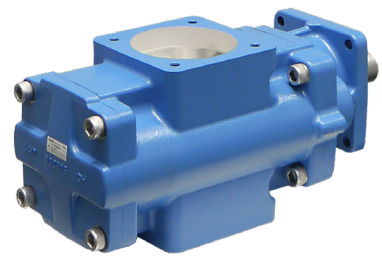


Gear pumps
KF 730 ... 1500



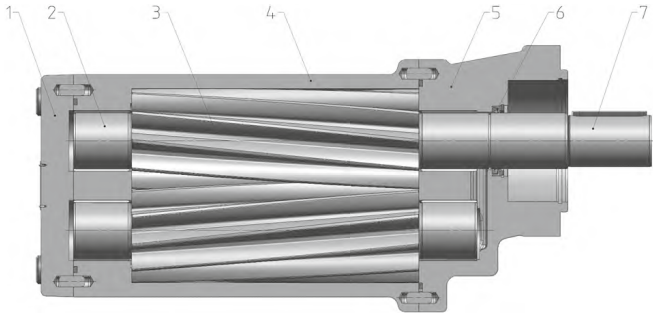
KRACHT®
FLUID TECHNOLOGY AND SYSTEMS

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General

I Construction



- 1 End cover
- 2 Plain bearing bushes
- 3 Gear
- 4 Housing
- 5 Flange cover
- 6 Shaft seal
- 7 Shaft end

I Function

Gear pumps KF are used for pumping a wide variety of fluids. 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 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 single radial 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.

I 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.

I Variants

- Sealing of the drive shaft:
 - Single radial lip-type seal
 - Double radial lip-type seal (Quench)
 - Mechanical seal
- Outboard bearing to take up input drive-side radial load

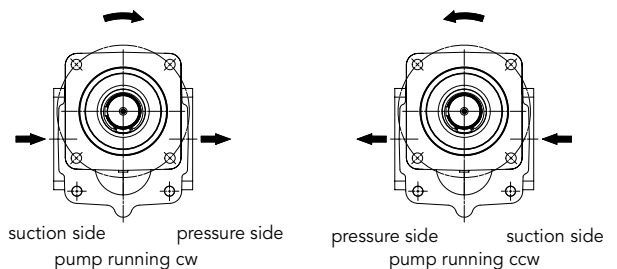
I Special design

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.

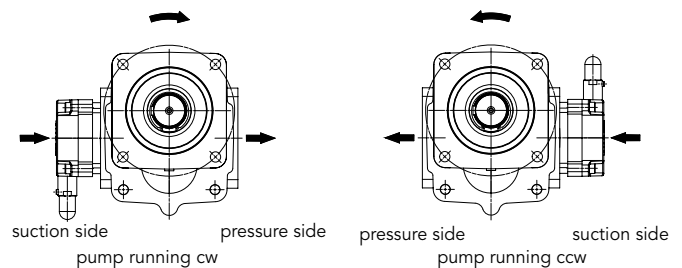
I Direction of rotation

- 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



I Accessories

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

Technical data

I General characteristics

Nominal sizes	730 · 1000 · 1250 · 1500	
Flange connection	SAE D-4-hole flange	
Housing connection	KF 730 / KF 1000 KF 1250 / KF 1500	Flange DN 132 / hole circle 180 Flange DN 160 / hole circle 210
Direction of rotation	Right or left Right and left	For reciprocal operation (Continuous operation on request)
Mounting position	Without quench With quench	Optional Horizontal, quench connection above
Speed	200 ... 2000 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).	
Drive shaft end	Cylindrical Ø 55 mm	

I Hydraulic characteristics

Working pressure suction side	See working pressure chart on page 6	
Working pressure pressure side	See working pressure chart on page 6	
Viscosity	min max	1.4 ... 12 mm ² /s 20 000 mm ² /s See chart permissible temperatures Higher viscosities on request
Media temperature	min max	-20 °C NBR 90 °C EPDM 120 °C FKM 150 °C PTFE / FEP with FKM-core 200 °C
Ambient temperature	-20 ... 60 °C	

I Materials

Housing and cover	Grey cast iron Spheroidal cast iron	EN-GJL-250 (GG 25) EN-GJS-400-15 (GGG 40)
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 seals	Single radial lip-type seals: Mechanical seal:	NBR, FKM, PTFE, EPDM Metal-impregnated carbon / SiC, FKM, CrNi-Steel
O-ring	NBR FKM EPDM FEP with FKM-core	

