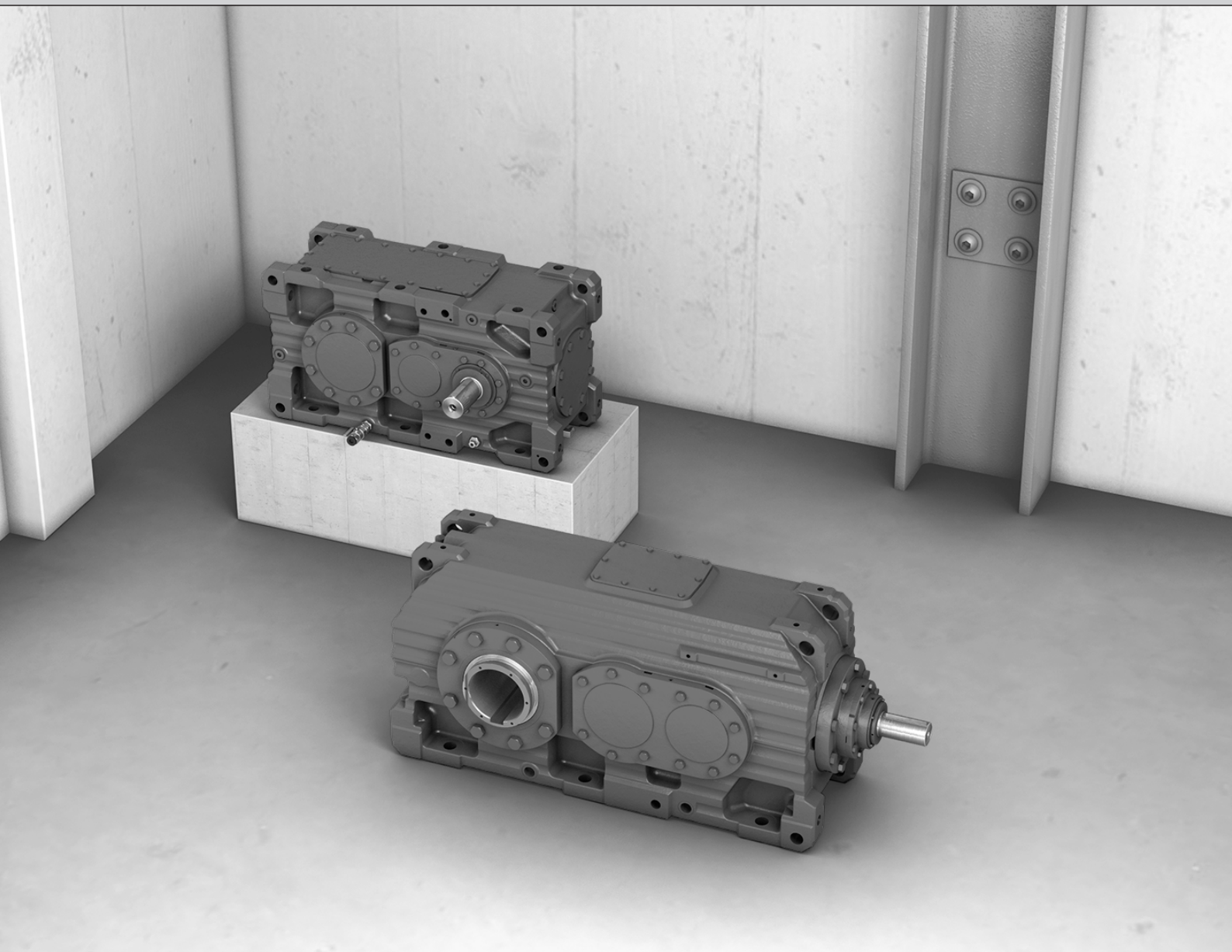




SEW
EURODRIVE

Assembly and operating instructions



Industrial Gear Units

Motor Pump with Pressure Lubrication /ONP1L



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1 Motor pump with pressure lubrication

1.1 Structure/function

1.1.1 Structure

The motor pump is used, for example, if the shaft end pump speed is $\leq 400 \text{ min}^{-1}$, or for inverter operation if using a shaft end pump is only possible to a certain extent.

The motor pump is mounted externally to the gear unit and is independent from the speed of the gear unit.

For gear unit sizes X140 - X320, the pump is equipped with an integrated pressure control valve.

INFORMATION



In addition, observe the operating instructions of the motor pump manufacturer.

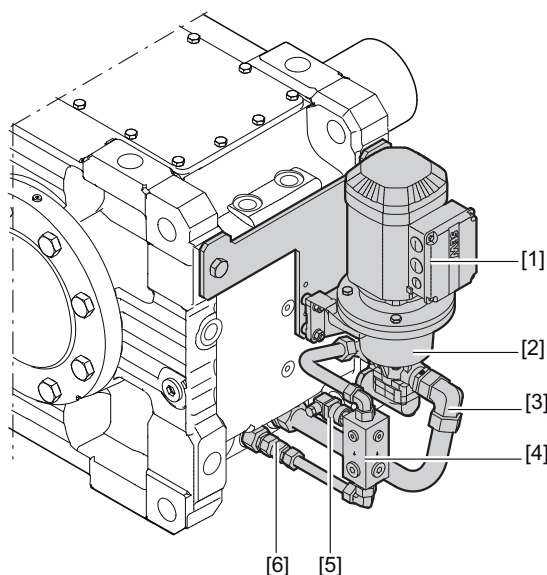
The following figures show the gear unit in mounting positions M1 and M5 with the standard mounting surfaces for the motor pump.

INFORMATION



Mounting surfaces deviating from the standard require the construction of a new piping set. This may affect the minimum oil viscosity. A comprehensive individual check is required. Contact SEW-EURODRIVE.

Mounting position M1 / mounting surface F6



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[1] Pump motor

[2] Oil pump

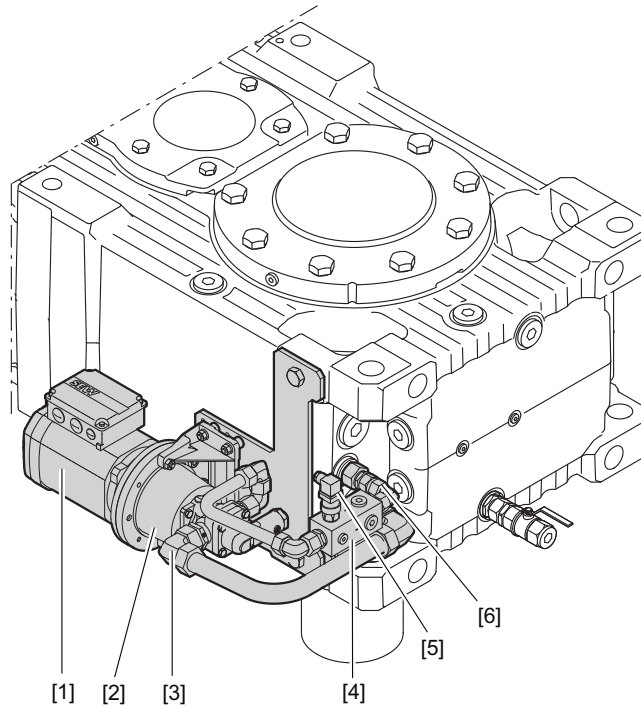
[3] Suction pipe

[4] Gauge mounting block

[5] Pressure switch

[6] Pressure pipe

Mounting position M5 / mounting surface F1



9007218133694859

[1] Pump motor

[2] Oil pump

[3] Suction pipe

[4] Gauge mounting block

[5] Pressure switch

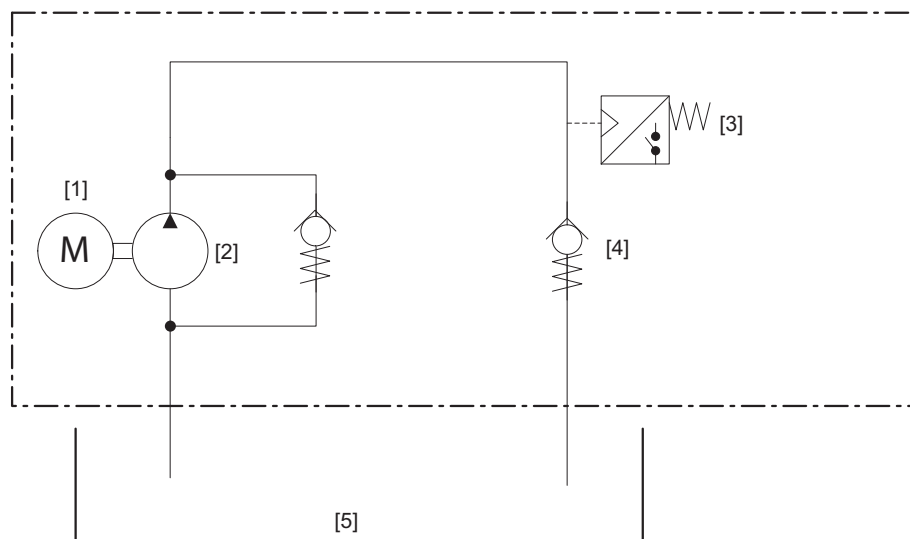
[6] Pressure pipe

1 Motor pump with pressure lubrication

Structure/function

Hydraulics plan

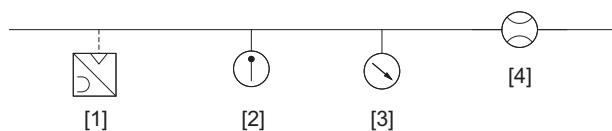
The following figure shows an example of the standard device structure of the oil supply systems.



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- [1] Motor
- [2] Oil pump
- [3] Pressure switch
- [4] Check valve
- [5] Gear unit

The following figure shows possible options that can be installed.



19057234827

- [1] Pressure sensor
- [2] Thermometer
- [3] Manometer
- [4] Flow switch

1.1.2 General information

The motor pump is delivered as a complete unit but without electrical connections.

Default

As standard, the motor pump comprises:

- Oil pump with directly connected asynchronous motor (**pump always running**)
- Pressure switch that monitors the pump pressure. Warning or switch-off signal when the oil pressure reaches < 0.5 bar
- Gauge mounting block (pressure switch installed as standard)

Optional accessories

The motor pump can be equipped with the following components as an option:

- Temperature switch /NTB with trip point for monitoring the cooling group, i.e. warning or gear unit shutdown at oil temperature > 90 °C
- Installed in the measuring group:
 - Manometer
 - Thermometer
 - Flow switch
 - Pressure sensor

1.1.3 Function

Observe the following control information for the individual components.

Oil pump

The pump motor has to be switched on 20 s prior to gear unit startup and is always running during operation of the gear unit.

For gear unit sizes X140 – 320, a pressure control valve integrated in the pump limits the system pressure if the pump is operated.

INFORMATION



Do not change the default setting of the valve at the oil pump.

Oil supply system

The oil supply system always starts up together with the gear unit → max. start viscosity 5000 cSt.

Motor

Starting the motor pump cold may increase the motor's current consumption. For the reason, the motor overload protection should be slightly above the nominal consumption of the motor.

Temperature switch /NTB (optional)

Temperature monitoring of the system is realized using a temperature switch /NTB connected to the user's controller.

- At $T > 90\text{ °C}$ → **STOP GEAR UNIT/WARNING**

General information

The pressure switch requires a 10 s delay after motor pump startup.

1.1.4 Interlocking specifications

Gear unit enable

The gear unit is enabled if the following condition is met:

- Oil pressure $p > 0.5$ bar (startup delay of 10 s)
- Oil temperature $T < 90$ °C (optional)

STOP gear unit/warning

Gear unit STOP/warning if one of the following conditions is met:

- Oil pressure $p < 0.5$ bar
- Oil temperature $T > 90$ °C (optional)

1.1.5 Sizes and selection

The performance data of the standardized motor pump is summarized in the following table.

Size ONP1L	Size Oil pump	Motor data			Connection power motor oil pump in kW	Global motor in Hz	Pump capacity at 1500 1/min
		Type	IEC stand- ard	Number of poles			
ONP1L 6	KF 6 RF	DRN	80MK	4	0.55	50/60	8.4
ONP1L 8	KF 8 RF	DRN	80MK	4	0.55	50/60	10.5
ONP1L 10	KF 10 RF	DRN	80M	4	0.75	50/60	13.7
ONP1L 12	KF 12 RF	DRN	90S	4	1.1	50/60	17.1
ONP1L 16	KF 16 RF	DRN	90S	4	1.1	50/60	21.8
ONP1L 20	KF 20 RF	DRN	90L	4	1.5	50/60	27.1
ONP1L 25	KF 25 RF	DRN	100L	4	2.2	50/60	34.0

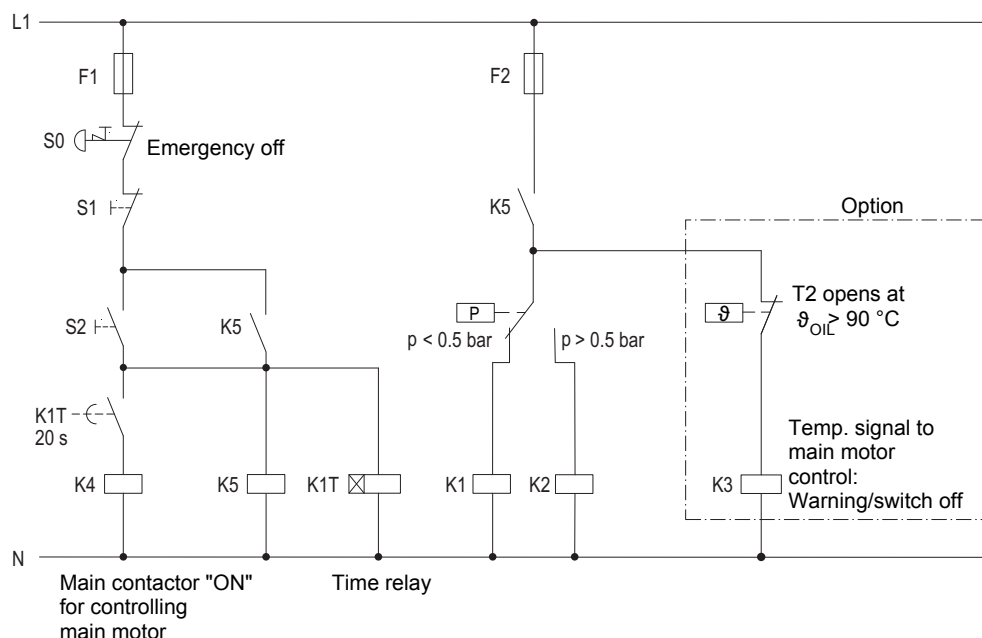
1 Motor pump with pressure lubrication

Wiring diagram (schematic illustration)

1.2 Wiring diagram (schematic illustration)

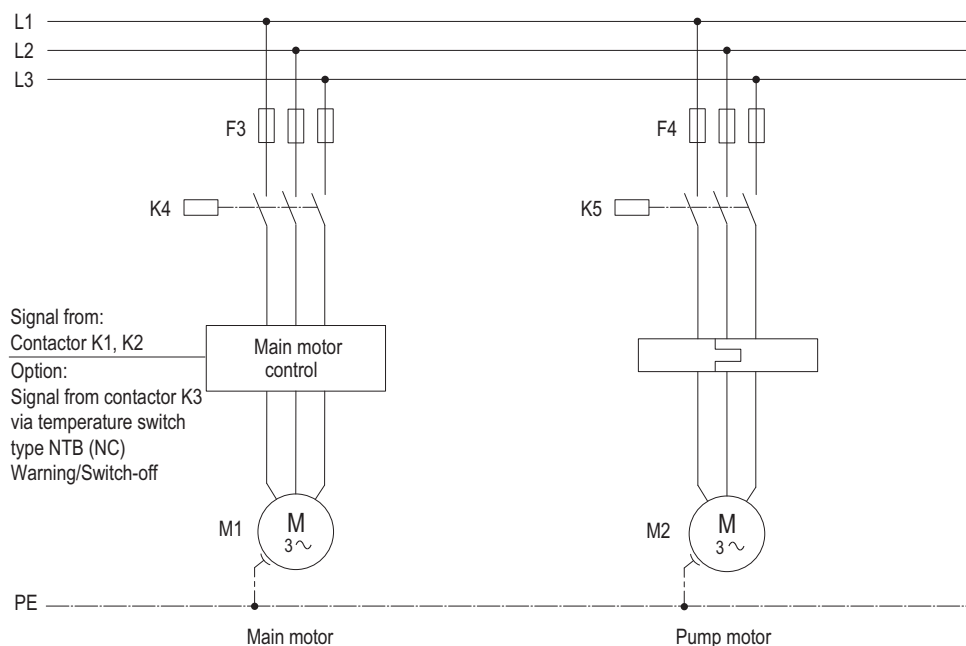
The wiring diagrams show a possible setup of the control for the cooling system.

1.2.1 Control circuit with optional temperature switch /NTB



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1.2.2 Main circuit



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1.3 Installation/assembly

1.3.1 Mechanical connection

Connect the motor pump to the lubrication circuit according to the identifying markings and observing local regulations.

In this respect, observe the following basic conditions:

- Do not reduce the specified cable cross section.
- It is important that you choose the correct wall thickness and material when selecting pipes, hoses and screw fittings.

1.3.2 Electrical connection

Observe country-specific regulations during the electrical connection.

With the standard design, connect the following components:

- Motor
- Temperature switch (optional)
- Pressure switch

Observe the following information.

- Ensure that the oil pump rotates in the correct direction when making the connection.
- Observe the motor data sheet
- The pump motor has to be switched on 20 s prior to gear unit startup and is always running during operation of the gear unit.
- The pressure switch issues a warning signal when the pressure falls below 0.5 bar.

When using options:

- Connect the temperature switch /NTB to the operator's control.
- Connect the flow switch to the operator's control.
- Connect the pressure sensor to the operator's control.

Observe the following information.

- If a temperature switch /NTB is used, it must be integrated in the circuit in a way that a warning signal is issued and the main drive is switched off if the switching point of 90 °C is reached.

1 Motor pump with pressure lubrication

Installation/assembly

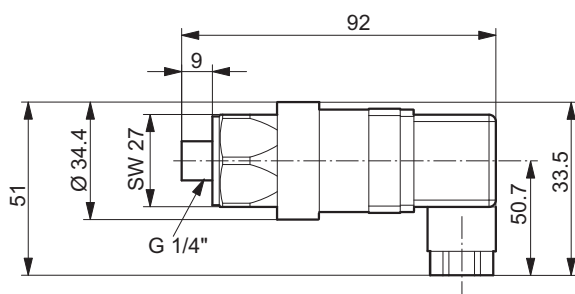
1.3.3 Pressure switch /PS

The pressure switch signals the correct oil pressure in the pressure pipe und in this way indicates that the pressure lubrication is ready for operation. The pressure switch must be monitored by the operator.

Pressure might build up with a delay during the startup phase of the gear unit with shaft end pump. The slow pressure build-up in this phase can lead to an error signal by the pressure switch that can be bridged. The pressure switch signal must then be bridged for **5 to a maximum of 10 seconds**.

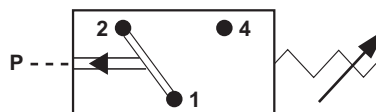
Longer shutdown delays may damage the gear unit and are not permitted.

Dimensions



721994635

Electrical connection



722003723

[1][2]	NC contact
[1][4]	NO contact

Technical data

- Switching pressure: 0.5 ± 0.2 bar
- Maximum switching capacity: $4 \text{ A} - V_{AC} 250$; $4 \text{ A} - V_{DC} 24$
- Plug connector: DIN EN 175301-803
- The tightening torque for the retaining screw in the back of the plug connector for electrical connection is 0.25 Nm.

1.3.4 Limit temperature for start-up of the motor pump

To ensure a correct function of the motor pump, the gear unit oil must have at least the minimum oil viscosity. The viscosity depends on the used oil, and on the oil temperature in the oil pipes/hoses and in the oil pump. Observe chapter "Permitted lubricants" (→ 17).

When the motor pump is used at low ambient temperatures, it may be required to adjust the motor pump. Contact SEW-EURODRIVE, if required.

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1.4 Notes on checking the oil level

Using an oil supply system might influence the oil level. The fill quantities specified on the nameplate are guide values and refer only to the gear unit. The mark on the oil sight glass, oil level glass or oil dipstick is the decisive indicator for the correct oil quantity.

Observe the chapter "Checking the oil level" in the operating instructions for the X.. series industrial gear units.

1.4.1 Additionally required gear unit oil

The following table shows the lubricant fill quantity for the motor pump which has to be filled into the gear unit additionally.

Size	Lubricant fill quantity in liters
ONP1L 6	1.0
ONP1L 8	
ONP1L 10	
ONP1L 12	
ONP1L 16	1.5
ONP1L 20	
ONP1L 25	

1.5 Startup

1.5.1 Notes

NOTICE

Improper startup of gear units with pressure lubrication can damage the gear unit.

Possible damage to property.

- Note the following

- Prior to startup, make sure that monitoring devices (pressure switch, flow switch, temperature switch /NTB etc.) are fully operational.
- Do not start up the gear unit if the pressure switch is not connected.
- Before taking the gear unit into operation for the first time and after each oil change, run the oil pump at least 10 minutes to ensure that all oil chambers are filled with oil. Switch off the oil pump and control the oil level after a short period of time. Correct the oil level if necessary.
- Note that the oil pump must run 20 seconds prior to gear unit startup.
- An oil heater is mandatory when operating the gear unit with oil pump at low temperatures. For further information, refer to chapter Limit temperature for start-up of the cooling system.

1.5.2 Venting the oil pump



⚠ WARNING

Danger due to leaking and squirting gear unit oil.

Serious injury.

- You must wear safety goggles.
- Be very careful when you vent the oil pump.

If the oil pump does not supply oil immediately after the start, do the following:

- Fill the oil pump with oil.
- Vent the oil supply system on the pressure side during start, if possible at the highest point.

1.5.3 Flow switch

Observe the following procedure:

1. Start up the oil pump.
2. Connect the flow switch.
3. Perform the high-flow adjustment, observe the notes in the manufacturer documentation (see attachment).
4. Set the switch-off point of the flow switch to LED 4 or 5 and observe the notes in the manufacturer documentation.
5. Integrate the switching point into the system in a way that the gear unit is switched off if the value is undercut.

1.6 Inspection/maintenance

INFORMATION



First read the operating instructions of the cooling system manufacturer.

1.6.1 Inspection and maintenance intervals

Adhere to the following inspection and maintenance intervals.

Time interval	What is to be done?
Depending on the operating conditions, at least every 12 months	Check the condition of the motor pump, replace filter element if necessary
Varying (depending on external factors)	Check all hose pipes for tightness. The period of use of hose pipes should not exceed 6 years from the date of manufacture printed on them.

1.6.2 Checking hose pipes

NOTICE

Hoses and hose pipes are subject to natural aging even if they are properly stored and used. This is why the period of use is limited.

- The period of use of hose pipes should not exceed 6 years from the date of manufacture printed on them.
- The operator of the plant is responsible for making sure that hose pipes are replaced at adequate intervals even if they do not show any signs of safety-related defects.
- Have hose pipes checked by a specialist at least once a year to ensure operational safety.

1.7 Malfunctions

Failure	Possible cause	Remedy
No oil pump suction	- Air in the pipes - Motor not running - Wrong direction of rotation of the motor - Not enough oil in the gear unit - Wrong oil grade	- Fill suction pipe and oil pump with oil - Vent pressure pipe on startup - Check electrical connections - Check electrical connections - Check oil level in gear unit - Check oil grade (in particular when temperatures are low)
Delivery rate of oil pump not sufficient	- Wrong motor speed - Oil circulation clogged - Negative pressure at pump suction side too high - Wrong oil grade	- Check pump motor speed - Open valves and plugs - Increase cross section of suction line - Decrease suction lift - Check oil grade (in particular when temperatures are low)
Oil pump very loud	Negative pressure at pump suction side too high	- Increase cross section of suction line - Decrease suction lift - Avoid distortion of the suction line - Avoid reductions in the suction pipes
Oil pump delivers froth	- Leaky suction line - Not enough oil in the gear unit	- Check screw fittings for leaks - Check oil level in gear unit
Pressure switch not switching	- Air in the pipes - Pressure switch connected incorrectly - Pressure switch defective	- Fill suction pipe and oil pump with oil - Vent pressure pipe on startup - Check the connection - Replace pressure switch

1.8 Permitted lubricants

This chapter describes the permitted lubricants and the permitted temperatures for industrial gear units from SEW-EURODRIVE.

INFORMATION



- The standard for viscosity and oil grade is the type of oil that is specified by SEW-EURODRIVE in the order (see order confirmation and nameplate).
- Contact SEW-EURODRIVE if you use bio and food grade lubricants or polyglycol oils.
- Check the compatibility of the greases and oils used.
- The tables contain the lubricants approved by SEW-EURODRIVE.
- Oils of the same viscosity class from different manufacturers do not have the same characteristics. In particular, the minimum permitted oil bath temperatures are manufacturer-specific. These temperatures are specified in the lubricant tables.
- The minimum permitted oil bath temperatures depend on the lubrication type used. These temperatures are specified in the lubricant tables. The values correspond to the maximum viscosity of the individual lubricants.
- The values specified in the lubricant tables apply as of the time of printing of this document. The data of the lubricants are subject to dynamic change on the part of the lubricant manufacturers. For the latest information about the lubricants, visit: www.sew-eurodrive.de/lubricants

1.8.1 Structure of the tables and abbreviations

[2]	DIN (ISO) API	ISO,SAE NLGI				
			-20	+65	-20	+65
[1]	CLP	VG 150 ¹⁾	-5		-5	
			+5		+5	
			Optigear BM 150		Alpha SP 150	
			S0		S0	
		VG 220	-15	+75	-15	+75
			0		0	
			+10		+10	
			Optigear BM 220		Alpha SP 220	
			S0		S0	
		VG 320	-10	+85	-10	+80
			+5		+5	
			+15		+15	
			Optigear BM 320		Alpha SP 320	
			S0		S0	

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[1] Lubricant type

[2] Viscosity class

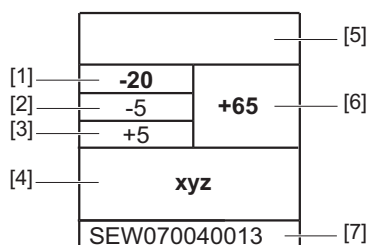
1 Motor pump with pressure lubrication

Permitted lubricants

Abbreviations

Icons	Designation
CLP	= Mineral oil
CLP HC	= Synthetic polyalphaolefin (PAO)
E	= Ester-based oil
	= Mineral lubricant
	= Synthetic lubricant
	= Lubricant for the food industry (NSF H1 -compliant)
	= Biodegradable oil (lubricant for agriculture, forestry, and water management)
1)	= Lubricants may only be used if service factor $F_s \geq 1.3$

1.8.2 Explanation of the various lubricants



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- [1] Lowest cold start temperature in °C for splash lubrication¹⁾
- [2] Lowest cold start temperature in °C for drives with pumps up to a max. oil viscosity of 5000 cSt¹⁾
- [3] Lowest cold start temperature in °C for drives with pumps up to a max. oil viscosity of 2000 cSt¹⁾
- [4] Trade name
- [5] Manufacturer
- [6] Highest oil bath temperature in °C. MUST NOT BE EXCEEDED.
- [7] Approvals

1) In case of low temperatures, the oil must be heated to the specified minimum temperature, for example by using an oil heater. For the maximum permitted oil viscosity per pump type, refer to the following chapter.

1.8.3 Explanation of the oil supply systems and the oil viscosity

The motor pump is designed for an oil viscosity of **5000 cSt**.

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1.8.4 Lubricant tables

This lubricant table is valid when the document is published. Please refer to www.sew-eurodrive.de/lubricants for the latest version of the table.

[1]	[2]	SEW EURODRIVE	Castrol	FUCHS	Mobil®	KLÜBER LUBRICATION	Shell	TOTAL
CLP	VG 150 ¹⁾	SEW GearOil Base 150 E1	Optigear BM 150	Renolin CLP 150 Plus	Renolin HighGear 150	Klüberoil GEM 1-150 N		
		SEW070040013		SEW070030013	SEW070030013			
		-20 -15 0 +10	-20 -15 0 +10	-20 -15 0 +10	-20 -15 0 +10	-20 -15 0 +10	-15 0 +10	-15 0 +10
		+65 +75	+65 +75	+65 +75	+65 +75	+65 +75	+75	+75
	VG 220	SEW GearOil Base 220 E1	Optigear BM 220	Renolin CLP 220 Plus	Renolin HighGear 220	Klüberoil GEM 1-220 N	Shell Omala Oil F 220	Carter EP 220
		SEW070040013		SEW070030013				
		-10 -5 +5 +15	-10 -5 +5 +15	-10 -5 +5 +15	-10 -5 +5 +15	-10 -5 +5 +15	-10 -5 +5 +15	-10 -5 +5 +15
		+85	+85	+85	+85	+85	+85	+85
	VG 320	SEW GearOil Base 320 E1	Optigear BM 320	Renolin CLP 320 Plus	Renolin HighGear 320	Klüberoil GEM 1-320 N	Shell Omala Oil F 320	Carter EP 320
		SEW070040013		SEW070030013				
		-5 -10 +10 +20	-5 -10 +10 +20	-5 -10 +10 +20	-5 -10 +10 +20	-5 -10 +10 +20	-5 -10 +10 +20	-5 -10 +10 +20
		+90	+90	+90	+90	+90	+90	+90
	VG 460	SEW GearOil Base 460 E1	Optigear BM 460	Renolin CLP 460 Plus	Renolin HighGear 460	Klüberoil GEM 1-460 N	Shell Omala Oil F 460	Carter EP 460
		SEW070040013		SEW070030013				
		-5 -10 +10 +20	-5 -10 +10 +20	-5 -10 +10 +20	-5 -10 +10 +20	-5 -10 +10 +20	-5 -10 +10 +20	-5 -10 +10 +20
		+90	+90	+90	+90	+90	+90	+90
	VG 680	SEW GearOil Base 680 E1	Optigear BM 680	Renolin CLP 680 Plus	Renolin HighGear 680	Klüberoil GEM 1-680 N		Carter EP 680
		SEW070040013		SEW070030013				
		-5 -10 +10 +20	-5 -10 +10 +20	-5 -10 +10 +20	-5 -10 +10 +20	-5 -10 +10 +20	-5 -10 +10 +20	-5 -10 +10 +20
		+90	+90	+90	+90	+90	+90	+90
	VG 1000		Optigear BM 1000					

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This lubricant table is valid when the document is published. Please refer to www.sew-eurodrive.de/lubricants for the latest version of the table.

[1]	[2]						
CLP HC	VG 32 ¹⁾			-40 -30 -25 +30 SHC 624			
	VG 68 ¹⁾		-35 -20 +50 Renolin Unisyn CLP 68	-40 -20 -15 +50 SHC 626	-35 -20 -10 +50 Küblersynth GEM 4-68 N	-40 -20 -10 +50 Omala S4 GX 68	-35 -15 -5 +75 Carter SH 150
	VG 150 ¹⁾	-25 -10 0 Alphasyn EP 150	-30 -10 +70 Optigear Synthetic X 150 Unisyn CLP 150	-30 -10 +75 SHC 629	-25 -10 0 Küblersynth GEM 4-150 N	-30 -10 0 Omala S4 GX 150	-35 -15 -5 Carter SH 150
	VG 220	-25 -5 +80 Alphasyn EP 220	-25 -5 +80 Optigear Synthetic X 220 Unisyn CLP 220	-25 -5 +85 SHC 630	-25 -5 +80 Küblersynth GEM 4-220 N	-25 -5 +85 Omala S4 GX 220	-25 -5 +80 Carter SH 220
	VG 320	-20 0 +90 Alphasyn EP 320	-20 0 +90 Optigear Synthetic X 320 Unisyn CLP 320	-20 0 +95 SHC 632	-20 0 +95 Küblersynth GEM 4-320 N	-20 0 +95 Omala S4 GX 320	-20 0 +90 Carter SH 320
	VG 460	-15 +5 +100 Alphasyn EP 460	-15 +5 +100 Optigear Synthetic X 460 Unisyn CLP 460	-15 +5 +105 SHC 634	-15 +5 +105 Küblersynth GEM 4-460 N	-15 +5 +105 Omala S4 GX 460	-15 +5 +100 Carter SH 460
	VG 680		-10 +10 +110 Optigear Synthetic X 680 Renolin Unisyn CLP 680	-10 +10 +110 SHC 636	-10 +10 +110 Küblersynth GEM 4-680 N	-10 +10 +110 Omala S4 GX 680	-10 +10 +110 Carter SH 680
	VG 1000			-10 +15 +30 SHC 639	-10 +15 +30 SHC Gear 1000	0 +20 +30 Küblersynth EG4-1000	

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This lubricant table is valid when the document is published. Please refer to www.sew-eurodrive.de/lubricants for the latest version of the table.

[1]	[2]	[3]																												
	CLP HC NSF H1	VG 68 ¹⁾	<table> <tr><td>-35</td><td>+45</td></tr> <tr><td>-20</td><td></td></tr> <tr><td>-10</td><td></td></tr> </table>	-35	+45	-20		-10		<table> <tr><td>-40</td><td>+45</td></tr> <tr><td>-25</td><td></td></tr> <tr><td>-15</td><td></td></tr> </table>	-40	+45	-25		-15		<table> <tr><td>-35</td><td>+45</td></tr> <tr><td>-20</td><td></td></tr> <tr><td>-10</td><td></td></tr> </table>	-35	+45	-20		-10		<table> <tr><td>-35</td><td>+45</td></tr> <tr><td>-20</td><td></td></tr> <tr><td>-10</td><td></td></tr> </table>	-35	+45	-20		-10	
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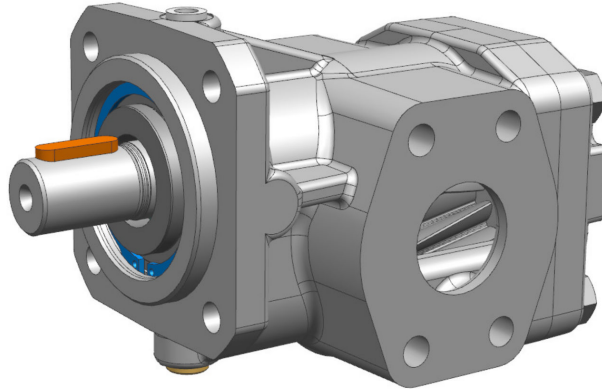
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Operating instructions (Translation)



Gear pump KF 2.5 - 630

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Englisch

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Gear pump KF 2.5 - 630

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1 General

1.1 About the documentation

These operating instructions describe the installation, operation and maintenance of the following device:

Gear pump KF 2.5 - 630

The device is manufactured in different versions. Information about the version concerned in the individual case can be found on the device's type plate.

