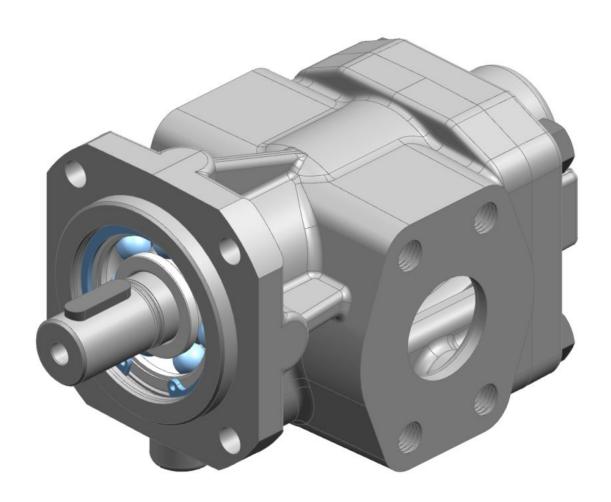
KRACHT

D.0025880002Operating instructions (Translation)



Gear pump KF 2.5-630 for magnetic coupling English

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Kracht GmbH General | 1

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 for magnetic coupling attachment or direct attached magnetic coupling

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

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.

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

1.2 Manufacturer address

KRACHT GmbH

Gewerbestraße 20

DE 58791 Werdohl

Tel: +49 2392 935-0

Fax: +49 2392 935-209 E-Mail: info@kracht.eu Web: www.kracht.eu

1.3 Applicable documents

In addition to these instructions, also observe the corresponding instructions for the existing or planned systems or system parts.

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1 | General Kracht GmbH

1.4 Symbols



A DANGER

Identification of an immediate hazard, which would result in death or severe bodily injury if not avoided.



MARNING

Identification of a potential medium risk hazard, which would lead to death or severe bodily injury if not avoided.



A CAUTION

Identification of a low risk hazard, which could lead to minor or medium bodily injury if not avoided.

ATTENTION

Flagging of notices to prevent property damage.



NOTICE

Identification of basic safety instructions.

Non-compliance can lead to hazards for people and the device.



TIPP

Flagging of special user tips and other especially useful or important information.

Kracht GmbH Safety | 2

2 Safety

2.1 Intended use

- The device has been designed for operation with fluid.
 Dry operation is not permitted.
- 2. The product may only be operated when completely filled.
- 3. The fluid must be compatible with the materials used in the product. Chemical expertise is required for that. Be careful with ethylene oxide or other catalytically or exothermically reacting or self-decomposing substances. Please consult the manufacturer in cases of doubt.
- 4. The product may only be used in normal industrial atmospheres.

 If there are any aggressive substances in the air, always consult the manufacturer.
- The product may only be operated in compliance with these operating instructions and the applicable documents.
 Deviating operating conditions require the express approval of the manufacturer.
- 6. The device may be operated in connection with a magnetic coupling.
- 7. Use of the product for purposes other than those for which it is intended invalidates any warranty.

2.2 Foreseeable misuse

The manufacturer is not liable for damage resulting from non-intended or improper use.

2.3 Personnel qualification and training

The personnel 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.



NOTICE

Read the operating instructions thoroughly before use.

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2 | Safety Kracht GmbH

2.4 Basic safety instructions



NOTICE

Basic safety instructions

Non-compliance can lead to hazards for people and the unit.

- a) Follow existing regulations for accident prevention and safety at work as well as the internal regulations of the operating company.
- b) Ensure the greatest possible cleanliness.
- c) Wear suitable personal protective equipment.
- d) Do not remove type plates or other information or make them illegible or unrecognisable.
- e) Do not make any technical modifications.
- f) Comply with maintenance intervals.
- g) Only use spare parts approved by the manufacturer.

2.5 Fundamental hazards



A DANGER

Hazardous fluids

Danger to life when handling hazardous fluids.

- a) Comply with the safety data sheets and regulations on handling the hazardous fluids.
- b) Collect and dispose of hazardous fluids so that no hazard is created for persons or the environment.



A DANGER

Hazardous fluids

Danger to life when handling hazardous fluids.

- a) Defective components and connection lines must be replaced or fixed without delay.
- b) Use only components and connection lines approved for the expected pressure range.



⚠ DANGER

Rotating parts!

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

- a) Before all work, ensure that existing drives are voltage-free and pressure-free.
- b) Securely prevent restarting during all work.

Kracht GmbH Safety | 2



A DANGER

Rotating parts

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

a) Take measures against accidental touching of rotating parts.



MARNING

Rotating parts!

Danger of injury from flying parts.

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



⚠ WARNING

Failure of pressure bearing parts due to overload

Risk of injury from flying parts.

Risk of injury due to splashing fluids.

- a) Depressurize the system before all work.
- b) Securely prevent the pressure from being restored during work.



MARNING

Failure of pressure bearing parts due to overload

Risk of injury from flying parts.

Risk of injury due to fluid spurting out.

- a) Use only connections and lines approved for the expected pressure range.
- b) Securely prevent the permissible pressures from being exceeded, e.g. by using pressure relief valves or bursting discs.
- c) Pipelines must be designed in such a way that no tension e.g. caused by changes in length due to fluctuations in temperature can be transferred to the product.



MARNING

Failure of pressure bearing parts due to overload

Risk of injury from flying parts.

Risk of injury due to fluid spurting out.

- a) Do not operate the product with shut-off devices closed.
- b) Securely prevent the restoration of pressure while working on the device.

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2 | Safety Kracht GmbH

2.6 Special hazards



⚠ DANGER

Powerful magnetic field

Danger of death for people with heart pacemakers

- a) Maintain a safety clearance of at least 2 m to the unmounted components of the magnetic coupling.
- b) Maintain a safety clearance of at least 0.5 m to assembled couplings with axially aligned magnetic rotors and surrounding coupling housing (bell housing).



MARNING

Powerful magnetic field

Danger of injury due to uncontrolled mutual attraction of magnetic parts or parts that can be magnetized.

a) When performing any work, bear in mind the magnetic forces which occur, especially within 0.5 m of the magnetic coupling.

ATTENTION

Powerful magnetic field

Magnetic data carriers (discs, credit cards, etc.) can be damaged or erased by magnetic fields.

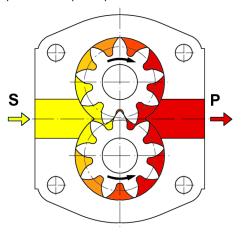
a) Maintain a minimum clearance of 1 m to the magnetic field.

Kracht GmbH Device description | 3

3 Device description

3.1 Functional principle

Pumps of this series are external gear pump types that work according to the positive displacement principle.



- S Suction connection
- P Pressure connection

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.

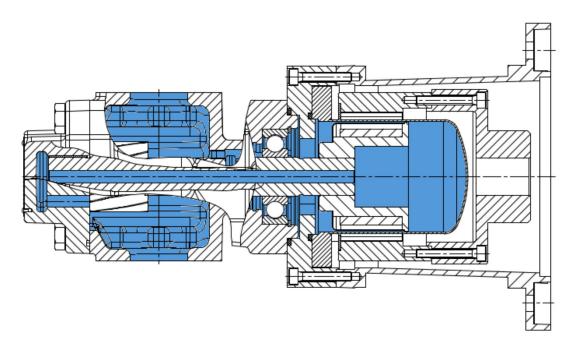
The displacement cycle describe initially takes place without exhibiting appreciable pressure build-up. Only after setting external loads, for example, through delivery heights, flow resistances, line elements, etc. will the required working pressure arise to overcome these resistances.