Technical data

I Permissible differential pressure

Bearing	Δp_{\max} in bar		
	$\geq 1.4 \text{ mm}^2/\text{s}$	$\geq 6 \text{ mm}^2/\text{s}$	$\geq 12 \text{ mm}^2/\text{s}$
Multi-layer plain bearing containing lead	3	12	25*
Multi-layer plain bearing lead-free			
Plastic plain bearing	-	6	10

* KF 1500: 20 bar

I Working pressure standard operation

Shaft seals	Sealing material	Speed in 1/min	Working pressure in bar	
			Suction side **	Pressure side
Single radial lip-type seal, outboard bearing with single radial lip-type seal, double radial lip-type seal with connection possibility for quench	NBR / FKM	≤ 750	-0.4 ... 5.0	25*
		≤ 1000	-0.4 ... 4.0	
	≤ 1500	-0.4 ... 2.5		
≤ 2000	-0.4 ... 1.5			
	EPDM	≤ 2000	-0.4 ... 0.5	
	PTFE		-0.4 ... 2.0	
Mechanical seal	FKM	≤ 2000	-0.4 ... 10.0	

* KF 1500: 20 bar

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

I Working pressure vacuum operation

Shaft seals	Sealing material	Speed in 1/min	Working pressure in bar	
			Suction side	Pressure side
Double radial lip-type seal for vacuum operation with connection possibility for quench	NBR / FKM / PTFE	≤ 2000	-0.9 ... 0.2	25*

* KF 1500: 20 bar

The indicated maximum values are dependent upon the remaining working conditions.
Note vacuum operation: The tank installation must be above the suction connection.
Other sealing materials on request.

I Working characteristics

Nominal size	Geom. displacement in cm^3/rev	Working pressure in bar	Maximum pressure (Pressure peak) in bar	Speed range in 1/min*		Perm. radial force at 1500 1/min*** in N	Sound pressure level in dB (A) at		
				min	max**		5 bar	15 bar	25 bar
730	713.8	25	30	200	2000	2500	80	81	81
1000	985.7	25	25				81	83	83
1250	1236.2	25	25				83	84	86
1500	1473.0	20	20				83	85	86****

* Comply with media-specific properties

** Pay attention to the viscosity

*** Outside forces are only permissible in combination with an outboard bearing. Fradial on central shaft end.

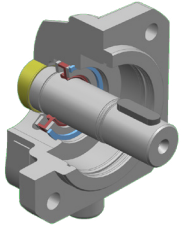
**** KF 1500: 20 bar

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 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 gear oil,
oil viscosity $34 \text{ mm}^2/\text{s}$, speed 1500 1/min.

Shaft end seals

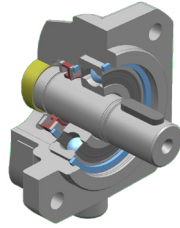
I Seal types



Single radial lip-type seal

Sealing materials:

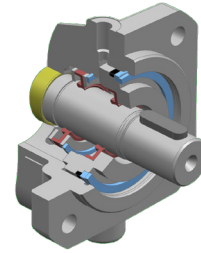
NBR = 1
FKM = 2
PTFE = 3
EPDM = 9
FKM = 18



Single radial lip-type seal with outboard bearing

Sealing materials:

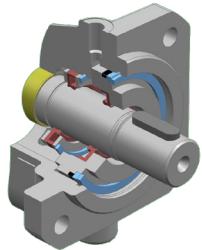
NBR = 1
FKM = 2
PTFE = 3
EPDM = 9
FKM = 18



Double radial lip-type seal with connection possibility for quench

Sealing materials:

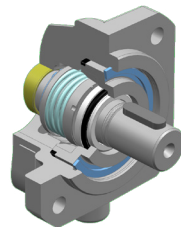
NBR = 19
FKM = 7
PTFE = 4
EPDM = 32



Double radial lip-type seal for vacuum operation with connection possibility for quench

Sealing materials:

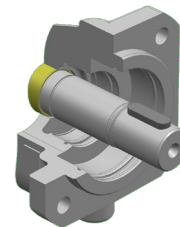
NBR = 19
FKM = 7
PTFE = 4
Special number: 74