These operating instructions are a component of the device and must be kept accessible for the personnel near the device at all times.

If you have any questions about these operating instructions, please contact the manufacturer.

1.2 Manufacturer's address

KRACHT GmbH
Gewerbestraße 20
DE 58791 Werdohl
phone: +49 2392 935-0
fax: +49 2392 935-209
email: info@kracht.eu
web: www.kracht.eu

1.3 Applicable documents

1. KTR Kupplungstechnik GmbH, DE 48407 Rheine
 - KTR-N 40210: Coupling operating/assembly instruction Rotex

Excerpts from these documents are included in these operating instructions.

If required, the original documents can be requested from the respective manufacturer.

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1.4 Symbolism

 	 Identification of an immediate hazard, which would result in death or severe bodily injury if not avoided.
	 Identification of a potential medium risk hazard, which would lead to death or severe bodily injury if not avoided.
	 Identification of a low risk hazard, which could lead to minor or medium bodily injury if not avoided.
	 Flagging of notices to prevent property damage.
	Identification of basic safety instructions. Non-compliance can lead to hazards for people and the device.
	Flagging of special user tips and other especially useful or important information.

Gear pump KF 2.5 - 630

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2 Safety

2.1 Intended use

1. The device has been designed for operation with fluid. Dry operation is not permitted.
2. The device may be operated in filled condition only.
The medium must be compatible with the materials used in the device. The chemical competence is necessary for this. Be careful with ethylene oxide or other cathalytic or exothermic or self-decomposing materials. Please consult the manufacturer in cases of doubt.
3. The device may be operated only in usual industrial atmospheres. If there are any aggressive substances in the air, always ask the manufacturer.
4. Operation of the device is only permissible when complying with the operating instructions and applicable documents.
Deviating operating conditions require the express approval of the manufacturer.
5. In case of any use of the device not according to specification, any warranty is voided.

2.2 Personnel qualification and training

The staff designated to assemble, operate and service the device must be properly qualified. This can be through training or specific instruction. Personnel must be familiar with the contents of this operating instructions.



Read the operating instructions thoroughly before use.

2.3 Basic safety instructions



1. Comply with existing regulations on accident prevention and safety at work along with any possible internal operator regulations.
2. Pay attention to the greatest possible cleanliness.
3. Wear suitable personal protection equipment.
4. Do not remove, make illegible or obliterate type plates or other references on the device.
5. Do not make any technical changes on the device.
6. Maintain and clean the device regularly.
7. Use spare parts approved by the manufacturer only.

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Gear pump KF 2.5 - 630

2.4 Basic hazards

**DANGER****Hazardous fluids!**

Danger of death when handling hazardous fluids.

1. Comply with the safety data sheets and regulations on handling hazardous fluids.
2. Collect and dispose of hazardous fluids so that no hazards arise for people or the environment.

**DANGER****Rotating parts!**

Danger of death due to body parts, hair or clothing getting trapped or entangled.

1. Before all work, ensure that existing drives are voltage-free and pressure-free.
2. Securely prevent restarting during all work.

**DANGER****Rotating parts!**

Danger of death due to body parts, hair or clothing getting trapped or entangled.

1. Take measures against accidental touching of rotating parts.

**WARNING****Rotating parts!**

Danger of injury from flying parts.

1. Enclose rotating parts so as to avoid any danger from flying parts in the event of breakage or malfunction.

**WARNING****Failure of load-carrying parts due to overload!**

Danger of injury from flying parts.

Danger of injury from spurting fluids.

1. Depressurise the device and all connection lines before doing any work.
2. Securely prevent the restoration of pressure while working on the device.

Gear pump KF 2.5 - 630

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 WARNING
Failure of load-carrying parts due to overload! Danger of injury from flying parts. Danger of injury from spurting fluids. 1. Use only connections and lines approved for the expected pressure range. 2. Securely prevent exceeding the permissible pressure, e.g. by using pressure relief valves or rupture discs. 3. Design pipework so that no tensions, e.g. caused by changes in length due to fluctuations in temperature, are transmitted to the device.

 WARNING
Failure of load-carrying parts due to overload! Danger of injury from flying parts. Danger of injury from spurting fluids. 1. Do not operate the device against closed shut-off devices. 2. Do not operate the device in the false direction of rotation.

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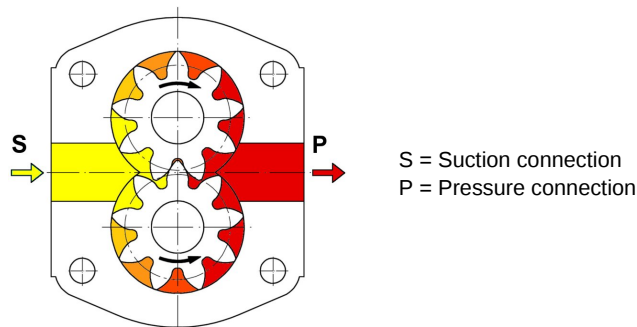
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Gear pump KF 2.5 - 630

3 Device description

3.1 Functional principle

KF/KFF series pumps are external gear pump types that work according to the positive displacement principle.



When rotated, two gearwheels meshing together produce a volume enlargement as a result of the opening of the tooth spaces on the suction side (S), so that medium can flow in and so that a corresponding volume is displaced simultaneously by immersion of the teeth into the filled tooth spaces on the pressure side (P). Fluid transport takes place through entrainment in the tooth gaps along the wall of the wheel chamber. The so-called geometric flow rate V_g is being displaced per wheel rotation. A value that is stated in technical documents as rated volume V_{gn} to specify the pump size.

The actually delivered amount of liquid does not correspond with the theoretical value, it is being reduced through losses due to the necessary tolerances. The losses are less the lower the operating pressure and the higher the viscosity of the medium.

Gear pumps are self-priming within wide limits. The displacement cycle describe initially takes place without exhibiting appreciable pressure build-up. Only after setting external loads, for example, through delivery heights, flow resistances, line elements, etc. will the required working pressure arise to overcome these resistances.

As usual with non-axial play compensated pumps, the lateral clearance between gear and front face has been set in such a way that the maximum allowable operating pressure is managed in an adequate and secure way.

Bearing and shaft seal of the device are lubricated by the media. The device's operating life will be reduced if the medium contains abrasive ingredients.

The shaft seal chamber is connected to the device's suction side. The pressure occurring at the shaft seal therefore corresponds to the pressure at the

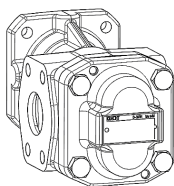
Gear pump KF 2.5 - 630

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suction connection of the device. The permissible pressure is determined by the type of sealing.

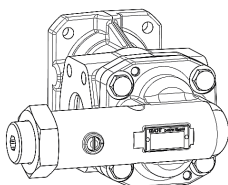
3.2 Possible versions

Gear pump with end cover



Standard

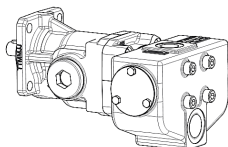
Gear pump with pressure relief valve



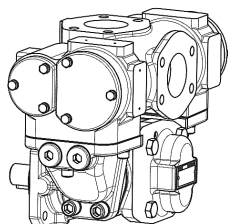
Directly attached pressure relief valves of the series "D" are used exclusively for protection of the gear pumps and may respond on a short-term basis only. Constant triggering of the valve can destroy the gear pump due to overheating.

Gear pump with universal valve

KF 2.5 - 25 U



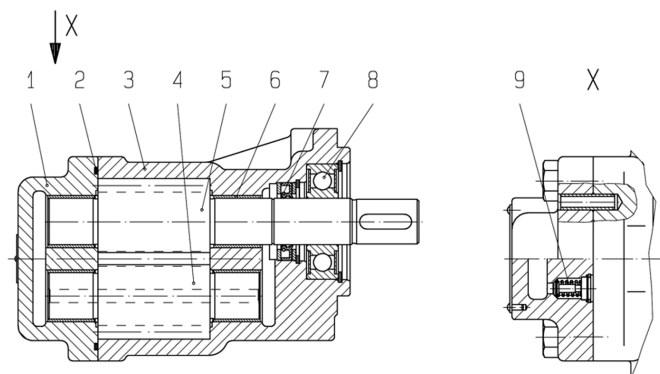
KF 32 - 80 U



Pumps with universal valve pump to the same pressure connection even when the direction of rotation of the drive shaft changes. Because of the operating principle, the pressure and suction connections remain the same under any direction of rotation. Select the mounting position so that the piston is in a horizontal position and the pressure port is at the top.

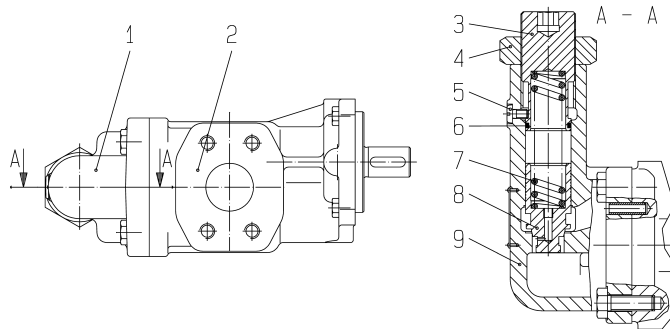
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Gear pump KF 2.5 - 630

3.3 Basic design**3.3.1 KF 2.5 - 630 R/L/B (with end cover)****Explanation**

- | | |
|-----------------------|---------------------------------|
| 1. End cover | 7. Shaft seal |
| 2. O-Ring | (see "Section: Seal types") |
| 3. Housing | 8. Outboard bearing |
| 4. Driven shaft | (Mounting only: G; X) |
| 5. Driving shaft | 9. Valve |
| 6. Plain bearing bush | (Direction of rotation only: B) |

Gear pump KF 2.5 - 630

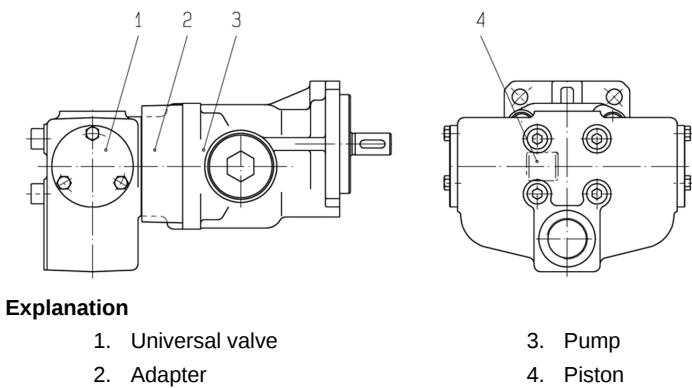
KRACHT**3.3.2 KF 2.5 - 630 R/L. .-D. (with pressure relief valve)****Explanation**

- | | |
|--------------------------|-----------------------|
| 1. Pressure relief valve | 6. O-Ring |
| 2. Pump | 7. Compression spring |
| 3. Adjustment screw | 8. Valve cone |
| 4. Hexagonal nut | 9. Housing |
| 5. Retaining screw | |

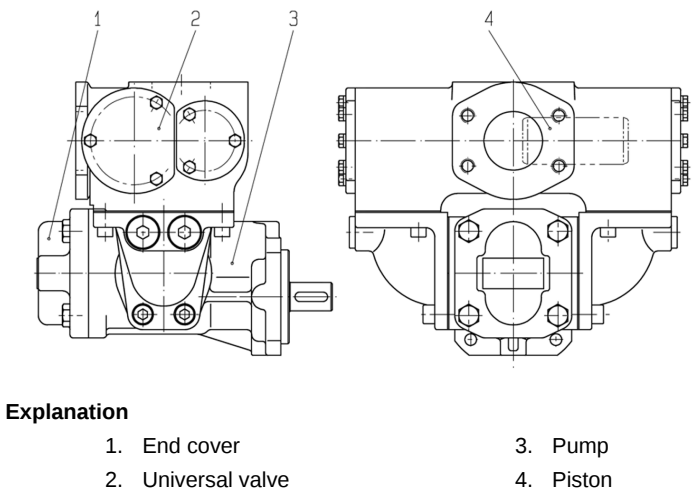
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Gear pump KF 2.5 - 630

3.3.3 KF 2.5 - 25 U (with universal valve)



3.3.4 KF 32 - 80 U (with universal valve)



Gear pump KF 2.5 - 630

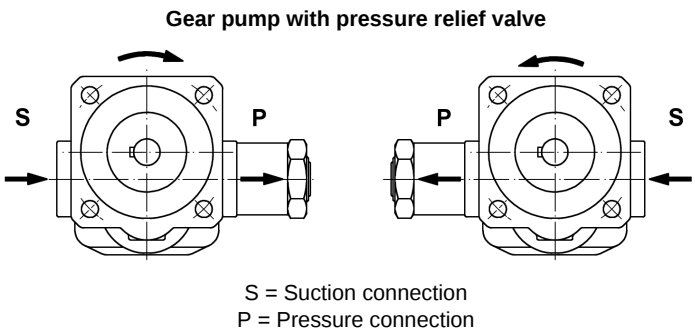
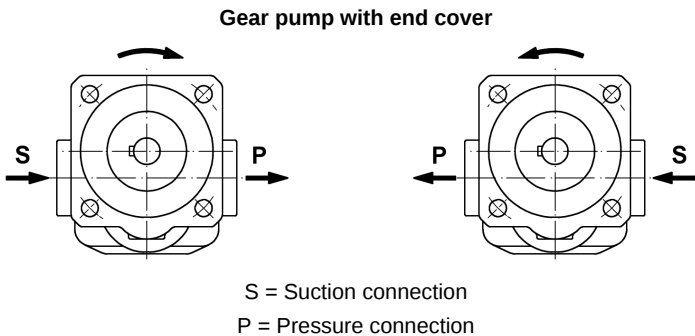


3.4 Rotation and delivery direction

The following definition applies with respect to the rotation and delivery direction of external gear pumps for pump connections positioned below the drive shaft:

Looking at the pump shaft end, the pumping flow is from left to right when the shaft is moving clockwise.

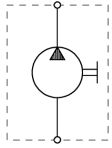
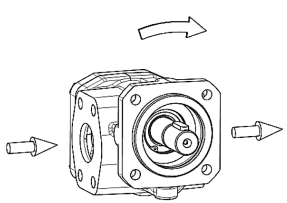
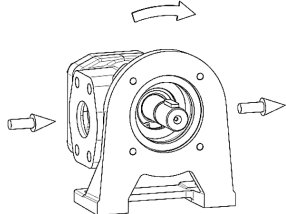
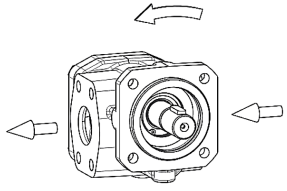
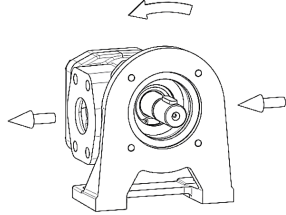
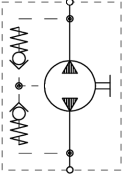
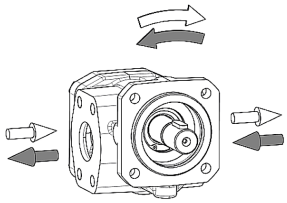
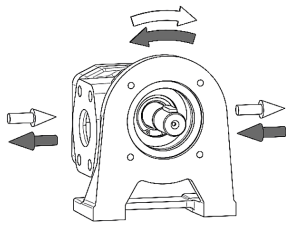
Looking at the pump shaft end, the pumping flow is from right to left when the shaft is moving counter-clockwise.



The direction of rotation is indicated by the bent arrow.
The flow direction is indicated by the straight arrows.

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Gear pump KF 2.5 - 630

Hydraulic symbol	Flange mounting	Foot mounting
	Gear pump with end cover	
		
	KF . R F/G	KF . R W/X
		
	KF . L F/G	KF . L W/X
		
	KF . B F/G	KF . B W/X

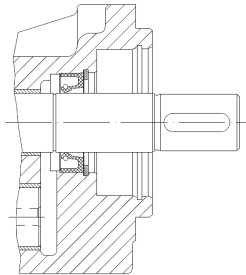
Gear pump KF 2.5 - 630



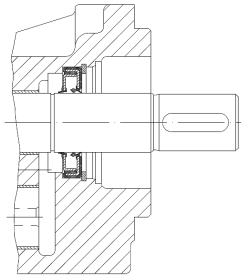
Hydraulic symbol	Flange mounting	Foot mounting
	Gear pump with pressure relief valve	
	KF . R F/G. .-D.	KF . R W/X. .-D.
	KF . L F/G. .-D.	KF . L W/X. .-D.
	Gear pump with universal valve	
	KF 2.5 - 25 U F/G	-
	KF 32 - 80 U F/G	-

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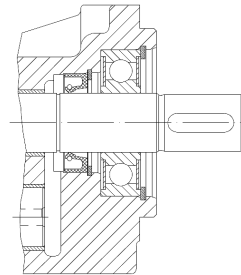
Gear pump KF 2.5 - 630

3.5 Types of seals

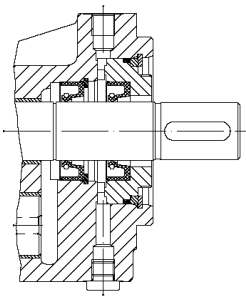
Rotary shaft seal
Seal type: 1; 2; 3; 9; 18; 31



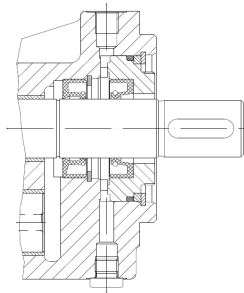
Rotary shaft seal
Seal type: 23



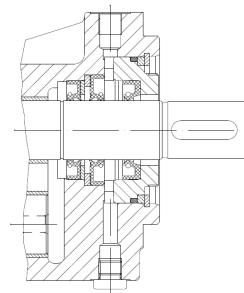
Rotary shaft seal
with outboard bearing
Seal type: 1; 2; 3; 9; 18; 31



Double rotary shaft seal
Connection borehole G1/8 (for
Quench) ⁽¹⁾
Seal type: 4; 7; 19; 32

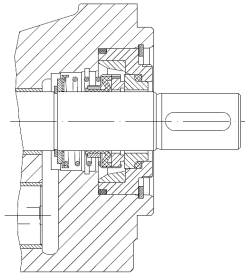


Double rotary shaft seal (for vac-
uum operation)
Connection borehole G1/8 (for
Quench) ⁽¹⁾
Seal type: 4; 7; 19; 32
Special number 74

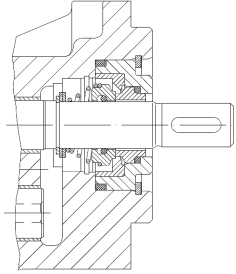


Triple rotary shaft seal (for vac-
uum operation + for normal oper-
ation)
Connection borehole G1/8 (for
Quench) ⁽¹⁾
Seal type: 7
Special number 322
(only KF 32 - 80)

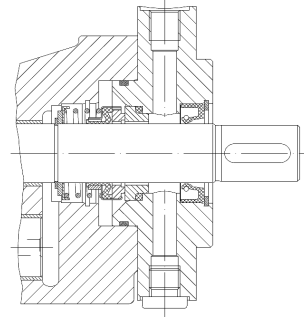
Gear pump KF 2.5 - 630

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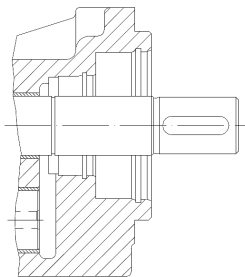
Mechanical seal
Seal type: 5; 40



Mechanical seal
Seal type: 6



Mechanical seal with Quench ⁽¹⁾
KF 2.5 - 25: Connection borehole
G1/8 (for Quench) ⁽¹⁾
KF 32 - 80: Connection borehole
G1/4 (for Quench) ⁽¹⁾
Seal type: 5
Special number 198



without shaft seal
(Leak oil drain through shaft seal-
ing chamber)
Seal type: 30; 36

⁽¹⁾ See [section 3.6 "Quench"](#)

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3.6 Quench

Versions with quench are used when absolute leak tightness is required on the shaft seal, e.g. when pumping media

- which cures upon contact with air.
- which crystallises upon contact with air humidity.
- the leakage of which must not be released into the environment.
- are under vacuum and their seal shall be gastight.

Select the mounting position so that the connection for the quench faces up.

Gear pump KF 2.5 - 630

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3.7 Type key

Ordering example KF 2.5 - 630												
KF		40		R	F		1	/...	-	D15	-	...
1.		2.		3.	4.		5.	6.		7.		8.

Explanation of type key KF 2.5 - 630			
1.	Product name		
2.	Nominal size (Rated volume)		
	V _{gn}	Size 1: 2.5; 4; 5; 6; 8; 10; 12; 16; 20; 25 Size 2: 32; 40; 50; 63; 80 Size 3: 100; 112; 125; 150; 180; 200 Size 4: 250; 315; 400; 500; 630	
3.	Direction of rotation		
	R	Clockwise	B Clockwise and counterclockwise Flow direction alternating
	L	Counterclockwise	U Clockwise and counterclockwise Flow direction consistent
4.	Fixing type		
	F	DIN flange without outboard bearing	W Mounting angle without outboard bearing (KF 2.5 - 200)
	G	DIN flange with outboard bearing	X Mounting angle with outboard bearing (KF 2.5 - 200)

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Gear pump KF 2.5 - 630

Explanation of type key KF 2.5 - 630				
5.	Seal type			
	1	Rotary shaft seal NBR (BABSL)	18	Rotary shaft seal FKM (BAUMX7)
	2	Rotary shaft seal FKM (BABSL)	19	Double rotary shaft seal NBR (BABSL)
	3	Rotary shaft seal PTFE (HN2390)	23	Rotary shaft seal FKM (MSS1) (Low temperature) (KF 2.5 - 80)
	4	Double rotary shaft seal PTFE (HN2390)	30	without shaft seal O-Ring FKM
	5	Mechanical seal with FKM second- ary seals (AX15) C2S2V1G3G1 (KF 2.5 - 200) B10SV1G3G1 (KF 250 - 630)	31	Rotary shaft seal FKM (BABSL) (Low temperature) (KF 32 - 200)
	6	Mechanical contact seal with FFKM secondary seals (AX30) Q2Q2K1G3 (KF 2.5 - 25) Q2B2K1G3 (KF 32 - 200)	32	Double rotary shaft seal EPDM (R02-R) (not resistant to mineral oil)
	7	Double rotary shaft seal FKM (BABSL)	36	without shaft seal O-Ring NBR
	9	Rotary shaft seal EPDM (R02-R) (not resistant to mineral oil)	40	Mechanical seal with FKM second- ary seals (L4) AQ2VFF
6. Special number for special versions				
	See section 3.8 "Important special numbers"			
7. Pressure relief valve (only for direction of rotation R or L)				
D15	Adjustable from 0 - 15 bar	D25	Adjustable from 15 - 25 bar	
D30	Adjustable from 15 - 30 bar			
8. Housing and cover material				
No specifi- cation	EN-GJL-250 (GG-25)			
GJS	EN-GJS-400-15 (GGG-40)			

Gear pump KF 2.5 - 630

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3.8 Important special numbers

Special number	Description
74	Double rotary shaft seal (for vacuum operation) Connection borehole G1/8 (for Quench)
158	Housing connection: KF 2.5 - 12: Flange connection SAE 3/4" KF 16 - 25: Flange connection SAE 1"
197	Noise-optimized version for aerated oils ⁽¹⁾
198	Mechanical seal with Quench
232	Housing connection: KF 50 - 80: Flange connection SAE 2" KF 100 - 112: Flange connection SAE 2 1/2" KF 125 - 150: Flange connection SAE 3" KF 180 - 200: Flange connection SAE 3 1/2"
277	Vertical mounting position (shaft end above) Separate lubrication for rotating shaft seal (reduced pumping rate) (Size 4: on request)
304	Plastic plain bearings Iglidur® X (non-ferrous metal-free), $\Delta p_{\max} = 10$ bar (Size 4: on request)
317	Noise-optimized version for aerated oils ⁽¹⁾ (197) Plastic plain bearings Iglidur® X (non-ferrous metal-free), $\Delta p_{\max} = 10$ bar (304)
322	Triple rotary shaft seal (for normal operation + for vacuum operation) Connection borehole G1/8 (for Quench) Plastic plain bearings Iglidur® X (non-ferrous metal-free), $\Delta p_{\max} = 10$ bar (304) Housing connection: KF 32; 40: Flange connection SAE 1 1/2" (Standard) KF 50 - 80: Flange connection SAE 2" (232)
353	Noise-optimized version for aerated oils ⁽¹⁾ (197) Multi layer friction bearings DP4 (lead free) (Size 4: on request)
359	Housing connection: KF 2.5 - 12: Flange connection SAE 3/4" (158) KF 16 - 25: Flange connection SAE 1" (158) Noise-optimized version for aerated oils ⁽¹⁾ (197)
363	Plastic plain bearings Iglidur® X (non-ferrous metal-free), $\Delta p_{\max} = 10$ bar (304) Housing connection: KF 2.5 - 12: Flange connection SAE 3/4" (158) KF 16 - 25: Flange connection SAE 1" (158)

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Special number	Description
391	Noise-optimized version for aerated oils ⁽¹⁾ (197) Housing connection: KF 50 - 80: Flange connection SAE 2" (232) KF 100 - 112: Flange connection SAE 2 1/2" (232) KF 125 - 150: Flange connection SAE 3" (232) KF 180 - 200: Flange connection SAE 3 1/2" (232)
402	Double rotary shaft seal (for vacuum operation) (74) Connection borehole G1/8 (for Quench) (74) Housing connection: KF 2.5 - 12: Flange connection SAE 3/4" (158) KF 16 - 25: Flange connection SAE 1" (158) KF 50 - 80: Flange connection SAE 2" (232) KF 100 - 112: Flange connection SAE 2 1/2" (232) KF 125 - 150: Flange connection SAE 3" (232) KF 180 - 200: Flange connection SAE 3 1/2" (232)
455	Noise-optimized version for aerated oils ⁽¹⁾ (197) Vertical mounting position (shaft end above) Separate lubrication for rotating shaft seal (reduced pumping rate) (277)
459	Double rotary shaft seal (for vacuum operation) (74) Connection borehole G1/8 (for Quench) (74) Noise-optimized version for aerated oils ⁽¹⁾ (197) Housing connection: KF 2.5 - 12: Flange connection SAE 3/4" (158) KF 16 - 25: Flange connection SAE 1" (158) KF 50 - 80: Flange connection SAE 2" (232) KF 100 - 112: Flange connection SAE 2 1/2" (232) KF 125 - 150: Flange connection SAE 3" (232) KF 180 - 200: Flange connection SAE 3 1/2" (232)
⁽¹⁾ Measures for noise optimisation are only possible for one rotational direction and only effective for aerated oils or vacuum (only in connection with seal versions that are suitable for vacuum operation). Can lead to a reduction of delivery rate.	

Gear pump KF 2.5 - 630

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4 Technical data

4.1 General

General information KF 2.5 - 630		
Design	External gear pump	
Fixing type	Flange similar DIN ISO 3019 or Foot mounting	
End of drive shaft	ISO R 775 short-cylindrical	
Housing connection ⁽¹⁾	KF 2.5 - 12	Whitworth pipe thread G3/4
	KF 2.5 - 12 .. /158	Flange connection SAE 3/4"
	KF 16 - 25	Whitworth pipe thread G1
	KF 16 - 25 .. /158	Flange connection SAE 1"
	KF 32 - 80	Flange connection SAE 1 1/2"
	KF 50 - 80 .. /232	Flange connection SAE 2"
	KF 100 - 112	
	KF 100 - 112 .. /232	Flange connection SAE 2 1/2"
	KF 125 - 150	
	KF 125 - 150 .. /232	Flange connection SAE 3"
	KF 180 - 200	
	KF 180 - 200 .. /232	Flange connection SAE 3 1/2"
	KF 250 - 315	Flange connection SAE 3"
	KF 400 - 630	Flange connection SAE 4"
	KF 2.5 - 25 U	Suction connection: Whitworth pipe thread G3/4
		Pressure connection: Whitworth pipe thread G1/2
Mounting position	KF . R/L/B without fluid buffer	Any ⁽²⁾
		Shaft end horizontal, fluid buffer connection top
	KF . U	Piston horizontal Pressure connection on top
External loads on shaft end	See section 4.2 "Overview nominal sizes"	
Speed	n	See section 4.2 "Overview nominal sizes" + section 4.3 "Viscosity - Rotation speed assignment"

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Gear pump KF 2.5 - 630

General information KF 2.5 - 630		
Operating pressure	p_e p_b	See section 4.4 "Permissible pressure range"
Viscosity	v_{min}	See section 4.4.3 "Differential pressure - viscosity assignment"
	v_{max}	20000 mm ² /s
Fluid temperature	ϑ_m	See section 4.5 "Permissible temperature range"
Ambient temperature	ϑ_u	
Material		See section 4.6 "Material data"
Filtering		Filter porosity $\leq 60 \mu m$
Permissible media		Lubricating fluids without abrasive components. (Petrols, solvents, etc. are not permissible.)
⁽¹⁾ Pipe thread: ISO 228-1; Flange connection: ISO 6162-1 (SAE J518) ⁽²⁾ A reduced service life must be expected for the shaft seal in the case of vertical installation (shaft end top).		

Gear pump KF 2.5 - 630

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4.2 Overview nominal sizes

Nominal size V _{gn}	Geom. displacement V _g [cm³/rev.]	Speed n		Perm. radial force ⁽¹⁾ F _{radial} [N] (n = 1500 rpm)	Permissible axial force F _{axial} [N] (n = 1500 rpm)	Sound pressure level ⁽²⁾ L _{pA} [dBA]	Mass inertia x10 ⁻⁶ J [kg m²]
		n _{min} [rpm]	n _{max} [rpm] ⁽³⁾				
2,5	2.55	200	3600	700	-	≤ 67	14.0
4	4.03						15.9
5	5.05						17.8
6	6.38						20.5
8	8.05						24.0
10	10.11						28.4
12	12.58						33.7
16	16.09						42.3
20	20.1						50.8
25	25.1						61.7
32	32.12						≤ 68
40	40.21					254	
50	50.2					299	
63	63.18					368	
80	80.5					443	
100	101.5		≤ 69	741			
112	113.5			806			
125	129.4		≤ 65	1418			
150	155.6			1637			
180	186.6			1911			
200	206.2			2072			
250	245.1		≤ 75	4133			
315	312.9			5011			
400	399.5		≤ 77	6618			
500	496.5			7830			
630	622.5		≤ 80	9591			

⁽¹⁾ Outside forces are only permissible in combination with an outboard bearing. *F_{radial}* on central shaft end.

⁽²⁾ *n* = 1500 rpm ; *v* = 34 mm²/s ; *p* = 5 - 25 bar.

⁽³⁾ Pay attention to the viscosity.

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4.3 Viscosity - Rotation speed assignment

Kinematic viscosity ν [mm²/s]									
100	200	300	500	1000	2000	3000	6000	10000	20000
3600	2900	2300	1800	1200	800	650	450	300	200
Recommended rpm n [rpm]									



Select the speed of rotation so that complete filling of the pump is ensured. This is given if the pressure on the suction side does not fall below the permissible pressure $p_{e \text{ min.}}$

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4.4 Permissible pressure range

4.4.1 Operating pressure of suction side and pressure side

Seal type ⁽¹⁾		Special number	Operating pressure ⁽²⁾			
			Suction side		Pressure side	
			$p_{e \min}$ [bar abs.] ⁽³⁾	$p_{e \max}$ [bar]	p_b [bar] (perm. continuous pressure)	$p_{b \max}$ [bar] (Pressure peaks)
1	WDR (BABSL)	-	0.6 ⁽⁴⁾	See section 4.4.2 "Max. suction side operating pressure for sealing type 1, 2, 7 and 19"	25	40
2	WDR (BABSL)	-				
3	WDR (HN2390)	-		2		
4	DRWDR (HN2390)	-				
		74	0.1	0.2		
5	GLRD (AX15)	-	0.6 ⁽⁴⁾	10		
6	GLRD (AX30)	-				
7	DRWDR (BABSL)	-		See section 4.4.2 "Max. suction side operating pressure for sealing type 1, 2, 7 and 19"		
		74	0.1	0.2		
9	WDR (R02-R)	-	0.6 ⁽⁴⁾	0.5		
18	WDR (BAUMX7)	-				
19	DRWDR (BABSL)	-		See section 4.4.2 "Max. suction side operating pressure for sealing type 1, 2, 7 and 19"		
		74	0.1	0.2		

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Seal type ⁽¹⁾		Special number	Operating pressure ⁽²⁾			
			Suction side		Pressure side	
			$p_{e \min}$ [bar abs.] ⁽³⁾	$p_{e \max}$ [bar]	p_b [bar] (perm. continuous pressure)	$p_{b \max}$ [bar] (Pressure peaks)
23	WDR (MSS1)	-	0.6 ⁽⁴⁾	0.5	25 ⁽⁵⁾	-
30	-	-		25	25	40
31	WDR (BABSL)	-		0.5	25 ⁽⁵⁾	-
32	DRWDR (R02-R)	-		0.5	25	40
		74		0.2		
36	-	-		25		
40	GLRD (L4)	-		10		

⁽¹⁾ WDR: Rotary shaft seal, DRWDR: Double rotary shaft seal, GLRD: Mechanical seal
⁽²⁾ bar abs.: absolute pressure, bar: relative pressure
⁽³⁾ KF . U: $p_{e \min} = 0.65$ bar abs.
⁽⁴⁾ Start-up condition: 0.4 bar absolute (max. 30 minutes).
⁽⁵⁾ $\vartheta_m < -20$ °C: 16 bar (Housing material GJL).

4.4.2 Max. suction side operating pressure for sealing type 1, 2, 7 and 19

Speed n [rpm]	$p_{e \max}$ [bar]					
	KF 2.5 - 63	KF 80	KF 100 - 180	KF 200	KF 250 - 315	KF 400 - 630
≤ 750	6	6	6	6	5.5	5
≤ 1000	5	5	5	5	4.5	4
≤ 1500	4	4	3.5	3.5	3	2.5
≤ 2000	3	3	2.5	2.5	2	1.5
≤ 2500	2.5	2.5	2	2	-	-
≤ 3000	2	2	1.5	-	-	-
≤ 3600	1.5	-	-	-	-	-

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4.4.3 Differential pressure - viscosity assignment

Bearing	$\Delta p_{\max}$ [bar]		
	$v \geq 1.4 \text{ mm}^2/\text{s}$	$v \geq 6 \text{ mm}^2/\text{s}$	$v \geq 12 \text{ mm}^2/\text{s}$
Multi layer friction bearings contains lead (Standard) DU, P10	3	12	25
Multi layer friction bearings lead free DP4			
Plastic plain bearings Iglidur® G; X; H370	-	6	10
White-metalled bearing TEGO® V738			

4.5 Permissible temperature range

Sealing material	Fluid temperature $\vartheta_m^{(1)}$	
	$\vartheta_{m \min}$ [°C]	$\vartheta_{m \max}$ [°C]
NBR	-20	90
PTFE / FEP with FKM-core		200
EPDM		120
FKM		150
FFKM / FEP with FKM-core		200
FKM (Low temperature)	-30	150

⁽¹⁾ Comply with media-specific properties.