The pressure occurring at the shaft seal therefore corresponds to the pressure at the suction connection of the device. The permissible pressure is determined by the type of sealing.

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3 | Device description Kracht GmbH

3.1.1 Magnetic coupling



Versions with magnetic coupling are used when absolute leak-proofness is required on the shaft seal or when being operated with supply pressure on the suction side. The magnetic coupling is leak-proof within the permissible technical limits.

This magnetic coupling has the exterior rotor installed on the motor shaft and the interior rotor on the pump shaft. The torque is transmitted between the two rotors via magnetic force. A separating can installed in-between the two rotors provides hermetic sealing of the pump.

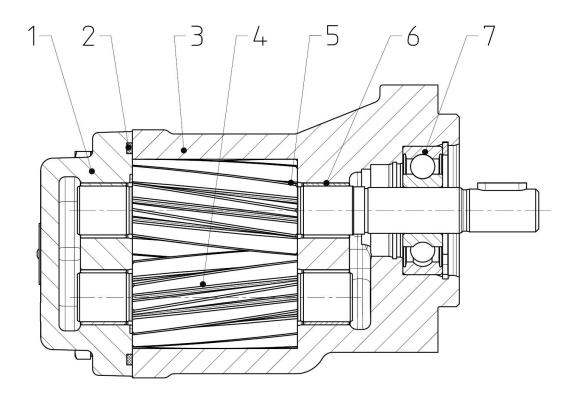
The device can be used in vacuum mode, e.g. for filling brake fluid, while doing so, the penetration of air into the system is reliably prevented. Leakagefree operation is ensured during operation in closed systems that have the system pressure applied on the suction side.

On versions with rinsing, an internal forced rinsing of the interior rotor by the pumping medium is provided for continuous removal of the heat developing in the air gap. The magnetic coupling is cooled by a substream of the pumping medium.

Kracht GmbH Device description | 3

3.2 Possible versions

Gear pump



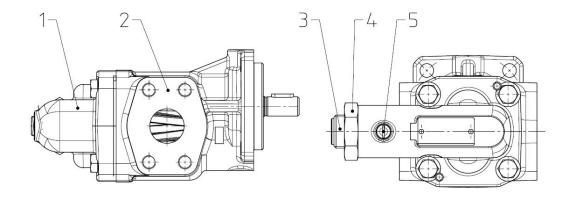
- 1 End cover
- 3 Housing
- 5 Driving shaft
- 7 Outbord bearing

- 2 O-ring
- 4 Driven shaft
- 6 Plain bearing bush

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3 | Device description Kracht GmbH

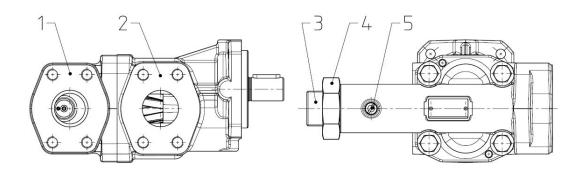
Gear pump with pressure relief valve



- 1 Pressure relief valve
- 3 Adjustment screw
- 5 Retaining screw

- 2 Gear pump
- 4 Hexagonal nut

Gear pump KF 32-80 with pressure relief valve (T-valve)

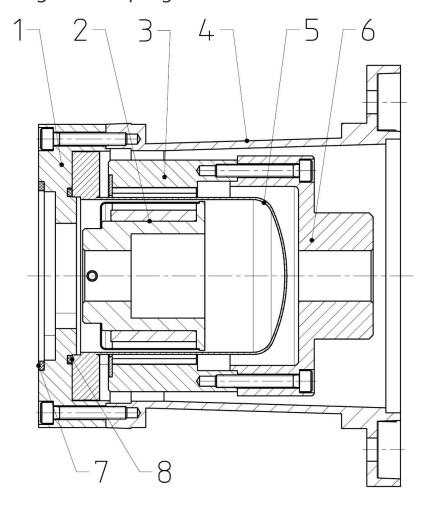


- 1 Pressure relief valve with Tank connection
- 3 Adjustment screw
- 5 Retaining screw

- 2 Gear pump
- 4 Hexagonal nut

Kracht GmbH Device description | 3

3.2.1 Magnetic coupling



- 1 Adapter flange
- 3 External rotor
- 5 Containment shroud
- 7 O-ring

- 2 Internal rotor
- 4 Bell housing
- 6 Flange hub
- 8 O-ring

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3 | Device description Kracht GmbH

3.3 Type key

Ordering example												
KF		40		R	G		10	/	-	D15	-	•••
1.		2.		3.	4.		5.	6.		7.		8.

Explana	tion of type key										
1. Produ	ict name										
2. Nomi	nal size										
	Size 1: 2,5; 4; 5; 6; 8; 10; 12; 16; 20; 25	5									
.,	Size 2: 32; 40; 50; 63; 80										
V _{gn}	Size 3: 100,112; 125; 150; 180; 200										
	Size 4: 250; 315; 400; 500; 630										
3. Direct	tion of rotation										
R	Clockwise	L	Counterclockwise								
4. Fixing	type										
G	DIN flange with outboard bearing										
5. Seal t	ype										
10	wihtout rinsing	25	with rinsing								
10	O-ring EPDM	25	O-ring CR								
11	wihtout rinsing	27	with rinsing								
11	O-ring FKM		O-ring HNBR								
12	wihtout rinsing	28	with rinsing								
12	O-ring CR		O-ring EPDM								
15	with rinsing	29	with rinsing								
15	O-ring FKM	23	O-ring FEP with FKM-core								
16	wihtout rinsing	41	wihtout rinsing								
10	O-ring HNBR	41	O-ring NBR								
21	wihtout rinsing	43	with rinsing								
21	O-ring FEP with FKM-core	43	O-ring FKM Low temperature								
6. Specia	al number										
Special i	number [> 18]										
7. Valve	option										
Pressure	relief valve										
D15	Pressure setting ranges 0 – 15 bar	D25	Pressure setting ranges 15 – 25 bar								
D30	Pressure setting ranges 15 – 30 bar										
Pressure relief valve with Tank connection											
T15	T15Pressure setting ranges 0 – 15 barT25Pressure setting ranges 15 – 25 bar										
Viscosity	y range Pressure relief valve with Ta	ank coni	nection [mm²/s]								
No spe- cifica- tion	12 - 300	В	1.000 – 5.000								
Α	300 – 1.000										

Kracht GmbH Device description | 3

Explanation of type key								
8. Housing and cover material								
No spe-								
cifica-	EN-GJL-250 (GG-25)	GJS	EN-GJS-400-15 (GGG-40)					
tion								

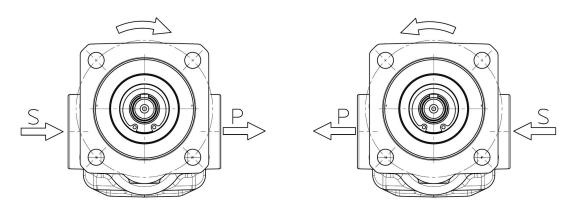
3.3.1 Type key magnetic coupling

Ordering example									
MSC75	-	Α	-	2	-	FKM			
1.		2.		3.		4.			