Mechanical seal

Sealing materials

secondary seals:
FKM = 40



Without shaft sealing

Sealing materials O-ring:

FKM = 30
NBR = 36

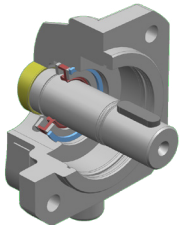
Noise optimized version (Special number 197)

I Beschreibung

The noise optimized pumps in the KF series are designed for conveying medias with increased air content, predominantly for use as lubricating oil pumps in gears. Special measures prevent the otherwise normally increased noise present in auriferous gear 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



Single radial lip-type seal

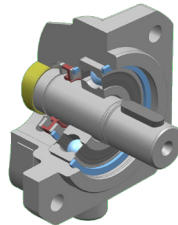
Sealing materials:

NBR = 1
FKM = 2

Note

The noise optimized version is also available in a spheroidal cast iron version. Dimensions conformable standard pumps.

Fig. 2



Single radial lip-type seal
with outboard bearing

Sealing materials:

NBR = 1
FKM = 2

Type key

KF	730	R	F	1	/	...	DVB	.
1	2	3	4	5	6	7	8	

1 Product

2 Nominal size

730 · 1000 · 1250 · 1500

3 Direction of rotation

R	Right
L	Left
B	Right and left for reciprocal operation (Continuous operation on request)

4 Mounting

F	SAE D 4-hole flange without outboard bearing
G	SAE D 4-hole flange with outboard bearing

5 Type of seal

1	Single radial lip-type seal	NBR
2	Single radial lip-type seal	FKM
3	Single radial lip-type seal	PTFE
4	Double radial lip-type seal	PTFE
7	Double radial lip-type seal	FKM
9	Single radial lip-type seal	EPDM
18	Single radial lip-type seal	FKM
19	Double radial lip-type seal	NBR
30	Without shaft sealing (O-ring)	FKM
32	Double radial lip-type seal	EPDM – not resistant to mineral oil
36	Without shaft sealing	NBR (O-ring)
40	Mechanical seal (Secondary seals)	FKM

6 Special number

74	Double radial lip-type seal for vacuum operation, connection borehole G 1/8" for quench
197	Noise-optimized version for aerated oils*

7 Pressure valve

DVB	Pressure relief valve	3 ... 25 bar	(See also related datasheet pressure valves DV)
DVR	Pressure control valve	3 ... 12 bar	(See also related datasheet pressure valves DV)

8 Housing and cover material

	EN-GJL-250 (GG 25)
GJS	EN-GJS-400-15 (GGG 40)

* 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.

Discharge flow and required drive power

I Speed = 950 1/min, viscosity = 30 ... 100 mm²/s

Pressure in bar								Nominal size	Pressure in bar							
2	4	6	8	10	15	20	25		2	4	6	8	10	15	20	25
662	643	626	609	594	555	520	486	730	4.6	6.9	9.2	11.6	14.0	20.0	26.0	32.0
921	901	886	864	849	801	760	720	1000	7.4	9.3	13.7	15.9	20.3	27.2	35.4	43.6
1160	1140	1121	1103	1084	1041	1000	961	1250	8.5	12.6	16.8	20.7	24.9	35.1	45.3	55.6
1389	1371	1351	1335	1316	1270	1229	-	1500	10.3	15.1	20.0	24.8	29.8	42.0	54.2	-
Discharge flow in l/min									Required drive power in kW							

I Speed = 1150 1/min, viscosity = 30 ... 100 mm²/s

Pressure in bar								Nominal size	Pressure in bar							
2	4	6	8	10	15	20	25		2	4	6	8	10	15	20	25
810	791	774	758	743	705	669	636	730	6.4	9.3	12.2	15.0	17.9	25.2	32.5	39.7
1119	1100	1084	1064	1047	1005	969	925	1000	8.8	12.7	17.4	20.6	24.6	34.3	45.2	54.3
1411	1393	1376	1358	1342	1300	1259	1223	1250	12.7	17.6	22.4	27.6	32.3	44.8	57.2	69.4
1682	1666	1651	1634	1616	1575	1534	-	1500	15.4	20.5	26.5	32.6	38.4	53.2	68.4	-
Discharge flow in l/min									Required drive power in kW							

