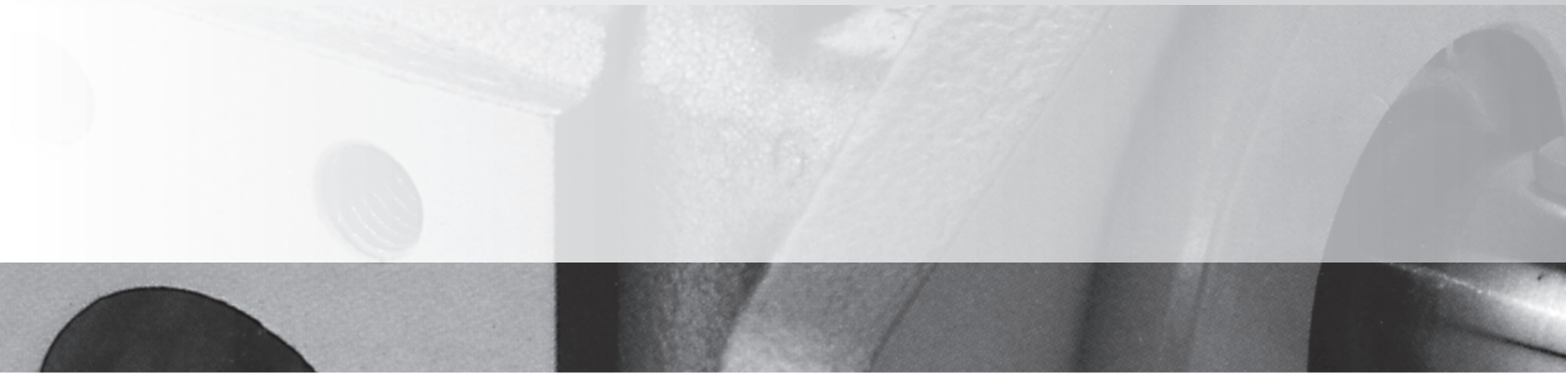
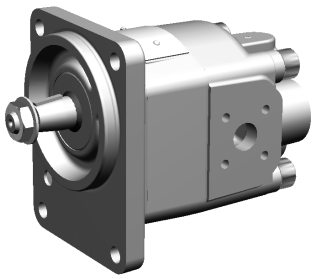
KRACHT





High Pressure Gear Pumps

KP 1 Series 2

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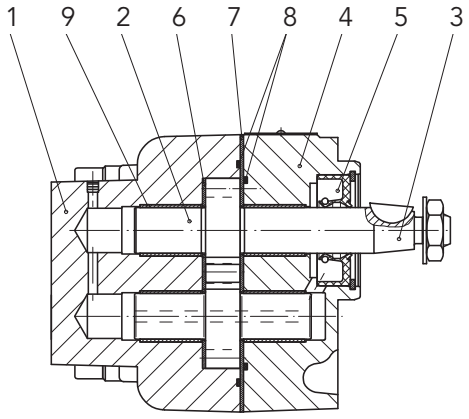
Construction



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

Function

KRACHT External gear pumps KP 1series 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.

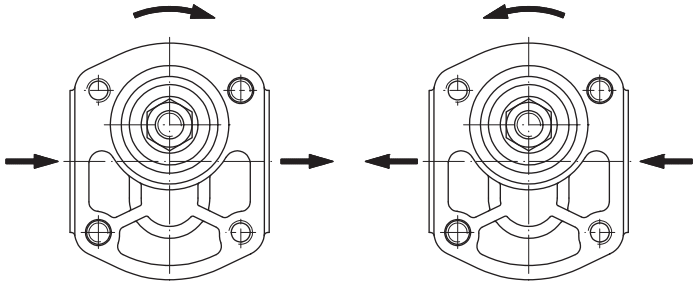
Radial forces can possibly be absorbed depending on the size and direction of action. Axial forces are not permissible. To absorb the external forces, use pump versions with outboard bearings.

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.



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 $\vartheta \leq 90$ °C FKM $\vartheta \leq 110$ °C (P20-plain bearing)

Characteristics

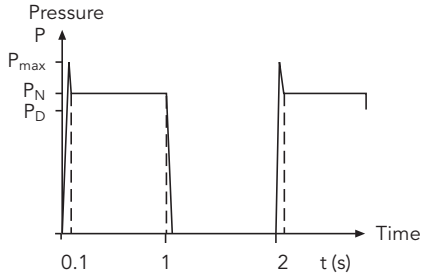
Mounting		flange or foot-type
Pipe connection		flange type threaded flange on request
Direction of rotation		clockwise **or** anticlockwise
Fitting position		optional (with containing water fluids see page 6)
Ambient temperature	$\vartheta_{u\ min}$ $\vartheta_{u\ max}$	= – 20 °C = 60 °C
Working pressure Inlet port Working pressure Short time	$p_{e\ min}$ $p_{e\ max}$ $p_{e\ max}$	= – 0.4 bar (vacuum) = 2 bar = 5 bar
Working pressure Outlet port	$p_{e\ max}$	see technical data
Fluid temperature range	$\vartheta_{m\ max}$ $\vartheta_{m\ max}$	90 °C für NBR 110 °C für FKM
Viscosity	ν_{min} ν_{max}	= 1.2 mm²/s = 600 mm²/s
Recommended oil cleanliness		class 19/16 acc. to ISO/DIS 4406 ⇨ class 10 acc. to NAS 1638
Recommended filtration		filter with filtration quotient $\beta_{25} \geq 75$ für … 200 bar $\beta_{40} \geq 75$ für … 100 bar
Discharge flow		see chart page 7
Input power		see chart page 7
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

