5-12/3/4C/D __ 1000+428/+429



1x XS1 connector (DIN EN 175301-803 A)
1x cable gland

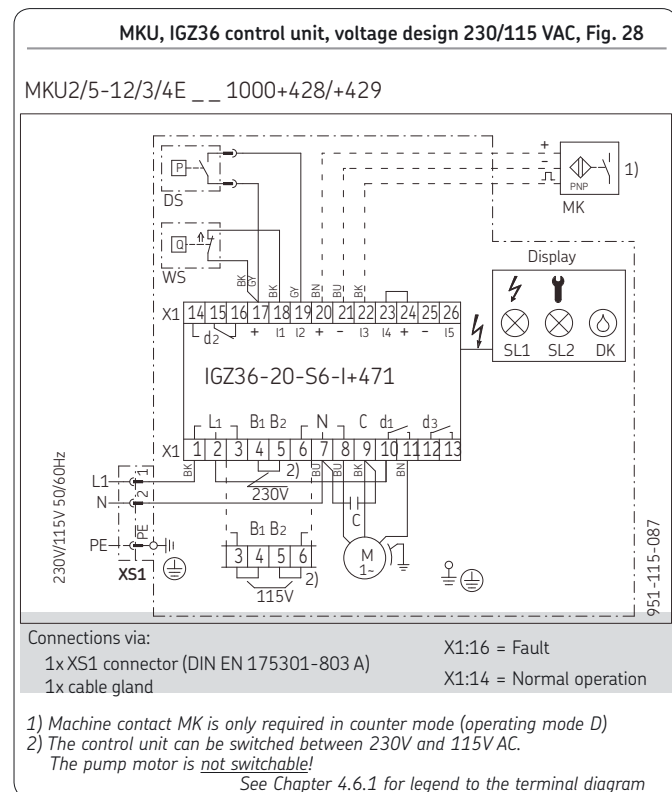
d2:12 = Fault
d2:24 = Normal operation
d2:22 = Fault

1) Machine contact MK is only required in counter mode (IZ38-30-I control unit)

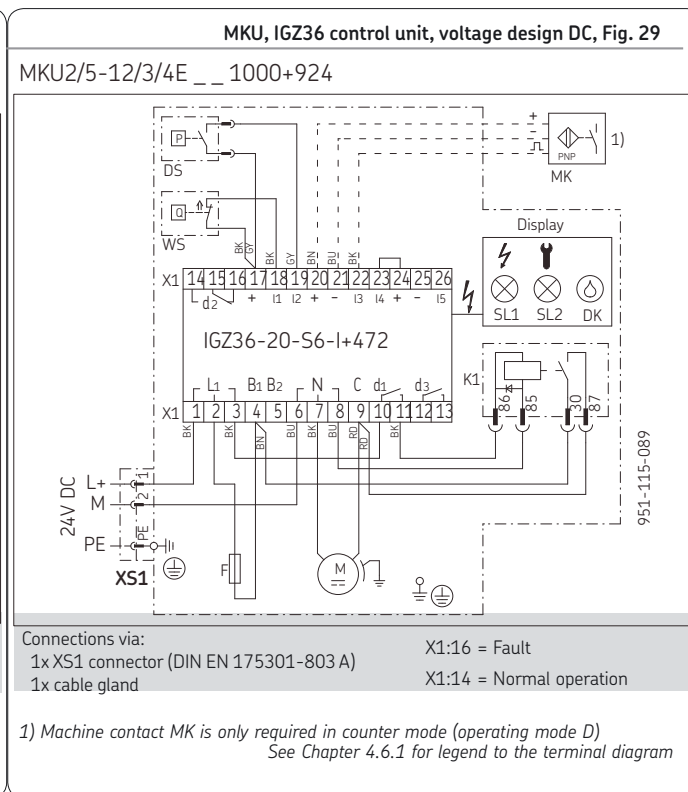
2) The control unit can be switched between 230V and 115V AC. The pump motor is not switchable!

See Chapter 4.6.1 for legend to the terminal diagrams

4.8.2 MKU, IGZ36 control unit, voltage design 230/115 VAC



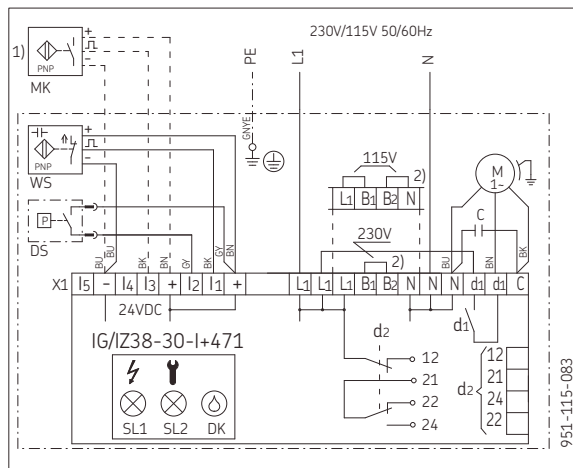
4.8.3 MKU, IGZ36 control unit, voltage design 24 VDC



4.8.4 MKF, IG/I38 control unit, voltage design 230/115 VAC

MKF, IG/I38 control unit, voltage design 230/115 VAC, Fig. 30

MKF2/5-12/4C/D __ 0000+428/+429



Connections via:

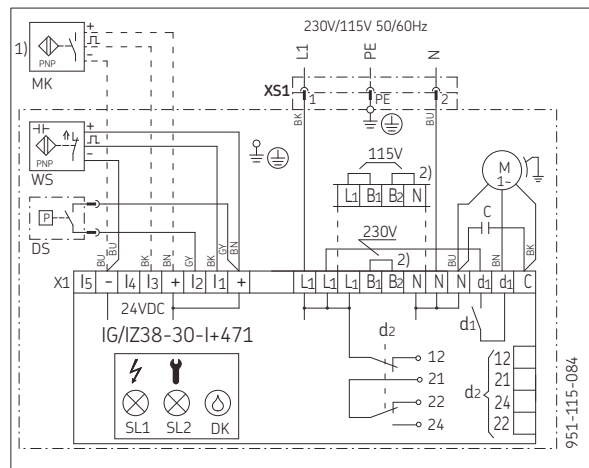
2x cable glands

d2:12 = Fault

d2:24 = Normal operation

d2:22 = Fault

MKF2/5-12/4C/D __ 1000+428/+429

1x XS1 connector (DIN EN 175301-803 A)
1x cable gland

d2:12 = Fault

d2:24 = Normal operation

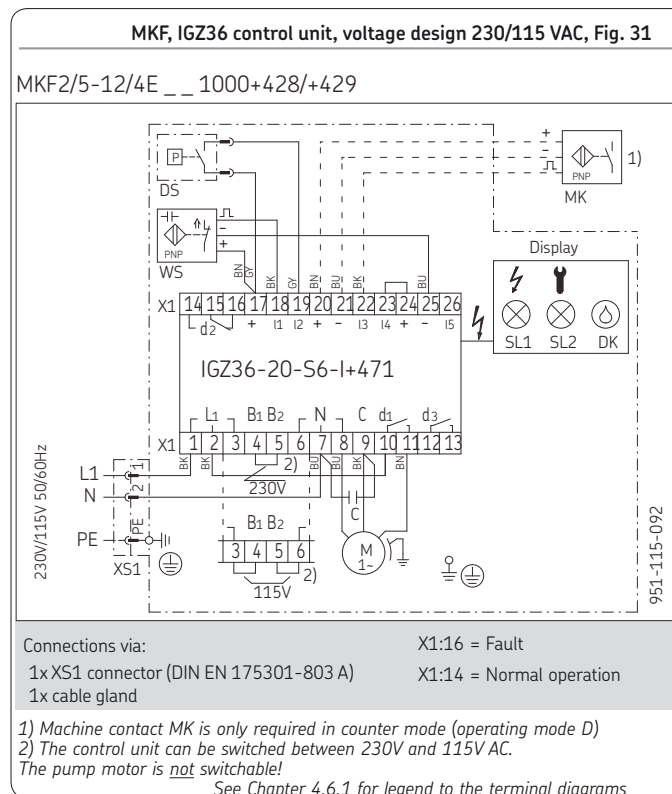
d2:22 = Fault

1) Machine contact MK is only required in counter mode (I38-30-I control unit)

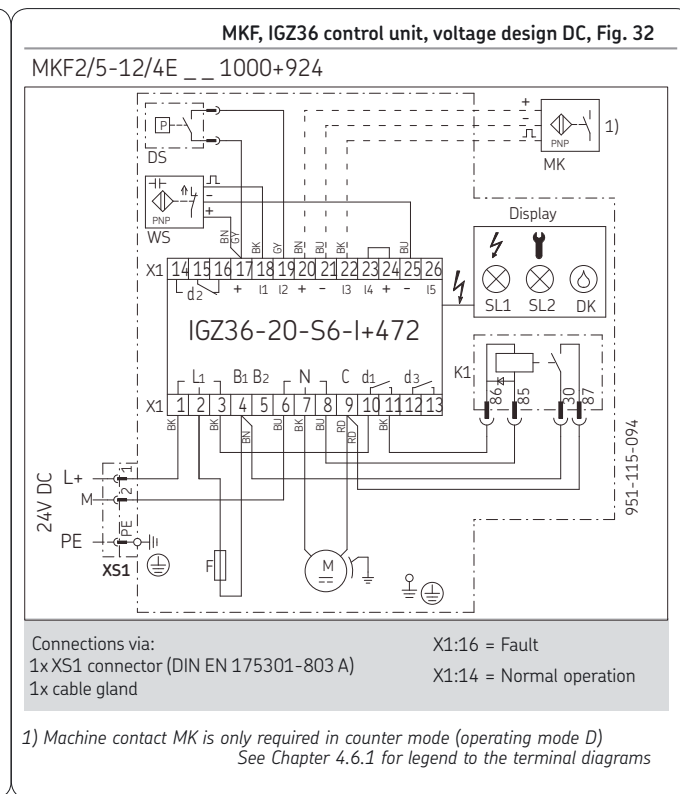
2) The control unit can be switched between 230V and 115V AC. The pump motor is not switchable!

