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High pressure
gear pumps
KP 0



KRACHT®
FLUID TECHNOLOGY AND SYSTEMS

Construction

According to its design, the Kracht KP0 external gear pump belongs to the type of so-called gland type pumps. The essential functional elements, gearing and bearing glands are located in an aluminium housing of high-strength extruded alloy, which is limited laterally by the the cover plate and flange cover.

The gearing, made of case hardened steel with surface hardening, consists of the drive shaft wheel and pin wheel. The highest manufacturing quality is guaranteed by shaving the tooth flanks.

The shaft journals are finely ground. Due to the high number of teeth ($n = 12$) and the special tooth shape, a considerable reduction in design-related volume flow fluctuation and the associated pressure pulsation is achieved.

The gland bearings located on both sides of the gearing carry the journals in heavyduty multicomponent plane bearing bushes and contain additionally those sealing elements which serve for the pressure field sealing to compensate the axial clearance.

Note

1. External loads

External forces acting on the drive shaft end have an influence on the operation of the bearing glands. Radial and axial forces are not permissible. An end bearing must be used for the purpose of absorbing external forces.

2. Direction of rotation

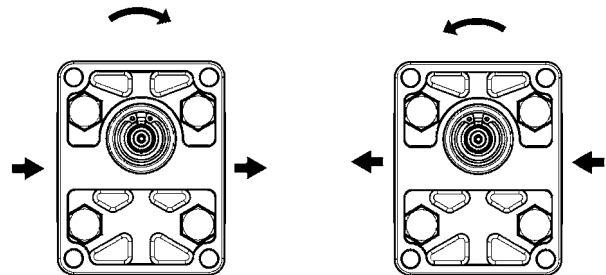
Regarding the direction of rotation basically the following applies provided the view is directed toward the drive shaft end:

Drive shaft end rotating clockwise:

Flow direction from left to right.

Drive shaft end rotating anticlockwise:

Flow direction from right to left.



Materials

Housing	Aluminium
Bearing	double-gland bearing with multicomponent plain bearing bushes
Shafts and gear wheels	surface hardened and ground case hardened steel acc. to DIN 17210
Seals	NBR (FKM on request)

Characteristics

Mounting	flange mounting		
Pipe connection	threaded connection		
Direction of rotation	clockwise or anticlockwise		
Fitting position	optional		
Ambient temperature	$\vartheta_{u \min}$	=	- 20 °C
	$\vartheta_{u \max}$	=	60 °C
Working pressure Inlet port	$p_{e \min}$	=	- 0.3 bar (vacuum)
Working pressure Short time	$p_{e \max}$	=	2.5 bar
Working pressure Outlet port	$p_{e \max}$	see technical data	
Fluid temperature	$\vartheta_{m \max}$	85 °C	
Viscosity	$\nu_{\min}$	=	10 mm ² /s
	$\nu_{\max}$	=	1400 mm ² /s
Recommended oil cleanliness	class 19/16 acc. to ISO/DIS 4406 ⇒ class 10 acc. to NAS 1638		
Recommended filtration	filter with filtration quotient $\beta_{20} \geq 75$ for ... 280 bar $\beta_{25} \geq 75$ for ... 100 bar		
Recommended viscosity range	ν	=	12 ... 90 mm ² /s
Discharge flow	see chart page 6		
Input power	see chart page 6		
Hydraulic fluids	mineral oil acc. to DIN 51524 bio-oils of type „HEES“ can be used up to 70 °C, max. pressure must be reduced minus 20 % (use only on request)		

Technical Data

Nominal size	geom. displacement V_g cm^3/rev	max. pressure p_{max} bar	Nominal pressure p_N bar	Continuous working pressure p_D bar	Speed	
					n_{max} rpm	n_{min} rpm
1	1.4	280	260	220	4000	700
2	1.9	280	260	220	4000	700
3	3.1	260	250	210	4000	700
4	4.4	260	250	210	4000	700
6	6.1	260	250	210	3000	700
8	7.9	200	180	160	3000	700

Maximum pressure = pressure peak

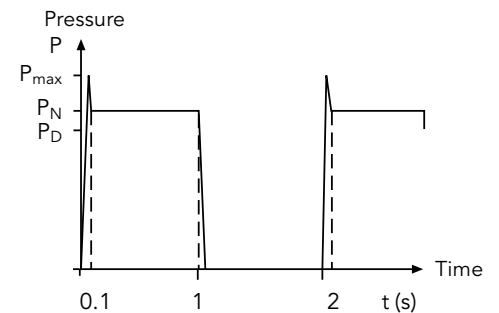
Nominal pressure $p_N < 6 \text{ s} = 50 \% \text{ ED}$

See time/pressure chart

max. permissible working cycles: 30 / min

Pressures as specified are applicable to $v \geq 30 \text{ mm}^2/\text{s}$

Time/pressure chart



Calculation Formulas for Hydraulic Pumps

Characteristic data, formula signs, units

1. Discharge flow / input flow	Q	l/min
2. Pump / motor displacement	V_g	cm^3/rev
3. Pressure	p	bar
4. Speed	n	rpm
5. Torque	M	Nm
6. Power	P	kW
7. Total efficiency	η_{tot}	—
8. Volumetric efficiency	η_{vol}	—
9. Hydr./mech. efficiency	η_{hm}	—
10. Flow velocity	v	m/s
11. Pipe diameter	d	mm

General

$$Q_{\text{th}} = V_g \cdot n, \quad \eta_{\text{tot}} = \eta_{\text{vol}} \cdot \eta_{\text{hm}}$$

$$M = 9549 \cdot \frac{P}{n}, \quad v = 21.22 \cdot \frac{Q}{d^2}$$

Approximate values for KRACHT products in the nominal working point

KP 0	η_{tot}	η_{vol}
1 to 4	≈ 0.75	≈ 0.85
6 to 8	≈ 0.90	≈ 0.90

Characteristic data for:	Volumetric flow	Discharge flow $Q = \frac{V_g \cdot n \cdot \eta_{\text{vol}}}{10^3} \left[\frac{\text{l}}{\text{min}} \right]$
	Torque	Drive torque $M = \frac{p \cdot V_g}{20 \cdot \pi \cdot \eta_{\text{hm}}} \text{ [Nm]}$
	Power	Input power $P = \frac{p \cdot Q}{600 \cdot \eta_{\text{tot}}} \text{ [kW]}$

Discharge Flow and Required Input Power

Discharge flow at n = 1495 rpm

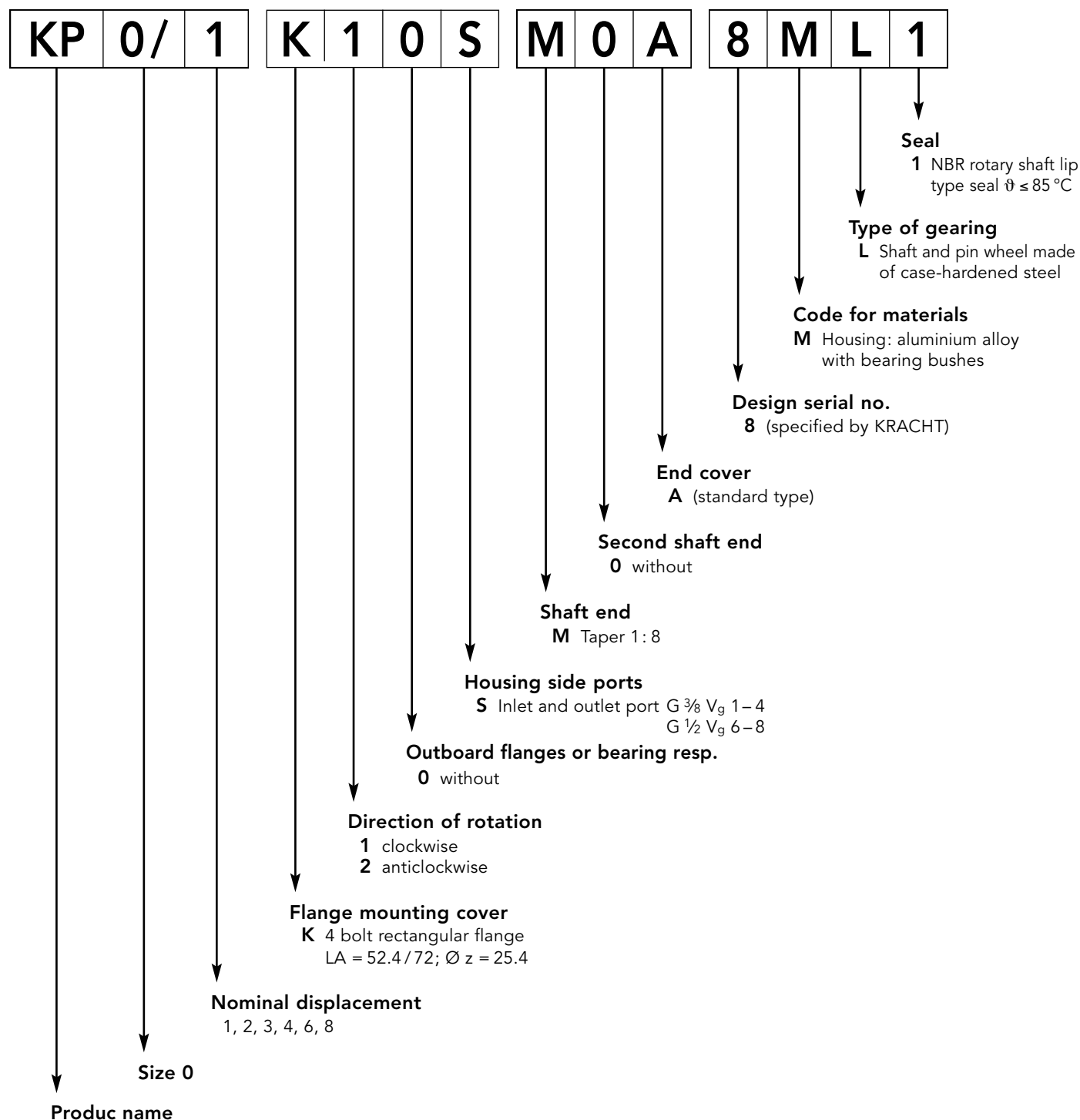
Nominal size	Discharge flow Q in l/min at 34 mm ² /s Pressure p in bar						
	20	60	100	140	180	220	260
1	2.00	1.95	1.90	1.86	1.82	1.78	1.73
2	2.80	2.70	2.65	2.60	2.55	2.50	2.40
3	4.70	4.65	4.60	4.55	4.50	4.45	–
4	6.30	6.25	6.20	6.15	6.10	6.05	–
6	9.00	8.95	8.90	8.85	8.80	–	–
8	11.75	11.60	11.50	11.45	11.40	–	–

Required input power at n = 1495 rpm

Nominal size	Pressure p in bar						
	20	60	100	140	180	220	260
1	0.14	0.32	0.50	0.68	0.86	1.05	1.23
2	0.17	0.42	0.67	0.92	1.17	1.42	1.66
3	0.25	0.57	0.91	1.30	1.60	2.00	–
4	0.30	0.75	1.20	1.60	2.05	2.50	–
6	0.40	1.05	1.70	2.30	2.95	–	–
8	0.50	1.30	2.10	3.05	3.90	–	–

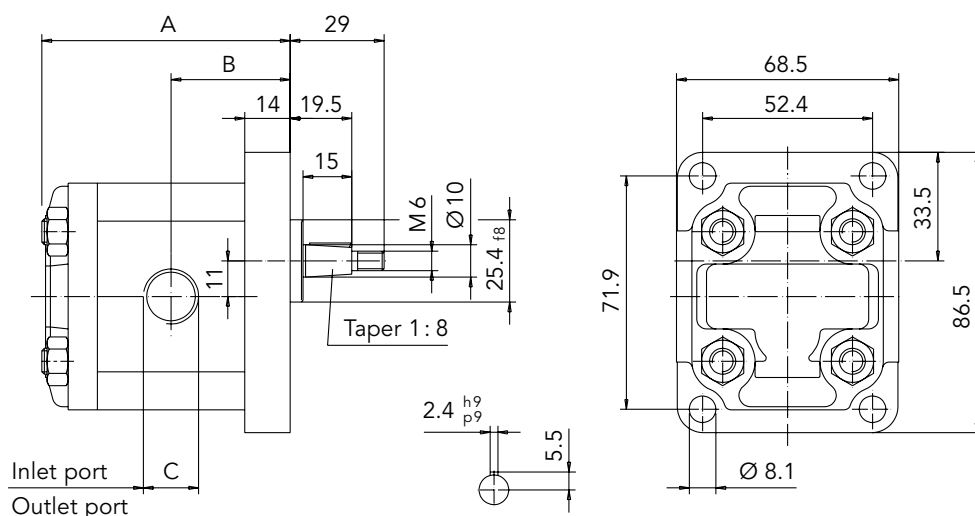
Type Key

Ordering example



- Possible on request:
- Multiple pump combinations
 - Motors
 - Other shaft and flange types
 - FKM rotary shaft lip type seals (on request)

K-Flange, Tapered Shaft End



Ordering example:

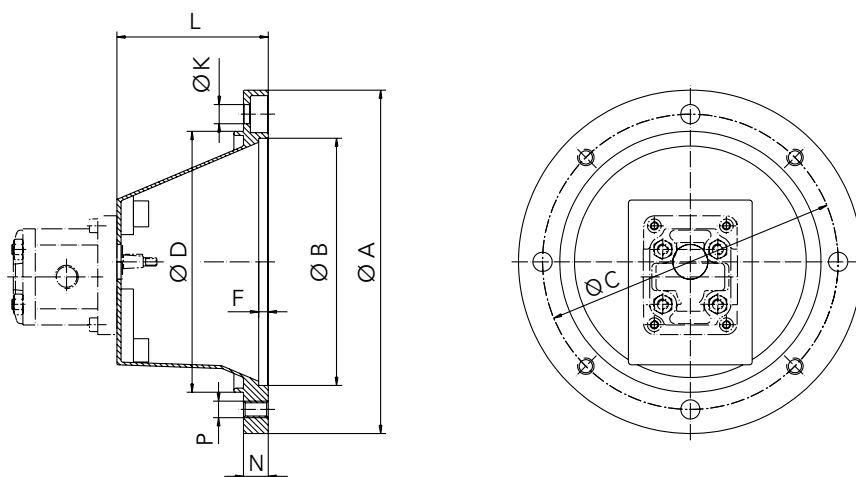
KP 0/1 K10S M0A 8ML1

The direction of rotation as represented is clockwise
In case of anticlockwise rotation the inlet and outlet ports are opposite

Shaft end: Taper 1:8

Nominal displacement	1	2	3	4	6	8
A	68.6	68.6	68.6	75.3	86.0	86.0
B	33.4	33.4	33.4	36.7	42.0	42.0
C	$\frac{3}{8}$ " BSP				$\frac{1}{2}$ " BSP	
Weight in kg	0.9	0.95	0.95	1.05	1.2	1.2

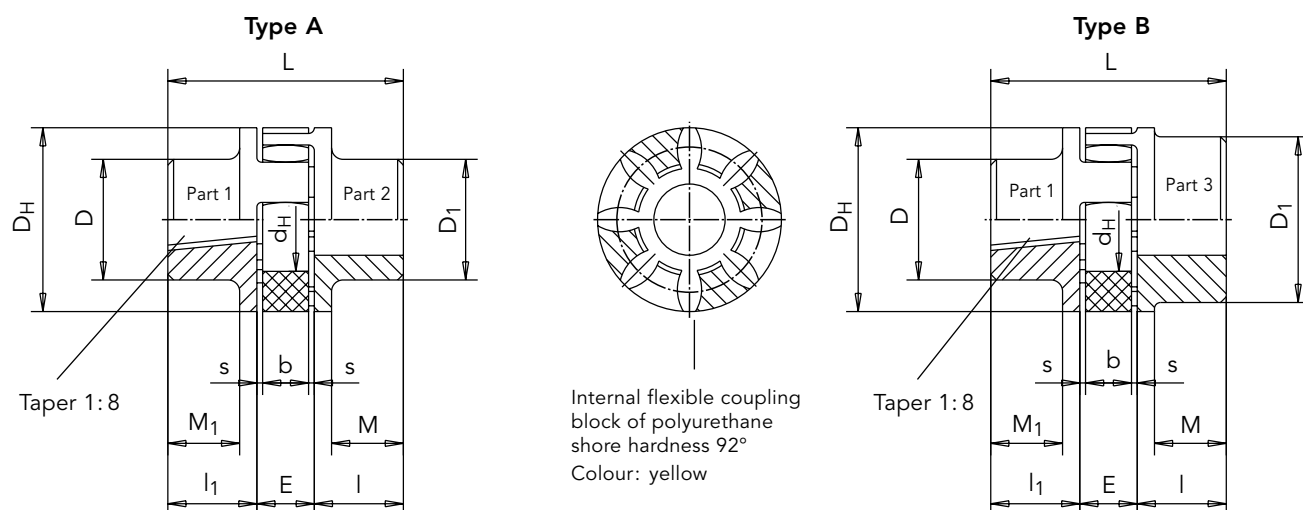
Bell Housing



Bell housing
with ventilation
or leakage hole
on request

Motor size	A	B	C	D	F	K	L	N	P	Bell housing Weight in kg	Coupling size
71	160	110	130	110	7	9	70	13	M8	0.5	RA19 -K16/10-Z25/14
80	200	130	165	145	7	11	90	16	M10	0.8	RA19 -K25/10-Z25/19
90	200	130	165	145	7	11	90	16	M10	0.8	RA19/24-K16/10-Z25/24
100/112	250	180	215	190	7	14	110	18	M12	2.0	RA24/28-K16/10-Z50/28

Couplings



Coupling size

Length of the coupling
hub and the hub bore
pump sided

Length of the coupling hub
and the hub bore motor sided
Straight hub bore

Ordering example:

RA 19 – K 16/10 – Z 25/14

	Coupling size	Weight kg	Moment of inertia kgm ²	Rough bore		Finished bore				Dimensions												Ordering code
				Part 2	Part 3	min. Part 2	min. Part 3	max. Part 2	max. Part 3	I	I ₁	E	s	b	L	M	M ₁	D _H	D	D ₁	d _H	
Type A	19	0.12	0.00003	–	–	6	–	19	–	25	17	16	2	12	58	20	10	40	32	–	18	RA 19-K16/10-Z 25/14
										25												RA 19-K25/10-Z 25/19
Type B	19/24	0.13	0.0004	–	18	–	19	–	24	25	17	16	2	12	58	20	10	41	32	41	18	RA 19/24-K16/10-Z 25/24
	24/28	0.22	0.0001	–	20	–	22	–	28	50	17	18	2	14	85	–	10	55	23	55	27	RA 24/28-K16/10-Z 50/28

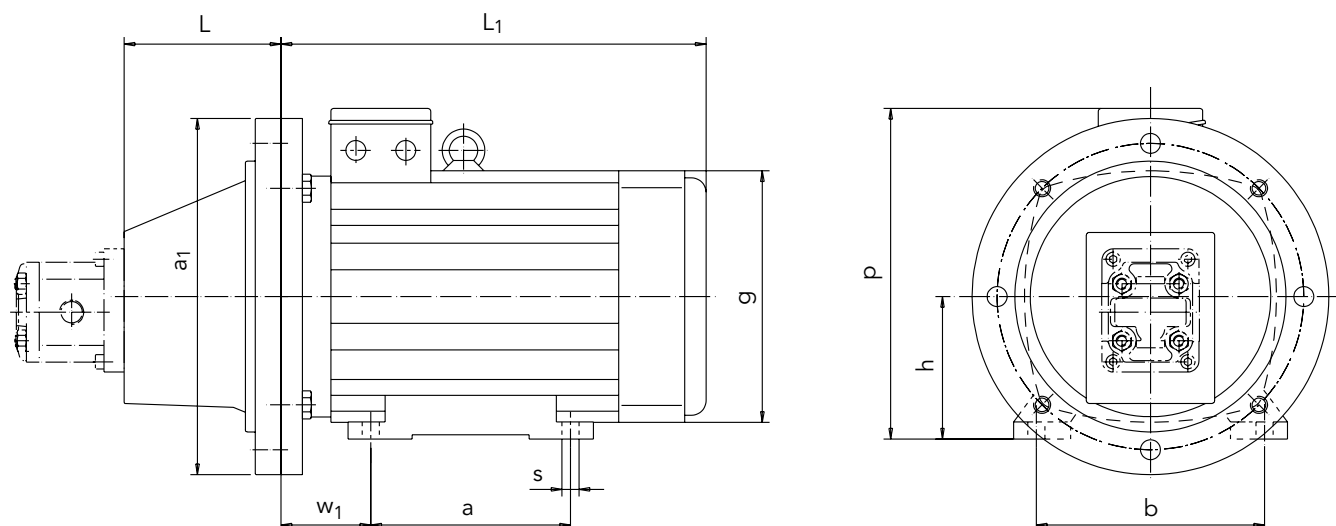
Working temperatur: – 40°C to + 90°C (short time temperature peaks up to + 120°C are permissible)

RA: Hub material Al

Weights as well as moments of inertia relate to the max. bore dia. after final machining – but without key-way

Bore finish acc. to ISO-fit class H7; key-ways acc. to DIN 6885 / part 1

Motor-Pump Assemblies



Nominal size	Motor Power	4-pole Speed	Bell housing	Coupling size		Weight	
	kW	rpm				Motor 4-pole kg	Bell housing kg
71 M4A	0.25	1390	PT 160-A-025.4-70	RA 19	– K16/10 – Z25/14	7	0.6
71 M4B	0.37	1390				8	
80 M4A	0.55	1400	PT 200-A-025.4-90	RA 19	– K25/10 – Z25/19	10	0.9
80 M4B	0.75	1400				11	
90 S4A	1.1	1410	PT 200-A-025.4-90	RA 19/24	– K16/10 – Z25/24	13	1.0
90 L4A	1.5	1420				15	
100 L4A	2.2	1420	PT 250-A-025.4-110	RA 24/28	– K16/10 – Z50/28	21	1.7
100 L4B	3	1430				24	
112 M4B	4	1440				31	

Nominal size	Dimensions									
	L	a ₁	a	b	g	h	L ₁	p	s	w ₁
71	70	160	90	125	138	71	223	182	7	45
80	90	200	100	125	158	80	244	199	10	50
90 S	90	200	100	140	193	90	267	218	10	56
90 L	90	200	125	140	193	90	267	218	10	56
100	110	250	140	160	217	100	277	237	12	63
112	110	250	140	190	232	112	308	256	12	70

Motor frame sizes are based on Schäfer. Other manufactures motors can be supplied on request as IM B 35.

Notes

KRACHT[®]

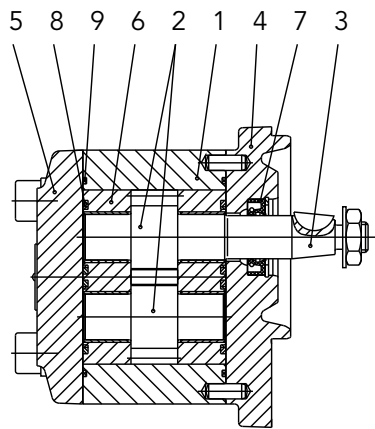
KRACHT GmbH · Gewerbestrasse 20 · 58791 Werdohl, Germany
Phone +49 2392 935 0 · E-Mail info@kracht.eu · Web www.kracht.eu

High pressure
gear pumps
KP 1



KRACHT®
FLUID TECHNOLOGY AND SYSTEMS

Construction



- 1 Housing
- 2 Gearing
- 3 Drive shaft end
- 4 Flange mounting cover
- 5 End cover
- 6 Double-gland bearing with special plane bearing bushes
- 7 Rotary shaft lip-type seals
- 8 Pressure field sealing for axial clearance compensation
- 9 Sealing of the housing

Function

Accordingly to its configuration – the Design Principle is illustrated by the Sectional Figure – the KRACHT external gear type pump series KP 1 is to be classified into the category of the so-called gland type bearing pumps.

All essential functional parts as the gearing and the gland bearings are located in an aluminium housing (cast iron on request possible) manufactured of a high strength extrusion alloy which are closed on each side by an end cover or by a flange mounting cover respectively.

The gearing of case hardening steel in surface hardened condition consists of the driving shaft pinion and the driven shaft pinion.

Highest manufacturing quality is assured by grinding and honing of the tooth flanks. The surfaces of the journals are superfinished.

An important reduction of the type dependent deviation of the volumetric flow and of the pressure pulsation incident thereto was achieved on the basis of the great teeth number ($z = 13$) and of the specially shaped teeth.

The gland bearings located on both sides of the gearing carry the journals in heavyduty multicomponent plane bearing bushes and contain additionally those sealing elements which serve for the pressure field sealing to compensate the axial clearance.

If required the pumps can be supplied with a Pressure Relief Valve-Type DBD... – directly attached to the pump or with special valve arrangements assembled onto the pump instead of the end cover.

Manifold pump combinations are available as well.

Note

1. External loads

Loads acting on the drive shaft end from outside impair the functions of the doublegland bearing.

Radial loads can be absorbed in dependence on the extent and the direction of the loads. Axial loads are not permissible.

To absorb outer loads only those pump types shall be used which are equipped with an outboard bearing.

2. Direction of rotation

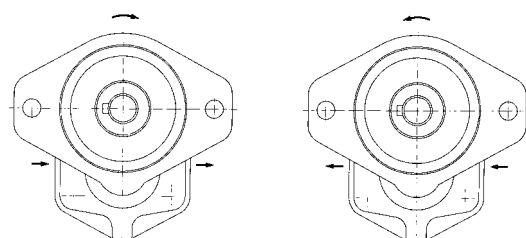
Regarding the direction of rotation basically the following applies provided the view is directed toward the drive shaft end:

Drive shaft end rotating clockwise:

Flow direction from left to right.

Drive shaft end rotating anticlockwise:

Flow direction from right to left.



Materials

Housing	aluminium
Bearing	double-gland bearing with multicomponent plane bearing bushes
Journals and gears	case hardening steel acc. to DIN 17210 surface hardened and ground
Seals	NBR rotary shaft lip type seal $\vartheta \leq 90^\circ\text{C}$ (PU-Seal for pressure field) FKM rotary shaft lip type seal $\vartheta \leq 100^\circ\text{C}$ (PU-Seal for pressure field)

Characteristics

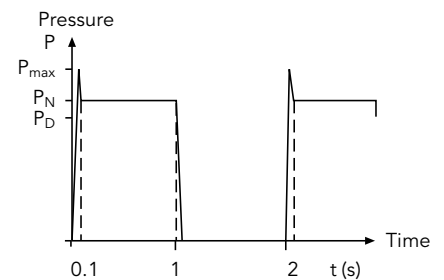
Mounting	flange and foot-type		
Pipe connection	flange type, threaded flange on request		
Direction of rotation	clockwise or anticlockwise		
Fitting position	optional		
Ambient temperature	$\vartheta_{u \min}$	=	-20°C
	$\vartheta_{u \max}$	=	60°C
Operating pressure Inlet port	$p_{e \min}$	=	$-0.4 \text{ bar (vacuum)}$
	$p_{e \max}$	=	2 bar
Operating pressure Short time	$p_{e \max}$	=	5 bar
Operating pressure Outlet port	$p_{e \max}$	see technical data	
Fluid temperature range	$\vartheta_{m \max}$	90°C for NBR rotary shaft lip type seal	
	$\vartheta_{m \max}$	100°C for FKM rotary shaft lip type seal	
Viscosity	$\nu_{\min}$	=	$10 \text{ mm}^2/\text{s}$
	$\nu_{\max}$	=	$600 \text{ mm}^2/\text{s}$
Recommended oil cleanliness	class 19/16 acc. to ISO/DIS 4406 ⇨ class 10 acc. to NAS 1638		
Recommended filtration	filter with filtration quotient $\beta_{25} \geq 75$ for ... 300 bar $\beta_{40} \geq 75$ for ... 100 bar		
Recommended viscosity range	ν	=	$30 \dots 45 \text{ mm}^2/\text{s}$
Discharge flow	see chart page 6		
Input power	see chart page 6		
Hydraulic fluids	mineral oil acc. to DIN 51524/25 engine oil acc. to DIN 51511 bio-oils of type „HEES“ can be used up to 70°C , max. pressure must be reduced minus 20 % (use only on request)		

Technical Data

Nominal displacement	Geom. displacement	max. pressure	Rated pressure	Continuous operating pressure	max. operating speed	Moment of inertia x 10 ⁻⁶	Minimum speed					
	V _g cm ³ /r	p _{max} bar	p _N bar	p _D bar	n _{max} 1/min	J kg m ²	at p = ... bar rpm					
					NBR FKM		...100	...120	...150	...180	...200	...250
3	3	300	280	250	3000 4000	23.3	600	700	900	1200	1300	1400
4	4	300	280	250	3000 4000	28.4	600	700	900	1200	1300	1400
5.5	5.45	300	280	250	3000 4000	35.7	500	700	900	1000	1200	1400
6.3	6.28	300	280	250	3000 4000	39.9	500	700	900	1000	1200	1400
8	7.9	300	280	250	3000 4000	51.1	500	700	900	1000	1100	1400
11	10.9	300	280	250	3000 3500	62.9	500	700	900	1000	1100	1200
14	13.85	300	280	250	3000 3000	77.7	500	700	800	900	1000	1100
16	15.9	300	280	250	3000 3000	87.7	500	600	700	800	1000	1000
19	18.8	250	230	200	2800 2800	102.5	500	600	700	800	1000	–
22	22.3	200	180	150	2500 2500	119.6	500	600	700	800	–	–

Maximum pressure = pressure peak
Rated pressure p_N < 6 s = 50 % ED
See time/pressure chart
max. permissible operating cycles: 30 / min
Pressures as specified are applicable to v ≥ 30 mm²/s

Time / pressure chart



Calculation Formulas for Hydraulic Pumps

Characteristic data, formula signs, units

- | | | |
|--------------------------------|------------------|--------------------|
| 1. Discharge flow / input flow | Q | l/min |
| 2. Pump / motor displacement | V _g | cm ³ /r |
| 3. Pressure | p | bar |
| 4. Speed of rotation | n | 1/min |
| 5. Torque | M | Nm |
| 6. Power | P | kW |
| 7. Total efficiency | η _{tot} | — |
| 8. Volumetric efficiency | η _{vol} | — |
| 9. Hydr./mech. efficiency | η _{hm} | — |
| 10. Flow velocity | v | m/s |
| 11. Pipe diameter | d | mm |

General

$$Q_{th} = V_g \cdot n, \quad \eta_{tot} = \eta_{vol} \cdot \eta_{hm},$$

$$M = 9549 \cdot \frac{P}{n}, \quad v = 21.22 \cdot \frac{Q}{d^2}$$

Approximate values for KRACHT products
in the nominal operating point

	η _{tot}	η _{vol}
KP	≈ 0.90	≈ 0.90

Characteristic data for:	Volumetric flow	Discharge flow $Q = \frac{V_g \cdot n \cdot \eta_{vol}}{10^3} \left[\frac{l}{min} \right]$
	Torque	Drive torque $M = \frac{p \cdot V_g}{20 \cdot \pi \cdot \eta_{hm}} [Nm]$
	Power	Input power $P = \frac{p \cdot Q}{600 \cdot \eta_{tot}} [kW]$

Discharge Flow and Required Input Power

Discharge flow at n = 1450 1/min

Nominal size	Discharge flow Q in l/min at 34 mm ² /s Pressure p in bar						
	20	60	100	140	180	220	260
3	4.2	4.1	4.1	4.0	4.0	3.9	3.9
5.5	7.7	7.7	7.6	7.5	7.4	7.4	7.3
8	11.2	11.2	11.1	11.0	10.9	10.8	10.7
11	15.4	15.3	15.2	15.1	15.0	14.8	14.7
14	19.6	19.5	19.4	19.3	19.2	19.0	18.9
16	22.5	22.4	22.3	22.2	22.1	22.0	21.9
19	26.7	26.6	26.5	26.4	26.3	26.2	—
22	31.6	31.5	31.4	31.4	31.3	—	—

