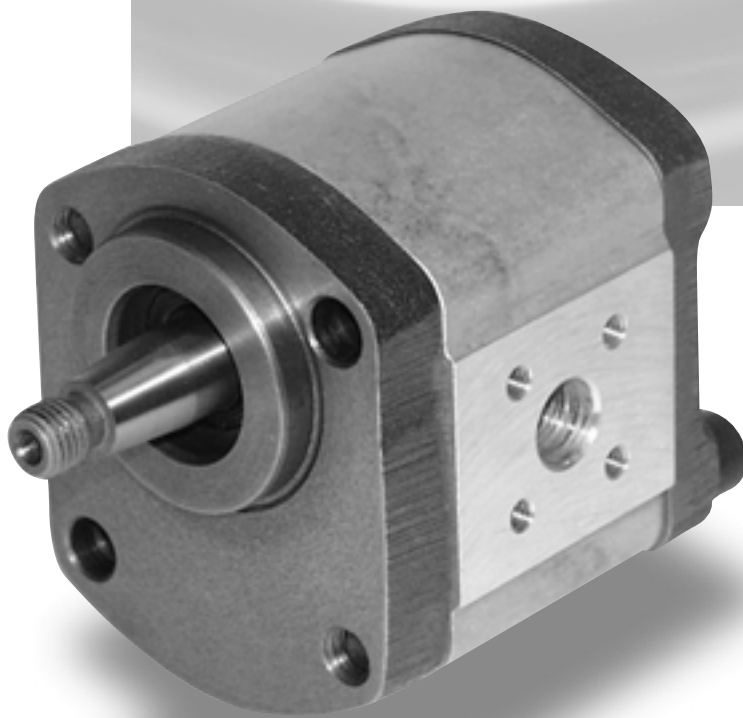
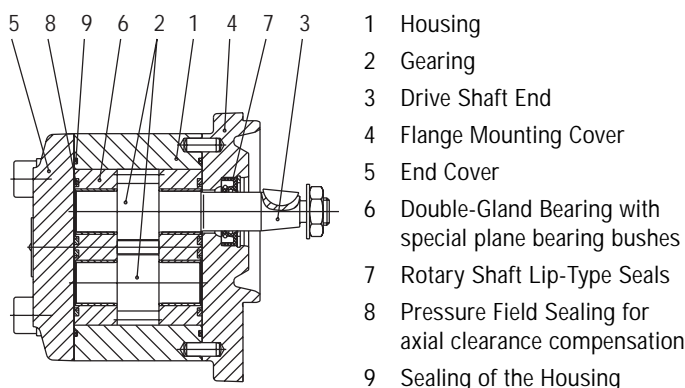


KRACHT



**High Pressure Gear Pumps KP 1**

# Configuration of High Pressure Gear Pump KP 1



- 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

## Description

Accordingly to its configuration – the Design Principle is illustrated by the Sectional Figure – the Kracht External Gear-Type Pump Series KP1 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.

All sealings are optionally available in Perbunan (NBR) or Viton (FPM) compounds in dependence on the different applications concerning the temperature ranges and/or medium requirements. 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.

## Special 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.

## General Characteristics

Mounting	Flange and Foot-Type
Pipe Connection	Flange Type, G-GAS thread on request
Direction of Rotation	Clockwise <b>or</b> Anticlockwise
Weight	refer to Dimensional Sheets
Fitting Position	Optional
Permissible Ambient Temperature Range	$\vartheta_{U \min} = - 20 \text{ }^{\circ}\text{C}$ $\vartheta_{U \max} = + 60 \text{ }^{\circ}\text{C}$

## Operating Characteristics

Operating Pressures	
Inlet Port	$p_{e \min} = - 0.4 \text{ bar (Vacuum)}$ $p_{e \max} = 2 \text{ bar}$
Short Time	$p_{e \max} = 5 \text{ bar}$
Outlet Port	$p_{\max} = \text{see technical Data}$
Fluid Temperature Range	$\vartheta_{m \max} = 90 \text{ }^{\circ}\text{C}$ for NBR-Rotary Shaft Lip-Type Seal $100 \text{ }^{\circ}\text{C}$ for FPM-Rotary Shaft Lip-Type Seal
Viscosity Range	$v_{\min} = 10 \text{ mm}^2/\text{s}$ $v_{\max} = 600 \text{ mm}^2/\text{s}$
Recommended Oil Cleanliness	Class 19/16 acc. to ISO /DIS 4406 $\Rightarrow$ 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	$v = 30 \dots 45 \text{ mm}^2/\text{s}$
Discharge Flow	refer to Charts Page 4
Input Power	refer to Charts Page 4
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 $70 \text{ }^{\circ}\text{C}$ , max. pressure must be reduced minus 20% (use only on request)

## Materials

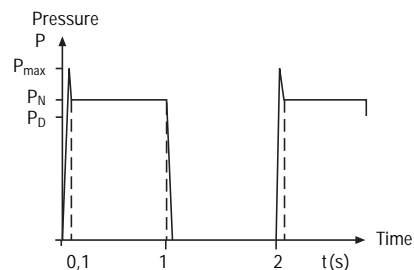
Housing	Aluminium-Alloy, Cast Iron on request
Bearing	Double-Gland Bearing with Multi-component Plane Bearing Bushes
Journals and Gears	Case Hardening Steel acc. to DIN 17210 Surface Hardened and Ground
Seals	1 NBR Rotary Shaft Lip-Type Seal $\vartheta \leq 90 \text{ }^{\circ}\text{C}$ 2 FPM Rotary Shaft Lip-Type Seal $\vartheta \leq 100 \text{ }^{\circ}\text{C}$

# Technical Data

Nominal Displacement	Geom. Displacement	max. Pressure	Rated Pressure	Continuous Operating Pressure	max. Operating Speed	Moment of Inertia x 10 <sup>-6</sup>
	V <sub>g</sub>	p <sub>max</sub>	p <sub>N</sub>	p <sub>D</sub>	n <sub>max</sub>	J
	cm <sup>3</sup> /r	bar	bar	bar	rpm	kg m <sup>2</sup>
					NBR FPM	
3	3	300	280	250	3000 4000	23.3
4	4	300	280	250	3000 4000	28.4
5.5	5.45	300	280	250	3000 4000	35.7
6.3	6.28	300	280	250	3000 4000	39.9
8	7.9	300	280	250	3000 4000	51.1
11	10.9	300	280	250	3000 3500	62.9
14	13.85	300	280	250	3000 3000	77.7
16	15.9	300	280	250	3000 3000	87.7
19	18.8	250	230	200	2800 2800	102.5
22	22.3	200	180	150	2500 2500	119.6

Maximum Pressure = Pressure Peak  
 Rated Pressure p<sub>N</sub> < 6s = 50% ED  
 see Time/Pressure Chart  
 max. Permissible Operating Cycles: 30/min  
 Pressures as specified are applicable to v ≥ 30 mm<sup>2</sup>/s

## Time/Pressure Chart



Nominal Displacement	Minimum Speed at p = ... bar rpm					
	...100	...120	...150	...180	...200	...250
3	600	700	900	1200	1300	1400
4	600	700	900	1200	1300	1400
5.5	500	700	900	1000	1200	1400
6.3	500	700	900	1000	1200	1400
8	500	700	900	1000	1100	1400
11	500	700	900	1000	1100	1200
14	500	700	800	900	1000	1100
16	500	600	700	800	1000	1000
19	500	600	700	800	1000	-
22	500	600	700	800	-	-

## Calculation Formulas for Hydraulic Pumps

### Characteristic Data, Formula Signs, Units

- |                                |                  |                    |
|--------------------------------|------------------|--------------------|
| 1. Discharge Flow / Input Flow | Q                | l/min              |
| 2. Pump / Motor Displacement   | V <sub>g</sub>   | cm <sup>3</sup> /r |
| 3. Pressure                    | p                | bar                |
| 4. Speed of Rotation           | n                | rpm                |
| 5. Torque                      | M                | Nm                 |
| 6. Power                       | P                | kW                 |
| 7. Total Efficiency            | η <sub>tot</sub> | —                  |
| 8. Volumetric Efficiency       | η <sub>vol</sub> | —                  |
| 9. Hydr./Mech. Efficiency      | η <sub>hm</sub>  | —                  |
| 10. Flow Velocity              | v                | m/s                |
| 11. Piping Diameter            | d                | mm                 |