I Speed = 1450 1/min, viscosity = 30 ... 100 mm²/s

Pressure in bar								Nominal size	Pressure in bar							
2	4	6	8	10	15	20	25		2	4	6	8	10	15	20	25
1029	1012	995	980	966	930	896	862	730	10.4	14.0	17.6	21.2	24.8	34.0	43.1	52.5
1413	1399	1383	1367	1351	1314	1273	1236	1000	14.6	19.5	24.5	29.5	34.6	47.9	59.5	71.8
1783	1765	1750	1735	1720	1682	1644	1609	1250	21.1	26.9	33.2	39.7	45.8	61.3	77.2	92.3
2130	2116	2101	2087	2072	2034	1998	-	1500	24.3	31.6	39.3	46.9	54.2	73.0	91.7	-
Discharge flow in l/min									Required drive power in kW							

I Speed = 1750 1/min, viscosity = 30 ... 100 mm²/s

Pressure in bar								Nominal size	Pressure in bar							
2	4	6	8	10	15	20	25		2	4	6	8	10	15	20	25
1247	1230	1214	1200	1187	1152	1120	1087	730	15.9	20.1	24.4	28.8	33.0	44.1	55.0	66.3
1711	1697	1682	1667	1653	1620	1582	1547	1000	22.3	28.2	34.2	40.1	46.3	62.4	76.1	91.2
2150	2135	2124	2111	2097	2062	2029	1995	1250	31.4	38.8	46.4	53.9	61.8	80.9	99.3	117.9
2568	2556	2543	2531	2519	2488	2457	-	1500	37.4	46.4	55.1	64.0	73.5	96.6	117.4	-
Discharge flow in l/min									Required drive power in kW							

Notes:

- The ratings refer to a mineral oil with a viscosity of 34 mm²/s.
- Margin of error for the flow Q -5 ... 10 % of the tabular value.
- For viscosity < 30 mm²/s, take a reduction of the rated flow into account.
- The output of the drive motor should be selected 20 % higher than tabular value.
- For viscosity > 100 mm²/s an increase in the required power is necessary; then proceed as described on page 11.
- -3% of discharge flow for the noise-optimized version.

Motor dimensioning

I Calculation of the real drive power and the maximum speed

Characteristics

P_{Tab} Drive power according to the chart in kW at 1450 1/min
(See chart „Discharge flow and required drive power“)

P_{Pu} Calculated drive power depending on the viscosity
(See sample calculation)

P_{Mot} Real drive power including safety bonus
(See sample calculation)

n Speed in rev/min
(Pay attention to the viscosity dependency! –
See chart at the right)

f_v Viscosity factor in kW / l/min
(See chart at the right)

V_g Geometric displacement in cm³/rev
(See chart „Working characteristics“)

Formulas

Q Discharge flow in l/min
 $= V_g \cdot n \cdot 1000^{-1}$

P_{Pu} Pump drive power in kW
 $= P_{Tab} \cdot n / 1450 \text{ rev/min} + f_v \cdot Q$

Sample calculation: Pump type KF 1500

Viscosity ν = 3000 mm²/s
Working pressure p = 10 bar
Drive power according to chart P_{Tab} = 54.2 kW
Speed n = 500 1/min
Viscosity factor according to chart f_v = 0.017 kW / l/min

$$Q = 1473 \text{ l/min} \cdot 500 \text{ rev min}^{-1} / 1000 \text{ rev min}^{-1} = 736.5 \text{ l/min}$$

$$P_{Pu} = 54.2 \text{ kW} \cdot 500 \text{ rev min}^{-1} / 1450 \text{ rev min}^{-1} + 0.017 \text{ kW / l/min} \cdot 736.5 \text{ l/min} = 31.2 \text{ kW}$$

Calculation of the real drive power
(The power should be selected 20% higher than the calculated value.)

$$P_{Mot} = 1.2 \cdot P_{Pu} \\ = 1.2 \cdot 31.2 \text{ kW} = 37.4 \text{ kW}$$

Motor dimensioning (Next available power level)