Sealing material	Ambient temperature ϑ_u	
	$\vartheta_{u \min}$ [°C]	$\vartheta_{u \max}$ [°C]
NBR	-20	60
PTFE / FEP with FKM-core		
EPDM		
FKM		
FFKM / FEP with FKM-core		
FKM (Low temperature)	-30	

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4.6 Material data

Seal type ⁽¹⁾		Material				
		Shaft seal	O-rings	Housing/End cover	Gears	Bearing
1	WDR (BABSL)	NBR	NBR	EN-GJL-250 (GG-25) - - - EN-GJS-400-15 (GGG-40)	Case-hardened steel (1.7139)	Multi layer friction bearings contains lead (Standard) DU, P10 (Steel, CuSn, PTFE, Pb) - - - Plastic plain bearings non-ferrous metal-free Iglidur® X - - - Multi layer friction bearings lead free DP4 (Steel, CuSn, PTFE) - - - White-metalled bearing TEGO® V738 (Steel, Cu, Sn, Sb, Cd, Ni, As) (only KF 2.5 - 80)
2	WDR (BABSL)	FKM	FKM			
3	WDR (HN2390)	PTFE	FEP with FKM-core			
4	DRWDR (HN2390)	PTFE	FEP with FKM-core			
5	GLRD with FKM secondary seals (AX15)	C2S2V1G3G1 ⁽²⁾ (KF 2.5 - 200)	FKM			
		B10SV1G3G1 ⁽³⁾ (KF 250 - 630)				
6	GLRD with FFKM secondary seals (AX30)	Q2Q2K1G3 ⁽⁴⁾ (KF 2.5 - 25)	FEP with FKM-core			
		Q2B2K1G3 ⁽⁵⁾ (KF 32 - 200)				
7	DRWDR (BABSL)	FKM	FKM			
9	WDR (R02-R)	EPDM	EPDM			
18	WDR (BAUMX7)	FKM	FKM			
19	DRWDR (BABSL)	NBR	NBR			
23	WDR (MSS1)	FKM (Low temperature)	FKM (Low temperature)			

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Seal type ⁽¹⁾		Material				
		Shaft seal	O-rings	Housing/End cover	Gears	Bearing
30	-	-	FKM	EN-GJL-250 (GG-25) --- EN-GJS-400-15 (GGG-40)	Case-hardened steel (1.7139)	Multi layer friction bearings contains lead (Standard) DU, P10 (Steel, CuSn, PTFE, Pb) ---
31	WDR (BABSL)	FKM (Low temperature)	FKM (Low temperature)			Plastic plain bearings non-ferrous metal-free Iglidur® X ---
32	DRWDR (R02-R)	EPDM	EPDM			Multi layer friction bearings lead free DP4 (Steel, CuSn, PTFE) ---
36	-	-	NBR			White-metalled bearing TEGO® V738 (Steel, Cu, Sn, Sb, Cd, Ni, As) (only KF 2.5 - 80)
40	GLRD with FKM secondary seals (L4)	AQ2VFF ⁽⁶⁾	FKM			

⁽¹⁾ WDR: Rotary shaft seal, DRWDR: Double rotary shaft seal, GLRD: Mechanical seal
⁽²⁾ Metal-impregnated carbon /CrMo-Steel, FKM, CrNiMo-Steel
⁽³⁾ Resin-impregnated carbon , Cr-casting, FKM, CrNiMo-Steel
⁽⁴⁾ SiC/SiC, FFKM, CrNiMo-Steel
⁽⁵⁾ SiC/Resin-impregnated carbon , FFKM, CrNiMo-Steel
⁽⁶⁾ Metal-impregnated carbon /SiC, FKM, CrNi-Steel

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4.7 Weight

Nominal size V_{gn}	Gear pump [kg]			Added weight Mounting angle [kg]
	with end cover	with D - valve	with universal valve	
2.5	2.9 (KF . /158: +1.3)	3.7 (KF . /158: +1.3)	6.9	1.3
4				
5				
6				
8				
10	3.5 (KF . /158: +1.3)	4.3 (KF . /158: +1.3)	7.5	1.3
12				
16				
20				
25	7.7	9.5	27.5	1.6
32				
40				
50				
63				
80	9.4	11.2	29.5	1.6
100				
112				
125				
150	22.2	26.5	-	3.3
180				
200				
250				
315				
400	44.2	47.2	-	-
500				
630				
	54.7	57.9		
	60.8	64.0		

4.8 Dimensions

Dimensions of the device can be found in the relevant technical data sheets.

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5 Transport and storage

5.1 General

- After receipt, check the device for transport damages.
- If transport damage is noticed, report this immediately to the manufacturer and the carrier. The device must then be replaced or repaired.
- Dispose of packing material and used parts in accordance with the local stipulations.

5.2 Transport



WARNING

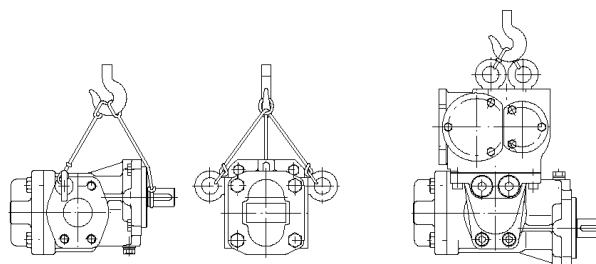
Falling or overturning loads!

Danger of injury while transporting large and heavy loads.

1. Use only suitable means of conveyance and lifting tackle with sufficient load-bearing capacity.
2. Attach lifting tackle only to suitable load points.
3. Attach the lifting tackle in such a manner that it cannot slip.
4. Pay attention to the load balance point.
5. Always avoid jerks, impacts and strong vibrations during transportation.
6. Never walk under suspended loads, never work under suspended loads.



To transport the device , eyebolts can be screwed into the flange connections.



5.3 Storage

The device's function is tested in the plant with mineral hydraulic oil. Then all connections are closed. The remaining residual oil preserves the interior parts for up to 6 months.

Metallic exposed exterior parts are protected against corrosion by suitable conservation measures, also up to 6 months.

In case of storage, a dry, dust-free and low-vibration environment is to be ensured. The device is to be protected against influences from weather, moisture and strong fluctuations of temperature. The recommended storage conditions are to be adhered to.

Below the permissible ambient temperature ϑ_u , elastomer seals lose their elasticity and mechanical loading capacity, since the glass transition temperature is fallen below. This procedure is reversible. A force action on the device is to be avoided in case of storage below the permissible ambient temperature ϑ_u .

Devices with EPDM seals are not mineral-oil resistant and are not tested for their function. There is no preservation of the interior parts. If the device is not taken into operation immediately, all corrosion-prone surfaces are to be protected by suitable conservation measures. The same applies for devices which are not tested for other reasons.

When storing for a long period of time (> 6 months), treat all surfaces at risk of corrosion again with suitable preserving agents.

If high air humidity or aggressive atmospheres are expected, take additional corrosion-preventing measures.



Storage in corrosion protection bags (VCI) maximum of 6 months.

NOTICE

Corrosion/chemical impact

Improper storage can render the device useless.

1. Protect endangered surfaces by means of suitable conservation measures.
2. Comply with recommended storage conditions.

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Recommended storage conditions

1. Storage temperature: 5 °C - 25 °C
2. Relative air humidity: < 70 %
3. Protect elastomer parts from light, especially direct sunlight.
4. Protect elastomer parts from oxygen and ozone.
5. Comply with maximum storage times of elastomeric parts:
 - 5 Years: AU (Polyurethane rubber)
 - 7 Years: NBR, HNBR, CR
 - 10 Years: EPM, EPDM, FEP/PTFE, FEPM, FKM, FFKM, VMQ, FVMQ

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6 Installation

6.1 Safety instructions for installation

**DANGER**
Hazardous fluids!

Danger of death when handling hazardous fluids.

1. Comply with the safety data sheets and regulations on handling hazardous fluids.
2. Collect and dispose of hazardous fluids so that no hazards arise for people or the environment.

**DANGER**
Rotating parts!

Danger of death due to body parts, hair or clothing getting trapped or entangled.

1. Before all work, ensure that existing drives are voltage-free and pressure-free.
2. Securely prevent restarting during all work.

**DANGER**
Rotating parts!

Danger of death due to body parts, hair or clothing getting trapped or entangled.

1. Take measures against accidental touching of rotating parts.

**WARNING**
Rotating parts!

Danger of injury from flying parts.

1. Enclose rotating parts so as to avoid any danger from flying parts in the event of breakage or malfunction.

**WARNING**
Unshielded gearwheels!

Gearwheels can trap and crush fingers and hands.

1. Do not engage gearwheels.

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WARNING

Failure of load-carrying parts due to overload!

Danger of injury from flying parts.

Danger of injury from spurting fluids.

1. Depressurise the device and all connection lines before doing any work.
2. Securely prevent the restoration of pressure while working on the device.

6.2 Noise reduction



Measures for noise reduction

1. Use suction and pressure hoses.
2. Use bell housings with high damping properties (plastic or cast iron).
3. Use of damping rings and damping rods for separation of structure-borne noise.

6.3 Mechanical installation

6.3.1 Preparation

- Check the device for transport damage and dirt.
- Check the device for freedom of movement.
- Remove existing preservatives.
 - Use only those cleaning agents that are compatible with the materials used in the device.
 - Do not use cleaning wool.
- Compare the environmental and ambient conditions at the place of installation to the permissible conditions.
 - Ensure a sufficiently stable and level foundation.
 - Expose the device only to small vibrations, see IEC 60034-14.
 - Secure sufficient access for maintenance and repair.

6.3.2 Pumps with free shaft end

The prerequisite for trouble-free operation is suitable load transmission between the pump and the drive. By default a torsionally flexible claw coupling Type "R" is used for this.

- Pre-mount coupling parts as per manufacturer's specifications.



Torsionally flexible claw coupling type "R.": See [section 6.3.3 "Coupling Type "R.""](#)

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- Position the pumps and the drive with respect to each other.
 - Comply with the permissible mounting position.
 - Comply with the permissible direction of rotation.



Rotation and delivery direction: See [chapter 3 "Device description"](#)

- Tighten all fastening screws with the specified torque.
 - Keep to the permissible displacement values of the coupling.
 - Rule out any distortion of the device.
 - Pay attention to sufficient screw-in depth of the fastening screws.

Tightening torques [Nm]							
Thread size ⁽¹⁾	M6	M8	M10	M12	M16	M20	M24
Counter-thread Aluminium	4.6	11	22	39	95	184	315
Counter-thread Cast iron/Steel	10	25	49	85	210	425	730
⁽¹⁾ Screws/Nuts with min. strength class 8.8/8							

- For devices without shaft seals, ensure that the leak oil from the shaft sealing chamber is specifically drained off and cannot get into the environment.
- Make sure no foreign bodies can get into the device.
- Take measures against accidental touching of rotating parts.
- Take measures against accidental touching of hot surfaces (> 60 °C).
- On devices with quench, mount a tank for the liquid seal.
 - Mount the tank above the device.
 - The connection on the device must point upward.
 - Checking the fluid level must be possible at any time.



A second port on the unit enables purging of the quench chamber and draining of the liquid seal.

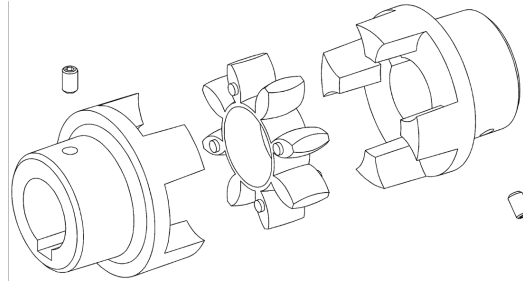
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6.3.3 Coupling Type "R."

Claw couplings Type "R." are torsionally flexible and transmit the torque positive. They are fail-safe. The vibrations and impacts that occur during operation are effectively dampened and reduced.

Claw coupling Type "R."



NOTICE

Coupling breakage or increased wear

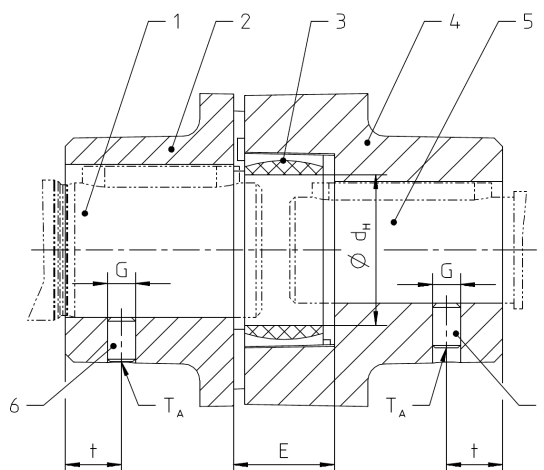
An overload can lead to premature failure of the coupling.

1. Ensure safe dimensioning when designing the coupling. Take vibrations, torque peaks and temperatures into account.

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Assembly data



Explanation

- | | |
|-------------------------------|---|
| 1. Shaft projects into spider | 4. Coupling halve |
| 2. Coupling halve | 5. Shaft with parallel key projects into spider |
| 3. Spider | 6. Setscrew |

When installing the coupling, maintain the "E" gap dimension so that the spider remains free during operation. If the shaft diameters are less than (also with parallel key) the dimension d_H of the spider, the shaft ends can protrude out into the spider.

Coupling size ⁽¹⁾	14	19	24	28	38	42	48	55	65	75
	-	19/24	24/28	28/38	38/45	42/55	48/60	55/70	65/75	75/90
Coupling clearance E [mm]	13	16	18	20	24	26	28	30	35	40
d_H [mm]	10	18	27	30	38	46	51	60	68	80
G	M4	M5	M5	M8	M8	M8	M8	M10	M10	M10
t [mm]	5	10	10	15	15	20	20	20	20	25
Tightening torque T_A [Nm]	1.5	2	2	10	10	10	10	17	17	17

⁽¹⁾ Example: R.19-Z25/14-Z25/19 or R.19/24-Z25/14-Z25/24.

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For assembly, the coupling halves can be heated to approx. 80 °C and pushed onto the shaft ends while warm.

**CAUTION****Hot surfaces!**

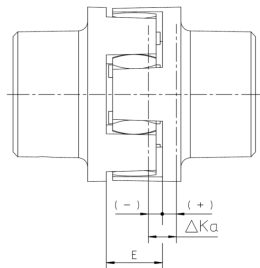
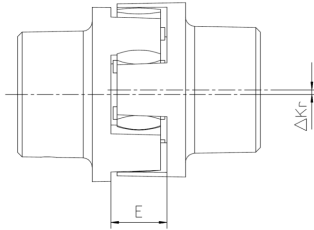
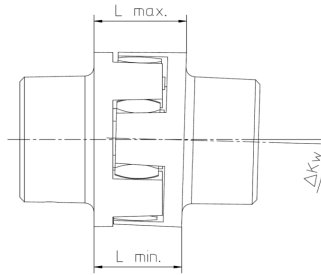
Burn injury to skin if touched.

1. Wear protective gloves at temperatures $\geq 48^{\circ}\text{C}$.

- Mount the coupling halves on the shaft ends but avoid impacts on the components.
- Position the coupling halves on the shaft ends so that in later operation the "E" gap dimension is maintained.
- Secure the coupling halves by tightening the setscrews.
- Insert the spider in a coupling half.

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Displacement values**Axial displacement**
 ΔK_a **Radial displacement**
 ΔK_r **Angular displacement**
 $\Delta K_w/\Delta K_L$ 

$$\Delta K_L \triangleq L_{\max} - L_{\min}$$

Coupling size		14	19	24	28	38	42	48	55	65	75
		-	19/24	24/28	28/38	38/45	42/55	48/60	55/70	65/75	75/90
Coupling clearance E [mm]		13	16	18	20	24	26	28	30	35	40
ΔK_a [mm]		+1.0 -0.5	+1.2 -0.5	+1.4 -0.5	+1.5 -0.7	+1.8 -0.7	+2.0 -1.0	+2.1 -1.0	+2.2 -1.0	+2.6 -1.0	+3.0 -1.5
ΔK_r [mm]	1500 rpm	0.11	0.13	0.15	0.18	0.21	0.23	0.25	0.27	0.30	0.34
	3000 rpm	0.08	0.09	0.1	0.13	0.15	0.16	0.18	0.19	0.21	0.24
ΔK_w [Degree]	1500 rpm	1.1	1.1	0.8	0.8	0.9	0.9	1.0	1.0	1.1	1.1
	3000 rpm	1.0	1.0	0.7	0.7	0.8	0.8	0.9	0.9	1.0	1.0
ΔK_L [mm]	1500 rpm	0.57	0.77	0.77	0.90	1.25	1.40	1.80	2.00	2.50	3.00
	3000 rpm	0.52	0.7	0.67	0.80	1.00	1.30	1.60	1.80	2.20	2.70

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Displacement combinations

Examples for displacement combinations shown in the photo opposite:

Example 1:

$\Delta K_r = 30 \%$

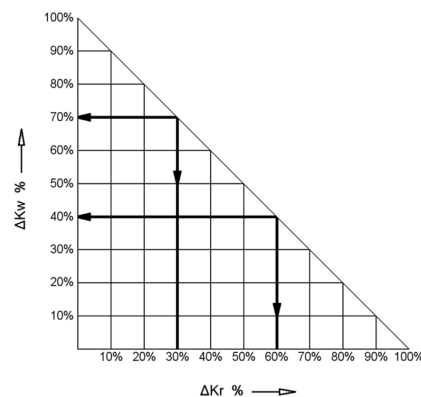
$\Delta K_w = 70 \%$

Example 2:

$\Delta K_r = 60 \%$

$\Delta K_w = 40 \%$

$\Delta K_r + \Delta K_w \leq 100 \%$



6.4 Connection lines

6.4.1 General



WARNING

Failure of load-carrying parts due to overload!

Danger of injury from flying parts.

Danger of injury from spurting fluids.

1. Use only connections and lines approved for the expected pressure range.
2. Securely prevent exceeding the permissible pressure, e.g. by using pressure relief valves or rupture discs.
3. Design pipework so that no tensions, e.g. caused by changes in length due to fluctuations in temperature, are transmitted to the device.



Additional connections

1. Provide measurement connections for pressure and temperature as close as possible to device.
2. If necessary, provide a facility to fill or empty the device and the line system.
3. If necessary, provide a facility to vent the device and the line system.

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6.4.2 Suction line

A less than optimally planned suction line can lead to increased noise emission, cavitation as well as reduction of the delivery rate (caused by not complete filling of the pump).

When designing the line, take the following points into consideration:

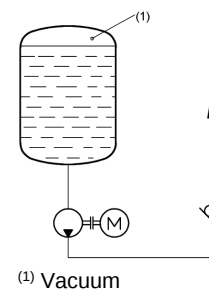
- The suction line must be piped as short as possible and in a straight line.
- Stipulate the nominal width of the suction line so that the permissible operating pressure $p_{e\ min}$ is not exceeded on the suction side.
- Avoid large suction heights.
- Avoid additional pressure loss through line resistances such as fittings, screwed connections, formed parts or suction filters/suction baskets. Ensure that all technically required suction filters/suction baskets are appropriately dimensioned.
- Make sure there is sufficient clearance of the suction port to the bottom and walls of the media container.
- Make sure that the suction opening lies underneath the lowest fluid level in all operating situations.
- When hose lines are used, ensure sufficient stability of the hoses so that they cannot become constricted through the sucking action.
- Comply with the recommended flow velocity in the suction line (max. 1.5 m/s).

Suction line at vacuum operation

If suction from a tank under vacuum is desired, the pump must be arranged approx. 1 m below the tank. The suction line must run in a straight line and without any resistances.

The tank may be subjected to vacuum only then when the pipework and the pump have been filled with liquid.

For this application, only pumps suitable for vacuum operation may be used.



NOTICE

Cavitation damage

Undercutting the permissible suction port pressure results in cavitation.

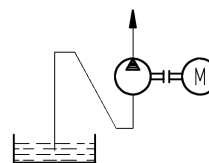
1. Design the suction line so that the pressure arising in operation on the suction side is always higher than the vapour pressure of the pumped medium. At the same time, comply with the installation altitude of the device above mean sea level.
2. For aqueous fluids, mount the device underneath the fluid level, set the operating temperature to 50 °C and limit the speed to 1500 rpm.

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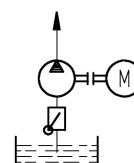
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Prevention of suction problems

If there is a possibility that the suction line can run dry if the pump stops, piping the suction line as siphon is an option to avoid suction problems. This way, the pump will remain permanently filled after initial commissioning.



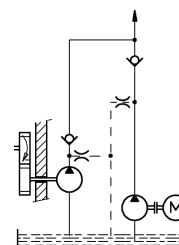
It is appropriate to employ a foot valve or a non-return valve in case of longer suction lines that can run dry while the pump is at rest. These must have been designed for use in suction lines and should offer as low a flow resistance as possible.



During operation of a pump that has to pump media via a non-return valve in a pressurized circuit (e.g. reserve pump in a lubricant circuit), suction problems can occur if the suction line is filled with air.

In this case the pressure pipe must be bled directly upstream of the non-return valve.

If no vent nozzle is used, the volume of the pressure pipe between the pump and the non-return valve must be at least 75 % of the suction line volume.



6.4.3 Pressure line

When designing the line, take the following points into consideration:

- Select the nominal width of the pressure line so that the maximum permissible pressures are not exceeded.
- If necessary, provide a vent nozzle to prevent suction problems.

6.4.4 Mounting Connection lines



Position of the device connections: See [chapter 3 "Device description"](#)

- Clean all lines.
 - Do not use cleaning wool.
 - Pickle and flush welded pipes.
- Remove the protective plugs.
- Mount the lines.
 - Comply with the manufacturer's information.
 - Do not use any sealing materials such as hemp, Teflon tape or putty.

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6.5 Change of the direction of rotation

For pump types KF . R and KF . L, a change of the direction of rotation is only possible by converting.

The manufacturer normally carries out the conversion work and the customer should do this only in exceptional cases. Please consult the manufacturer about this.



Gear pumps in noise-optimized version cannot be converted. (e.g. special number **197**)



DANGER

Rotating parts!

Danger of death due to body parts, hair or clothing getting trapped or entangled.

1. Before all work, ensure that existing drives are voltage-free and pressure-free.
2. Securely prevent restarting during all work.



WARNING

Failure of load-carrying parts due to overload!

Danger of injury from flying parts.
Danger of injury from spurting fluids.

1. Depressurise the device and all connection lines before doing any work.
2. Securely prevent the restoration of pressure while working on the device.



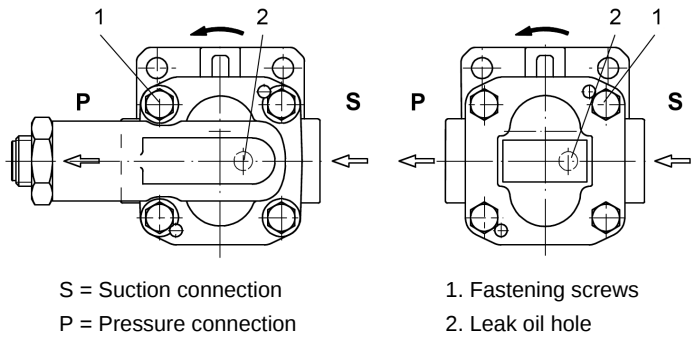
NOTICE

Leaks or increased wear

Damaged sealing surfaces or supports lead to lack of sealing and/or faults in later operation.

1. When assembling or disassembling housing components, be sure not to damage the bearings, e.g. by tilting.
2. When disassembling housing components, do not use screwdrivers or the like as a lever to separate the joints.
3. Do not remove, damage or jam seals.

Gear pump KF 2.5 - 630



To change the direction of rotation of the gear pump, turn the end cover or the pressure relief valve 180°.

- Loose fastening screws.
- Unscrew the end cover or the pressure relief valve of the pump housing and replace it rotated 180°.
- Tighten the fastening screws with the stated torque.

Fastening screws KF 2.5 - 630				
Gear pump	KF 2.5 - 25	KF 32 - 80	KF 100 - 200	KF 250 - 630
Tightening torques [Nm]	25	49	85	215



For pumps with sealing type 6, the lip-type seal must be replaced in addition. During this process, the spring coiling direction must be observed.

When checking, pay attention to the following points:

1. For gear pumps without pressure relief valve, the leak oil hole in the end cover must be placed at the pump's suction side.
2. Gear pumps with pressure relief valve must have their pressure relief valve adjusting screw point toward the pump's pressure side.

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Gear pump KF 2.5 - 630

7 Operation start-up

7.1 Safety instructions for start-up

 DANGER
Hazardous fluids! Danger of death when handling hazardous fluids. 1. Comply with the safety data sheets and regulations on handling hazardous fluids. 2. Collect and dispose of hazardous fluids so that no hazards arise for people or the environment.
 WARNING
Failure of load-carrying parts due to overload! Danger of injury from flying parts. Danger of injury from spurting fluids. 1. Do not operate the device against closed shut-off devices. 2. Do not operate the device in the false direction of rotation.
 CAUTION
Hot surfaces! Burn injury to skin if touched. 1. Wear protective gloves at temperatures $\geq 48^{\circ}\text{C}$.

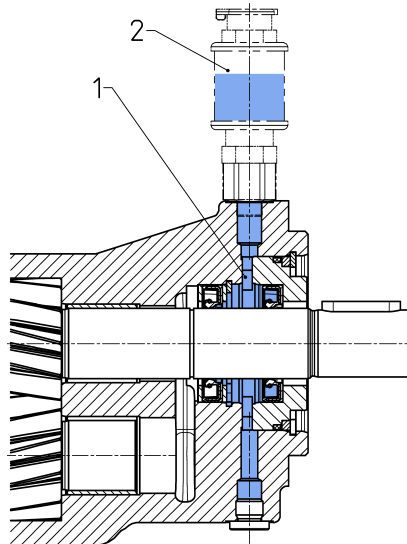
7.2 Preparation

- Before starting the system make sure that a sufficient quantity of the operating fluid is extant to avoid dry running.
 Take this into consideration especially with high output volumes.
- Check all fastening screws on the device.
- Fill pump and the suction line with medium.

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7.3 Filling the quench chamber



1. Quench chamber
2. Container for quench-liquid (Accessories)

- For versions with quench, fill the quench chamber with a suitable quench liquid.
 - The filling is implemented through the tank provided for that.
 - Fill fluid until the quench chamber is completely full and the tank is half full.
- Do not apply pressure or vacuum to the quench chamber.

NOTICE

Seal failure due to dry run

A lack of quench liquid can lead to a failure of the seal.

1. Do not put pumps without quench liquid into operation.



A second port on the unit enables purging of the quench chamber and draining of the liquid seal.

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7.4 Pressure relief valve adjustment

Directly attached pressure relief valves of the series "D" are used exclusively for protection of the gear pumps and may respond on a short-term basis only.

The valves are factory set to the rated pressure of each pressure stage. Setting pressures that deviate from this are stated on the rating plate.

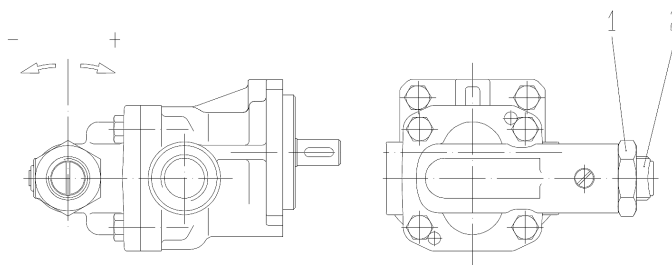


NOTICE

Failure of the pump

Long triggering of the valve can cause the pump to overheat.

1. Only allow intermittent triggering of the valve.



- Lower response pressure
+ Higher response pressure

1. Hexagonal nut
2. Adjustment screw

Pressure setting:

- Remove hexagon nut
- Set the response pressure using the adjusting screw
- Secure the adjusting screw with hexagon nut



WARNING

Failure of load-carrying parts due to overload!

Danger of injury from flying parts.
Danger of injury from spurting fluids.

1. Consider the permissible pressure setting range of the valve.
2. Check the pressure setting (the valve must not block).

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7.5 Further operation start-up

- Open existing shut-off elements upstream and downstream of the device.
- Adjust pressure relief valves in the system installed for lowest opening pressure.
- Allow the device start without or with a low pressure load (jog mode).
 - Flow should have developed after 30 s at the latest.
- Run the device for a few minutes depressurised or with low pressure.
- Vent the system at the highest possible point.
- Gradually increase the pressure load up to the desired operating pressure.
- Operate the system for so long until the final operating state is achieved.
- Check the operating data such as:
 - Discharge flow
 - Operating pressure (as close as possible to device)
 - Fluid temperature (as close as possible to device)
 - Device temperature (in particular in the area of the bearing points)
 - ...
- Document the operating data of the initial start-up for later comparison.
- Check the level of the operating medium in the system.
- Check the filling level of the liquid seal (if existing).
- Check the device for leaks.
- Check all threaded connections for leaks and retighten if necessary.



In order to ensure a constant and reliable function of the device, an initial maintenance of the device is recommended after several hours warm-up time (max. 24 h). Faults can thus be identified at an early stage.

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8 Removal

8.1 Safety instructions for removal



DANGER

Hazardous fluids!

Danger of death when handling hazardous fluids.

1. Comply with the safety data sheets and regulations on handling hazardous fluids.
2. Collect and dispose of hazardous fluids so that no hazards arise for people or the environment.



DANGER

Rotating parts!

Danger of death due to body parts, hair or clothing getting trapped or entangled.

1. Before all work, ensure that existing drives are voltage-free and pressure-free.
2. Securely prevent restarting during all work.



WARNING

Unshielded gearwheels!

Gearwheels can trap and crush fingers and hands.

1. Do not engage gearwheels.



WARNING

Failure of load-carrying parts due to overload!

Danger of injury from flying parts.

Danger of injury from spurting fluids.

1. Depressurise the device and all connection lines before doing any work.
2. Securely prevent the restoration of pressure while working on the device.



CAUTION

Hot surfaces!

Burn injury to skin if touched.

1. At temperatures $\geq 48^{\circ}\text{C}$ the device must be allowed to cool down first.

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KRACHT**NOTICE****Blocking of the device through hardening medium**

Hardening medium can mechanically jam the device and make it unusable.

1. Clean device immediately after operating with a hardening medium.

8.2 Removal

- Depressurise and de-energize the system.
- Close existing shut-off elements upstream and downstream of the device.
- Open existing drain elements and loosen connection lines. Collect and dispose of discharging medium so that no hazard arises for persons or environment.
- Dismantle the device.
- Clean the device.
- Close the device connections and lines to prevent dirt penetration.

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9 Maintenance

9.1 Safety instructions for maintenance



DANGER

Hazardous fluids!

Danger of death when handling hazardous fluids.

1. Comply with the safety data sheets and regulations on handling hazardous fluids.
2. Collect and dispose of hazardous fluids so that no hazards arise for people or the environment.



DANGER

Rotating parts!

Danger of death due to body parts, hair or clothing getting trapped or entangled.

1. Before all work, ensure that existing drives are voltage-free and pressure-free.
2. Securely prevent restarting during all work.



WARNING

Failure of load-carrying parts due to overload!

Danger of injury from flying parts.

Danger of injury from spurting fluids.

1. Depressurise the device and all connection lines before doing any work.
2. Securely prevent the restoration of pressure while working on the device.



CAUTION

Hot surfaces!

Burn injury to skin if touched.

1. At temperatures $\geq 48^{\circ}\text{C}$ the device must be allowed to cool down first.

9.2 Maintenance work



Checking and documentation of the operating data

Regular checking and documentation of all operating data such as pressure, temperature, current consumption, degree of filter soiling, etc. contributes to early problem detection.

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- Perform maintenance according to specification.
- Replace defective and worn components.
- If required, request spare parts lists and assembly drawings from the manufacturer.
- Document the type and scope of the maintenance work along with the operating data.
- Compare the operating data with the values of the first commissioning. Determine the cause in case of major non-compliances (> 10 %).
- Dispose of packing material and used parts in accordance with the local stipulations.



Barriers and instructions

All barriers and warning signs removed during this must be attached to their original position on completing maintenance and/or repairs.

9.3 Maintenance instructions

The following information provides recommendations on maintenance work and maintenance intervals for the device being used.

Depending on the actually occurring loads in operation, the type, scope and interval of the maintenance work can deviate from the recommendations. The equipment builder/operator shall write an obligatory maintenance plan.



Within the framework of preventive maintenance, it is appropriate to replace wear parts before reaching the wear limit.

With corresponding expertise and sufficient equipment, the replacement can be carried out by the equipment builder/operator. Please consult the manufacturer about this.



Warranty

In case of improper implementation, any warranty is voided.

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Maintenance recommendations Gear pump			
Interval	Maintenance work	Employ-ees	Duration approx. [h]
Firstly: after max. 24 h	Inspection: Discharge flow	1	1
	Inspection: Operating pressure		
	Inspection: Fluid temperature		
	Inspection: Device temperature		
	Inspection: Add-on valve function (if existing)		
	Inspection: Check potential equalisation for firm seating and functionality (if existing)		
	Inspection: Condition of operating fluid		
Daily	Audiometric monitoring: Unusual noise	1	0.1
	Cleaning: Remove dust deposits and dirt with a moist cloth		
	Visual inspection: Leakages		
	Visual inspection: Filling level of liquid seal (if existing)		
3000 Operating hours	Inspection: Discharge flow	1	1
	Inspection: Operating pressure		
	Inspection: Fluid temperature		
	Inspection: Device temperature		
	Inspection: Add-on valve function (if existing)		
	Inspection: Check potential equalisation for firm seating and functionality (if existing)		
	Inspection: Condition of operating fluid		
6000 Operating hours	Visual inspection: Condition of gears	1	2
	Visual inspection: Condition of housing parts		
	Visual inspection: Condition of plain bearings		
	Visual inspection: Condition of shaft seal		
	Visual inspection: Condition of outboard bearings (if existing)		
As required	Replace: Plain bearings (only by manufacturer)	1	2
	Replace: Outboard bearing (if existing)		
	Replace: Shaft seal		
	Replace: Other seals		

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10 Repairs

10.1 Safety instructions for repair

 DANGER Hazardous fluids! Danger of death when handling hazardous fluids. 1. Comply with the safety data sheets and regulations on handling hazardous fluids. 2. Collect and dispose of hazardous fluids so that no hazards arise for people or the environment.
 DANGER Rotating parts! Danger of death due to body parts, hair or clothing getting trapped or entangled. 1. Before all work, ensure that existing drives are voltage-free and pressure-free. 2. Securely prevent restarting during all work.
 WARNING Failure of load-carrying parts due to overload! Danger of injury from flying parts. Danger of injury from spurting fluids. 1. Depressurise the device and all connection lines before doing any work. 2. Securely prevent the restoration of pressure while working on the device.
 CAUTION Hot surfaces! Burn injury to skin if touched. 1. At temperatures $\geq 48^{\circ}\text{C}$ the device must be allowed to cool down first.