Explanation of type key							
1. Coupling size							
MSA46; MSA60; MSB60; MSA75; MSB75; MSC75; MSB110; MSC110; MSC110S; MSC135; MSC135S; MSD135; MSD135S; MSD165; MSE165; MSD200							
2. Max. c	pperating pressure						
Α	150 °C	В	300 °C				
3. Pressu	re range						
1	16 bar	3	40 bar				
2	2 25 bar 4 60 bar						
4. Material O-ring							

3.4 Rotation and delivery direction

The direction of rotation is indicated by the bent arrow, Looking at the end of drive shaft. The flow direction is indicated by the straight arrows.



S = Suction connection

P = Pressure connection

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3 | Device description Kracht GmbH

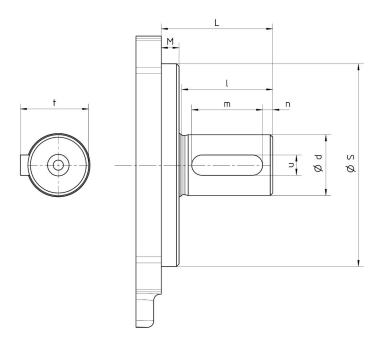
3.5 Special number

Special number	Description						
	Housing connection						
158	KF 2.5-12 : Flange connection SAE 3/4"						
	KF 16-25 : Flange connection SAE 1"						
	Housing connection						
173	KF 2.5-12: Flange connection 3/4-14 NPT						
	KF 16-25: Flange connection 1-11-1/2 NPT						
197	Noise-optimized version for aerated oils						
	Housing connection						
	KF 50-80 Flange connection SAE 2"						
KF 100-112 Flange connection SAE 2 ½"							
232	KF 125-150 Flange connection SAE 3"						
	KF 180-200 Flange connection SAE 3 1/2"						
	KF 250-315 Flange connection SAE 3 1/2"						
	KF 400-630 Flange connection SAE 5"						
272	See Special number 197						
273	White metal bearing						
304	Plastic plain bearings (non-ferrous metal-free)						
310	Plastic plain bearings (non-ferrous metal-free)						
317	Combination of Special number 197 + 304						
332	Special number 304						
346	For compressor applications						
340	Plastic plain bearings (non-ferrous metal-free)						
359	Combination of Special number 158 + 197						
363	Plastic plain bearings (non-ferrous metal-free)						
	+ Special number 158						
373	Plastic plain bearings (non-ferrous metal-free)						
	Neutral type plate						
391	Combination of Special number 197 + 232						
424	Gear pump with polierten Lagerstellen						
727	Housing material: EN-GJS-400-15 (GGG-40)						
	Without shaft seal						
469	Outboard bearing with steel cage						
409	With nozzle in the housing (0,7mm) for higher Volumetric flow						
	+ Special number 158						
	For compressor applications						
489	Plastic plain bearings (non-ferrous metal-free)						
407	But with sonder ball bearing (Bearing railroad with ATC-chrome						
	layer, ceramic rolling elements)						

Kracht GmbH Device description | 3

Special number	Description
404	Reinforced cover for magnetic coupling attachment up to 60 bar
494	Plastic plain bearings (non-ferrous metal-free)
	Use under water
517	+ Special number 197
	+ Special number 232
	Use under water
F10	With pressure lubrication
519	+ Special number 197
	+ Special number 232
F27	Pressure lubrication in the housing
527	Plastic plain bearings (non-ferrous metal-free)
	For compressor applications
528	See Special number 346
	Stainless steel type plate

3.6 Free shaft end



Nominal size	L	S _{h8}	М	d _{j6}	I	m	n	t	u
KF 2.5-25	33	63	7	14	25	16	4	16	5
KF 32-80	44	80		24	36	28	4	27	8
KF 100-200	60	110	0	28	50	40	5	31	8
KF 250-630	90	160	8	38	80	63	8	41	10

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4 | Technical data Kracht GmbH

4 Technical data

4.1 General

General information								
		KF 2.5-12	Whitworth pipe thread G 3/4					
		KF 2.5-12/158	Flange connection SAE 3/4"					
		KF 16-25	Whitworth pipe thread G 1					
		KF 16-25/158	Flange connection SAE 1"					
		KF 32-80	Flange connection SAE 1 1/2"					
		KF 32-80	Tank connection SAE 1 1/2"					
		KF 50-80/232	Elango connection SAE 2"					
Housing connection (1)		KF 100-112	Flange connection SAE 2"					
Housing connection		KF 50-80/232	Tank connection SAE 1 1/2"					
		KF 100-112/232	Flange connection SAE 2 1/2"					
		KF 125-150	Flange Connection SAE 2 1/2					
		KF 125-150/232	Flange connection SAE 3"					
		KF 180-200	Flatige Confidential SAE 3					
		KF 180-200/232	Flange connection SAE 3 1/2"					
		KF 250-315	Flange connection SAE 3"					
		KF 400-630 Flange connection SAE 4"						
Mounting position		Any						
External loads on shaft end		Axial and radial forces are not allowed.						
Speed	n	Nominal sizes [▶ 21] + Viscosity - Rotation speed assignment [▶ 22]						
	p _e							
Operating pressure	p _b	Permissible pressure range [> 23]						
Viscosity	v _{min}	Differential pressure - viscosity assignment [▶ 24]						
	ν _{max}	Consult the manufacturer						
Fluid temperature	9 _m	Permissible temperature range [> 24]						
Ambient temperature	9 _u	Permissible temperature range [> 24]						
Filtering	β	≤ 60 µm						
Material		Material data [▶ 25]						
		Lubricating fluids w	rithout abrasive components					
		Liquids with magnetizable components are not permitted						
Permissible media		(Petrols, solvents, e	tc. are not permissible)					
		For compressor applications :						
		Refrigerator oil ; Hydraulic oil ; Mineral oil						
⁽¹⁾ Pipe thread : ISO 228-1; Flange c	onnect							
		(<u>'</u>					

Kracht GmbH Technical data | 4

Magnetic coupling							
Coupling size		Rated torque [Nm] at 20 °C					
	Pressure	Pressure	Pressure	Pressure	Pressure		
	range	range	range	range	range		
	9 bar	16 bar	25 bar	40 bar	60 bar		
MSA46	-	3	-	-	-		
MSA60	-	-	-	7	7		
MSB60	-			14	14		
MSA75	10	-	-	-	-		
MSB75	-	24	24	-	24		
MSC75	-	40	40	-	40		
MSB110	-	-	60	60	54		
MSC110	-	-	95	95	77		
MSC135	-	-	145	-	125		
MSD135	-	-	200	-	160		
MSD165	-	-	280	-	-		
MSE165	-	-	370	-	-		
MSD200	-	-	430	-	-		

4.2 Nominal sizes

Nominal size	Geom. displace-	Spe	ed n	Sound pres-	Mass inertia x	
V_{gn}	ment	n _{min}	n _{max}	sure level	10 ⁻⁶	
	V _g [cm³/rev.]	[rpm]	[rpm]	L _{pA} [dBA]	J [kg m²]	
2.5	2.55				14.0	
4	4.03				15.9	
5	5.05				17.8	
6	6.38				20.5	
8	8.05			≤ 67	24.0	
10	10.11	200		≥ 07	28.4	
12	12.58		3600	3600		33.7
16	16.09		3000		42.3	
20	20.1				50.8	
25	25.1	200			61.7	
32	32.12				217	
40	40.21				254	
50	50.2			≤ 68	299	
63	63.18				368	
80	80.5				443	
100	101.5		3000	≤ 69	741	
112	113.5			<u> </u>	806	
125	129.4			≤ 65	1418	

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4 | Technical data Kracht GmbH