See Chapter 4.6.1 for legend to the terminal diagrams

4.8.5 MKF, IGZ36 control unit, voltage design 230/115 VAC



4.8.6 MKF, IGZ36 control unit, voltage design 24 VDC

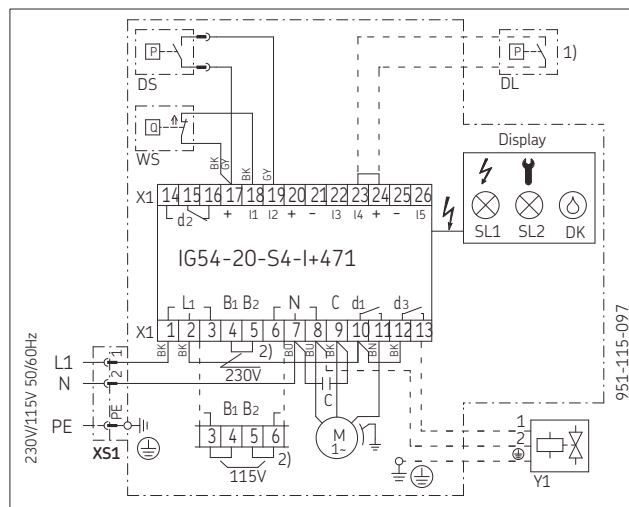


4.8.7 MKL, IG54 control unit, voltage design 230/115 VAC

4.8.8 MKL, IG54 control unit, voltage design 24 VDC

MKL, IG54 control unit, voltage design 230/115 VAC, Fig. 33

MKL2/5-12/3/4F __ 1000+428/+29



Connections via:

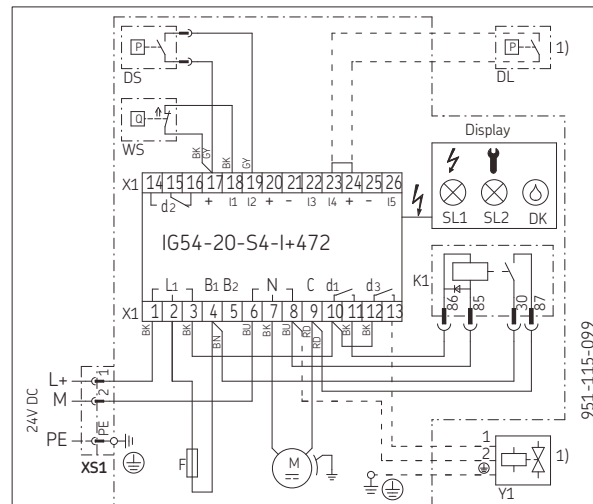
1x XS1 connector (DIN EN 175301-803 A)	X1:16 = Fault or completion of prelubrication cycles
1x cable gland	X1:14 = Normal operation

- 1) Customer-connectable air pressure switch DL, compressed air valve Y1
 2) The control unit can be switched between 230V and 115V AC.
 The pump motor is not switchable!

See Chapter 4.6.1 for legend to the terminal diagrams

MKL, IG54 control unit, voltage design DC, Fig. 34

MKL2/5-12/3/4F __ 1000+924



Connections via:

1x XS1 connector (DIN EN 175301-803 A)	X1:16 = Fault or completion of prelubrication cycles
1x cable gland	X1:14 = Normal operation

- 1) Customer-connectable air pressure switch DL, compressed air valve Y1
 See Chapter 4.6.1 for legend to the terminal diagrams

4.9 Technical connection data

Table 1

Reservoir capacity	2, 3, and 6 liters
Weight empty	
Unit with 2-liter plastic reservoir	3.4 kg
Unit with 3-liter plastic reservoir	4.2 kg
Unit with 3-liter metal reservoir	5 kg
Unit with 6-liter plastic reservoir	5.6 kg
Delivery rate ¹⁾	
MKU, MKL	0.1; 0.2; 0.5 l/min
MKF	0.1; 0.2 l/min
Max. operating pressure	30 bar
Operating temperature	+10 to 40°C
Protection class according to DIN EN 60529 (VDE 0470-1)	IP 54
Pumped media	
MKU, MKL	Mineral oil or synthetic oil
Operating viscosity	20–1500 mm²/s
MKF	Fluid grease of NLGI grade 000 or 00 compatible with plastics, NBR elastomers, copper and copper alloys

1) Based on an operating viscosity of 140 mm²/s (cSt) at a back pressure of p = 5 bar.

AC motor		
Rated frequency	50 Hz	60 Hz
Rated voltage	115/230 V	115/230 V
Rated current	1.06/0.53 A	1.36/0.68 A
Rated output	60 W	75 W
Operating mode acc. to DIN EN 60034-1 (VDE 0530-1) ²⁾	S3, 20% (1.25 to 25 min)	
With integrated thermostat		
Recommended fuse for line protection acc. to DIN EN 60898	B 6A	
DC motor		
Rated voltage	24 V DC	
Rated current	1.6 A	
Starting current	4 A	
Rated output	39 W	
Operating mode acc. to DIN EN 60034-1 (VDE 0530) ²⁾	S3, 20% (1.25 to 25 min.)	
Integrated device protection for motor		
Cartridge fuse-link (5×20 mm) acc. to DIN EN 60127-2 (VDE 0820-2) standard sheet 3	T2 A ⁴⁾	
Recommended fuse for line protection acc. to DIN EN 60898	B 6A or C 4A	

2) The operating mode S3 (periodic duty) describes the ratio of pump cycle time to subsequent down time. If the relative ON-time is 20% and the duty cycle time is 1.25 to 25 min., then the limit values are as follows:
 Min. duty cycle time: 1.25 min.×0.2 = 0.25 min. Pump cycle time with subsequent down time of 1 min.
 Max. duty cycle time: 25 min.×0.2 = 5 min. Pump cycle time with subsequent down time of 20 min.

Fill level switch for oil (opens when fill level too low)

Switching voltage range	10 to 36 V DC / 10 to 25 V AC
Switched current (resistive load) ³⁾	≤ 0.25 A
Pumped media switching capacity (resistive load)	≤ 3 W/VA

Fill level switch for oil (closes when fill level too low)

Operating viscosity	20–1500 mm ² /s
Switching voltage range	10 to 36 V DC/10 to 25 V AC
Switched current (resistive load) ³⁾	≤ 0.25 A
Switching capacity (resistive load)	≤ W/VA

Fill level switch for fluid grease (opens when fill level too low)

Operating voltage range	10 to 36 V DC,
Output current (resistive load) ³⁾	≤ 0.25 A
Power consumption without output load	< 10 mA (24 V), < 15 mA (36 V)
Short-circuit-proof and reverse voltage protection	Yes

Pressure switch (NO-contact)

Nominal pressure	20 bar
Switching voltage range	10 to 36 V DC/10 to 25 V AC
Switched current (resistive load) ³⁾	≤ 1 A
Switching capacity (resistive load)	≤ 10 W/VA

Additional input power for units with control unit

IG38-30 / IZ38-30	4 W
IG54-20 / IGZ36-20	8 W

³⁾ When switching inductive loads, take appropriate measures to protect contacts.

⁴⁾ Minimum short-circuit current of 6A must be ensured.

4.10 Lubrication line connection

The main lubrication line must be mounted on the gear pump unit in such a way that no forces are transferred to the unit once assembled (stress-free connection).

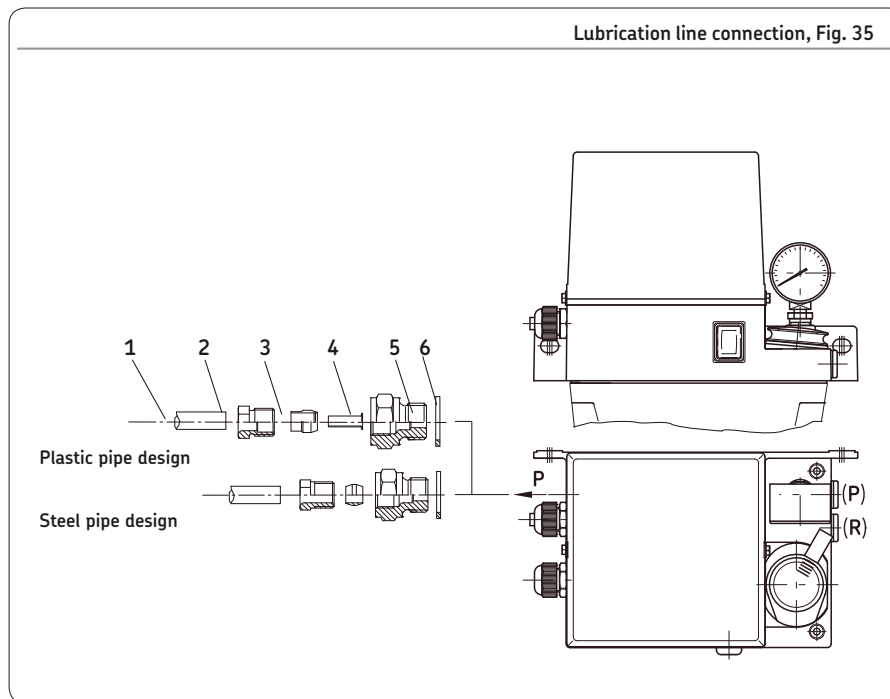
For operating pressures up to 45 bar as can occur especially in single-line piston distributor systems, SKF fittings for solderless pipe unions can be used (double tapered sleeves or tapered sleeves).