10.2 General

The repairs covers:

1. Troubleshooting
Determination of damage, pinpointing and localisation of the damage cause.
2. Elimination of damage
Elimination of the primary causes and replacement or repair of defective components. The repair is generally made by the manufacturer.

Repairs by manufacturer

- Before returning the device, fill in the *return notification* form. The form can be filled in online and is available as a pdf file download.



Device contains hazardous material

If the device was operated with dangerous liquids, it must be cleaned before the return. If this should not be possible, the safety data sheet of the hazardous material is to be provided beforehand.

Repair by equipment builder/operator

If corresponding expertise and sufficient equipment is available, the equipment builder/operator can also make the repairs. Please consult the manufacturer about this.

- If required, request spare parts lists and assembly drawings from the manufacturer.
- Use spare parts approved by the manufacturer only.
- Dispose of packing material and used parts in accordance with the local stipulations.



Warranty

In case of improper implementation, any warranty is voided.



Barriers and instructions

All barriers and warning signs removed during this must be attached to their original position on completing maintenance and/or repairs.

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10.3 Detecting and eliminating failures

Failure	Potential causes	Possible measures
1.1 Increased noise <i>Pump cavitation</i>	Excessive negative pressure (not complete filling of the pump)	Check suction line design Use noise-optimised pump
	Suction line plugged	Clean the suction line
	Suction filter plugged or too small	Clean suction filter or use a larger filter Replace filter element
	Suction basket plugged or too small	Clean intake strainer or dimension larger
	Fluid temperature too low	Adjust the temperature of medium
1.2 Increased noise <i>Foaming or air in medium</i>	Pump sucks air	Check oil level in the tank Check suction line Check the shaft seal
	Shaft seal defective	Replace shaft seal
	Suction connection leaking	Retighten or replace threaded connections Replace seals
	System not vented	Vent system
	Return line ends above the fluid level	Extend return line
	Heavy foaming in the system, e.g. in gears	Use noise-optimised pump
1.3 Increased noise <i>Mechanical vibrations</i>	Incorrectly aligned and/or loose coupling	Correct the alignment of the coupling and secure the coupling halves
	Incorrectly and/or insufficient line fastening	Fixate lines with suitable fastening material (e.g. pipe clamps)
	Wobbling pressure relief valve (if existing)	Increase valve opening pressure
	Not a noise-reducing setup	Use dampers

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Failure		Potential causes	Possible measures
2	Pump does not suck	Dry run	Fill pump and the suction line with medium.
		Minimum filling level in the supply tank undercut	Top up medium
		False direction of rotation of the pump	Correct the direction of rotation
		Closed shut-off element in the suction line	Open the shut-off element
		Suction line plugged	Clean the suction line
		The air in the suction line cannot be compressed in the pressure line	Reduce the start-up pressure
			Vent the pressure line
			Increase volume of the pressure line
		Speed of the pump is too low	Check the pump design
			During frequency inverter operation: Check the operation/line frequency
		Geodetic suction head too high	Check installation location
			Provide pre-filling pump

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Failure	Potential causes	Possible measures
3 Insufficient pressure Insufficient pumping flow rate	Excessive negative pressure (not complete filling of the pump)	Check suction line design
	Viscosity too high	Provide pre-filling pump
	Speed of the pump is too low	Check the pump design
		During frequency inverter operation: Check the operation/line frequency
	Throttled shut-off element in the suction line	Open the shut-off element
	Suction line plugged	Clean the suction line
	Suction filter plugged or too small	Clean suction filter or use a larger filter
		Replace filter element
	Suction bascet plugged or too small	Clean intake strainer or dimension larger
	Constant triggering of pressure relief valve (if existing)	Increase valve opening pressure
	Pump sucks air	Check oil level in the tank
		Check suction line
		Check the shaft seal
4 Excessive operating temperature	Wear	Replace the device
	Cooling and heat dissipation insufficient	Increase the cooling capacity
	Not sufficient oil in the system	Check the container layout
	Excess fluid is being delivered into the supply tank via pressure relief valve under load	Check the pump design
5 Impermissible pump heating	Constant triggering of a directly attached pressure relief valve (if existing)	Increase valve opening pressure
	Pressure too high in association with a media viscosity that is too low	Check the system design
	Speed too fast in connection with media viscosity that is too high	Check the system design
	Gland lid overtightened (for gland seal)	Unscrew gland lid and readjust leakage
	Suction pressure too high	Reduce the pressure
	Wear	Replace the device

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Failure	Potential causes	Possible measures
6 Leakages <i>Seal failure</i>	Poor maintenance	Comply with maintenance plan Replace seals
	Mechanical damage	Replace seals
	Thermal overload	Check the operating datas Replace seals
	Pressure too high	Check the operating datas Replace seals
	Gas content in medium too high	Check the operating datas Replace seals
	Corrosion/chemical impact	Check the material compatibility Replace seals
	Wrong direction of rotation	Correct the direction of rotation Replace seals
	Contaminated medium	Provide filtration Replace seals
	Gland lid not sufficiently tightened (for gland seal)	Retighten gland lid
	Loose threaded connections	Retighten or replace threaded connections
7.1 Coupling <i>Coupling wear</i>	Alignment error	Correct the alignment of the coupling and secure the coupling halves
	Spider overloaded	Check the operating datas Use harder spider
7.2 Coupling <i>Cam break</i>	Spider wear Torque transmission due to metal contact	Adapt maintenance intervals Replace coupling
7.3 Coupling <i>Premature spider wear</i>	Alignment error	Correct the alignment of the coupling and secure the coupling halves Replace spider
	Spider failure due to chemical corrosion	Check the material compatibility Replace spider

Gear pump KF 2.5 - 630

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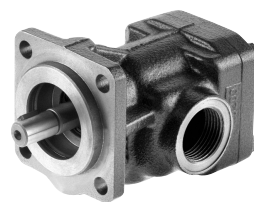
Failure		Potential causes	Possible measures
8	Motor protection switch tripped	Driving power too low	Check the drive design
		Motor incorrectly connected	Check motor connection
		Phase failure	Check feed/supply
		Current consumption too high	Check the operating datas
			Check direction of rotation
		Motor circuit breaker incorrectly designed	Check the operating datas
Consult the manufacturer for all unidentifiable failures.			

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Transfer Gear Pumps

KF 2.5...200

Transfer Gear Pumps KF 2.5...200

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Transfer Gear Pumps KF 2.5...200

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Transfer Gear Pumps KF 2.5...200

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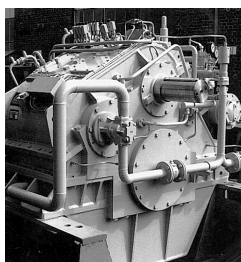
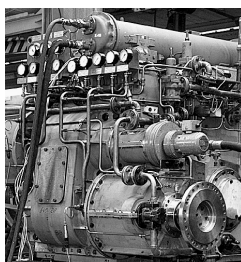
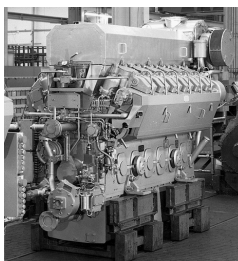
Applications, Suitable Fluids

Applications

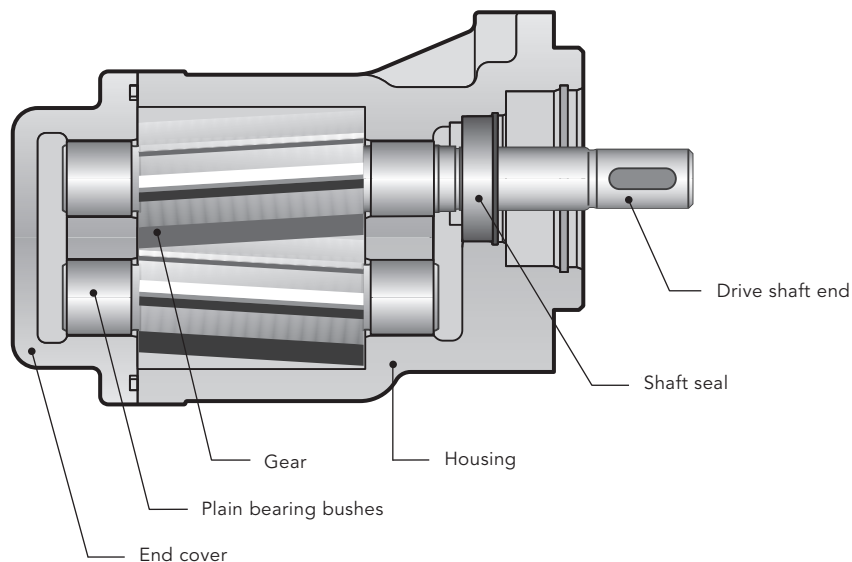
Centrifuge construction,
Coating machines, Compressors
Engine construction
Filling stations, Filter systems
Generator construction
Heat transfer systems, Heavy electrical machines
Lubricant manufacturers, Lubricating oil systems
Machine-building industry, Machine tools,
Manufacture of apparatus,
Marine engine construction,
Metal-forming machines, Metering systems
Paint industry, Plain metal bearing production,
Printing machines, PUR machinery
Refrigerators, Rubber and tire manufacturing
Tank plant construction,
Transmission building
Turbine construction
Vacuum machinery
Waste oil - disposal
- transport
- treatment

Suitable fluids

Adhesives, Antifreeze
Bore oils
Cutting oils
Diesel oils, Drawing compound
Emulsions
Fuel oils, L, EL, H
Gear oils, Grease
Hardening oils, Heat transfer media,
Heavy oils, Hydraulic fluids
Isocyanate
Lubricating oils, Lacquers
Motor oils
Paint, Paraffins, Plastics, Polyols
Printing inks, Processing oils
Resins, Rolling oils
Waste oils, Waxes



Transfer Gear Pumps KF 2.5...200

KRACHT**Construction****Product Features**

Transfer gear pumps KF are used for pumping a wide variety of fluids.

Transfer gear pumps KF are distinguished especially by their wide range of variants which are assembled as required on the modular principle and also permit subsequent upgrade.

The pumps are also suitable for media with low lubricating properties.

The standard housing sections are of grey cast iron.

The gear units are manufactured from high-strength case-hardening steel, hardened and mounted in special multi-compound plain bearing bushes.

The standard drive shaft is sealed by rotary shaft lip-type seal.

All pump sizes incorporate helical tooth system. This feature, combined with special gear geometry, results in extremely low noise levels and reduced pressure pulsation.

Working Notes

- The fluids should ensure a certain minimum lubricating properties, should not contain solids and should be chemically compatible.
- Avoid dry operation.
- The pumps may only be operated in the specified direction of rotation, as otherwise the shaft seal will be destroyed.
- In order to prevent excessive overpressure, a safety valve should be provided in the system or on the pump.
- The pressure relief valve attached to the pump may only be used as safety valve for short-term operation.
- A separate pressure relief valve with return line to the reservoir must be foreseen, if a partial discharge flow has to be drained over a prolonged period.

Transfer Gear Pumps KF 2.5...200

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Variants

- Sealing of the drive shaft:
 - Rotary shaft lip-type seal
 - Double rotary shaft lip-type seal (Quench)
 - Mechanical seal
- Outboard bearing to take up input drive-side radial load
- Pressure relief valve for pump and system
- Uniform discharge flow direction with changing direction of rotation by means of flange-mounting valve combination (universal device).

Special Design

Various shafts ends and gear units, as well as flange mounted versions, bearing alternatives, multi-stage pump combinations for your special application are available on request.

Our Sales engineers will be pleased to advise you.

Accessories

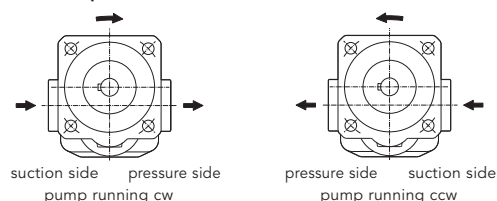
- Connecting flanges
- Couplings
- Bell housing
- Quench tank
- Attenuation elements

Direction of Rotation

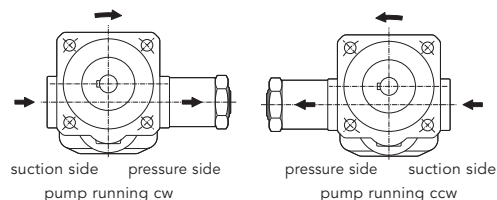
The following should be note for direction of rotation:

- when looking at the pump shaft end, the direction of pumping is from left to right if the shaft rotates **clockwise**.
- when looking at the pump shaft end, the direction of pumping is from right to left if the shaft rotates **counterclockwise**.

Without pressure relief valve



With pressure relief valve



With universal device

Direction of rotation right and left

Direction of rotation consistent, see dimension sheets page 18 to 21.

ATEX-Version

	KF 2,5...112 with lip-type seal	KF 2,5...112 with double lip-type seal
In Ex-area max. suitable for category	EX II 2G T4 EX II 2D T135 °C	EX II 2G T4
Perm. working pressure inlet port in bar	– 0.4 ... + 0.5	– 0.4 ... + 0.5
Perm. working pressure outlet port in bar	25	25
Perm. viscosity in mm ² /s	12 ... 20 000	12 ... 20 000
Max. speed in 1/min (viscosity dependent)	3 000	3 000
Perm. mounting position	Horizontal or shaft end toward bottom	Horizontal quencher up
Perm. media temperatures in °C	– 10 ... + 80	– 10 ... + 80
Perm. ambient temperatures in °C	– 20 ... + 60	– 20 ... + 60
Comments	Vertical mounting with shaft end up on request. In executing with outboard bearing max. speed 1500 1/min. In dust Ex-area, permissible only with non-conductive dusts. Dust-proof capsuling of pump shaft and coupling required.	Not suitable for dust-Ex. Execution with quench feed and quencher.

Additional products available on request.

Transfer Gear Pumps KF 2.5...200

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Materials

Housing and cover	EN-GJL-250 (GG 25) EN-GJS-400-15 (GGG 40) on request
Gear	Steel 1.7139
Plain bearing bushes	DU (multi-layer friction-type bearings P 10, DP 4) Bearings free of nonferrous metal on request
Shaft end seals	NBR, FKM, PTFE, EPDM (other sealing materials on request. E.g. HNBR / CR)
O-ring	NBR, FKM, PTFE, EPDM (other sealing materials on request. E.g. HNBR / CR)

Characteristics

Nominal sizes 2.5...200 cm ³	$V_g =$	2.5 / 4 / 5 / 6 / 8 / 10 / 12 / 16 / 20 / 25 / 32 / 40 / 50 / 63 / 80 / 100 / 112 / 125 / 150 / 180 / 200
Mounting position		KF... R/L/B ... without Quench optional KF... R/L/B ... with Quench horizontal, Quench connection above KF... U ... horizontal, Pressure connection above KF... U2...optional
Direction of rotation		right or left right and left
Fixing type		flange
Pipe connection	KF 2.5...25 KF 32...200	Whitworth pipe thread, SAE flange SAE flange
Drive shaft end		ISO R 775 short-cylindrical
Working pressure suction side		see chart page 8
Working pressure pressure side	P_n	25 bar (higher pressures on request)
Speed	KF 2.5... 63 KF 80... 180 KF 200	200 ... 3 600 1/min 200 ... 3 000 1/min 200 ... 2 500 1/min
Recommended speed		The speed of the pump must be chosen in such a way that complete pump filling is guaranteed. This is given if the relative pressure at the pump inlet does not fall below -0.4 bar (-0.6 bar briefly e.g. during cold start).
Viscosity (dependent on pressure and rotational speed)	V_{min} V_{max}	1.4... 12 mm ² /s (see table "permissible differential pressure") 20 000 mm ² /s
Fluid temperature		see chart page 8
Ambient temperature	$\vartheta_u =$	-20 °C ... 60 °C (-4 °F ... 140 °F) -30 °C... 60 °C Sealing type 23 (KF 2.5...80) -30 °C... 60 °C Sealing type 31 (KF 32...200)

Permissible Differential Pressure

Bearing	Δp_{max} [bar]		
	≥ 1.4 mm ² /s	≥ 6 mm ² /s	≥ 12 mm ² /s
Multi-layer plain bearing containing lead ⁽¹⁾ : DU®, P10	3	12	25
Multi-layer plain bearing lead-free ⁽²⁾ : DP4			
Polymer plain bearing ⁽²⁾ : Iglidur® X	–	3	10
White metal plain bearing ⁽²⁾			

⁽¹⁾ Standard ⁽²⁾ Is defined in the special number

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Transfer Gear Pumps KF 2.5...200

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Shaft End Seals

	Sealing material	Pressure suction side* (bar)		Fluid temperature	
		KF 2,5...80	KF 100...200	°C	°F
Pump with single rotary shaft lip	NBR/ max. 750 1/min	-0.4...6.0	-0.4...6.0	-10...90-NBR	14...194-NBR
	FKM max. 1000 1/min	-0.4...5.0	-0.4...5.0		
	max. 1500 1/min	-0.4...4.0	-0.4...3.5	-10...150-FKM	14...302-FKM
	max. 2000 1/min	-0.4...3.0	-0.4...2.5		
	max. 3000 1/min	-0.4...2.0	-0.4...1.5		
	FKM (low temperature)	-0.4...0.5		-30**...150	-22**...302
Pump with outboard bearing and single rotary shaft lip	EPDM	-0.4...0.5		-10...120	14...248
	PTFE	-0.4...2.0		-10...200	14...392
	NBR/ max. 750 1/min	-0.4...6.0	-0.4...6.0	-10...90-NBR	14...194-NBR
	FKM max. 1000 1/min	-0.4...5.0	-0.4...5.0		
	max. 1500 1/min	-0.4...4.0	-0.4...3.5	-10...150-FKM	14...302-FKM
	max. 2000 1/min	-0.4...3.0	-0.4...5.5		
Pump with double rotary shaft seal with connection borehole for liquid seal (quench)	max. 3000 1/min	-0.4...2.0	-0.4...1.5		
	PTFE	-0.4...2.0		-10...200	14...392
	NBR/ max. 750 1/min	-0.4...6.0	-0.4...6.0	-10...90-NBR	14...194-NBR
	FKM max. 1000 1/min	-0.4...5.0	-0.4...5.0		
	max. 1500 1/min	-0.4...4.0	-0.4...3.5	-10...150-FKM	14...302-FKM
	max. 2000 1/min	-0.4...3.0	-0.4...2.5		
Pump with double rotary shaft seal for vacuum operation with connection borehole for liquid seal (quench)	max. 3000 1/min	-0.4...2.0	-0.4...1.5		
	PTFE	-0.4...2.0		-10...200	14...392
	NBR	-0.9...0.2		-10...90	14...194
	FKM	-0.9...0.2		-10...150	14...302
	PTFE	-0.9...0.2		-10...200	14...392
	NBR/ max. 750 1/min	-0.9...6.0	-0.9...6.0	-10...90-NBR	14...194-NBR
Pump with triple rotary shaft seal for vacuum and normal operation with connection borehole for liquid seal (quench)	FKM max. 1000 1/min	-0.9...5.0	-0.9...5.0		
	max. 1500 1/min	-0.9...4.0	-0.9...3.5	-10...150-FKM	14...302-FKM
	max. 2000 1/min	-0.9...3.0	-0.9...2.5		
	max. 3000 1/min	-0.9...2.0	-0.9...1.5		
	FKM	-0.4...10.0		-10...150	14...302
	PTFE	-0.4...10.0		-10...200	14...392
Pump with mechanical seal	EPDM	-0.4...10.0		-10...120	14...248
	FKM	-0.4...10.0		-10...150	14...302
	PTFE	-0.4...10.0		-10...200	14...392
Pump with mechanical seal and connection borehole for liquid seal (quench)	FKM	-0.4...10.0		-10...150	14...302

Speed: KF 2.5... 63 200 ... 3 600 1/min
 KF 80... 180 200 ... 3 000 1/min
 KF 200 200 ... 2 500 1/min

* short term during start-up status: -0.6 bar

** only in connection with housing and cover material EN-GJS-400 (GGG 40)

The indicated maximum values are dependent upon the remaining working conditions.

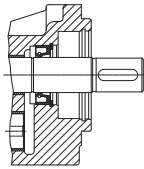
In case of universal devices, pay attention to limitation of $P_{e \text{ min.}}$

Other sealing materials on request.

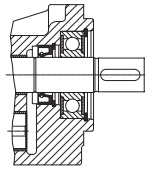
Transfer Gear Pumps KF 2.5...200

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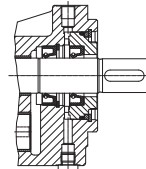
Variants Shaft End Seals



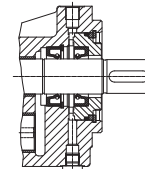
Pump with single rotary shaft lip
Fixing type: F/W
Sealing materials:
NBR = sealing type 1
FKM = sealing type 2
PTFE = sealing type 3
EPDM = sealing type 9
FKM low temperature
= sealing type 23/31



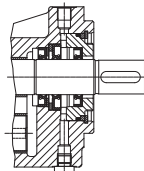
Pump with outboard bearing and single rotary shaft lip
Fixing type: G/X
Sealing materials:
NBR = sealing type 1
FKM = sealing type 2
PTFE = sealing type 3



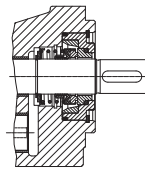
Pump with double rotary shaft seal with connection borehole for liquid seal (quench)
Fixing type: F/W
Sealing materials:
NBR = sealing type 19
FKM = sealing type 7
PTFE = sealing type 4
EPDM = sealing type 32



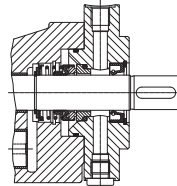
Pump with double rotary shaft seal for vacuum operation with connection borehole for liquid seal (quench)
Fixing type: F/W
Sealing materials:
NBR = sealing type 19
FKM = sealing type 7
PTFE = sealing type 4
EPDM = sealing type 32
Special number: 74



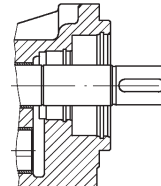
Pump with triple rotary shaft seal for vacuum and normal operation with connection borehole for liquid seal (quench)
Fixing type: F/W
Sealing materials:
NBR = on request
FKM = on request



Pump with mechanical seal
Fixing type: F/W
Sealing materials:
FKM = sealing type 5
PTFE = sealing type 6
mechanical seal
= sealing type 40



Pump with mechanical seal and connection borehole for liquid seal (quench)
Fixing type: F/W
Sealing materials:
FKM = sealing type 5
Special number: 198



Pump without shaft sealing
Fixing type: F/W
Sealing material:
FKM o-ring
= sealing type 30

Transfer Gear Pumps KF 2.5...200

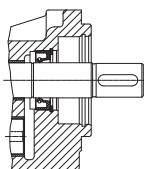
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KF 2.5...200 noise optimized for medias with increased air content

The noise optimized pumps in the KF series are designed for conveying for medias with increased air content, predominantly for use as lubricating oil pumps in transmissions. Special measures prevent the otherwise normally increased noise present in auriferous transmission oil. The noise levels do not exceed or only barely exceed the measurements with non-auriferous oils. Also, there is no noise spectrum shift to higher, unpleasant frequencies. In applications without auriferous portions in the media, it is not recommended to use this version as it will not bring about noise reduction effects there.

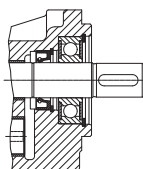
The noise optimized version of the KF pump is marked with the special number **197** at the end of the type key. Pumps with the special number **197** are built as pumps in combination with an electric motor or as mounted pumps. The pump in combination with an electric motor (Fig. 1) does not have an outboard bearing, so it has to be driven via an elastic coupling. The mounted pump (Fig. 2) comes equipped with an outboard bearing to absorb the centrifugal forces such as those which arise when using a flying pinion. Pumps for electric motor drives and mounted pumps are sealed at the shaft end using a lip-type shaft seal.

Fig. 1



Pump with
single rotary shaft lip
Fixing type: F/W
Sealing materials:
NBR = sealing type 1
FKM = sealing type 2
Special number: 197

Fig. 2



Pump with outboard bearing
and single rotary shaft lip
Fixing type: G/X
Sealing materials:
NBR = sealing type 1
FKM = sealing type 2
Special number: 197

The noise optimized version is also available in a ductile cast iron version. We can supply these pumps in the ATEX version also.

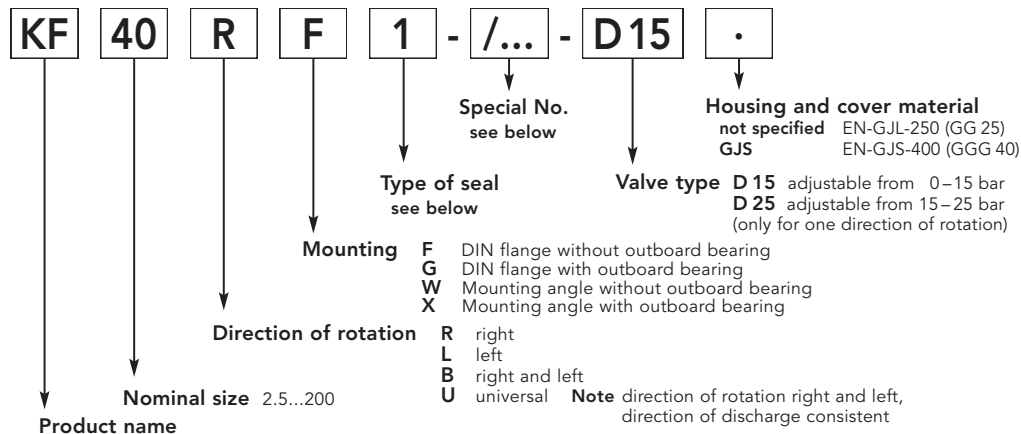
Note

Dimensions conformable standard pumps

Transfer Gear Pumps KF 2.5...200

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Type Key (Ordering example)



Type of seal

- 1 Rotary shaft seal BABSL NBR
- 2 Rotary shaft seal BABSL FKM
- 3 Rotary shaft seal PTFE
- 4 Double rotary shaft seal PTFE
- 5 Mechanical seal with FKM secondary seals (C2S2V1G3G1)
- 6 Mechanical seal with FFKM secondary seals
Q2Q2K1G3 (KF 2.5... 25) Q2B2K1G3 (KF 32... 200)
- 7 Double rotary shaft seal BABSL FKM
- 9 Rotary shaft seal EPDM (not resistant to mineral oils)
- 19 Double rotary shaft seal BABSL NBR
- 23 Rotary shaft seal MSS-1 FKM
(low temperature) (KF 2.5... 80)
- 30 Without shaft seal ⁽¹⁾ O-ring FKM
- 31 Rotary shaft seal BABSL FKM
(low temperature) (KF 32... 200)
- 32 Double rotary shaft seal EPDM
(not resistant to mineral oils)
- 36 Without shaft seal ⁽¹⁾ O-ring NBR
- 40 Mechanical seal with FKM secondary seals (AQ2VFF)

⁽¹⁾ Leak oil discharged through the gland pocket

Special No.

- 74 Double rotary shaft seal (for vacuum operation)
Connection bore G 1/8" (for liquid seal)
- 158 KF 2.5... 12: Flange connection SAE 3/4"
KF 16... 25: Flange connection SAE 1"
- 197 Noise-optimized version for aerated oils and vacuum⁽¹⁾
- 198 Mechanical seal
KF 2.5... 25: Connection bore G 1/8" (for liquid seal)
KF 32... 80: Connection bore G 1/4" (for liquid seal)
- 232 KF 50...80: Flange connection SAE 2"
KF 100...112: Flange connection SAE 2 1/2"
KF 125...150: Flange connection SAE 3"
KF 180...200: Flange connection SAE 3 1/2"
- 304 Polymer plain bearing iglidur®X
(free from non-ferrous metals), $\Delta p_{max} = 10$ bar
- 317 Noise-optimized version for aerated oils and vacuum⁽¹⁾
Polymer plain bearing iglidur®X
(free from non-ferrous metals), $\Delta p_{max} = 10$ bar
- 322 Triple rotary shaft seal (for normal operation + for vacuum operation)
Connection bore G 1/8" (for liquid seal)
Polymer plain bearing iglidur®X
(free from non-ferrous metals), $\Delta p_{max} = 10$ bar
KF 50... 80: Flange connection SAE 2"
- 353 Noise-optimized version for aerated oils and vacuum⁽¹⁾
Multi-layer plain bearing DP4 (lead-free)
- 355 Polymer plain bearing iglidur®X
(free from non-ferrous metals), $\Delta p_{max} = 10$ bar
Housing connection: KF 2.5... 25: as special number 158
- 363 Version for low-viscous media (housing and cover material = GJS)
Polymer plain bearing iglidur®X
(free from non-ferrous metals), $\Delta p_{max} = 10$ bar
Housing connection: KF 2.5... 25: as special number 158
KF 50... 200: as special number 232
- 391 Noise-optimized version for aerated oils and vacuum⁽¹⁾
Housing connection: KF 50... 200: as special number 232
- 425 Shaft end with centre hole DIN 322-D
Outboard bearing with steel cage

⁽¹⁾ There can be a reduction in pumping capacity. Measures for noise optimisation are only feasible for one rotational direction and only effective for aerated oils or vacuum.

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Transfer Gear Pumps KF 2.5...200

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Technical Data

Nominal size	geom. displacement	Working pressure *	Maximum pressure (pressure peaks)	Speed range		Permissible load ** (n = 1500 1/min)	Sound level dB (A)		
	V _g cm ³ /r			p _b bar	p _{max} bar		n _{min} 1/min	n _{max} 1/min	F _{radial} N
2.5	2.55	25	40	200	3600	700	≤ 65	≤ 66	≤ 67
4	4.03								
5	5.05								
6	6.38								
8	8.05								
10	10.11								
12	12.58								
16	16.09								
20	20.1								
25	25.1								
32	32.12				1500	≤ 67	≤ 68	≤ 68	
40	40.21								
50	50.2								
63	63.18								
80	80.5								
100	101.5								
112	113.5								
125	129.4								
150	155.6								
180	186.6								
200	206.2	3000	≤ 67	≤ 68	≤ 69				
		2500	≤ 65	≤ 65	≤ 65				

Remark

* Working pressure p_b = perm. sustained pressure (higher pressures on request)

** Permissible load only for version with outboard bearing. F_{radial} at centre of shaft end.

For certain working conditions, the minimum or maximum characteristics should not be used.

For example, the max. working pressure is not permissible in combination with low speed and low viscosity.

In such limit ranges, please consult us.

Sound level measured in dB(A) at 1 m distance

Sound level measured with drive motor, installation site:

Works hall, quiet sound level = 40 dB(A)

Pump assembly on rigid fastening angle,

Suction and pressure conduits: Hose

Measured with transmission oil,

Oil viscosity $\nu = 34 \text{ mm}^2/\text{s}$,

Speed $n = 1500 \text{ 1/min}$.