Nominal size	Geom. displace-	Spe	ed n	Sound pres-	Mass inertia x
$V_{\rm gn}$	ment	n _{min}	n _{max}	sure level	10 ⁻⁶
	V _g [cm³/rev.]	[rpm]	[rpm]	L _{pA} [dBA]	J [kg m²]
150	155.6				1637
180	186.6				1911
200	206.2		2500		2072
250	245.1			. 75	4133
315	312.9			≤ 75	5011
400	399.5		2000	. 77	6618
500	496.5			≤ 77	7830
630	622.5			≤ 80	9591

4.3 Viscosity - Rotation speed assignment

Kinematic viscosity ν [mm²/s]	Recommended rpm n [rpm]
100	3600
200	2900
300	2300
500	1800
1000	1200
2000	800
3000	650
5000	500



TIPP

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 $p_{e \, min.}$

Kracht GmbH Technical data | 4

4.4 Permissible pressure range

4.4.1 Operating pressure of suction side and pressure side

Gear pump						
Nominal size	Housing ma-	Operating pressure				
	terial	suction	side	pressure side		
		p _{e min} [bar abs.]	P _{e max} [bar	p _b [bar rel.]		
			rel.]	(perm. continous pressure)		
KF 2.5-630	EN-GJL-250 (GG-25)	0.6 (1)	25	35		
KF 2.5-112		Vacuum equip-				
KF 125-200 +	EN-GJS-400-15	ment: 0.08	60	60		
Special number 494	(GGG-40)	Standing still: 0				
KF 125-630			25	35		
(1) Start-up condition:	¹⁾ Start-up condition: 0.4 bar absolute (max. 30 minutes)					

	Gear p	oump with Magn	etic coupling	9		
Nominal size	Housing ma-	Pressure range	Operating pressure			
	terial	Magnetic	suction	n side	pressure side	
		coupling	p _{e min} [bar abs.]	p _{e max} [bar rel.]	p _b [bar rel.] (perm. continous pressure)	
	EN-GJL-250	1		16		
KF 2.5-630	(GG-25) EN-GJS-400-15 (GGG-40)	2; 3; 4	0.6 (1) Vacuum equipment:	25	35	
KF 2.5-112		3	0.08	40	40	
KF 2.5-112	EN-GJS-400-15 (GGG-40)	4	Standing	60	60	
KF 125-200 +		3	still: 0	40	40	
Special number 494	(==2.13)	4		60	60	
(1) Start-up condit	ion: 0.4 bar abso	lute (max. 30 min	utes)			

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4 | Technical data Kracht GmbH

4.5 Differential pressure - viscosity assignment

Bearing	Δp _{max} {bar]			
	$v = 1.4 \text{ mm}^2/\text{s}$	$v = 6 \text{ mm}^2/\text{s}$	$v = 12 \text{ mm}^2/\text{s}$	
Multi layer friction bearings contains lead (Standard)				
DU , P10	2	10	25	
Multi layer friction bearings non- ferrous metal-free	3	12	25	
DP4				
Plastic plain bearings				
Iglidur® G ; Iglidur® X ; H370		c	10 (1)	
White metal bearing	-	6	10 . ,	
TEGO® V738				
(1) For compressor applications ≥ 7 mm ²	² /s			

4.6 Permissible temperature range

Sealing material	Fluid temp	erature ϑ _m
	ϑ _{m min} [°C]	ဗီ _{m max} [°C]
CR		100
EPDM		120
FEP with FKM-core		200
FFKM / FEP with FKM-core	20	200
FKM	-20	150
HNBR		150
NBR		90
PTFE / FEP with FKM-core		200
FKM (Low temperature)	-30	150

Sealing material	Ambient temperature ${\mathfrak S}_{\scriptscriptstyle u}$		
	ϑ _{ս min} [°C]	ဗီ _{u max} [°C]	
CR			
EPDM			
FEP with FKM-core			
FFKM / FEP with FKM-core	20		
FKM	- 20	60	
HNBR			
NBR			
PTFE / FEP with FKM-core			
FKM (Low temperature)	-30		

Kracht GmbH Technical data | 4



NOTICE

Comply with media-specific properties

4.6.1 Gear pump with magnetic coupling

Sealing material	Fluid temperature ϑ _m				
	ϑ _{m min} [°C]	ئ m ma	ϑ _{m max} [°C]		
		Max. operat	ing pressure		
		Α	В		
CR		100	100		
EPDM		130	130		
FEP with FKM-core	-20	150	200		
FKM	-20	150	150		
HNBR		150	150		
NBR		90	90		
FKM (Low temperature)	-30	150	150		

ATTENTION

Eddy current losses

Metal separating cans in a magnetic coupling will always induce eddy current losses within the rotating magnetic field that are converted into heat.

a) When using pump design variants without circulating fluid, be sure to account for increases in temperature caused by eddy current losses.

4.7 Material data

	Gear pump						
Seal type		Material					
	O-ring	Housing/End cover	Gears	Bearing	Type plate / Grooved studs		
10	EPDM			Multi layer friction			
11	FKM			bearings contains			
12	CR	EN-GJL-250		lead (Standard)			
15	FKM	(GG-25) EN- GJS-400-15	(GG-25)	Case-hard		DU , P10	
16	HNBR				Case-hardened	(Steel , CuSn , PTFE ,	Al (mass frac-
21	FEP with FKM-core		(Steel 1.7139)	Pb) 	tion Mg ≤ 7.5 %)		
25	CR	(GGG-40)		Plastic plain bear-			
27	HNBR			ings non-ferrous metal-free			
28	EPDM			Iglidur® X			

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4 | Technical data Kracht GmbH

	Gear pump						
Seal type		Material					
	O-ring	Housing/End cover	Gears	Bearing	Type plate / Grooved studs		
29	FEP with FKM-core			 Multi layer friction			
41	NBR			bearings non-fer- rous metal-free			
				DP4 (Steel , CuSn , PTFE)			
43	FKM Low temperat- ure			 White metal bearing TEGO® V738			
				(Steel , Cu , Sn , Sb , Cd , Ni , As) (only KF 2.5-80)			

Magnetic coupling									
Max. operating	Material								
pressure	Internal ro- tor	External ro- tor	Contain- ment shroud	Bell housing	Other materials				
150 °C (A)	1.4571 / Sm2Co17	Steel / NdFeB Steel / Sm2Co17	1.4571 1.4571 /	Al (mass fraction Mg ≤ 7.5 %)	Steel				
300 °C (B)		Steel / Sm2Co17	Hastelloy	- 5,					

4.8 Weight

Nominal size	Gear pump									
V_{gn}	[kg]									
	with end cover	with T-valve								
2.5										
4										
5										
6	2.9 (1)	3.7 (1)	-							
8										
10										
12										
16	3.5 (1)	4.3 (1)								
20	5.5 `	4.5	-							

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Nominal size V _{gn}	Gear pump [kg]								
, and the second	with end cover	with T-valve							
25									
32									
40	7.7	9.5	12.4						
50									
63	9.4	11.2	14.3						
80	9.4	11.2							
100	16.0	18.7							
112	16.0	16.7							
125	22.2	26.5							
150	22.2	20.5							
180	24.8	29.1							
200	24.0	29.1	-						
250	44.2	47.2							
315	44.4	47.2							
400	F4.7	57.0							
500	54.7	57.9							
630	60.8	64.0							
⁽¹⁾ Special number 158	8: +1.3 kg								

Nominal	Magnetic coupling [kg]												
size	MSA 46	MSA 60	MSB 60	MSA 75	MSB 75	MSC 75	MSB 110	MSC 110	MSC 135	MSD 135	MSD 165	MSE 165	MSD 200
KF 2.5-25	3.1	6.4	7.3	7.4	10.5	11.5	-	-	-	-	-	-	-
KF 32-80	-	-	8.5	-	10.7	11.6	19.2	21.8	-	-	-	-	-
KF 100-200	-	-	-	-	13.2	13.9	20.0	22.2	32.5	32.5	-	-	-
KF 250-315	-	-	-	-	-	-	31.0	34.2	37.3	39.5	64.6	73.1	-
KF 400-630	-	-	-	-	-	-	-	34.1	37.3	39.3	-	69.0	72.9

4.9 Dimensions

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

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5 | Transport and storage Kracht GmbH

5 Transport and storage

5.1 General

- a) After receipt, check the device for transport damages.
- b) If transport damage is noticed, report this immediately to the manufacturer and the carrier. The device must then be replaced or repaired.
- c) 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.