### General

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

$$M = 9549 \cdot \frac{P}{n}, \quad v = 21,22 \frac{Q}{d^2}$$

Approximate Values for Kracht Products in the Nominal Operating Point

	η <sub>tot</sub>	η <sub>vol</sub>
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 $M = \frac{p \cdot V_g}{20 \cdot \pi \cdot \eta_{hm}} \quad [Nm]$
	Power	Input Power $P = \frac{p \cdot Q}{600 \cdot \eta_{tot}} \quad [kW]$

## Discharge Flow and required Input Power

### Discharge Flow at n = 1450 rpm

Discharge Flow Q in l/min at 34 mm<sup>2</sup>/s  
Pressure p in bar

Nominal Size	Discharge Flow Q in l/min at 34 mm <sup>2</sup> /s						
	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

Pressure p in bar

Nominal Size	Required Input Power at n = 1450 rpm						
	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 rpm

Discharge Flow Q in l/min at 34 mm<sup>2</sup>/s  
Pressure p in bar

Nominal Size	Discharge Flow Q in l/min at 34 mm <sup>2</sup> /s						
	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

Pressure p in bar

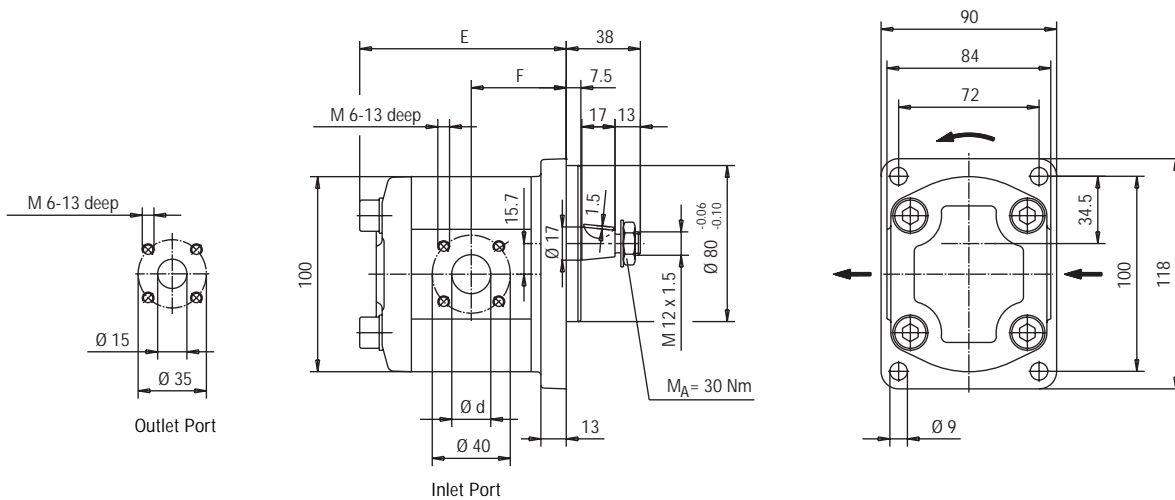
Nominal Size	Required Input Power at n = 950 rpm						
	20	60	100	140	180	220	260
3	0.18	0.39	0.60	0.82	—	—	—
5.5	0.25	0.60	0.96	1.32	1.68	—	—
8	0.33	0.85	1.37	1.89	2.40	—	—
11	0.42	1.13	1.84	2.55	3.26	—	—
14	0.52	1.41	2.31	3.20	4.09	—	—
16	0.58	1.61	2.64	3.66	4.69	—	—
19	0.68	1.89	3.11	4.33	5.55	—	—
22	0.78	2.21	3.64	5.07	6.50	—	—

# Type-Key

<b>Product Name</b>		<b>Shaft Ends</b>	
<b>Size 1</b>		<b>F</b> with two parallel Flats	<b>S</b> Involute Spline SAE-A DP 16/32 $\alpha = 30^\circ$ 9 Teeth
<b>Nominal Displacement</b> 3 / 4 / 5,5 / 6,3 / 8 / 11 / 14 / 16 / 19 / 22		<b>K</b> Taper 1:5	<b>X</b> Involute Spline B 17 x 14 DIN 5482
		<b>M</b> Taper 1:8	<b>S</b> = 55 Nm <sub>max</sub>
		<b>F</b> = 40 Nm <sub>max</sub>	<b>X</b> = 70 Nm <sub>max</sub>
		<b>K+M</b> = 160 Nm <sub>max</sub>	
		<b>Second Shaft End</b>	
		<b>0</b> without	
		<b>X</b> Involute Spline B 17 x 14 DIN 5482	
		<b>End Covers (Adaptor Pieces)</b>	
		<b>A</b> End Cover (Standard Type)	
		<b>F</b> Adaptor Piece for Multi-Stage Pump-Types: KP 1 coupled with KP 1 only	
		<b>W</b> The same as Type „F“ but KP 1 coupled with KP 0 only	
<b>KP 1/ .</b>	<b>...A</b>	<b>... .</b>	<b>4 . L . / .</b>
<b>Selection: Flange Mounting Cover</b>		<b>Housing Side Ports:</b>	
<b>A</b> SAE-A-2-Bolt-Type LA = 106.4; $\emptyset z = 82.55$		<b>A</b> Inlet Port, Dia. 15 with pitch circle Dia. 35 applicable up to Nom. Displacement V <sub>g</sub> 5.5 only	
<b>F</b> 2-Bolt-Square-Flange LA = 60/60; $\emptyset z = 50$		Inlet Port, Dia. 20 with pitch circle Dia. 40 applicable from Nom. Displacement V <sub>g</sub> 6.3 only	
<b>G</b> 4-Bolt Rectangular-Flange LA = 72/100; $\emptyset z = 80$		Outlet Port, Dia. 15 with pitch circle Dia. 35	
<b>K</b> 4-Bolt Rectangular-Flange LA = 71.4/96.1; $\emptyset z = 36.47$		<b>Q</b> see Page 8	
<b>L</b> 2-Bolt-Square-Flange LA = 60/60; $\emptyset z = 52$ with O-Ring (without Shaft Seal)		<b>Outboard Flanges or Bearing resp.</b>	
<b>M</b> Same as Type F; but the Bolting is mirror inverted		<b>0</b> without	
<b>Q</b> 2-Bolt-Square-Flange LA = 60/60; $\emptyset z = 52$ with O-Ring		<b>L</b> Bearing Series: light	
<b>LA</b> = Mounting Hole Distance		<b>P</b> Bearing Series: heavy	
<b>Dia.z</b> = Centering Diameter		<b>R</b> Mounting Angle	
		<b>Direction of Rotation</b>	
		<b>1</b> clockwise	
		<b>2</b> anticlockwise	
		<b>Code-No for Special Construction</b>	
		<b>Seals</b>	
		<b>1</b> NBR-Rotary Shaft Lip-Type Seals $\vartheta \leq 90^\circ$	
		<b>2</b> FPM-Rotary Shaft Lip-Type Seals $\vartheta \leq 100^\circ$	
		<b>Type of Gearing</b>	
		<b>L</b> Driving and Driven Gears of Case Hardening Steel. Tooth Flanks Grinded and Honed.	
		<b>Code for Materials</b>	
		<b>N</b> Housing: Aluminium-Alloy Double Gland Bearing with Multicomponent Plane Bearing Bushes	
		<b>V</b> Housing: Cast iron on request	
		<b>Design Serial No</b>	
		<b>4</b> Specified by Kracht	

# High Pressure Gear Pumps KP 1

## G-Flange, Tapered Shaft End

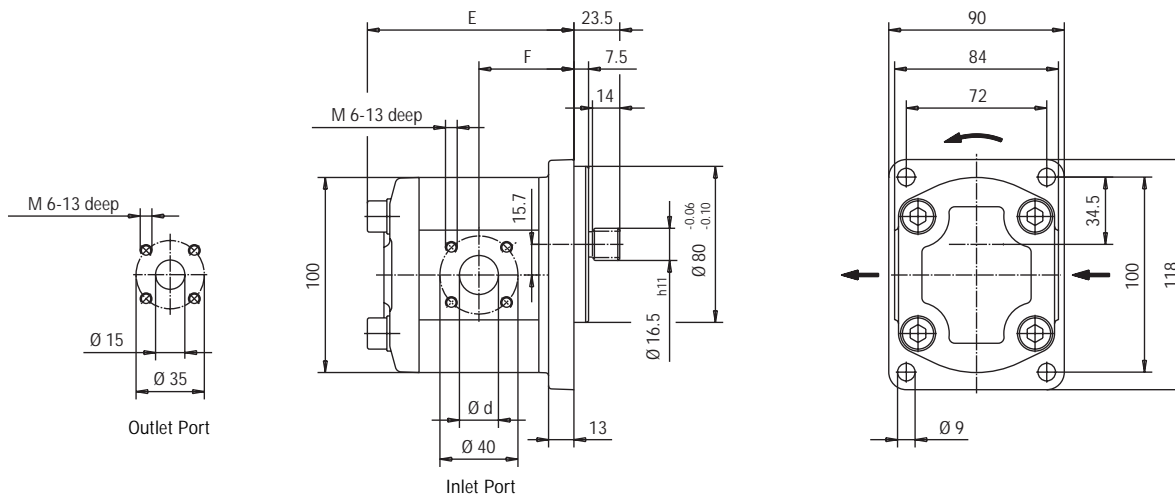


Ordering Code:  
**KP 1/4 G10A K0A 4NL1**

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 B12 DIN 137  
Woodruff Key 3 x 6.5 DIN 6888