Transfer Gear Pumps KF 2.5...200

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Power Consumption

Speed $n = 950$ 1/min

Discharge Q in l/min	Pressure p_b in bar								Nominal size		Pressure p_b in bar								Power consumption P in kW
	2	4	6	8	10	15	20	25			2	4	6	8	10	15	20	25	
	2.5	3.7	4.6	5.8	7.3	9.2	11.4	14.2	18	22.8	29	36	45	57	74	92	102	114	
	2.4	3.7	4.6	5.7	7.3	9.2	11.4	14.2	18	22.8	29	36	45	57	74	92	102	114	
	2.3	3.6	4.5	5.6	7.1	8.9	11.1	13.8	17.6	22.3	27	34	42	53	71	86	97	109	
	2.2	3.6	4.5	5.5	7.1	8.8	11.1	13.4	16.6	21.1	26	34	41	52	70	84	94	106	
	2.1	3.5	4.4	5.5	7.1	8.8	11.1	13.4	16.6	21.1	26	34	41	52	70	84	94	106	
	2	3.4	4.2	5.3	6.8	8.5	10.8	12.9	15.7	20.4	25	30	36	46	65	79	88	96	
	1.8	3.3	4.1	5.1	6.6	8.2	10.3	11.8	14.9	19.8	24	28	34	43	62	73	77	82	
	2.5	4	5	6	8	10	12	16	20	25	32	40	50	63	80	100	112	125	
	0.03	0.04	0.05	0.06	0.08	0.09	0.11	0.13	0.18	0.25	0.32	0.4	0.5	0.6	0.8	1	1.2	1.4	
	0.04	0.05	0.07	0.08	0.09	0.11	0.14	0.17	0.21	0.29	0.38	0.47	0.56	0.74	0.92	1.14	1.39	1.69	
	0.04	0.06	0.08	0.1	0.11	0.14	0.17	0.21	0.25	0.36	0.47	0.58	0.74	0.92	1.14	1.39	1.69	1.87	
	0.05	0.07	0.09	0.12	0.14	0.19	0.25	0.3	0.39	0.48	0.7	0.92	1.14	1.39	1.69	1.87	1.84	180	
	0.06	0.09	0.11	0.14	0.17	0.24	0.31	0.45	0.56	0.74	0.92	1.14	1.39	1.69	1.87	1.84	180	200	
	0.07	0.1	0.14	0.17	0.21	0.29	0.38	0.47	0.58	0.74	0.92	1.14	1.39	1.69	1.87	1.84	180	200	
	0.08	0.12	0.16	0.21	0.25	0.36	0.47	0.58	0.74	0.92	1.14	1.39	1.69	1.87	1.84	180	200	200	
	0.09	0.13	0.16	0.2	0.25	0.38	0.47	0.58	0.74	0.92	1.14	1.39	1.69	1.87	1.84	180	200	200	
	0.11	0.16	0.2	0.25	0.31	0.45	0.6	0.74	0.92	1.14	1.39	1.69	1.87	1.84	180	200	200	200	
	0.13	0.16	0.2	0.25	0.31	0.45	0.6	0.74	0.92	1.14	1.39	1.69	1.87	1.84	180	200	200	200	
	0.16	0.2	0.25	0.31	0.45	0.6	0.74	0.92	1.14	1.39	1.69	1.87	1.84	180	200	200	200	200	
	0.19	0.25	0.31	0.45	0.6	0.74	0.92	1.14	1.39	1.69	1.87	1.84	180	200	200	200	200	200	
	0.25	0.3	0.4	0.5	0.6	0.8	1	1.2	1.4	1.6	1.8	2.1	2.4	2.9	3.7	4.5	5.2	6.1	
	0.3	0.4	0.5	0.6	0.8	1	1.2	1.4	1.6	1.8	2.1	2.4	2.9	3.7	4.5	5.2	6.1	7.2	
	0.4	0.5	0.6	0.8	1	1.2	1.4	1.6	1.8	2.1	2.4	2.9	3.7	4.5	5.2	6.1	7.2	8.1	
	0.5	0.6	0.8	1	1.2	1.4	1.6	1.8	2.1	2.4	2.9	3.7	4.5	5.2	6.1	7.2	8.1	9	
	0.6	0.8	1	1.4	1.6	2.3	3	3.7	4.5	5.2	6.1	7.2	8.1	9	10	11	12	13	
	0.7	1	1.3	1.6	1.9	2.7	3.6	4.5	5.2	6.1	7.2	8.1	9	10	11	12	13	14	
	0.9	1.2	1.6	2	2.4	3.3	4.3	5.2	6.1	7.2	8.1	9	10	11	12	13	14	15	
	1	1.4	1.8	2.3	2.8	3.9	5	6.1	7.2	8.1	9	10	11	12	13	14	15	16	
	1.1	1.6	2.1	2.6	3.2	4.5	5.8	7.2	8.1	9	10	11	12	13	14	15	16	17	
	1.2	1.8	2.4	3	3.6	5.1	6.6	8.1	9	10	11	12	13	14	15	16	17	18	
	1.4	2.1	2.8	3.4	4	5.7	7.3	9	10	11	12	13	14	15	16	17	18	19	

Speed $n = 1450$ 1/min

Discharge Q in l/min	Pressure p_b in bar								Nominal size		Pressure p_b in bar								Power consumption P in kW
	2	4	6	8	10	15	20	25			2	4	6	8	10	15	20	25	
	3.6	5.7	6.9	8.9	11.3	14.2	17.6	22.2	27.9	35.3	45	57	70	88	114	144	161	181	
	3.6	5.7	6.9	8.9	11.3	14.2	17.6	22.2	27.9	35.3	45	57	70	88	114	144	161	181	
	3.5	5.6	6.7	8.8	11.1	14.1	17.5	22.1	27.8	35.2	44	56	68	86	113	143	160	178	
	3.5	5.5	6.6	8.7	10.9	13.8	17.2	21.7	27.7	35.1	44	56	68	86	113	143	160	178	
	3.4	5.4	6.5	8.6	10.8	13.7	16.9	21.5	27.6	35.0	44	56	68	86	113	143	160	178	
	3.3	5.3	6.4	8.5	10.6	13.6	16.7	21.4	27.5	34.9	44	56	68	86	113	143	160	178	
	3.2	5.3	6.4	8.5	10.6	13.6	16.7	21.4	27.5	34.9	44	56	68	86	113	143	160	178	
	2.5	4	5	6	8	10	12	16	20	25	32	40	50	63	80	100	112	125	
	0.04	0.06	0.07	0.08	0.1	0.12	0.14	0.16	0.18	0.22	0.28	0.36	0.45	0.56	0.7	0.88	1.08	1.27	
	0.05	0.08	0.1	0.12	0.15	0.19	0.27	0.32	0.39	0.48	0.6	0.74	0.92	1.14	1.39	1.69	1.87	1.84	
	0.06	0.1	0.12	0.15	0.19	0.27	0.32	0.39	0.48	0.6	0.74	0.92	1.14	1.39	1.69	1.87	1.84	180	
	0.08	0.11	0.14	0.18	0.22	0.32	0.39	0.48	0.6	0.74	0.92	1.14	1.39	1.69	1.87	1.84	180	200	
	0.09	0.14	0.18	0.22	0.26	0.37	0.47	0.58	0.74	0.92	1.14	1.39	1.69	1.87	1.84	180	200	200	
	0.11	0.16	0.21	0.27	0.32	0.45	0.58	0.72	0.89	1.08	1.33	1.61	1.9	2.3	2.9	3.6	4.5	5.2	
	0.12	0.19	0.26	0.32	0.39	0.55	0.72	0.89	1.08	1.33	1.61	1.9	2.3	2.9	3.6	4.5	5.2	6.1	
	0.16	0.26	0.37	0.47	0.57	0.82	1.08	1.33	1.61	1.9	2.3	2.9	3.6	4.5	5.2	6.1	7.2	8.1	
	0.17	0.28	0.39	0.49	0.6	0.87	1.14	1.41	1.69	1.98	2.4	2.9	3.6	4.5	5.2	6.1	7.2	8.1	
	0.24	0.34	0.47	0.61	0.74	1.08	1.41	1.75	2.14	2.58	3.1	3.7	4.5	5.2	6.1	7.2	8.1	9	
	0.3	0.5	0.7	0.8	1	1.4	1.9	2.3	2.9	3.6	4.5	5.2	6.1	7.2	8.1	9	10	11	
	0.4	0.6	0.9	1.1	1.3	1.8	2.3	2.9	3.6	4.5	5.2	6.1	7.2	8.1	9	10	11	12	
	0.5	0.8	1.1	1.3	1.6	2.3	2.9	3.6	4.5	5.2	6.1	7.2	8.1	9	10	11	12	13	
	0.7	1	1.3	1.7	2	2.9	3.7	4.5	5.2	6.1	7.2	8.1	9	10	11	12	13	14	
	0.94	1.35	1.8	2.2	2.6	3.6	4.6	5.7	6.9	8.9	11	13	16	19	23	28	34	41	
	1.2	1.6	2	2.5	3	4.3	5.7	7	8.1	9	10	11	12	13	14	15	16	17	
	1.4	2	2.6	3.1	3.7	5.2	6.7	8.2	9	10	11	12	13	14	15	16	17	18	
	1.7	2.3	2.9	3.6	4.2	5.8	7.4	9	10	11	12	13	14	15	16	17	18	19	
	2	2.7	3.5	4.2	5	6.9	8.9	11	12	13	14	15	16	17	18	19	20	21	
	2.3	3.2	4.1	5	5.9	8.2	10.4	12.7	15	18	22	27	33	40	49	59	71	84	
	2.6	3.6	4.6	5.6	6.6	9.1	11.6	14	17	21	26	32	39	47	57	69	83	99	

The ratings refer to a mineral oil with a viscosity of 34 mm²/s.

Margin of error for the flow Q + 2.5 % ... - 5 % of the tabular value. For viscosity < 30 mm²/s, take a reduction of the rated flow Q into account.

The output of the drive motor should be selected 20 % higher than tabular value P.

For viscosity > 100 mm²/s, an increase in the required power is necessary, in this case proceed as per description on page 15.

Transfer Gear Pumps KF 2.5...200

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Discharge Flow / Input Power

Calculation

$$P_{1Pu} = P_{tab} \cdot \frac{n}{1450} + f_v \cdot Q$$

P_{1Pu} = pump power consumption (kW)
 P_{tab} = power consumption per table (kW) at 1450 1/min
 n = speed (1/min)
 dependent on viscosity!
 (see speed recommendation)
 f_v = viscosity factor $\left[\frac{\text{kW}}{\text{l/min}} \right]$
 (see diagram)
 Q = discharge flow (l/min) with $Q = \frac{V_g \cdot n}{1000}$
 V_g = geometrical displacement (cm³/r)

Example: Pump type KF 80

Viscosity $v = 3000 \text{ mm}^2/\text{s}$
 Working pressure $p = 15 \text{ bar}$
 at $P_{tab} = 3.6 \text{ kW}$
 $n = 500 \text{ 1/min}$
 $f_v = 0.017 \frac{\text{kW}}{\text{l/min}}$
 $Q = \frac{80.5 \cdot 500}{1000} = 40 \text{ l/min}$
 becomes
 $P_{1Pu} = \left(3.6 \cdot \frac{500}{1450} + 0.017 \cdot 40 \right) \text{ kW}$
 $P_{1Pu} = 1.92 \text{ kW}$
 Motorpower output: $P_{2Mot} = 1.2 \cdot P_{1Pu} = 2.3 \text{ kW}$
 Select helical geared motor with
 $P = 3.0 \text{ kW}$
 $n = 500 \text{ 1/min}$

Conversion factors

$1 \text{ bar} \triangleq 14.5 \frac{\text{lb}}{\text{in}^2} = 14.5 \text{ psi}$
 $1 \frac{\text{l}}{\text{min}} \triangleq 0.220 \frac{\text{gal}}{\text{min}} = [\text{U.K.}]$
 $1 \frac{\text{l}}{\text{min}} \triangleq 0.264 \frac{\text{gal}}{\text{min}} = [\text{US}]$

Input Power

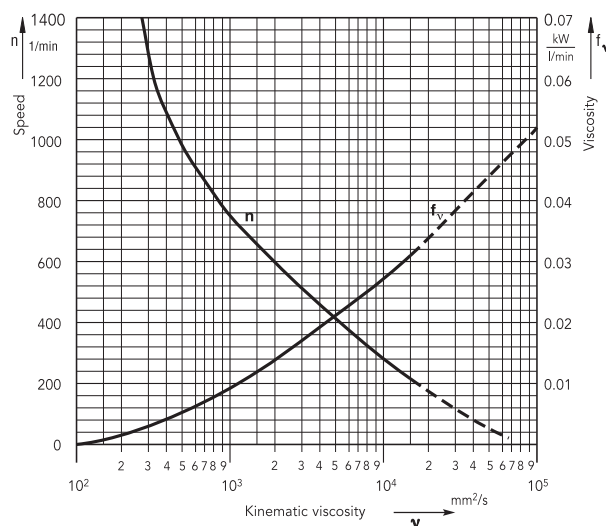


Diagramm: $n, f_v = f(v)$

Note:

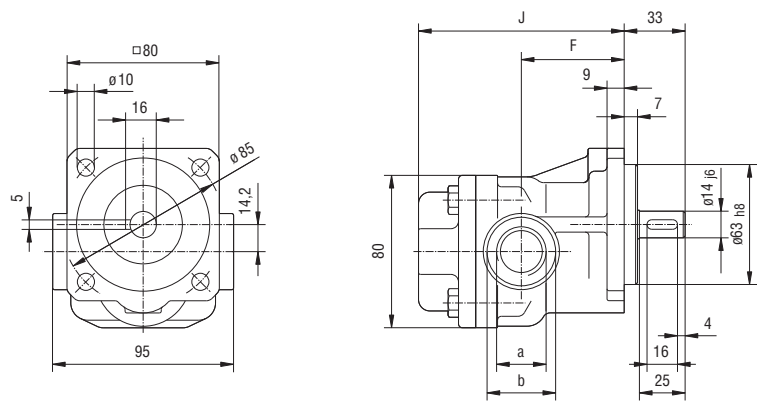
To determine the power consumption, always take the max. working viscosity at starting state into consideration. The power of the drive motor should be selected 20 % higher than the value determined.

Transfer Gear Pumps KF 2.5...200

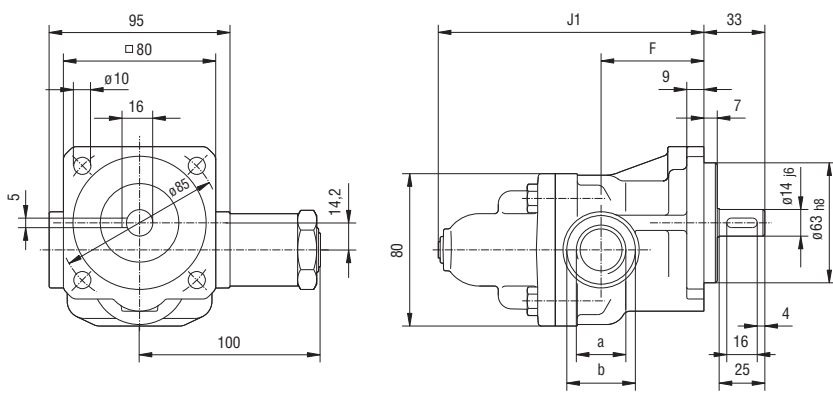
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Flange-Mounting Version with Pipe Thread

KF 2.5...25



KF 2.5...25 with pressure relief valve



Nominal size	Suction and pressure connection		F	J	J ₁	Weight in kg	
	a	b				without valve	with valve
2,5...12	G 3/4 17 deep	Ø 36	54	109	140	2.9	3.7
16...25	G 1 19 deep	Ø 42	63	131	161	3.5	4.3

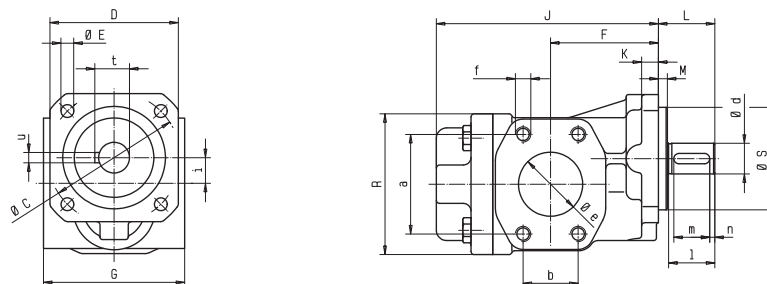
(Dimensions in mm)

Transfer Gear Pumps KF 2.5...200

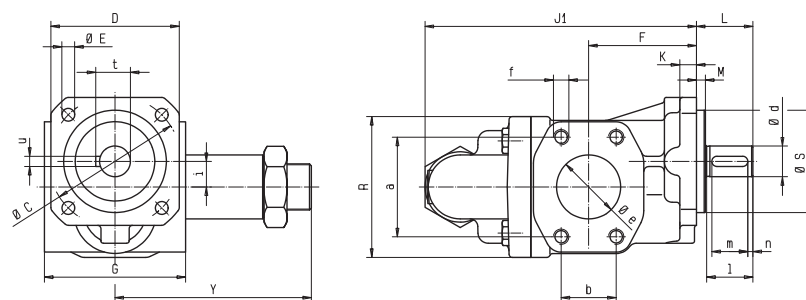
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Flange-Mounting Version with SAE-Connection

KF 2.5...200



KF 2.5...200 with pressure relief valve



Nominal size	Sp.-No.	SAE	Seal	Suction- and pressure connection				Pump sizes														Shaft end						Weight in kg	
				a	b	e	f	C	D	E	F	G	J	J ₁	K	L	M	R	S _{h8}	i	Y	d _h	l	m	n	t	u	without valve	with valve
2.5...12	158	3/4"	-	47.6	22.2	19.5	M10-15deep	85	80	10	54	109	140		9	33	7	80	63	14,2	100	14	25	16	4	16	5	4.2	5.0
16...25	158	1"	-	52.4	26.2	25.0	M10-17deep				63	100	131	162														4.8	5.6
32...50	-	1 1/2"	-	69.9	35.7	38.0					84	110	173	212														7.7	9.5
63/80	-	1 1/2"	-					103	100	10	100		208	247	13	44	7	110	80	20	153	24	36	28	4	27	8	9.4	11.2
50	232	2"	-			50.0					84		173	212														7.7	9.5
63/80	232	2"	-	77.8	42.9						100		208	247														9.4	11.2
100/112	-	2"	-			50.8	M12-20deep								60							28	50	40	5	31			
100/112	-	2"	31												46							24	36	28	4	27			
100/112	232	2 1/2"	-								102	130	220.5	262.5	17							28	50	40	5	31		16.0	18.7
100/112	232	2 1/2"	31	88.9	50.8	63.5									46							24	36	28	4	27			
125/150	-	2 1/2"	-												60							28	50	40	5	31			
125/150	-	2 1/2"	31												46							24	36	28	4	27			
125/150	232	3"	-					145	135	14	120		245.0	282.0	60							28	50	40	5	31		22.2	24.9
125/150	232	3"	31	106.4	61.9	76.2						150			18	46		159				24	36	28	4	27			
180/200	-	3"	-																			28				31			
180/200	-	3"	31																			24				27			
180/200	232	3 1/2"	-										262	299	60							28	50	40	5	31		24.8	27.5
180/200	232	3 1/2"	31	120.7	69.9	88.9	M16-32deep															24				27			

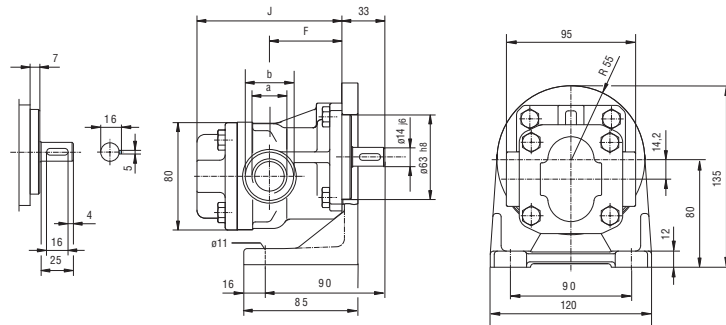
(Dimensions in mm)

Transfer Gear Pumps KF 2.5...200

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Pump with Mounting Angle, Pipe Thread

KF 2,5...25

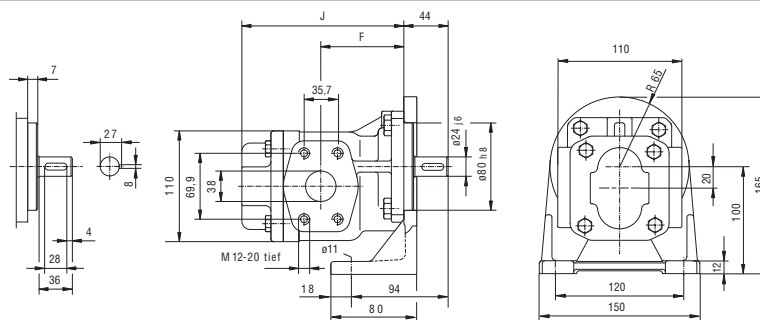


Nominal size	Suction and pressure connection		F	J	Weight in kg
	a	b			
2,5...12	G 3/4 17 deep	Ø 36	54	109	4,2
16...25	G 1 19 deep	Ø 42	63	131	4,8

(Dimensions in mm)

Pump with Mounting Angle, Pipe Thread, SAE 1 1/2-connection

KF 32...80



Nominal-size		F	J	Weight in kg
32...50	SAE 1½	84	173	9.5
63 / 80	SAE 1½	100	208	11.2

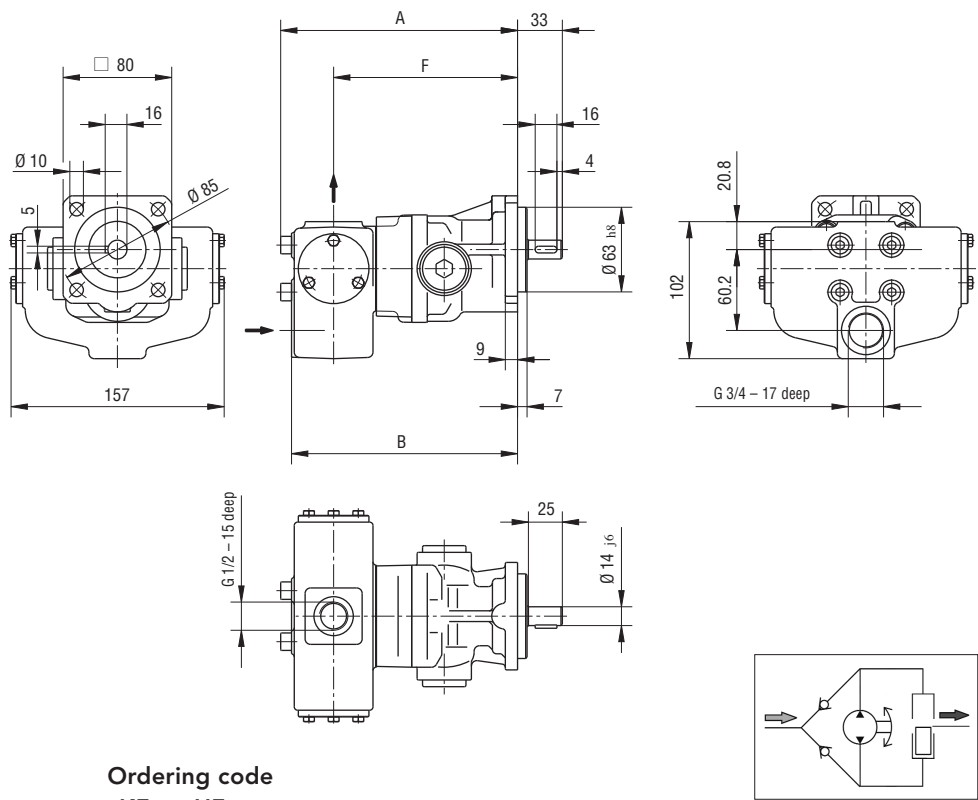
(Dimensions in mm)

Transfer Gear Pumps KF 2.5...200

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Flange-Mounting Version with Universal Arrangement

KF 2.5...25



Ordering code

KF . UF .
Seals 1 2

Nominal size	A	B	F	Weight in kg	Perm. manometr. low pressure at the pump suction connection p _e bar
2.5	174.5	166.5	135.5	6.9	0.35
4					
5					
6					
8					
10					
12					
16	196.5	188.5	157.5	7.5	
20					
25					

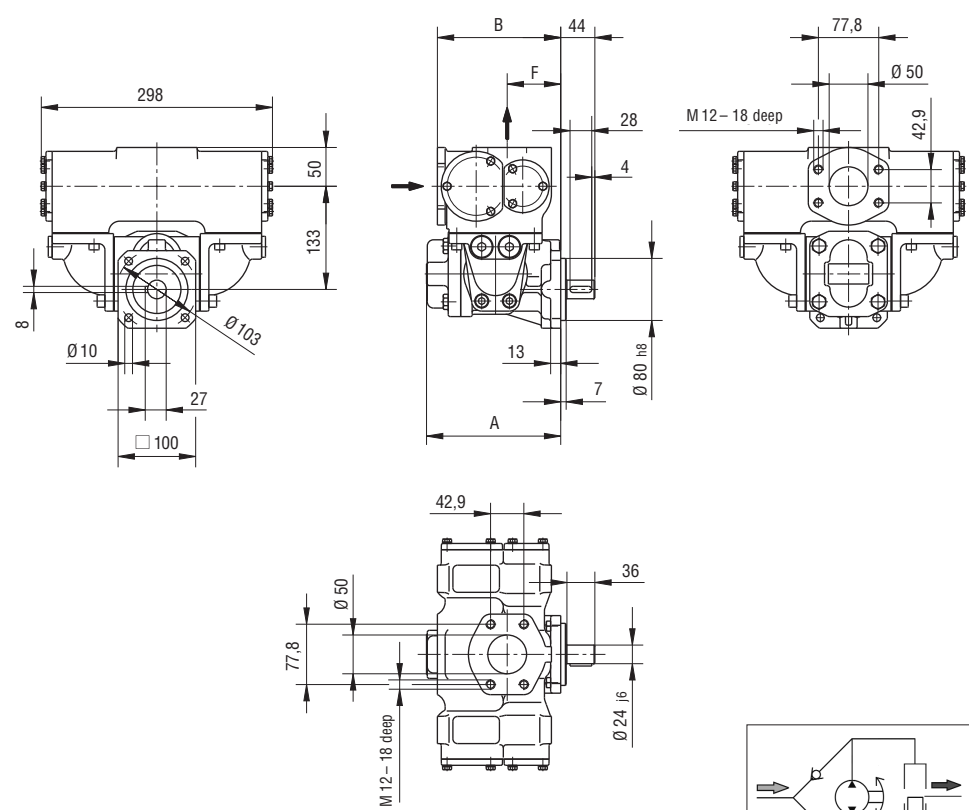
(Dimensions in mm)
Mounting position horizontal, Pressure connection above

Transfer Gear Pumps KF 2.5...200

KRACHT

Flange-Mounting Version with Universal Arrangement

KF 32 ... 80



Ordering code

KF . UF .

Seals $\frac{1}{2}$

Nominal size	A	B	F	Weight in kg	Perm. manometr. low pressure at the pump suction connection p_e bar
32 40 50	173	159	69	27.5	0.35
63 80	208	175	85	29.5	

(Dimensions in mm)
Mounting position horizontal, Pressure connection above

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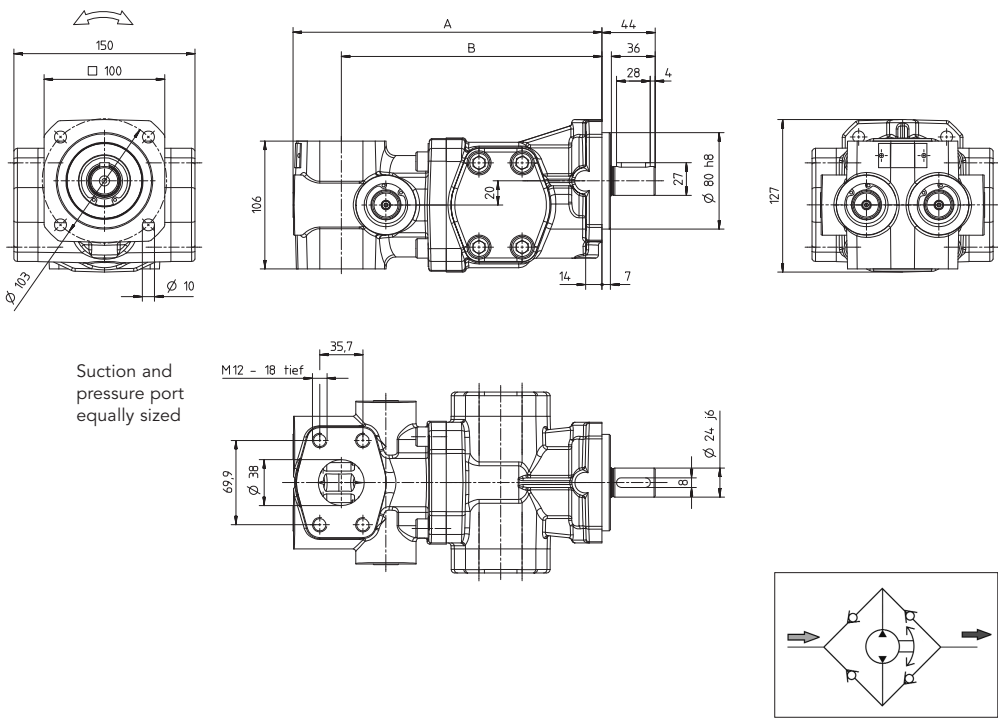
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Transfer Gear Pumps KF 2.5...200

KRACHT

Flange-Mounting Version with Universal Arrangement U2

KF 32...80



Nominal displacement	A	B	Weight in kg
32 40 50	256	216	15.5
63 80	291	251	17.5

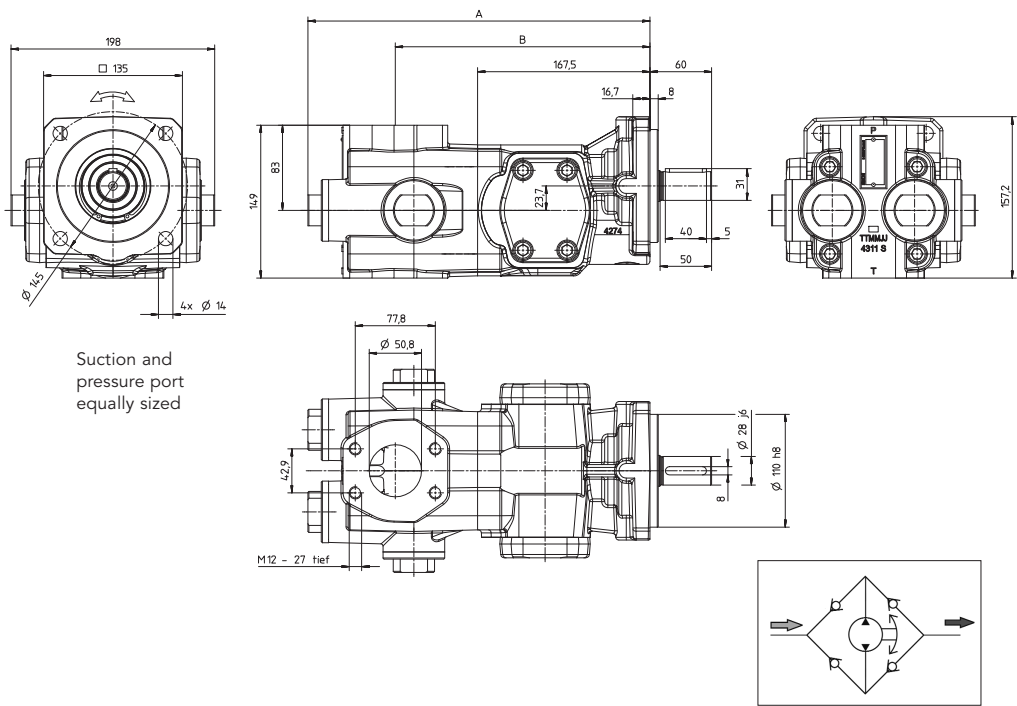
(Dimensions in mm)
Mounting position optional

Transfer Gear Pumps KF 2.5...200

KRACHT

Flange-Mounting Version with Universal Arrangement U2

KF 100/112



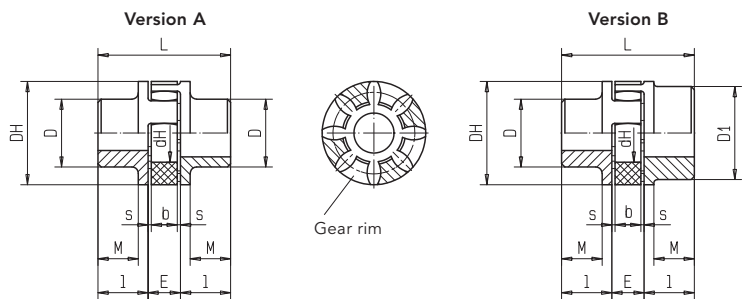
Nominal displacement	A	B	Weight in kg
100	312,5	247,5	21.6
112			

(Dimensions in mm)
Mounting position optional

Transfer Gear Pumps KF 2.5...200

KRACHT

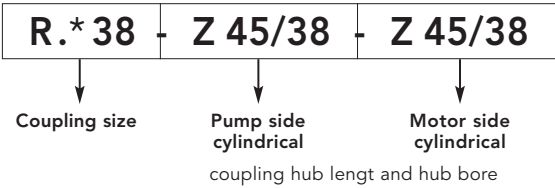
Accessory Couplings



	Ordering code	Coupling size	Weight kg	Moment of inertia kgm²	Pre bore		Finished bore		Dimensions (in mm)													
					part 1	part 2	min.		max.		l	E	s	b	L	M	DH	D	D ₁	dh		
							part 1	part 2	part 1	part 2												
Version A	RA 19-Z25/...Z25/..	19	0.117	0.00003	4	–	6	–	19	–	25	16	2	12	66	20	40	32	–	18		
	RA 24-Z30/...Z30/..	24	0.24	0.00008	6	–	8	–	24	–	30	18	2	14	78	24	55	40	–	27		
	RA 28-Z30/...Z30/..	28	0.39	0.0002	8	–	10	–	28	–	30	20	2.5	15	80	28	65	48	–	30		
Version B	RA 19/24-Z25/...Z25/..	19/24	0.129	0.00004	4	17	6	19	19	24	25	16	2	12	66	20	40	32	–	18		
	RA 24/28-Z30/...Z30/..	24/28	0.26	0.0001	6	22	8	24	24	28	30	18	2	14	78	24	55	40	–	27		
	RA 28/38-Z35/...Z35/..	28/38	0.46	0.0003	8	26	10	28	28	38	35	20	2.5	15	90	28	65	48	–	30		
	RA 38/45-Z45/...Z45/..	38/45	0.89	0.0008	10	36	12	38	38	45	45	24	3	18	114	37	80	66	–	38		
	RA 42/55-Z50/...Z50/..	42/55	1.39	0.0018	12	40	14	42	42	55	50	26	3	20	126	40	95	75	–	46		
	RG 42/55-Z50/...Z75/..	42/55	3.57	0.005	12	40	14	42	42	55	50/75	26	3	20	151	40	95	75	–	46		

Type Key KF Coupling

Ordering example



.*	Hub material
A	AL
G	GG

Working temperature:
–20 °C to +80 °C (–4 °F to 176 °F)
(short duration temperature peaks
up to 120 °C / 248 °F are permissible).

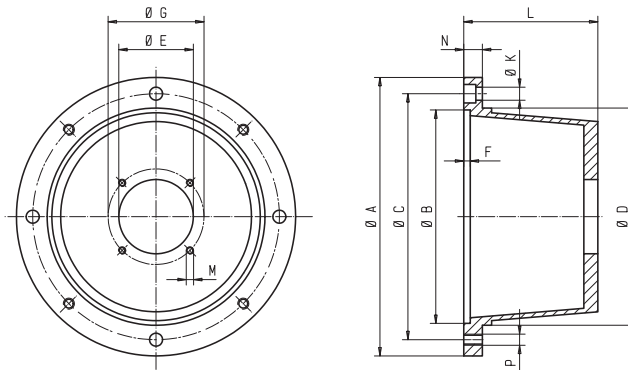
Weights and mass moments of inertia refer
to max. finish machined bore without slot.
Finish-machined bores to ISO Fit H7,
parallel key slots in accordance with DIN 6886 Sh.1.