Required input power at n = 1450 rpm

Nominal size	Pressure p in bar						
	20	60	100	140	180	220	260
3	0.26	0.59	0.93	1.26	1.59	1.93	2.26
5.5	0.36	0.91	1.45	1.99	2.53	3.07	3.61
8	0.49	1.28	2.07	2.86	3.65	4.44	5.23
11	0.64	1.72	2.81	3.89	4.97	6.06	7.14
14	0.80	2.22	3.63	5.05	6.46	7.88	9.29
16	0.89	2.49	4.08	5.67	7.26	8.85	10.45
19	1.02	2.87	4.72	6.57	8.42	10.27	—
22	1.20	3.39	5.58	7.76	9.95	—	—

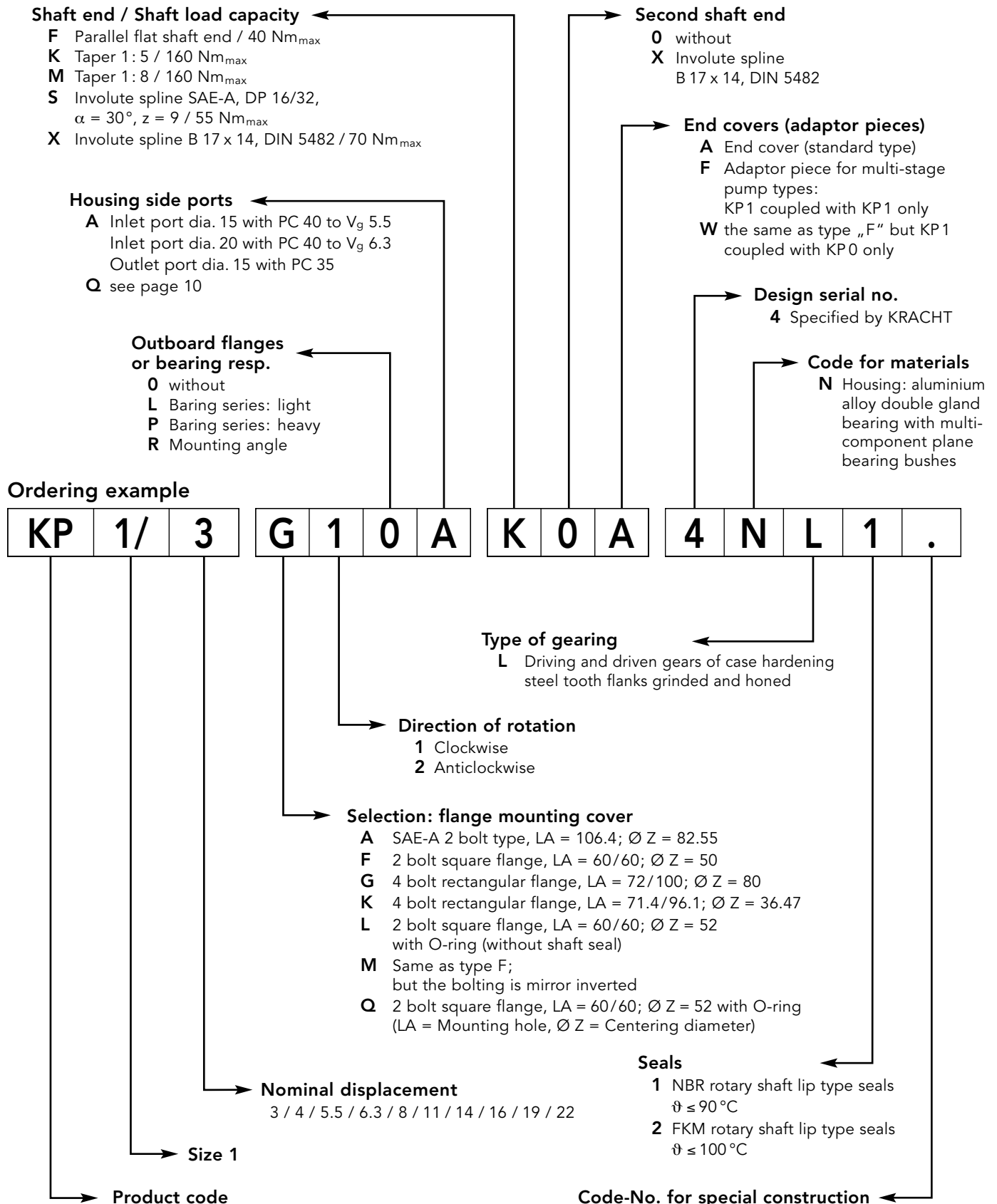
Discharge flow at n = 950 1/min

Nominal size	Discharge flow Q in l/min at 34 mm ² /s Pressure p in bar						
	20	60	100	140	180	220	260
3	2.6	2.6	2.5	2.4	—	—	—
5.5	4.9	4.8	4.6	4.5	4.4	—	—
8	7.1	7.0	6.9	6.8	6.7	—	—
11	9.8	9.7	9.6	9.5	9.4	—	—
14	12.5	12.4	12.3	12.2	12.0	—	—
16	14.3	14.2	14.1	13.9	13.8	—	—
19	17.0	16.9	16.8	16.7	16.6	—	—
22	20.1	20.0	20.0	19.9	19.8	—	—

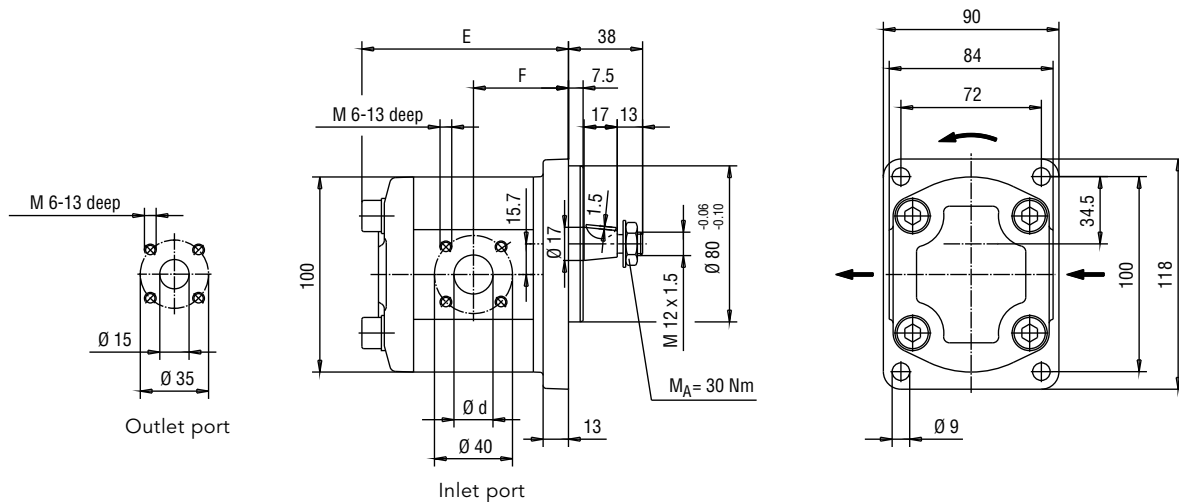
Required input power at n = 950 rpm

Nominal size	Pressure p in bar						
	20	60	100	140	180	220	260
3	0.18	0.39	0.60	0.82	—	—	—
5.5	0.25	0.60	0.96	1.32	1.68	—	—
8	0.33	0.85	1.37	1.89	2.40	—	—
11	0.42	1.13	1.84	2.55	3.26	—	—
14	0.52	1.41	2.31	3.20	4.09	—	—
16	0.58	1.61	2.64	3.66	4.69	—	—
19	0.68	1.89	3.11	4.33	5.55	—	—
22	0.78	2.21	3.64	5.07	6.50	—	—

Type Key



G-Flange, Tapered Shaft End



Ordering example:

KP 1/4 G10A K0A 4NL1

The direction of rotation as represented is clockwise

In case of anticlockwise rotation the inlet and outlet ports are opposite

Shaft end: Taper 1:5

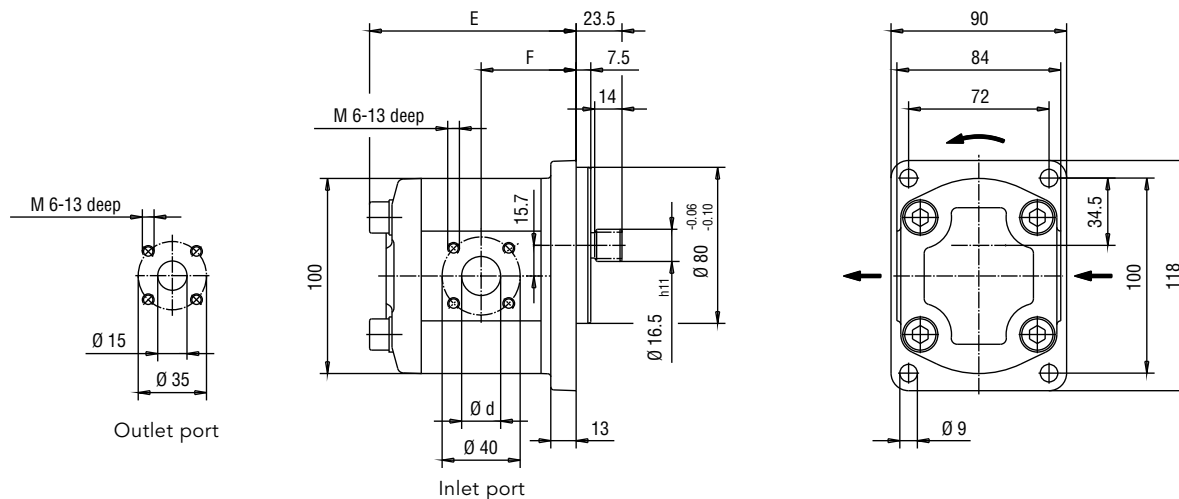
Hex. lock nut M 12 x 1.5

DIN EN 28675

Curved spring washer B 12 DIN 137

Woodruff key 3 x 6.5 DIN 6888

G-Flange, Involute Spline Shaft End



Ordering example:

KP 1/4 G10A X0A 4NL1

Shaft end: Involute spline

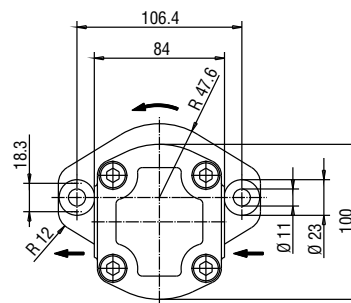
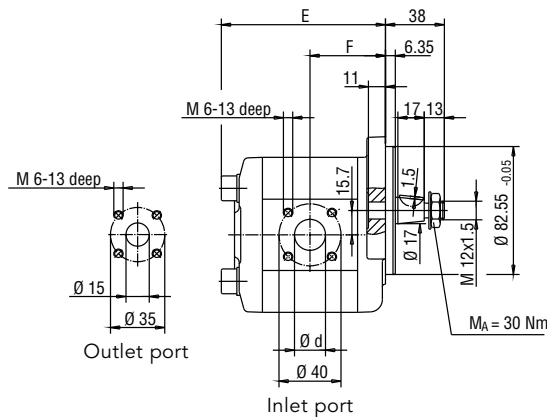
B 17 x 14 DIN 5482

but tooth thickness $S_w = 3.206$

Addendum modification = +0.6

Nominal displacement	3	4	5.5	6.3	8	11	14	16	19	22
d	15.0	15.0	15.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0
E	87.5	89.2	91.7	93.1	95.9	100.9	105.9	109.3	114.3	120.1
F	39.5	40.4	41.6	42.3	43.7	46.2	48.7	50.4	52.9	55.8
Weight kg	2.1	2.2	2.2	2.3	2.3	2.5	2.6	2.8	2.9	3.1

SAE A-Flange, Tapered Shaft End

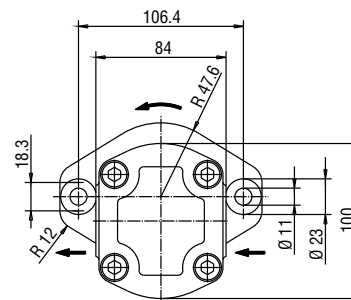
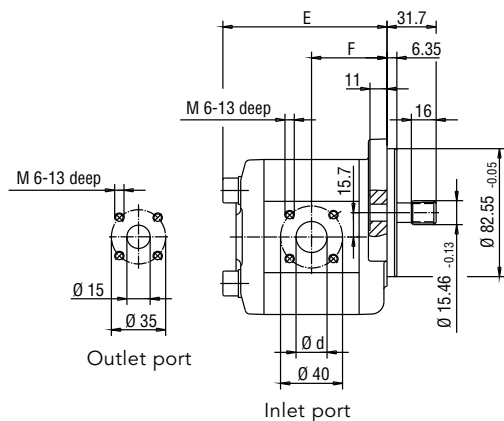


Shaft end: Taper 1:5
Hex. lock nut M 12 x 1.5
DIN EN 28675
Curved spring washer B 12 DIN 137
Woodruff key 3 x 6,5 DIN 6888

The direction of rotation as represented is clockwise
In case of anticlockwise rotation the inlet and outlet ports are opposite

Ordering example:
KP 1/4 A10A K0A 4NL1

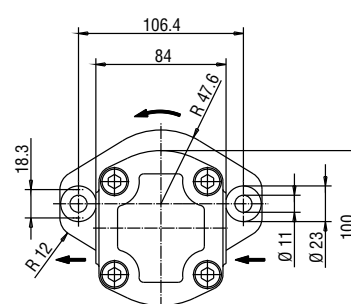
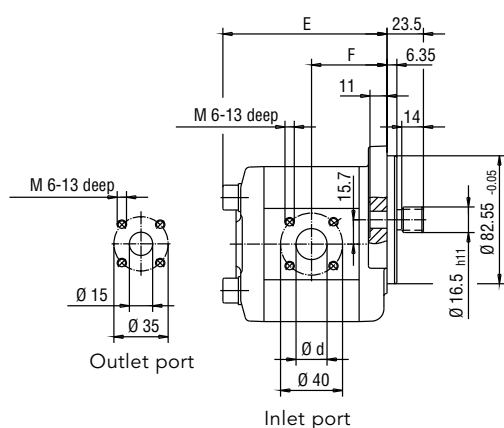
SAE A-Flange, SAE A-Shaft



Shaft end: Involute spline
SAE-A z = 9 T, DP 16/32; $\alpha = 30^\circ$

Ordering example:
KP 1/4 A10A S0A 4NL1

SAE A-Flange, Involute Spline Shaft End

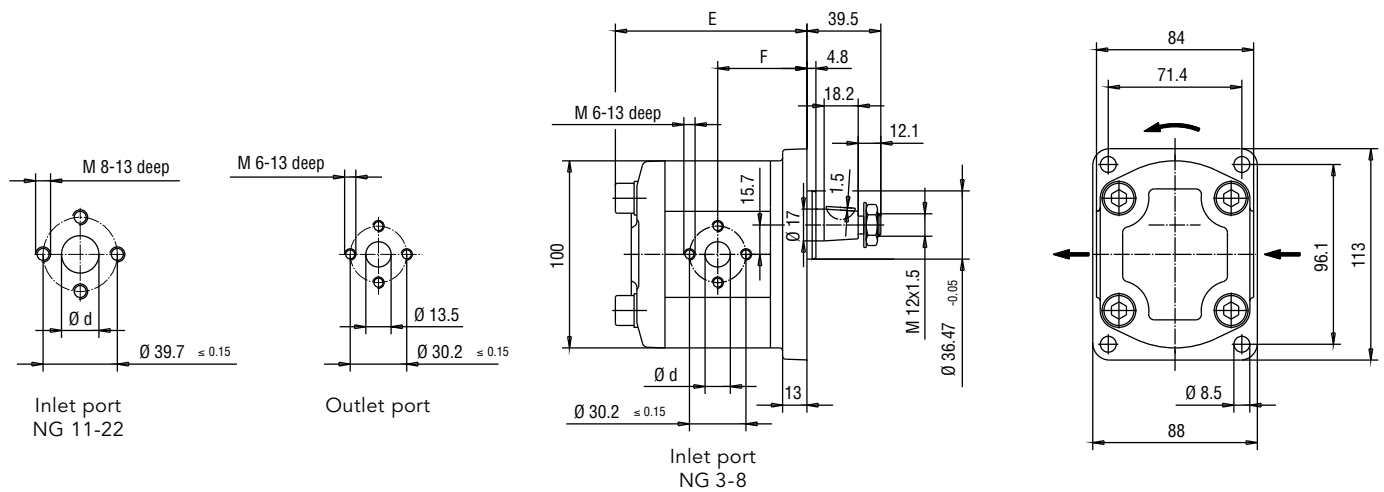


Shaft end: Involute spline
B 17 x 14 DIN 5482

Ordering example:
KP 1/4 A10A X0A 4NL1

Nominal displacement	3	4	5.5	6.3	8	11	14	16	19	22
d	15.0	15.0	15.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0
E	87.5	89.2	91.7	93.1	95.9	100.9	105.9	109.3	114.3	120.1
F	39.5	40.4	41.6	42.3	43.7	46.2	48.7	50.4	52.9	55.8
Weight kg	2.5	2.6	2.6	2.7	2.7	2.9	3.0	3.2	3.3	3.5

K-Flange, Tapered Shaft End 1 : 8



Ordering example:

KP 1/4 K10Q M0A 4NL1

The direction of rotation as represented is clockwise

In case of anticlockwise rotation the inlet and outlet ports are opposite

Shaft end: Taper 1 : 8

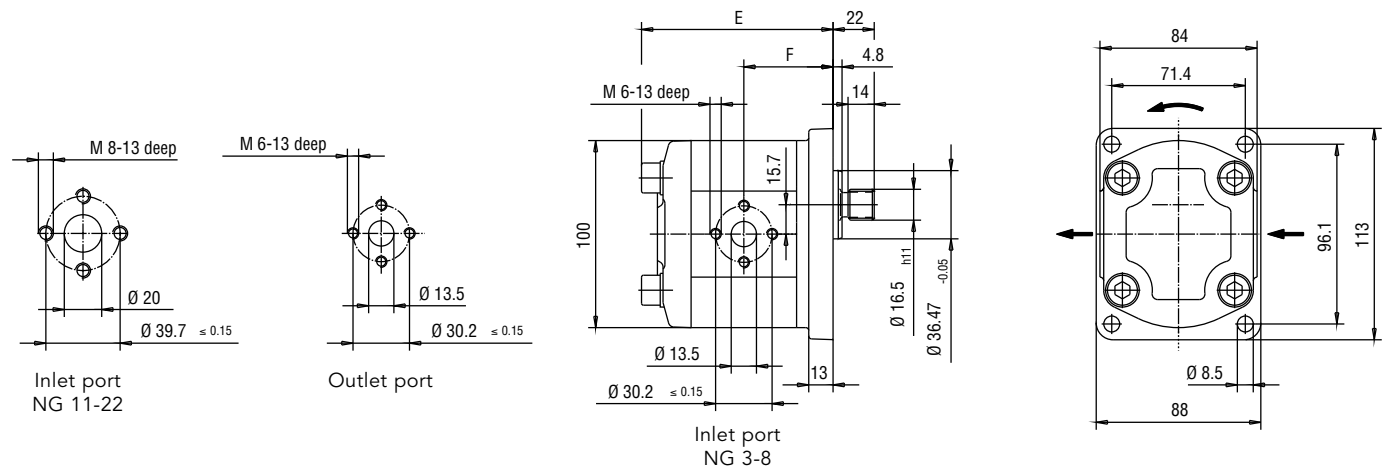
Hex. lock nut M 12 x 1.5

DIN EN 28675

Curved spring washer B 12 DIN 137

Woodruff key 3 x 6.5 DIN 6888

K-Flange, Involute Spline Shaft End



Ordering example:

KP 1/4 K10Q X0A 4NL1

The direction of rotation as represented is clockwise

In case of anticlockwise rotation the inlet and outlet ports are opposite

Shaft end: Involute spline

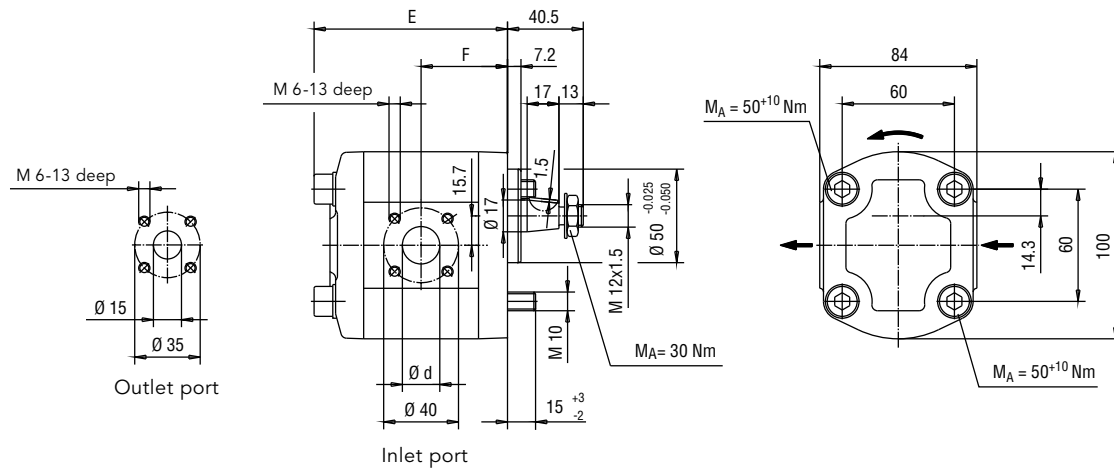
B 17 x 14 DIN 5482

but tooth thickness $S_w = 3.206$

Addendum modification = + 0.6

Nominal displacement	3	4	5.5	6.3	8	11	14	16	19	22
d	13.5	13.5	13.5	13.5	13.5	20.0	20.0	20.0	20.0	20.0
E	89.0	90.7	93.2	94.6	97.4	102.4	107.4	110.8	115.8	121.6
F	41.0	41.85	43.1	43.8	45.2	47.7	50.2	51.9	54.4	57.3
Weight kg	2.1	2.2	2.2	2.3	2.3	2.5	2.6	2.8	2.9	3.1

F-Flange, Tapered Shaft End



Ordering example:

KP 1/4 F10A K0A 4NL1

The direction of rotation as represented is clockwise

In case of anticlockwise rotation the inlet and outlet ports are opposite

Shaft end: Taper 1:5

Hex. lock nut M 12 x 1.5

DIN EN 28675

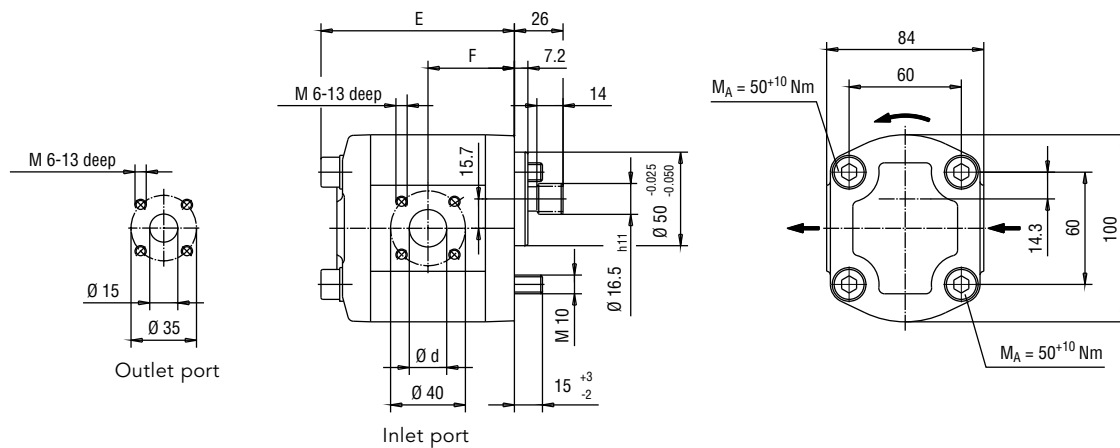
Curved spring washer B 12

DIN 137

Woodruff key 3 x 6.5

DIN 6888

F-Flange, Involute Spline Shaft End



Ordering example:

KP 1/4 F10A X0A 4NL1

The direction of rotation as represented is clockwise

In case of anticlockwise rotation the inlet and outlet ports are opposite

Shaft end: Involute spline

B 17 x 14 DIN 5482

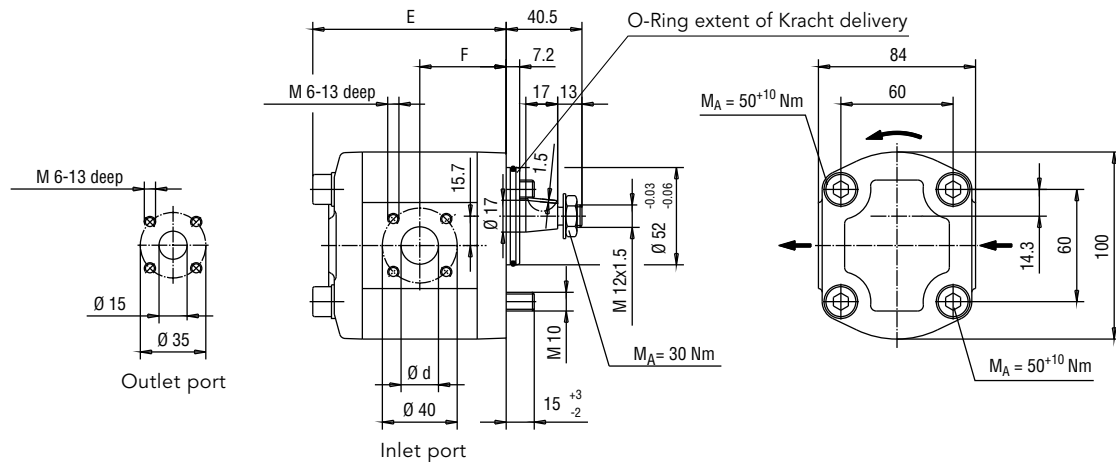
but tooth thickness $S_w = 3.206$

Addendum modification = +0.6

Nominal displacement	3	4	5.5	6.3	8	11	14	16	19	22
d	15.0	15.0	15.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0
E	85.0	86.7	89.2	90.6	93.4	98.4	103.4	106.8	111.8	117.6
F	37.0	37.9	39.1	39.8	41.2	43.7	46.2	47.9	50.4	53.3
Weight kg	2.1	2.2	2.2	2.3	2.3	2.5	2.6	2.8	2.9	3.1

Nominal displacement	3	4	5.5	6.3	8	11	14	16	19	22
d	15.0	15.0	15.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0
E	85.0	86.7	89.2	90.6	93.4	98.4	103.4	106.8	111.8	117.6
F	37.0	37.9	39.1	39.8	41.2	43.7	46.2	47.9	50.4	53.3
Weight kg	2.1	2.2	2.2	2.3	2.3	2.5	2.6	2.8	2.9	3.1

Q-Flange, Tapered Shaft End



Ordering example:

KP 1/4 Q10A K0A 4NL1

The direction of rotation as represented is clockwise

In case of anticlockwise rotation the inlet and outlet ports are opposite

Shaft end: Taper 1: 5

Hex. lock nut M 12 x 1.5

DIN EN 28675

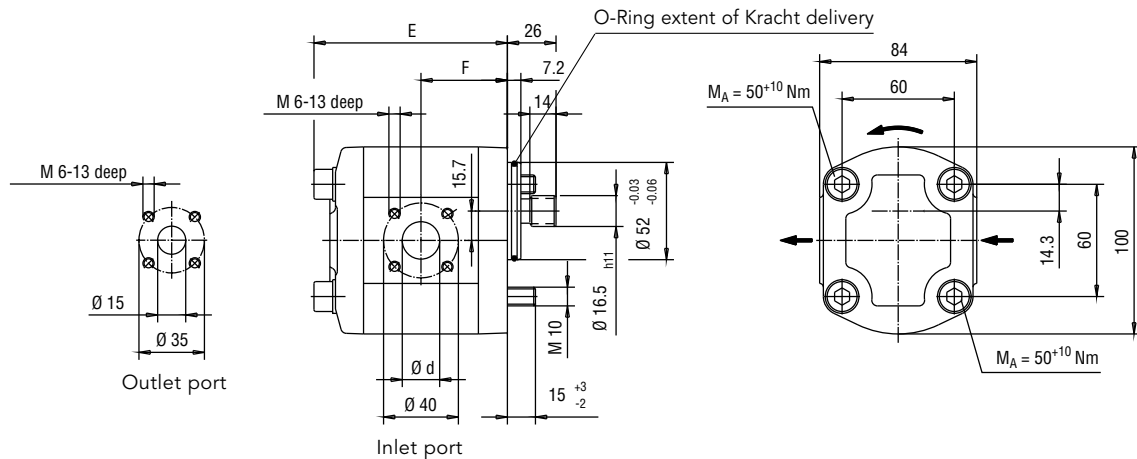
Curved spring washer B 12

DIN 137

Woodruff key 3 x 6.5

DIN 6888

Q-Flange, Involute Spline Shaft End



Ordering example:

KP 1/4 Q10A X0A 4NL1

The direction of rotation as represented is clockwise

In case of anticlockwise rotation the inlet and outlet ports are opposite

Shaft end: Involute spline

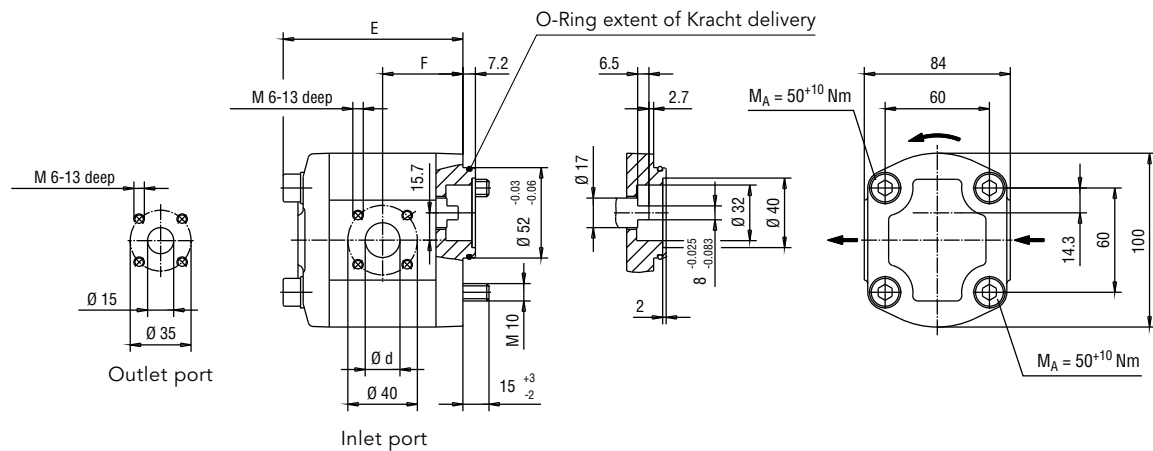
B 17 x 14 DIN 5482

but tooth thickness $S_w = 3.206$

Addendum modification = +0.6

Nominal displacement	3	4	5.5	6.3	8	11	14	16	19	22
d	15.0	15.0	15.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0
E	85.0	86.7	89.2	90.6	93.4	98.4	103.4	106.8	111.8	117.6
F	37.0	37.9	39.1	39.8	41.2	43.7	46.2	47.9	50.4	53.3
Weight kg	2.1	2.2	2.2	2.3	2.3	2.5	2.6	2.8	2.9	3.1

L-Flange, Parallel Flat Shaft End



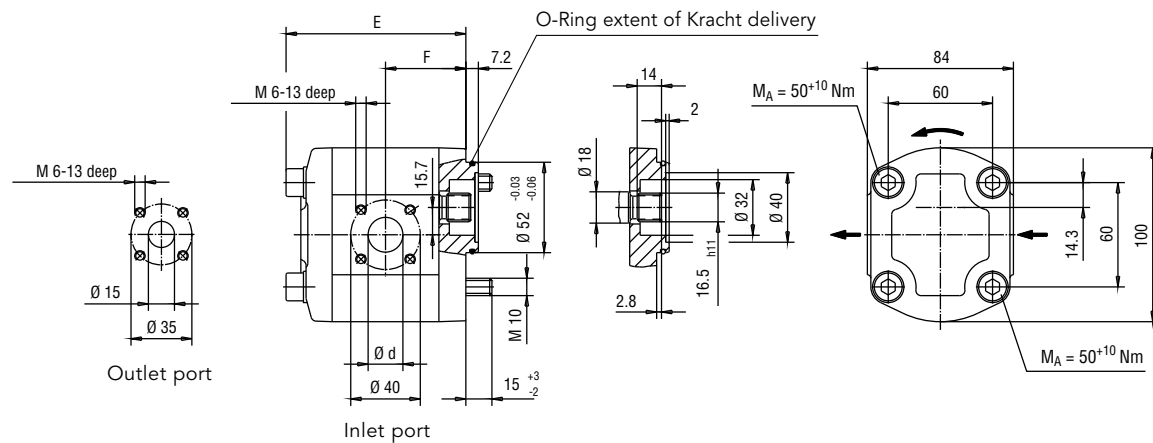
Ordering example:

KP 1/4 L10A F0A 4NL1

The direction of rotation as represented is clockwise

In case of anticlockwise rotation the inlet and outlet ports are opposite

L-Flange, Involute Spline Shaft End



Ordering example:

KP 1/4 L10A X0A 4NL1/204

The direction of rotation as represented is clockwise

In case of anticlockwise rotation the inlet and outlet ports are opposite

Shaft end: Involute spline
B 17 x 14 DIN 5482
but tooth thickness $S_w = 3.206$
Addendum modification = +0.6

Nominal displacement	3	4	5.5	6.3	8	11	14	16	19	22
d	15.0	15.0	15.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0
E	85.0	86.7	89.2	90.6	93.4	98.4	103.4	106.8	111.8	117.6
F	37.0	37.9	39.1	39.8	41.2	43.7	46.2	47.9	50.4	53.3
Weight kg	2.1	2.2	2.2	2.3	2.3	2.5	2.6	2.8	2.9	3.1

[illegible]

Technical drawing of a square flange. The drawing shows a square flange with a central circular hole and four smaller circular holes. The overall width and height are 100. The distance between the centers of the four small holes is 60. The distance from the center of the central hole to the center of one of the small holes is 34.5. The thickness of the flange is 15.7. The central hole has a diameter of $\varnothing 9$. The four small holes have a diameter of $\varnothing 9$. The flange has a fillet radius of R 9. The text 'M 10-22 deep' indicates the thread specification for the central hole.