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



NOTICE

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.

ATTENTION

Corrosion/chemical impact

Improper storage can render the device useless.

- a) Protect endangered surfaces by means of suitable conservation measures.
- b) Comply with recommended storage conditions.

5.4 Storage conditions



TIPP

Recommended storage conditions

- a) Storage temperature: 5 °C 25 °C
- b) Relative air humidity: < 70 %
- c) Protect elastomer parts from light, especially direct sunlight.
- d) Protect elastomer parts from oxygen and ozone.
- e) Comply with maximum storage times of elastomeric parts:
 - ⇒ 5 Jahre: AU (Polyurethan-Kautschuk)
 - ⇒ 7 Jahre: NBR, HNBR, CR
 - ⇒ 10 Years: EPM, EPDM, FEP/PFTE, FEPM, FKM, FFKM, VMQ, FVMQ

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5 | Transport and storage Kracht GmbH

5.5 Special hazards



⚠ DANGER

Powerful magnetic field

Danger of death for people with heart pacemakers

- a) Maintain a safety clearance of at least 2 m to the unmounted components of the magnetic coupling.
- b) Maintain a safety clearance of at least 0.5 m to assembled couplings with axially aligned magnetic rotors and surrounding coupling housing (bell housing).



MARNING

Powerful magnetic field

Danger of injury due to uncontrolled mutual attraction of magnetic parts or parts that can be magnetized.

a) When performing any work, bear in mind the magnetic forces which occur, especially within 0.5 m of the magnetic coupling.

ATTENTION

Powerful magnetic field

Magnetic data carriers (discs, credit cards, etc.) can be damaged or erased by magnetic fields.

a) Maintain a minimum clearance of 1 m to the magnetic field.

Kracht GmbH Installation | 6

6 Installation

6.1 Safety instructions for installation



A DANGER

Hazardous fluids

Danger to life when handling hazardous fluids.

- a) Comply with the safety data sheets and regulations on handling the hazardous fluids.
- b) Collect and dispose of hazardous fluids so that no hazard is created for persons or the environment.



A DANGER

Rotating parts!

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

- a) Before all work, ensure that existing drives are voltage-free and pressure-free.
- b) Securely prevent restarting during all work.



A DANGER

Rotating parts

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

a) Take measures against accidental touching of rotating parts.



MARNING

Rotating parts!

Danger of injury from flying parts.

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



MARNING

Unshielded gearwheels

Gearwheels can trap and crush fingers and hands.

a) Do not engage gearwheels.

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6 | Installation Kracht GmbH



MARNING

Failure of load-carrying parts due to overload!

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

- a) Depressurise the device and all connection lines before doing any work.
- b) Securely prevent the restoration of pressure while working on the device.



MARNING

Failure of pressure bearing parts due to overload

Risk of injury from flying parts.

Risk of injury due to fluid spurting out.

- a) Use only connections and lines approved for the expected pressure range.
- b) Securely prevent the permissible pressures from being exceeded, e.g. by using pressure relief valves or bursting discs.
- c) Pipelines must be designed in such a way that no tension e.g. caused by changes in length due to fluctuations in temperature can be transferred to the product.

Kracht GmbH Installation | 6

6.1.1 Special hazards



⚠ DANGER

Powerful magnetic field

Danger of death for people with heart pacemakers

- a) Maintain a safety clearance of at least 2 m to the unmounted components of the magnetic coupling.
- b) Maintain a safety clearance of at least 0.5 m to assembled couplings with axially aligned magnetic rotors and surrounding coupling housing (bell housing).



MARNING

Powerful magnetic field

Danger of injury due to uncontrolled mutual attraction of magnetic parts or parts that can be magnetized.

a) When performing any work, bear in mind the magnetic forces which occur, especially within 0.5 m of the magnetic coupling.

ATTENTION

Powerful magnetic field

Magnetic data carriers (discs, credit cards, etc.) can be damaged or erased by magnetic fields.

a) Maintain a minimum clearance of 1 m to the magnetic field.

6.2 Noise reduction



TIPP

Measures for noise reduction

- a) Use suction and pressure hoses.
- b) Use bell housings with high damping properties (plastic or cast iron).
- c) Use of damping rings and damping rods for separation of structureborne noise.

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6 | Installation Kracht GmbH

6.3 Mechanical installation

6.3.1 Preparation

- a) Check the device for transport damage and dirt.
- b) Check the device for freedom of movement.
- c) Remove existing preservatives.
 - ⇒ Use only those cleaning agents that are compatible with the materials used in the device.
 - ⇒ Do not use cleaning wool.
- d) 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.
- e) Position the product and secure them against slipping.
 - ⇒ Comply with the manufacturer's information.
 - ⇒ Do not use any sealing materials such as hemp, Teflon tape or putty.

6.3.2 Gear pump for magnetic coupling

The prerequisite for trouble-free operation is suitable load transmission between the pump and the drive. By default, a permanent magnetic coupling is used for this.



TIPP

For the assembly we recommend to have the data sheet of the magnetic coupling with you. Specifications entered in the dimensional drawing have to be primarily observed.



TIPP

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



A CAUTION

Hot surfaces

Burn injury to skin if touched.

a) Wear protective gloves at temperatures ≥ 48 °C.

Kracht GmbH Installation | 6



MARNING

Strong magnetic forces

Risk of crushing by suddenly engaging magnets.

- a) Pre-mount coupling parts as per manufacturer's specifications.
- b) Position the pumps and the drive with respect to each other.
 - ⇒ Comply with the permissible mounting position.
 - ⇒ Comply with the permissible direction of rotation.
- c) Tighten all fastening screws with the specified torque.

Tightening torques [Nm]								
Thread size	М6	M8	M10	M12	M16	M20	M24	
Counter-thread Alu- minium	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								



TIPP

- a) Keep to the permissible displacement values of the coupling.
- b) Rule out any distortion of the device.
- c) Pay attention to sufficient screw-in depth of the fastening screws.



NOTICE

a) Make sure no foreign bodies can get into the device.

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6 | Installation Kracht GmbH

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.

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



NOTICE

Additional connections

- a) Provide measurement connections for pressure and temperature as close as possible to device.
- b) If necessary, provide a facility to fill or empty the device and the line system.
- c) If necessary, provide a facility to vent the device and the line system.

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.

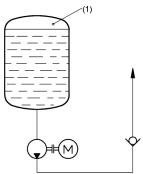
- Stipulate the nominal width of the suction line so that the permissible operating pressure $p_{e\,min}$ is not exceeded on the suction side.
- Avoid large suction heights.
- Avoid additional pressure loss through line resistances such as fittings, screwed connections, formed parts or suction filters/suction 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).