## G-Flange, Involute Spline Shaft End



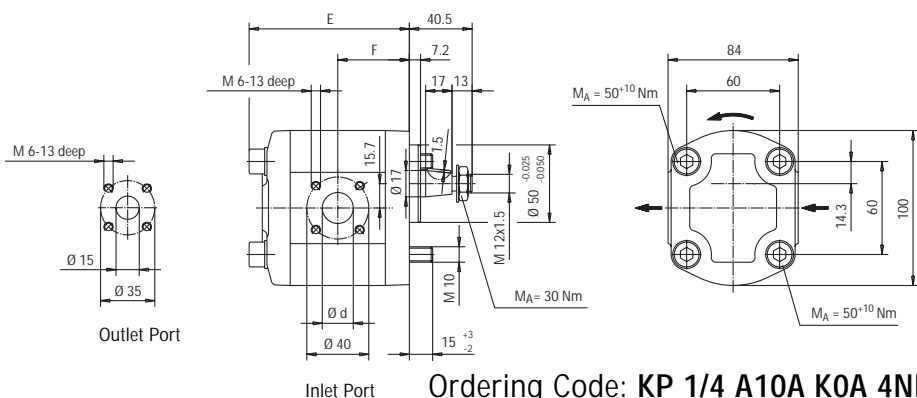
Ordering Code:  
**KP 1/4 G10A X0A 4NL1**

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

# High Pressure Gear Pumps KP 1

## SAE A-Flange, Tapered Shaft End

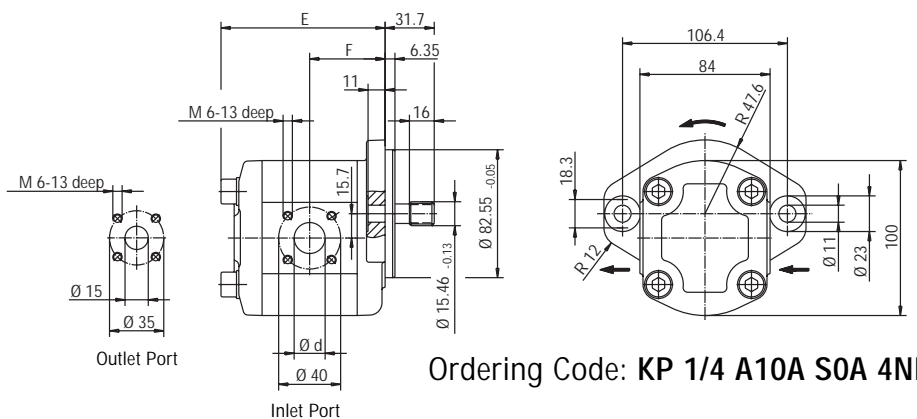


Ordering Code: **KP 1/4 A10A K0A 4NL1**

- Shaft End: Taper 1:5
- Hex. Lock Nut M 12 x 1.5
- DIN EN 28675
- 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 opposite