The graph plots the required force F_R in kN on the y-axis (ranging from 0 to 2.5) against the shaft length l in mm on the x-axis (ranging from 0 to 50). Four curves are shown for different rotational speeds n :

- $n = 1000 \text{ min}^{-1}$ (top curve)
- $n = 2000 \text{ min}^{-1}$
- $n = 3000 \text{ min}^{-1}$
- $n = 4000 \text{ min}^{-1}$ (bottom curve)

All curves show a decreasing trend of F_R as l increases. A vertical line is drawn at $l = 20 \text{ mm}$, and a horizontal line is drawn at $F_R = 0.5 \text{ kN}$, intersecting the $n = 4000 \text{ min}^{-1}$ curve.

$$F_R = f(l)$$

Technical drawing of a mechanical part, showing a cross-section and a side view.

Top View (Cross-section):

- Overall width: 53.5
- Left section width: 37.5
- Right section width: 9
- Inner hole diameter: $\varnothing 80$ with tolerance -0.06 to -0.10
- Outer diameter of the right section: $\varnothing 20$
- Distance from the inner hole to the outer edge: 20
- Distance from the outer edge to the center of the bolt: 15
- Bolt diameter: 2
- Bolt specification: M 14x1.5
- Applied torque: $M_A = 63 \text{ Nm}$
- Distance from the inner hole to the center of the bolt: 20
- Distance from the outer edge to the center of the bolt: 15
- Distance from the inner hole to the center of the bolt: 20

Bottom View (Side view):

- Overall width: 63.5
- Distance from the left edge to the center of the bolt: 38
- Force F_R is applied to the top of the part.

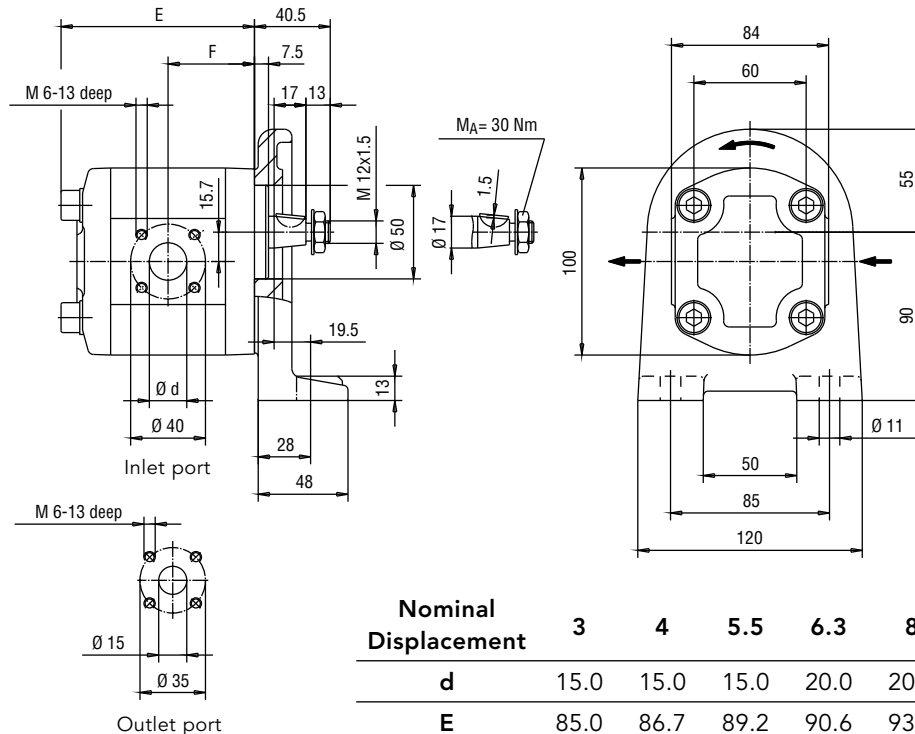
Graph showing the relationship between the force ratio FR (Y-axis, in kN) and the length l (X-axis, in mm) for different rotational speeds n (1000, 2000, 3000, and 4000 min^{-1}). The curves show that FR decreases as l increases and as n increases.

l (mm)	FR (kN) at $n = 1000 \text{ min}^{-1}$	FR (kN) at $n = 2000 \text{ min}^{-1}$	FR (kN) at $n = 3000 \text{ min}^{-1}$	FR (kN) at $n = 4000 \text{ min}^{-1}$
0	2.5	2.1	1.9	1.7
10	1.8	1.5	1.3	1.1
20	1.3	1.1	0.9	0.7
30	1.0	0.8	0.65	0.5
40	0.7	0.6	0.5	0.4
50	0.6	0.5	0.45	0.35
60	0.5	0.45	0.4	0.3
70	0.45	0.4	0.35	0.25

$$F_R = f(l)$$

15

Mounting Angle, Tapered Shaft End



Shaft end: Taper 1:5
Hex. lock nut M 12 x 1.5
DIN EN 28675
Curved spring washer B 12
DIN 137
Woodruff key 3 x 6.5
DIN 6888

Ordering example:
KP 1/4 F1RA K0A 4NL1

Nominal Displacement	3	4	5.5	6.3	8	11	14	16	19	22
d	15.0	15.0	15.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0
E	85.0	86.7	89.2	90.6	93.4	98.4	103.4	106.8	111.8	117.6
F	37.0	37.9	39.1	39.8	41.2	43.7	46.2	47.9	50.4	53.3
Weight kg	3.7	3.8	3.8	3.9	3.9	4.1	4.2	4.4	4.5	4.7

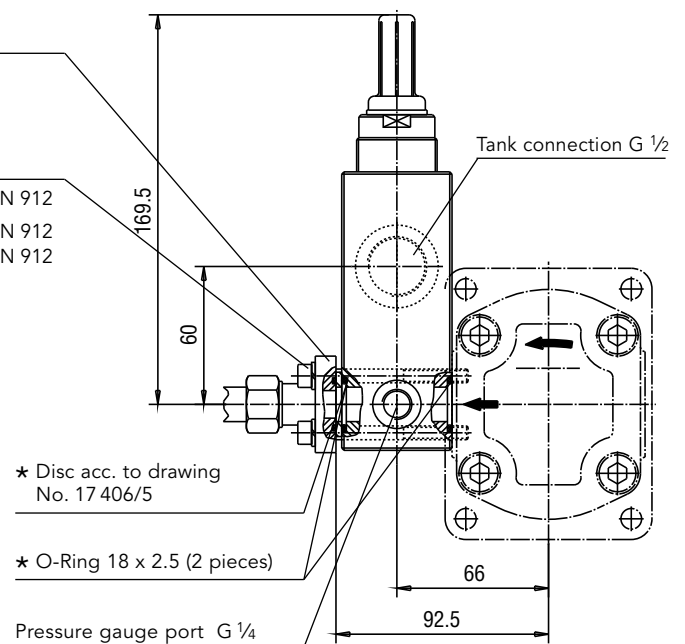
Pressure Relief Valve

- a Straight flanged connection GDA 1/12 1/16
b Elbow flanged connection WDA 1/12 1/16

★ Fixing screws

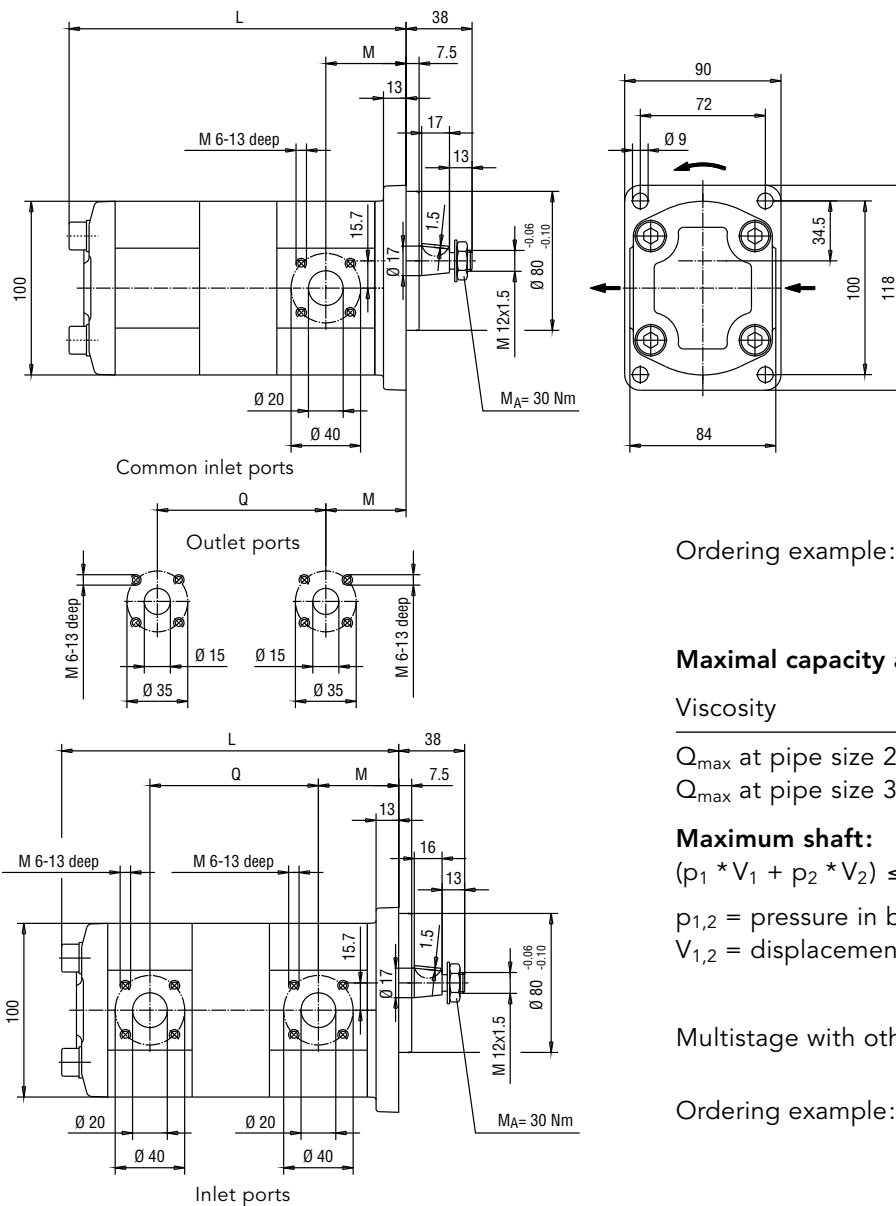
- a Straight flanged connection 4 pieces M6 x 70 DIN 912
b Elbow flanged connection 2 pieces M6 x 70 DIN 912
2 pieces M6 x 85 DIN 912

Ordering code	Set pressure P_{v1} bar	Set pressure P_{v2} bar	Discharge flow $Q_{1 \max}$ l/min	Discharge flow $Q_{2 \max}$ l/min
DBD 10 D 1 A 300	10	280	15	75
DBD 10 D 1 A 200	10	200	15	70
DBD 10 D 1 A 150	10	150	10	55
DBD 10 D 1 A 85	10	85	10	45
DBD 10 D 1 A 40	10	40	10	30
DBD 10 D 1 A 16	5	16	9	20



★ Extent of KRACHT delivery

Tandem Pump, Tapered Shaft End



The direction of rotation as represented is clockwise

In case of anticlockwise rotation the inlet and outlet ports are opposite

Shaft end: Taper 1:5
Hex. lock nut M 12 x 1.5
DIN EN 28675
Curved spring washer B 12
DIN 137
Woodruff key 3 x 6.5
DIN 6888

Ordering example: **KP 1/4 G10A KXF 4NL1/271 + KP 1/4 010U X0A 4NL1/271**

Maximal capacity at $n_{psh} = 1$ m

Viscosity $\nu = 120 \text{ mm}^2/\text{s}$ 34 mm^2/s

$Q_{\max}$ at pipe size 28 L 65 l/min 90 l/min
 $Q_{\max}$ at pipe size 35 L 85 l/min 110 l/min

Maximum shaft:

$$(p_1 \cdot V_1 + p_2 \cdot V_2) \leq 9000$$

$p_{1,2}$ = pressure in bar

$V_{1,2}$ = displacement in cm^3

Multistage with other flanges and shaft possible

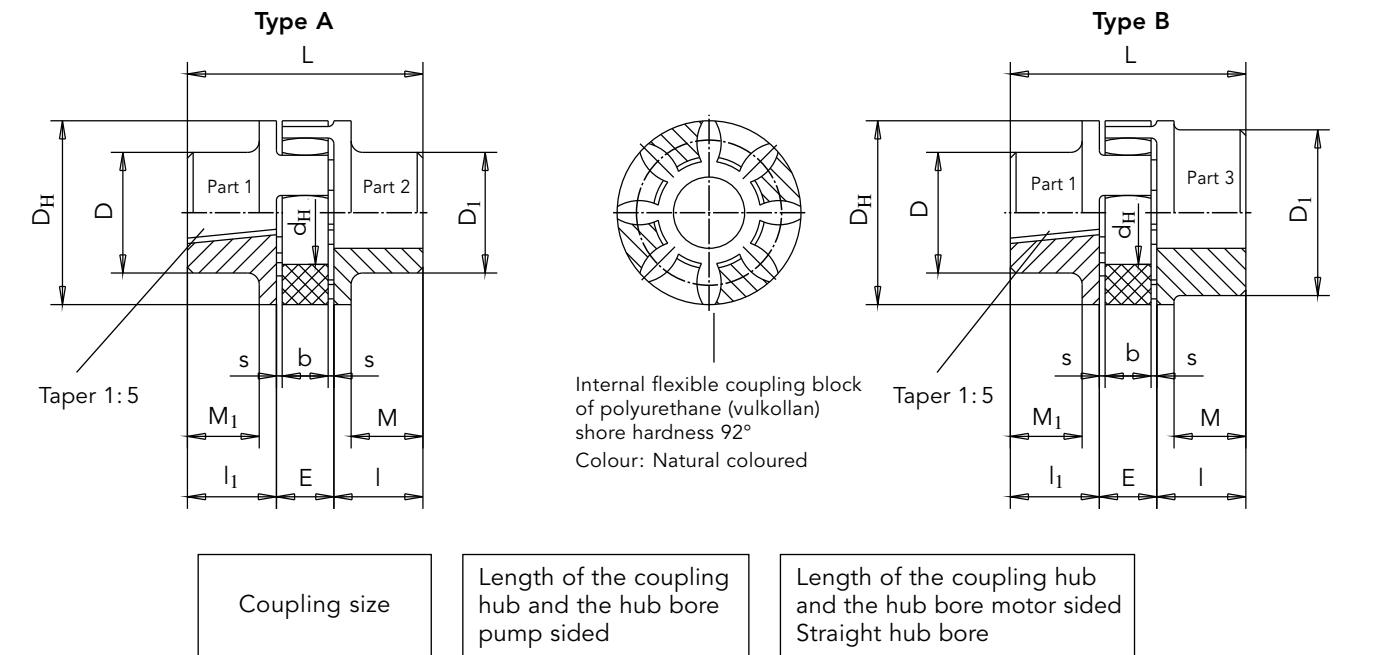
Ordering example: **KP 1/4 G10A KXF 4NL1/271 + KP 1/4 010A X0A 4NL1/271**

Nom. displ.	M	Nominal displacement	1. stage																				
			22		19		16		14		11		8		6.3		5.5		4		3		
			Q	L	Q	L	Q	L	Q	L	Q	L	Q	L	Q	L	Q	L	Q	L	Q	L	
3	39.5	2. stage	3	103.8	207.6	100.9	201.8	98.4	196.8	96.7	193.4	94.2	188.4	91.7	183.4	90.3	180.6	89.6	179.2	88.4	176.7	87.5	175.0
4	40.4		4	104.7	209.3	101.7	203.5	99.2	198.5	97.6	195.1	95.0	190.1	92.6	185.1	91.2	182.3	90.5	180.9	89.2	178.5		
5.5	41.6		5.5	105.9	212.1	103.0	206.0	100.5	201.0	98.8	197.6	96.3	192.6	93.8	187.6	92.4	184.8	91.7	183.4				
6.3	42.3		6.3	106.6	213.2	103.7	207.4	101.2	202.4	99.5	199.0	97.0	194.0	94.5	189.0	93.1	186.1						
8	43.7		8	108.0	216.0	105.1	210.2	102.6	205.2	100.9	201.8	98.4	196.8	95.9	191.8								
11	46.2		11	110.5	221.0	107.6	215.2	105.1	210.2	103.4	206.8	100.9	201.8										
14	48.7		14	113.0	226.0	110.1	220.2	107.6	215.2	105.9	211.8												
16	50.4		16	114.7	229.4	111.8	223.6	109.3	218.6														
19	52.9		19	117.2	234.4	114.3	228.6																
22	55.8		22	120.1	240.2																		

Note: Handling of different media / fluids with type / 271 not possible

Note: Handling of different media / fluids with type / 271 not possible
Single media / fluids on request

Couplings and Accessories



Ordering example: **RA 38 – K 18/17 – Z 45/38**

	Coupling size	Weight kg	Moment of inertia kgm ²	Rough bore		Finished bore				Dimensions												Ordering code
				Part 2	Part 3	min. Part 2	min. Part 3	max. Part 2	max. Part 3	I	I ₁	E	s	b	L	M	M ₁	D _H	D	D ₁	d _H	
Type A	24	0.2	0.00008	–	–	9	–	24	–	30	18.5	18	2	14	66.5	24	12.5	55	40	–	27	RA 24-K18/17-Z 30/...
	28	0.35	0.0002	–	–	10	–	28	–	35	18.5	20	2.5	15	73.5	28	11.5	65	48	–	30	RA 28-K18/17-Z 35/...
	38	0.75	0.0007	–	–	12	–	38	–	45	18.5	24	3	18	87.5	37	10.5	80	66	–	38	RA 38-K18/17-Z 45/...
	42	1.15	0.0014	25	–	28	–	42	–	50	18.5	26	3	20	94.5	40	8.5	95	75	–	46	RA 42-K18/17-Z 50/...
Type B	24/28	0.22	0.0001	–	20	–	22	–	28	30	18.5	18	2	14	66.5	24	12.5	55	40	56	27	RA 24/28-K18/17-Z 30/...
	28/38	0.42	0.0003	–	23	–	28	–	38	35	18.5	20	2.5	15	73.5	28	11.5	65	48	67	30	RA 28/38-K18/17-Z 35/...
	38/45	0.82	0.0008	–	36	–	38	–	45	45	18.5	24	3	18	87.5	37	10.5	80	66	77	38	RA 38/45-K18/17-Z 45/...
	38/45	2.5	0.0020	–	–	–	38	–	45	70	18.5	24	3	18	112.5	62	10.5	80	66	78	38	RG 38/45-K18/17-Z 70/...
	42/55	1.29	0.0018	–	25	–	42	–	55	50	18.5	26	3	20	94.5	40	8.5	95	75	94	46	RG 42/55-K18/17-Z 50/...

Operating temperature: –40 °C to +90 °C (short time temperature peaks up to +120 °C are permissible)

RA: Hub material Al

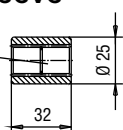
Weights as well as moments of inertia relate to the max. bore dia. after final machining – but without key-way

RG: Hub material part 2 and 3 GG

Bore finish acc. to ISO-fit class H7; key-ways acc. to DIN 6885 / part 1

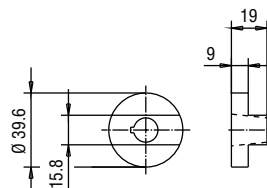
Coupling sleeve

Retaining ring
14 x 1 DIN 472



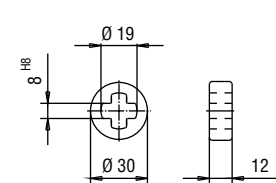
Internal involute
A 17 x 14
DIN 5482 sheet 1

Coupling sleeve part 1
Partnumber: B.0079020001



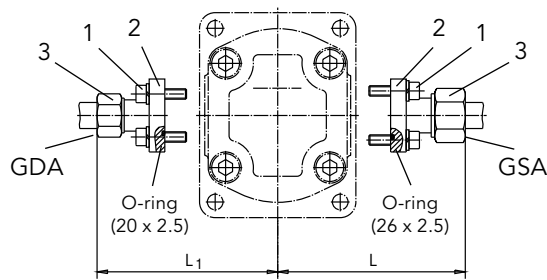
Coupling KP1 K-shaft
Partnumber: E.0187220001

Coupling



Coupling KP1 L
Partnumber: E.0104040001

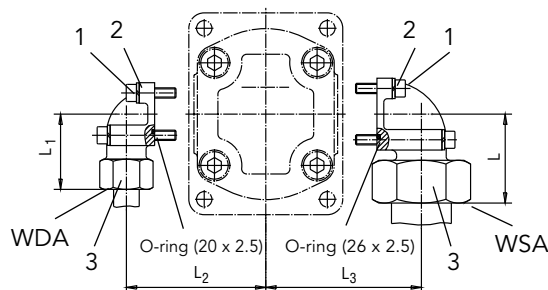
Straight Flanged Connector



- 1 Hex. socket head cap screw (DIN 912 – 8.8)
- 2 Single coil spring lock washer (A6 DIN 127)
- 3 Covering nut with cutting ring (SW)

Inlet port Pipe externa dia. mm	Ordering code	Discharge flow Q in l/min at 34 mm ² /s	Dimensions		Cap screws	Weight kg
			L	SW		
22	GSA 1/22	45	86	36	4 x M6 x 22	0.23
18	GSA 1/18	30	86	32	4 x M6 x 22	0.22
15	GSA 1/15	12	85	27	4 x M6 x 22	0.19
Outlet port Pipe externa dia. mm	Ordering code	Rated pressure P _N in bar	Dimensions		Cap screws	Weight kg
			L ₁	SW		
16	GDA 1/16	315	82	30	4 x M6 x 22	0.18
15	GDA 1/15	250	81	27	4 x M6 x 22	0.17
12	GDA 1/12	315	81	22	4 x M6 x 22	0.16

Elbow Flanged Connector



Ordering Code of a complete connection:

For the inlet port:

Straight flanged connector **GSA 1/22**

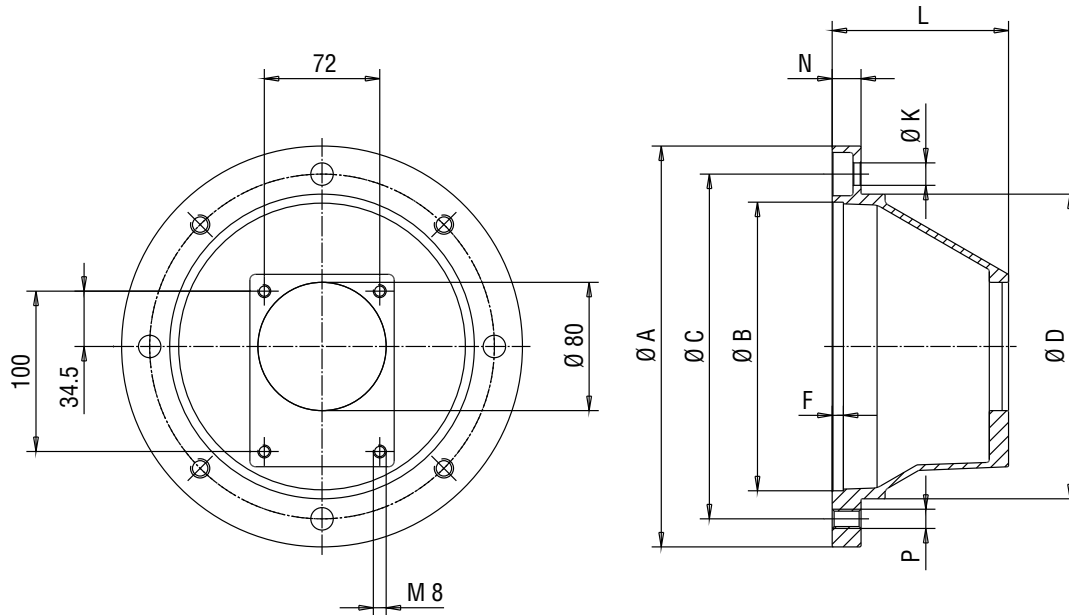
For the outlet port:

Elbow flanged connector **WDA 1/20**

Extend of Kracht delivery: Hex. socket head cap screw acc. to DIN 912 as well as single coil spring lock washers and O-rings.

Inlet port Pipe externa dia. mm	Ordering code	Discharge flow Q in l/min at 34 mm ² /s	Dimensions			Cap screws		Weight kg
			L	L ₃	SW			
35	WSA 1/35	65	52	74	50	2 x M6 x 60	2 x M6 x 22	0.55
28	WSA 1/28	45	49	70	41	2 x M6 x 50	2 x M6 x 20	0.38
22	WSA 1/22	25	47	64.5	36	4 x M6 x 22		0.27
18	WSA 1/18	18	47	64.5	32	4 x M6 x 22		0.25
15	WSA 1/15	12	46	64.5	27	4 x M6 x 22		0.23
Outlet port Pipe externa dia. mm	Ordering code	Rated pressure P _N in bar	Dimensions			Cap screws		Weight kg
			L ₁	L ₂	SW			
20	WDA 1/20	315	56	67	36	2 x M6 x 45	2 x M6 x 22	0.40
16	WDA 1/16	315	48	62	30	2 x M6 x 40	2 x M6 x 22	0.28
15	WDA 1/15	250	46	58.5	27	2 x M6 x 35	2 x M6 x 22	0.22
12	WDA 1/12	315	47	58.5	22	2 x M6 x 35	2 x M6 x 22	0.20

Aluminium Bell Housing for KP 1/..G..-Type

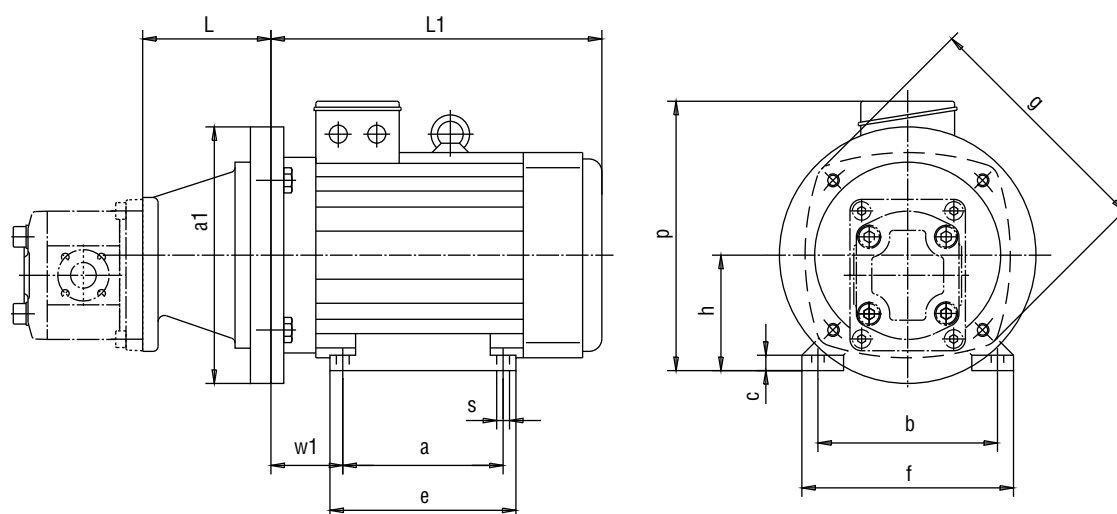


Type	Motor size											Adaptor flange weight kg	Coupling size	
		E-motor	A	B	C	D	F	K	L	N	P			
* Z1/160/110	71	160	110	130	110	7	9	110	13	9	0.8	RS24	-K18/17-Z50/14	
* Z1/200/100	80	200	130	165	145	7	11	100	16	M10	0.9	RA24	-K30/17-Z30/19	
* Z1/200/100	90	200	130	165	145	7	11	100	16	M10	1.0	RA24	-K18/17-Z30/24	
Z1/250/110	100/112	250	180	215	190	7	14	110	18	M12	1.5	RA24/28	-K18/17-Z30/28	
Z1/300/132	132	300	230	265	234	7	14	132	20	M12	2.1	RA38	-K18/17-Z45/38	
Z1/350/171	160	350	250	300	260	7	18	171	25	M16	3.1	RG38/45	-K18/17-Z70/42	

Those adaptor flanges marked by * are not suitable for installations into reservoirs because the pump flange dia. is larger than the centering dia. of the adaptor flange.

Bell housing with vent hole or leakage oil-hole on request.

Motor-Pump Assemblies KP 1/. G.0A K0A 4 NL.



Nominal size	Power	Operating speed	Power	Operating speed	Bell-housing	Coupling	Weight E-motor		Bell-housing
	Motor 6-pole kW	rpm	Motor 4-pole kW	rpm			kg	kg	
80 S	0.37	920	0.55	1400	Z1/200/100-K	RA 24-K30/17-Z30/19	11	10	0.9
80	0.55	910	0.75	1400			12	11	
90 S	0.75	925	1.1	1410	Z1/200/100-K	RA 24-K18/17-Z30/24	13	13	1.0
90 L	1.1	935	1.5	1420			17	15	
100 LS	—	—	2.2	1420	Z1/250/110-K	RA 24/28-K18/17-Z30/28	—	21	1.5
100 L	1.5	940	3	1430			20	24	
112 M	2.2	945	4	1440			29	31	
132 S	3	955	5.5	1445	Z1/300/132-K	RA 28/38-K18/17-Z35/38	36	39	2.1
132 M	4	960	7.5	1450			63	60	
160 M	7.5	960	11	1450	Z1/350/171-K	RG 38/45-K18/17-Z70/42	76	76	3.1
160 L	11	960	15	1450			94	90	

Nominal size	Dimensions in mm											
	L	a ₁	a	b	c	e	g	h	L ₁	p	s	w ₁
80 S	100	200	100	125	5	120	156	80	244	199	10	50
80	100	200	100	125	5	120	156	80	244	199	10	50
90 S	100	200	100	140	12	158	190	90	258	210	9	56
90 L	100	200	125	140	12	158	190	90	258	210	10	56
100 LS	110	250	140	160	12	172	213	100	298	232	12	63
100 L	110	250	140	160	12	172	213	100	298	232	12	63
112 M	110	250	140	190	12	172	234	112	325	252	12	70
132 S	132	300	140	216	12	187	265	132	358	283	12	89
132 M	132	300	178	216	12	218	298	132	399	303	12	89
160 M	171	350	210	254	16	306	323	160	476	341	15	108
160 L	171	350	254	254	16	306	323	160	476	341	15	108

Motor frame sizes are based on Schäfer. Other manufactures motors can be supplied on request as IM B 35.