Kracht GmbH Installation | 6

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.

- a) 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.
- b) For aqueous fluids, mount the device underneath the fluid level, set the operating temperature to 50 °C and limit the speed to 1500 rpm.

Prevention of suction problems

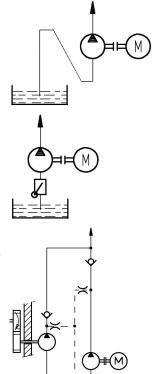
If there is a possibility that the suction line can run dry if the pump stops, piping the suction line as siphon is an option to avoid suction problems. This way, the pump will remain permanently filled after initial commissioning.

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.



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6 | Installation Kracht GmbH

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 Tank line T-valve

Specify the nominal width of the tank line so that the delivery volume can be discharged at low or no pressure. The tank line must be passed directly into the supply tank.

6.4.5 Mounting Connection lines

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



TIPP

Position of the device connections: **Rotation and delivery direction** [▶ 17]

6.5 Change of the direction of rotation

Depending on the version a change in the direction of rotation is possible.

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

Kracht GmbH Operation start-up | 7

7 Operation start-up

7.1 Safety instructions for start-up



A DANGER

Hazardous fluids

Danger to life when handling hazardous fluids.

- a) Comply with the safety data sheets and regulations on handling the hazardous fluids.
- b) Collect and dispose of hazardous fluids so that no hazard is created for persons or the environment.



MARNING

Failure of load-carrying parts due to overload

Danger of injury from flying parts.

Danger of injury from spurting fluids.

- a) Do not operate the device against closed shut-off devices.
- b) Do not operate the device in the false direction of rotation.



A CAUTION

Hot surfaces

Burn injury to skin if touched.

a) Wear protective gloves at temperatures \geq 48°C.

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7 | Operation start-up Kracht GmbH

7.2 Special hazards



⚠ DANGER

Powerful magnetic field

Danger of death for people with heart pacemakers

- a) Maintain a safety clearance of at least 2 m to the unmounted components of the magnetic coupling.
- b) Maintain a safety clearance of at least 0.5 m to assembled couplings with axially aligned magnetic rotors and surrounding coupling housing (bell housing).



MARNING

Powerful magnetic field

Danger of injury due to uncontrolled mutual attraction of magnetic parts or parts that can be magnetized.

a) When performing any work, bear in mind the magnetic forces which occur, especially within 0.5 m of the magnetic coupling.

ATTENTION

Powerful magnetic field

Magnetic data carriers (discs, credit cards, etc.) can be damaged or erased by magnetic fields.

a) Maintain a minimum clearance of 1 m to the magnetic field.

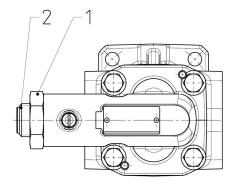
7.3 Preparation

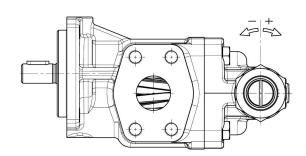
- a) Before starting the product, make sure that a sufficient quantity of the service fluid is extant to avoid dry running. This must be taken into account especially with large line volumes.
- b) Check all fastening screws on the product.
- c) Fill pump and the suction line with medium.

Kracht GmbH Operation start-up | 7

7.4 Pressure relief valve adjustment

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.





- response pressure lower
- + response pressure higher
- 1 Hexagonal nut
- 2 Adjustment screw

- a) Remove hexagon nut.
- b) Set the response pressure using the adjusting screw.
- c) Secure the adjusting screw with hexagon nut.



MARNING

Failure of load-carrying parts due to overload

Danger of injury from flying parts.

Danger of injury from spurting fluids.

- a) Consider the permissible pressure setting range of the valve.
- b) Check the pressure setting (the valve must not block).

7.4.1 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.



NOTICE

Failure of the pump

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

a) Only allow intermittent triggering of the valve.

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7 | Operation start-up Kracht GmbH

Directly attached pressure relief valves of the series "T" are used exclusively for protection of the gear pump. The valve can also be used to control the pressure of the gear pump thus allowing to keep the system pressure constant.



NOTICE

Overheating of the gear pump

A direct return flow into the suction line may increase the temperature at the gear pump beyond the permissible level.

a) For heat disspation, the pumping medium passing through the T-valve must be discharged directly into the storage tank.

7.5 Further operation start-up

- a) Open existing shut-off elements upstream and downstream of the device.
- b) Adjust pressure relief valves in the system installed for lowest opening pressure.
- c) Allow the device start without or with a low pressure load (jog mode).
 - ⇒ Flow should have developed after 30 s at the latest.
- d) Run the device for a few minutes depressurised or with low pressure.
- e) Vent the system at the highest possible point.
- f) Gradually increase the pressure load up to the desired operating pressure.
- g) Operate the system for so long until the final operating state is achieved.
- h) Check the operating data.
 - **⇒ Maintenance table [**▶ 49]
- i) Document the operating data of the initial start-up for later comparison.
- j) Check the level of the operating medium in the system.
- k) Check the filling level of the liquid seal (if existing).
- I) Check the device for leaks.
- m) Check all threaded connections for leaks and retighten if necessary.



TIPP

In order to ensure a constant and reliable function of the product, an initial maintenance of the product is recommended after several hours warm-up time (max. 24 h). This allows faults to be detected at an early stage.

Kracht GmbH Removal | 8

8 Removal

8.1 Safety instructions for removal



A DANGER

Hazardous fluids

Danger to life when handling hazardous fluids.

- a) Comply with the safety data sheets and regulations on handling the hazardous fluids.
- b) Collect and dispose of hazardous fluids so that no hazard is created for persons or the environment.



A DANGER

Rotating parts!

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

- a) Before all work, ensure that existing drives are voltage-free and pressure-free.
- b) Securely prevent restarting during all work.



MARNING

Unshielded gearwheels

Gearwheels can trap and crush fingers and hands.

a) Do not engage gearwheels.



MARNING

Failure of load-carrying parts due to overload!

Danger of injury from flying parts.

Danger of injury from spurting fluids.

- a) Depressurise the device and all connection lines before doing any work.
- b) Securely prevent the restoration of pressure while working on the device.



A CAUTION

Hot surfaces

Burns of the skin on contact.

a) At temperatures ≥48°C the product must be allowed to cool down first.

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8 | Removal Kracht GmbH

ATTENTION

Blocking of the product due to curing media

Curing media can mechanically block the product and make it unusable.

a) Clean the product immediately after operation with curing media.

8.2 Special hazards



⚠ DANGER

Powerful magnetic field

Danger of death for people with heart pacemakers

- a) Maintain a safety clearance of at least 2 m to the unmounted components of the magnetic coupling.
- b) Maintain a safety clearance of at least 0.5 m to assembled couplings with axially aligned magnetic rotors and surrounding coupling housing (bell housing).



⚠ WARNING

Powerful magnetic field

Danger of injury due to uncontrolled mutual attraction of magnetic parts or parts that can be magnetized.

a) When performing any work, bear in mind the magnetic forces which occur, especially within 0.5 m of the magnetic coupling.

ATTENTION

Powerful magnetic field

Magnetic data carriers (discs, credit cards, etc.) can be damaged or erased by magnetic fields.

a) Maintain a minimum clearance of 1 m to the magnetic field.

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8.3 Removal

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



NOTICE

The concrete procedure for cleaning depends on the media being used.

a) See the safety data sheet of the media in use.

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9 Maintenance

9.1 Important notes about explosion protection



⚠ DANGER

Hazardous fluids

Danger to life when handling hazardous fluids.