Nominal Displacement	Geom. Displacement	Max. pressure	Rated pressure	Continuous working pressure	Max. working speed	Moment of intertia x 10^{-6}	Minimum speed				
	V_g	p_{max}	p_N	p_D	n_{max}	J	at p = ... bar				
							... 100	... 120	... 150	... 180	... 200
	cm^3/r	bar	bar	bar	1/min	kg m^2	1/min				
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	–	–

Max. Pressure = pressure peak
Nominal pressure pN < 6 s = 50 % ED
see time / pressure chart
max. operating frequency: 30 / min
Pressure specifications apply to $\nu \geq 34$ mm^2/s

Time / pressure chart



Calculation Formulas

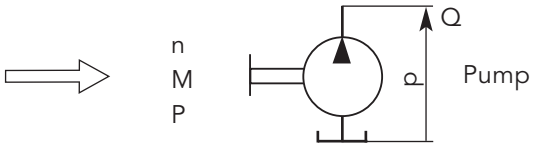
Characteristic data, formular sign, units

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

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

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



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]

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)

Fluid	max. pressure	Speed	Speed	Temparature	Seal	Inlet to pump required
	p_{max} bar	n_{min} 1/min	n_{max} 1/min	ϑ °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

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!

Recommended values for efficiency dependent on the viscosity in n = 1450 1/min:

Vg nenn	ν	Pressure	η vol	η_{hm}
cm^3/r	mm^2/s	bar	%	%
4	34	220	75	75
4	4	80	75	75
4	1.2	40	69	75

Vg nenn	ν	Pressure	η vol	η_{hm}
cm^3/r	mm^2/s	bar	%	%
11	34	180	90	90
11	4	80	80	90
11	1.2	40	78	90

Vg nenn	ν	Pressure	η vol	η_{hm}
cm^3/r	mm^2/s	bar	%	%
20	34	140	89	90
20	4	80	85	90
20	1.2	40	82	90

Discharge Flow and Required Input Power

Discharge flow at n = 1450 1/min

	Discharge flow Q in l/min at 34 mm²/s Pressure p at bar						
Nominal Size	**20**	**60**	**100**	**140**	**180**	**200**	**220**
3	4.5	4.3	4.0	3.8	3.5	3.4	3.3
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 1/min

	Pressure p at bar						
Nominal Size	**20**	**60**	**100**	**140**	**180**	**200**	**220**
3	0.27	0.64	1.00	1.36	1.72	1.90	2.08
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	—	—	—