Notes

Notes

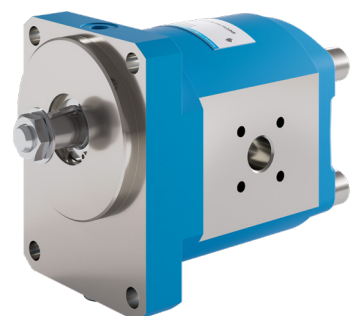
KRACHT®

KRACHT GmbH · Gewerbestrasse 20 · 58791 Werdohl, Germany
Phone +49 2392 935 0 · E-Mail info@kracht.eu · Web www.kracht.eu

High pressure
gear pumps

KP 1

Series 2



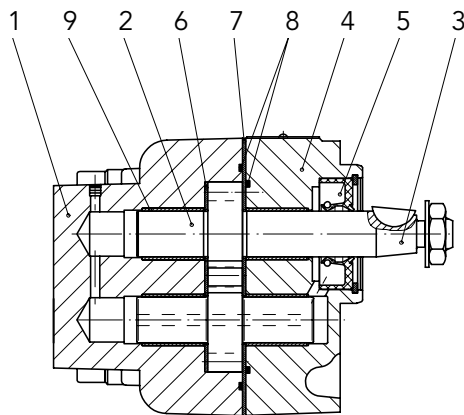
KRACHT®
FLUID TECHNOLOGY AND SYSTEMS

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Description

I Construction



- 1 Housing
- 2 Gearing
- 3 Drive shaft end
- 4 Flange mounting cover
- 5 Rotary shaft lip-type seal
- 6 Sliding plate
- 7 Pressure plate
- 8 O-ring seal
- 9 Plain bearing bush

I Function

KRACHT External gear pumps KP 1 series 2, due to their structure (design principle) and the materials employed, are ideal for use under the most extreme operating conditions. Important modular elements (see sectional drawing) are the housings and flanged covers - both made from grey cast iron or cast iron - can be highly loaded dynamically making them insensitive to pressure peaks and continuous vibrations. Large-surface-dimensioned, PTFE-Pb coated, bronze plain bearings on steel backs in the housing and flanged cover support the micro-finish ground bearing journals of the gear, which comprises the drive-shaft wheel and bolt wheel. To realise optimum running properties, the tooth flanks of the gear, which are manufactured out of casehardening steel, are ground.

This function of the active axial-play compensation, indispensable for high-pressure pump kidneys, is implemented under the pressure plate. It has hydraulically pressurised pressure-fields, guaranteeing compensation of the axial play at every operating pressure. The pressure plates are designed for viscosity-independent play-compensation. That ensures a high level of volumetric and mechanical efficiency at every operating point. NBR or FKM seals can be used to meet comprehensive application requirements caused by the temperature and/or media. These pumps are ideal for hydraulic oil, engine oil, HEES bio-oils and flame resistant fluids.

Note:

1. External loads

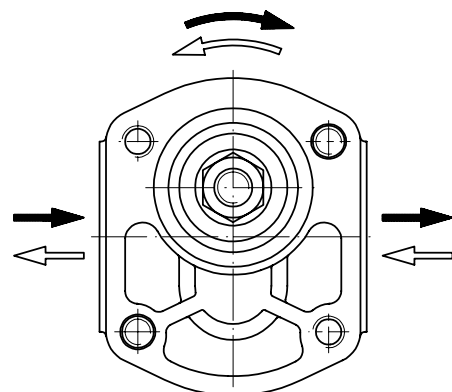
Externally acting forces acting on the drive-shaft end influence the function of the bearing glands. Radial forces can possibly be absorbed depending on the size and direction of action. Axial forces are not permissible. To absorb the external forces, use pump versions with outboard bearings.

2. Direction of rotation

Concerning the direction of rotation, - when looking at the drive shaft end - the following stipulation applies:

Shaft rotating clockwise:
Feed direction from left to right.

Shaft rotating counter-clockwise:
Feed direction from right to left.



Technical Data

I Materials

Housing	EN-GJL-300
Flange mounting cover	EN-GJS-400-15
Bearing	Multi-compound plain bearing bushes
Shafts and gears	Casehardened and ground carburised steel according to DIN 17210
Seals	NBR $\vartheta \leq 90^{\circ}\text{C}$ FKM $\vartheta \leq 110^{\circ}\text{C}$ (P20-plain bearing) FKM $\vartheta \leq 150^{\circ}\text{C}$ (DU-plain bearing)

I Characteristics

Mounting	flange or foot-type
Pipe connection	flange type threaded flange on request
Direction of rotation	clockwise or anticlockwise
Fitting position	optional (with containing water fluids see page 7)
Ambient temperature	$\vartheta_{u \text{ min}}$ = -20°C $\vartheta_{u \text{ max}}$ = 60°C
Working pressure Inlet port	$p_{e \text{ min}}$ = -0.4 bar (vacuum) $p_{e \text{ max}}$ = 2 bar Flange mounting cover F $p_{e \text{ max}}$ = 25 bar bei $n < 500 \text{ rpm}$ $p_{e \text{ max}}$ = 20 bar bei $n < 1000 \text{ rpm}$ $p_{e \text{ max}}$ = 15 bar bei $n < 1500 \text{ rpm}$
Working pressure Short time	$p_{e \text{ max}}$ = 5 bar
Working pressure Outlet port	$p_{e \text{ max}}$ = see technical data
Fluid temperature range	$\vartheta_{m \text{ max}}$ = 90°C NBR $\vartheta_{m \text{ max}}$ = 110°C FKM (P20-plain bearing) $\vartheta_{m \text{ max}}$ = 150°C FKM (DU-plain bearing)
Viscosity	v_{min} = $1.2 \text{ mm}^2/\text{s}$ v_{max} = $600 \text{ mm}^2/\text{s}$
Recommended oil cleanliness	acc. to ISO 4406:1999 Code 21/19/16 acc. to NAS 1638 class 10
Discharge flow	see chart page 8
Input power	see chart page 8
Hydraulic fluids	Mineral oil acc. to DIN 51524/25 Engine oil acc. to DIN 51511 Bio oils of type „HEES“ (VDMA 24568) Flame resistant fluids (VDMA 24317) Diesel, heating oil EL and kerosene on request

Technical Data

Calculation formulas for hydraulic pumps

Characteristic data, formula signs, units

1. Discharge flow / input flow	Q	l/min
2. Pump /motor displacement	V _g	cm ³ /rev
3. Pressure	p	bar
4. Speed of rotation	n	rpm
5. Torque	M	Nm
6. Power	P	kW
7. Total efficiency	η _{tot}	–
8. Volumetric efficiency	η _{vol}	–
9. Hydr./mech. efficiency	η _{hm}	–
10. Flow velocity	v	m/s
11. Pipe diameter	d	mm

Characteristic data for:	Volumetric flow	Discharge flow $Q = \frac{V_g \cdot n \cdot \eta_{vol}}{10^3} \left[\frac{l}{min} \right]$
	Torque	Drive torque $M = \frac{p \cdot V_g}{20 \cdot \pi \cdot \eta_{hm}} [Nm]$
	Power	Input power $P = \frac{p \cdot Q}{600 \cdot \eta_{tot}} [kW]$

General

$$Q_{th} = V_g \cdot n, \eta_{tot} = \eta_{vol} \cdot \eta_{hm}$$

$$M = 9549 \cdot \frac{P}{n}, v = 21.22 \frac{Q}{d^2}$$

Max. switching frequency: 30 /min

Pressure specifications apply to $v \geq 34 \text{ mm}^2/\text{s}$

Technical Data

Nominal Displacement	Geom. Displacement	Max. pressure	Rated pressure	Continuous working pressure	Max. working speed	Moment of inertia x 10 ⁻⁶	Minimum speed at p = ... bar				
							... 100	... 120	... 150	... 180	... 200
							n in rpm				
	V _g in cm ³ /rev	P _{max} in bar	P _N in bar	P _D in bar	n _{max} in rpm	J in kg m ²					
3	3.2	250	220	200	4000	24.8	700	800	1000	1200	1200
4	4.7	250	220	200	4000	31.1	600	800	900	1000	1100
5.5	5.7	250	220	200	4000	35.7	500	700	900	1000	1100
8	8.3	220	200	180	4000	48.4	500	700	900	1000	1000
11	11.3	200	180	160	3500	61.2	500	700	800	900	-
16	16.6	200	180	160	3000	85.5	500	600	800	800	-
20	20.4	160	140	120	2500	104.2	500	600	800	-	-

Technical Data

I Explanation on flame resistant hydraulic fluids compliant with VDMA 24317

1. HFA Moisture content > 80 % (Oil in water emulsion)
2. HFB Moisture content > 40 % (Water in oil emulsion)
3. HFC Moisture content > 35 % (Aqueous polymer solutions)
4. HFDR Moisture content = 0 % (Anhydrous fluids based on phosphoric acid esters)

Max. pressure	Max. pressure	Speed	Speed	Temperature	Seal	Inlet to pump required
	$p_{\max}$ in bar	$n_{\min}$ in rpm	$n_{\max}$ in rpm	ϑ in °C		
HFA	40	1400	1800	5 ... 55	NBR	yes
HFB	80	see technical data	1800	5 ... 60	NBR	yes
HFC	120	see technical data	1800	-20 ... 60	NBR	yes
HFDR	140	see technical data	1800	-20 ... 110	FKM	yes

Water glycol coolants (e.g. Glythermin from BASF) must not be used!

Note: With HFA, HFB and HFC (all aqueous fluids), keep in mind that all components that come into contact with air (parting line between the medium and the air in the tank or air bubbles in the components) will corrode. For that reason, tanks require a special coating and it is mandatory that the pumps be attached below the tank level outside and inside. Never allow the pumps to run dry. When installing in the tank, the pumps must always be completely immersed into the medium. Attention: in case of varying volumes, always pay attention to and monitor the lowest liquid level!

I Recommended values for efficiency dependent on the viscosity in $n = 1450$ rpm

$V_{g\text{ nenn}}$	ν	Pressure	η_{vol}	η_{hm}
in cm³/rev	in mm²/s	in bar	in %	in %
4	34	220	75	75
4	4	80	75	75
4	1.2	40	69	75

$V_{g\text{ nenn}}$	ν	Pressure	η_{vol}	η_{hm}
in cm³/rev	in mm²/s	in bar	in %	in %
11	34	180	90	90
11	4	80	80	90
11	1.2	40	78	90

$V_{g\text{ nenn}}$	ν	Pressure	η_{vol}	η_{hm}
in cm³/rev	in mm²/s	in bar	in %	in %
20	34	140	89	90
20	4	80	85	90
20	1.2	40	82	90

Discharge flow and required input

Discharge flow at n = 1450 rpm

Nominal Size	Pressure in bar							
	20	60	100	140	180	200	220	
3	4.5	4.3	4.0	3.8	3.5	3.4	3.3	Discharge flow Q in l/min at 34 mm ² /s
4	6.6	6.3	6.0	5.7	5.4	5.3	5.1	
5.5	8.0	7.8	7.5	7.2	6.9	6.8	6.6	
8	11.7	11.4	11.1	10.7	10.4	10.2	-	
11	15.9	15.7	15.4	15.1	14.7	-	-	
16	23.4	23.1	22.7	22.3	21.9	-	-	
20	28.7	28.0	27.2	26.3	25.5	-	-	

Required input at n = 1450 rpm

Nominal Size	Pressure in bar							
	20	60	100	140	180	200	220	
3	0.27	0.64	1.00	1.36	1.72	1.90	2.08	Required input P in kW
4	0.35	0.87	1.39	1.91	2.43	2.69	2.95	
5.5	0.38	0.94	1.51	2.08	2.64	2.93	3.21	
8	0.51	1.34	2.17	2.99	3.82	4.24	-	
11	0.66	1.78	2.91	4.03	5.16	-	-	
16	0.93	2.60	4.27	5.93	7.60	-	-	
20	1.10	3.11	5.12	7.12	-	-	-	

Discharge flow at n = 950 rpm

Nominal Size	Pressure in bar							
	20	60	100	140	180	200	220	
3	2.8	2.6	2.4	2.2	-	-	-	Discharge flow Q in l/min at 34 mm ² /s
4	4.2	3.9	3.6	3.4	3.1	-	-	
5.5	5.1	4.8	4.6	4.3	4.0	-	-	
8	7.4	7.1	6.9	6.6	6.2	6.1	-	
11	10.1	9.9	9.6	9.4	9.1	-	-	
16	14.9	14.6	14.3	14.0	13.6	-	-	
20	18.2	17.6	16.9	16.1	-	-	-	

Required input at n = 950 rpm

Nominal Size	Pressure in bar							
	20	60	100	140	180	200	220	
3	0.19	0.42	0.65	0.88	-	-	-	Required input P in kW
4	0.24	0.57	0.90	1.23	1.56	-	-	
5.5	0.26	0.63	1.00	1.38	1.75	-	-	
8	0.34	0.88	1.43	1.97	2.51	2.79	-	
11	0.44	1.17	1.91	2.64	3.38	-	-	
16	0.61	1.68	2.75	3.83	4.90	-	-	
20	0.73	2.05	3.37	4.69	-	-	-	

Type key

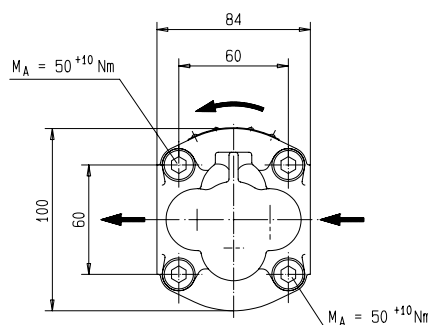
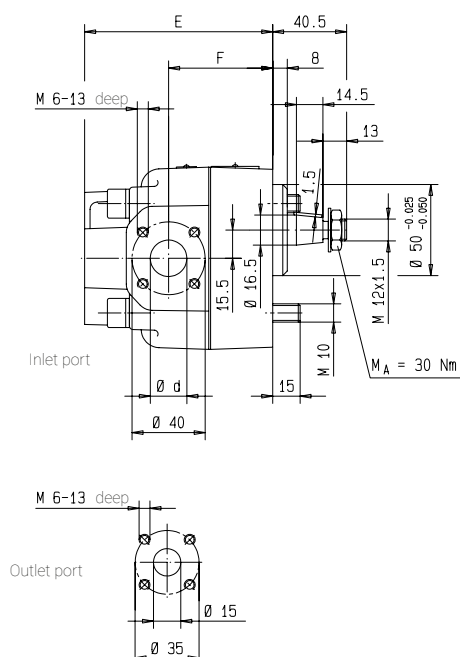
Example

KP	1/	3	F	1	0	A	K	0	0	2	K	L	1	/...
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15

1 Product code		
2 Size		
1		
3 Nominal displacement		
3 · 4 · 5.5 · 8 · 11 · 16 · 20		
4 Selection: flange mounting cover (LA = Hole spacing / Ø Z = Centering diameter)		
F	bolt square flange, LA = 60/60; Ø Z = 50	
G	bolt rectangular flange, LA = 72 /100; Ø Z = 80, only in connection with K-shafts (special number 446)	
5 Direction of rotation		
1	right	
2	left	
6 Outboard flanges or bearing resp.		
0	without	
L	Bearing series light	
U	Mounting angel with bearing	
7 Housing side ports		
A	Inlet port Ø 15 with LK 40 up to V _g 5.5 Inlet port Ø 20 with LK 40 from V _g 8 Outlet port Ø 15 with LK 35	
8 Shaft end / Shaft load capacity		
K	Taper 1:5 / 150 Nm _{max}	
L	Taper 1:5 for outboard bearing and mounting angle	
X	Involute Spline B 17 x 14, DIN 5482 / 70 Nm _{max}	
9 2. shaft end		
0	without	
10 Endcovers (adapter pieces)		
0	without	
11 Design serial no.		
2	(specified by KRACHT)	
12 Code for materials (Housing and bearing type)		
K	plain bearings P20	Cast iron housing and sliding plates
D	plain bearings DU	
13 Type of gearing		
L	Driving und driven gears of case hardening steel tooth flanks grinded and honed	
14 Seals		
1	NBR θ ≤ 90 °C	
2	FKM θ ≤ 110 °C (2KL) FKM θ ≤ 150 °C (2DL)	
15 Code-No. for special construction		

Dimensions and weights

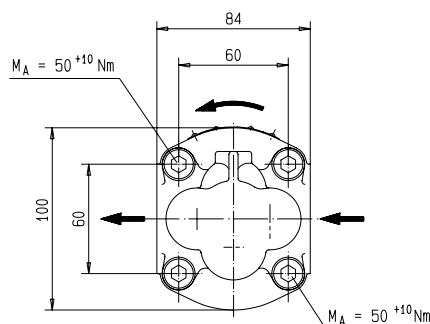
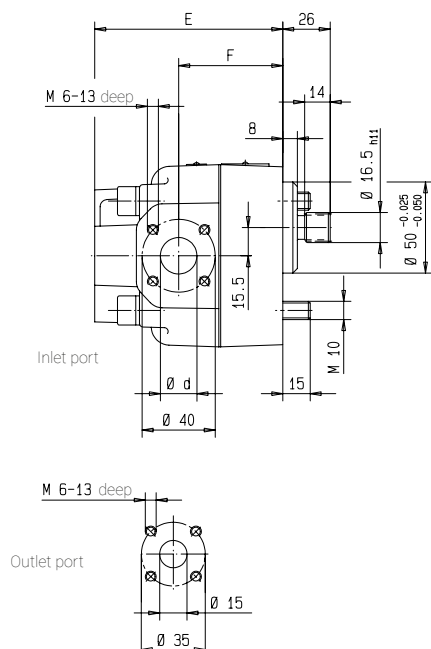
I F-flange, tapered shaft end



Shaft end: Taper 1:5
Hex. lock nut M 12 x 1.5 EN ISO 8675
Curved spring washer B12 DIN 137
Woodruff key 3 x 6.5 DIN 6888
The direction of rotation as represented is clockwise. In case of anticlockwise rotation the inlet and outlet ports are.

Nominal displacement	Dimensions			Weight in kg
	d	E	F	
3	Ø 15	103	54.8	4.4
4	Ø 15	103	57	4.4
5.5	Ø 15	103	57	4.2
8	Ø 20	103	57	4.3
11	Ø 20	103	57	4.4
16	Ø 20	103	57	4.4
20	Ø 20	105	63	4.6

I F-flange, involute spline shaft end

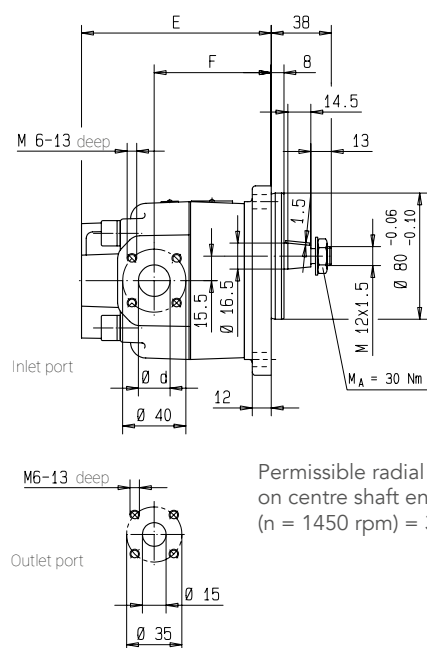


Gear shaft profile
B17x14 DIN 5482
gear-tooth thickness Sw = 3.206
Off-set profiling = +0.6

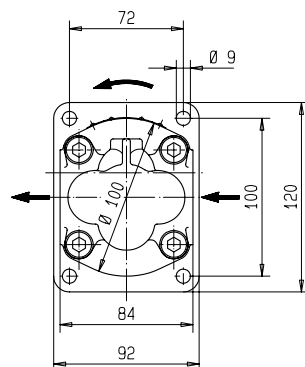
Nominal displacement	Dimensions			Weight in kg
	d	E	F	
3	Ø 15	103	54.8	4.2
4	Ø 15	103	57	4.2
5.5	Ø 15	103	57	4.0
8	Ø 20	103	57	4.1
11	Ø 20	103	57	4.2
16	Ø 20	103	57	4.2
20	Ø 20	105	63	4.4

Dimensions and weights

I Outboard bearing type L, tapered shaft end



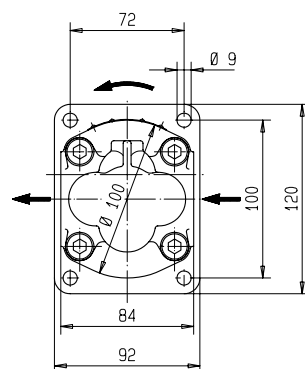
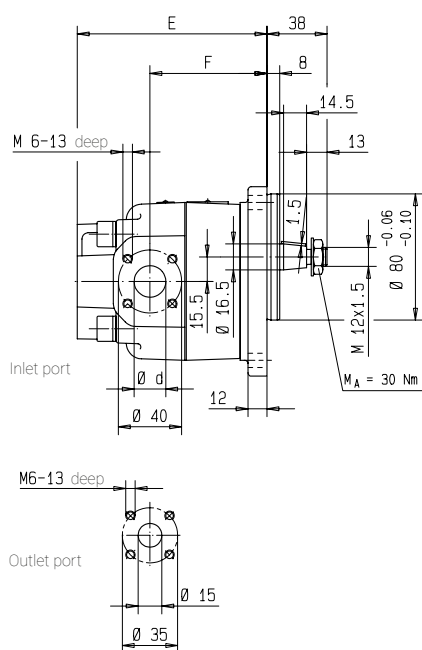
Permissible radial force N
on centre shaft end
(n = 1450 rpm) = 340 N



Shaft end: Taper 1:5
Hex. lock nut M 12 x 1.5 EN ISO 8675
Curved spring washer B12 DIN 137
Woodruff key 3 x 6.5 DIN 6888

Nominal displacement	Dimensions			Weight in kg
	d	E	F	
3	Ø 15	120	71.8	5.4
4	Ø 15	120	74	5.4
5.5	Ø 15	120	74	5.2
8	Ø 20	120	74	5.3
11	Ø 20	120	74	5.4
16	Ø 20	120	74	5.4
20	Ø 20	122	80	5.6

I Outboard without bearing type L, tapered shaft end (see type key flange mounting cover G)



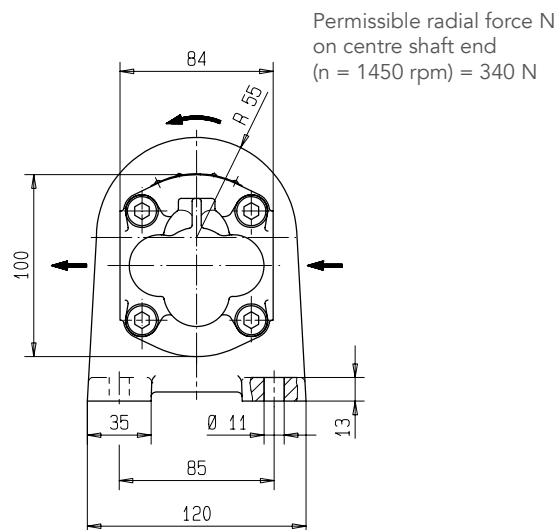
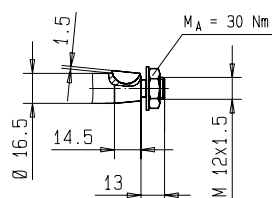
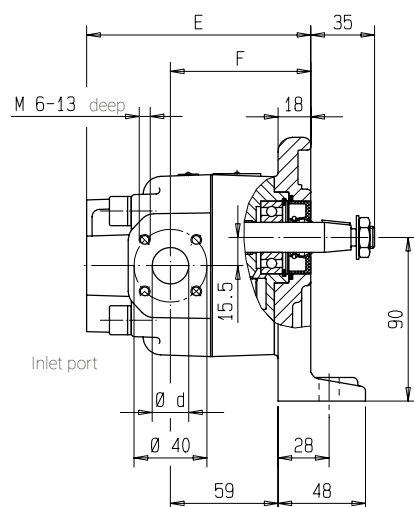
Shaft end: Taper 1:5
Hex. lock nut M 12 x 1.5 EN ISO 8675
Curved spring washer B12 DIN 137
Woodruff key 3 x 6.5 DIN 6888

Nominal displacement	Dimensions			Weight in kg
	d	E	F	
3	Ø 15	120	71.8	5.3
4	Ø 15	120	74	5.3
5.5	Ø 15	120	74	5.1
8	Ø 20	120	74	5.2
11	Ø 20	120	74	5.3
16	Ø 20	120	74	5.2
20	Ø 20	122	80	5.5

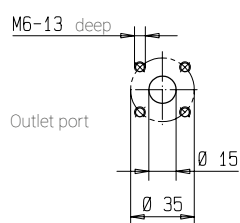
Dimensions in mm

Technical Data

I Mounting angle, outboard bearing, tapered shaft end



Permissible radial force N
on centre shaft end
(n = 1450 rpm) = 340 N

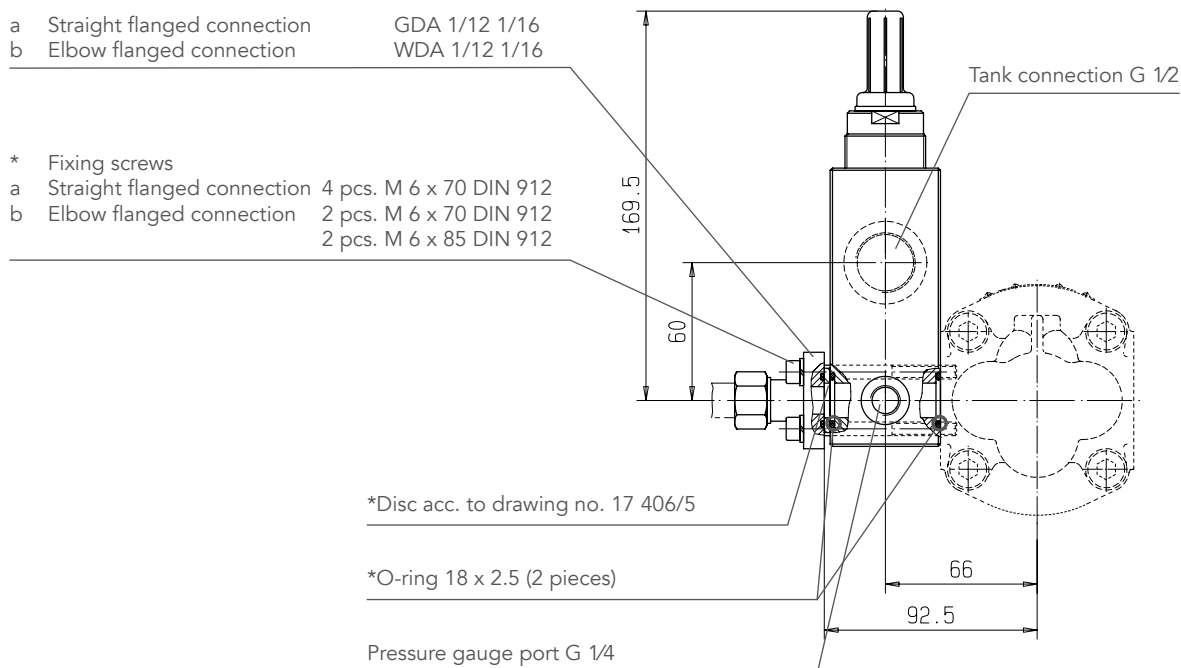


Shaft end: Taper 1:5
Hex. lock nut M 12 x 1.5 EN ISO 8675
Curved spring washer B12 DIN 137
Woodruff key 3 x 6.5 DIN 6888

Nominal displacement	Dimensions			Weight in kg
	d	E	F	
3	Ø 15	123	74	6.0
4	Ø 15	123	77	6.0
5.5	Ø 15	123	77	5.8
8	Ø 20	123	77	5.9
11	Ø 20	123	77	6.0
16	Ø 20	123	77	6.0
20	Ø 20	125	83	6.2

Technical Data

I Pressure relief valve

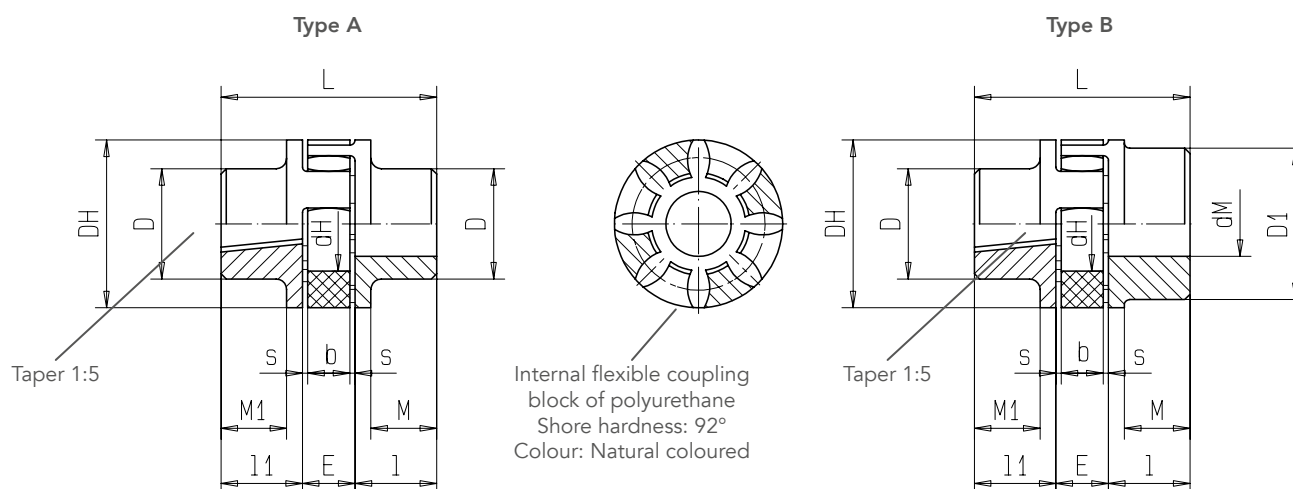


* Extent of KRACHT delivery

Ordering code	Set pressure		Discharge flow	
	P_{v1} in bar	P_{v1} in bar	Q_{1max} in l/min	Q_{2max} in l/min
DBD 10 D 1 A 300	10	280	15	75
DBD 10 D 1 A 200	10	200	15	70
DBD 10 D 1 A 150	10	150	10	55
DBD 10 D 1 A 85	10	85	10	45
DBD 10 D 1 A 40	10	40	10	30
DBD 10 D 1 A 16	5	16	9	20

Technical Data

I Couplings



Ordering code

RA 24	–	K 18/17	–	Z 30/24
Coupling Size		Length of the coupling hub and the hub bore pump sided		Length of the coupling hub and the hub bore motor sided straight hub bore

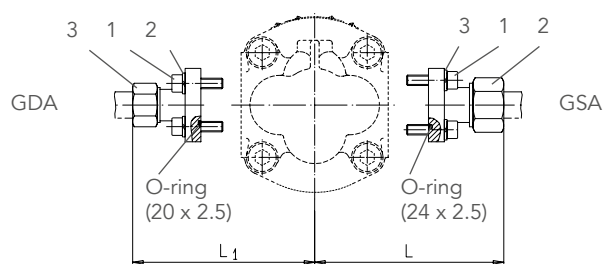
	Coupling Size	Weight in kg	Dimensions													Ordering code
			l	l ₁	E	s	b	L	M	M ₁	D _H	D	D ₁	d _h	d _M	
Type A	24	1.2	50	18.5	18	2	14	86	-	8.0	55	48	-	27	14	RS 24-K18/17-Z 50/14
	24	0.3	30	30.0	18	2	14	78	24	24.0	56	40	-	27	19	RA 24-K30/17-Z 30/19
	24	0.2	30	18.5	18	2	14	66	24	12.5	56	40	-	27	24	RA 24-K18/17-Z 30/24
	38	2.6	70	18.5	24	3	18	112	62	10.5	80	78	-	38	38	RG 38-K18/17-Z 70/38
Type B	24/28	0.3	30	18.5	18	2	14	66	-	12.5	56	40	56	27	28	RA 24/28-Z 18/17-Z 30/28

Working temperatur: -40 °C to +90 °C (short time temperature peaks up to + 120 °C are permissible).
Weights as well as moments of inertia relate to the max. bore dia. after final machining
– but without key-way Bore finish acc. to ISO-fit class H7; key-ways acc. to DIN 6885 / part 1.