P = 38 kW
 n = 500 1/min

Consultation

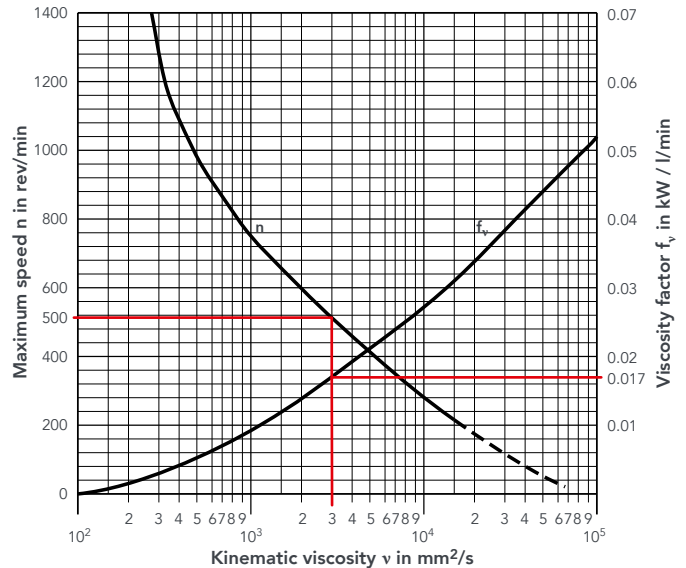
For competent advice, please get in touch with your responsible contact person in the sales department or give us a call (+49 2392.935 0).

Maximum speed / Viscosity factor

Chart: $n, f_v = f(\nu)$

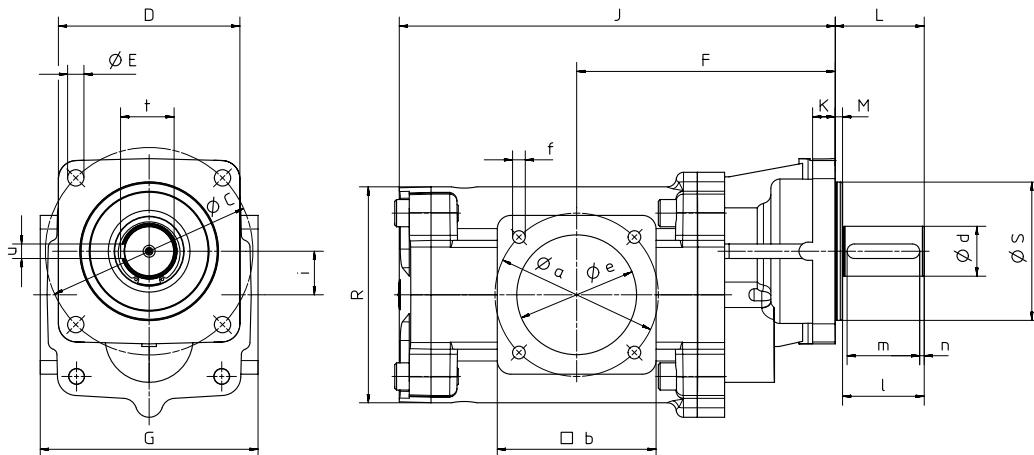
Note:

To determine the power consumption, always take the max. working viscosity at starting state into consideration.