SKF recommends the use of SKF plug connectors; see Chapter 12, Accessories. If using fittings from other manufacturers, pay careful attention to the assembly instructions and technical specifications provided by the manufacturer.

4.11 Assembly of the main lubrication line with tapered sleeve union


☞ See Figure 35

- Deburr the connecting end of the main line (steel or plastic pipe) (1)
- Remove the tapered sleeve (2) and socket union (3) from the connecting end (5)
- Pass the main line (1) through the tapered sleeve (2) and socket union (3) (also into a reinforcing socket 4) if using plastic pipe) and attach to the connecting end (5)
- Apply the main line (1), tapered sleeve (2), socket union (3), reinforcing socket (4), connecting end and sealing ring (6) to the pump outlet thread
- Gently tighten the socket union (3) by hand and align the main line (1)
- Tighten the socket union (2) $1\frac{1}{2}$ rotations using an open-end wrench



4.12 Assembly of the lubrication lines using plug connectors

☞ See Figure 36, Fig. 37

	 WARNING
	System pressure 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.

The SKF plug connectors are available in designs for metal or plastic pipes. The claw groove securely fastens the tube in the plug connectors, which prevents the metal tube from slipping out of the SKF plug connector. Both designs, for metal and plastic pipes, have a locking claw. The locking claw of the collet secures the pipe in the SKF plug connector, which prevents the pipe from accidentally slipping out.

- Cut the connecting tube **(1)** to the correct length with a tube cutter (see Accessories).

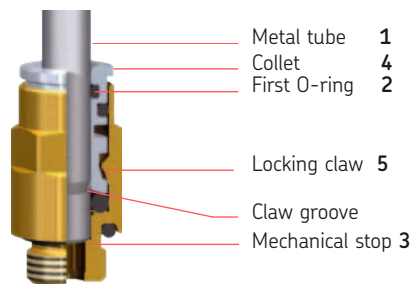
☞ In the following installation of the tube, a noticeable resistance must be overcome when passing through the first O-ring **(2)**, the locking claw **(5)** of the collet **(4)**. If a claw groove is not used, fix the pipe using appropriate fastening hardware (e.g., mounting clips) to prevent the pipe from slipping out of the SKF plug connector.

- Manually insert the pipe **(1)** fully into the collet **(4)** of the SKF plug connector until it clears the first O-ring **(2)** and the locking claw **(5)** of the collet **(4)** and reaches the mechanical stop **(3)**.

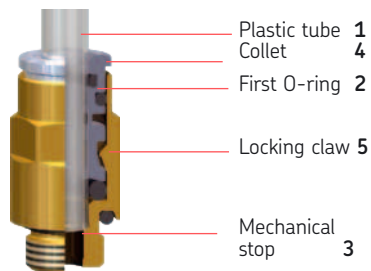
☞ **To remove the metal pipe **(1)****, press the collet **(4)** inward into the SKF plug connector. The metal pipe **(1)** can now be pulled out of the collet **(4)** of the SKF plug connector.

To remove the plastic tube **(1)**, press the collet **(4)** inward into the SKF plug connector. To do this, also press the plastic pipe **(1)** inward into the SKF plug connector fitting, which releases the collet **(4)** from the plastic pipe **(1)**. The plastic tube **(1)** can now be pulled out of the collet **(4)** of the SKF plug connector. Before reassembling, shorten the end of the plastic pipe by at least 7 mm to ensure that the locking claw **(5)** of the collet **(4)** functions properly.

Plug connectors for metal pipe, Fig. 36



Plug connectors for plastic pipe, Fig. 37



4.13 System criteria for MKL gear pump unit

The MKL gear pump unit can be used for oil+air centralized lubrication systems. In this case, consult the corresponding assembly instructions for the oil+air lubrication system when assembling and designing the system. The assembly instructions for the SKF OLA oil+air system are **951-170-004-EN**.

4.14 General information on lubrication line arrangement

When arranging the main lubricant lines and lubrication point lines, observe the following instructions in order to ensure that the entire centralized 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 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.

The pipes, hoses, 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. The lubrication line system also needs to be protected from excessive pressure by means of a pressure regulating valve.

All components of the lubrication line system such as tubes, hoses, shutoff valves and

directional control valves, fittings, etc. must be carefully cleaned before assembly. No seals in the lubrication line system should protrude inwards in a way that disrupts the flow of the lubricant and could allow contaminants to enter the lubrication line system. 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 impeded by the incorporation of sharp bends, angle valves, or flap valves. Unavoidable changes in the cross-section in lubrication lines must have smooth transitions. Sudden changes of direction should be avoided if possible.

	 CAUTION
	Slipping hazard 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, or repair of centralized lubrication systems. Leaks must be sealed off without delay.

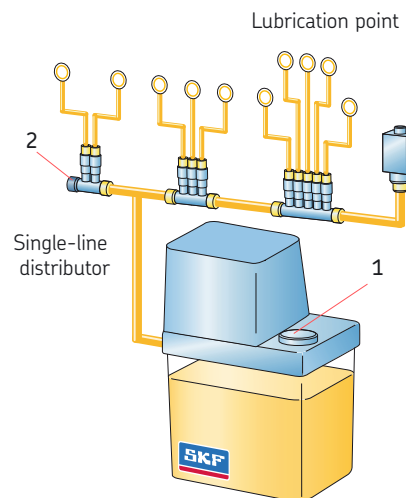
NOTE
Follow the safety instructions on the lubricant's safety data sheet.

4.15 Venting a MKU/MKF/MKL centralized lubrication system

The process of venting the centralized lubrication system can be facilitated by:

- o Opening the ends of the main pipes until lubricant without bubbles is discharged
 - o Filling long pipe sections before connecting to the lubrication points
- Fill the gear pump unit with lubricant via the filler socket (1)
 - Remove the lubricant line at the end of the first distributor (2)
 - Allow the pump to run until lubricant without bubbles discharges
 - Mount the lubrication line
 - Repeat the venting procedure at the following distributor
 - Allow pump to run until oil can be seen discharging at all lubrication points

Single-line centralized lubrication system, Fig. 38

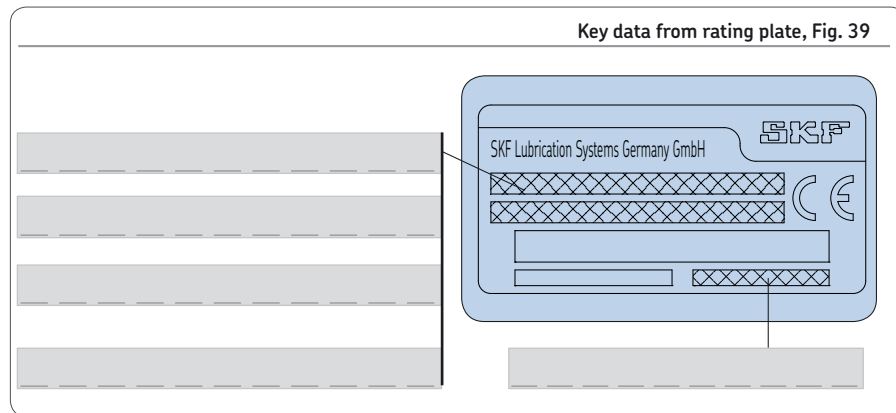


4.16 Note on the rating plate

The rating plate 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



4.17 Notes on the CE marking

The CE marking is performed following the requirements stated in the applied standards:

- 2014/30/EC
Electromagnetic Compatibility
- 2011/65/EU (RoHS II) Directive on the restriction of the use of certain hazardous substances in electrical and electronic equipment

Notes on the Low Voltage Directive

The protective regulations of the low voltage directive 2014/35/EU are complied with according to annex I, no. 1.5.1 of machinery directive 2006/42/EC.

Notes on the Pressure Equipment Directive 2014/68/EU

Due to its performance rates the product does not achieve the limit values fixed in article 4 (1)(a)(i) and is excluded from the scope of the pressure equipment directive 2014/68/EC article 4(3).

Gear Pump Units of Product Series MKU, MKF, MKL

for oil and fluid grease for use in SKF MonoFlex single-line
and oil+air centralized lubrication systems

**Operating instructions associated
with assembly instructions**

1. Safety instructions

2. Lubricants

1.1 General information

NOTE

The operator of the product described here must ensure that the operating instructions are read and understood by all persons responsible for assembly, operation, maintenance, and repair of the product. In addition to the operating instructions, general statutory regulations and other regulations for accident prevention and environmental protection must be observed and applied.