RA: Hub material Al
RG: Hub material GG
RS: Hub material Stahl

Technical Data

I Straight Flanged Connector



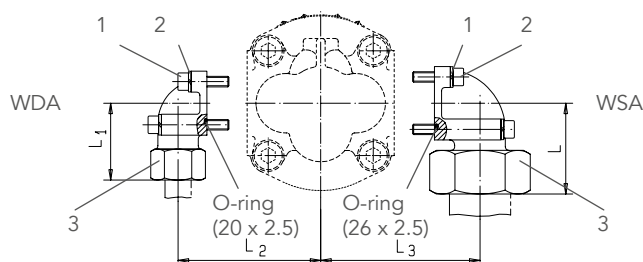
- 1 Hex. socket head cap screw (DIN 912 – 8.8)
- 2 Single coil spring lock washer (A6 DIN 127)
- 3 Covering nut with cutting ring (SW)

Extend of Kracht delivery: Hex. socket head cap screw acc. to DIN 912 as well as single coil spring lock washers and O-rings.

Inlet port Pipe externa dia. in mm	Ordering code	Discharge flow Q at 34 mm ² /s in l/min	Dimensions		Cap screws	Weight in kg
			L	SW		
22	GSA 1/22	45	86	36	4 x M 6 x 22	0.23
18	GSA 1/18	30	86	32	4 x M 6 x 22	0.22
15	GSA 1/15	12	85	27	4 x M 6 x 22	0.19

Outlet port Pipe externa dia. in mm	Ordering code	Rated pressure PN in bar	Dimensions		Cap screws	Weight in kg
			L1	SW		
16	GDA 1/16	315	82	30	4 x M 6 x 22	0.18
15	GDA 1/15	250	81	27	4 x M 6 x 22	0.17
12	GDA 1/12	315	81	22	4 x M 6 x 22	0.16

I Elbow Flanged Connector



- 1 Hex. socket head cap screw (DIN 912 – 8.8)
- 2 Single coil spring lock washer (A6 DIN 127)
- 3 Covering nut with cutting ring (SW)

Extend of Kracht delivery: Hex. socket head cap screw acc. to DIN 912 as well as single coil spring lock washers and O-rings.

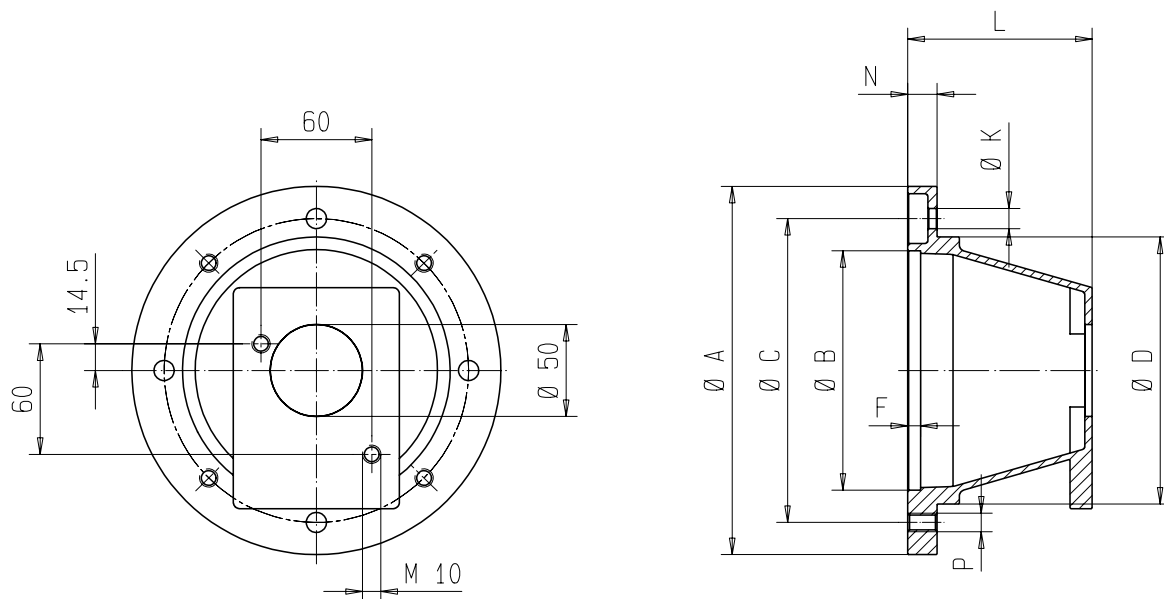
Inlet port Pipe externa dia. in mm	Ordering code	Discharge flow Q at 34 mm ² /s in l/min	Dimensions			Cap screws	Weight in kg
			L	L ₃	SW		
35	WSA 1/35	65	52	74	50	2 x M 6 x 60 2 x M 6 x 22	0.55
28	WSA 1/28	45	49	70	41	2 x M 6 x 50 2 x M 6 x 20	0.38
22	WSA 1/22	25	47	64.5	36	4 x M 6 x 22	0.27
18	WSA 1/18	18	47	64.5	32	4 x M 6 x 22	0.25
15	WSA 1/15	12	46	64.5	27	4 x M 6 x 22	0.23

Outlet port Pipe externa dia. in mm	Ordering code	Rated pressure P _N in bar	Dimensions			Cap screws	Weight in kg
			L ₁	L ₂	SW		
20	WDA 1/20	315	56	67	36	2 x M 6 x 45 2 x M 6 x 22	0.40
16	WDA 1/16	315	48	62	30	2 x M 6 x 40 2 x M 6 x 22	0.28
15	WDA 1/15	250	46	58.5	27	2 x M 6 x 35 2 x M 6 x 22	0.22
12	WDA 1/12	315	47	58.5	22	2 x M 6 x 35 2 x M 6 x 22	0.20

Dimensions in mm

Technical Data

I Aluminium Bell Housing for KP 1/..F.-Type

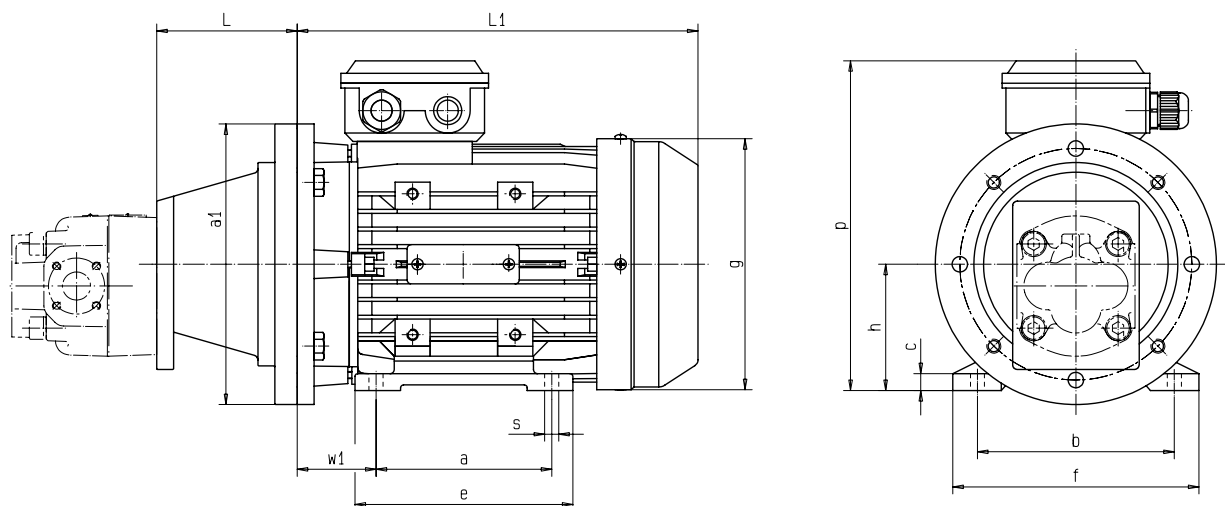


Type	Motorsize E-Motor	Dimensions									Adapter flange weight	Coupling size
		A	B	C	D	F	K	L	N	P	in kg	
*Z1/200/100	80	200	130	165	145	7	11	100	16	M 10	0.9	RA 24- K30/17-Z30/19
*Z1/200/100	90	200	130	165	145	7	11	100	16	M 10	0.9	RA 24 - K18/17-Z30/24
Z1/250/110	100/112	250	180	215	190	7	14	110	19	M 12	1.2	RA 24/28 - K18/17-Z30/28
Z1/300/144	132	300	230	265	234	7	14	144	20	M12	1.9	RG 38 - K18/17-Z 70/38

Those adaptor flanges marked by * are not suitable for installations into reservoirs because the pump flange dia. is larger than the centering dia. of the adaptor flange. Bell housing with vent hole or leakage oil-hole on request.

Technical Data

I Motor-Pump Assemblies KP 1/ . F.OA K00 2KL.



Nominal Size	Power	Operating	Leistung	Operating	Bellhousing	Coupling	Weight E-Motor		Weight Bell- housing
	Motor 6-pole		Motor 4-pole				6-pole	4-pole	
	in kW	in rpm	in kW	in rpm			in kg		in kg
80	0.37	900	0.55	1370	Z1/200/100	RA 24-K30/17-Z30/19	8.1	8.1	0.9
80	0.55	900	0.75	1380			9.6	9.1	
90 S	0.75	920	1.10	1400	Z1/200/100	RA 24-K18/17-Z30/24	11.3	11.7	0.9
90 L	1.10	925	1.50	1400			14.4	14.4	
100	-	-	2.20	1420	Z1/250/110	RA 24/28-K18/17-Z30/28	-	19.2	1.2
100	1.50	945	3.00	1420			18.8	22.5	
112	2.20	955	4.00	1430			25.0	29.0	
132 S	3.00	960	5.50	1450	Z1/300/144	RG 38-K18/17-Z70/38	35.0	39.0	1.9
132 M	4.00	960	7.50	1450			47.6	48.6	

Nominal Size	Dimensions												
	L	a ₁	a	b	c	e	f	g	h	L ₁	p	s	w ₁
80	100	200	100	125	10	122	155	164	80	250	217	10	50
90 S	100	200	100	140	12	125	175	180	90	260	235	10	56
90 L	100	200	125	140	12	150	175	180	90	285	235	10	56
100	110	250	140	160	14	173	198	205	100	326	252	12	63
112	110	250	140	190	14	172	228	222	112	335	292	12	70
132 S	144	300	140	216	16	225	258	264	132	356	325	12	89
132 M	144	300	178	216	16	225	258	264	132	395	325	12	89

Motor frame sizes are based on ADDA. Other manufactures motors can be supplied on request as IM B 35.

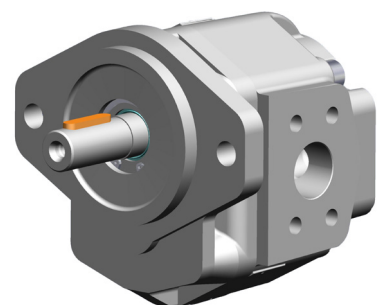
Notes

Notes

KRACHT®

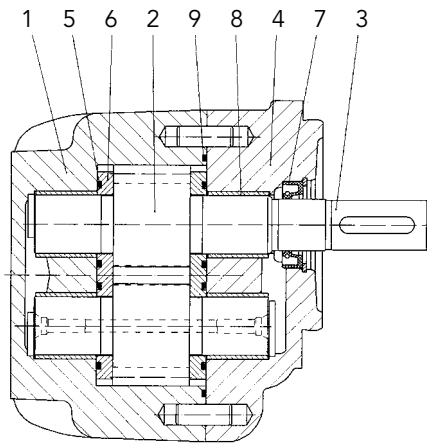
KRACHT GmbH · Gewerbestrasse 20 · 58791 Werdohl, Germany
Phone +49 2392 935 0 · E-Mail info@kracht.eu · Web www.kracht.eu

High pressure
gear pumps
KP 2 / KP 3



KRACHT®
FLUID TECHNOLOGY AND SYSTEMS

Construction



- 1 Housing
- 2 Gear
- 3 Drive shaft end
- 4 Flange mounting cover
- 5 Gasket for the pressure fields for axial and play compensation
- 6 Sliding plates
- 7 Single rotary shaft lip
- 8 Plain bearings
- 9 Sealing of the housing

Function

Due to the construction (design principle) and the materials used KRACHT series KP 2 / KP 3 external gear pumps are suitable for use under the most stringent operating conditions. The housing and the flange mounting cover (see the sectional drawing) – both made of gray cast iron – have high dynamic load capabilities and are therefore insensitive to peak pressures and permanent oscillations. Large-scale PTFE-Pb coated plain bronze bearings on steel backs in the housing and the flange mounting cover carry the extremely finely ground bearing pins of the gear, which consists of the driving shaft pinion.

The tooth profiles of the gear, which is made of case hardened steel, are ground to achieve the best running characteristics. A considerable reduction in the volume flow fluctuation and thus of the pressure pulsation is achieved through the high number of teeth ($z = 14$) and in combination with a tooth form shaped in accordance with the special requirements of hydraulics and the optimum ra-

ting of the expansion grooves in the quench oil area. This leads to much lower noise levels for the pumps, or for complete systems and machines.

The function of the axial play compensation that is essential for high pressure pumps is carried out by the sliding plates located at the side of the gear. These have hydraulic pressure fields that guarantee compensation of the axial play on all operating pressures.

The sliding plates are designed so that play is compensated independently of the viscosity. This ensures a high degree of volumetric and mechanical efficiency at every working point.

Depending on the temperature or the media, NBR or FKM sealing gaskets can be used to meet a wide range of application requirements. Multiple pump combinations of the same or different sizes are possible.

Note

1. External loads

Loads acting on the drive shaft end from outside impair the functions of the double-land bearing. Radial loads can be absorbed in dependence on the extent and the direction of the loads. Axial loads are not permissible.

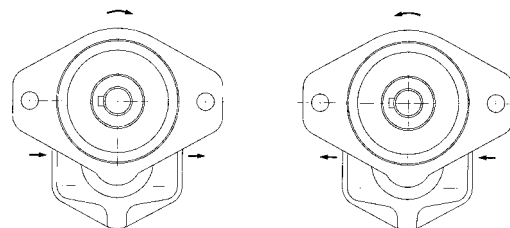
To absorb outer loads only those pump types shall be used which are equipped with an outboard bearing.

2. Direction of rotation

Regarding the direction of rotation basically the following applies provided the view is directed toward the drive shaft end:

Drive shaft end rotating clockwise:
Flow direction from left to right.

Drive shaft end rotating anticlockwise:
Flow direction from right to left.



Materials

Housing	grey cast iron
Bearing	composite plain bearing bushes
Journals and gears	case hardening steel acc. to DIN 17210 surface hardened and ground
Seals	NBR rotary shaft lip type seal ϑ 90 °C FKM rotary shaft lip type seal ϑ 150 °C

Characteristics

Mounting	flange type		
Pipe connection	flange		
Direction of rotation	clockwise or anticlockwise		
Weight	see dimension sheets		
Mounting position	optional		
Ambient temperature	$\vartheta_{u \min}$	=	- 20 °C
	$\vartheta_{u \max}$	=	60 °C
Operating pressure Inlet port	$p_{e \min}$	=	- 0.4 bar (vacuum)
	$p_{e \max}$	=	2 bar
Operating pressure Short time	$p_{e \max}$	=	5 bar
Operating pressure Outlet port	$p_{e \max}$	=	300 bar
Fluid temperature range	$\vartheta_{m \max}$	90 °C for NBR rotary shaft lip type seal	
	$\vartheta_{m \max}$	150 °C for FKM rotary shaft lip type seal	
Viscosity	$v_{\min}$	=	10 mm ² /s
	$v_{\max}$	=	600 mm ² /s
Recommended oil cleanliness	according to ISO 4406 : 1999 Code 21/19/16 ☐ according to NAS 1638 Class 10		
Recommended filtration	filter with filtration quotient β_{25} 75 for ... 300 bar β_{40} 75 for ... 100 bar		
Recommended viscosity range	v	=	30 ... 45 mm ² /s
Discharge flow	see chart page 7 and 8		
Input power	see chart page 7 and 8		
Hydraulic fluids	mineral oil acc. to DIN 51524/25 engine oil acc. to DIN 51511 flame-retardant hydraulic fluids on request bio-oils of typ „HEES“, can be used up to 70 °C, max. pressure must be reduced minus 20% (use only on request)		

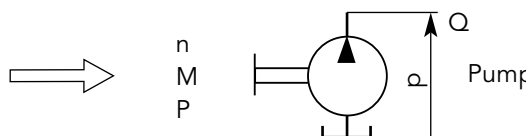
ATEX (KP2 only)

Products and media on request.

Calculation Formulas for Hydraulic Pumps

Characteristic data, formula signs, units

Discharge flow / input flow	Q	l/min
Pump / motor displacement	V_g	cm ³ /r
Pressure	p	bar
Speed of rotation	n	1/min
Torque	M	Nm
Power	P	kW
Total efficiency	η_{tot}	–
Volumetric efficiency	η_{vol}	–
Hydr./mech. efficiency	η_{hm}	–
Flow velocity	v	m/s
Pipe diameter	d	mm

		
Characteristic data for:	Volumetric flow	Discharge flow $Q = \frac{V_g \cdot n \cdot \eta_{vol}}{10^3} \left[\frac{l}{min} \right]$
	Torque	Drive torque $M = \frac{p \cdot V_g}{20 \cdot \pi \cdot \eta_{hm}} [Nm]$
	Power	Input power $P = \frac{p \cdot Q}{600 \cdot \eta_{tot}} [kW]$

General

$$Q_{th} = V_g \cdot n, \quad \eta_{tot} = \eta_{vol} \cdot \eta_{hm}$$

$$M = 9549 \cdot \frac{P}{n} \quad v = 21.22 \cdot \frac{Q}{d^2}$$

Approximate values for KRACHT products
in the nominal operating point

	η_{tot}	η_{vol}
KP	0.90	0.95

Technical Data KP2

Displace- ment Nominal size	Geom. displace- ment V_g cm ³ /r	Max. operating pressure p_b bar 1)	Peak pressure p_{max} bar	Max. speed n_{max} 1/min 2) 3)		Moment of inertia J kg m ² $\times 10^{-5}$	Minimum speed				
							at $p = \dots$ bar 1/min				
							...100	...120	...150	...180	≥ 200
20	19.7	250	300	3000	2800	34.3	700	700	800	900	1000
25	24.6	250	300	3000	2800	40.5	600	600	700	800	900
28	27.7	230	280	2800	2500	44.3	600	600	700	800	900
32	31.5	230	280	2600	2500	49.2	500	600	700	800	900
40	39.4	210	250	2800	2200	59.0	500	600	700	800	800
50	49.2	210	250	2600	2000	71.4	500	600	700	800	800
62	61.2	180	200	2200	—	86.5	500	600	700	800	—

1) S1 or S3 mode (50% operating factor 30 1/min)
Pressure data applies for $v \geq 30$ mm²/s and $n \geq 1000$ 1/min

2) For housing with SAE connection $\varnothing 32 / \varnothing 40$

3) For housing with connection $\varnothing 26$

Technical Data KP3

Displace- ment Nominal size	Geom. displace- ment V_g cm ³ /r	Max. operating pressure p_b bar	Peak pressure p_{max} bar	Max. speed n_{max} 1/min		Moment of inertia J kg m ² $\times 10^{-5}$	Minimum speed				
							at $p = \dots$ bar 1/min				
							...100	...120	...150	...180	≥ 200
63	62.5	230	280	2600		169	800	800	900	1000	1000
71	70.6	230	280	2500		187	700	700	800	900	900
82	81.0	210	250	2600		210	500	600	700	800	800
100	99.5	210	250	2500		252	500	600	700	800	800
112	111.1	200	230	2400		277	500	600	700	800	800
125	123.8	200	230	2300		306	500	600	700	800	800

Discharge Flow and Required Input Power KP2

Discharge flow at n = 1450 1/min

Nominal size	Discharge flow Q in l/min at 34 mm ² /s							
	Pressure p in bar							
	20	60	100	140	180	200	230	250
20	27.9	27.6	27.4	27.1	26.8	26.6	26.4	26.2
25	34.8	34.5	34.2	33.8	33.4	33.2	33.0	32.8
28	39.2	38.9	38.6	38.2	37.9	37.7	37.4	–
32	44.6	44.3	43.9	43.5	43.1	42.8	42.5	–
40	55.8	55.4	54.9	54.4	53.9	53.6	–	–
50	69.7	69.2	68.6	67.9	67.3	67.0	–	–
62	86.8	86.4	86.0	85.6	85.2	–	–	–

Required input power P in kW at n = 1450 1/min

Nominal size	Pressure p in bar							
	20	60	100	140	180	200	230	250
20	1.39	3.57	5.75	7.92	10.10	11.19	12.82	13.91
25	1.65	4.31	6.98	9.64	12.30	13.63	15.63	16.96
28	1.82	4.79	7.75	10.72	13.69	15.17	17.39	–
32	2.02	5.36	8.70	12.04	15.38	17.05	19.55	–
40	2.45	6.58	10.71	14.85	18.98	21.04	–	–
50	2.96	8.07	13.19	18.30	23.41	25.97	–	–
62	3.54	9.74	15.93	22.13	28.33	–	–	–

Discharge flow at n = 950 1/min

Nominal size	Discharge flow Q in l/min at 34 mm ² /s							
	Pressure p in bar							
	20	60	100	140	180	200	230	250
20	18.0	17.8	17.5	17.2	16.9	–	–	–
25	22.5	22.2	21.9	21.5	21.1	20.9	20.7	20.5
28	25.4	25.1	24.7	24.4	24.0	23.8	23.5	–
32	28.9	28.5	28.1	27.7	27.3	27.1	26.8	–
40	36.1	35.7	35.2	34.7	34.2	33.9	–	–
50	45.1	44.6	44.0	43.3	42.7	42.4	–	–
62	56.2	55.8	55.4	55.0	54.6	–	–	–

Required input power P in kW at n = 950 1/min

Nominal size	Pressure p in bar							
	20	60	100	140	180	200	230	250
20	0.91	2.34	3.76	5.19	6.61	–	–	–
25	1.08	2.82	4.57	6.31	8.06	8.93	10.24	11.11
28	1.19	3.13	5.08	7.02	8.96	9.94	11.39	–
32	1.32	3.51	5.70	7.89	10.07	11.17	12.81	–
40	1.60	4.31	7.02	9.72	12.43	13.78	–	–
50	1.93	5.28	8.63	11.98	15.33	17.01	–	–
62	2.31	6.37	10.43	14.49	18.56	–	–	–

The ratings are based on a viscosity of 34 mm²

The output of the drive motor must be chosen 20% higher than the table value P

Discharge Flow and Required Input Power KP3

Discharge flow at n = 1450 1/min

Nominal size	Discharge flow Q in l/min at 34 mm ² /s							
	Pressure p in bar							
	20	60	100	140	180	200	210	250
63	88.5	87.8	87.0	86.2	85.4	84.9	84.7	83.8
71	100.1	99.4	98.7	98.0	97.2	96.8	96.6	96.2
82	114.8	114.2	113.6	112.9	112.1	111.8	111.6	–
100	141.2	140.7	140.1	139.6	139.0	138.7	138.5	–
112	157.8	157.5	157.1	156.8	156.4	156.3	–	–
125	175.8	175.5	175.1	174.7	174.3	174.1	–	–

Required input power P in kW at n = 1450 1/min

Nominal size	Pressure p in bar							
	20	60	100	140	180	200	210	250
63	3.65	10.31	16.97	23.62	30.28	33.61	35.28	41.93
71	4.10	11.63	19.15	26.68	34.20	37.96	39.84	43.61
82	4.67	13.31	21.94	30.57	39.21	43.52	45.68	–
100	5.63	16.13	26.63	37.13	47.63	52.87	55.50	–
112	6.20	17.79	29.39	40.98	52.58	58.38	–	–
125	6.81	19.60	32.39	45.17	57.96	64.35	–	–

Discharge flow at n = 950 1/min

Nominal size	Discharge flow Q in l/min at 34 mm ² /s							
	Pressure p in bar							
	20	60	100	140	180	200	210	250
63	57.3	56.6	55.8	55.0	54.1	–	–	–
71	64.8	64.1	63.4	62.7	61.9	61.5	61.3	60.9
82	74.3	73.7	73.1	72.4	71.6	71.3	71.1	–
100	91.4	90.9	90.4	89.8	89.2	88.9	88.8	–
112	102.2	101.9	101.6	101.2	100.9	100.7	–	–
125	113.9	113.6	113.2	112.8	112.4	112.2	–	–

Required input power P in kW at n = 950 1/min

Nominal size	Pressure p in bar							
	20	60	100	140	180	200	210	250
63	2.39	6.75	11.11	15.48	19.84	–	–	–
71	2.68	7.61	12.54	17.47	22.40	24.87	26.10	28.57
82	3.06	8.71	14.37	20.03	25.68	28.51	29.93	–
100	3.69	10.57	17.44	24.32	31.20	34.64	36.36	–
112	4.06	11.65	19.25	26.85	34.44	38.24	–	–
125	4.46	12.83	21.21	29.59	37.97	42.16	–	–

The ratings are based on a viscosity of 34 mm²/s

The output of the drive motor must be chosen 20% higher than the table value P

Type Key

Housing connection

- A** Suction and pressure connection Ø 26 with LK 55 to V_g 50
- F** Suction side 1 1/4" SAE connection (Ø 32) to V_g size 32
Pressure side 1" SAE connection (Ø 25) to V_g size 32
- G** Suction side 1 1/2" SAE connection (Ø 40) from V_g size 40 to V_g 71
Pressure side 1 1/4" SAE connection (Ø 32) from V_g size 40 to V_g 71
- J** Suction side 2" SAE connection (Ø 50) from V_g size 82
Pressure side 1 1/4" SAE connection (Ø 32) from V_g size 82
- V** as A housing;
for multi-stage pump version
- Y** as F housing;
for multi-stage pump version
- Z** as G housing;
for multi-stage pump version
- X** as J housing;
for multi-stage pump version

Shaft end / Shaft load capacity

- B** External spline W 35 x 2; DIN 5480 from V_g 82; 800 Nm_{max}
- K** Cone 1 : 5; 500 Nm_{max}
- U** External spline SAE-B; Z = 13; DP 16/32; α = 30°; 180 Nm_{max}
- Y** Cylindrical shaft Ø 24; 230 Nm_{max} KP 2; Ø 32; 550 Nm_{max} KP 3
- W** External spline B 28 x 25; DIN 5482; Z = 15; m = 1.75; 450 Nm_{max}
- Q** External spline SAE C; Z = 14; DP 12/24; α = 30°; 500 Nm_{max}

2. Shaft end

- 0** None
- W** External spline B 28 x 25; DIN 5482; Z = 15; m = 1.75

Transition piece

- G** Transition piece for multi-stage design KP 2 with KP 1
- H** Transition piece for multi-stage design KP 2 with KP 2
- 0** Standard design (1-stage pump)
- J** KP 3 with KP 1
- L** KP 3 with KP 2 and KP 3 with KP 3

Design code

- 4** KP 2 (specified by KRACHT)
- 6** KP 3 (specified by KRACHT)

Ordering example

KP	2/	20	S	1	0	A	Y	0	0	4	D	L	1	.
----	----	----	---	---	---	---	---	---	---	---	---	---	---	---

Housing and bearing design

- D** Grey cast iron with composite plain bearings

Outboard flanges or bearing

- 0** without

Direction of rotation

- 1** Clockwise
- 2** Anticlockwise

Flange mounting cover

- G** Square 4-hole flange, LA = 102/145; Ø Z = 105
- S** SAE-B 2-hole flange, LA = 146; Ø Z = 101.6
- M** 2-hole flange, LA 78/90; Ø Z = 63
- F** as M, but fastener drill holes laterally reversed
- T** SAE C 2-hole flange, LA = 181; Ø Z = 127
- V** SAE C 4-hole flange, LA = 114.55; Ø Z = 127

LA = Hole spacing
Ø Z = Centring diameter

Nominal size

- KP2** 20/25/28/32/40/50/62
- KP3** 63/71/82/100/112/125

Size 2, 3

Gear design

- L** Shaft and pin wheel made of case-hardened steel, ground tooth flanks

Seals

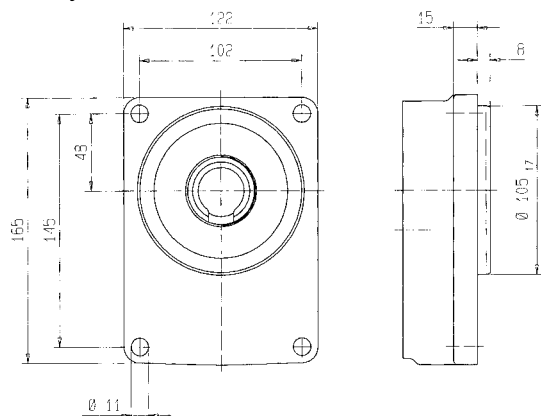
- 1** NBR rotary shaft lip type seals
ϑ 90 °C
- 2** FKM rotary shaft lip type seals
ϑ 150 °C

Product code

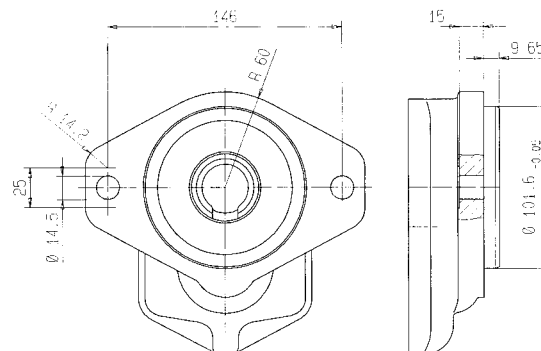
Code-No. for special construction

Flange Types

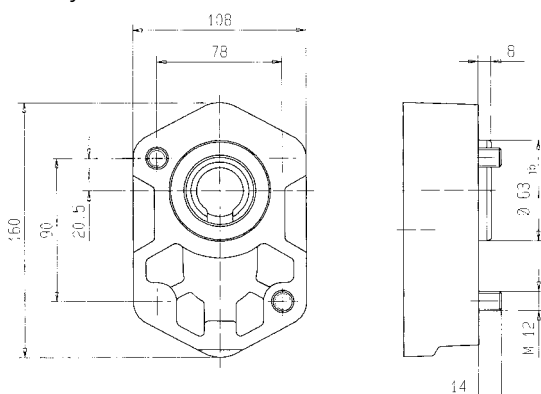
Square 4-hole flange G
KP 2 only



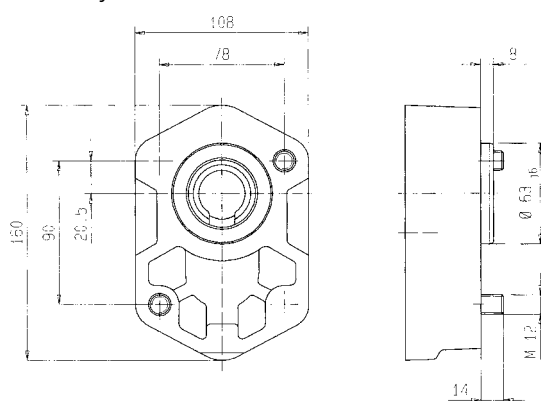
SAE B 2-hole flange S



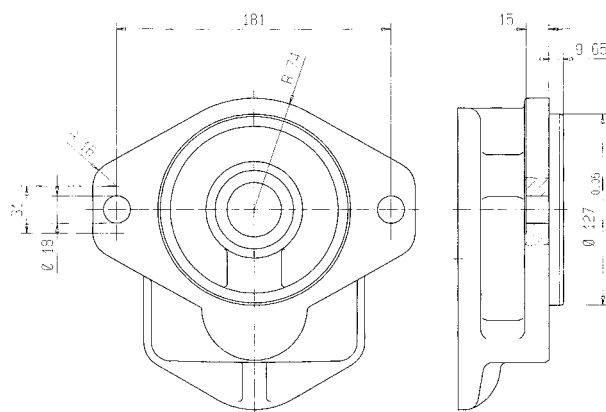
2-hole flange F
KP 2 only



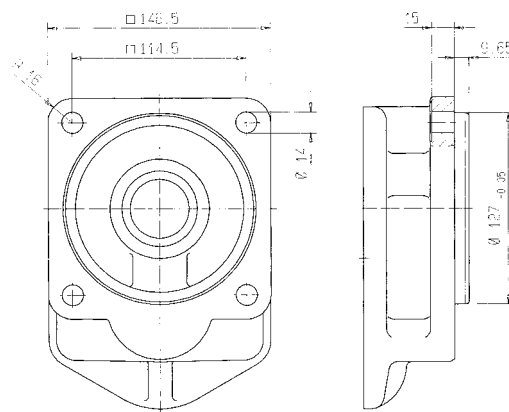
2-hole flange M
KP 2 only



SAE C 2-hole flange T
KP 3 only

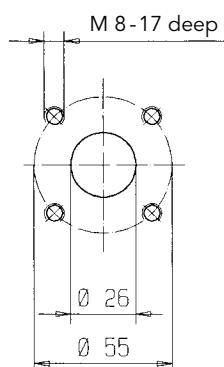


SAE C 4-hole flange V
KP 3 only

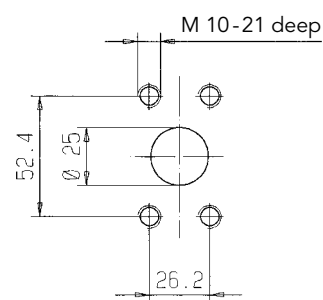
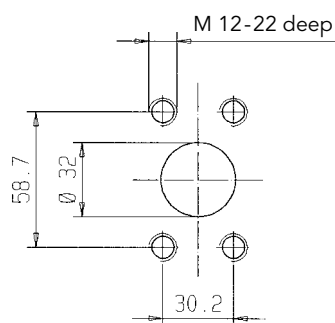