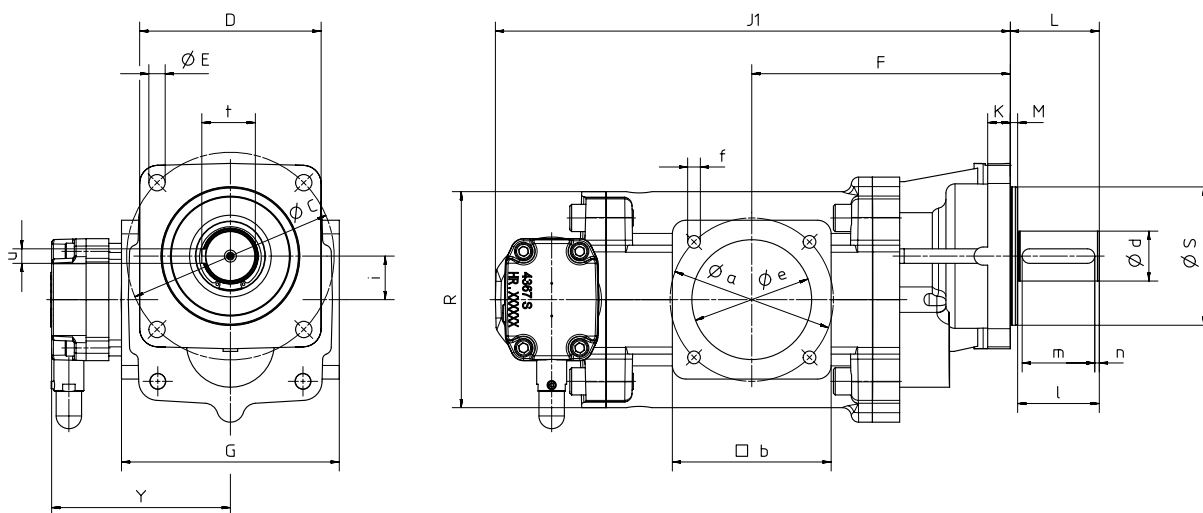


Dimensions and weights

I Flange-mounting version



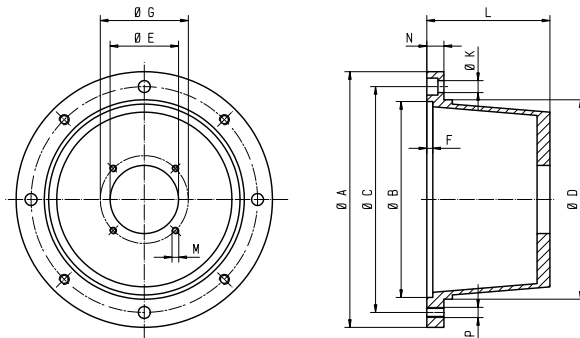
with pressure valve



Nominal size	DN	Dimensions																				Weight in kg					
		Suction and pressure connection				Gear pump												Shaft end				without valve	with valve				
		a	b	e	f	C	D	E	F	G	J	J ₁	K	L	M	R	S _{h8}	i	Y	d _{j6}	l			m	n	t	u
730	132	180	175	132	M16 - 30 deep	228.7	200	18	285	240	415	502	25	98	8	238	152.4	48	197	55	90	80	5	59	16	90	99.5
1000											481	568														102	111.5
1250	160	210	205	160					330	270	559	646														124	133.5
1500											125	134.5															

Dimensions and weights

I Accessory bell housing and coupling

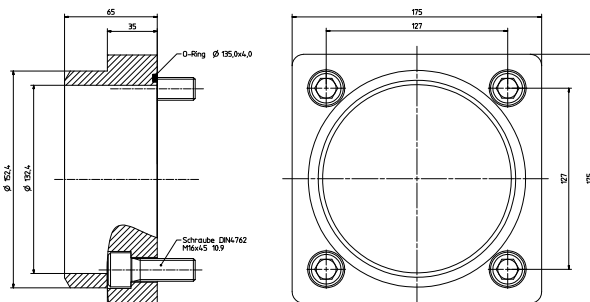


Motor size	Bell housing	Coupling	Dimensions bell housing											Weight in kg	
			A	B	C	D	E	F	G	K	L	M	N		P
160	PT 350-A-152.4-256	RG 42/55-Z50/55-Z75/42	350	250	300	260	152.4	7	228.6	18	M 16	26	M 16	256	4.5
180	PT 350-A-152.4-256	RG 42/55-Z50/55-Z75/48												228	
200	PT 400-A-152.4-228	RG 42/55-Z50/55-Z50/55	400	300	350	300	152.4	6	228.6	18	M 16	26	M 16	262	5.0
225	PT 450-A-152.4-262	RG 48/62-Z56/55-Z56/60	450	400	450	350								265	7.0
250	PT 550-A-152.4-265	RG 55/74-Z65/55-Z65/65	550	450	500	450	152.4	6	228.6	18	M 16	26	M 16	275	11.5
280	PT 550-A-152.4-275	RG 65-Z75/55-Z75/75												275	13.0
315	PT 660-A-152.4-310	RG 75-Z85/55-Z85/80	660	550	600	550	152.4	8	228.6	22	M 16	32	M 20	310	18.5
														275	13.0