NOTE

The lubricant notes listed in Chapter 2 "Lubricants" of the assembly instructions also apply without restriction to these operating instructions.

The operator of the product described here must ensure that the operating instructions are read and understood by all persons responsible for assembly, operation, maintenance, and repair of the product. In addition to the operating instructions, general statutory regulations and other regulations for accident prevention and environmental protection must be observed and applied.

3. Delivery, returns, and storage


3.1 Checking the delivery

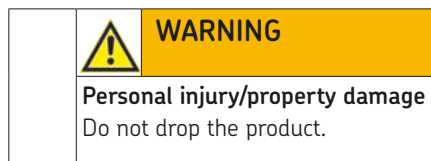
Immediately after receipt, the delivery must be checked for completeness according to the shipping documents. Any transport damage must be reported to the transport company immediately. The packaging material should be preserved until any discrepancies are resolved.

3.2 Returns

Before return shipment, all parts must be cleaned and properly packed (i.e., according to the requirements of the recipient country). There are no restrictions for land, air, or sea transport.

The following must be marked on the packaging of return shipments:

	Do not top load / This side up
	Keep dry
	Handle with care, Do not drop



The following conditions apply to storage:

3.3 Storage

3.3.1 Lubrication units

- o Dry and dust-free surroundings, storage in well ventilated dry area
- o Storage time: max. 24 months
- o Relative humidity: < 65%
- o Storage temperature: +10°C - +40°C
- o No direct sun or UV exposure
- o Protected against nearby sources or heat or cold

3.3.2 Electronic and electrical devices

- o Dry and dust-free surroundings, storage in well ventilated dry area
- o Storage time: max. 24 months
- o Relative humidity: < 65%
- o Storage temperature: +10°C - +40°C
- o No direct sun or UV exposure
- o Protected against nearby sources or heat or cold

3.3.3 General notes

- o The product(s) can be enveloped in plastic film to provide low-dust storage
- o Protect against ground moisture by storing on a shelf or wooden pallet
- o Bare metallic surfaces must be protected using anti-corrosion agents Check corrosion protection every 6 months and reapply if necessary
- o Motors must be protected from mechanical damage Do not store motors on the fan cowl

4. Assembly

4.1 Information on assembly

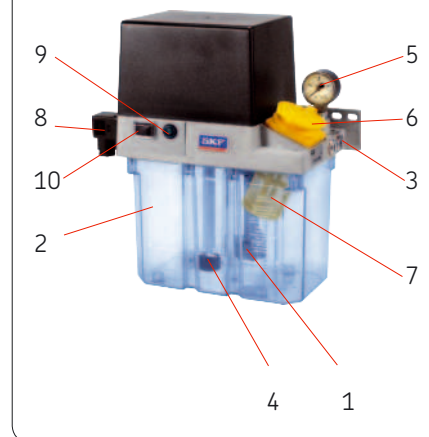
The assembly procedure for the product is described in detail in the assembly instructions (Chapter 4) associated with these operating instructions.

5. Functional description

5.1 General

Gear pump units are reservoir units with electrically driven gear pumps that contain all hydraulic and electrical components required for the operation of a piston distributor system or an oil+air centralized lubrication system. Thanks to their compact construction, gear pump units can be used to set up piston distributor systems to lubricate small and mid-sized machines, machine groups and systems very easily and with low mounting effort.

MKU gear pump unit, Fig. 1



5.2 Structure of a gear pump unit

☞ See Figure 1

In the basic design, gear pump units contain an electrically driven gear pump **(1)**, a lubricant reservoir **(2)** (plastic = 2-, 3-, and 6-liter rated capacity; metal = 3-liter rated capacity), a pressure switch **(3)** for electrical pressure monitoring, a fill level switch **(4)** for monitoring the minimum fill level, and a pressure gauge **(5)** for visual pressure monitoring.

A pressure relief valve and a pressure-regulating valve are also mounted inside the gear pump unit. The filler socket **(6)** is accessible from outside the unit and is equipped with a filler screen **(7)** (only on gear pump units for oil lubrication).

The plastic reservoirs consist of transparent plastic that allows visual inspection of the fill level. The metal reservoirs (only on the oil design) contain a fill level indicator that likewise allows visual inspection of the fill level. Due to the components built into the reservoir, only a maximum of 80% of the

theoretical reservoir capacity (rated capacity) can be used.

The pressure relief valve mounted in the gear pump unit is required in order to relieve the system pressure built up during a lubricating cycle to a residual pressure of ≤ 0.5 bar once the motor is turned off.

This is required for the operation of the piston distributors.

The pressure-regulating valve mounted in the gear pump unit is required in order to limit the maximum permissible system pressure in the centralized lubrication system to a maximum value. In the basic design, the pressure-regulating valve in a gear pump unit is set to a maximum system pressure of 30 bar.

Gear pump units are available in model designs with or without a control unit. In the model design without a control unit, the gear pump unit (and thus the lubrication interval) is controlled by the control unit of the machine that the gear pump unit is

mounted on. In the model design with a control unit, the gear pump unit is equipped with an electronic control unit that controls the gear pump unit (and thus the lubrication interval).

In the model designs with or without a control unit, the electrical connection to the supply voltage is established using a rectangular connector **(8)** as per DIN EN 175301-803-A (clamping range \varnothing 8 to 10 mm).

In the model design without a control unit, the electrical connection to monitoring units such as pressure switches and float switches is established via a terminal strip. The electrical line is run outwards via a cable gland (clamping range \varnothing 6 to 12 mm or \varnothing 5 - 10 mm) mounted on the gear pump unit.

In the model design with a control unit, the electrical connection to the monitoring units such as pressure switches and float switches is established inside the gear pump unit directly to the connectors on the

electronic control unit. Depending on the control unit's model design, a signal line for fault monitoring can be run outwards to connect to the machine control unit via a cable fitting (clamping range Ø 6 to 12 mm or Ø 5 - 10 mm) mounted on the gear pump unit.

Depending on the model design, the gear pump unit can be equipped with an indicator lamp (9) in the front panel. If the indicator lamp is lit green, this indicates that the unit is operating (pump motor running = lubricating). If the indicator lamp is lit red, this indicates a malfunction (only on design with a control unit).

Depending on the model design, the gear pump unit can be equipped with a pushbutton (10) in the front panel. The pushbutton is used for manually performing an interim lubrication.

The electrical circuit diagram of the gear pump unit is affixed inside the unit's cover cap and can be accessed by removing the

cap. This diagram is affixed in such a way that it cannot be removed.

The hydraulic pressure connection can be established via

either of the two pressure ports on the metal lid (letter P). A return line can be connected on the return connection (letter R). The pipe thread size for the pressure port and return connection is G1/4. On delivery, one of the two pressure ports and the return connection are closed leak-tight with a screw plug. The second pressure port is closed with a plastic plug.

Oils or fluid greases can be used as lubricants, depending on the design of the gear pump unit. For details on the lubricants that are to be used, consult the documentation or the Chapter "Technical Data."

Detailed information about the function and the electrical connection of the gear pump unit is included in Chapter 4 of the assembly instructions.

The documentation can also be requested directly from SKF Lubrication Systems Germany GmbH.

5.3 Gear pump unit without control unit

Gear pump units without an integrated electronic control unit are controlled by the control unit of the machine to which the gear pump unit is connected. The machine control unit controls the pump cycle time, the pump delay time, and the interval time of the gear pump unit according to the lubricant required by the lubrication points. The pump cycle time, referred to as the contact time, consists of the pressure build-up time and the pump delay time.

The monitoring time consists of the period between switching on the gear pump motor and establishment of the maximum pressure built-up time. A fault signal will be issued if the maximum pressure build-up time elapses without the pressure switch closing.

The interval time is the period between two pump cycle times (contact time).

A lubricating cycle consists of the contact time and the interval time.

Operating mode S3 of the gear pump motor is used to define the interval time, the pump cycle time, and the pump delay time.

Consult the “Technical data” chapter for information on the operating mode.

With regard to monitoring pressure build-up in the main lubricant line during a lubricating cycle, note that several seconds may pass after the gear pump motor is switched on before the pressure switch responds. A fixed monitoring time for lubricant pressure build-up is recommended so that the machine control unit waits until this time has elapsed to issue a fault notification if the required lubricant pressure is not reached. A period of approx. 60 seconds is recommended. The pressure switch responds once the required lubricant pressure has been reached. If the required lubricant pressure is not reached, the machine must be shut down to prevent underlubrication of the bearings.

To prevent underlubrication of the bearings in the oil +air pump design (MKL without control unit), the monitoring of minimum air pressure of the supplied compressed air must be configured so that the machine is shut down if there is no air pressure or the

pressure drops too low. Ensure that a time buffer is stored in the machine control unit to level out brief pressure fluctuations in the compressed air supply.

In order to prevent underlubrication of the bearings, monitoring of the minimum fill level of the lubricant reservoir must be configured in such a way that the machine is shut down if the fill level is too low.

5.4 Gear pump unit with control unit (IG/IZ38, IGZ36, IG54)

Gear pump units with a control unit contain a programmable electronic control unit that can be used to control and monitor the gear pump unit. Electronic control units are designed as pulse generators/pulse counters (contactors/contact counters).