Connections

Housing connection A
Displacement nominal size
KP 2: 20 – 50
Inlet and outlet ports same dimensions

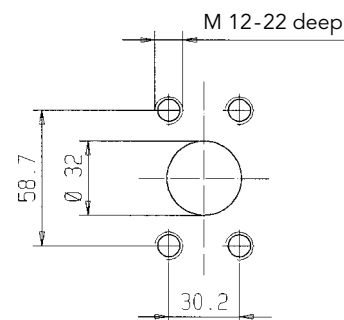
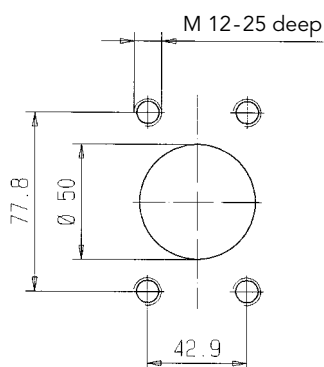
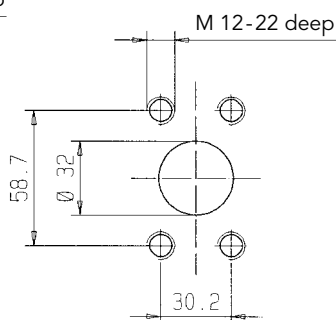
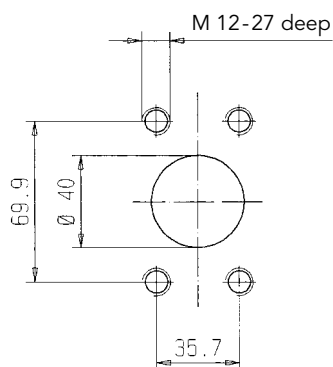


Housing connection F
Displacement nominal size
KP 2: 20, 25, 28, 32
Inlet port SAE 1¼ Outlet port SAE 1

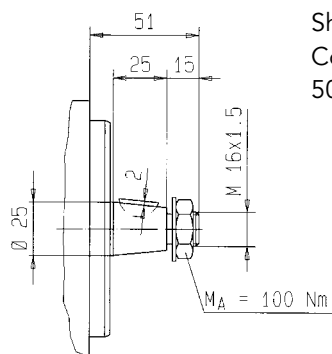


Housing connection G
Displacement nominal size
KP2: 40, 50, 62
KP3: 63-71
Inlet port SAE 1½ Outlet port SAE 1¼

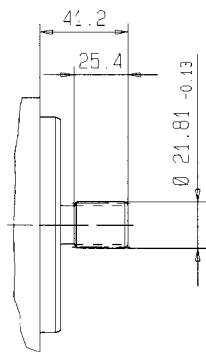
Housing connection J
Displacement nominal size
KP3: 82, 100, 112, 125
Inlet port SAE 2 Outlet port SAE 1¼



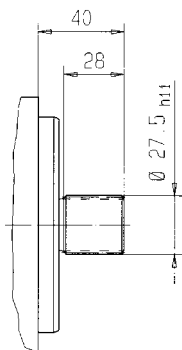
Shaft Ends KP 2



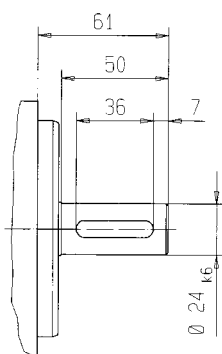
Shaft end K
Cone 1:5
500 Nm_{max}



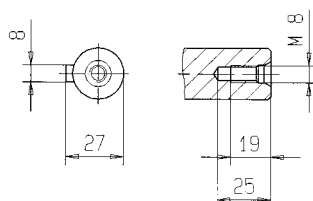
Shaft end U
External spline SAE-B
z = 13 DP 16/32, $\alpha = 30^\circ$
180 Nm_{max}



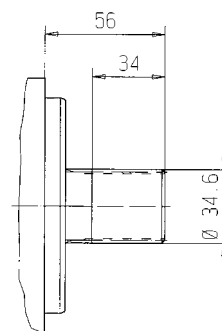
Shaft end W
External spline B 28x25
DIN 5482
z = 15, m = 1.75
450 Nm_{max}



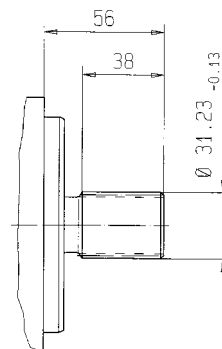
Shaft end Y
Cylindrical shaft
230 Nm_{max}



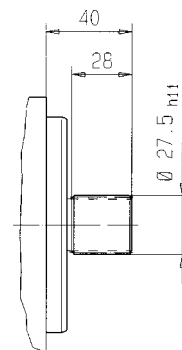
Shaft Ends KP 3



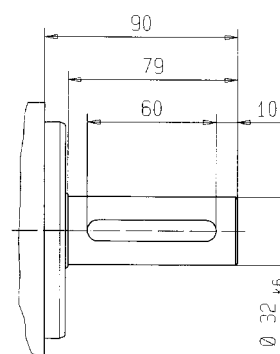
Shaft end B
External spline W 35x2
DIN 5480 from V_g 82
800 Nm_{max}



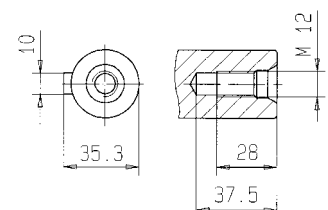
Shaft end Q
External spline SAE-C
z = 14 DP 12/24, $\alpha = 30^\circ$
500 Nm_{max}



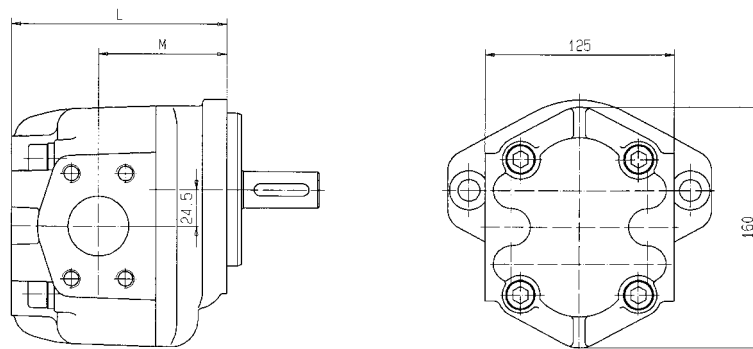
Shaft end W
External spline B 28x25
DIN 5482
z = 15, m = 1.75
450 Nm_{max}



Shaft end Y
Cylindrical shaft
550 Nm_{max}

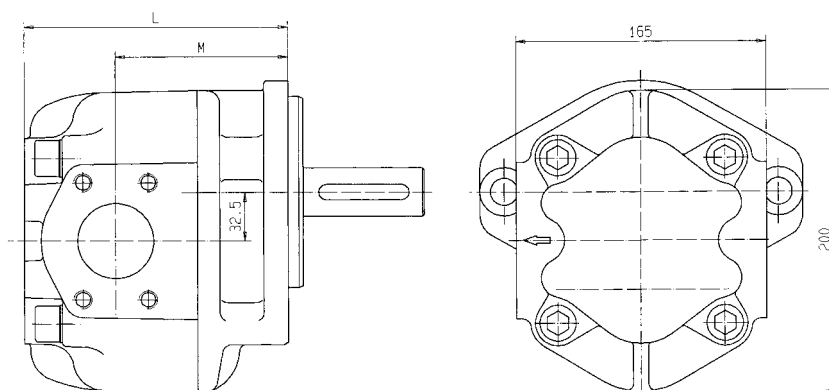


Dimensions, Weight KP 2



Displacement Nominal size	L	M	Weight		
			Design G flange	Design S flange	Design F/M flange
20	129	75	11	10	9
25			11.5	10.5	9.5
28			12	11	10
32			12.5	11.5	10.5
40	142	85	13	12.5	11.5
50			13.5	13	12
62	152		15	14	13

Dimensions, Weight KP 3

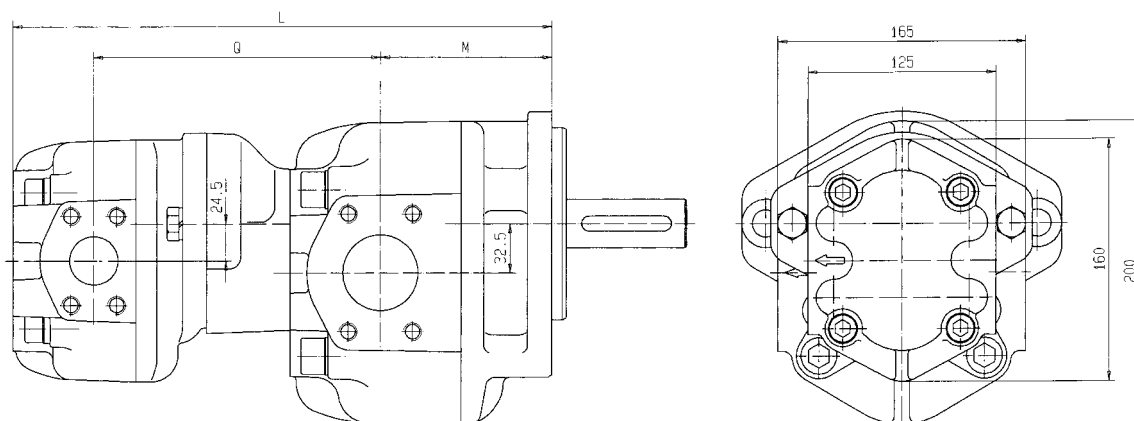


Displacement Nominal size	L	M	Weight		
			Design S flange	Design T flange	Design V flange
63	162	102	23.5	24.0	24.5
71			23	23.5	24
82	174	114	24.5	25	25.5
100			26	26.5	27
112	185	125	27	27.5	28
125			29	29.5	30

Tandem Version SAE-C Flange, Cylindrical Shaft

The pump stages shown here can work in hydraulically separated circuits or with different media

Direction of rotation: clockwise
With anticlockwise rotation the inlet and outlet ports are opposite



The drive should be by means of a compensating coupling!
Important: Unbalanced states and/or axial loads must not occur.

Ordering example

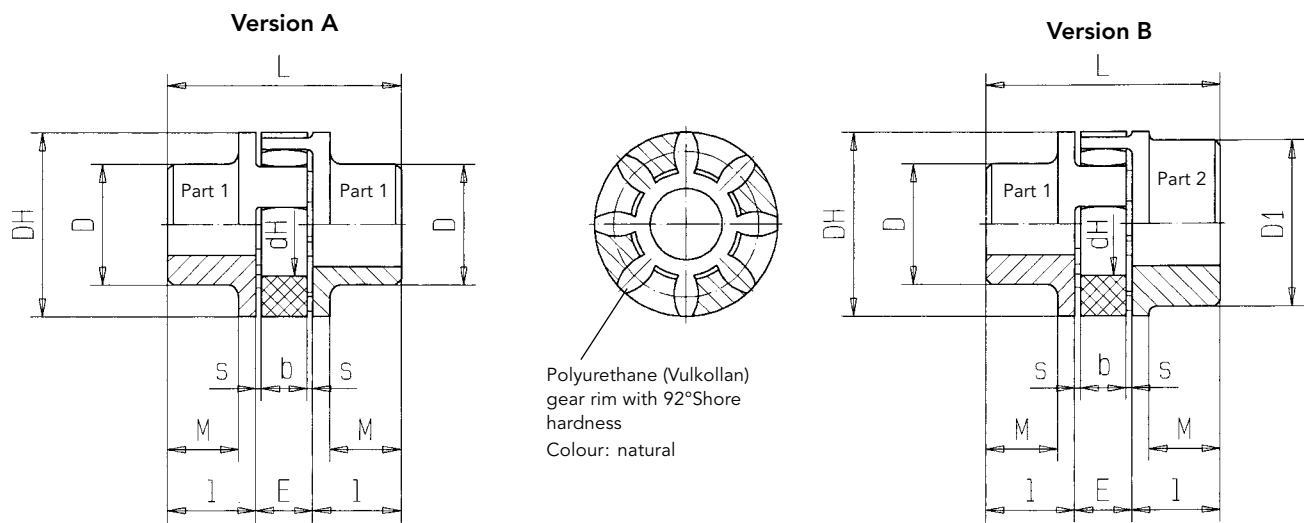
KP 3/100 T10X YWL 6DL1 + KP 2/32 S10F W00 4DL1

Displacement Nominal size 2 nd stage	Displacement Nominal size											
	63-71			1. stage 82-100			112-125					
	Q	L	M	Q	L	M	Q	L	M			
20	191	347	102	191	359	114	191	370	125			
25												
28												
32												
40	201	360		201	372		201	383				
50												
62	201	370		201	382		201	393				

Along with the versions shown here, the following are available on request:

- other pump combinations (KP 3, KP 2, KP 1)
- other flange mounting cover and shaft version for the 1st stage
- three-stage pumps

Accessory – Couplings



Ordering example:

R^A_G 38 – **Z 45/ ²⁴/₃₂** – **Z 45/38**

	Hub material
A	AL
G	GG

Coupling size

Coupling hub length
and hub drill hole on
pump side cylindrical
KP2: Ø 24; KP3: Ø 32

Coupling hub length
and hub drill hole on
motor side cylindrical

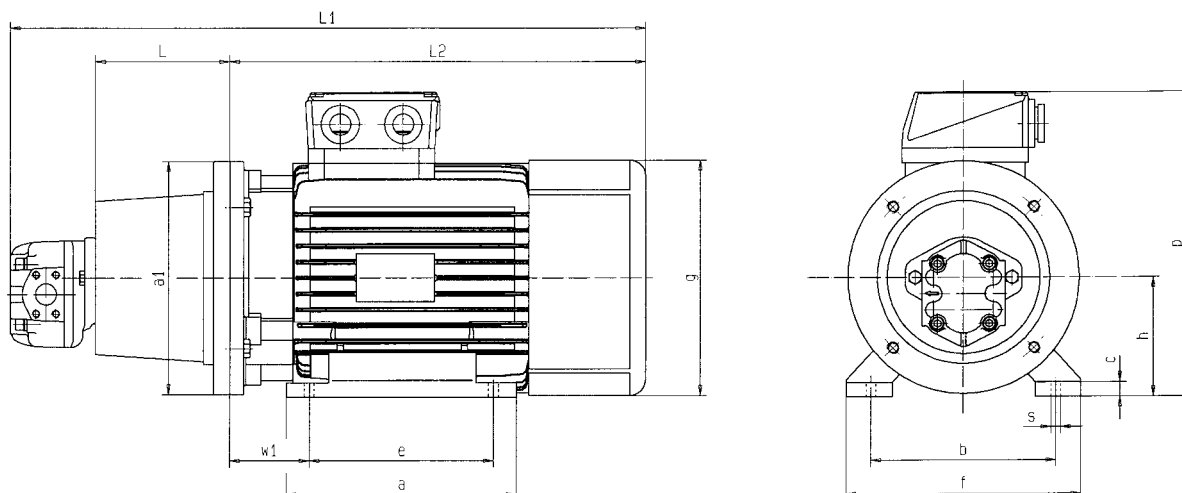
	Coupling size	Hub material: Aluminium		Pilot hole		Finished bore				Dimensions										Ordering example
		Weight Kg	Moment of inertia Kgm ²	Part 1	Part 2	min. Part 1	min. Part 2	max. Part 1	max. Part 2	l	E	s	b	L	M	D _H	D	D ₁	d _h	
Version A	28	0.39	0.0002	8	–	10	–	28	–	35	20	2.5	15	90	28	65	48	–	30	RA 28-Z 35/..-Z 35/..
	38	0.82	0.0007	10	–	12	–	38	–	45	24	3	18	114	37	80	66	–	38	RA 38-Z 45/..-Z 45/..
	42	1.25	0.0014	12	–	14	–	42	–	50	26	3	20	126	40	95	75	–	46	RA 42-Z 50/..-Z 50/..
	48	1.71	0.0024	13	–	15	–	48	–	56	28	3.5	21	140	45	105	85	–	51	RA 48-Z 56/..-Z 56/..
	55	6.64	0.012	18	–	20	–	55	–	65	30	4	22	160	52	120	98	–	60	RG 55-Z 65/..-Z 65/..
Version B	24/28	0.26	0.0001	6	22	8	24	24	28	30	18	2	14	78	24	55	40	48	27	RA 24/28-Z 30/..-Z 30/..
	28/38	0.46	0.0003	8	26	10	28	28	38	35	20	2.5	15	90	28	65	48	65	30	RA 28/38-Z 35/..-Z 35/..
	38/45	0.89	0.0008	10	36	12	38	38	45	45	24	3	18	114	37	80	66	76	38	RA 38/45-Z 45/..-Z 45/..
	42/55	1.39	0.0018	12	40	14	42	42	55	50	26	3	20	126	40	95	75	94	46	RA 42/55-Z 50/..-Z 50/..
	48/60	1.86	0.0030	13	46	15	48	48	60	56	28	3.5	21	140	45	105	85	102	51	RA 48/60-Z 56/..-Z 56/..
	55/70	7.37	0.016	18	52	20	55	55	70	65	30	4	22	160	–	120	98	120	60	RG 55/70-Z 65/..-Z 65/..
	65/70	10.89	0.031	20	63	22	65	65	75	75	35	4.5	26	185	–	135	115	135	68	RG 65/75-Z 75/..-Z 75/..

Operating temperature: – 10 °C to + 80 °C (short-term temperature peaks up to + 120 °C are permissible)

Weights and moments of inertia refer to max. finished bore without groove

Finished bore in accordance with ISO fit H7; parallel keys in accordance with DIN 6885 sheet 1

Motor with Pump KP 2/. S.O. Y00 4DL.



KP2

Size	Motor 6-pole Power kW	Speed 1/min	Motor 4-pole Power kW	Speed 1/min	Bell housing	Coupling
100 LA 100 LB 112 M	1.5 — 2.2	940 — 940	2.2 3.0 4.0	1420 1420 1440	Z2/250/135	RA 24/28 – Z30/24 – Z30/28
132 S 132 M	3.0 5.5	960 960	5.5 7.5	1440 1440	Z2/300/168	RA 28/38 – Z35/24 – Z35/38
160 M 160 L	7.5 11.0	970 970	11.0 15.0	1460 1470	Z2/350/188	RA 38/45 – Z45/24 – Z45/42
180 M 180 L	— 15.0	— 970	18.5 22.0	1470 1480	Z2/350/204	RA 42/55 – Z50/24 – Z50/48
200 L	22.0	970	30.0	1480	Z2/400/204	RA 42/55 – Z50/24 – Z50/55

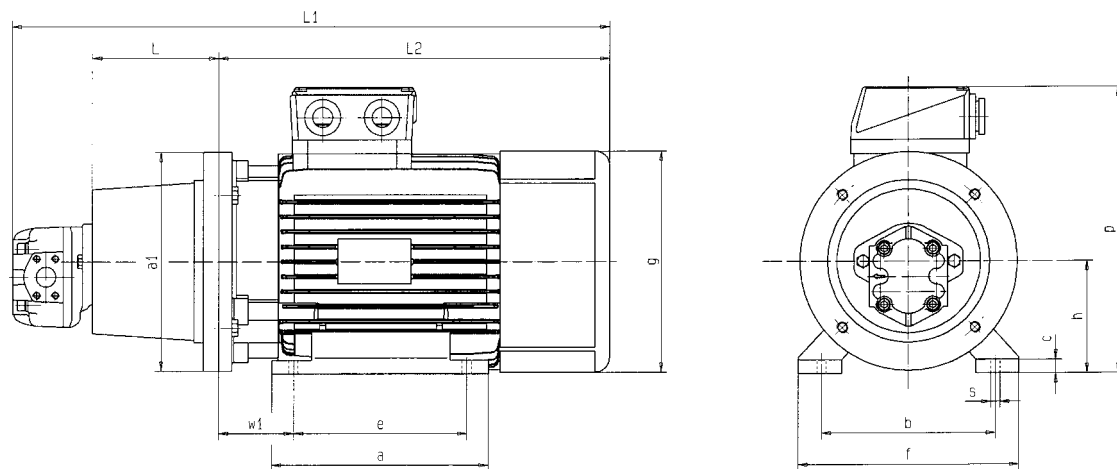
All motor dimensions and date refer to AC motors; other motor makes on enquiry. Motor type IMB35

KP2

Size	20-32 L ₁	40-50 L ₁	62 L ₁	20-62												
	L	a ₁	a	b	c	e	f	g	h	L ₂	p	s	w ₁			
100 L	589	602	612	135	250	150	160	11	140	205	187	100	325	260	12	63
112 M	604	617	627	135	250	180	190	12	140	230	210	112	340	290	12	70
132 S	700	713	723	168	300	190	216	15	140	270	248	132	403	338	12	89
132 M	727	740	750	168	300	190	216	15	178	270	248	132	430	338	12	89
160 M	822	835	845	188	350	260	254	20	210	320	312	160	505	422	15	108
160 L	877	890	900	188	350	304	254	20	254	320	312	160	560	422	15	108
180 M	923	936	946	204	350	311	279	22	241	355	354	180	590	458	15	121
180 L	963	976	986	204	350	349	279	22	279	355	354	180	630	458	15	121
200 L	993	1006	1016	204	400	370	318	25	305	395	396	200	660	525	19	133

All pump nominal sizes and motor sizes can be combined with each other

Motor with Pump KP 3/. T.O. Y00 6DL.



KP 3

Size	Motor 6-pole		Motor 4-pole		Bell housing	Coupling
	Power kW	Speed 1/min	Power kW	Speed 1/min		
100 LA	1.5	940	2.2	1420	Z3/250/175	RA 28/38 – Z35/32 – Z35/28
100 LB	–	–	3.0	1420		
112 M	2.2	940	4.0	1440		
132 S	3.0	960	5.5	1440	Z3/300/196	RA 28/38 – Z35/32 – Z35/38
132 M	5.5	960	7.5	1440		
160 M	7.5	970	11.0	1460	Z3/350/228	RA 38/45 – Z45/32 – Z45/42
160 L	11.0	970	15.0	1470		RA 42/55 – Z50/32 – Z50/48
180 M	–	–	18.5	1470		
180 L	15.0	970	22.0	1480		
200 L	22.0	970	30.0	1480	Z3/400/228	RA 42/55 – Z50/32 – Z50/55
225 S	–	–	37.0	1480	Z3/450/262	RA 48/60 – Z56/32 – Z56/60
225 M	30.0	980	45.0	1480		
250 M	37.0	980	55.0	1480	Z3/550/265	RG 55/70 – Z65/32 – Z65/65
280 S	45.0	980	75.0	1480	Z3/550/265	RGS 65 – Z75/32 – Z75/75

All motor dimensions and data refer to AC motors; other motor makes on enquiry. Motor type IMB35

KP 3

Size	63-71 L ₁	82-100 L ₁	112-125 L ₁	71-125												
	L	a ₁	a	b	c	e	f	g	h	L ₂	p	s	w ₁			
100 L	662	674	685	175	250	150	160	11	140	205	187	100	325	260	12	63
112 M	677	689	700	175	250	180	190	12	140	230	210	112	340	290	12	70
132 S	761	773	784	196	300	190	216	15	140	270	248	132	403	338	12	89
132 M	788	800	811	196	300	190	216	15	178	270	248	132	430	338	12	89
160 M	895	907	918	228	350	260	254	20	210	320	312	160	505	422	15	108
160 L	950	962	973	228	350	304	254	20	254	320	312	160	560	422	15	108
180 M	980	992	1003	228	350	311	279	22	241	355	354	180	590	458	15	121
180 L	1020	1032	1043	228	350	349	279	22	279	355	354	180	630	458	15	121
200 L	1050	1062	1073	228	400	370	318	25	305	395	396	200	660	525	19	133
225 S	1099	1111	1122	262	450	368	356	28	286	435	450	225	675	574	19	149
225 M	1129	1141	1152	262	450	395	356	28	311	435	450	225	705	574	19	149
250 M	1197	1209	1220	265	550	445	406	30	349	490	490	250	770	635	24	168
280 S	1272	1284	1295	265	550	485	457	35	368	550	550	280	845	693	24	190

All pump nominal sizes and motor sizes can be combined with each other

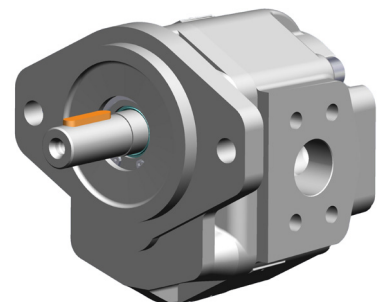
Notes

Notes

KRACHT®

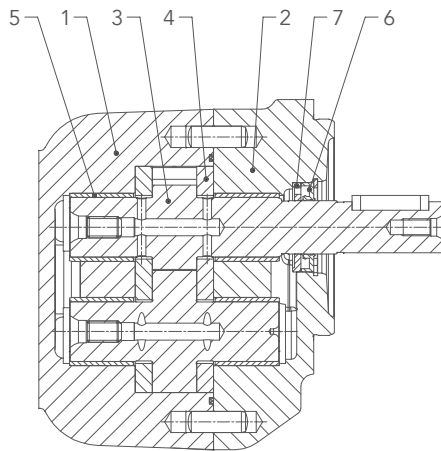
KRACHT GmbH · Gewerbestrasse 20 · 58791 Werdohl, Germany
Phone +49 2392 935 0 · E-Mail info@kracht.eu · Web www.kracht.eu

High pressure
gear pumps
KP 2 / KP 3
noise optimized



Description

Construction



- 1 Housing
- 2 Flange cover
- 3 Gear
- 4 Sliding plate
- 5 Plain bearing
- 6 Rotary shaft seal
- 7 Defecting plate

KP 2 / KP 3 .../364 noise optimized for medias with increased air percentage

The noise-optimised KP series pumps are designed for pumping media with increased air content, primarily for use as lubricating oil pumps in gearboxes. Special structural measures prevent the otherwise usual increase in noise with air-containing gear oils. The noise levels are not or only insignificantly higher than the measured values with oils that do not contain air. There is also no shift in the noise spectrum to higher, unpleasant frequencies. In applications without air in the medium, it is not advisable to use this variant as in this case there is no noise reduction effect.

The noise optimized version is identified by the special number **364** at the end of the type key. The pumps with the special number **364** are built as pumps in combination with an electric motor. The KP 2 / KP 3 .../365 are available as add-on pumps. The pumps are designed for a continuous pressure of 40 bar and can be temporarily loaded up to 120 bar, e.g. for switching pressures. All variants can be supplied with ship approvals.

Notes

1. External forces

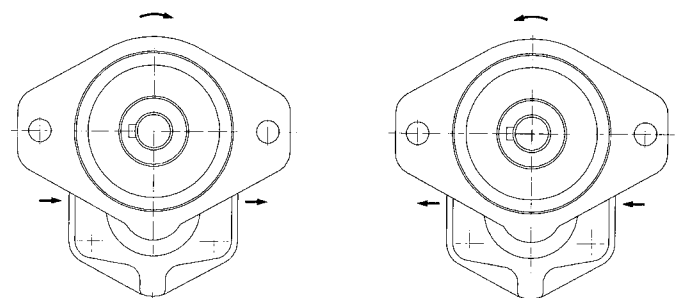
External forces acting on the drive shaft end influence the function of the bearing gland. Radial forces may be absorbed depending on size and direction of action. Axial forces are not permissible.

2. Direction of rotation

The following applies with regard to the direction of rotation – when looking at the drive shaft end – following regulation:

Clockwise rotating shaft:
Direction of flow from left to right.

Counter-clockwise rotating shaft:
Direction of flow from right to left.