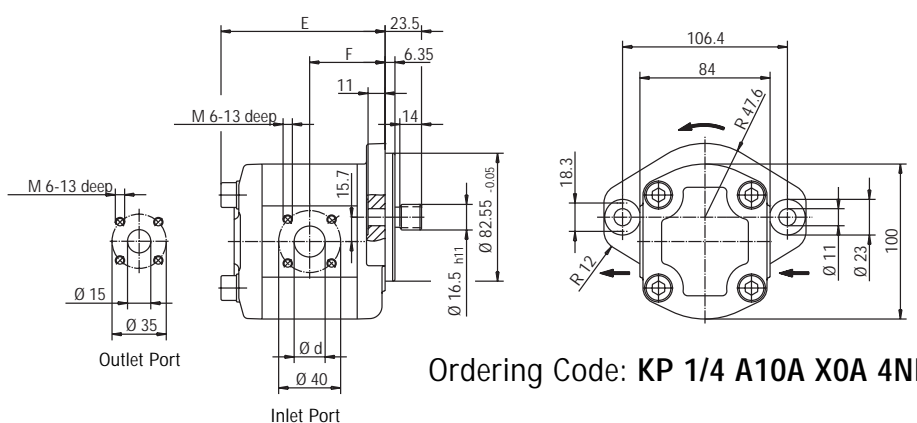
## SAE A-Flange, SAE A-Shaft



Ordering Code: **KP 1/4 A10A S0A 4NL1**

- Shaft End: Involute Spline
- SAE-A 9 T; D/P 16/32;  $\alpha = 30^\circ$

## SAE A-Flange, Involute Spline Shaft End



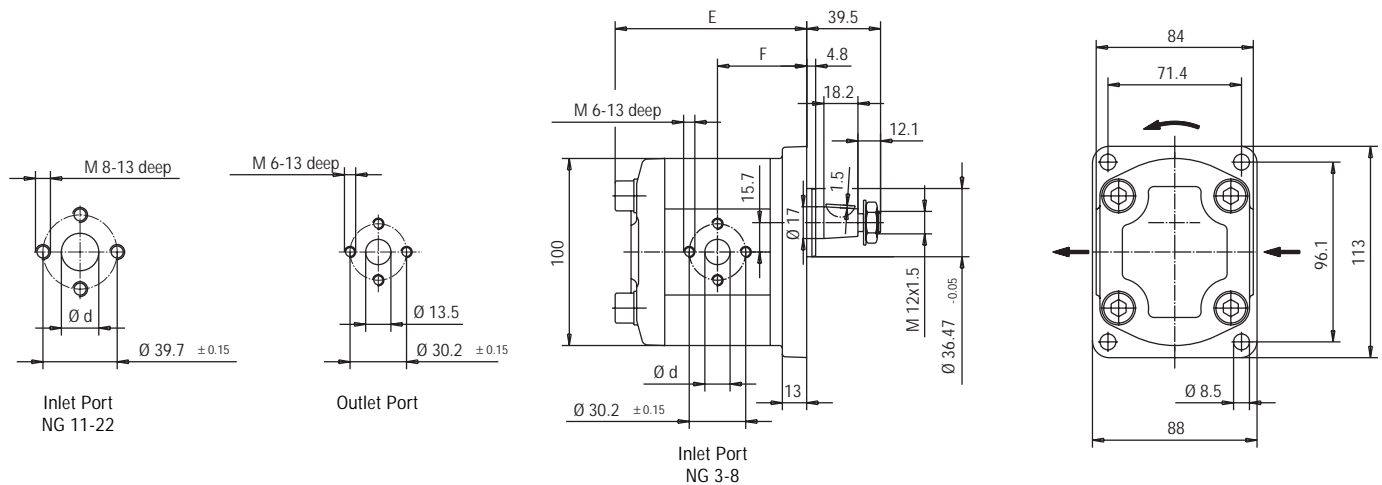
Ordering Code: **KP 1/4 A10A X0A 4NL1**

- Shaft End: Involute Spline
- B 17 x 14 DIN 5482

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

# High Pressure Gear Pumps KP 1

## K-Flange, Tapered Shaft End 1 : 8

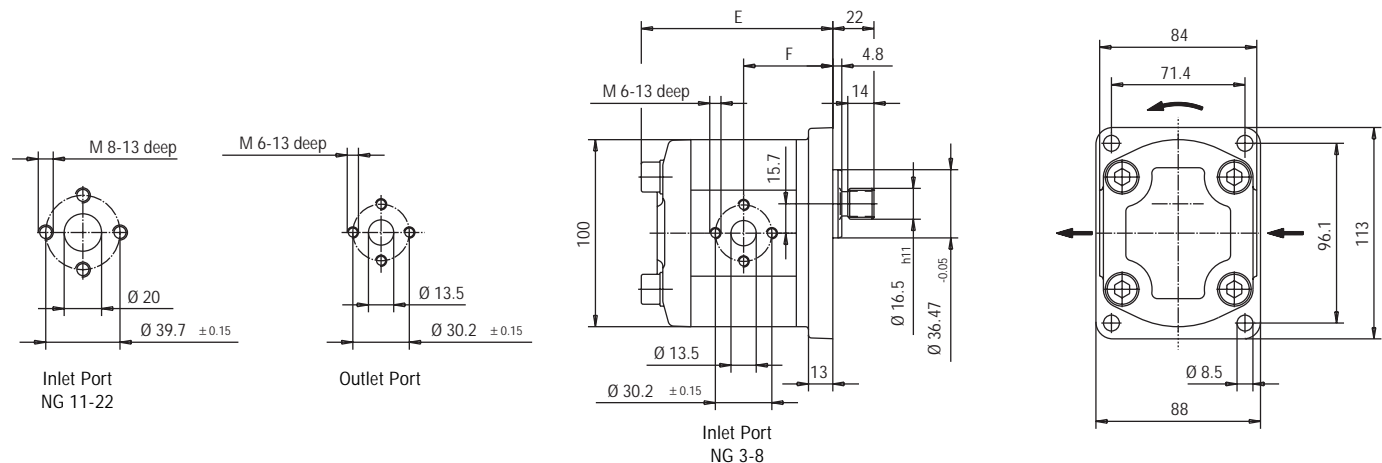


Ordering Code:  
**KP 1/4 K10Q M0A 4NL1**

The Direction of Rotation as represented is clockwise.  
In case of Anticlockwise Rotation the Inlet and Outlet Ports are opposite

Shaft End: Taper 1:5  
Hex. Lock Nut M 12 x 1.5  
DIN EN 28675  
Curved Spring washer B12 DIN 137  
Woodruff Key 3 x 6.5 DIN 6888

## K-Flange, Involute Spline Shaft End



Ordering Code:  
**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

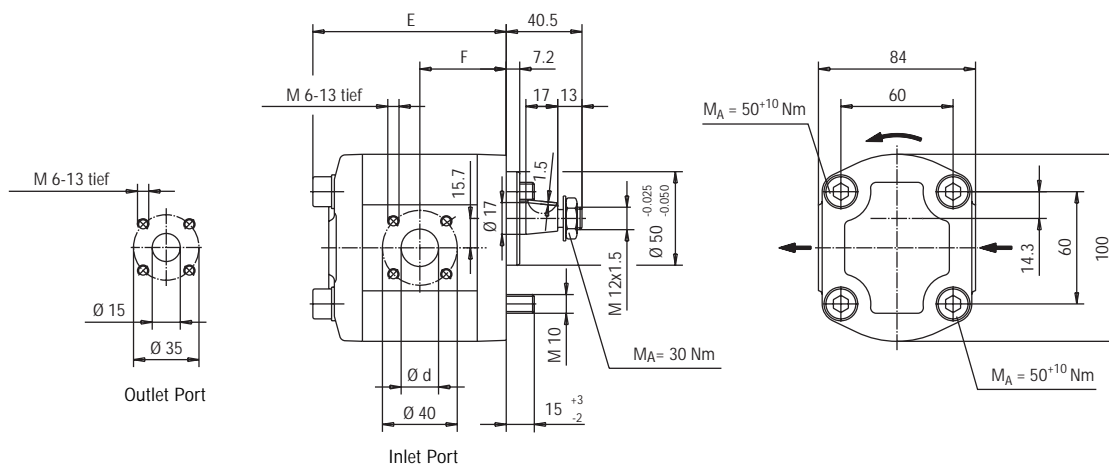
Shaft End: Involute Spline  
B 17 x 14 DIN 5482  
but tooth thickness  $S_w = 3.206$   
Addendum Modification = +0.6

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



# High Pressure Gear Pumps KP 1

## F-Flange, Tapered Shaft End

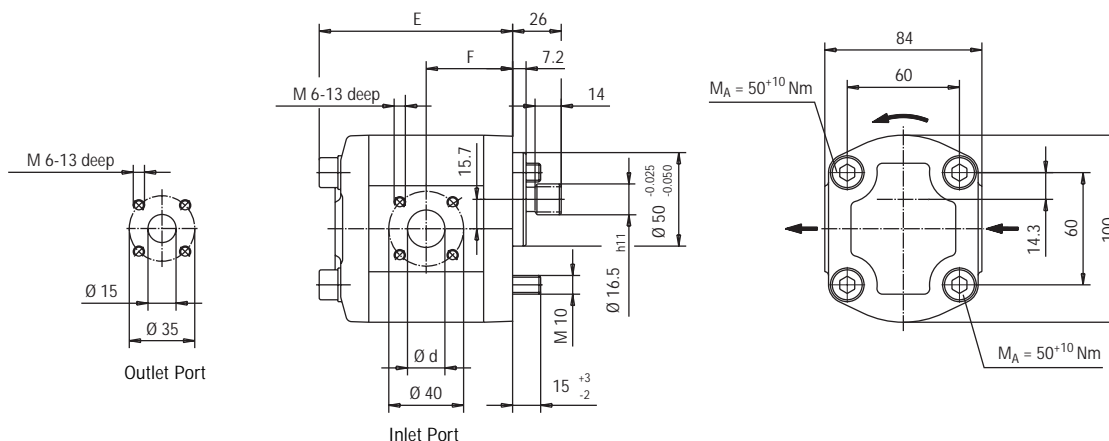


Ordering Code:  
**KP 1/4 F10A K0A 4NL1**

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 B12 DIN 137  
Woodruff Key 3 x 6.5 DIN 6888

## F-Flange, Involute Spline Shaft End



Ordering Code:  
**KP 1/4 F10A X0A 4NL1**

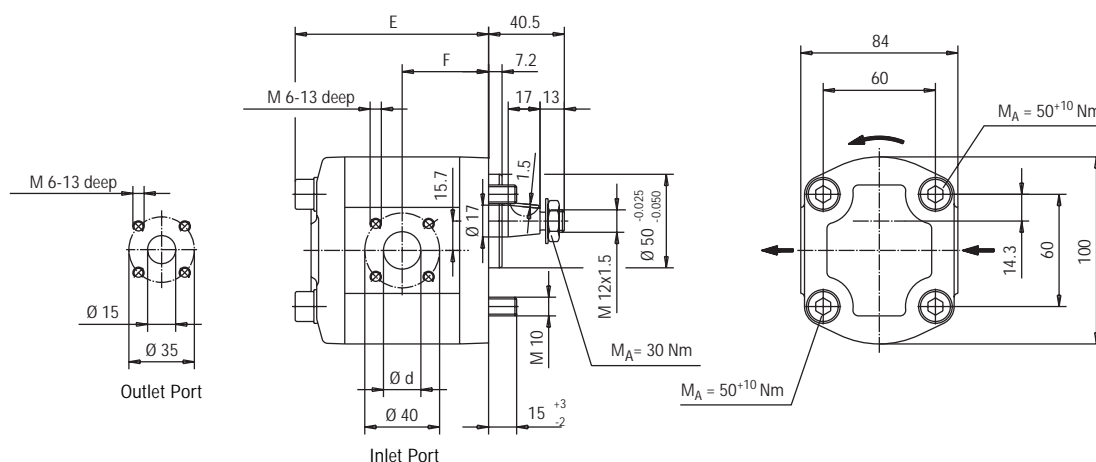
The Direction of Rotation as represented is clockwise.  
In case of Anticlockwise Rotation the Inlet and Outlet Ports are opposite

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

# High Pressure Gear Pumps KP 1

## M-Flange, Tapered Shaft End

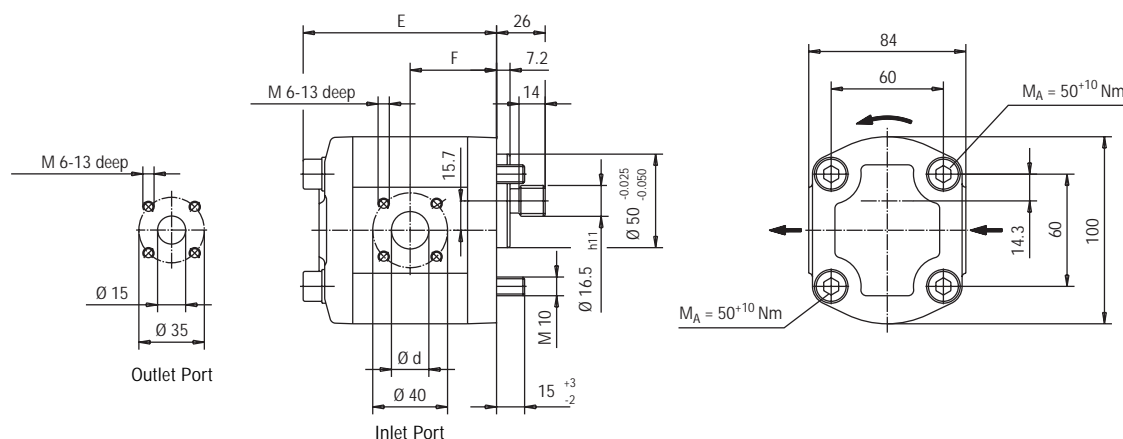


Ordering Code:  
**KP 1/4 M10A K0A 4NL1**

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 B12 DIN 137  
Woodruff Key 3 x 6.5 DIN 6888