For pulse generators (contactors), the device determines the length of the interval by starting at the intervals defined by the operator.

Depending on the model design, the electronic control unit allows configuration of the interval time, pump delay time, and the number of prelubrication cycles. One or more prelubrication cycles with short interval times can be triggered prior to starting up the machine.

Prelubrication cycles ensure that, prior to actually starting the machine, a sufficient quantity of lubricant is built up in the lubricant lines and distributor or (in oil+air centralized lubrication systems) a fully developed oil streak is formed in the lubrication point lines.

The pump cycle time is 60 seconds and cannot be changed.

For pulse generators (contact counters), the interval is determined by the machine, which sends pulses to the control unit during operation. The control unit counts the pulses that are received on the machine contact (MK or MKPV) and starts a contact time after the pre-set number of pulses. The operator can set the number of incoming pulses to be counted.

Some of the control units provide support for monitoring devices. The electrical connection of the monitoring units is established at the terminal strip of the electronic control unit of the gear pump unit. The control unit directly monitors the operation of the oil pressure switch, the pressure switch for minimum air pressure (both possible on MKL design), and the fill level switch.

Gear pump units with an electronic control unit are supplied with all internal wiring fully connected. Depending on the electronic control

unit's model design, a signal line for fault monitoring can be connected to the electronic control unit for connection to the machine control unit.

The signal line is run outwards via a cable gland mounted on the gear pump unit. Details on the function and operation of the electronic control unit can be found in the assembly instructions for the electronic control unit, which are included in the scope of delivery of a gear pump unit.

5.5 Control unit designs with their basic settings

Control unit:
Operating instructions:
Description:

IG38-30-I
951-180-000-EN
The IG38-30-I is used as a pulse generator.

Functions

- Adjustable interval time
- Interval time extension
- Pump cycle time limit
- Pressure build-up monitoring
- Fill level monitoring (NC contact)

Control unit:
Operating instructions:
Description:

IZ38-30-I
951-180-000-EN
The IZ38-30-I is used as a pulse counter.

Functions

- Adjustable interval time
- Pump cycle time limit
- Pressure build-up monitoring
- Fill level monitoring (NC contact)

IG38-30-I parameters, Table 1

Designation	Default	Unit	Adjusted via	Adjustment range	Unit
Interval time	1	Minutes	Rotary switch	1 - 2048 in binary increments	Minutes
Monitoring time	60	Seconds	Non-adjustable	+ 3000	
Delay time	15	Seconds	Non-adjustable	+ 4000 + 5000	

IZ38-30-I parameters, Table 2

Designation	Default	Unit	Adjusted via	Adjustment range	Unit
Interval time	1	Pulses	Rotary switch	1 - 2048 in binary increments	Pulses
Monitoring time	60	Seconds	Non-adjustable	+ 3000	
Delay time	15	Seconds	Non-adjustable	+ 4000 + 5000	

Control unit: **IGZ36-20-S6-I**

Operating instructions: **951-180-001-EN**

Description: The IGZ36-20-S6-I device can be used as a pulse generator (operating mode B) and a pulse counter (operating mode D).

Functions

- Adjustable interval time
- Adjustable pump delay time
- Adjustable monitoring time
- Pump cycle time limit
- Pressure build-up monitoring
- Pressure reduction monitoring
- Fill level monitoring (NC contact)

IGZ36-20-S6-I parameters, Table 3

Designation	Abbreviation	Default	Unit	Adjustment range	Unit
Operating mode	BA	B		B (pulse generator) D (pulse counter)	
Interval time	TP	10	Minutes	01 E 00 - 99 E 04 (BA B) 01 E 00 - 99 E 04 (BA D)	Minutes Pulses
Monitoring time	TU	60	Seconds	01 E 00 - 10 E 01	Seconds
Delay time	TN	15	Seconds	01 E 00 - 30 E 00	Seconds

Control unit: **IG54-20-S4-I**

Operating instructions: **951-180-001-EN**

Description: The IG54-20-S4-I device can only be used as a pulse generator (operating mode B).

Functions

- Adjustable interval time
- Adjustable number of prelubrication cycles
- Adjustable pump delay time
- Pump cycle time limit
- Oil pressure monitoring
- Air pressure monitoring
- Fill level monitoring (NC contact)
- Non-volatile memory (EEPROM)
- Additional output d3 for compressed-air valve

IG54-20-S4-I parameters, Table 4

Designation	Abbreviation	Default	Unit	Adjustment range	Unit
Operating mode	BA	B		Non-adjustable	
Interval time	TP	10	Minutes	01 E 00 - 99 E 00	Minutes
Monitoring time	TU	60	Seconds	Non-adjustable	
Delay time	TN	5	Seconds	00 E 00 - 99 E 00	Seconds
Prelubrication cycles	VZ	10		00 E 00 - 99 E 00	

5.6 Lubrication systems

5.6.1 General

Gear pump units are generally used for single-line systems with piston distributors. Single-line systems with piston distributors are total-loss lubrication systems.

5.6.2 Total-loss lubrication systems

Total-loss lubrication systems feed clean lubricant (oil, fluid grease or grease) to one or more lubrication points at specific intervals (dependent on time or machine cycle) during the lubricating cycle time (contact time, pump cycle time). The quantity of lubricant fed is measured so that the lubrication points are supplied with adequate lubricant during the total-loss lubrication system's interval time to maintain a lubricant film between the friction partners. The lubricant fed to the lubrication point is partially consumed during operation due to aging, evaporation, and leaks. An interval-controlled supply of lubricant to the lubrication point is

required in order to ensure that the lubrication point receives adequate lubrication. Such systems are referred to as intermittently operated centralized lubrication systems.

Lubrication points cannot be cooled when using a total-loss lubrication system.

5.6.3 Single-line systems with piston distributors

☞ See Figures 2 and 3

Single-line systems with piston distributors generally consist of a reservoir unit, and here include a gear pump unit, piston distributors, and lubrication lines. The pressure-regulating valve and pressure relief valve required for the centralized lubrication system's operation are mounted in the gear pump unit.

If pressure losses of greater than 10 bar are expected in the centralized lubrication system, for example due to expansion of

the system or due to the viscosity of the lubricant (depending on the ambient temperature), a pressure switch should be positioned before the last lubricant distributor to monitor the centralized lubrication system. The pressure switch monitors whether the required pressure build-up occurs in the centralized lubrication system during the pump cycle time.

The pump delay time specified by the control unit or machine control unit (8 to 15 seconds are recommended; other delay times are possible depending on the layout of the centralized lubrication system) ensures pressure build-up in the centralized lubrication system. Pressure in the main lubricant line must be relieved after the pump is switched off in order to ensure proper functioning of the piston distributors. This is performed by the pressure relief valve mounted in the gear pump unit. On centralized lubrication systems with extended main lubricant lines longer than 100 m, the main lubricant line must be designed as a

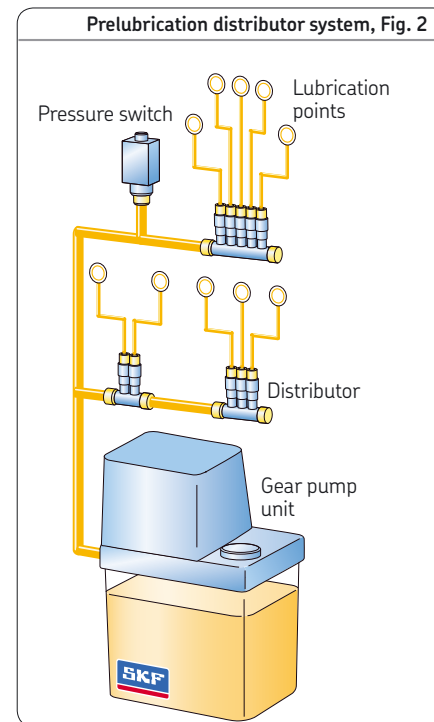
5.6.5 Lubricating cycle of prelubrication distributor

ring line (use the second pressure port P) and the relief procedure in the centralized lubrication system must be facilitated using additional valves (using the return connection R).

5.6.4 Lubricating cycle sequence

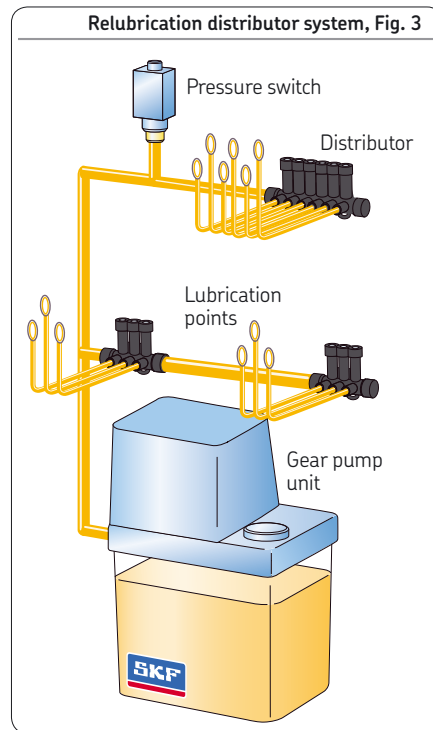
The sequence of a lubrication cycle depends on the type of piston distributors in use. Piston distributors are differentiated into prelubrication distributors and relubrication distributors. Piston distributors designed as prelubrication distributors deliver the metered quantity of lubricant at the same time that pressure is built up in the lubricant line. Piston distributors designed as relubrication distributors supply the metered quantity of lubricant after the pressure relief procedure in the lubricant line.