Technical Data

Materials

Housing	EN-GJS-400-15
Bearing	multi-compound plain bearing bushes
Shafts and gears	surface-hardened and ground case-hardened steel according to DIN 17210
Seals	NBR rotary shaft seal $\vartheta \leq 90^\circ\text{C}$ FKM rotary shaft seal $\vartheta \leq 150^\circ\text{C}$

Characteristics

Mounting	Flange
Pipe connection	Flange
Direction of rotation	right or left
Weight	see dimension sheets
Mounting position	arbitrary
Ambient temperature	$\vartheta_{u \min} = -20^\circ\text{C}$ $\vartheta_{u \max} = 60^\circ\text{C}$
Operating pressure inlet side	$p_{e \min} = -0.4 \text{ bar (underpressure)}$ $p_{e \max} = 2 \text{ bar}$ $p_{e \max} = 5 \text{ bar}$
Short time working pressure	
Outlet port working pressure	$p_{e \max} = 120 \text{ bar}$
Media temperature	$\vartheta_{m \max} = 90^\circ\text{C}$ for NBR rotary shaft seal $\vartheta_{m \max} = 150^\circ\text{C}$ for FKM rotary shaft seal
Viscosity	$\nu_{\min} = 10 \text{ mm}^2/\text{s}$ $\nu_{\max} = 1000 \text{ mm}^2/\text{s}$
Recommended viscosity range	$\nu = 30 \dots 200 \text{ mm}^2/\text{s}$ (speed-dependent)
Recommended oil cleanliness	according to ISO 4406:1999 Code 21/19/16 according to NAS 1638 Class 10
Discharge flow	see table page 6
Input Power	see table page 6
Hydraulic fluids	Mineral oil according to DIN 51524/25 Motor oil according to DIN 51511 Organic oils of the "HEES" Group can be used up to 70°C and at approx. 20% reduced maximum pressure

We reserve the right to make technical changes

Technical data

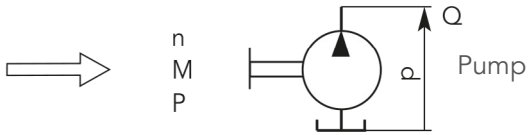
Characteristics, formula signs, units

1. Discharge flow/input flow	Q	l/min
2. geom. delivery/absorption volume	V _g	cm ³ /rev
3. Pressure	p	bar
4. Speed	n	rpm
5. Torque	M	Nm
6. Power	P	kW
7. Total efficiency	η _{tot}	–
8. volumetric efficiency	η _{vol}	–
9. hydr./mech. Efficiency	η _{hm}	–
10. Flow velocity	v	m/s
11. Piping diameter	d	mm

General

$$Q_{th} = V_g \cdot n, \eta_{tot} = \eta_{vol} \cdot \eta_{hm}$$

$$M = 9549 \cdot \frac{P}{n}, v = 21.22 \cdot \frac{Q}{d^2}$$

		
Characteristics for:	Volumetric flow	Discharge flow $Q = \frac{V_g \cdot n \cdot \eta_{vol}}{10^3} \frac{l}{min}$
	Torque	Drive torque $M = \frac{p \cdot V_g}{20 \cdot \pi \cdot \eta_{hm}} Nm$
	Power	Input power $P = \frac{p \cdot Q}{600 \cdot \eta_{tot}} kW$

Technical data

KP 2 .../364

Displacement Nominal size	Geometrical displacement	Max. working pressure	Pressure peak	Max. speed	Moment of inertia x 10 ⁻⁵
	V_g in cm ³ /rev	p_b in bar	p_{max} in bar	N_{max} in rpm	J in kg m ²
20	19.7	40	120	3000	34.3
25	24.6	40	120	3000	40.5
28	27.7	40	120	2800	44.3
32	31.5	40	120	2600	49.2
40	39.4	40	120	2800	59.0
50	49.2	40	120	2600	71.4
56	55.2	40	120	2400	78.9
62	61.2	40	120	2200	86.5

KP 3 .../364

Displacement Nominal size	Geometrical displacement	Max. working pressure	Pressure peak	Max. speed	Moment of inertia x 10 ⁻⁵
	V_g in cm ³ /rev	p_b in bar	p_{max} in bar	N_{max} in rpm	J in kg m ²
71	70.6	40	120	2500	187
82	81.0	40	120	2600	210
100	99.5	40	120	2500	252
112	111.1	40	120	2400	277
125	123.8	40	120	2300	306

Technical data

Discharge flow / Input power

KP 2 .../364 Speed n = 950 1/min

Pressure p _b in bar					Nominal size	Pressure p _b in bar				
10	20	30	40	120		10	20	30	40	120
17.4	16.6	15.8	14.9	6.9	20	0.5	0.9	1.2	1.6	4.4
21.8	20.8	19.7	18.6	8.7	25	0.6	1.1	1.5	1.9	5.3
24.7	23.8	22.8	21.8	12.8	28	0.7	1.2	1.6	2.1	5.9
28.2	27.2	26.2	25.1	15.8	32	0.8	1.3	1.8	2.4	6.7
35.3	34.3	33.1	31.9	21.5	40	0.9	1.6	2.2	2.9	8.2
44.3	43.1	41.8	40.5	29.0	50	1.1	1.9	2.7	3.6	10.2
49.8	48.6	47.3	46.0	34.4	56	1.2	2.1	3.0	3.9	11.3
55.3	54.1	52.8	51.4	39.7	62	1.3	2.3	3.3	4.3	12.4
Discharge flow Q in l/min						Required input power P in kW				

KP 2 .../364 Speed n = 1450 1/min

Pressure p _b in bar					Nominal size	Pressure p _b in bar				
10	20	30	40	120		10	20	30	40	120
27.3	26.5	25.6	24.7	16.8	20	0.8	1.4	1.9	2.4	6.6
34.1	33.1	32.0	30.9	21.0	25	1.0	1.6	2.3	2.9	8.1
38.6	37.6	36.7	35.6	26.7	28	1.1	1.8	2.5	3.2	9.0
43.9	43.0	41.9	40.9	31.5	32	1.2	2.0	2.8	3.6	10.2
55.0	54.0	52.8	51.6	41.2	40	1.4	2.4	3.4	4.4	12.6
68.9	67.7	66.4	65.1	53.6	50	1.7	2.9	4.2	5.4	15.5
77.4	76.2	74.9	73.6	62.0	56	1.8	3.2	4.6	6.0	17.2
85.9	84.7	83.4	82.0	70.3	62	2.0	3.5	5.1	6.6	18.9
Discharge flow Q in l/min						Required input power P in kW				

KP 3 .../364 Speed n = 950 1/min

Pressure p _b in bar					Nominal size	Pressure p _b in bar				
10	20	30	40	120		10	20	30	40	120
60.6	59.3	57.8	56.3	43.0	71	1.4	2.7	3.9	5.1	14.9
69.7	68.2	66.7	65.1	50.9	82	1.6	3.0	4.4	5.9	17.1
88.4	86.5	84.5	82.4	63.7	100	2.0	3.7	5.4	7.1	20.8
100.4	98.2	95.8	93.4	72.0	112	2.1	4.0	5.9	7.8	22.9
112.0	109.8	107.5	105.0	83.6	125	2.4	4.4	6.5	8.6	25.3
Discharge flow Q in l/min						Required input power P in kW				

KP 3 .../364 Speed n = 1450 1/min

Pressure p _b in bar					Nominal size	Pressure p _b in bar				
10	20	30	40	120		10	20	30	40	120
95.9	94.6	93.1	91.6	78.3	71	2.2	4.1	5.9	7.8	22.8
110.2	108.7	107.2	105.6	91.4	82	2.5	4.6	6.8	8.9	26.1
138.2	136.3	134.2	132.1	113.5	100	3.0	5.6	8.2	10.8	31.7
155.9	153.7	151.4	148.9	127.5	112	3.3	6.2	9.1	11.9	35.0
173.9	171.7	169.4	166.9	145.5	125	3.6	6.8	10.0	13.2	38.6
Discharge flow Q in l/min						Required input power P in kW				

The characteristic data refer to a mineral oil with a viscosity of 34 mm²/s. The power of the drive motor must be selected 20 % higher than the value P in the table.

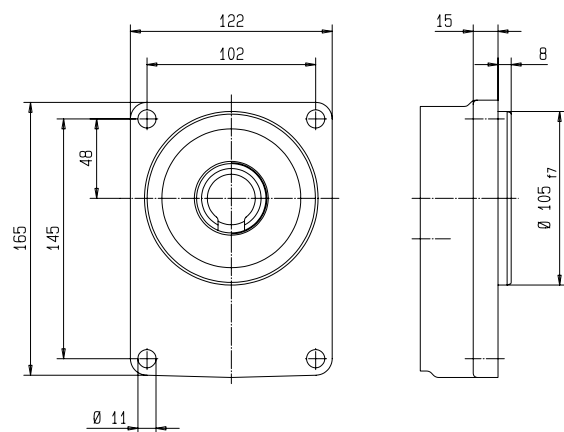
Type key

KP	2/	20	S	1	0	F	Y	0	0	4	V	L	1	/364

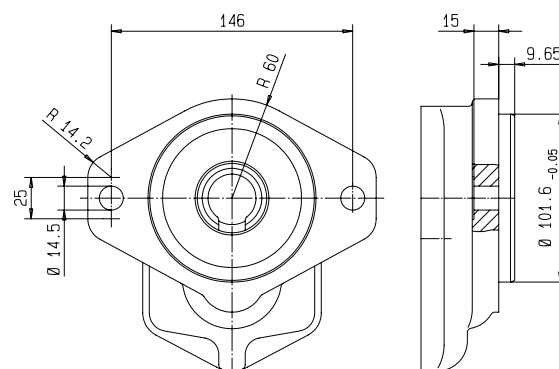
Dimensions

Flange mounting

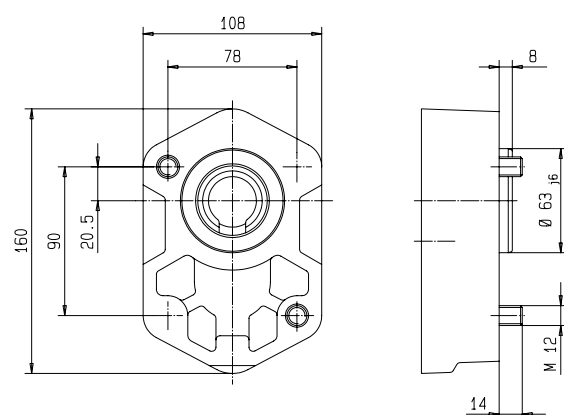
4-hole rectangular flange G KP2 only



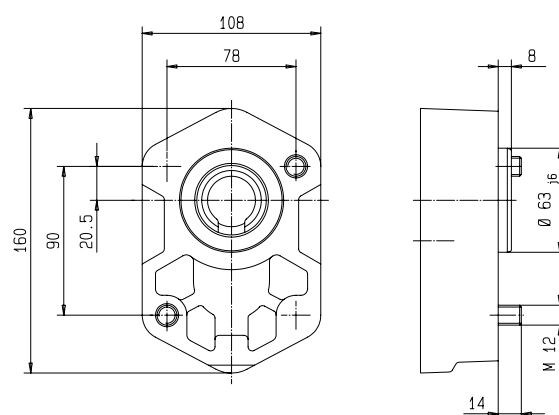
SAE-B-2-hole flange S



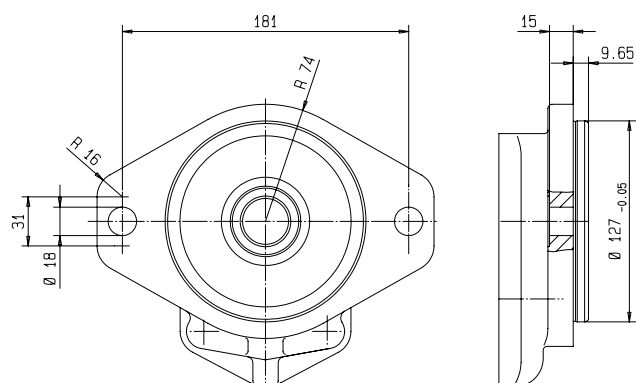
2-hole flange F KP2 only



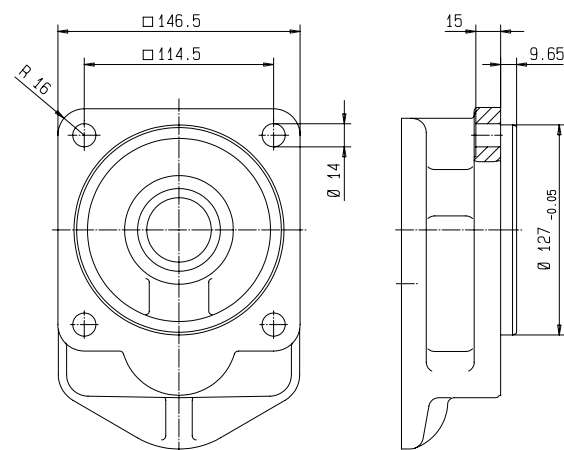
2-hole flange M KP2 only



SAE-C-2-hole flange T KP2 only



SAE-C-4-hole flange V KP3 only

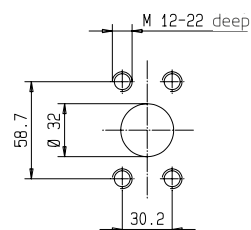


Dimensions

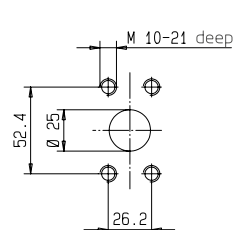
Connections

Housing connection F
Displacement nominal size
KP 2: 20, 25, 28, 32

Suction port
SAE 1 1/4"

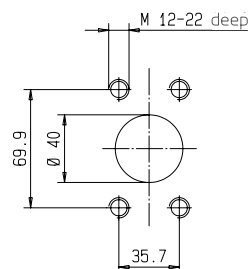


Pressure port
SAE 1"

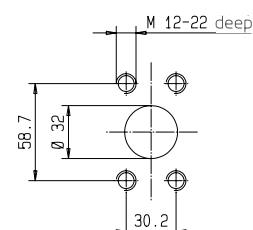


Housing connection G
Displacement nominal size
KP2: 40, 50, 56, 62
KP3: 71

Suction port
SAE 1 1/2"

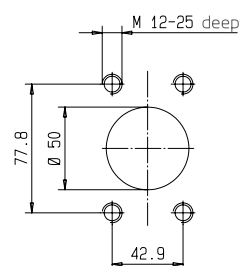


Pressure port
SAE 1 1/4"

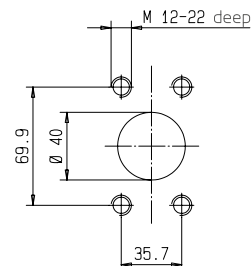


Housing connection J
Displacement nominal size
KP3: 82, 100, 112, 125

Suction port
SAE 2"

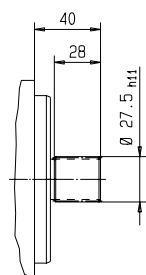


Pressure port
SAE 1 1/2"



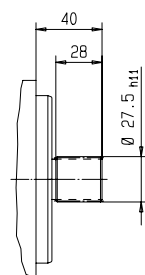
Dimensions

Shaft ends KP 2

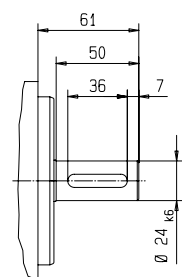


Shaft end W
Splined shaft profile B 28 x 25
DIN 5482
 $z = 15$, $m = 1,75$
 $450 \text{ Nm}_{\text{max}}$

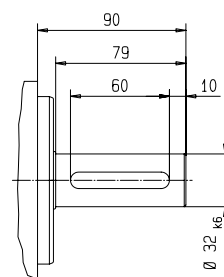
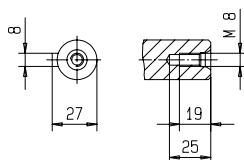
Shaft ends KP 3



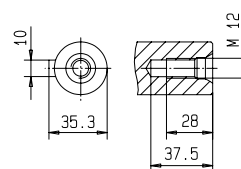
Shaft end W
Splined shaft profile B 28 x 25
DIN 5482
 $z = 15$, $m = 1,75$
 $450 \text{ Nm}_{\text{max}}$



Shaft end Y
Cylindrical shaft
 $230 \text{ Nm}_{\text{max}}$

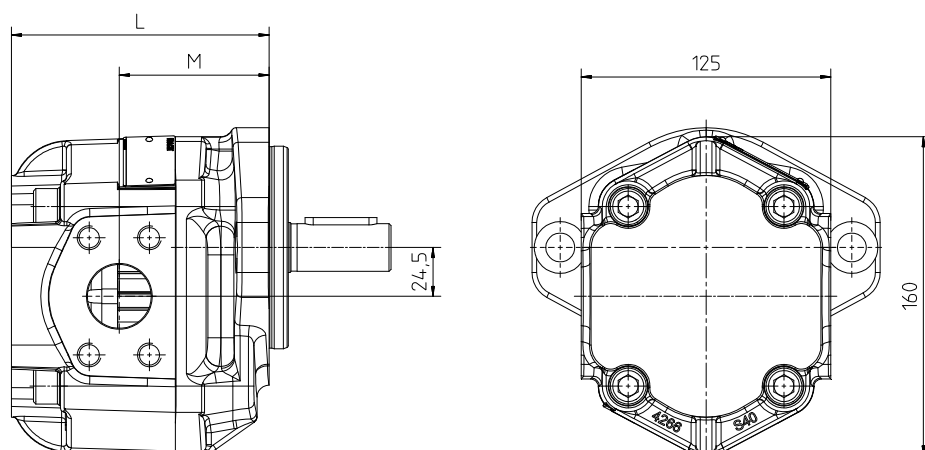


Shaft end Y
Cylindrical shaft
 $550 \text{ Nm}_{\text{max}}$



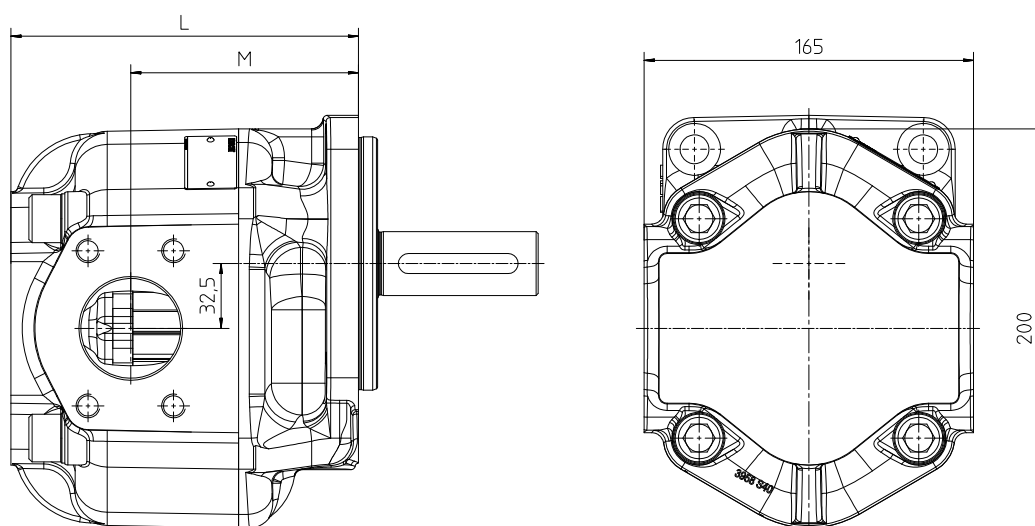
Dimensions / Weights

KP 2



Displacement Nominal size	L	M	Weight in kg		
			Version G-Flansch	Version S-Flansch	Version F/M-Flansch
20	129	75	11.0	10.0	9.0
25			11.5	10.5	9.5
28			12.0	11.0	10.0
32			12.5	11.5	10.5
40	142	85	13.0	12.5	11.5
50			13.5	13.0	12.0
56	152		15.0	14.0	13.0
62			15.0	14.0	13.0

KP 3



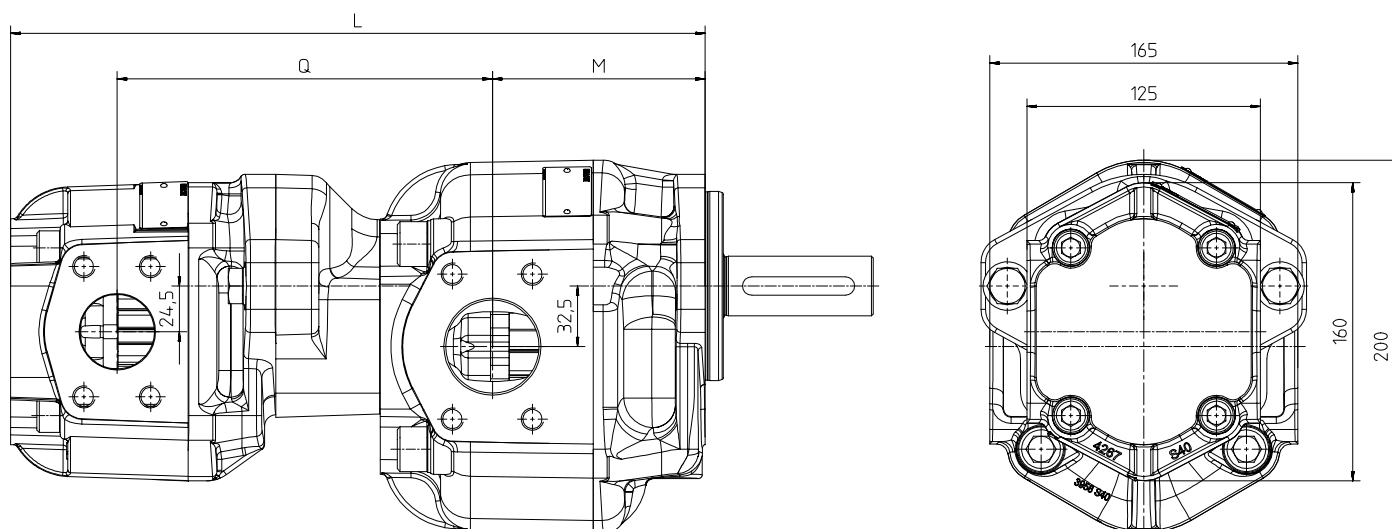
Displacement Nominal size	L	M	Weight in kg	
			Version S-Flange	Version V-Flange
71	162	102	23.0	24.0
82	174	114	24.5	25.5
100			26.0	27.0
112	185	125	27.0	28.0
125			29.0	30.0

Dimensions

Tandem design SAE-B flange, cylindrical shaft

The individual pump stages can operate in hydraulically separated circuits or with different media.

Direction of rotation shown: right
For counter-clockwise rotation, suction and pressure connections are opposite



The drive should be made using a compensating coupling!
Important: Unbalanced and/or axial forces must not occur.

Order example

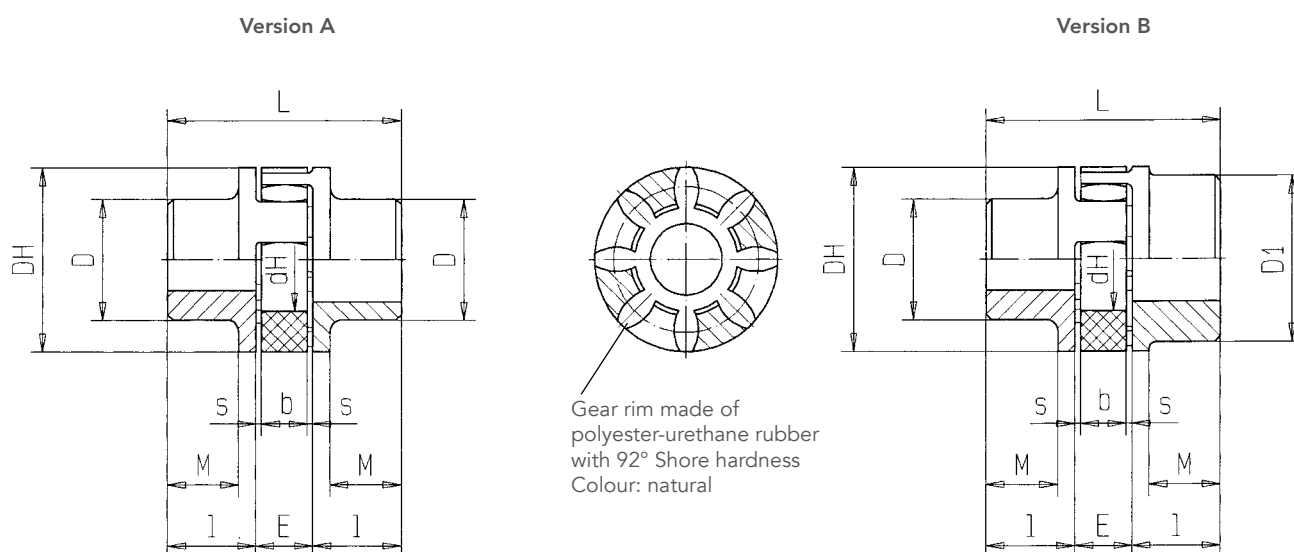
KP 3/82 S10X YWL 6VL1/364 + KP 2/40 S10G W00 4VL1/364

Displacement Nominal size 1st stage	Displacement Nominal size 2nd stage								
	71			82-100			112-125		
	Q	L	M	Q	L	M	Q	L	M
20	191	347	102	191	359	114	191	370	125
25									
28									
32									
40	201	360		201	372		201	383	
50									
56	201	370		201	382		201	393	
62									

In addition to the design shown, the following are available on request:

- Other pump combinations (KP 3, KP2)
- Other flange cover and shaft designs of 1st stage
- Three-stage pumps

Couplings – Dimensions and weights



Ordering code

Hub material
A

R A 38 – Z 45/ ²⁴/₃₂ – Z 45/38

Coupling size

Coupling hub length
and hub bore
pump-side cylindrical
KP2: Ø 24; KP3: Ø 32

Coupling hub length
and hub bore
motor side cylindrical

	Coupling size	Hub material: Aluminium		Pilot hole		Finished bore				Dimensions										Ordering code
		Weight in kg	Moment of inertia in kgm ²	Part 1	Part 2	min. Part 1	min. Part 2	max. Part 1	max. Part 2	I	E	s	b	L	M	D _H	D	D ₁	d _h	
Version A	28	0.39	0.0002	8	-	10	-	28	-	35	20	2.5	15	90	28	65	48	-	30	RA 28-Z 35/..-Z 35/..
	38	0.82	0.0007	10	-	12	-	38	-	45	24	3.0	18	114	37	80	66	-	38	RA 38-Z 45/..-Z 45/..
	42	1.25	0.0014	12	-	14	-	42	-	50	26	3.0	20	126	40	95	75	-	46	RA 42-Z 50/..-Z 50/..
	48	1.71	0.0024	13	-	15	-	48	-	56	28	3.5	21	140	45	105	85	-	51	RA 48-Z 56/..-Z 56/..
Version B	24/28	0.26	0.0001	6	22	8	24	24	28	30	18	2.0	14	78	24	55	40	48	27	RA 24/28-Z 30/..-Z 30/..
	28/38	0.46	0.0003	8	26	10	28	28	38	35	20	2.5	15	90	28	65	48	65	30	RA 28/38-Z 35/..-Z 35/..
	38/45	0.89	0.0008	10	36	12	38	38	45	45	24	3.0	18	114	37	80	66	76	38	RA 38/45-Z 45/..-Z 45/..
	42/55	1.39	0.0018	12	40	14	42	42	55	50	26	3.0	20	126	40	95	75	94	46	RA 42/55-Z 50/..-Z 50/..
	48/60	1.86	0.0030	13	46	15	48	48	60	56	28	3.5	21	140	45	105	85	102	51	RA 48/60-Z 56/..-Z 56/..

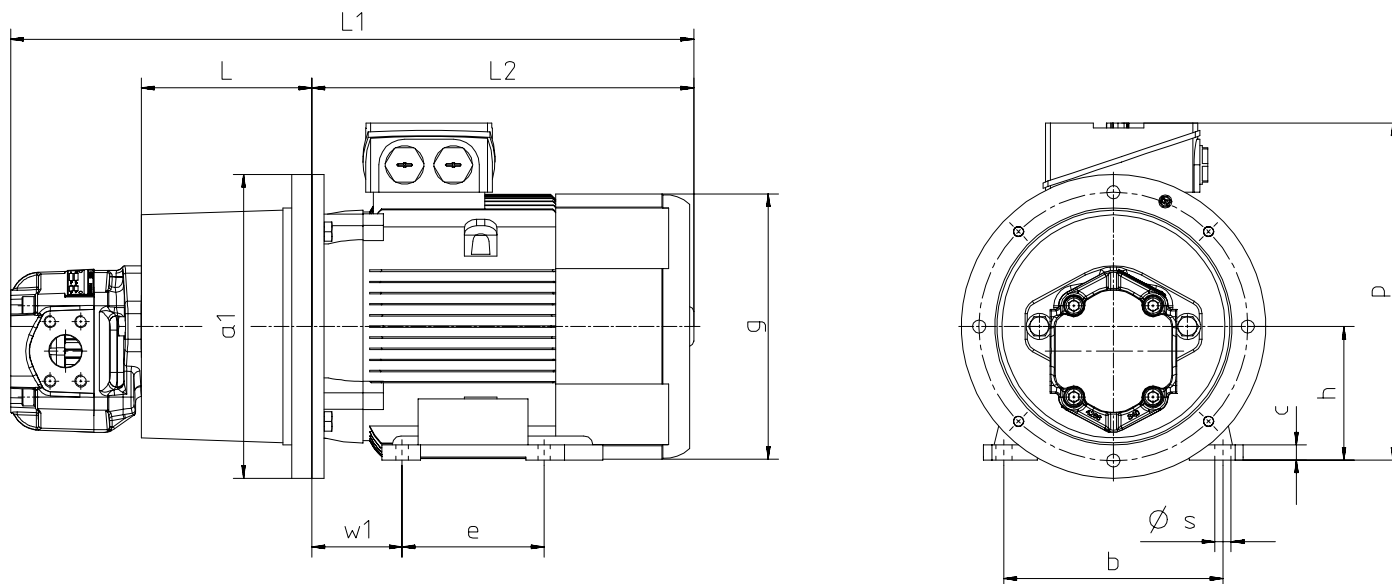
Media temperature: -10 to +80°C (short-term temperature peaks up to +120 °C are permissible)

Weights and mass moments of inertia refer to max. finished bore without keyway.

Finished bore to ISO fit H7; parallel keyway according to DIN 6885 Sheet 1

Dimensions

Pump unit KP2/ . S.O. Y00 4VL. /364



KP 2

Size	Motor 6-pole Power in kW	Motor 4-pole Power in kW	Pump support	Coupling
100 LK	-	2.2	Z2/250/135	RA 24/28 - Z30/24 - Z30/28
100 L	1.5	3.0		
112 M	2.2	4.0		
132 S	3.0	5.5	Z2/300/168	RA 28/38 - Z35/24 - Z35/38
132 M	5.5	7.5		
160 M	7.5	11.0	Z2/350/188	RA 38/45 - Z45/24 - Z45/42
160 L	11.0	15.0		
180 M	-	18.5	Z2/350/204	RA 42/55 - Z50/24 - Z50/48
180 L	15.0	22.0		

Dimensions depend on motor make

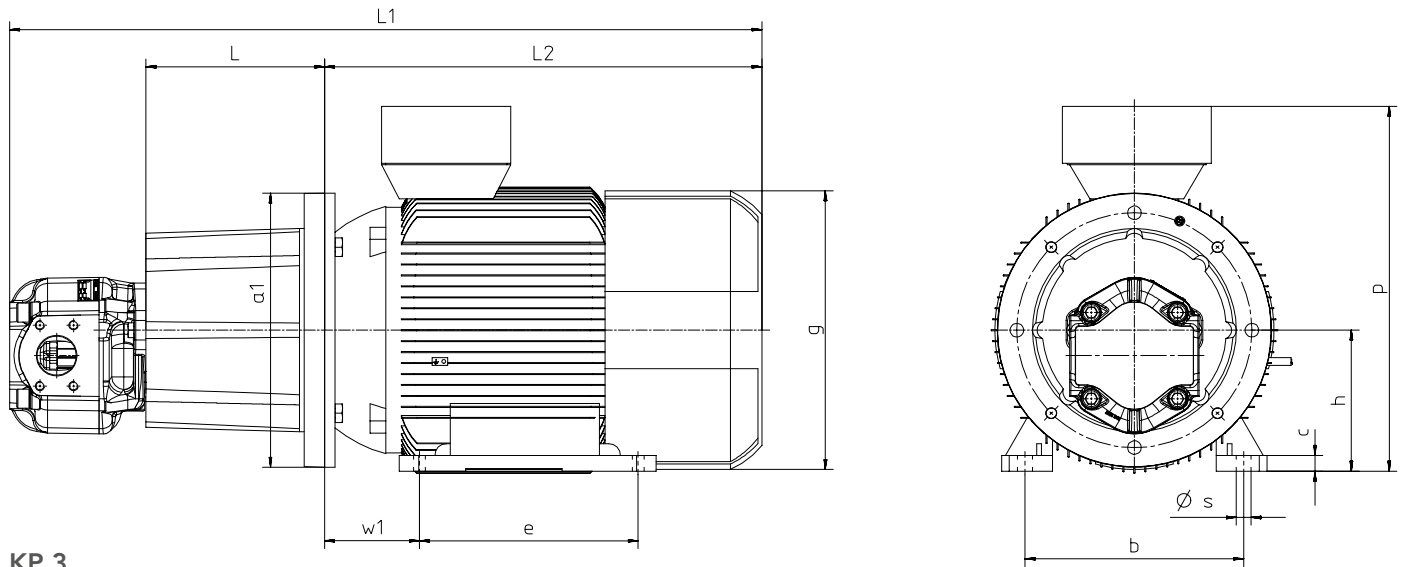
KP 2

Size	20-32	40-50	56-62	20-62													
	L1	L1	L1	L	L2	a1	a	b	c	e	f	g	h	p	s1	s2	w1
100 L	634.5	647.5	657.5	135	370.5	250	176	160	12	140	196	198	100	293	12	16	63
112 M	593.0	606.0	616.0	135	329.0	250	176	190	12	140	226	222	112	308	12	16	70
132 S	682.0	695.0	705.0	168	385.0	300	218	216	15	140	256	262	132	347	12	16	89
132 M	682.0	695.0	705.0	168	385.0	300	218	216	15	178	256	262	132	347	12	16	89
160 M	811.0	824.0	834.0	188	494.0	350	300	254	18	210	300	314	160	425	15	19	108
160 L	811.0	824.0	834.0	188	494.0	350	300	254	18	254	300	314	160	425	15	19	108
180 M	891.0	904.0	914.0	204	558.0	350	328	279	20	241	339	356	180	466	15	19	121
180 L	921.0	934.0	944.0	204	588.0	350	328	279	20	279	339	356	180	466	15	19	121

All motor dimensions and data refer to Rotor NL motor make, other motor makes on request. Motor size IMB35.