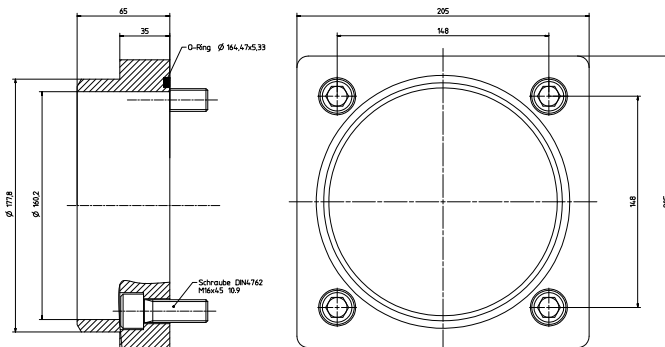
Hub material RG = Grey cast iron

I Accessory connections

KF 730 ... 1000

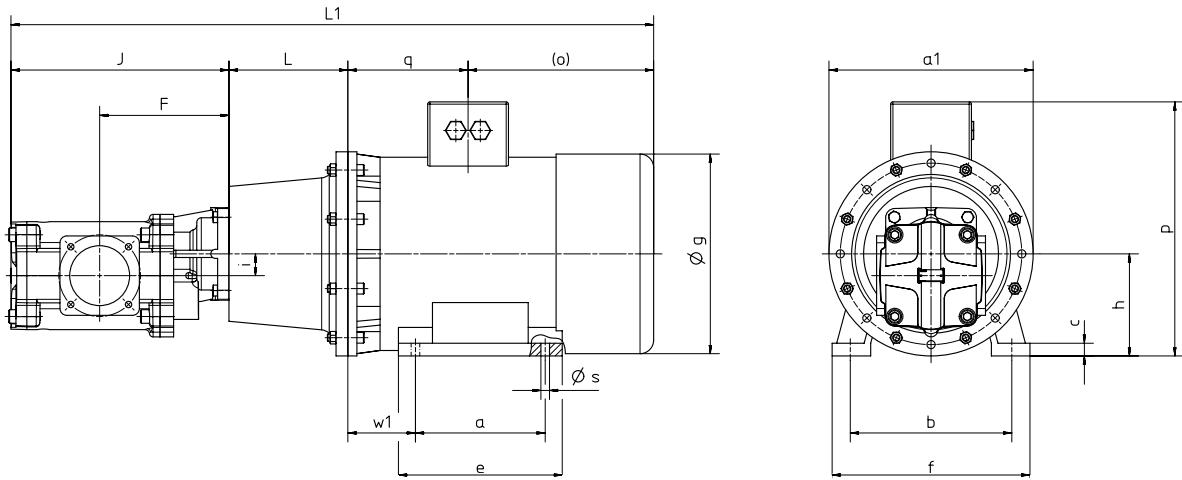


KF 1250 ... 1500

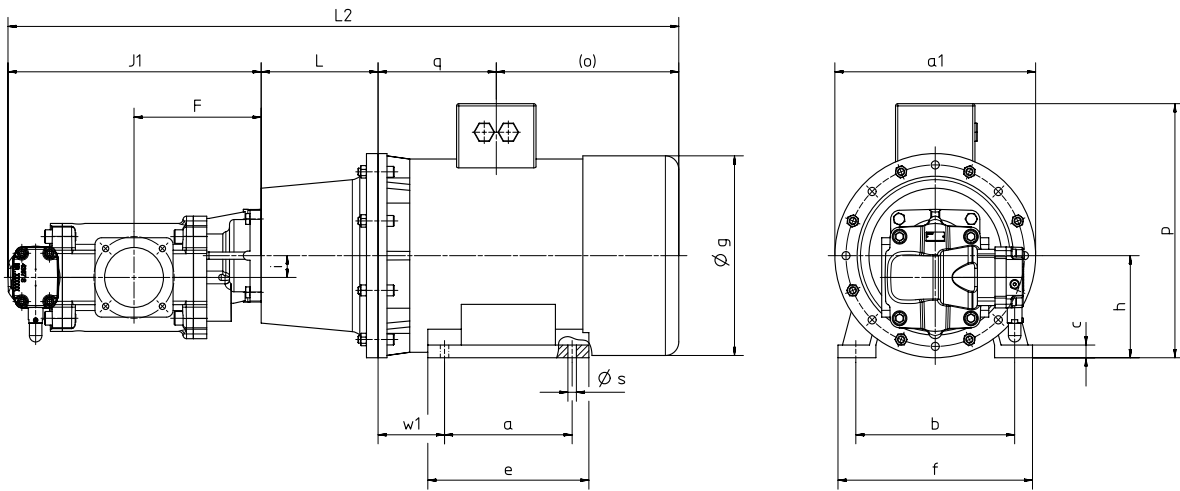


Dimensions – Motor-pump assemblies

I Motor-pump assemblies



With pressure valve



I Pump sizes

Nominal size	F	J	J ₁	i
730	285	415	502	48
1000		481	568	
1250	330	559	646	
1500				

Dimensions and technical data – Motor-pump assemblies

I Dimensions

Size	Dimensions ⁽¹⁾																	
	KF 730	KF 1000	KF 1250	KF 1500														
	L ₁	L ₁	L ₁	L ₁	L	a ₁	a	b	c	e	f	g	h	o	p	q	s	w ₁
160 M	1166	1232	1310	1310	256	350	210	254	17	332	315	325	160	323	410	172	15	108
160 L	1211	1277	1355	1355	256	350	254	254	17	332	315	325	160	368	410	172	15	108
180 M	1248	1314	1392	1392	256	350	241	279	27	320	350	360	180	336	450	241	15	121
180 L	1286	1352	1430	1430	256	350	279	279	27	320	350	360	180	354	450	261	15	121
200 M/L	1301	1367	1445	1445	228	400	305	318	25	358	388	399	200	373	500	285	19	133
225 S	1351	1417	1495	1495	262	450	286	356	28	341	436	465	225	391	560	283	19	149
225 M	1376	1442	1520	1520	262	450	311	356	28	386	436	465	225	404	560	295	19	149
250 M	1458	1524	1602	1602	265	550	349	406	30	443	484	506	250	436	616	342	24	168
280 S	1534	1600	1678	1678	275	550	368	457	34	459	557	559	280	470	673	374	24	190
280 M	1585	1651	1729	1729	275	550	419	457	34	510	557	559	280	495.5	690	399.5	24	190
315 S	1940	2006	2084	2084	310	660	508	508	45	672	628	682	315	870	825	345	28	216