After the electric motor is switched on, the lubricant is drawn out of the lubricant reservoir by the gear pump and fed through the lubricant line to the prelubrication distributors via the pressure relief valve and the pressure regulating valve. The pressure built up in the centralized lubrication system meters the lubricant separately for each lubrication point and feeds it to the consuming points. After the electric motor is switched off, the pressure is relieved in the centralized lubrication system. In this process, the lubricant is moved within the prelubrication distributor from the spring chamber into the metering chamber. The centralized lubrication system is ready for the next lubrication cycle.



5.6.6 Lubricating cycle of relubrication distributor

After the electric motor is switched on, the lubricant is drawn out of the lubricant reservoir by the gear pump and fed through the lubricant line to the relubrication distributors via the pressure relief valve and the pressure regulating valve. The pressure built up in the centralized lubrication system feeds the lubricant into the storage chamber of the relubrication distributors. After the electric motor is switched off, the pressure is relieved in the centralized lubrication system. In this process, the lubricant is metered within the relubrication distributor and delivered to the lubrication point (relubrication effect). After the lubricant has been completely expelled to the lubrication point, the centralized lubrication system is ready for the next lubrication cycle.



6. Commissioning

NOTE

Only fill using clean lubricant and an appropriate device. Contaminated lubricants lead to system malfunctions. The lubricant reservoir must be filled without introducing bubbles.

NOTE

Different lubricants must not be mixed together. Doing so can cause damage and require 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 General

The described product functions automatically. The lubricant transport in the lubrication lines should, however, be subjected to regular visual inspection.

6.2 Interim lubrication pushbutton

The gear pump unit can optionally be equipped with a pushbutton **(1)** (DK) for manually triggering an interim lubrication. This is often used when performing setup work on the machine/system. The gear pump unit delivers lubricant as long as the pushbutton remains pressed.

MKU gear pump unit, Fig. 4

Cover cap

1



DK
pushbutton



6.3 Commissioning

Before the product is commissioned, all electrical and hydraulic connections must be inspected.

The lubricant reservoir must be filled with clean lubricant without introducing bubbles. The gear pump unit should be operated only approx. 15 min. after filling in order to allow possible air pockets to escape.

Air pockets in the lubricant adversely affect the function of the device and impair the reliability of lubricant delivery, which can result in damage to the bearings requiring lubrication.

Prior to commissioning, the centralized lubrication system must be vented as described in the assembly instructions, Chapter 4.15.

Proceed as follows to commission:

- Check all connections for tight fit
- Check whether sufficient lubricant is present in the lubricant reservoir
- Start the system

The functional check on the gear pump unit is performed as follows:

- When the machine is at a standstill, check whether signals are exchanged properly between the machine and the gear pump unit
- If available, trigger an interim lubrication using the pushbutton

7. Operation/shutdown and disposal

7.1 Operation

NOTE

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

NOTE

Only fill using clean lubricant and an appropriate device. Contaminated lubricants lead to system malfunctions. The customer's lubricant reservoir must be filled without introducing bubbles.

NOTE

Property damage due to mixing of different lubricants

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 functions automatically. The lubricant transport in the lubrication lines should, however, be subjected to regular visual inspection. The lubricant fill level in the lubricant reservoir should be subjected to visual inspection on a regular basis. If the lubricant fill level is too low, lubricant needs to be topped up.

7.2 Temporary shutdown

The described product can be temporarily shut down by disconnecting the electrical and/or hydraulic supply connections. The instructions in the "Assembly" chapter 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 the Chapter "Transport, delivery, and storage" of these assembly instructions.

To recommission the product, follow the instructions in the Chapter "Assembly" in the assembly instructions.

7.3 Recommissioning


The lubricant may only be fed without bubbles. The lubricant reservoir must be filled with clean lubricant. The product is then operated until lubricant without bubbles is discharged at all lubrication points.

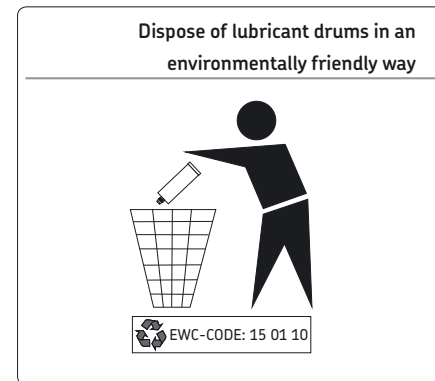
Air pockets in the lubricant adversely affect the function of the device and impair the reliability of lubricant delivery, which can result in damage to the bearings requiring lubrication.

7.4 Shutdown and disposal

If the product is to be shut down permanently, observe the legal requirements for disposal of contaminated parts/equipment.



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



	<p>Note</p> <p>Environmental pollution Lubrication lines must always be free of leaks. Lubricants can contaminate soil and waterways. Lubricants must be used and disposed of properly. Observe the local regulations and laws regarding the disposal of lubricants.</p>
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8. Maintenance

8.1 General

	 WARNING
	Electric shock De-energize the product prior to beginning work. Electrical connections for the product may only be established by qualified personnel authorized to do so by the operator. The electrical operating conditions and local regulations (e.g., DIN, VDE) must be observed.

	 WARNING
	Hot surface 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.

SKF products are low-maintenance. All connections and fittings must be regularly inspected for proper seating to ensure proper function. If necessary, the product's exterior can be cleaned using mild cleaning agents that are compatible with the product's materials (non-alkaline, non-soap). For safety reasons, the product must be disconnected from the power supply. Do not allow any cleaning agent to enter the interior of the product during cleaning. The interior of the product does not need to be cleaned.

The interior of the product must be cleaned if incorrect or contaminated lubricant is accidentally filled into the product. Contact the SKF Service department if this occurs.

Dismantling of the product or individual parts thereof within the statutory warranty period is prohibited and voids any claims.

NOTE

Only original SKF spare parts may be used. Unauthorized alterations and the use of non-original spare parts and accessories are prohibited and nullify the statutory warranty.

NOTE

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

8.2 Maintenance schedule

The maintenance intervals are determined depending on the specific conditions of the application.

The criteria are machine-specific settings such as lubricant quantity, ambient and operating conditions, and the purity of the lubricant used.

Due to these conditions, the customer defines and maintains the maintenance intervals.

If the reservoir has been emptied, the entire system must be ventilated after refilling (assembly instructions, Chapter 4.15).



The purity of the lubricants used is the decisive factor in the service life of the gear pump unit.

Maintenance intervals vary depending on the system and are affected by environmental factors such as dust and heat. The maintenance intervals are therefore defined by the system manufacturer.

Component	Check	Operating hours
System	<ul style="list-style-type: none"> Visually inspect the bearing's lubrication 	
System/pump	<ul style="list-style-type: none"> Regularly inspect system components for leaks 	
Pump	<ul style="list-style-type: none"> Inspect electrical cables for damage Inspect electrical connections and contacts Inspect fill level (lubricant reservoir) 	
System/pump	<ul style="list-style-type: none"> Check the shelf life of the lubricant 	

8.3 Service

If you encounter problems or have any questions, please contact our sales and service centers or our representatives abroad. A list with current addresses is available on the Internet at:

www.skf.com/lubrication

9. Malfunctions, causes, and remedies



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



NOTE

Dismantling of the product is prohibited and voids any claims. Defective products must be replaced. Only SKF Service is capable of repairing them.

NOTE

Only original SKF spare parts may be used. Unauthorized alterations to products and the use of non-original spare parts and accessories are prohibited.

	 WARNING
	System pressure 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.

	 WARNING
	Hot surface 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.

9.1 Prior to beginning troubleshooting

If the gear pump unit does not pump, first check the customer's power supply. Only after the power supply has been verified and there are no system-related malfunctions outside of the pump should you search for and resolve the source of the error on the pump in accordance with Chapter 9.2.

9.2 Replacing a defective fuse (24 VDC)

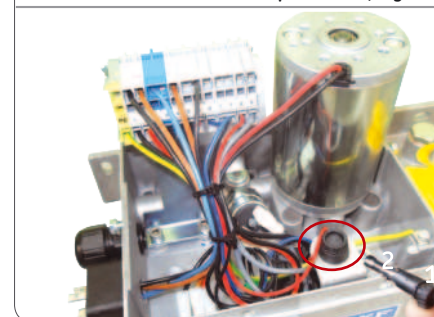
See Figure 5

NOTE

The cause of the malfunction must be resolved prior to replacing the defective fuse. The defective fuse may only be replaced with a fuse of the same type.