- a) Comply with the safety data sheets and regulations on handling the hazardous fluids.
- b) Collect and dispose of hazardous fluids so that no hazard is created for persons or the environment.



A DANGER

Rotating parts!

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

- a) Before all work, ensure that existing drives are voltage-free and pressure-free.
- b) Securely prevent restarting during all work.



MARNING

Failure of load-carrying parts due to overload!

Danger of injury from flying parts.

Danger of injury from spurting fluids.

- a) Depressurise the device and all connection lines before doing any work.
- b) Securely prevent the restoration of pressure while working on the device.



A CAUTION

Hot surfaces

Burns of the skin on contact.

a) At temperatures ≥48°C the product must be allowed to cool down first.

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9.2 Special hazards



▲ DANGER

Powerful magnetic field

Danger of death for people with heart pacemakers

- a) Maintain a safety clearance of at least 2 m to the unmounted components of the magnetic coupling.
- b) Maintain a safety clearance of at least 0.5 m to assembled couplings with axially aligned magnetic rotors and surrounding coupling housing (bell housing).



MARNING

Powerful magnetic field

Danger of injury due to uncontrolled mutual attraction of magnetic parts or parts that can be magnetized.

a) When performing any work, bear in mind the magnetic forces which occur, especially within 0.5 m of the magnetic coupling.

ATTENTION

Powerful magnetic field

Magnetic data carriers (discs, credit cards, etc.) can be damaged or erased by magnetic fields.

a) Maintain a minimum clearance of 1 m to the magnetic field.

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9.3 Maintenance work



TIPP

Checking and documentation of the operating data

Regular checking and documentation of all operating data helps to detect faults at an early stage.

- 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.



NOTICE

Protective equipment and notices

After maintenance and/or repair, reattach all protective devices and notices removed in the process to their original position.

9.4 Maintenance instructions

The following information provides recommendations for maintenance work and maintenance intervals for the product in use.

Depending on the actual loads occurring during operation, the type, scope and interval of the maintenance work may deviate from the recommendations. A mandatory maintenance plan must be drawn up by the installer/operating company.



TIPP

In the course of preventive maintenance, it is advisable to replace wearing parts before the wear limit is reached.

With the appropriate expertise and sufficient equipment, the repair can also be carried out by the installer/operating company.

If necessary, request spare parts lists and assembly drawings from the manufacturer. Please consult the manufacturer for this purpose.



NOTICE

Warranty

Any warranty will be void if not executed properly.

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9.5 Maintenance table

Maintenance table

		Firstly:after max. 24 h	Daily	3000 Operating hours	6000 Operating hours	As required	Additional information
9.5.1	Inspection: Discharge flow	2					
9.5.2	Inspection: Operating pressure	2					
9.5.3	Inspection: Media temperature	2					
9.5.5	Inspection: Add-on valve function (if existing)	2					
9.5.6	Inspection: Check the potential compensation (if existing)	2					
9.5.7	Inspection: Condition of operating fluid	2					
9.5.8	Audiometric monitoring: Unusual noise		1				
9.5.9	Visual inspection: Leakages		1				
9.5.10	Visual inspection: Filling level of liquid seal (if existing)		2				
9.5.1	Inspection: Discharge flow			2			
9.5.2	Inspection: Operating pressure			2			
9.5.3	Inspection: Media temperature			2			
9.5.4	Inspection: Device temperature			2			
9.5.5	Inspection: Add-on valve function (if existing)			2			
9.5.6	Inspection: Check the potential compensation (if existing)			2			
9.5.7	Inspection: Condition of operating fluid			2			
9.5.11	Visual inspection: Condition gears				3		
9.5.12	Visual inspection: Condition of housing parts				3		
9.5.13	Visual inspection: Condition of plain bearings				3		
9.5.14	Visual inspection: Condition of shaft seal				3		
9.5.15	Visual inspection: Condition of outboard bearings				3		
9.5.16	Replacing: Outboard bearings					3	
9.5.18	Replacing: Shaft seal					3	
9.5.19	Replacing: Other seals					3	

1 - 0,1 h; 2 - 0,2 h; 3 - 0,75 h

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9.5.1 Inspection: Discharge flow

The discharge flow is measured via the flow rate volume counters.

The values are displayed by the built-in controller in the electrical control system.

- If there is no discharge flow, check the individual components of the product.
- Comply with the product-specific data sheets/operating instructions.

9.5.2 Inspection: Operating pressure

The operating pressure is indicated by the pressure gauges

- If there is no operating pressure, check the individual components of the product
- Comply with the product-specific data sheets/operating instructions.

9.5.3 Inspection: Media temperature

The media temperature is measured through the temperature sensor.

The values are displayed by the built-in controller in the electrical control system.

- If the media temperature is too high or too low, check the product components.
- Comply with the product-specific data sheets/operating instructions.

9.5.4 Inspection: Device temperature

Measure the surface temperature in the area of the bearings.

9.5.5 Inspection: Add-on valve function (if existing)

Pressure relief valves must be actuated at regular intervals. This is the only way to ensure proper functioning.

9.5.6 Inspection: Check the potential compensation (if existing)

Check potential equalization for tight fit and function.

9.5.7 Inspection: Condition of operating fluid

Pay attention to colour (dark colouring), odour and milky turbidity.

Replace operating fluid if necessary.

9.5.8 Audiometric monitoring: Unusual noise

In this case, attention must be paid to increased noise or uneven operation (pump unit).

- In case of unusual noises, check the individual components of the product, line attachments and the operating media for foam formation.
- Comply with the product-specific data sheets/operating instructions.

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9.5.9 Visual inspection: Leakages

Care must be taken here to ensure that there is no leakage from the connections.

In the event of leaks in the connections, the glands must be tightened and, if necessary, the seals replaced.

9.5.10 Visual inspection: Filling level of liquid seal (if existing)

Checking the confining fluid filling level is mandatory for safe pump operation. Top up the confining fluid as required.

If there is no automatic monitoring, the filling level must be checked at least before each shift begins.

If the filling level drops unusually fast within a short period of time, the outer but also the inner shaft seal could be leaking.

If the filling level should rise, the inner shaft seal may probably be leaking and the confining fluid is begin mixed with the pressurised medium.

Stop plant operation immediately in both cases.

9.5.11 Visual inspection: Condition gears

Like shaft gear are wear items. In the event of excessive wear, the parts or the pump must be replaced.

Important control points are the mating surfaces of the shaft sealing ring and bearing bushes, the end faces of the shaft and pin wheels and the tooth flanks.

9.5.12 Visual inspection: Condition of housing parts

Like shaft gear are wear items. In the event of excessive wear, the parts or the pump must be replaced.

Important control points are the mating surfaces of the shaft sealing ring and bearing bushes, the end faces of the shaft and pin wheels and the tooth flanks.

9.5.13 Visual inspection: Condition of plain bearings

Like plain bearings are wear items. In the event of excessive wear, the parts or the pump must be replaced..

The wear limit of multi-layer plain bearings is reached when the bronze layer of the bearings is exposed to 50-70%.

The drive shaft and driven shaft are supported on the suction side under load in the bearings, so that the wear can be seen there first.

9.5.14 Visual inspection: Condition of shaft seal

Check on increased and impermissible temperature rises

- Small amounts of leakage, however, are indispensable for function.
- If there are excessive amounts of leakage, stop pump operation immediately.
 Replace: Shaft seal.

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9.5.15 Visual inspection: Condition of outboard bearings

Like outboard bearings are wear items.