315 M/L	1790	1856	1934	1934	310	660	406	508	45	590	628	682	315	720	825	345	28	216

Note

⁽¹⁾ Dimensions dependent on motor type (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.

I Technical data

Size	Motor				Bell housing	Coupling	Total weight in kg ⁽¹⁾			
	6 pole		4 pole				KF 730	KF 1000	KF 1250	KF 1500
	Power in kW	Speed in 1/min	Power in kW	Speed in 1/min						
160 M	7.5	955	11.0	1440	PT 350-A-152.4-256	RG 42/55-Z50/55-Z75/42	260.8	272.8	294.8	295.8
160 L	11.0	960	15.0	1440			266.4	278.4	300.4	301.4
180 M	-	-	18.5	1445		RG 42/55-Z50/55-Z75/48	286.9	298.9	320.9	321.9
180 L	15.0	960	22.0	1460			311.5	323.5	345.5	346.5
200 M	18.5	965	30.0	1460	PT 400-A-152.4-228	RG 42/55-Z50/55-Z50/55	385.9	397.9	419.9	420.9
200 L	22.0	965	-	-			415.4	427.4	449.4	450.4
225 S	-	-	37.0	1470	PT 450-A-152.4-262	RG 48/62-Z56/55-Z56/60	460.3	472.3	494.3	495.3
225 M	30.0	975	45.0	1480			517.4	529.4	551.4	552.4
250 M	37.0	975	55.0	1480	PT 550-A-152.4-265	RG 55/74-Z65/55-Z65/65	613.5	625.5	647.5	648.5
280 S	45.0	980	75.0	1480	PT 550-A-152.4-275	RG 65-Z75/55-Z75/75	809.0	821.0	843.0	844.0
280 M	55.0	980	90.0	1480			865.0	877.0	899.0	900.0
315 S	75.0	980	110.0	1480			1212.7	1224.7	1246.7	1247.7
315 M	90.0	980	132.0	1480	PT 660-A-152.4-310	RG 75-Z85/55-Z85/80	-	1359.1	1381.1	1382.1
315 L	110.0	980	160.0	1480			-	1448.7	1470.7	1471.7

⁽¹⁾ Pump, motor, bell housing and coupling

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