- Resolve the cause of the malfunction
- Disconnect the gear pump unit from the power supply
- Loosen screws on both sides of the motor's cover cap using a screwdriver
- Carefully lift the cover cap and put it aside
- Push in the bayonet closure (1) of the fuse housing and loosen it counterclockwise
- Replace the defective fuse (2) with a new fuse of the same type
- Push the bayonet closure (1) of the fuse housing into the fuse box and turn it clockwise to seal
- Apply the cover cap and tighten both screws
- Connect the gear pump unit to the power supply
- Switch on the gear pump unit
- Conduct a functional test

Fuse replacement, Fig. 5



Spare part, Table 5

Designation	Order No.
Fuse Fuse-link (5x20mm) T2A acc. to DIN EN 60127-2 (VDE 0820-2) standard sheet 3	179-990-206

9.3 Commissioning, product, and system malfunctions

Malfunction	Cause	Remedy
Motor fails to start when the operating voltage is applied	o No operating voltage on motor	<ul style="list-style-type: none"> • Check mains connection • Check mains plug/cable and connect properly if necessary • Check operating voltage on motor • Check fuse • Check motor circuit breaker
	o Pump jammed	<ul style="list-style-type: none"> • Measure motor current If current is impermissibly high: • Dismantle pump, crank by hand: • If resistance is high, replace the pump.
	o Motor jammed	<ul style="list-style-type: none"> • Measure motor current If current is impermissibly high: • Dismantle motor, crank by hand: • If resistance is high, replace the motor.
Motor runs with difficulty and at a low speed	o Sluggish pump	<ul style="list-style-type: none"> • Measure motor current If current is impermissibly high: • Dismantle pump, crank by hand: • If resistance is high, replace the pump.
Motor runs with difficulty and at a low speed	o Sluggish motor	<ul style="list-style-type: none"> • Measure motor current If current is impermissibly high: • Dismantle motor, crank by hand: • If resistance is high, replace the motor.
	o Unsuitable lubricant (see technical data)	<ul style="list-style-type: none"> • Remove lubricant from entire system and dispose of lubricant in the proper manner; fill system with suitable lubricant
	o Pressure too high, pressure-regulating valve is jammed or defective	<ul style="list-style-type: none"> • Check pressure-regulating valve and replace if necessary

Malfunction	Cause	Remedy
Motor runs with difficulty and at a low speed	o Ambient temperature too low (see technical data)	<ul style="list-style-type: none"> • Increase ambient temperature
Pump does not convey lubricant; no pressure build-up	o Pump jammed	<ul style="list-style-type: none"> • Measure motor current. If current is impermissibly high: • Dismantle pump, crank by hand: • If resistance is high, replace the pump.
	o Motor jammed	<ul style="list-style-type: none"> • Measure motor current. If current is impermissibly high: • Dismantle motor, crank by hand: • If resistance is high, replace the motor.
	o Incorrect rotational direction of motor	<ul style="list-style-type: none"> • Check pressure-regulating valve to make sure that opening pressure is correct and that there is no contamination or damage • If opening pressure is incorrect or if the pressure-regulating valve is damaged, replace the valve. Only use original SKF spare parts. • If contaminated, clean the pressure-regulating valve
No pressure build up in the main line	o Air in the main line o Main line leaky/broken	<ul style="list-style-type: none"> • Vent main line • Repair main line
	o Pressure-regulating valve does not close	<ul style="list-style-type: none"> • Check pressure-regulating valve to make sure that opening pressure is correct and that there is no contamination or damage • If opening pressure is incorrect or if the pressure-regulating valve is damaged, replace the valve. Only use original SKF spare parts. • If contaminated, clean the pressure-regulating valve

Malfunction	Cause	Remedy
No pressure build up in the main line	o Pressure relief valve does not close	<ul style="list-style-type: none">• Clean or replace pressure relief valve. Only use original SKF spare parts.
	o Unsuitable lubricant (see technical data)	<ul style="list-style-type: none">• Remove lubricant from entire system and dispose of lubricant in the proper manner; fill system with suitable lubricant
	o Fill level too low	<ul style="list-style-type: none">• Top up lubricant

10. Technical data

Technical data

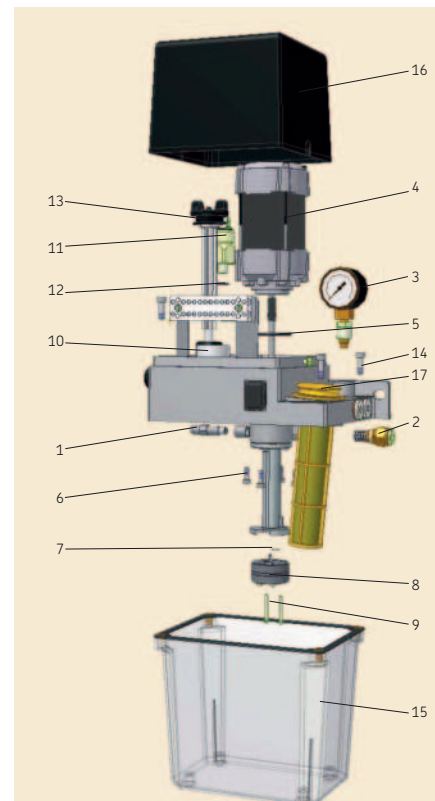
Gear pump unit	Unit	MKU1(2)(5)-..	MKF1(2)-..	MKL1(2)(5)-..
General Delivery rate ¹⁾ Ambient temperature Rated capacity of reservoir Reservoir material Pressure regulating valve Pressure relief valve Protection class Permiss. oil viscosity ²⁾ NLGI grade for fluid grease	l/min °C liter bar cSt (mm ² /s) -	0.1 (0.2)(0.5) +10 to +40 2 (3) (6) Plastic or metal 30 Included IP 54 20 to 1500 -	0.1 (0.2) +10 to +40 2 (3) (6) Plastic 30 Included IP 54 - 000, 00	0.1 (0.2)(0.5) +10 to +40 2 (3) (6) Plastic or metal 30 Included IP 54 20 to 1500 -
AC motor ³⁾ Rated voltage Rated current Rated frequency Rated output Rated speed Operating mode	Type V A Hz W rpm	Capacitor motor 230 0.53/0.68 50/60 60/75 2600/3050 S3 20% (1.25 to 25min)	Capacitor motor 230 0.53/0.68 50/60 60/75 2600/3050 S3 20% (1.25 to 25min)	Capacitor motor 230 0.53/0.68 50/60 60/75 2600/3050 S3 20% (1.25 to 25min)
AC motor ³⁾ Rated voltage Rated current Rated frequency Rated output Rated speed Operating mode	Type V A Hz W rpm	Capacitor motor 115 1.06/1.36 50/60 60/75 2600/3050 S3 20% (1.25 to 25min)	Capacitor motor 115 1.06/1.36 50/60 60/75 2600/3050 S3 20% (1.25 to 25min)	Capacitor motor 115 1.06/1.36 50/60 60/75 2600/3050 S3 20% (1.25 to 25min)
DC motor ³⁾ Rated voltage Rated current Starting current Rated frequency Rated output Rated speed Operating mode	Type V A A Hz W rpm	Brushed motor 24 1.7 3.8 - 41 1650 S3 20% (1.25 to 25min)	Brushed motor 24 1.7 3.8 - 41 1650 S3 20% (1.25 to 25 min)	1) Based on an oil viscosity of 140 mm ² /s (cSt) at a back pressure of p = 5 bar 2) Permitted range of oil viscosity depends on back pressure and delivery rate 3) Depending on model design

11. Spare parts

Table 6

Reservoir capacity	2, 3, and 6 liters
Weight empty	
Unit with 2-liter plastic reservoir	3.4 kg
Unit with 3-liter plastic reservoir	4.2 kg
Unit with 3-liter metal reservoir	5.0 kg
Unit with 6-liter plastic reservoir	5.6 kg
Delivery rate ¹⁾	
MKU, MKL	0.1; 0.2; 0.5 l/min
MKF	0.1; 0.2 l/min
Max. operating pressure	30 bar
Operating temperature	+10 to 40°C
Protection class according to DIN EN 60529 (VDE 0470-1)	IP 54
Pumped media	
MKU, MKL	Mineral oil or synthetic oil
Operating viscosity	20–1500 mm ² /s
MKF	Fluid grease of NLGI grade 000 or 00 compatible with plastics, NBR elastomers, copper and copper alloys

1) Based on an operating viscosity of 140 mm²/s (cSt) at a back pressure of $p = 5$ bar.