Transfer Gear Pumps KF 2.5...200

KRACHT

Bell Housing

KF 2,5 ... 25 Aluminum bell housing



	Motor size	Bell housing	Coupling	Dimensions (in mm)													Weight
				A	B	C	D	E	F	G	K	L	M	N	P	kg	
KF 2.5...25	71 S	PT160-A-063-80	RA19-Z25/14-Z25/14	160	110	130	110	63	7	85	9	80	M8	13	M8	1.01	
	71																
	80 S	PT200-A-063-100	RA19-Z25/14-Z25/19	200	130	165	145	63	7	85	11	100	M8	16	M10	1.06	
	80																
	90 S	PT200-A-063-100	RA19/24-Z25/14-Z25/24	200	130	165	145	63	7	85	11	100	M8	16	M10	1.06	
	90 L																
	100 LS	PT250-A-063-120	RA24/28-Z30/14-Z30/28	250	180	215	190	63	7	85	14	120	M8	19	M12	1.75	
100 L																	
	112 M																
KF 32...80	80 S	PT200-A-080-100	RA19/24-Z25/24-Z25/19	200	130	165	145	80	7	103	11	100	M8	16	M10	1.41	
	80																
	90 S	PT200-A-080-110	RA24-Z30/24-Z30/24	200	130	165	145	80	7	103	11	110	M8	16	M10	1.19	
	90 L																
	100 LS	PT250-A-080-124	RA24/28-Z30/24-Z30/28	250	180	215	190	80	7	103	14	124	M8	19	M12	1.42	
	100 L																
	112 M																
	132 S	PT300-A-080-144	RA28/38-Z35/24-Z35/38	300	230	265	234	80	7	103	14	144	M8	20	M12	2.10	
	132 M																
160 M	PT350-A-080-188	RA38/45-Z45/24-Z45/42	350	250	300	260	80	7	103	18	188	M8	26	M16	3.05		
160 L																	
KF 100...200	100 L	PT250-A-110-135	RA24/28-Z30/28-Z30/28 * RS24/28-Z30/24-Z30/28	250	180	215	190	110	7	145	14	135	M12	18	M12	1.4	
	112 M																
	132 S	PT300-A-110-168	RA28/38-Z35/28-Z35/38	300	230	265	234	110	7	145	14	168 *144	M12	20	M12	2.0	
	132 M			* PT300-A-110-144 ** PT300-A-110-168	* RS28/38-Z35/24-Z35/38 ** RS28-Z35/24-Z60/38											*1.6	
	132																
	160 M	PT350-A-110-188	RA38/45-Z45/28-Z45/42 * RS38/45-Z45/24-Z45/42	350	250	300	260	110	7	145	18	188	M12	26	M16	2.9	
	160 L																
	180 M	PT350-A-110-204	RA42/55-Z50/28-Z50/48 * RG42/55-Z50/24-Z75/48 ** RG42/55-Z50/24-Z50/48	350	250	300	260	110	7	145	18	204	M12	26	M16	3.0	
	180 L																
180																	

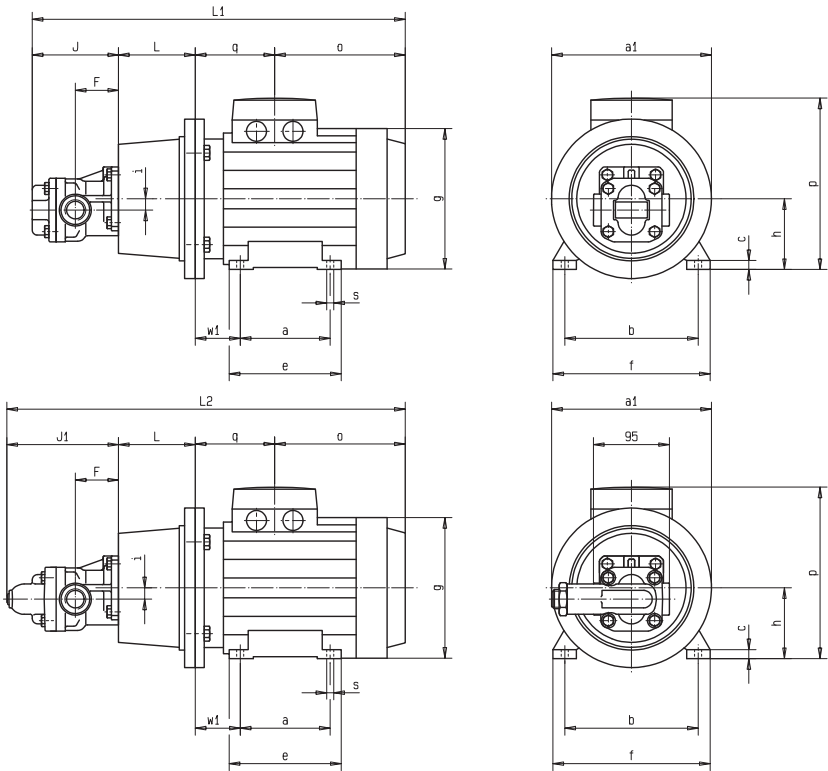
* Version seal 31 (KF 100... 150) ** Version seal 31 (KF 180... 200)

Transfer Gear Pumps KF 2.5...200

KRACHT

Motor-Pump Assemblies with Pipe Thread

KF 2.5 ... 25



with pressure relief valve

KF 2.5 ... 25 Pump sizes (in mm)

Nominal size	Pump sizes		
	F	J	J ₁
2.5 ... 12	54	109	140
16...25	63	131	162

Transfer Gear Pumps KF 2.5...200

KRACHT

Motor-Pump Assemblies with Pipe Thread

KF 2.5 ... 25

Frame size	Power Motor 6 pole		Speed Motor 4 pole		Bell housing	Coupling	Total weight * kg	
	kW	1/min	kW	1/min			Nominal size 4...12 16...25	
71	0.18	880	0.25	1350	PT160-A-063-80	RA19-Z25/14-Z25/14	11.5	12.1
71	0.25	900	0.37	1370			11.5	12.1
80	0.37	900	0.55	1370	PT200-A-063-100	RA19-Z25/14-Z25/19	13.5	14.1
80	0.55	900	0.75	1420			15.5	16.1
90 S	0.75	935	1.1	1425	PT200-A-063-100	RA19/24-Z25/14-Z25/24	17.5	18.1
90 L	1.1	935	1.5	1420			20.5	21.1
100	1.5	940	2.2	1430	PT250-A-063-120	RA24/28-Z30/14-Z30/28	25.5	26.1
100	–	–	3	1430			28.5	29.1
112	2.2	940	4	1435			35	35.6

* with pressure relief valve add, weight 0.8 kg

KF 2.5 ... 25 Dimensions

Frame size	Dimensions (in mm)																			
	4...12 16...25		4...12 16...25																	
	L ₁ *	L ₁ *	L ₂ *	L ₂ *	L	i	a ₁	a	b	c*	e*	f*	g*	h	o*	p*	q*	ø s*	w ₁	
71	414	436	445	467	80	14.2	160	90	112	10	105	132	145	71	158	188	67	7	45	
80	459	481	490	512	100	14.2	200	100	125	10	130	160	165	80	170.5	217	79.5	10	50	
90 S	469	491	500	522	100	14.2	200	100	140	12	130	175	185	90	177.5	235	82.5	10	56	
90 L	494	516	525	547	100	14.2	200	125	140	12	155	175	185	90	202.5	235	82.5	10	56	
100	555	577	586	608	120	14.2	250	140	160	14	176	196	205	100	247.5	252	78.5	12	63	
112	564	586	595	617	120	14.2	250	140	190	14	180	220	230	112	247.0	292	88	12	70	

Note: Flange connection same outer dimensions as for pipe connection

Note

* Dimensions dependent on motor typ
(drawing: manufacture ADDA).

Other manufactures motors can be supplied on request.

Motor frame sizes are based on DIN 42673/677.

All pump and motor sizes can be combined.

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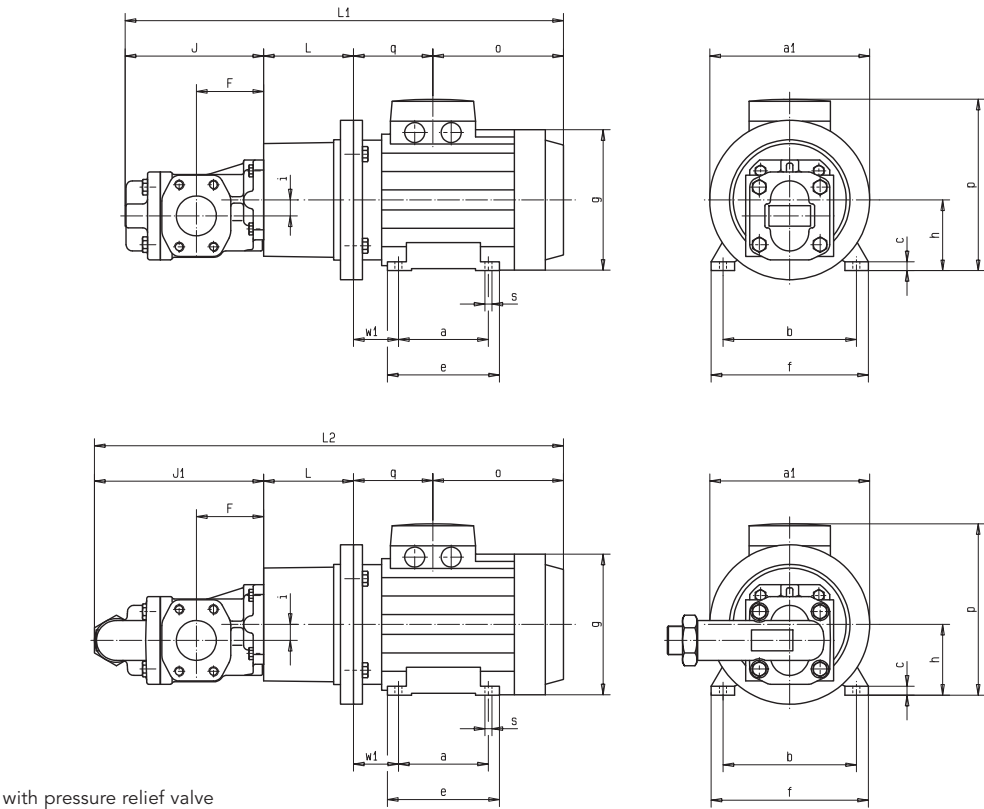
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Transfer Gear Pumps KF 2.5...200

KRACHT

Motor-Pump Assemblies with SAE-Connection

KF 32 ... 80



KF 32 ... 80 Pump sizes (in mm)

Nominal size	F	J	J ₁
32...50	84	173	212
63 / 80	100	208	247

Transfer Gear Pumps KF 2.5...200

KRACHT

Motor-Pump Assemblies with SAE-Connection

KF 32... 80

Frame size	Power Motor 6 pole		Speed Motor 4 pole		Bell housing	Coupling	Total weight * kg	
	kW	1/min	kW	1/min			Nominal size 32...50 63...80	
80	0.37	900	0.55	1370	PT200-A-080-100	RA19/24-Z25/24-Z25/19	18.5	19.5
80	0.55	900	0.75	1420			19.5	21
90 S	0.75	935	1.1	1425	PT200-A-080-110	RA24-Z30/24-Z30/24	21	23
90 L	1.1	935	1.5	1420			23.5	25.5
100	–	–	2.2	1430	PT250-A-080-124	RA24/28-Z30/24-Z30/28	29.5	31
100	1.5	940	3	1430			32	34
112	2.2	940	4	1435			38.5	40
132 S	3	940	5.5	1430	PT300-A-080-144	RA28/38-Z35/24-Z35/38	49.5	51.5
132 M	4	945	7.5	1430			59	60.5
132 L	5.5	945	–	–			61	62.5
160 M	7.5	955	11	1440	PT350-A-080-188	RA38/45-Z45/24-Z45/42	81	82.5
160 L	11	960	15	1445			101	102.5

* with pressure relief valve add. weight 1.8 kg

KF 32... 80 Dimensions

Frame size	Dimensions (in mm)																			
	32...50 63...80				32 - 80															
	L ₁ *	L ₁ *	L ₂ *	L ₂ *	L	i	a ₁	a	b	c*	e*	f*	g*	h	o*	p*	q*	ø s*	w ₁	
80	523	558	562	597	100	20	200	100	125	10	130	160	165	80	170.5	217	79.5	10	50	
90 S	543	578	582	617	110	20	200	100	140	12	130	175	185	90	177.5	235	82.5	10	56	
90 L	568	603	607	642	110	20	200	125	140	12	155	175	185	90	202.5	235	82.5	10	56	
100	623	658	662	697	124	20	250	140	160	14	176	196	205	100	247.5	252	78.5	12	63	
112	532	567	571	606	124	20	250	140	190	14	180	220	230	112	247	252	88	12	70	
132 S	673	708	712	747	144	20	300	140	216	16	176	252	270	132	262	325	94	12	89	
132 M	712	747	751	786	144	20	300	178	216	16	213	252	270	132	301	325	94	12	89	
160 M	891	926	930	965	188	20	350	210	254	17	262	290	320	160	394	390	136	14.5	108	
160 L	891	926	930	965	188	20	350	254	254	17	306	290	320	160	394	390	136	14.5	108	

Note

* Dimensions dependent on motor typ
(drawing: manufacture ADDA).
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Motor frame sizes are based on DIN 42673/677.

All pump and motor sizes can be combined.

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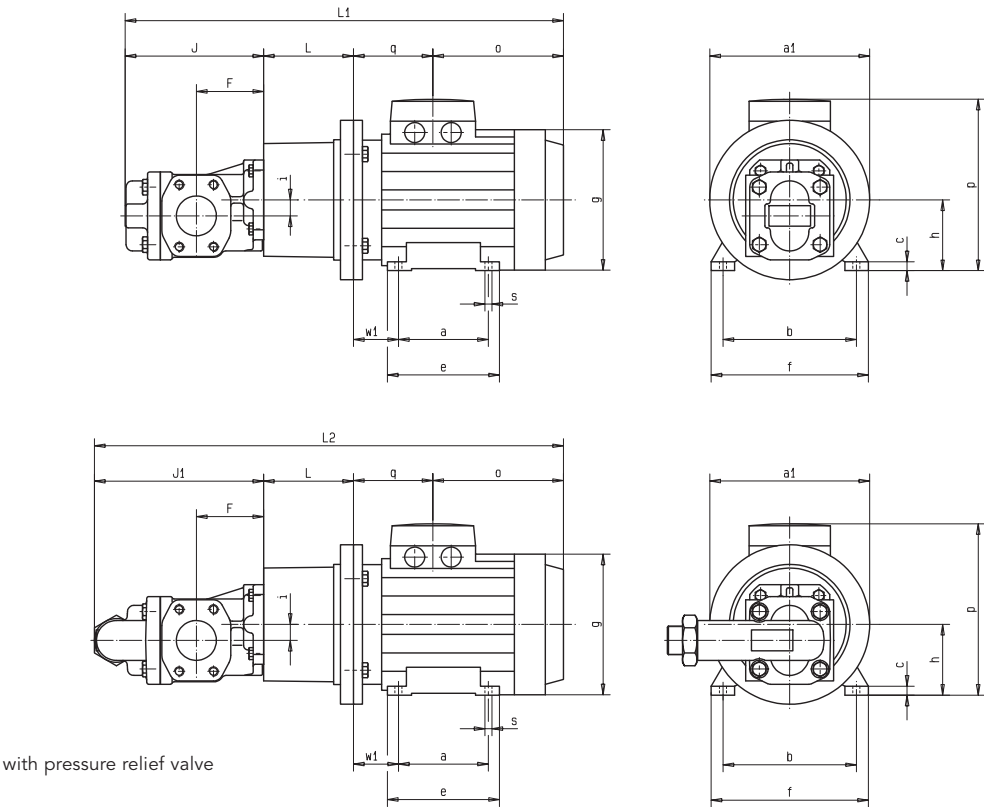
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Transfer Gear Pumps KF 2.5...200

KRACHT

Motor-Pump Assemblies with SAE-Connection

KF 100...200



KF 100...200 Pump sizes (in mm)

Nominal-size	F	J	J ₁
100/112	102	220.5	262.5
125/150	120	245	282
180/200	130	261.5	298.5

Transfer Gear Pumps KF 2.5...200

KRACHT

Motor-Pump Assemblies with SAE-Connection

KF 100...200

Frame size	Power Motor 6 pole	Speed pole	Power Motor 4 pole	Speed pole	Bell housing	Coupling	Total weight * kg		
	kW	1/min	kW	1/min			Nominal size 100/112 125/150 180/200		
100 L	—	—	2.2	1430	PT250-A-110-135	RA24/28-Z30/28-Z30/28	37.5	43.5	46.5
100 L	1.5	940	3	1430		**RA24/28-Z30/24-Z30/28	40.5	46.5	49.5
112 M	2.2	940	4	1435			47.5	53.5	56.5
132 S	3	940	5.5	1430	PT300-A-110-168	RA28/38-Z35/28-Z35/38	58	64	67
132 M	4	945	7.5	1430		**PT300-A-110-144	**RA28/38-Z35/24-Z35/38	67	73
132 L	5.5	945	—	—			69	75	78
160 M	7.5	955	11	1430	PT350-A-110-188	RA38/45-Z45/28-Z45/42	89	95	98
160 L	11	960	15	1140		**RA38/45-Z45/24-Z45/42	109	115	118
180 M	—	—	18.5	1445	PT350-A-110-204	RA42/55-Z50/28-Z50/48	129	135	138
180 L	15	960	22	1460		**RG42/55-Z50/24-Z50/48	139	145	148

* * with pressure relief valve KF 100-200 add. weight 2.7 kg

** Sealing version 31

KF 100 ... 200 Dimensions

Frame size	Dimensions (in mm)																			
	100/112 125/150 180/200						100/112 125/150 180/200													
	L ₁ *	L ₁ *	L ₁ *	L ₂ *	L ₂ *	L ₂ *	L	a ₁	a	b	c*	e*	f*	g*	h	o*	p*	q*	ø s*	w ₁
100	670.5	695	711.5	712.5	754	770.5	124	250	140	160	14	176	196	205	100	247.5	252	78.5	12	63
112	579.5	604	620.5	621.5	663	679.5	124	250	140	190	14	180	220	230	112	147	292	88	12	70
132 S	720.5	745	761.5	762.5	804	820.5	144	300	140	216	16	176	252	270	132	262	325	94	12	89
132 M	759.5	784	800.5	801.5	843	859.5	144	300	178	216	16	213	252	270	132	301	325	94	12	89
160 M	938.5	963	979.5	980.5	1022	1038.5	188	350	210	254	17	262	290	320	160	394	390	136	14.5	108
160 L	938.5	963	979.5	980.5	1022	1038.5	188	350	254	254	17	306	290	320	160	394	390	136	14.5	108
180 M	1001.5	1026	1042.5	1043.5	1085	1101.5	204	350	279	279	27	300	348	360	180	336	450	241	15	121
180 L	1039.5	1064	1080.5	1081.5	1123	1139.5	204	350	279	279	27	338	348	360	180	354	450	261	15	121

Note

* Dimensions dependent on motor typ
(drawing: manufacture ADDA).

Other manufactures motors can be supplied on request.

Motor frame sizes are based on DIN 42673/677.

All pump and motor sizes can be combined.

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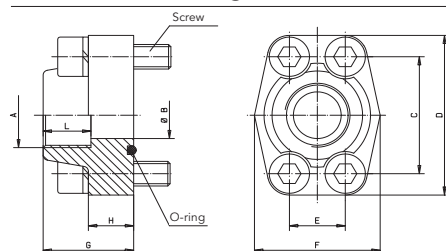
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Transfer Gear Pumps KF 2.5...200

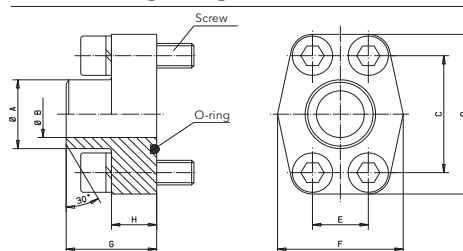
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Accessory Connections

SAE-Threaded Flange



SAE-Welding Flange



SAE-Threaded Flange Dimensions (in mm)

Nominal size SAE	DN	A	B max.	C	D*	E	F*	G	H*	L min.	Screws 10.9	O-ring	Working pressure max.**	Weight ca. [kg]
3/4"	13	G 1/2"	13	47.63	65	22.23	50	36	18	14	M 10 x 35	24.99 x 3.53	350	0.54
	19	G 3/4"	19							16				0.51
1"	13	G 1/2"	13	52.37	70	26.19	55	38	18	14	M 10 x 35	32.92 x 3.53	315	0.64
	19	G 3/4"	19							16				0.61
	25	G 1"	25							18				0.58
1 1/4"	19	G 3/4"	19	58.72	79	30.18	68	41	21	16	M 10 x 40	37.69 x 3.53	250	0.92
	25	G 1"	25							18				0.88
	32	G 1 1/4"	32							20				0.79
1 1/2"	25	G 1"	25	69.85	93	35.71	78	45	25	18	M 12 x 45	47.22 x 3.53	200	1.36
	32	G 1 1/4"	32							20				1.30
	38	G 1 1/2"	38							22				1.25
2"	25	G 1"	25	77.77	102	42.88	90	45	25	18	M 12 x 45	56.74 x 3.53	200	1.64
	32	G 1 1/4"	32							20				1.60
	38	G 1 1/2"	38							22				1.45
2 1/2"	51	G 2"	51	88.90	114	50.80	105	50	25	26	M 12 x 45	69.44 x 3.53	160	1.39
	64	G 2 1/2"	63							30				1.65
	76	G 3"	73							30				1.60
3"	64	G 2 1/2"	63	106.38	134	61.93	124	50	27	26	M 16 x 50	85.32 x 3.53	138	2.68
	76	G 3"	73							30				2.58
3 1/2"	76	G 3"	73	120.65	152	69.85	136	48	27	30	M 16 x 50	98.02 x 3.53	35	2.93
	89	G 3 1/2"	89							30				2.83

SAE-Welding Flange Dimensions (in mm)

Nominal size SAE	DN	A*	B max.	C	D*	E	F*	G	H*	Screws 10.9	O-ring	Working pressure max.**	Weight ca. [kg]
3/4"	19	28.0	19	47.63	65	22.23	50	36	18	M 10 x 35	24.99 x 3.53	350	0.51
1"	25	34.0	25	52.37	70	26.19	55	38	18	M 10 x 35	32.92 x 3.53	315	0.58
1 1/4"	32	42.8	32	58.72	79	30.18	68	41	21	M 10 x 40	37.69 x 3.53	250	0.79
1 1/2"	38	48.6	38	69.85	93	35.71	78	44	25	M 12 x 45	47.22 x 3.53	200	1.25
2"	51	61.0	51	77.77	102	42.88	90	45	25	M 12 x 45	56.74 x 3.53	200	1.39
2 1/2"	64	77.0	63	88.90	114	50.80	105	50	25	M 12 x 45	69.44 x 3.53	160	1.60
3"	76	92.0	73	106.38	134	61.93	124	50	27	M 16 x 50	85.32 x 3.53	138	2.58
3 1/2"	89	103.0	89	120.65	152	69.85	136	48	27	M 16 x 50	98.02 x 3.53	35	2.83

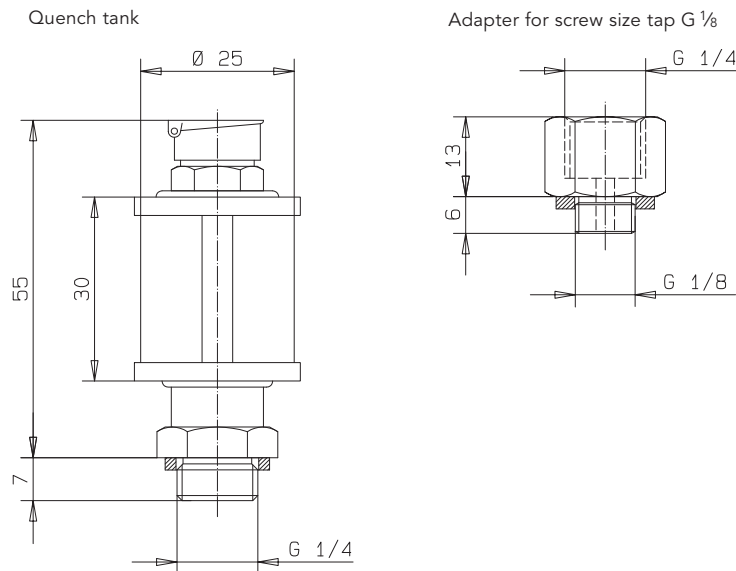
* Dimensions depending on the manufacturer
Material: Steel S355J2G3 or equivalent

** O-ring material with hardness 90 Shore A
Stainless steel 1.4404 or equivalent 316L

Transfer Gear Pumps KF 2.5...200

KRACHT

Accessory Quench Chamber



Product Portfolio

Transfer Pumps

Transfer pumps for lubricating oil supply equipment, low pressure filling and feed systems, dosing and mixing systems.

Mobile Hydraulics

Single and multistage high pressure gear pumps, hydraulic motors and valves for construction machinery, vehicle-mounted machines.

Flow Measurement

Gear and turbine flow meters and electronics for volume and flow metering technology in hydraulics, processing and laquering technology.

Industrial Hydraulics / Test Bench Construction

Cetop directional control and proportional valves, hydraulic cylinders, pressure, quantity and stop valves for pipe and slab construction, hydraulic accessories for industrial hydraulics (mobile and stationary use).

Technology Test benches / Fluid Test benches.



KF2.5...200/GB/06.14

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Bedienungsanleitung

Für künftige Verwendung bitte aufbewahren

Membran-/ Kolbendruckschalter mit Gerätesteckdose Baureihe 0184 Serie 0185

Einbau und Inbetriebnahme sind nach dieser Bedienungsanleitung und nur von autorisiertem Fachpersonal vorzunehmen.



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Funktion und Anwendung

Die Baureihe 0184/0185 öffnet oder schließt einen elektrischen Stromkreis beim Erreichen eines einstellbaren Druckwerts. Durch das Ansteigen des Drucks wird eine Membrane bzw. ein Kolben bewegt. Die Auslenkung der Membrane bzw. der Hub des Kolbens hängt von der Druckkraft und der einstellbaren Federoversion ab. Bei einer definierten Auslenkung der Membrane bzw. einem definierten Hub des Kolbens wird ein Mikroschalter betätigt, der die elektrischen Kontakte öffnet bzw. schließt (Wechsler).

Der Druckschalter überwacht einen eingestellten Druckwert.

Voraussetzungen für den Produkteinsatz

- Allgemeine, stets zu beachtende Hinweise für den ordnungsgemäßen und sicheren Einsatz des Druckschalters:
- Beachten Sie unbedingt die Warnungen und Hinweise in der Bedienungsanleitung.
- Beachten Sie die Vorschriften der Berufsgenossenschaften, des Technischen Überwachungsvereins (TÜV) oder die entsprechenden nationalen Bestimmungen.
- Der Druckschalter ist für die Überwachung von flüssigen und gasförmigen Medien bestimmt.
- Halten Sie die angegebenen Grenzwerte wie z.B. Drücke, Kräfte, Momente und Temperaturen ein.
- Berücksichtigen Sie die vorherrschenden Umgebungsbedingungen (Temperatur, Luftfeuchte, Luftdruck etc.).
- Setzen Sie den Druckschalter niemals starken Stößen oder Vibrationen aus.
- Verwenden Sie das Produkt nur im Originalzustand. Nehmen Sie keine eigenmächtige Veränderung vor.
- Entfernen Sie alle Transportvorkehrungen wie Schutzfolien, Kappen oder Kartons.
- Die Entsorgung der einzelnen Werkstoffe in Recycling-Sammelbehältern ist möglich.

Betriebsbedingungen

- Bei Medientemperaturen außerhalb der Raumtemperatur (20 °C):
 - Extreme Temperatureinflüsse (abweichend von der Raumtemperatur) können zu einer starken Schallpunktabweichung oder zum Ausfall des Druckschalters führen.
- Schaltzeit IP65:
 - Die Typenprüfung ist nicht uneingeschränkt auf alle Umweltbedingungen übertragbar.
 - Die Überprüfung, ob die Steckverbindung anderen als den angegebenen Bestimmungen und Vorschriften entspricht bzw. ob diese in speziellen, von uns nicht vorgesehenen Anwendungen eingesetzt werden kann, obliegt dem Anwender.

Sauerstofftauglichkeit

Beim Einsatz von Sauerstoff sind die einschlägigen Unfallverhütungsvorschriften zu beachten. Außerdem empfehlen wir, einen maximalen Betriebsdruck von 10 bar nicht zu überschreiten.

Kolbendruckschalter: Kolbendruckschalter sind für gasförmige Medien, insbesondere für Sauerstoff, nicht geeignet.

Überdrucksicherheit: In den Technischen Daten ist die statische Überdrucksicherheit angegeben. Sie bezieht sich auf den hydraulischen bzw. pneumatischen Teil des Druckschalters. Der dynamische Wert ist 30 bis 50% niedriger.

Technische Daten

Bemessungsbetriebsspannung U_N	Bemessungsstrom I_N	Gebrauchskategorie
250 Volt AC 50/60 Hz	4 Ampere	AC 12
250 Volt AC 50/60 Hz	1 Ampere	AC 14
30 Volt DC	4 / 4 Ampere	DC 12 / DC 13
50 Volt DC	2 / 1 Ampere	DC 12 / DC 13
75 Volt DC	1 / 0,5 Ampere	DC 12 / DC 13
125 Volt DC	0,3 / 0,2 Ampere	DC 12 / DC 13
250 Volt DC	0,25 / 0,2 Ampere	DC 12 / DC 13
Bemessungsisolationsspannung U_i	300 Volt	
Bemessungsisolationsspannungsfestigkeit U_{imp}	2,5 kV	
Konventioneller thermischer Strom I_{th}	5 Ampere	
Schaltüberspannung:	< 2,5 kV	
Bemessungsfrequenz:	DC und 50/60 Hz	
Nennstrom der Kurzschlusseinrichtung:	bis 5 Ampere	
Bedingter Kurzschlussstrom:	< 350 Ampere	
IP-Schutzart nach EN 60 529-1991:	IP65 mit Stecker	
Anzugsdrehmoment der Anschlussschrauben:	< 0,35 Nm	
Anschlussquerschnitt:	0,5 bis 1,5 mm ²	

Bitte wenden

Technische Änderungen zur Produktverbesserung vorbehalten.

Zeichenerklärung:

⚠ Achtung ⚠ Hinweis, Bemerkung ♻ Recycling ⚠ Gefahr

Operating Instructions

Please keep carefully for future use

Diaphragm-/ Piston Pressure Switch with connector Series 0184 Serie 0185

Installation and commissioning must be carried out in accordance with these Operating Instructions and by authorized, qualified personnel only.



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Operation and use

The series 0184/0185 switch opens or closes an electrical circuit when a certain (adjustable) pressure is reached. A diaphragm or piston is moved by the increase in pressure. The amount of diaphragm deflection or piston travel depends on the force of the pressure applied and the (adjustable) spring tension. At a predetermined deflection of the diaphragm or movement of the piston, a microswitch is actuated which opens or closes the electrical contacts (changeover).

The pressure switch monitors a preset pressure.

Conditions governing the use of the product

- The following general instructions are to be observed at all times to ensure the correct, safe use of the pressure switch:
- Observe without fail the warning notices and other instructions laid down in the operating instructions.
- Observe the applicable safety regulations laid down by the regulatory bodies in the country of use.
- Use the switch only for monitoring fluid and gaseous media.
- Do not exceed the specified limits for e.g. pressures, forces, moments or temperatures under any circumstances.
- Give due consideration to the prevailing ambient conditions (temperature, atmospheric humidity, atmospheric pressure, etc.).
- Never expose the pressure switch to severe side impacts or vibrations.
- Use the product only in its original condition. Do not carry out any unauthorized modifications.
- Remove all items providing protection in transit such as foils, caps or cartons.
- Disposal of the above-named materials in recycling containers is permitted.

Operating conditions

- Media temperatures other than room temperature (20 °C):
 - The effects of extreme temperatures (relative to room temperature) can lead to pronounced variations in the switching point or the failure of the pressure switch.
- Type of protection IP65:
 - Type testing does not apply to all ambient conditions without limitations. The user is responsible for verifying that the plug-and-socket connection complies with the specified rules and regulations of CE, or whether it may be used for specialized purposes other than those intended by us.
- Use with oxygen:
 - Diaphragm Pressure Switch: If oxygen is used, the applicable accident prevention regulations must be observed. In addition, we recommend a maximum operating pressure of 10 bar, which should not be exceeded.
 - Piston Pressure Switch: Piston Pressure Switches are not suitable for gaseous media, particularly oxygen.
- Protection against overpressure:
 - The static overpressure safety is included in the technical data. The overpressure safety corresponds to the hydraulic, pneumatic part of the pressure switch. The dynamic rating of the overpressure safety is smaller than 30 to 50%.

Technical data

Rated operating voltage U_N	Rated operating current I_N	Utilization category
250 Volt AC 50/60 Hz	4 Ampere	AC 12
250 Volt AC 50/60 Hz	1 Ampere	AC 14
30 Volt DC	4 / 4 Ampere	DC 12 / DC 13
50 Volt DC	2 / 1 Ampere	DC 12 / DC 13
75 Volt DC	1 / 0,5 Ampere	DC 12 / DC 13
125 Volt DC	0,3 / 0,2 Ampere	DC 12 / DC 13
250 Volt DC	0,25 / 0,2 Ampere	DC 12 / DC 13
Rated insulation voltage U_i	300 Volt	
Rated surge capacity U_{imp}	2,5 kV	
Rated thermal current I_{th}	5 Ampere	
Switching overvoltage:	< 2,5 kV	
Rated frequency:	DC und 50/60 Hz	
Rated current of short-circuit protective device:	Up to 5 Ampere	
Rated short-circuit current:	< 350 Ampere	
IP-protection to EN 60 529-1991:	IP65 with plug	
Tightening torque for terminal screws:	< 0,35 Nm	
Connection size:	0,5 to 1,5 mm ²	

PTO

Continuing development sometimes necessitates specification changes without notice.

Key to drawings:

⚠ Caution ⚠ Note ♻ Recycling ⚠ Danger

Mode d'emploi

A conserver pour toute utilisation ultérieure

Pressostat à membrane/ ou à piston avec connecteur Série 0184 Série 0185

Montage et mise en service sont à entreprendre d'après le présent mode d'emploi et par le personnel autorisé seulement.



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Fonctionnement et applications

Les séries 0184/0185 ouvrent ou ferment un circuit électrique dès qu'une valeur de pression pré-réglée est atteinte. La montée en pression agit sur une membrane ou un piston. L'ampleur de la déformation subie par la membrane ou la course du piston dépend de la pression exercée et de la précontrainte pré-réglée sur un ressort. Par une déformation de la membrane ou une course du piston donnée, le microinterrupteur est actionné; il ouvre ou il ferme le circuit électrique (inverseur).

Le pressostat contrôle une valeur de pression pré-réglée!

Consignes relatives à la mise en service

- Remarques d'ordre général, mais dont il faut toutefois toujours tenir compte, pour obtenir un fonctionnement fiable et sûr du pressostat:
- Impérativement respecter les avis et les remarques données dans le mode d'emploi.
- Toujours respecter les prescriptions et directives des Chambres syndicales, des Services de contrôle technique ainsi que les dispositions légales nationales.
- Utiliser le pressostat exclusivement avec des fluides liquides ou gazeux.
- Respecter les valeurs seuils indiquées (pressions, forces, moments, températures, par exemple).
- Tenir compte des conditions environnementales rencontrées (température ambiante, humidité atmosphérique, pression atmosphérique, etc.).
- Veillez à ce que le pressostat ne soit jamais soumis à des fortes accélérations, vibrations, et des chocs forts.
- N'utiliser le produit que dans son état original. Ne jamais entreprendre des modifications quelconques sur celui-ci.
- Retirer tous les éléments de protection nécessaire pour le transport, telles que emballages, capuchons ou cartons.
- Tous les matériaux susmentionnés sont recyclables et peuvent être déposés dans des conteneurs prévus à cet effet!