## M-Flange, Involute Spline Shaft End



Ordering Code:  
**KP 1/4 M10A X0A 4NL1**

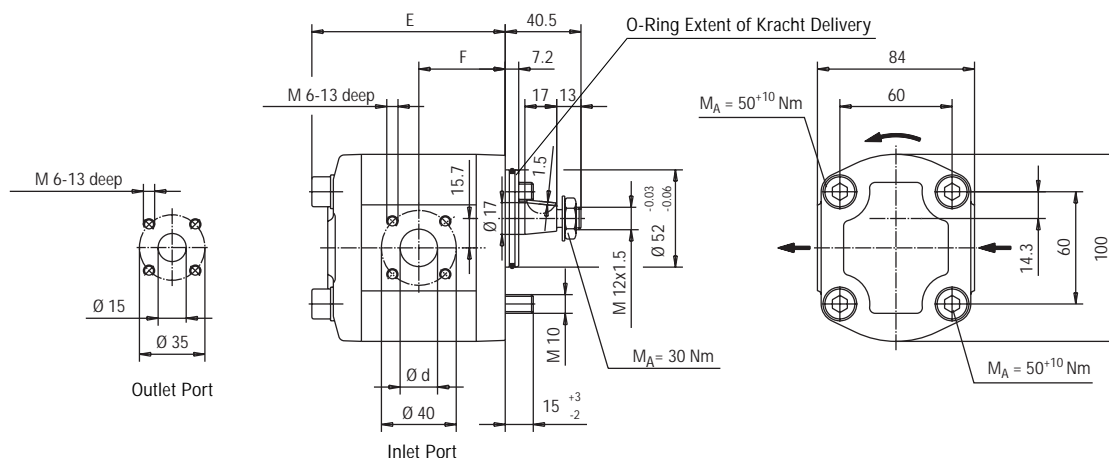
The Direction of Rotation as represented is clockwise.  
In case of Anticlockwise Rotation the Inlet and Outlet Ports are opposite

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

# High Pressure Gear Pumps KP 1

## Q-Flange, Tapered Shaft End

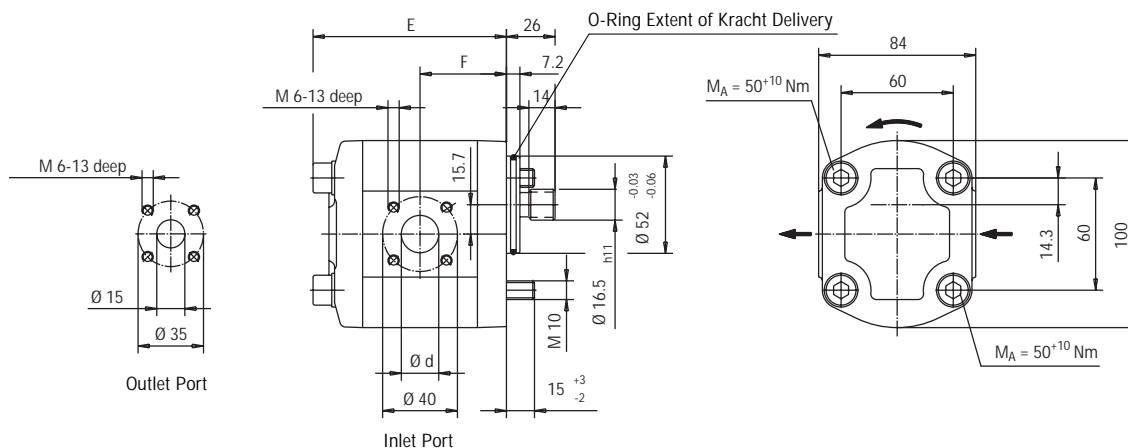


Ordering Code:  
**KP 1/4 Q10A KOA 4NL1**

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 B12 DIN 137  
Woodruff Key 3 x 6.5 DIN 6888

## Q-Flange, Involute Spline Shaft End



Ordering Code:  
**KP 1/4 Q10A XOA 4NL1**

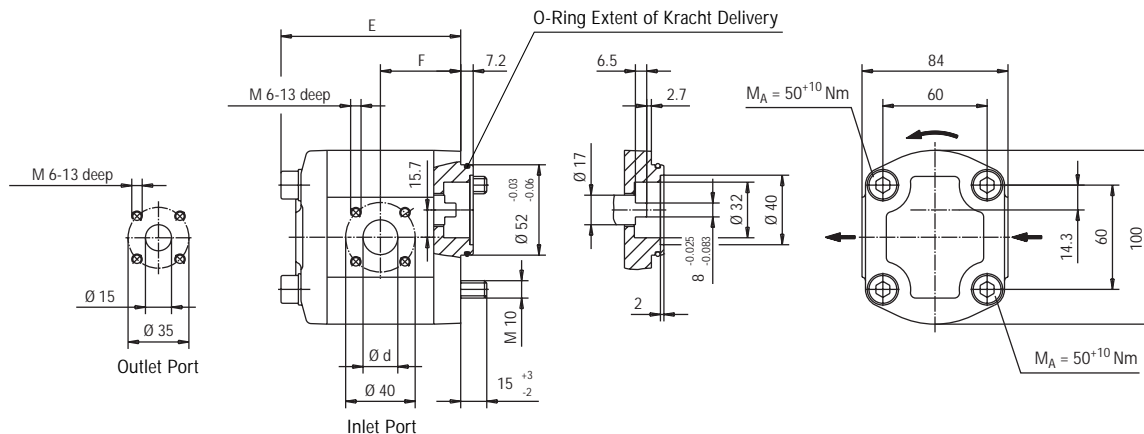
The Direction of Rotation as represented is clockwise.  
In case of Anticlockwise Rotation the Inlet and Outlet Ports are opposite

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

# High Pressure Gear Pumps KP 1

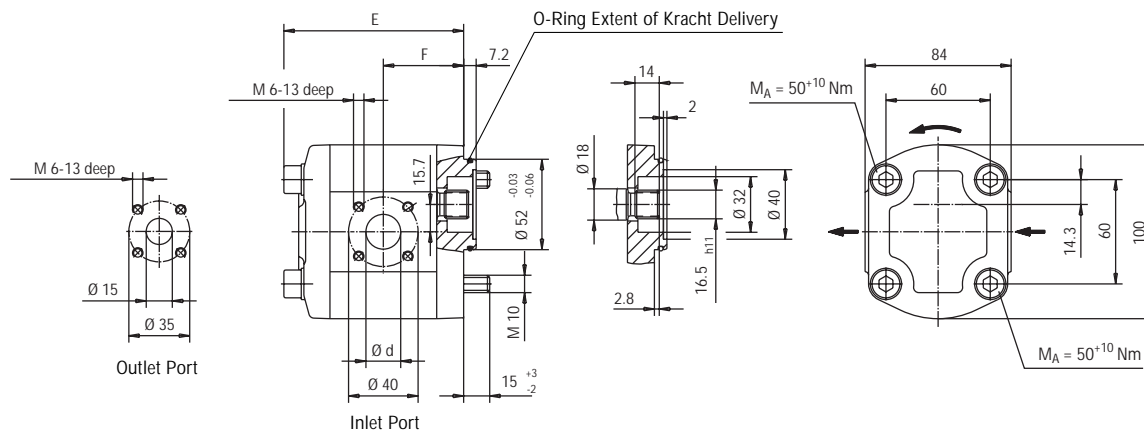
## L-Flange, Parallel Flat Shaft End



Ordering Code:  
**KP 1/4 L10A FOA 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 Code:  
**KP 1/4 L10A XOA 4NL1/204**