11. Spare parts

Item	Quantity	Material number	Designation	Description
1	1	996-000-947	Pressure regulating valve 32 bar	For oil
	1	996-002-197	Pressure regulating valve 30 bar	For fluid grease
2	1	MKF.U012	Pressure relief., cpl., for fluid grease	For fluid grease
	1	MKU.U012	Pressure relief., cpl., for oil	For oil
3	1	MKF.U013	Pressure gauge for fluid grease	For fluid grease (without restrictor)
	1	MKU.U013	Pressure gauge for oil	For oil (with restrictor)
4	1	MKF1.U5+924	Motor with shaft 24 V DC	For 2- and 3-liter fluid grease units
	1	MKF2.U1+XXX ¹⁾	Motor with shaft	For 2- and 3-liter fluid grease units
	1	MKF2.U2+XXX ¹⁾	Motor with shaft	For 6-liter fluid grease units
	1	MKF2.U5+924	Motor with shaft 24 V DC	For 6-liter fluid grease units
	1	MKU1.U5+924	Motor with shaft 24 V DC	For 2- and 3-liter oil units
	1	MKU2.U2+XXX ¹⁾	Motor with shaft	For 2- and 3-liter oil units
	1	MKU2.U3+XXX ¹⁾	Motor with shaft	For 6-liter oil units
	1	MKU2.U5+924	Motor with shaft 24 V DC	For 6-liter oil units
5	1	WVN501-32.2x3	O-ring	Seal between motor and lid
6	4	911-204-122	Cheese-head screw	Motor fastening
7	1	WVN501-5.28x1.78	O-ring	Seal between pump and flange pipe
8	1	ZP110-2	Gear pump	Delivery rate 0.1 l/min.
	1	ZP120-2	Gear pump	Delivery rate 0.2 l/min.; 0.1 l/min. at 24 V DC
	1	ZP150-2	Gear pump	Delivery rate 0.5 l/min.; 0.2 l/min. at 24 V DC
9	2	834-240-018	Screw M3x25 Tx10	Fastening for ZP110-2 and ZP120-2
	2	834-250-034	Screw M3x30	Fastening for ZP150-2
10	1	179-340-090	Capacitor 4 UF/450 V	Capacitor for 230 V AC (+428)
	1	179-340-091	Capacitor 16 UF/220 V	Capacitor for 115 V AC (+429)
11	1	176-112-020	Pressure switch 20 bar	NO-contact function

*) Not shown

1) Add voltage code to material number when ordering 230 V AC (+428); 115 V AC (+429)

2) Add voltage code to material number when ordering 230/115 V AC (+471); 24 V DC (+472)

Item	Quantity	Material number	Designation	Description
12	1	WVN501-10.5x1.5	O-ring	Seal for pressure switch
13	1	MKF.U016	Level switch, cpl.	For fluid grease in 2- and 3-liter unit (NC contact)
	1	MKF.U116	Level switch, cpl.	For fluid grease in 6-liter unit (NC contact)
	1	MKU.U015	Fill level switch, cpl.	For oil in 2- and 3-liter unit (NO-contact)
	1	MKU.U016	Fill level switch, cpl.	For oil in 2- and 3-liter unit (NC contact)
	1	MKU.U115	Fill level switch, cpl.	For oil in 6-liter unit (NO-contact)
	1	MKU.U116	Fill level switch, cpl.	For oil in 6-liter unit (NC contact)
14	4	911-205-161	Cheese-head screw	Reservoir fastening for 2-liter
	6	911-205-181	Cheese-head screw Z1	Reservoir fastening for 3- and 6-liter
15	1	993-000-169	Reservoir, cpl.	2-liter plastic reservoir with seal
	1	B3.U180	Reservoir, 3-liter	3-liter metal reservoir with seal
	1	BK3.U147	Reservoir, 3-liter	3-liter plastic reservoir with seal
	1	BK6.U180	Reservoir, 6-liter	6-liter plastic reservoir with seal
16	1	898-660-056	Cover	Cover for 2-liter unit
	1	898-660-052	Cover	Cover for 3- and 6-liter unit
17	1	MKU.U009	Filler socket, cpl.	For oil (with strainer)
	1	MKU.U019	Filler socket, cpl.	For oil (with strainer), 3-liter lid
	1	MKF.U009	Filler socket, cpl.	For fluid grease (without strainer)
	1	MKF.U019	Filler socket, cpl.	For fluid grease (without strainer), 3-liter lid
18 *	1	IG38-30-I+XXX 2)	Control unit	For time-dependent control (only for 3- and 6-liter units)
	1	IZ38-30-I+XXX 2)	Control unit	For load-dependent control (only for 3- and 6-liter units)
	1	IGZ36-20-S6-I+XXX 2)	Control unit	Pulse generator/pulse counter (only for 3- and 6-liter units)
	1	IG54-20-S4-I+XXX 2)	Control unit	Pulse generator (only for MKL units)
19 *	1	79-990-033	Cable socket	
20*	1	79-990-206	Device protection fuse	For 24 V DC units

*) Not shown

1) Add voltage code to material number when ordering 230 V AC (+428); 115 V AC (+429)

2) Add voltage code to material number when ordering 230/115 V AC (+471); 24 V DC (+472)

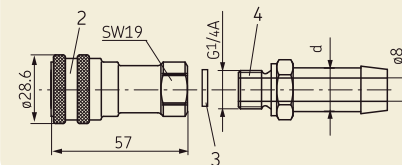
12. Accessories

Filling device

Item	Description	Order No.
1	Filling device, complete, with banjo fitting (Figure 7)	995-000-800
2	Coupling socket (for refill connection)	995-001-500
3	Sealing ring	DIN 7603-A14x18-CU
4	Hose socket for connection to coupling socket	
	d ø13	857-760-007
	d ø16	857-870-002

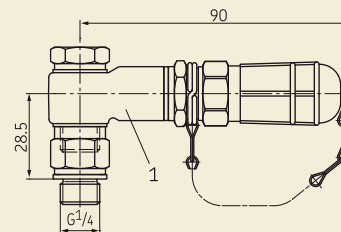
Filling device with quick-action coupling,

Fig. 6



Filling device, complete, with banjo fitting,

Fig. 7



Filling device, see Fig. 8

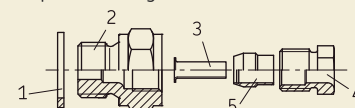
Item	Description	Order No.
1	Sealing ring	508-108
2	Connecting piece	406-054
3	Reinforcing socket	406-603
4	Socket union	406-612
5	Tapered sleeve	406-611
6	Socket union	406-002
7	Double tapered ring	406-001
8	Plug connector, straight	406-054-VS
9	Plug connector, pivoted	506-143-VS

Pipe cutter, see Fig. 9

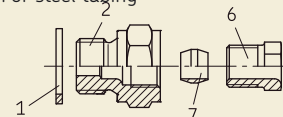
Pipe cutter		Cutting ring	
	for pipe Ø	Order No.	Order No.
For plastic tubing		169-000-301	
For steel tubing with claw groove	4	169-000-336	844-330-006
	6	169-000-337	844-330-007
	8	169-000-338	844-330-007

Main line connections, Fig. 8

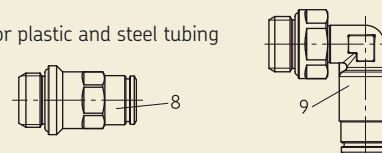
For plastic tubing



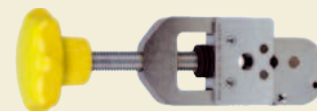
For steel tubing



For plastic and steel tubing



Pipe cutter fitting tool, Fig. 9

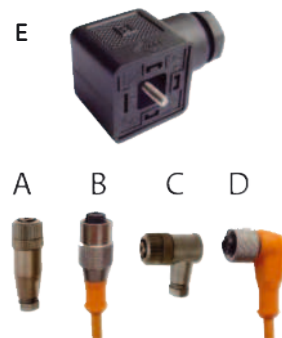


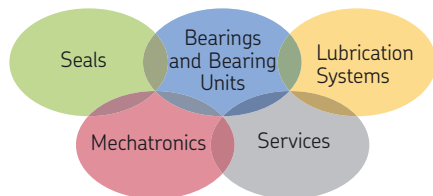
Cable sockets

Designation		Order No.	Weight [g]
E	Square connector per DIN EN 175301-803A cable diameter 6–10 mm, 3-pin +PE, max. 1.5 mm ²	179-990-033	
Cable sockets M12x1, 4-pin design, without LED			
A	Circular connector, straight, without cable diameter 4–6 mm, 4-pin, max. 0.75 mm ²	179-990-371	15
B	Circular connector, straight, with 5-m integrally extruded cable, 4-pin, 4×0.25 mm ²	179-990-600	178
B	Circular connector, straight, with 10-m integrally extruded cable, 4-pin, 4×0.25 mm ²	179-990-603	325
C	Circular connector, angled, without cable diameter 4–6 mm, 4-pin, max. 0.75 mm ²	179-990-372	16
D	Circular connector, angled, with 5-m integrally extruded cable, 4-pin, 4×0.25 mm ²	179-990-601	182

For other cable sockets, please refer to brochure No. 1-1730-EN, "Electrical Plug-In Connections."

Square connector and cable sockets, Fig. 10





The Power of Knowledge Engineering

Over the course of more than a century, SKF has specialized in five fields of competence and acquired a wide range of application expertise. We utilize this experience to provide innovative solutions to OEMs and other manufacturers in practically all industrial sectors worldwide. Our five fields of competence are: bearings and bearing units, seals, mechatronics (combining mechanical and electronic components to improve the performance of classic systems), and extensive services from 3-D computer stimulations and modern condition monitoring systems for high reliability to system management. SKF is a leading global company and guarantees its customers uniform quality standards and global product availability.



Important information on product usage

All products from SKF may be used only for their intended purpose as described in this brochure and the operating instructions. Should operating instructions be supplied together with the products, they must be read and followed.

Not all lubricants can be fed using centralized lubrication systems. SKF can, on request, inspect the suitability of the lubricant selected by the user for pumping in centralized lubrication systems. Lubrication systems and their components manufactured by SKF are not approved for use in conjunction with gases, liquefied gases, pressurized gases in solution, vapors, or such fluids whose vapor pressure exceeds normal atmospheric pressure (1 013 mbar) by more than 0.5 bar at their maximum permissible temperature.

We expressly point to the fact that hazardous substances and mixtures in accordance with annex I part 2-5 of the CLP regulation (EC 1272/2008) may be filled into SKF centralized lubrication systems and components and delivered and/or distributed with such systems only after consulting with and obtaining written approval from SKF.

951-170-223-EN

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