Conditions d'utilisation

- En présence de températures des fluides autres que la température ambiante (20 °C):
 - Des températures ambiantes extrêmes peuvent provoquer une forte dérive du point de commutation ou une défaillance du pressostat.
- Indice de protection IP65:
 - Cet indice est fortement dépendant de l'environnement dans lequel travaille le pressostat.
 - L'utilisateur est tenu de vérifier si le connecteur répond aux prescriptions et règlements autres que ceux indiqués dans la notice, ou s'il peut être utilisé pour des applications non prévues par nous.
- Utilisation avec l'oxygène:
 - Pressostat à membrane: Pour la manipulation d'oxygène, la réglementation afférente à la Sécurité de Travail et à la Prévention d'Accidents devra impérativement être respectée. Nous recommandons en outre de ne pas dépasser une pression de service de 10 bar maximum.
 - Pressostat à piston: Les pressostats à piston ne sont pas appropriés à la manipulation de fluides gazeux, l'oxygène en particulier.
- Souage de surpression:
 - La valeur admise de surpression statique est exprimée dans les caractéristiques techniques. Elle se réfère à la valeur hydraulique ou pneumatique du pressostat. La valeur dynamique est de 30% jusqu'à 50% inférieure.

Caractéristiques techniques

Tension de assignées d'emploi U_N	Intensité de service de référence I_N	Catégorie de service
250 V CA 50/60 Hz	4 Ampère	CA 12
250 V CA 50/60 Hz	1 Ampère	CA 14
30 V CC	4 / 4 Ampère	CC 12 / CC 13
50 V CC	2 / 1 Ampère	CC 12 / CC 13
75 V CC	1 / 0,5 Ampère	CC 12 / CC 13
125 V CC	0,3 / 0,2 Ampère	CC 12 / CC 13
250 V DC	0,25 / 0,2 Ampère	CC 12 / CC 13
Tension d'isolement de référence U_i :	300 V	
Résistance de référence aux ondes de surtension U_{imp} :	2,5 kV	
Courant thermique nominal I_{th} :	5 Ampère	
Surintensité de commutation:	< 2,5 kV	
Fréquence de référence:	CC et 50/60 Hz	
Courant nominal de protection contre les court-circuits:	jusqu'à 5 Ampère	
Courant de court-circuit conditionnel:	< 350 Ampère	
Protection IP selon EN 60 529-1991:	IP65 avec connecteur	
Couple de serrage des vis de raccordement:	< 0,35 Nm	
Section de raccordement:	0,5 à 1,5 mm ²	

T.S.V.P.

Soucieux d'apporter une amélioration continue à nos produits, les caractéristiques peuvent évoluer sans préavis.

Explication des symboles:

⚠ Attention ⚠ Nota, remarque ♻ Recyclage ⚠ Danger

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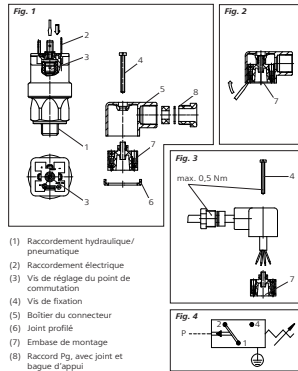
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Presse-étoupe:	Pg 9
Connecteur DIN 43650 lumineux à LED:	Pg 11
Diamètre du câble:	Pg 9: 6 à 9 mm Pg 11: 6 à 11 mm
Fréquence de commutation:	< 200 min ⁻¹
Hystérésis:	10 à 30% réglable en usine
Durée de vie mécanique	10 ⁶ cycles de manoeuvre
Version à membrane (0184):	(pour des pressions de commutation jusqu'à 50 bar)
Version à piston (0184):	10 ⁶ cycles de manoeuvre
Corps:	acier zingué, nickelé (Fe/ZnNi(12)/6/A/T2)
Tenue à la température:	NBR -40 °C à +100 °C EPDM -30 °C à +120 °C FKM -5 °C à +120 °C
Sécurité de surpression	100 bar (0,3 à 1,5 bar)
Pressostat à membrane (0184):	300 bar (autres plages)
Pressostat à piston (0185):	600 bar

Éléments de manœuvre et de raccordement



Montage

Mécanisme, pneumatique, hydraulique:
A l'aide d'une clé plate de 27 (DIN 894 ou analogue), visser par l'embout 6 pans le pressostat dans le raccord de pression prévu (couple dynamométrique: voir le tableau suivant).

Attention: ne jamais serrer le pressostat en le saisissant par ses parties en plastique! Risque de détérioration!

Filetage du raccord	Couple dynamométrique
M10 x 1 conique et NPT 1/8	Visser jusqu'à ce que le système soit hermétique
M10 x 1 cylindrique	35 Nm
Autres	45 Nm

Électrique:
S'assurer que le connecteur fourni par nos services.
S'assurer que le câble électrique soit exempt:
- d'écralements,
- de coupes trop prononcées
- qu'il soit installé de manière à ne pas pouvoir s'allonger.

Câblage avec le connecteur:
1. Oter la vis de fixation (4) présente à l'extrémité (la conserver en lieu sûr).
2. Démontez l'embase de montage (7) ainsi libérée (Fig. 3).
3. Raccorder les conducteurs (section maxi: 1,5 mm²) sur les bornes prévues à cet effet (Fig. 4).
4. Réengager l'embase de montage (7) dans le boîtier (5), remettre la vis de fixation (4) en place. Engager la prise de courant sur le pressostat et serrer fermement la vis de fixation (4).
5. Procéder aux vérifications suivantes:
- Le câblage correspond-il au schéma de la figure 4?
- Les câblages sont-ils pondés sans risque d'écralement?
- Les couples dynamométriques (Fig. 3) sont-ils respectés?

Veiller à ce que le joint profilé (6) soit correctement positionné et à ce que le raccord Pg (8) soit en place comme il faut, faute de quoi l'indice de protection spécifié (IP65) ne serait pas obtenu.

Mise en service

- Dévisser la vis de fixation (4) et la retirer.
- Relier les bornes 1 et 4 avec un multimètre (Fig. 4).
- Si l'on se sert d'une lampe en tant que contrôleur de passage, il faut veiller à respecter la puissance de commutation maximale admise (voir caractéristiques techniques).
- Tout d'abord visser la vis de réglage (3) à fond.
- Utiliser pour cela un tournevis avec une largeur de lame de 2,5 mm.
- Alimenter le pressostat avec la pression de commutation souhaitée (un manomètre de contrôle est nécessaire).

Tenir compte du fait que la vis de réglage (4) n'a une butée que pour le serrage.
5. Dévisser la vis de réglage (3) jusqu'à ce que le pressostat commute (la lampe de contrôle réagit).
6. Contrôler le cas échéant la pression de commutation en agissant en conséquence sur la vis de réglage (3).
7. Engager finalement la prise de l'appareil sur le pressostat (respecter le schéma de raccordement).

Le réglage des seuils de contact selon les points 3, 4, 5 et 6 ci-dessus peut également être entrepris, la prise de courant étant engagée sur le pressostat. Pour cela, oter la vis de fixation (4). On aura ainsi accès à la vis de réglage (3), avec un tournevis d'une largeur de lame de 2,5 mm, introduit par cet orifice à l'intérieur de la prise.
Procéder comme décrit points 3, 4, 5, 6 ci-dessus.

À la mise en service du pressostat, tenir compte des prescriptions et directives correspondantes données par les Chambres syndicales concernées, ainsi que les dispositions nationales respectives.

Le réglage de l'hystérésis est fait par l'usine. Une utilisation abusive pourrait endommager le pressostat.

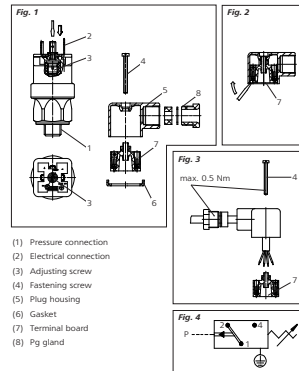
Démontage

Avant de démonter le pressostat il est très important de tenir compte des points suivants:
• Il est impératif que le système sur lequel le pressostat est monté soit au préalable mis hors pression et hors tension.
• À l'aide d'une clé plate de 27 (DIN 894 ou analogue), dévisser par l'embout 6 pans le pressostat du raccord de pression sur lequel il a été monté.
• De même, les prescriptions inhérentes à la sécurité doivent impérativement être respectées.

Ne jamais dévisser le pressostat en le saisissant par ses parties en plastique, faute de quoi on encourt le risque de l'endommager.

Cable screw coupling:	Pg 9
Connector with LED:	Pg 11
Cable size:	Pg 9: 6 to 9 mm Pg 11: 6 to 11 mm
Operating frequency:	< 200 min ⁻¹
Switching hysteresis:	10 to 30% adjustable
by the factory	
Mechanical life	10 ⁶ operating cycles
Diaphragm type (0184):	(at a trip pressures up to 50 bar)
Piston type (0184):	10 ⁶ operating cycles
Body material:	Zinc-plated steel (Fe/ZnNi(12)/6/A/T2)
Temperature range:	NBR -40 °C to +100 °C EPDM -30 °C to +120 °C FKM -5 °C to +120 °C
Overpressure safety	100 bar (0.3 to 1.5 bar)
Diaphragm Pressure Switch (0184):	300 bar (residual pressure)
Piston Pressure Switch (0185):	600 bar

Operating controls and connections



Installation

Mechanical, pneumatic, hydraulic:
With a size 27 open-ended wrench (to DIN 894 or similar), install the pressure switch, by means of the hexagon connector, in the corresponding pressure socket (for torque specification, see following table).

For sealing the system, use a standard copper gasket of the appropriate dimensions.

Caution: Do not secure the pressure switch by means of the plastic components under any circumstances; otherwise they may be damaged beyond further use.

Connecting thread	Torque
M10 x 1 tap, and NPT 1/8	Tighten until system is hermetically sealed
M10 x 1 cyl.	35 Nm
Remaining	45 Nm

Electrical:
Use the connector supplied.
Take care to ensure that the cable is laid in such a way that it is not:
- pinched
- kinked
- under tension.

Connection to the connector:
1. Remove the fastening screw (4) from the head end (set aside for later use).
2. Remove the released terminal board (7) (Fig. 2).
3. Connect the cable (max. lead cross-section 1,5 mm²) to the screw terminals provided (Fig. 4).
4. Reinstall the terminal board (7) in the plug housing (5). Install the fastening screw (4). Install the connector on the pressure switch and tighten the fastening screw (4).
5. Pay attention to the following points:
- Wiring in accordance with connection diagram (Fig. 4)
- Cabling laid free of pinching, chafing, etc.
- Torque specifications (Table 3)

Take care to ensure that the gasket (6) and Pg gland (8) are correctly installed; otherwise the conditions specified for protection category IP65 will not be achieved.

Entry into service

- Remove the connector.
- Using a continuity tester, wire up the electrical connections 1 and 4 (Fig. 4).

If using a testing lamp as a continuity tester, observe the maximum permissible switching capacity (see Technical Data).

- First screw in the adjusting screw (3) as far as it will go. To adjust the pressure switch, use a screwdriver with a 2,5 mm wide blade.
- Adjust the pressure switch to the desired switching pressure (a test pressure gauge required).

Take care to ensure that the adjusting screw (3) does not seize at any point other than when it is fully tightened down.

- Ease off the adjusting screw (3) to a sufficient extent to cause the pressure switch to trip (continuity tester reacts).
- If necessary, adjust the trip pressure setting by turning the adjusting screw (3).
- Push the connector onto the pressure switch (observe the connection diagram).

Adjustment of the trip pressure setting in accordance with points 3, 4, 5 and 6 can also be carried out with the connector installed. In this case, first remove the fastening screw (4). With a screwdriver (blade width 2,5 mm), you can now reach the adjusting screw (3) through the aperture in the connector. Now proceed in accordance with points 3, 4, 5 and 6 above.

When putting the pressure switch into service, please observe the applicable safety regulations laid down by the governing bodies in the country of use.

The adjustment of hysteresis can only be carried out in the factory. If this is unexpectedly undertaken, damage may be caused to the pressure switch.

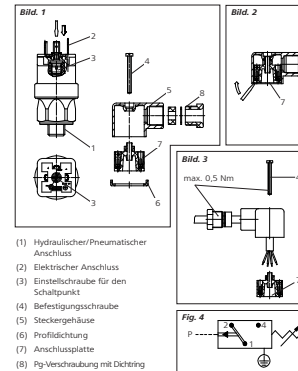
Removing the pressure switch

When removing the pressure switch, observe the following important instructions:

- The pressurized system from which the pressure switch is intended to be removed must be entirely relieved of pressure.
- All the relevant safety regulations must be observed.
- Use a size 27 open-ended wrench (to DIN 894 or similar), to remove the pressure switch.
- Do not attempt to turn the switch by means of the plastic collars, otherwise it could be damaged beyond further use.

Kabelverschraubung:	Pg 9
Gerätesteckdose mit LED:	Pg 11
Klemmbereich:	Pg 9: 6 bis 9 mm Pg 11: 6 bis 11 mm
Schaltfrequenz:	<200 min ⁻¹
Schalthysterese:	10 bis 30% im Werk einstellbar
Mechanische Lebensdauer	10 ⁶ Schaltspiele (bei Schaltströmen bis 50 bar)
Membranausführung (0184):	10 ⁶ Schaltspiele
Kolbenausführung (0184):	10 ⁶ Schaltspiele
Gehäusewerkstoff:	verzinkter Stahl (Fe/ZnNi(12)/6/A/T2)
Temperaturbeständigkeit:	NBR -40 °C bis +100 °C EPDM -30 °C bis +120 °C FKM -5 °C bis +120 °C
Überdrucksicherheit	100 bar (0,3 bis 1,5 bar)
Membrandruckschalter (0184):	300 bar (restl. Druckbereich)
Kolbendruckschalter (0185):	600 bar

Bedienteile und Anschlüsse



Einbau

Mechanisch, pneumatisch, hydraulisch:
Drehen Sie den Druckschalter an dem sechskantförmigen Ansatz mit einem Maulschlüssel der Schlüsselweite 27 (nach DIN 894 o.ä.) in den vorgesehenen Druckanschluss (Anzugsdrehmomente siehe nachfolgende Tabelle).

Zum Abdichten des Systems verwenden Sie einen Standard-Kupferdichtung mit den entsprechenden Abmessungen.

Achtung: niemals den Druckschalter an den Kunststoffteilen mechanisch belasten. Zerstörungsgefahr!

Anschlussgewinde	Drehmoment
M10 x 1 kegl. und NPT 1/8	Einschrauben bis System abgedichtet ist
M10 x 1 zyl.	35 Nm
Restliche	45 Nm

Elektrisch:
Verwenden Sie die mitgelieferte Gerätesteckdose.
Stellen Sie sicher, dass das Kabel:
- quetschfrei,
- knickfrei,
- dehnungsfrei verlegt ist.

Verkabelung des Gerätesteckdoses:
1. Lösen Sie die Befestigungsschraube (4), und ziehen Sie diese am Kopf ende ganz heraus (gut aufbewahren).
2. Demontieren Sie die gelaste Anschlussplatte (7) (Bild 2).
3. Schließen Sie die Kabel (max. Leistungsschnitt 1,5 mm²) in den dafür vorgesehenen Schraubklemmen an (Bild 4).
4. Anschlussplatte (7) wieder in das Steckergehäuse (5) schieben. Befestigungsschraube (4) montieren. Gerätesteckdose auf den Druckschalter stecken und Befestigungsschraube (4) anziehen.
5. Achten Sie auf folgende Punkte:
- Verkabelung nach Anschlussbild (Bild 4)
- quetschfreie Kabelanführung
- Anzugsdrehmomente (Bild 3)

Achten Sie auf die ordnungsgemäße Lage der Profildichtung (6) und auf eine sachgemäße Montage der Pg-Verschraubung (8), da sonst die Schutzart IP65 nicht erreicht wird.

Inbetriebnahme

- Lösen Sie die Befestigungsschraube (4), und ziehen Sie die Gerätesteckdose ab.
- Verkabeln Sie die elektrischen Anschlüsse 1 und 4 mit einem Durchgangsprüfer (Bild 4).

Bei Verwendung einer Prüflampe als Durchgangsprüfer: Achten Sie auf die max. zulässige Schaltleistung (siehe technische Daten).

- Drehen Sie die Einstellschraube (3) zunächst ganz ein. Verwenden Sie zum Einstellen des Druckschalters einen Schraubendreher mit 2,5 mm Klingbreite.
- Bewachen Sie den Druckschalter mit dem gewünschten Schalldruck (Kontrollmanometer erforderlich).
- Beachten Sie bitte, dass die Einstellschraube (3) nur beim Einziehen einen Anschlag besitzt.

- Drehen Sie die Einstellschraube (3) so weit heraus, bis der Druckschalter umschaltet (Durchgangsprüfer reagiert).
- Kongrieren Sie gegebenenfalls den Schalldruck durch Verdrehen der Einstellschraube (3).
- Schieben Sie die Gerätesteckdose auf den Druckschalter (Anschlussbild beachten).

Das Einstellen des Schaltpunkts nach den Punkten 3, 4, 5 und 6 kann auch mit aufgesetzter Gerätesteckdose durchgeführt werden. Hierzu entfernen Sie bitte die Befestigungsschraube (4). Nun können Sie mit einem Schraubendreher (Klingenbreite 2,5 mm) durch die Durchgangsböhrung der Gerätesteckdose die Einstellschraube (3) erreichen. Verfahren Sie nun wie in Punkt 3, 4, 5 und 6 des Kapitels „Inbetriebnahme“ beschrieben.

Bei Inbetriebnahme des Druckschalters beachten Sie bitte die entsprechenden Sicherheitsvorschriften der Berufsgenossenschaft oder die entsprechenden nationalen Bestimmungen.

Die Einstellung der Hysteresis ist nur werkseitig durchführbar. Bei unsachgemäßer Vorgehensweise kann der Druckschalter beschädigt werden.

Ausbau

Beachten Sie folgende wichtige Punkte beim Ausbau des Druckschalters:

- Das Drucksystem, aus dem der Druckschalter ausgebaut werden soll, muss sich im drucklosen Zustand befinden.
- Es müssen alle relevanten Sicherheitsbestimmungen beachtet werden.
- Drehen Sie den Druckschalter mit einem Maulschlüssel der Schlüsselweite 27 (nach DIN 894 o.ä.) aus dem Druckanschluss.
- Drehen Sie den Druckschalter niemals an den Kunststoffflanszen heraus, da Zerstörungsgefahr für den Druckschalter besteht.

Mechanical pressure measurement

Bourdon tube pressure gauge Model 213.53, liquid filling, stainless steel case

WIKA data sheet PM 02.12



for further approvals
see page 2

Applications

- For measuring points with high dynamic pressure loads or vibrations
- For gaseous and liquid media that are not highly viscous or crystallising and will not attack copper alloy parts
- Hydraulics
- Compressors, shipbuilding

Special features

- Vibration and shock resistant
- Especially sturdy design
- NS 63 and 100 with German Lloyd and Gosstandart approval
- Scale ranges up to 0 ... 1,000 bar



Bourdon tube pressure gauge, model 213.53.100,
lower mount

Description

Design
EN 837-1

Nominal size in mm
50, 63, 100

Accuracy class
NS 50, 63: 1.6
NS 100: 1.0

Scale ranges
NS 50: 0 ... 1 to 0 ... 400 bar
NS 63, 100: 0 ... 0.6 to 0 ... 1,000 bar
or all other equivalent vacuum or combined pressure and vacuum ranges

Pressure limitation

NS 50, 63: Steady: 3/4 x full scale value
Fluctuating: 2/3 x full scale value
Short time: Full scale value
NS 100: Steady: Full scale value
Fluctuating: 0.9 x full scale value
Short time: 1.3 x full scale value

Permissible temperature

Ambient: -20 ... +60 °C
Medium: +60 °C maximum

Temperature effect

When the temperature of the measuring system deviates from the reference temperature (+20 °C):
Max. ±0.4 %/10 K of the span

Ingress protection

IP 65 per EN 60529 / IEC 60529

WIKA data sheet PM 02.12 · 03/2015

Page 1 of 3

Data sheets showing similar products:
Standard version with liquid filling; model 113.53; see data sheet PM 01.08



23055316/EN – 05/2019

Standard version

Process connection

Copper alloy,
lower mount (LM) or back mount (BM),
NS 50, 63: G ¼ B (male), 14 mm flats
NS 100: G ½ B (male), 22 mm flats

Pressure element

NS 50:
Copper alloy, C-type or helical type

NS 63:
≤ 400 bar: Copper alloy, C-type or helical type
> 400 bar: Stainless steel 316L, helical type

NS 100:
< 100 bar: Copper alloy, C-type
≥ 100 bar: Stainless steel 316L, helical type

Movement

Copper alloy

Dial

NS 50, 63: Plastic ABS, white, with pointer stop pin
NS 100: Aluminium, white, black lettering

Pointer

NS 50, 63: Plastic, black
NS 100: Aluminium, black

Window

Plastic, crystal-clear

Case

Natural finish stainless steel, with blow-out device with
NS 50: in case back, 12 o'clock
NS 63, 100: at case circumference, 12 o'clock
O-ring seal between case and connection.
Scale ranges ≤ 0 ... 16 bar with compensating valve to vent case.

Bezel ring

Crimp ring, glossy finish stainless steel, triangular bezel

Filling liquid

Glycerine

Options

- Other process connection
- Sealings (model 910.17, see data sheet AC 09.08)
- Measuring system and movement from stainless steel (model 233.53)
- NS 100: Zero adjustment (in front)
- Increased medium temperature with special soft solder
 - NS 50, 63: 100 °C
 - NS 100: 150 °C
- Ambient temperature resistant -40 ... +60 °C with silicone oil filling
- NS 50: Higher scale ranges up to 0 ... 1,000 bar
- Panel mounting flange, stainless steel, for back connection
- Surface mounting flange, stainless steel (not NS 50)
- Mounting clamp (for back connection)

CE conformity

Pressure equipment directive

97/23/EC, PS > 200 bar, module A, pressure accessory

Approvals

- GL, ships, shipbuilding (e.g. offshore), Germany
- EAC, import certificate, customs union Russia/Belarus/Kazakhstan
- GOST, metrology/measurement technology, Russia
- KBA, automotive, European Community
- CRN, safety (e.g. electr. safety, overpressure, ...), Canada

Certificates ¹⁾

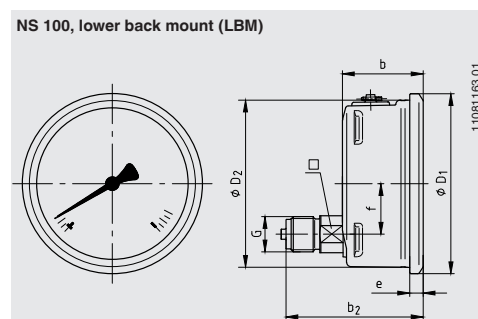
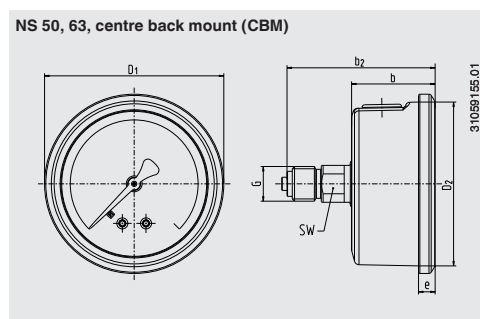
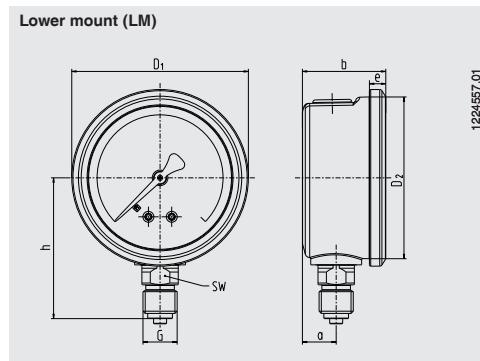
- 2.2 test report per EN 10204 (e.g. state-of-the-art manufacturing, material proof, indication accuracy)
- 3.1 inspection certificate per EN 10204 (e.g. indication accuracy)

¹⁾ Option

Approvals and certificates, see website

Dimensions in mm

Standard version



NS	Dimensions in mm										Weight in kg
	a	b ±0.5	b ₂ ±0.5	D ₁	D ₂	e	f	G	h ±1	SW	
50	12	30	55	55	50	5.5	-	G ¼ B	48	14	0.15
63	13	32	56	68	62	6.5	-	G ¼ B	54	14	0.21
100	15.5	48	81.5	107	100	8	30	G ½ B	87	22	0.80

Process connection per EN 837-1 / 7.3

Ordering information

Model / Nominal size / Scale range / Connection size / Connection location / Options

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23055316/EN – 05/2019

**Mechanical
temperature measurement**

Bimetal thermometer Model 52, industrial series

WIKA data sheet TM 52.01



for further approvals
see page 6

Applications

- A wide range of applications in machine building, vessel, piping and apparatus construction
- Heating technology

Special features

- Scale ranges from -30 ... +500 °C
- Large choice of nominal sizes from 25 ... 160 mm
- Case and stem from stainless steel
- 5 different connection designs



Fig. left: model A52.100, back mount
Fig. right: model R52.100, lower mount

Description

The model 52 bimetal thermometer is the entry-level model among process thermometers. The target markets of this thermometer are air-conditioning and machine building.

Model 52 is manufactured in accordance with EN 13190 and already offers a stainless steel case and accuracy class 1 for nominal sizes > 60 mm.

Especially noteworthy is the large number of stem lengths and nominal sizes. This enables the individual adaptation to the target applications.

WIKA data sheet TM 52.01 · 01/2016

Page 1 of 6



Standard version

Measuring element

Bimetal coil

Nominal size in mm

25, 33, 40, 50, 63, 80, 100, 160

Connection designs

- S Standard (male threaded connection)
- 1 Plain stem (without thread)
- 2 Male nut ¹⁾
- 3 Union nut ¹⁾
- 4 Compression fitting (sliding on stem) ¹⁾

¹⁾ Not for NS 25, 33, 40, 50

Model overview

Model	NS	Design
A52.025	25	Back mount (axial)
A52.033	33	
A52.040	40	
A52.050	50	
A52.063	63	
A52.080	80	
A52.100	100	
A52.160	160	
R52.063	63	Lower mount (radial)
R52.080	80	
R52.100	100	
R52.160	160	

Accuracy class

NS 25, 33: ±5 % of scale range
 NS 40, 50: 2 per EN 13190
 NS 63, 80, 100, 160: 1 per EN 13190

Working range

Continuous loading: Measuring range per EN 13190
 Short time (24 h max.): Scale range per EN 13190

Case, bezel ring, stem, process connection and spacer

Stainless steel

Elbow behind the case

Aluminium, only with lower mount version

Dial

Aluminium, white, black lettering

Window

Instrument glass

NS 33: polycarbonate

Pointer

NS 25, 33, 40: Aluminium, black

NS 50, 63, 80, 100, 160: Aluminium, black, adjustable pointer

Permissible operating pressure at the stem

NS 25, 33, 40, 50: max. 6 bar, static

NS 63, 80, 100, 160: max. 25 bar, static

Ingress protection

NS 25, 33, 40: IP54 per EN 60529 / IEC 529

NS 50, 63, 80, 100, 160: IP43 per EN 60529 / IEC 529

Options

- Scale range °F, °C/°F (dual scale)
- Other scale ranges
- Other connection types

Scale ranges, measuring ranges ²⁾, error limit (EN 13190)
Scale graduation per WIKA standard

Scale range in °C	Measuring range in °C	Scale spacing in °C		Error limit ±°C	
		up to NS 63	from NS 80	up to NS 50	from NS 63
-30 ... +50	-20 ... +40	1	1	2	1
-20 ... +60	-10 ... +50	1	1	2	1
0 ... 60	10 ... 50	1	1	2	1
0 ... 80	10 ... 70	1	1	2	1
0 ... 100	10 ... 90	2	1	2	1
0 ... 120	10 ... 110	2	1	4	2
0 ... 160	20 ... 140	2	2	4	2
0 ... 200 ³⁾	20 ... 180	5	2	4	2
0 ... 250 ³⁾	30 ... 220	5	2	5	2.5
0 ... 300 ⁴⁾	30 ... 270	5	2	-	5
0 ... 400 ⁴⁾	50 ... 350	5	5	-	5
0 ... 500 ⁴⁾	50 ... 450	5	5	-	5

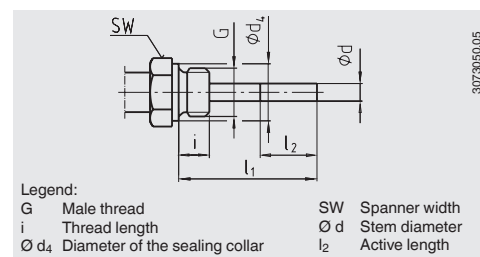
2) The limits of the measuring range are indicated on the dial by two triangular marks.
 Only within this range is the stated error limit valid per EN 13190.
 3) Not for NS 33
 4) Not for NS 25 to NS 50

Connection designs

Standard design (male thread connection)

Standard insertion length $l_1 = 63, 100, 160, 200, 250$ mm

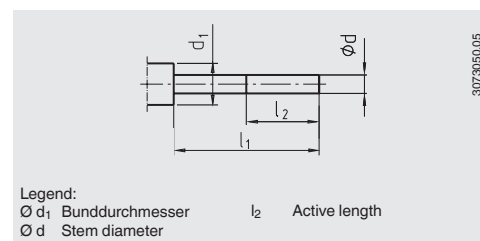
Nominal size	Process connection		Dimensions in mm			
	G	i	SW	Ø d ₄	Ø d	
25, 33	M8 x 1.25	8	12	-	4	
	G ½ B	8	12	-	4	
	G ¼ B	8	17	-	4	
40, 50	M8 x 1.25	8	12	-	4	
	G ½ B	8	17	-	4	
	G ¼ B	8	17	-	4	
	G ½ B	12	22	-	4	
63, 80, 100, 160	G ¼ B	12	19	18	6 or 8	
	G ½ B	14	27	26	6 or 8	
	M18 x 1.5	12	24	23	6 or 8	
	½ NPT	19	22	-	6 or 8	



Bauform 1, Anschluss glatt (ohne Gewinde)

Standard-Einbaulänge $l_1 = 45, 63, 100, 140, 160, 200, 240, 290$ mm

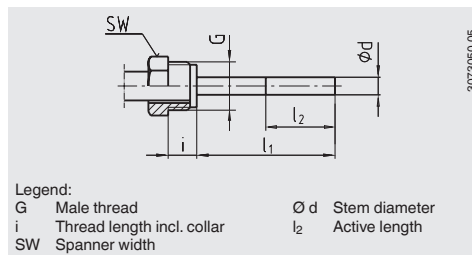
Nominal size	Dimensions in mm	
	d ₁	Ø d
25, 33	8	4
40, 50	12	4
63, 80, 100, 160	18	6 or 8



Design 2, male nut

Standard insertion length $l_1 = 80, 140, 180, 230$ mm

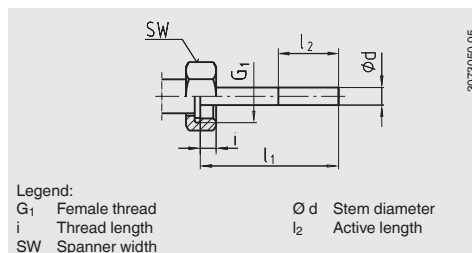
Nominal size	Process connection		Dimensions in mm		
NS	G	i	SW	$\varnothing d$	
63, 80, 100, 160	G $\frac{1}{2}$ B	20	27	6 or 8	
	M18 x 1.5	17	22	6 or 8	



Design 3, union nut

Standard insertion length $l_1 = 89, 126, 186, 226, 276$ mm

Nominal size	Process connection		Dimensions in mm		
NS	G	i	SW	$\varnothing d$	
63, 80, 100, 160	G $\frac{1}{2}$	8.5	27	6 or 8	
	G $\frac{3}{4}$	9.5	32	6 or 8	

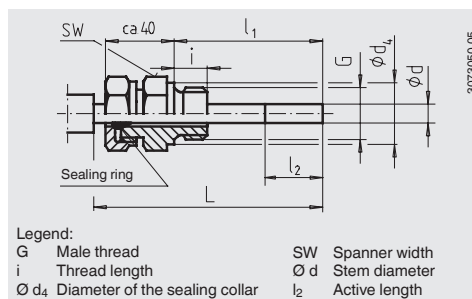


Design 4, compression fitting (sliding on stem)

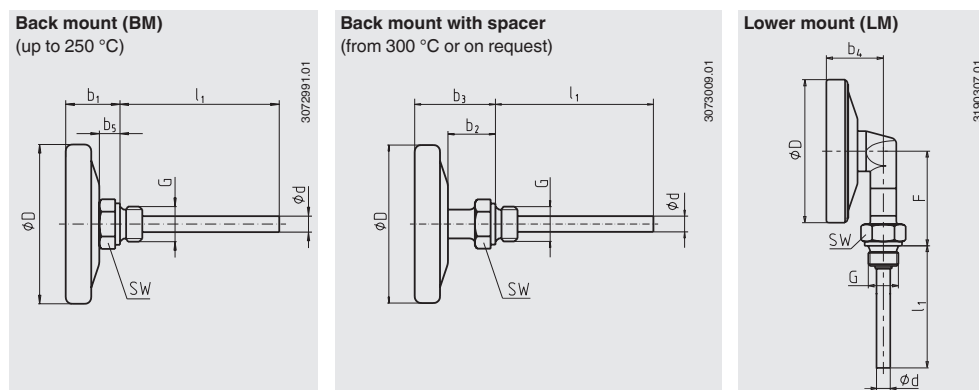
Insertion length $l_1 =$ variable

Length $L = l_1 + 40$ mm

Nominal size	Process connection		Dimensions in mm		
NS	G	i	SW	$\varnothing d_4$	$\varnothing d$
63, 80, 100, 160	G $\frac{1}{4}$ B	8	22	18	6 or 8
	G $\frac{1}{2}$ B	14	27	26	6 or 8
	M18 x 1.5	12	24	23	6 or 8
	$\frac{1}{2}$ NPT	19	22	-	6 or 8
	G $\frac{3}{4}$ B	16	32	32	6 or 8
	$\frac{3}{4}$ NPT	20	30	-	6 or 8



Dimensions in mm



NS	Dimensions in mm							Weight in kg		
	b ₁	b ₂	b ₃	b ₄	b ₅	Ø D	F	R	RD	U
25	16	-	-	-	6	25	-	0.035	-	-
33	16	-	-	-	6	33	-	0.040	-	-
40	21	-	-	-	8	40	-	0.050	-	-
50	21	-	-	-	8	50	-	0.060	-	-
63	29	30 ¹⁾	46	34	13	63	47	0.160	0.200	0.220
80	30	30 ¹⁾	47	36	13	80	56	0.200	0.240	0.270
100	35	30 ¹⁾	52	40	13	100	66	0.250	0.290	0.330
160	39	30 ¹⁾	57	42.5	13	160	96	0.450	0.490	0.560

1) from 300 °C or on request
R Back mount (BM)
RD Back mount with spacer
U Lower mount (LM)

Thermowell

In principle, the operation of a mechanical thermometer without a thermowell with low process-side loading (low pressure, low viscosity and low flow velocities) is possible.