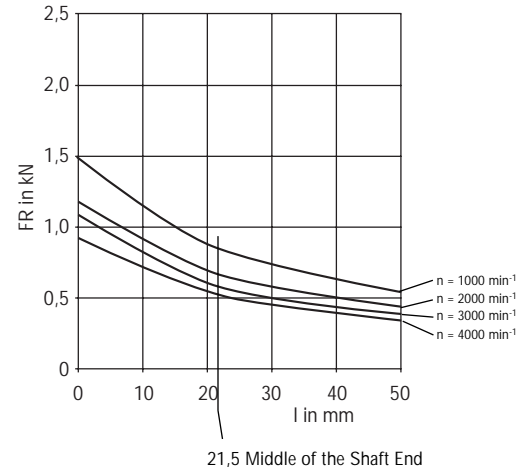
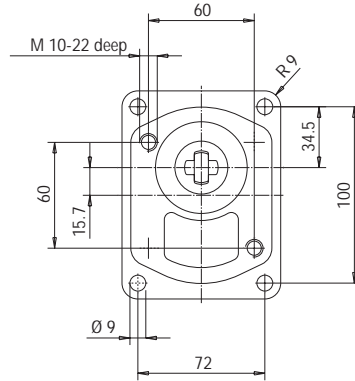
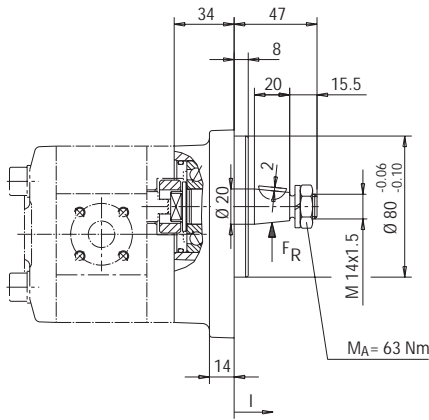
The Direction of Rotation as represented is clockwise.  
In case of Anticlockwise Rotation the Inlet and Outlet Ports are opposite

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

# High Pressure Gear Pumps KP 1

## Outboard Bearing Type L, Tapered Shaft End



Ordering Code: **KP 1/4 L1LA FOA 4NL1**

Weight of the Outboard Bearing = 1.0 kg

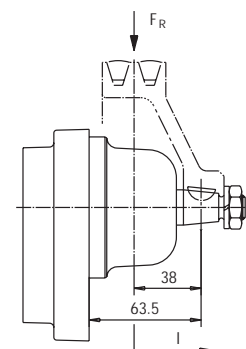
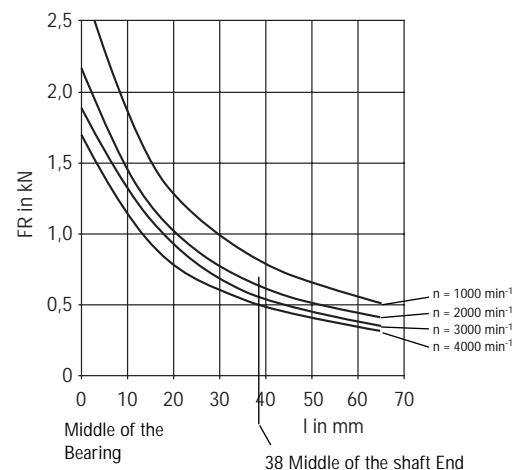
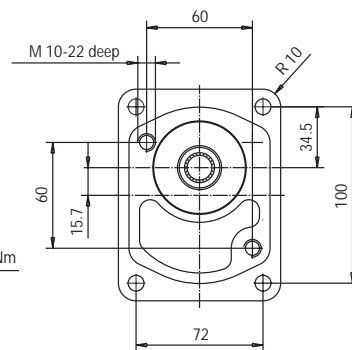
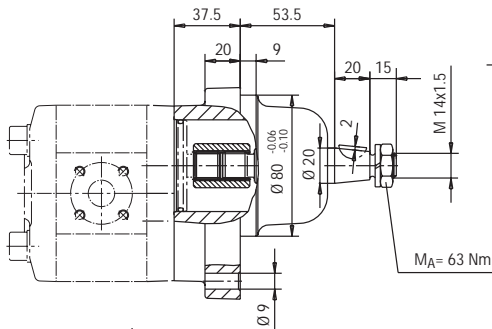
Outboard Bearing L, Tapered Shaft End KP1/4  
L1LA FOA 4NL1 Parallel Flat Shaft End 40 Nm<sub>max</sub>  
alternativ KP1/4 L1LA XOA 4NL1  
Involute Spline Shaft End 70 Nm<sub>max</sub>

Dimensions and type see Page 12

Shaft End: Taper 1:5  
Hex. Lock Nut M 14 x 1.5  
DIN EN 28675  
Curved Spring washer  
B14 DIN 127  
Woodruff Key 4 x 6.5  
DIN 6888

Permissible Radial Load  $F_R$   
as Function of the Supporting  
Distance  $l$  (for  $L_h = 10.000$  h)  
 $F_R = f(l)$

## Outboard Bearing Type P, Tapered Shaft End



Shaft End: Taper 1:5  
Hex. Lock Nut M 14 x 1.5  
DIN EN 28675  
Curved Spring washer  
B14 DIN 127  
Woodruff Key 4 x 6.5  
DIN 6888

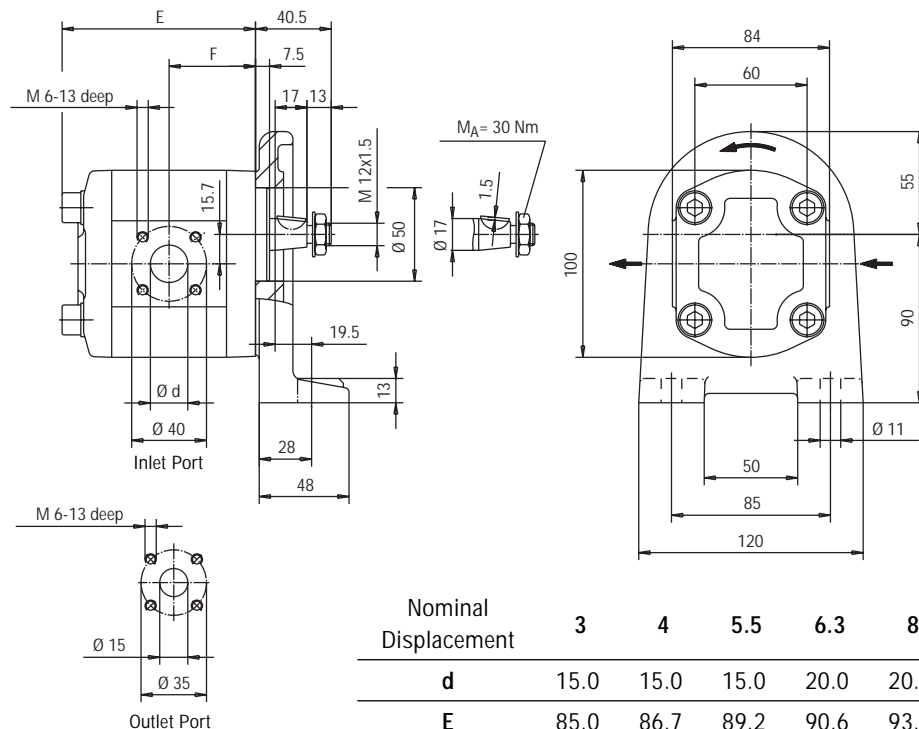
Permissible Radial Load  $F_R$   
as Function of the Supporting  
Distance  $l$  (for  $L_h = 10.000$  h)  
 $F_R = f(l)$

Ordering Code: **KP 1/4 Q1PA XOA 4NL1**

Weight of the Outboard Bearing = 3.5 kg

# High Pressure Gear Pumps KP 1

## Mounting Angle, Tapered Shaft End



Shaft End: Taper 1:5  
 Hex. Lock Nut M 12 x 1.5  
 DIN EN 28675  
 Curved Spring washer  
 B12 DIN 137  
 Woodruff Key 3 x 6.5  
 DIN 6888

Ordering Code:  
**KP 1/4 F1RA KOA 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