Dimensions

Pump unit KP3/ . S.O. Y00 6VL. /364



KP 3

Size	Motor 6-pole Power in kW	Motor 4-pole Power in kW	Pump support	Coupling
100 LK	-	2.2	PFL 250/18/41	RA 24/28 - Z30/32 - Z30/28
100 L	1.5	3.0		
112 M	2.2	4.0		
132 S	3.0	5.5	PL 300/7/5	RA 28/38 - Z35/32 - Z35/38
132 M	5.5	7.5		
160 M	7.5	11.0	PK 350/10/38	RA 38/45 - Z45/32 - Z45/42
160 L	11.0	15.0		RA 42/55 - Z50/32 - Z50/48
180 M	-	18.5		
180 L	15.0	22.0		
200 L	22.0	30.0	PK 400/5/23	RA 42/55 - Z50/32 - Z50/55
225 S	30.0	37.0	PK 450/3/34	RA 48/60 - Z56/32 - Z56/60
225 M	37.0	45.0		

Dimensions depend on motor make

KP 3

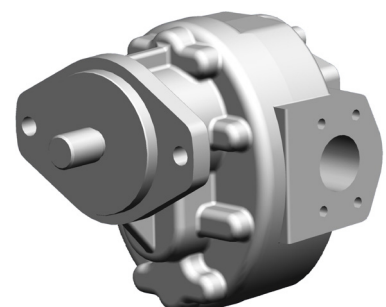
Baugröße	71	82-100	112-125	71-125													
	L1	L1	L1	L	L2	a1	a	b	c	e	f	g	h	p	s1	s2	w1
100 L	707.5	719.5	730.5	175	370.5	250	176	160	12	140	196	198	100	293	12	16	63
112 M	666.0	678.0	689.0	175	329.0	250	176	190	12	140	226	222	112	308	12	16	70
132 S	743.0	755.0	766.0	196	385.0	300	218	216	15	140	256	262	132	347	12	16	89
132 M	743.0	755.0	766.0	196	385.0	300	218	216	15	178	256	262	132	347	12	16	89
160 M	884.0	896.0	907.0	228	494.0	350	300	254	18	210	300	314	160	425	15	19	108
160 L	884.0	896.0	907.0	228	494.0	350	300	254	18	254	300	314	160	425	15	19	108
180 M	948.0	960.0	971.0	228	558.0	350	328	279	20	241	339	356	180	466	15	19	121
180 L	978.0	990.0	1001.0	228	588.0	350	328	279	20	279	339	356	180	466	15	19	121
200 L	1032.5	1044.5	1055.5	228	642.5	400	355	318	25	305	378	396	200	515	19	25	133
225 S	1047.0	1059.0	1070.0	262	623.0	450	361	356	34	286	436	449	225	563	19	25	149
225 M	1132.0	1144.0	1155.0	262	708.0	450	361	356	34	311	436	449	225	563	19	25	149

All motor dimensions and data refer to Rotor NL motor make, other motor makes on request. Motor size IMB35.

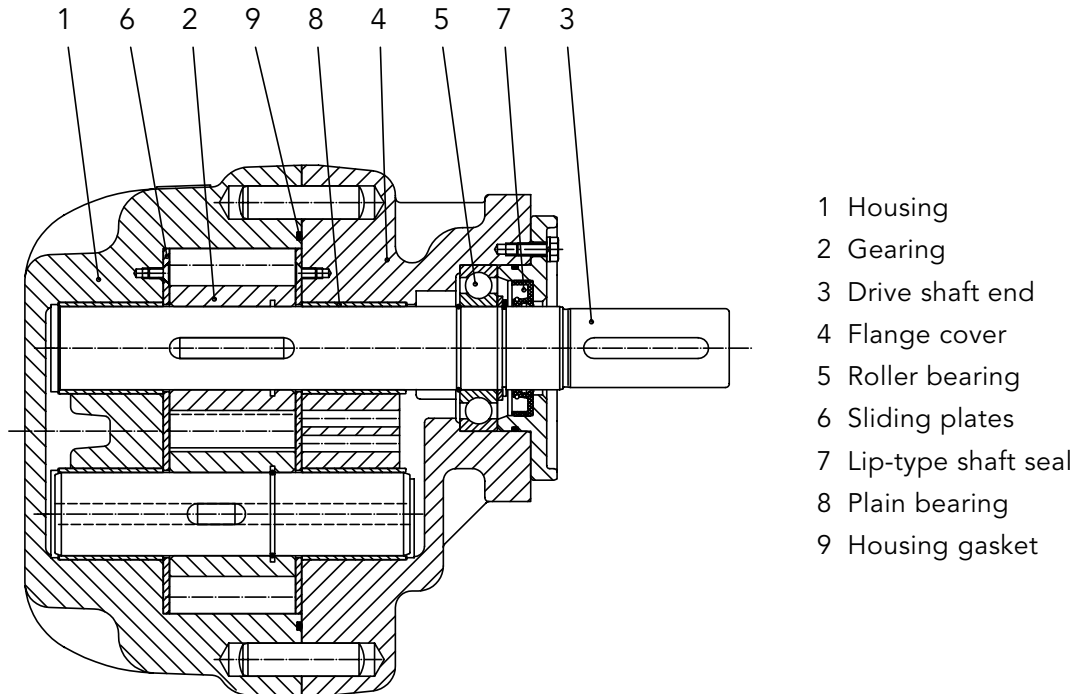
KRACHT®

KRACHT GmbH · Gewerbestrasse 20 · 58791 Werdohl, Germany
Phone +49 2392 935 0 · E-Mail info@kracht.eu · Web www.kracht.eu

High pressure
gear pumps
KP 5



Construction



Description

KP series high pressure gear pumps are mainly used in oil-hydraulic plants. They are suitable both for hydraulic fluids as well as mineral oil bases (DIN 51524/25) and engine oils (DIN 51511).

The housing components are made from high-grade cast iron, the shaft and gears from hardened and ground case-hardening steel.

The shafts are supported in multi-layer bearings that have excellent antifriction properties. The seals in the drive shaft ends are made using solely NBR or FKM shaft seals.

An outboard bearing is placed on the shaft end to handle radial and axial forces.

The use of fine-meshed filters significantly increases the gear pump service life. Careful maintenance is the prerequisite.

Technical Information

1. External loads

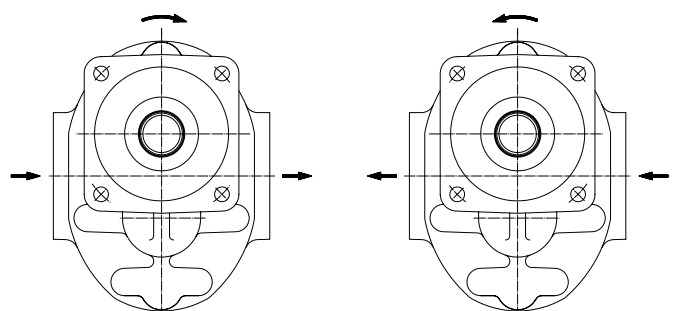
The robust design facilitates handling external radial forces, depending on the size and direction of application.

2. Direction of rotation

The following stipulations apply to the direction of rotation when looking at the drive shaft end:

Shaft rotation clockwise: direction of conveyance from left to right

Shaft rotation counter clockwise: direction of conveyance from right to left



General Characteristics

Fixing type	Flange type
Pipe connection	Flange; Dimensions, page 8
Drive shafts	Dimensions, page 8
Direction of rotation	clockwise or anticlockwise
Weight	Page 7
Mounting position	optional
Ambient temperature	$\vartheta_{u \min} = -20\text{ °C}$ $\vartheta_{u \max} = +60\text{ °C}$

Operating Characteristics

Operating pressure	
Inlet port	$p_{e \min} = -0.4\text{ bar (underpressure)}$ $p_{e \max} = 2.0\text{ bar}$
Outlet port	$p_{\max} = \text{Table, page 5}$
Fluid temperature	$\vartheta_{m \min} = -20\text{ °C}$ $\vartheta_{m \max} = +80\text{ °C for NBR-}$ Lip-type shaft seal $+120\text{ °C for FKM-}$ Lip-type shaft seal
Viscosity	$v_{\min} = 13\text{ mm}^2/\text{s (cSt)}$ $v_{\max} = 600\text{ mm}^2/\text{s (cSt)}$
Recommended viscosity range	$v = 16 \dots 90\text{ mm}^2/\text{s (cSt)}$
Discharge flow	Page 5
Input power	Page 5
Filter fineness	Return line filter $\leq 0.060\text{ mm mesh size}$
Hydraulic fluids	Mineral oil based on DIN 51524/25 Motor oil based on DIN 51511 flameproof hydraulic fluids on request

ATEX

Products and media on request

Accessories

Straight flange connection, hole pattern based on SAE standard. Differential coupling for cyl. shaft end. Intermediate flange to standard motors with fastening flange according to DIN 42948.

Calculation Formulas for Hydropumps

Characteristics, formula signs, units

1 Discharge/displacement flow	Q	l/min
2 geom. discharge/displ. flow	V_g	cm^3/r
3 Pressure	p	bar
4 Speed	n	1/min
5 Torque	M	Nm
6 Power	P	kW
7 Total efficiency	η_{tot}	–
8 Volumetric efficiency	η_{vol}	–
9 hydr./mech. efficiency	η_{hm}	–
10 Flow velocity	v	m/s
11 Piping diameter	d	mm

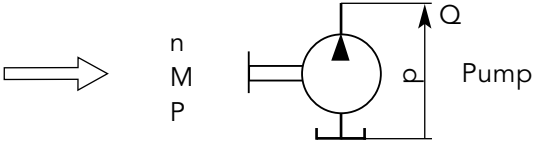
General:

$$Q_{\text{th}} = V_g \cdot n, \quad \eta_{\text{tot}} = \eta_{\text{vol}} \cdot \eta_{\text{hm}}$$

$$M = 9549 \cdot \frac{P}{n} \quad P = \frac{M \cdot n}{9549} \quad v = 21,22 \cdot \frac{Q}{d_2}$$

Recommended values for KRACHT products
at the nominal operating pressure

	η_{tot}	η_{vol}
KP 5	≈ 0.85	≈ 0.95

		
Parameters for:	Volume flow	Discharge flow $Q = \frac{V_g \cdot n \cdot \eta_{\text{vol}}}{10^3} \left[\frac{\text{l}}{\text{min}} \right]$
	Torque	Drive torque $M = \frac{p \cdot V_g}{20 \cdot \pi \cdot \eta_{\text{hm}}} \text{ [Nm]}$
	Performance	Input power $P = \frac{p \cdot Q}{600 \cdot \eta_{\text{tot}}} \text{ [kW]}$

Displacement / Nominal Size

Displacement Nominal size	geom. displacement V_g cm ³ /r	max. operating pressure p_b bar	Speed range		Torque M_{max} Nm	Permitted torques in N middle at shaft ends (n = 1450 1/min)		Mass inertia torque x 10 ⁻³ J kg/m ²
			n _{min}	n _{max}		axial	radial	
160	160	100	800	2000	560	400	1500	3.77
200	200	100	800	1800				4.57
250	250	100	800	1600				5.87
300	300	80	800	1500				6.50

Discharge Flow and Required Input Power

Discharge flow at $n = 950$ 1/min

Nominal size	Discharge flow Q in 1/min at 34 mm ² /s Pressure p in bar					
	10	20	40	60	80	100
160	150	149	147	146	144	143
200	190	189	187	185	183	181
250	239	238	236	234	232	230
300	286	285	284	283	281	–

Required input power P in kW at $n = 950$ 1/min

Nominal size	Pressure p in bar					
	10	20	40	60	80	100
160	3.5	6.5	12	17.5	23	29
200	4	8	14.5	22	29	36
250	5	9.5	18	26.5	35	43.5
300	6	11.5	21.5	32	42.5	–

Discharge flow at $n = 1450$ 1/min

Nominal size	Discharge flow Q in 1/min at 34 mm ² /s Pressure p in bar					
	10	20	40	60	80	100
160	227	225	223	221	219	216
200	285	284	282	280	278	276
250	358	356	354	352	349	346
300	429	428	426	424	422	–

Required input power P in kW at $n = 1450$ 1/min

Nominal size	Pressure p in bar					
	10	20	40	60	80	100
160	5.5	10	18.5	27	36	44.5
200	6.5	12	23	33.5	43.5	54
250	8.0	14	27.5	41	54	67
300	9.5	17.5	33	49	64.5	–

Tolerance zone of the discharge flow: – 5 % of table value Q.

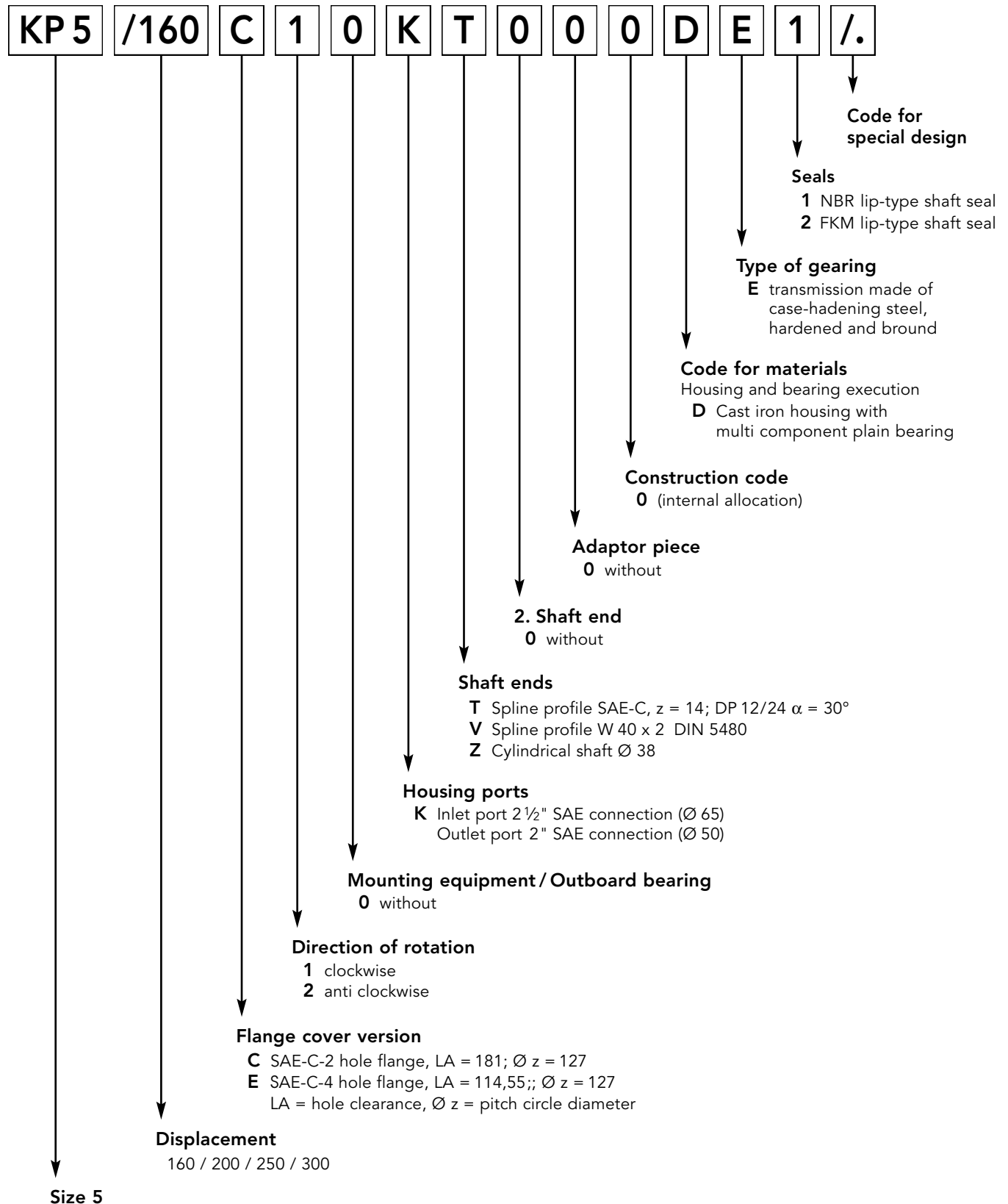
Select the delivery power of each drive motor approx. 20 % greater than table value P.

If the viscosity is less than 30 mm²/s (cSt), reduce discharge flow Q

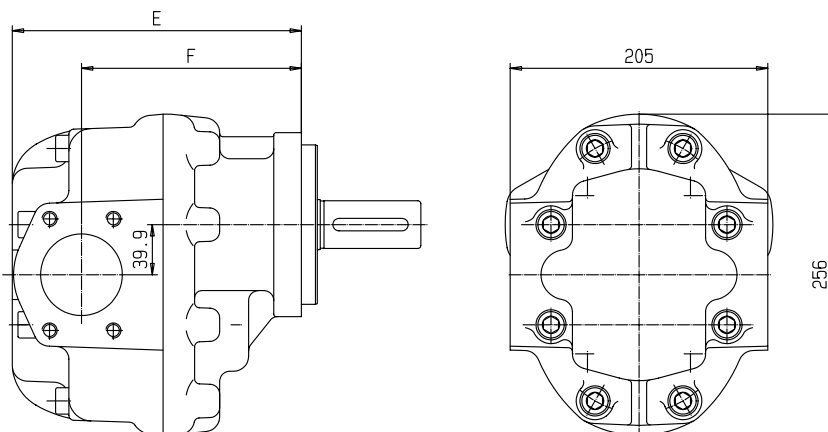
If the viscosity is more than 75 mm²/s (cSt), consider the addition to the input power, if over 300 mm²/s (cSt), reduction of the speed.

Type Key

Ordering example



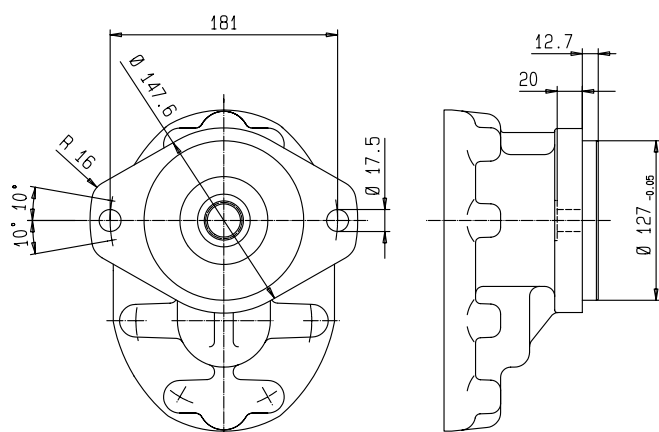
Dimensions



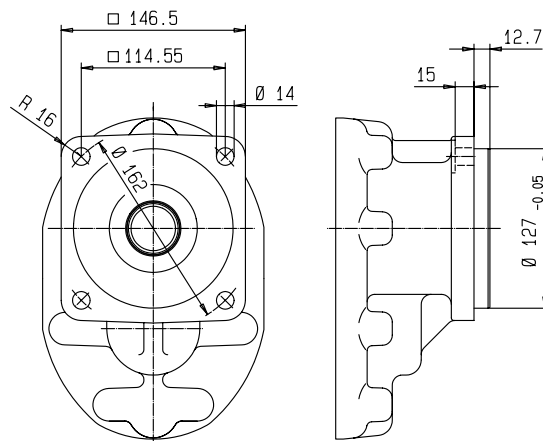
Displacement Nominal size	E	F	Weight in kg	
			Version C flange	Version E flange
160	225	170	42	43
200	230	175	44	45
250	243	188	48	49
300	255	200	52	53

Flange Type

SAE-C-2 hole flange C,
LA = 181; $\varnothing z = 127$

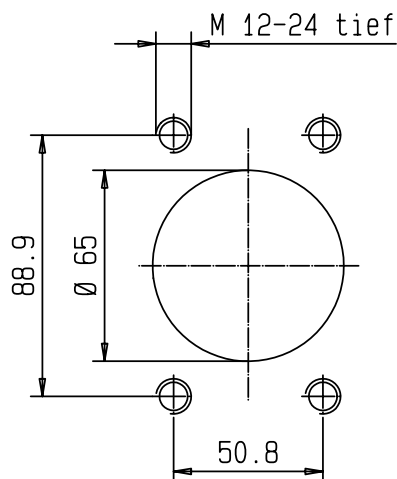


SAE-C-4 hole flange E,
LA = 114.55; $\varnothing z = 127$

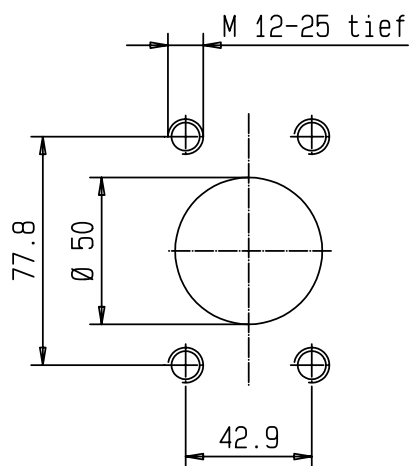


Connections

Housing side ports
Inlet port 2 1/2" SAE connection (Ø 65)

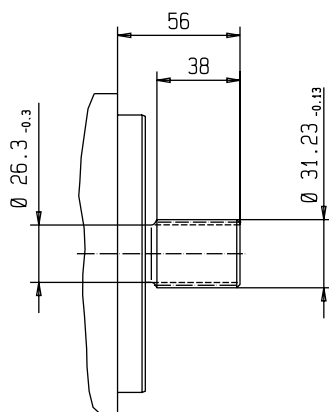


Housing side ports
Outlet port 2" SAE connection (Ø 50)

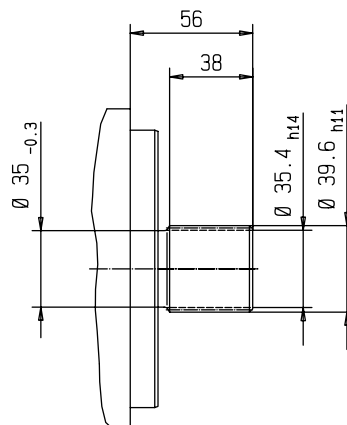


Shaft Ends

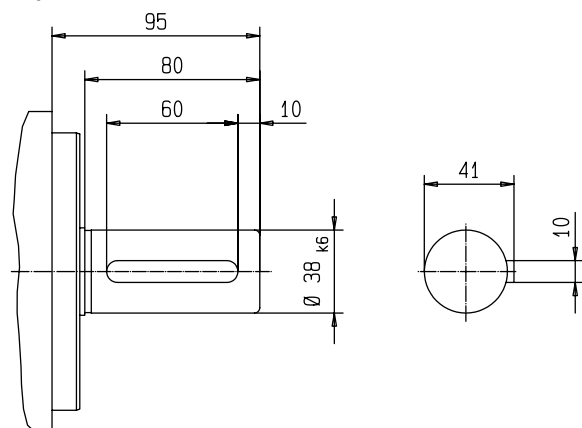
Shaft end T
Spline profile SAE-C
Z = 14; DP 12/24, $\alpha = 30^\circ$



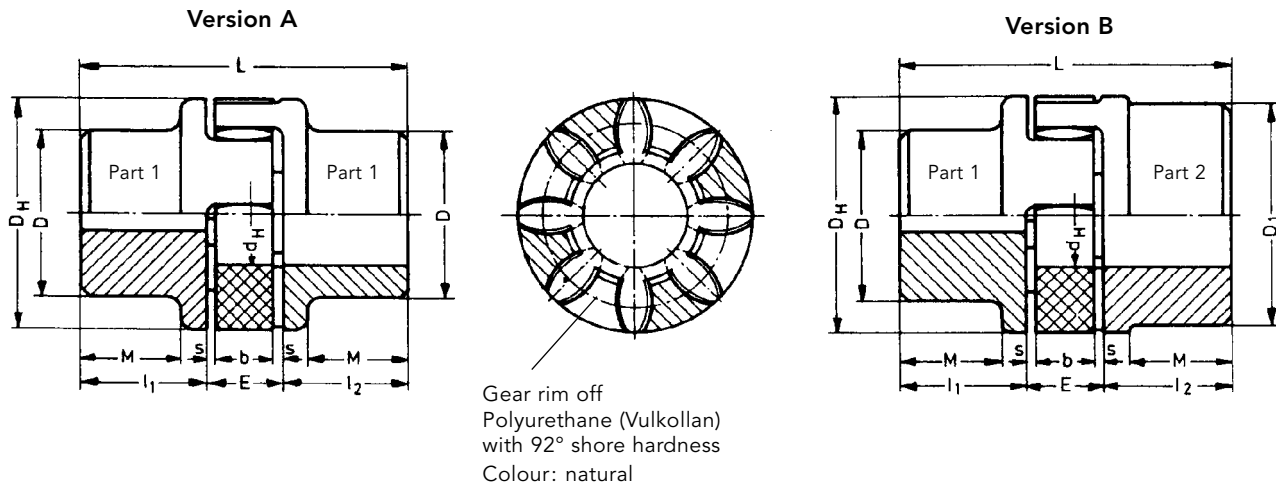
Shaft end V
Spline profile W 40 x 2, DIN 5480



Shaft end Z
Cylindrical shaft Ø 38



Accessory, Couplings



Ordering code

RA 38
RG

–

Z 45/38

–

Z 45/38

	Hub material
A	AL
G	GG

Coupling size
in Al (aluminium)
in GG (cast iron)

Coupling hub length
and hub bore
Pump side cylindrical

Coupling hub length
and hub bore
Motor side zylindrical

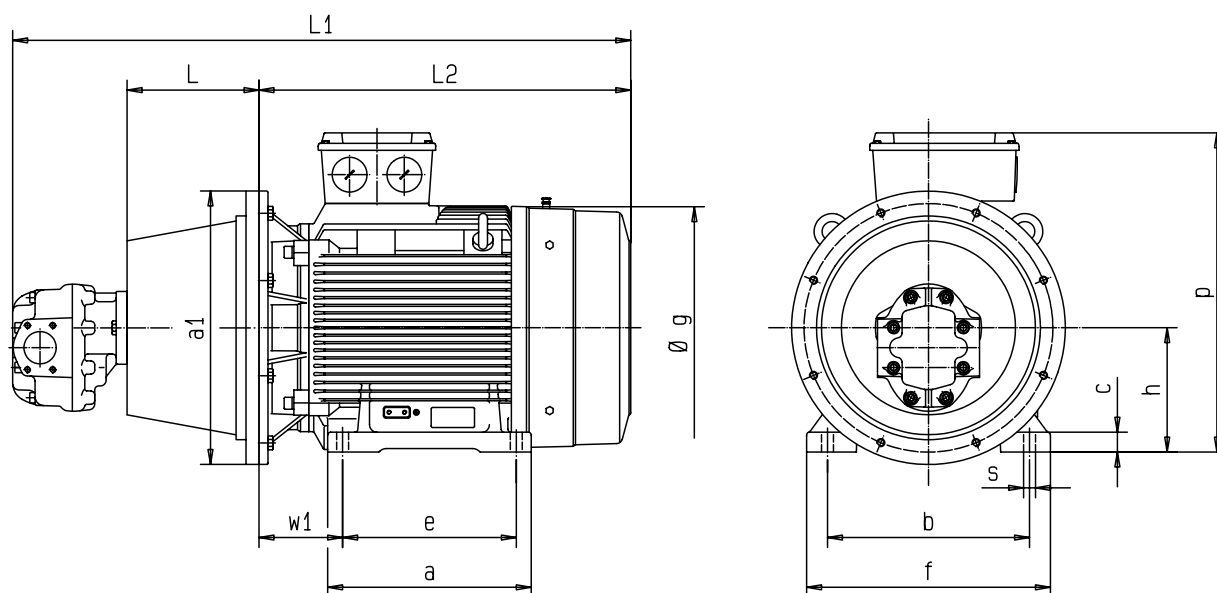
	Coupling size	Hub material				Lead bore		Finished bore				Dimensions												Ordering code
		Al		GG		Part 1	Part 2	min.		max.		l ₁ ; l ₂	E	s	b	L	M	D _H	D	D ₁	d _H			
		Weight	Mass moment of inertia	Weight	Mass moment of inertia			Part 1	Part 2	Part 1	Part 2													
																						Kg	Kgm ²	
Version A	38	0.82	0.0007	2.08	0.002	10	–	12	–	38	–	45	24	3	18	114	37	80	66	66	–	38	R.38-Z 45/..-Z 45/..	
	42	1.25	0.0014	3.21	0.004	12	–	14	–	42	–	50	26	3	20	126	40	95	75	75	–	46	R.42-Z 50/..-Z 50/..	
	48	1.71	0.0024	4.41	0.006	13	–	15	–	48	–	56	28	3,5	21	140	45	105	85	85	–	51	R.48-Z 56/..-Z 56/..	
Version B	38/45	0.89	0,0008	2.27	0.002	10	36	12	38	38	45	45	24	3	18	114	37	80	66	66	76	38	R.38/45-Z 45/..-Z 45/..	
	42/55	1.39	0.0018	3.57	0.005	12	40	14	42	42	55	50	26	3	20	126	40	95	75	75	94	46	R.42/55-Z 50/..-Z 50/..	
	48/60	1.86	0.0030	4.8	0.008	13	46	15	48	48	60	56	28	3.5	21	140	45	105	85	85	102	51	R.48/60-Z 56/..-Z 56/..	
	55/70	–	–	7.37	0.016	18	52	20	55	55	70	65	30	4	22	160	52	120	–	98	120	60	R.55/70-Z 65/..-Z 65/..	
	65/75	–	–	10.9	0.031	20	63	22	65	65	75	75	35	4.5	26	185	61	135	–	115	135	68	R.65/70-Z 75/..-Z 75/..	
	75/90	–	–	17.7	0.068	28	73	30	75	75	90	85	40	5	30	210	69	160	–	135	160	80	R.75/90-Z 85/..-Z 85/..	

Medium temperature: – 10 °C up to + 80 °C (intermittent temperature peaks up to + 120 °C are permissible)

Weights and mass inertial torque are related to max. finished bore without groove

Finished bore based on ISO alignment H7; Keyway according to DIN 6885 Sheet 1

Motor with Pump KP5 / . C.O. Z00 0DE.



Size	Motor 4-pole		Motor 6-pole		Bell housing	Coupling
	Power kW	Speed 1/min	Power kW	Speed 1/min		
160 M	11	1465	7.5	960	PK 350/10/19	RA 38/45 – Z45/38 – Z45/42
160 L	15	1465	11	960		
180 M	18.5	1470	–	–	PK 350/10/19	RA 42/55 – Z50/38 – Z50/48
180 L	22	1470	15	970		
200 LK	30	1470	18.5/22	975/975	PK 400/5/7	RA 42/55 – Z50/38 – Z50/55
225 S	37	1480	–	–	PK 450/3/23	RA 48/60 – Z56/38 – Z56/60
225 M	45	1480	30	980		
250 M	55	1480	37	980	PL 550/1/9	RG 55/70 – Z65/38 – Z65/65 RG 65/75 – Z75/38 – Z75/75
280 S	75	1485	45	985	PK 550/3/9	

All motor dimensions and information refer to the ADDA motor make, other motor makes on request. Motor mounting IMB35

Size	160	200	250	300	160-300												
	L ₁	L ₁	L ₁	L ₁	L	a ₁	a	b	c	e	f	Øg	h	L ₂	p	s	w ₁
160 MT	913	918	931	943	228	350	250	254	18	210	292	290	160	460	375	14	108
160 L	993	998	1011	1023	228	350	332	254	20	254	315	325	160	540	405	14	108
180 M	1033	1038	1051	1063	228	350	320	279	22	241	350	340	180	580	425	14	121
180 L	1033	1038	1051	1063	228	350	320	279	22	279	350	340	180	580	425	14	121
200 L	1093	1098	1111	1123	228	400	365	318	24	305	395	380	200	640	475	18	133
225 S	1177	1182	1195	1221	262	450	370	356	30	286	436	420	225	690	515	18	149
225 M	1177	1182	1195	1221	262	450	370	356	30	311	436	420	225	690	515	18	149
250 M	1255	1260	1273	1285	265	550	410	406	32	349	476	480	250	765	580	22	168
280 S	1390	1395	1408	1420	275	550	480	457	35	368	534	535	280	890	680	22	190

All pump and motor sizes can be combined with each other

Note

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KRACHT GmbH · Gewerbestrasse 20 · 58791 Werdohl, Germany
Phone +49 2392 935 0 · E-Mail info@kracht.eu · Web www.kracht.eu