However, in order to enable exchanging the thermometer during operation (e.g. instrument replacement or calibration) and to ensure a better protection of the instrument and also the plant and the environment, it is advisable to use a thermowell from the extensive WIKA thermowell portfolio.

For further information on the calculation of the thermowell, see Technical information IN 00.15.

Approvals

Logo	Description	Country
	GOST (option) Metrology, measurement technology	Russia
-	CRN (option) Safety (e.g. electr. safety, overpressure, ...)	Canada

Certificates (option)

2.2 test report

Approvals and certificates, see website

Ordering information

Model / Connection design / Scale range / Process connection / Stem diameter, material / Insertion length / Options

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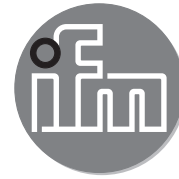


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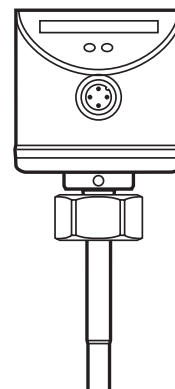
ifm electronic



Operating instructions
Flow monitors

efector300®**SI5000****SI5001****UK**

704056 / 03 08 / 2010



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Preliminary note

- An instruction is indicated by "►":
Example: ► Check whether the unit operates correctly.
- A reaction to the action is indicated by ">":
Example: > LED 9 lights.

1 Safety instructions

- Please read the product description prior to set-up of the unit. Ensure that the product is suitable for your application without any restrictions.
- The unit conforms to the relevant regulations and EC directives.
- Improper or non-intended use may lead to malfunctions of the unit or to unwanted effects in your application.
- That is why installation, electrical connection, set-up, operation and maintenance of the unit must only be carried out by qualified personnel authorised by the machine operator.

UK

For the scope of validity cULus:

The device shall be supplied from an isolating transformer having a secondary Listed fuse rated as noted in the following table.

Overcurrent protection		
Control-circuit wire size		Maximum protective device rating Ampere
AWG	(mm ²)	
26	(0.13)	1
24	(0.20)	2
22	(0.32)	3
20	(0.52)	5
18	(0.82)	7
16	(1.3)	10

2 Functions and features

2.1 Application area

The unit monitors the flow of liquid and gaseous media.

2.2 Operating principle flow monitoring

- The unit detects the flow speed to the calorimetric measuring principle and switches the output:
 - output closed if medium is flowing / output open if no medium is flowing.This applies to the unit on delivery: output = normally open. In case of need you can change the output to normally closed (→ 7.2). It then applies: output open if medium is flowing.
- If the flow speed increases, the switching status changes when the switch point is reached.
- If the flow speed falls again, the switching status changes if the value "SP minus hysteresis" is reached.

The hysteresis changes with the flow speed and it is essentially influenced by the set monitoring range.

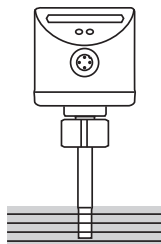
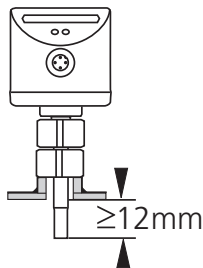
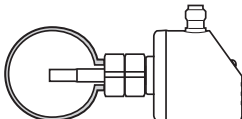
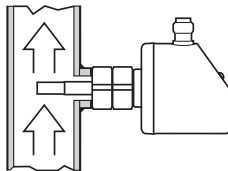
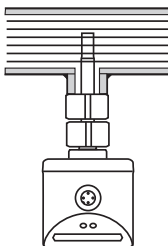
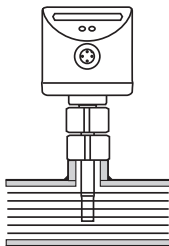
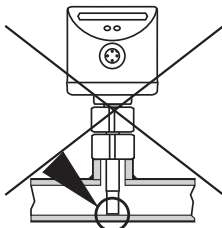
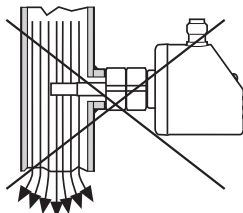
It is 2...5 cm/s for the setting 5...100 cm/s (= factory setting), it increases with higher flow speeds.
- The typical response time of the unit is 1...10 s. It can be influenced by the setting of the switch point:
 - Low switch point = quick reaction with rising flow.
 - High switch point = quick reaction with falling flow.

3 Installation

Using process adapters the unit can be adapted to different process connections.

- Adapters have to be ordered separately as accessories.
A correct fit of the unit and ingress resistance of the connection are only ensured using ifm adapters.
- For small flow rates ifm adapter blocks are available.

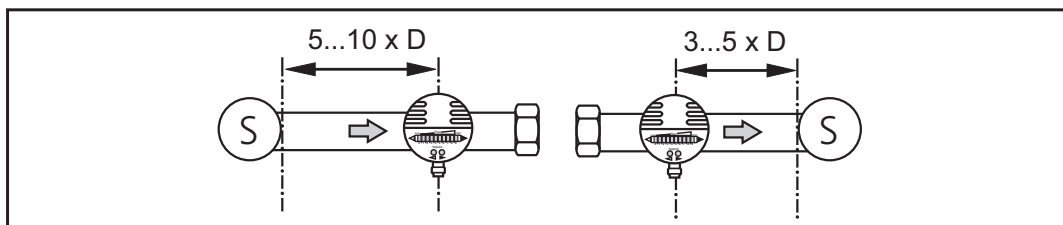
3.1 Installation location

General			UK
Recommended			
Conditional			
To avoid			

3.2 Sources of interference in the pipe system

Components integrated in the pipes, bends, valves, reductions, etc. lead to turbulence of the medium. This affects the function of the unit.

Recommendation: Adhere to the distances between sensor and sources of interference:

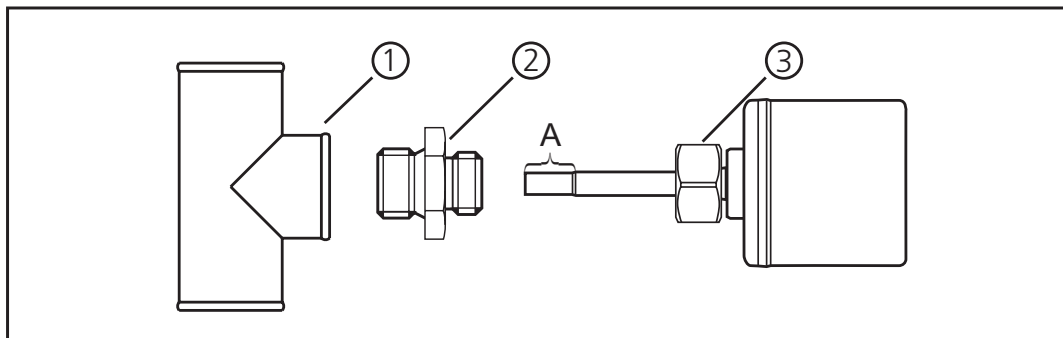


D = pipe diameter; S = sources of interference

3.3. Mounting operation



- ▶ Ensure that the system is free of pressure during installation.
- ▶ Ensure that no media can leak at the mounting location during installation.



- ▶ Grease the threads of the process connection (1), adapter (2) and nut (3).
Note: The sensor tip (A) must not be in contact with grease.
- ▶ Screw the suitable adapter into the process connection.
- ▶ Place the flow monitor onto the adapter and tighten the nut. Tightening torque 25 Nm. Ensure that the unit is correctly oriented.

4 Electrical connection

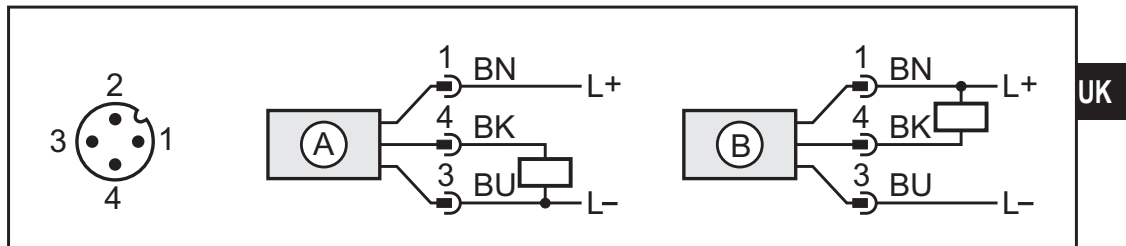


The unit must be connected by a qualified electrician.

The national and international regulations for the installation of electrical equipment must be adhered to.

Voltage supply to EN 50178, SELV, PELV.

- ▶ Disconnect power.
- ▶ Connect the unit as follows:

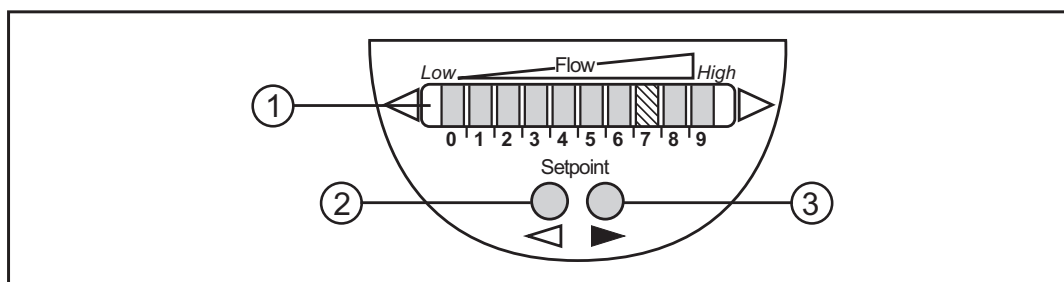


A: SI5000 (positive switching); B: SI5001 (negative switching)

Core colours of ifm sockets:

1 = BN (brown), 3 = BU (blue), 4 = BK (black)

5 Operating and display elements



1: Operation display

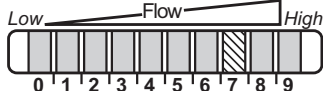
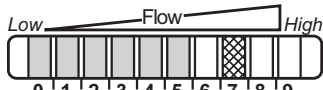
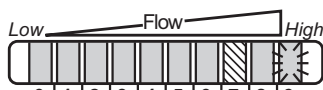
- The green LEDs indicate the current flow (the LEDs 0 to 9 represent the range between no flow and maximum flow).
- A lighting LED indicates the position of the switch point (orange = output closed, red = output open).

2, 3: Setting buttons for adjustment and configuration

6 Set-up and settings for water

(For media other than water → 7.1: Low flow adjustment).

- ▶ Switch on the supply voltage.
- > All LEDs light and go out again step by step. During this time the output is closed (if configured as normally open). The unit is in the operating mode.
- ▶ Let the normal flow circulate in the installation.
- ▶ Check the display and determine further actions.

1		The factory setting is suitable for the application. ▶ No further settings are required.
2		Your normal flow is below the representation range of the display. 2 setting options: ▶ Change the switch point (→ 6.1). ▶ Carry out high flow adjustment (→ 6.2).
3		Your normal flow exceeds the representation range of the display (LED 9 flashes). ▶ Carry out high flow adjustment (→ 6.2).

You can restore the factory setting any time. (→ 7.3).

6.1 Change the switch point (optional)

For the factory setting the switch point is at LED 7. A change makes sense if:

- the display shows example 2.
- the flow fluctuates much or pulsates.
- if a faster response time of the unit is requested (low switch point = fast response with rising flow, high switch point = fast response with falling flow).
- ▶ Briefly press the pushbutton ◀ or ▶.
- > The switch point LED flashes.
- ▶ Press the pushbutton ◀ or ▶ as often as required. Each press of the pushbutton shifts the LED by one position in the indicated direction.

Note: If no pushbutton is pressed for 2 s, the unit returns to the operating mode with the newly set value.

6.2 High flow adjustment (optional)

The unit determines the existing flow as normal flow and adapts the display representation (all LEDs except the switch point LED light green).

- ▶ Let the normal flow circulate in the installation.
- ▶ Press the pushbutton  and keep it pressed.
- > LED 9 lights, after approx. 5 s it flashes.
- ▶ Release the pushbutton.

The unit is now adapted to your flow conditions. It passes into the operating mode, the display should now show example 1.

UK

Note: The adjustment affects the switch point: It is increased proportionally (maximum up to LED 7).

7 Additional settings (optional)

7.1 Low flow adjustment

If the unit is used in media other than water, you should additionally adapt the unit to the minimum flow.

Note: The following adjustment must only be carried out after the high flow adjustment.

- ▶ Let the minimum flow circulate in the installation or ensure flow standstill.
- ▶ Press the pushbutton  and keep it pressed.
- > LED 0 lights, after approx. 5 s it flashes.
- ▶ Release the pushbutton. The unit adopts the new value and passes into the operating mode.

7.2 Configure the switching output

The unit is delivered as normally open. In case of need you can change the output to normally closed:

- ▶ Press the pushbutton  for at least 15 s.
- > LED 0 lights, after approx. 5 s it flashes.
- > After 10 s the current setting is displayed: LEDs 5...9 light orange (= output normally open).
- > After approx. 15 s LEDs 0...4 flash orange.
- ▶ Release the pushbutton. The output is changed to normally closed operation.

For a new changeover repeat the operation.

7.3 Restore the factory setting (reset)

- ▶ Press the pushbutton ► for at least 15 s.
 - > LED 9 lights, after approx. 5 s it flashes.
 - > After approx. 15 s LEDs 0...9 flash orange.
- ▶ Release the pushbutton. All settings are reset to the factory setting:
 - operating area: 5 ... 100 cm/s for water
 - switch point: LED 7
 - output function: NO
 - unlocked.

7.4 Lock / unlock the unit

The unit can be locked electronically to prevent unintentional settings.

- ▶ Press both setting pushbuttons simultaneously for at least 10 s in the operating mode.
 - > The indication goes out, the unit locks or unlocks.
- On delivery: unlocked.

8 Error during adjustment

If no adjustment is possible, all LEDs flash red. The unit then passes into the operating mode with unchanged values.

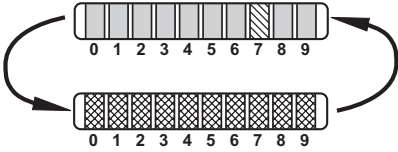
Possible cause /aid:

Error during installation.	▶ Read chapter 3 Installation. Check whether all requirements have been met.
The difference between maximum flow and minimum flow is too small.	▶ Increase the flow difference and carry out the adjustment once again.
The sequence high flow /low flow adjustment was not adhered to.	▶ Carry out the two adjustment operations again in the right sequence.

9 Operation

After every power on all LEDs light and go out again step by step (during this time the output is closed if configured as normally open). The unit is then ready for operation.

In case of power failure or interruption all settings remain.

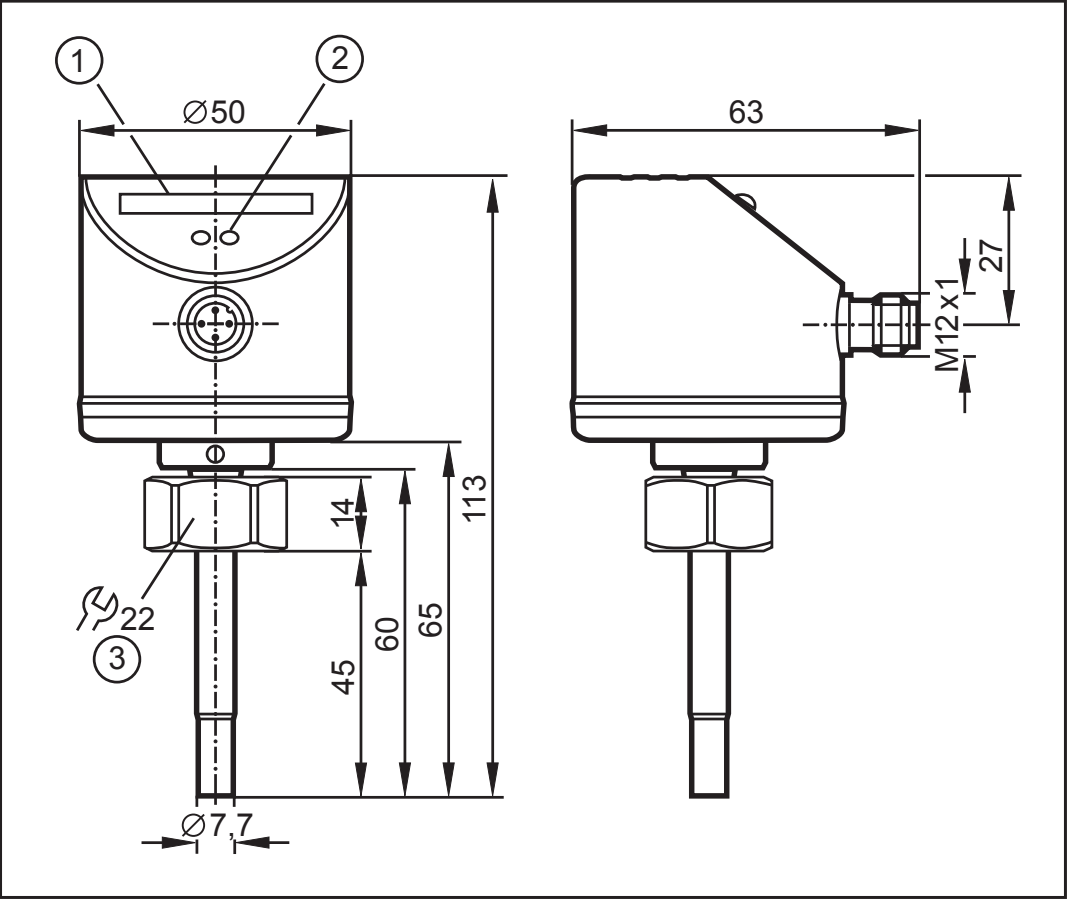
Operating indicators	
	Green LED bar: Current flow within the representation range. Indication of the switch point (SP): - LED orange: output closed. - LED red: output open.
	LED 9 flashes: current flow above the representation range.
	LED 0 flashes: current flow far below the representation range.
Interference indicators	
	Short circuit at the switching output: The operating indicator and red LEDs light alternately. If the short circuit has been rectified, the unit immediately passes into the normal operating state. The current operating state is displayed.
Display OFF (no LED lights):	Operating voltage too low (< 19 V) or failed. Ensure a correct voltage supply.

10 Maintenance

Recommended maintenance:

- Check the sensor tip for build-up from time to time.
- Clean it using a soft cloth. Stubborn build-up (e.g. lime) can be removed using a common vinegar cleaning agent.

11 Scale drawing



- 1: LED bar display
- 2: set button
- 3: tightening torque 25 Nm

12 Technical data

Application area.....	Liquids and gases
Operating voltage [V].....	19 ... 36 DC ¹⁾
Current rating [mA]	250
Short-circuit protection, pulsed; reverse polarity / overload protection	
Voltage drop [V]	< 2.5
Current consumption [mA]	< 60
Power-on delay time [s].....	10, optically indicated

Liquids	
Medium temperature [°C]	-25 ... +80
Setting range [cm/s].....	3 ... 300
Greatest sensitivity [cm/s]	3...100
Temperature gradient [K/min]	300
Gases	
Medium temperature [°C]	-25 ... +80
Setting range [cm/s].....	200 ... 3000
Greatest sensitivity [cm/s].....	200 ... 800
Switch point accuracy [cm/s]	$\pm 2 \dots \pm 10^{(2)}$
Hysteresis [cm/s]	2...5 ²⁾
Repeatability [cm/s]	1...5 ²⁾
Temperature drift [cm/s x 1/K].....	0.1 ³⁾
Response time [s].....	1 ... 10
Pressure resistance [bar].....	30
Operating temperature [°C]	-25 ... +80
Protection rating	IP 67
Protection class	III
Shock resistance [g]	50 (DIN / IEC 68-2-27, 11 ms)
Vibration resistance [g]	20 (DIN / IEC 68-2-6, 55-2000 Hz)
Housing materials.....	stainless steel 316L / 1.4404; stainless steel 304 / 1.4301; PC (Makrolon); PBT-GF 20; EPDM/X (Santoprene)
Materials (wetted parts).....	stainless steel 316L / 1.4404; O-ring: FPM 8x1.5 gr 80° Shore A
EMC	
EN 61000-4-2 ESD:	4 kV CD / 8 kV AD
EN 61000-4-3 HF radiated:	10 V/m
EN 61000-4-4 Burst:	2 kV
EN 61000-4-6 HF conducted:	10 V

UK

¹⁾ to EN50178, SELV, PELV;

²⁾ for water; 5...100 cm/s; 25°C (factory setting)

³⁾ for water; 5...100 cm/s; 10...70°C

The sensor conforms to the standard EN 61000-6-2

More information at www.ifm.com

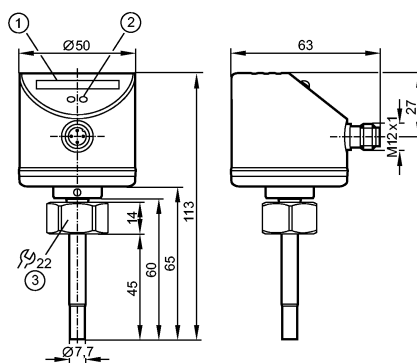
efector300

SI5000

SID10ABBFPKG/US-100



Flow sensors



- 1: LED display
2: setting pushbutton
3: tightening torque 25 Nm



Product characteristics

Flow monitor

Compact type for adapter

Process connection: internal thread M18 x 1.5 for adapter

Probe length: 45 mm

Setting range: 3...300 cm/s (liquids)

Application

Application	liquids and gases
Pressure rating [bar]	30
Medium temperature [°C]	-25...80

Electrical data

Electrical design	DC PNP
Operating voltage [V]	19...36 DC
Current consumption [mA]	< 60
Protection class	III
Reverse polarity protection	yes

Outputs

Output function	normally open / closed programmable
Current rating [mA]	250
Voltage drop [V]	< 2.5
Short-circuit protection	pulsed
Overload protection	yes

Measuring / setting range

Liquids	
Setting range [cm/s]	3...300
Greatest sensitivity [cm/s]	3...100
Gases	
Setting range [cm/s]	200...3000
Greatest sensitivity [cm/s]	200...800

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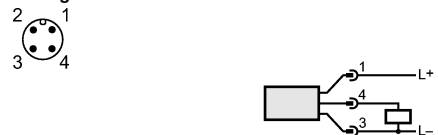
efector300[®]

SI5000

SID10ABBFPKG/US-100



Flow sensors

Accuracy / deviations		
Switch point accuracy	[cm/s]	± 2...± 10 *)
Hysteresis	[cm/s]	2...5 *)
Repeatability	[cm/s]	1...5 *)
Temperature drift	[cm/s x 1/K]	0.1 **)
Max. temperature gradient of medium	[K/min]	300
Reaction times		
Power-on delay time	[s]	10
Response time	[s]	1...10
Software / programming		
Adjustment of the switch point		pushbuttons
Environment		
Ambient temperature	[°C]	-25...80
Storage temperature	[°C]	-25...100
Protection		IP 67
Tests / approvals		
EMC	EN 61000-4-2 ESD: EN 61000-4-3 HF radiated: EN 61000-4-4 Burst: EN 61000-4-6 HF conducted:	4 kV CD / 8 kV AD 10 V/m 2 kV 10 V
Shock resistance	DIN IEC 68-2-27:	50 g (11 ms)
Vibration resistance	DIN EN 60068-2-6	20 g (55...2000 Hz)
MTTF	[Years]	298
Mechanical data		
Process connection		internal thread M18 x 1.5 for adapter
Materials (wetted parts)		stainless steel 316L / 1.4404; O-ring: FKM 8 x 1.5 gr 80° Shore A
Housing materials		stainless steel 316L / 1.4404; stainless steel / 301 / 1.4310; PC (polycarbonate); PBT-GF 20; EPDM/X
Probe length L	[mm]	45
Weight	[kg]	0.235
Displays / operating elements		
Function display	LED	10 LEDs, three-colour
Electrical connection		
Connection		M12 connector
Wiring 		
Remarks		
Remarks		*) for water; 5...100 cm/s; 25°C (factory setting) **) for water; 5...100 cm/s; 10...70°C
Pack quantity	[piece]	1

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SID10ABBFPKG/US-100

**Flow sensors**

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PT5403

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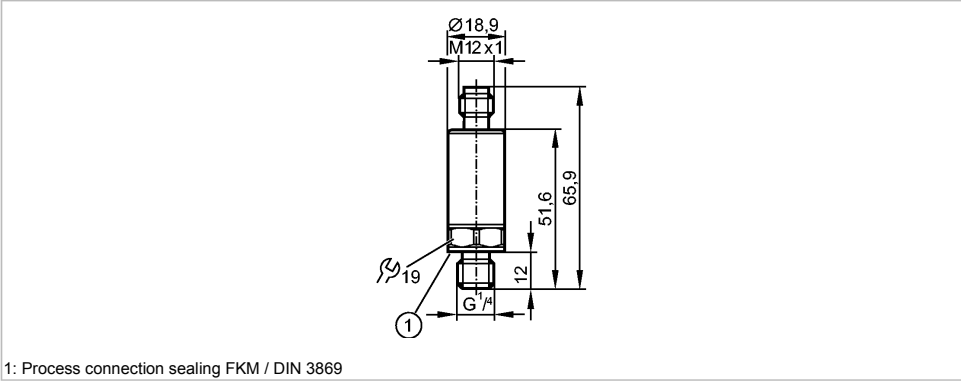
efectorsoo



PT5403

PT-025-SEG14-A-ZVG/US/ /W

Pressure sensors



Product characteristics	
Electronic pressure sensor	
for industrial applications	
Process connection: G ¼ A (according to DIN EN ISO 1179-2)	
Analog output	
Measuring range: 0...25 bar	
Application	
Application	Type of pressure: relative pressure Group 2 fluids according to the Pressure Equipment Directive (PED), group 1 fluids on request
Pressure rating [bar]	65 (static)
Bursting pressure min. [bar]	600
Vacuum resistance [mbar]	-1000
Medium temperature [°C]	-40...90
Electrical data	
Electrical design	DC
Operating voltage [V]	8.5...36 DC
Insulation resistance [MΩ]	> 100 (500 V DC)
Protection class	III
Reverse polarity protection	yes
Outputs	
Output	Analog output
Output function	4...20 mA analog
Short-circuit proof	yes
Overload protection	yes
Analog output	4...20 mA
Max. load [Ω]	(Ub - 8.5 V) / 21.5 mA; 720 at Ub = 24 V
Measuring / setting range	
Measuring range [bar]	0...25
Accuracy / deviations	

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Accuracy / deviations (in % of the span)

Characteristics deviation *)	< ± 0.5
Linearity	< ± 0.1 (BFSL) / < ± 0.2 (LS)
Hysteresis	< ± 0.2
Repeatability **)	< ± 0.05
Long-term stability ***)	< ± 0.1

Temperature coefficients (TEMPCO) in the temperature range -40...90° C (in % of the span per 10 K)

Greatest TEMPCO of the zero point + span	< 0.1 (-25...90 °C) / < 0.2 (-40...-25 °C)
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Reaction times

Step response time analogue output	[ms]	1
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Environment

Ambient temperature	[°C]	-40...90
Storage temperature	[°C]	-40...100
Protection		IP 67 / IP 69K

Tests / approvals

Pressure equipment directive	sound engineering practice	
EMC	DIN EN 61000-6-2	
	DIN EN 61000-6-3	
Shock resistance	DIN EN 60068-2-27	50 g (11 ms)
Vibration resistance	DIN EN 60068-2-6	20 g (10...2000 Hz)
MTTF	[Years]	686

Mechanical data

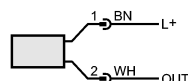
Process connection	G ¼ A (according to DIN EN ISO 1179-2)	
Process connection sealing	FKM (to DIN 3869)	
Materials (wetted parts)	1.4542 (17-4 PH / 630) ²	
Housing materials	1.4542 (17-4 PH / 630) ² ; stainless steel (316L / 1.4404); PEI	
Min. pressure cycles	60 millions in the course of the lifetime (at 1.2 times the nominal pressure)	
Tightening torque	[Nm]	25...35 (recommended tightening torque ¹)
Restrictor element integrated	no	
Weight	[kg]	0.056

Electrical connection

Connection	M12 connector
------------	---------------

Wiring

Core colors
BN brown
WH white



OUT: 4...20 mA

The following pin connection is available on request:

pin 1: L+, pin 3: OUT

Colours to DIN EN 60947-5-2

Remarks

Remarks	*) incl. drift when overtightened, zero point and span error, non-linearity, hysteresis **) with temperature fluctuations < 10 K ***) in% of the span / 6 months
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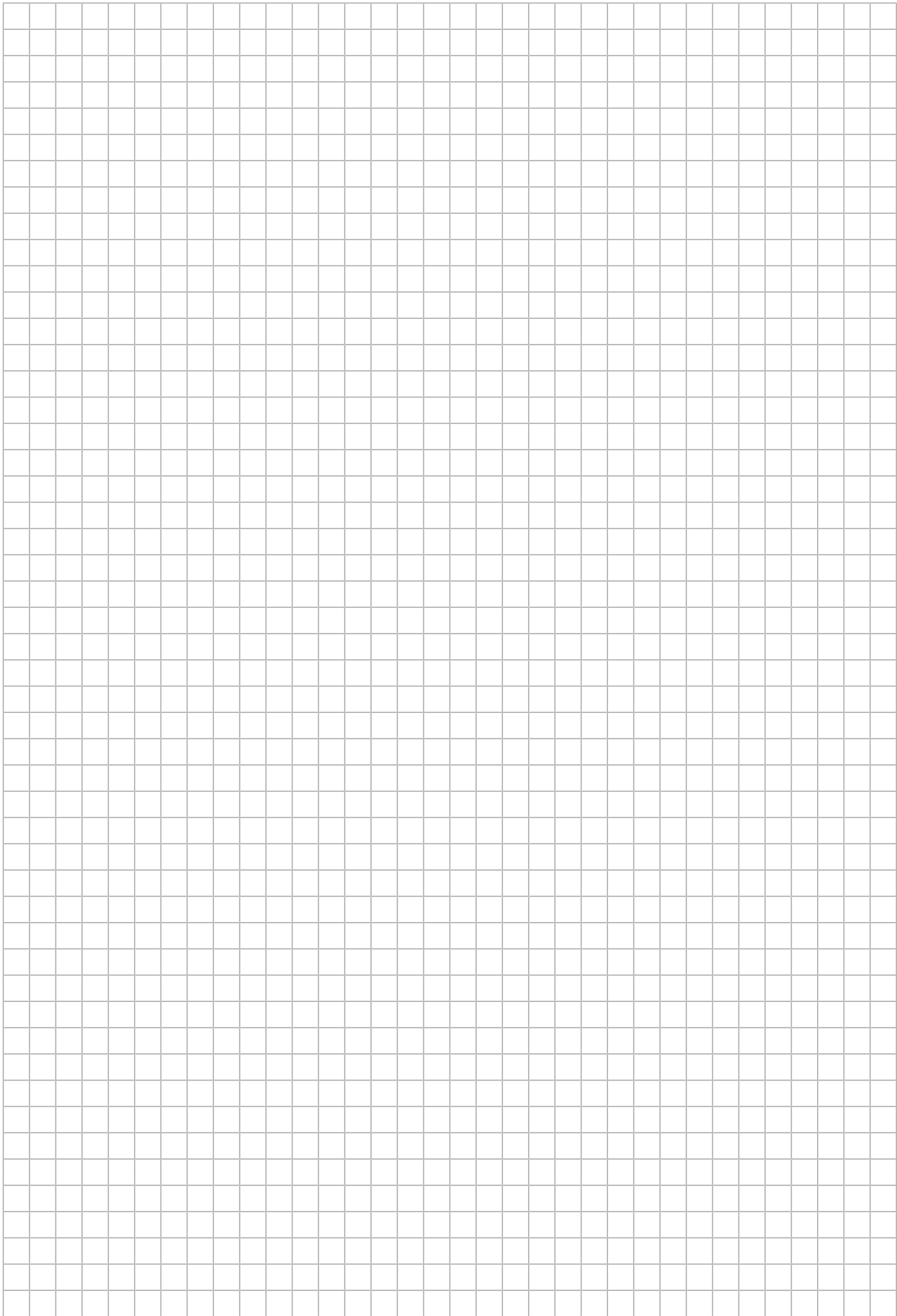
Seite 3 von 3

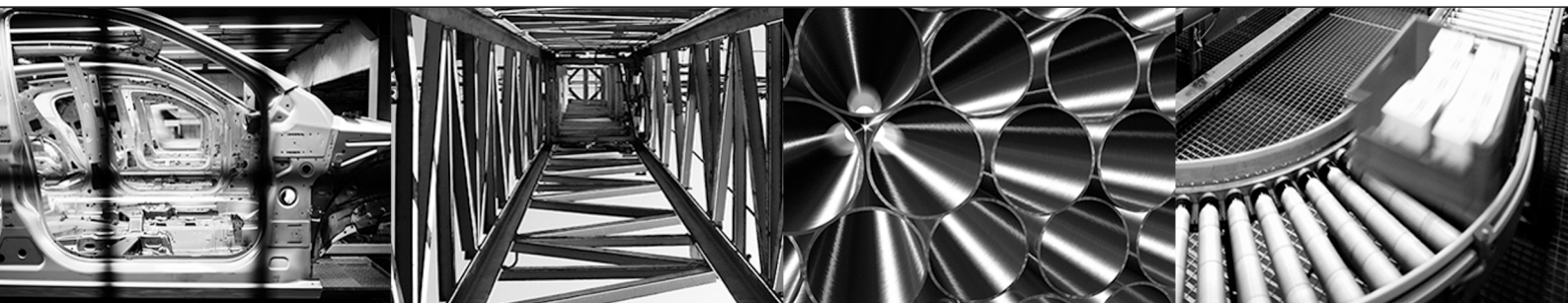
		¹⁾ Depends on lubrication, seal and pressure rating ²⁾ Characteristics similar to stainless steel (e.g. 304/1.4301) but higher strength. BFSL = Best Fit Straight Line / LS = Limit Value Setting
Pack quantity	[piece]	1
ifm efector, inc. • 1100 Atwater Drive • Malvern • PA 19355 — We reserve the right to make technical alterations without prior notice. — US — PT5403-01 — 07.09.2015		

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