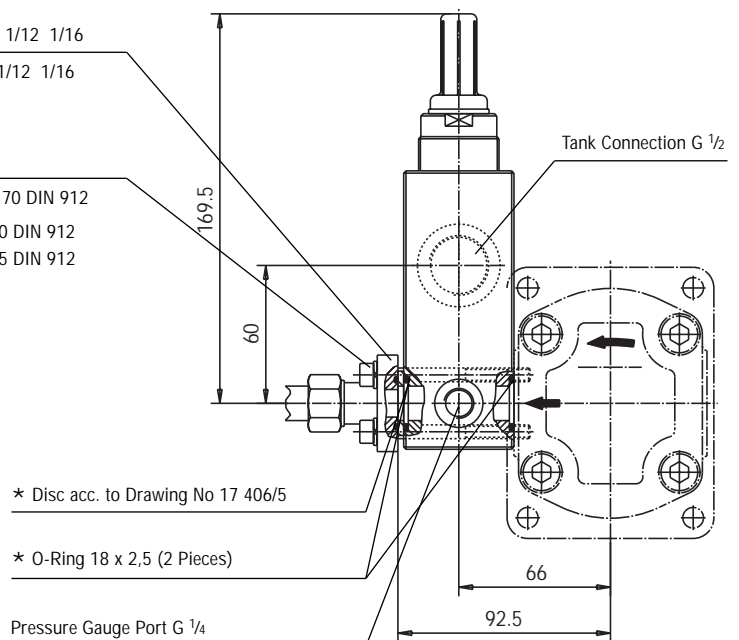
## Pressure Relief Valve

- 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

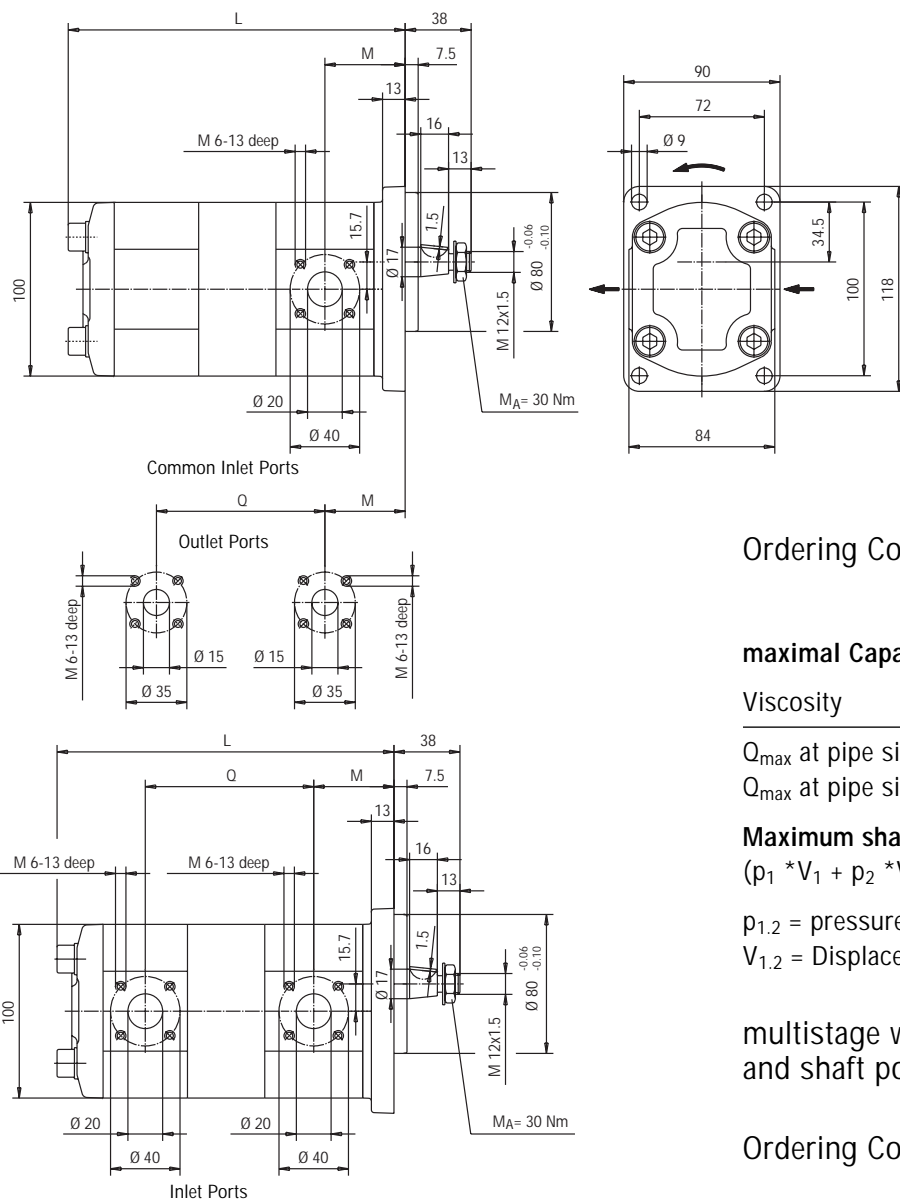
Ordering Code	Set Pressure P <sub>v1</sub> bar	Set Pressure P <sub>v2</sub> bar	Discharge Flow Q <sub>1 max</sub> l/min	Discharge-Flow Q <sub>2 max</sub> l/min
DBD 10 D 1 A 300	10	280	15	75
DBD 10 D 1 A 200	10	200	15	70
DBD 10 D 1 A 150	10	150	10	55
DBD 10 D 1 A 85	10	85	10	45
DBD 10 D 1 A 40	10	40	10	30
DBD 10 D 1 A 16	5	16	9	20



\* Extent of KRACHT Delivery

# High Pressure Gear Pumps KP 1

## 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  
B12 DIN 137  
Woodruff Key 3 x 6.5 DIN 6888

Ordering Code: **KP 1/4 G10A KXA 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  $\text{mm}^2/\text{s}$

$Q_{\max}$  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  $\text{cm}^3$

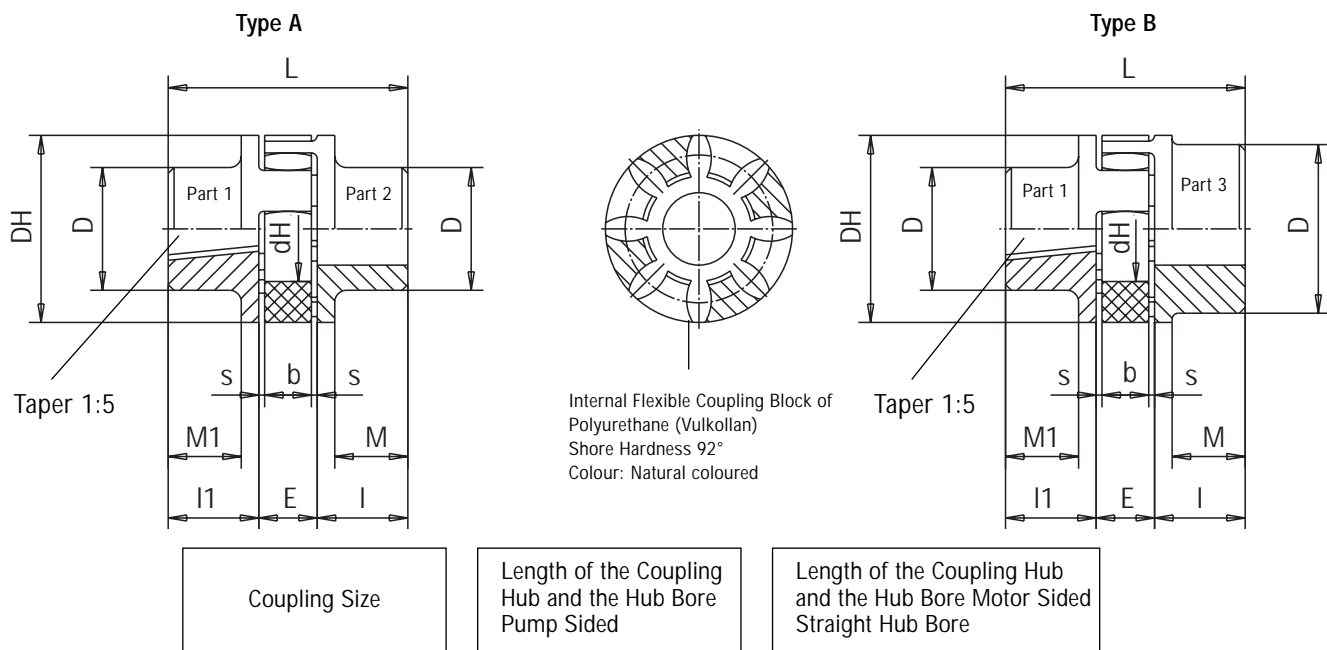
multistage with other flanges  
and shaft possible

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

Nominal Displacement	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	101.1	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																		

# High Pressure Gear Pumps KP 1

## Couplings and Accessories



Ordering Code:

**RA 38 - K 18/17 - Z 45/38**

	Coupling Size	Weight kg	Moment of Inertia kgm <sup>2</sup>	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 <sub>1</sub>	E	s	b	L	M	M <sub>1</sub>		D <sub>H</sub>	D	D <sub>1</sub>	d <sub>H</sub>
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 24/38-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	RA 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	RA 42/55-K18/17-Z 50/...