The service life of the bearings depends primarily on the operating conditions.

The bearing should therefore be checked for damage after 4,000 hours at the latest. If the wear is unacceptable, the bearing must be replaced.

The beginning of wear or an imminent failure can become noticeable through increasing heating of the bearing, increased power consumption, imperfect running behavior or the development of noise.

9.5.16 Replacing: Outboard bearings

With corresponding expertise and sufficient equipment, the replacement can be carried out by the equipment builder/operator.

If required, request spare parts lists and assembly drawings from the manufacturer.

Use spare parts approved by the manufacturer only.

9.5.17 Replacing: Plain bearings (only by manufacturer)

The replacement is carried out only by the manufacturer.

Consult the manufacturer

9.5.18 Replacing: Shaft seal

With corresponding expertise and sufficient equipment, the replacement can be carried out by the equipment builder/operator.

If required, request spare parts lists and assembly drawings from the manufacturer.

Use spare parts approved by the manufacturer only.

9.5.19 Replacing: Other seals

With corresponding expertise and sufficient equipment, the replacement can be carried out by the equipment builder/operator.

If required, request spare parts lists and assembly drawings from the manufacturer.

Use spare parts approved by the manufacturer only.

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10 Repairs

10.1 Safety instructions for repair



A DANGER

Hazardous fluids

Danger to life when handling hazardous fluids.

- a) Comply with the safety data sheets and regulations on handling the hazardous fluids.
- b) Collect and dispose of hazardous fluids so that no hazard is created for persons or the environment.



A DANGER

Rotating parts!

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

- a) Before all work, ensure that existing drives are voltage-free and pressure-free.
- b) Securely prevent restarting during all work.



⚠ WARNING

Failure of pressure bearing parts due to overload

Risk of injury from flying parts.

Risk of injury due to splashing fluids.

- a) Depressurize the system before all work.
- b) Securely prevent the pressure from being restored during work.



A CAUTION

Hot surfaces

Burns of the skin on contact.

a) At temperatures ≥48°C the product must be allowed to cool down first.

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10 | Repairs Kracht GmbH

10.2 Special hazards



⚠ DANGER

Powerful magnetic field

Danger of death for people with heart pacemakers

- a) Maintain a safety clearance of at least 2 m to the unmounted components of the magnetic coupling.
- b) Maintain a safety clearance of at least 0.5 m to assembled couplings with axially aligned magnetic rotors and surrounding coupling housing (bell housing).



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ATTENTION

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Kracht GmbH Repairs | 10

10.3 General

The repairs covers:

Troubleshooting
 Determination of damage, pinpointing and localisation of the damage cause.

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.



NOTICE

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.

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



NOTICE

Warranty

Any warranty will be void if not executed properly.



NOTICE

Protective equipment and notices

After maintenance and/or repair, reattach all protective devices and notices removed in the process to their original position.

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10.4 Detecting and eliminating failures

Fault	Potential causes	Possible measures		
Increased noise				
	Excessive negative pressure (not	Check suction line design		
	complete filling of the pump)	Use noise-optimised pump		
	Suction line clogged	Clean the suction line		
Pump cavitation	Suction filter plugged or too	Clean suction filter or use a larger filter		
amp cavitation	Siliali	Replace filter element		
	Suction bascet plugged or too small	Clean intake strainer or dimension larger		
	Fluid temperature too low	Adjust the temperature of medium		
	Pump does not suck	Check the oil level in the tank		
		Check suction line		
		Check the shaft seal		
	Shaft seal defective	Replace seals		
Foaming or air in media	Suction connection leaking	Tighten or replace the screw connections		
l carriing or all in media		Replace seals		
	System not vented	Vent the system		
	Return line ends above the fluid level	Extend return line		
	Heavy foaming in the system, e.g. in gears	Use noise-optimised pump		
	Incorrectly aligned and/or loose coupling	Correct the alignment of the coupling and secure the coupling halves		
Mechanical vibrations	Incorrectly and/or insufficient line fastening	Fixate lines with suitable fasten ing material (e.g. pipe clamps)		
	Wobbling pressure relief valve	Increase valve opening pressure		
	Not a noise-reducing setup	Use dampers		

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Pump does not suck				
•	Dry run	Fill pump and the suction line with medium		
	Minimum filling level in the reservoir tank undercut	Refill media		
	Wrong direction of rotation	Correct the direction of rotation		
	Throttled/closed shut-off element in the suction line	Open the shut-off element		
	Suction line clogged	Clean the suction line		
		Reduce the start-up pressure		
	The air in the suction line can- not be compressed in the pres-	Vent the pressure line		
	sure line	Increase volume of the pressure line		
		Check the pump design		
	Speed of the pump is too low	During frequency inverter operation: Check the operation/line frequency		
		Check installation location		
	Geodetic suction head too high	Provide pre-filling pump		
Insufficient pressure Insufficient pumping flo	ow rate			
	Excessive negative pressure (not complete filling of the pump)	Check suction line design		
	Too high media viscosity	Provide pre-filling pump		
		Check the pump design		
	Speed of the pump is too low	During frequency inverter operation: Check the operation/line frequency		
	Throttled/closed shut-off element in the suction line	Open the shut-off element		
	Suction line clogged	Clean the suction line		
	Suction filter plugged or too	Clean suction filter or use a larger filter		
	small	Replace filter element		
	Suction bascet plugged or too small	Clean intake strainer or dimension larger		
	No response of a pressure relief valve	Increase valve opening pressure		
		Check the oil level in the tank		
	Pump does not suck	Check suction line		
		Check the shaft seal		
	Wear	Replace the device		

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Excessive operating ter	nperature	
	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
Impermissible pump he	eating	
	No response of a pressure relief valve	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
Leakage		
	Lack of maintenance	Comply with maintenance intervals
		Replace seals
	Mechanical damage	Replace seals
	Thermal overload	Check operating data
	Thermal overload	Replace seals
	Pressure too high	Check operating data
		Replace seals
	Gas content in media too high	Check operating data
Seal failure		Replace seals
Jean randre	Correction/chemical degradation	Check material compatibility
	Corrosion/chemical degradation	Replace seals
	Wrong direction of rotation	Correct the direction of rotation
	Wrong direction of rotation	Replace seals
	Contaminated medium	Provide filtration
	Contaminated medium	Replace seals
	Gland lid not sufficiently tightened (for gland seal)	Retighten gland lid
	Loose screw connection	Tighten or replace the screw connections

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Magnetic coupling				
	Alignment error			
Change in operating	Breakdown of the magnetic forces	See Operating/installation in- structions for magnetic coup-		
noise and/or the occur- rence of vibrations	Damaged exterior magnets due to assembly error (external rotor striking the containment shroud)	ling: Failures, causes and clear- ance		
	Operating parameters do not match the coupling power	See Operating/installation in-		
Repeated breakdown of	Excessive operating temperature	structions for magnetic coup-		
the magnetic forces	Abrasive particles in the pumping medium that block the pump	ling: Failures, causes and clear- ance		
Pump does not suck	The magnets of the interior and	Check the assembly dimensions in accordance with the assembly drawing		
The torque is not trans- mitted	exterior rotors are not placed flush above one another			
Motor protection switch	tripped			
	Driving power too low	Check the drive design		
	Motor incorrectly connected	Check motor connection		
	Phase failure	Check feed/supply		
		Check operating data		
	Current consumption too high	Check direction of rotation		
	Motor circuit breaker incorrectly designed	Check operating data		
Consult the manufacturer	in the event of unidentifiable faul	ts		

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