Operating Temperature: -40 °C bis +90 °C (Short Time Temperature peaks up to +120 °C are permissible)

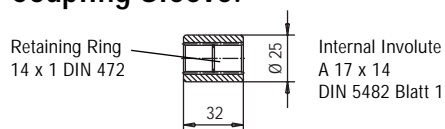
RA: Hub Material Al

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

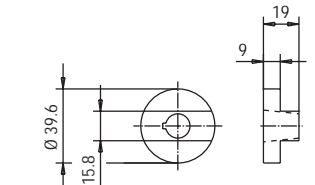
RG: Hub Material Part 2 and 3 GG

Bore Finish acc. to ISO-Fit Class H7; Key-Ways acc. to DIN 6885 / Part 1.

### Coupling Sleeve:

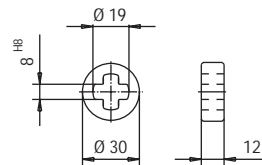


Coupling Sleeve Size 1  
Partnumber : B.0079020001



Coupling KP1 K-Shaft  
Partnumber : E.0187220001

### Coupling:

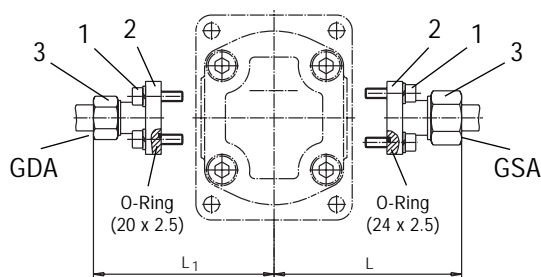


Coupling KP 1L  
Partnumber: E.0104040001



# High Pressure Gear Pumps KP 1

## Straight Flanged Connector



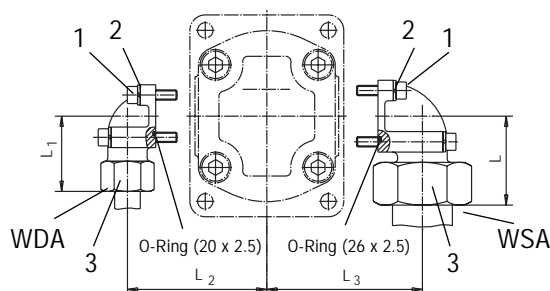
- 1 Hex. Socket Head Cap Screw (DIN 912 – 8.8)
- 2 Single Coil Spring Lock Washer (A6 DIN 127)
- 3 Covering Nut with Cutting Ring (SW)

Inlet Port Pipe Externa Dia. mm	Ordering Code	Discharge Flow Q in l/min at 34 mm <sup>2</sup> /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 <sub>N</sub> in bar	Dimensions		Cap Screws	Weight kg
			L <sub>1</sub>	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.

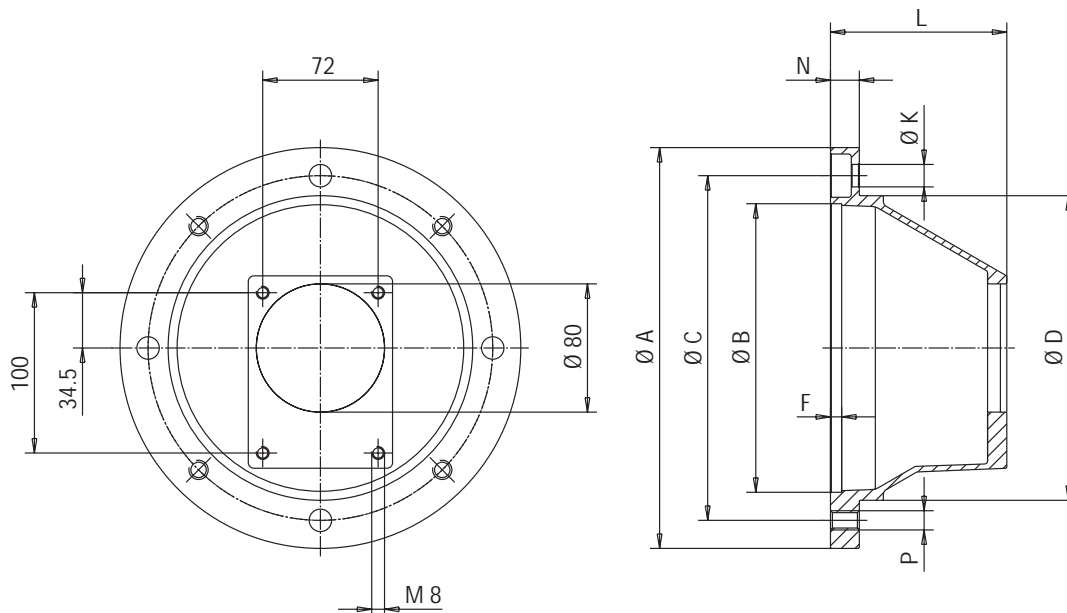
Inlet Port Pipe Externa Dia. mm	Ordering Code	Discharge Flow Q in l/min at 34 mm <sup>2</sup> /s	Dimensions			Cap Screws		Weight kg
			L	L <sub>3</sub>	SW			
35	WSA 1/35	65	52	74	50	2 x M6 x 60	2 x M6 x 22	0.55
28	WSA 1/28	45	49	70	41	2 x M6 x 50	2 x M6 x 20	0.38
22	WSA 1/22	25	47	64.5	36	4 x M6 x 22		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 <sub>N</sub> in bar	Dimensions			Cap Screws		Weight kg
			L <sub>1</sub>	L <sub>2</sub>	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

# High Pressure Gear Pumps KP 1

## Bell housing for KP 1/.G.-Type

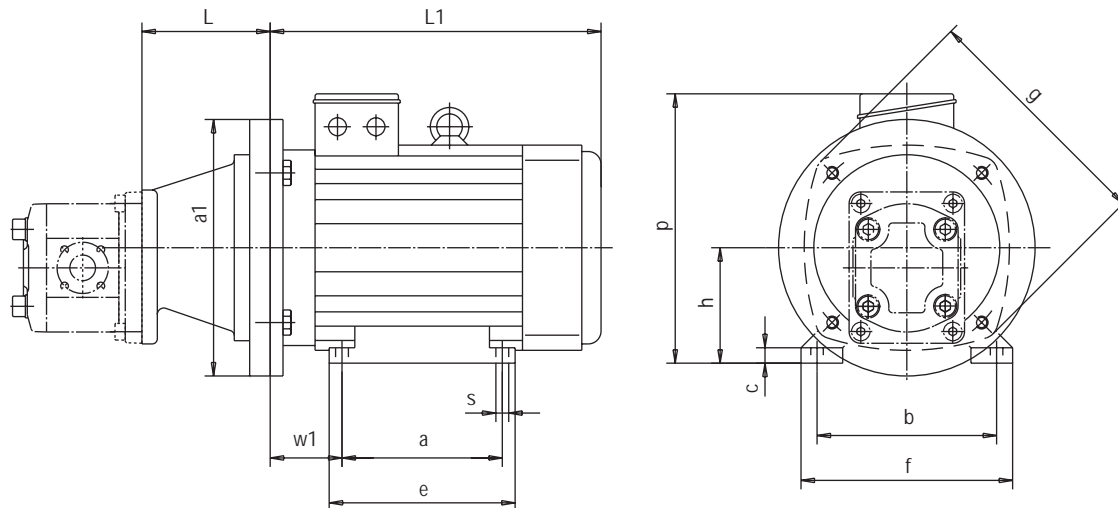


Type	Frame Size		Adaptor-Flange Weight								Coupling Size		
	E-Motor	A	B	C	D	F	K	L	N	P	kg		
* Z1/160/111	71	160	110	130	110	7	9	110	13	9	0.8	RG24	-K18/17-Z60/14
* Z1/200/ 90	80	200	130	165	145	7	11	90	16	M10	0.9	RA24	-K18/17-Z30/19
* Z1/200/100	90	200	130	165	145	7	11	100	16	M10	1.0	RA24	-K18/17-Z30/24
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	RA38/45	-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.

# High Pressure Gear Pumps KP 1

## Motor with pump



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

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

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

## Overview of our complete programme

### Transfer pumps

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

### Volutronic®

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

### Mobile hydraulics

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

### Industrial hydraulics

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

With our decades of experience, we are at your side, world-wide, for the professional mastery of specific applications and complete solutions in hydraulics and process technology.



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