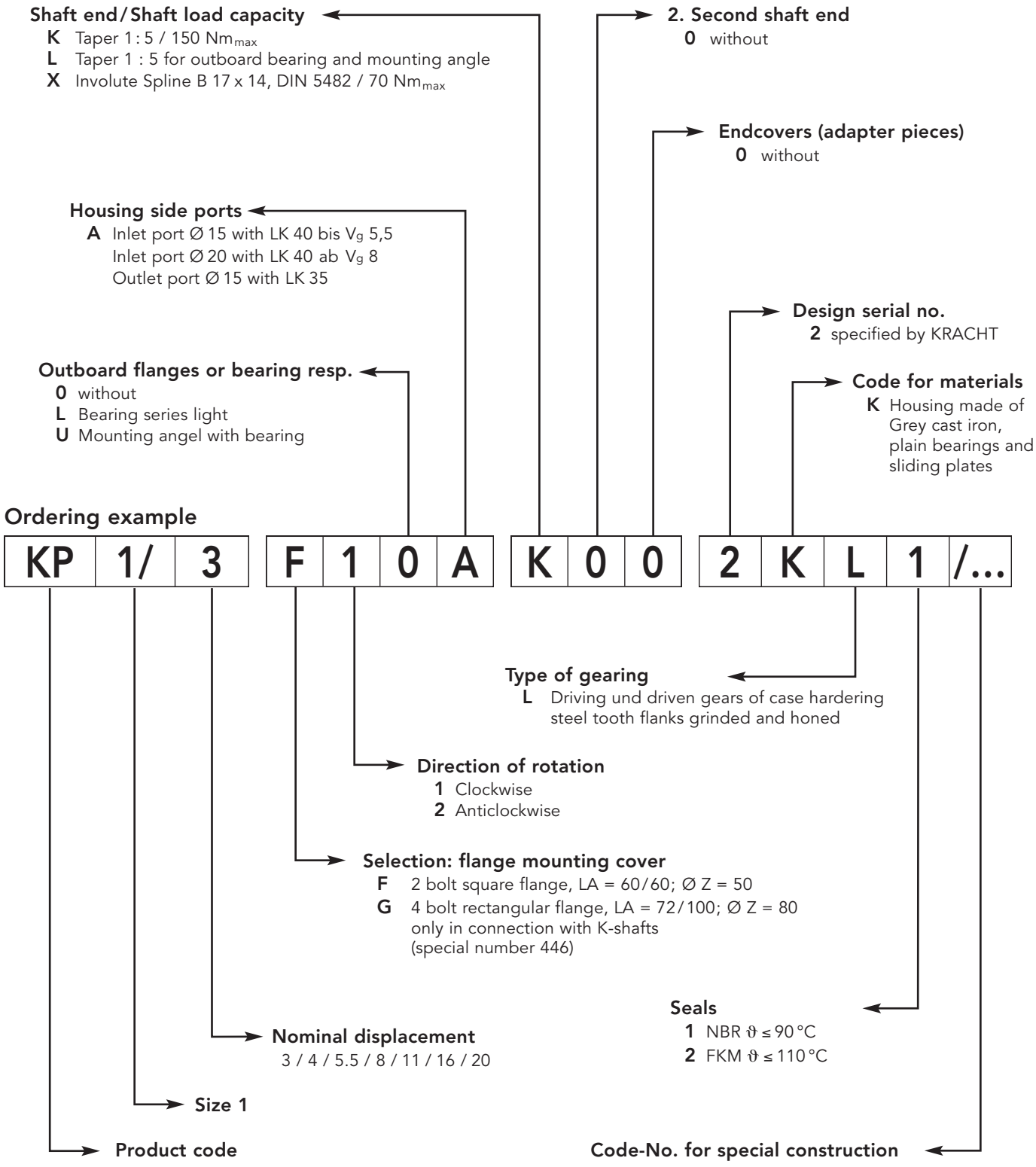
Discharge flow at n = 950 1/min

	Discharge flow Q in l/min at 34 mm²/s Pressure p at bar						
Nominal Size	**20**	**60**	**100**	**140**	**180**	**200**	**220**
3	2.8	2.6	2.4	2.2	—	—	—
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	—	—	—

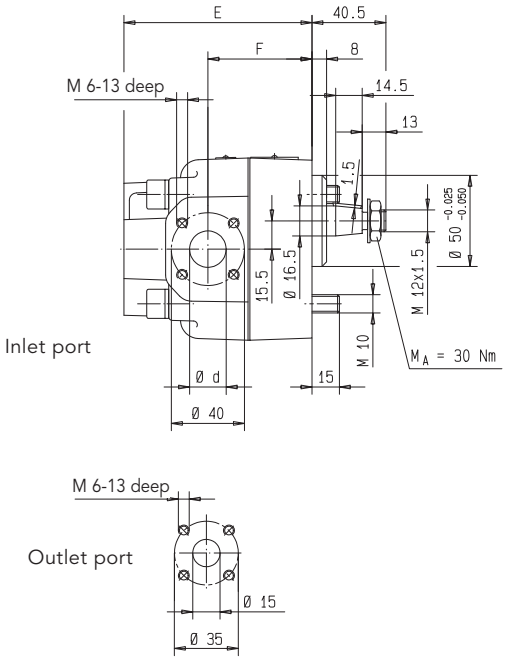
Required input at n = 950 1/min

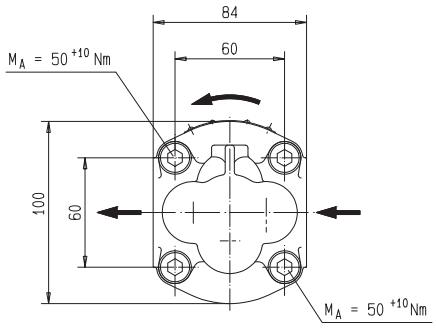
	Pressure p at bar						
Nominal Size	**20**	**60**	**100**	**140**	**180**	**200**	**220**
3	0.19	0.42	0.65	0.88	—	—	—
4	0.24	0.57	0.90	1.23	1.56	—	—
5.5	0.26	0.63	1.00	1.38	1.75	—	—
8	0.34	0.88	1.43	1.97	2.51	2.79	—
11	0.44	1.17	1.91	2.64	3.38	—	—
16	0.61	1.68	2.75	3.83	4.90	—	—
20	0.73	2.05	3.37	4.69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

Type Key


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
2. Second shaft end
0 without
Endcovers (adapter pieces)
0 without
Housing side ports
A Inlet port Ø 15 with LK 40 bis Vg 5,5
Inlet port Ø 20 with LK 40 ab Vg 8
Outlet port Ø 15 with LK 35
Design serial no.
2 specified by KRACHT
Outboard flanges or bearing resp.
0 without
L Bearing series light
U Mounting angel with bearing
Code for materials
K Housing made of Grey cast iron, plain bearings and sliding plates
Ordering example
KP 1/ 3 F 1 0 A K 0 0 2 K L 1 /...
Type of gearing
L Driving und driven gears of case hardering steel tooth flanks grinded and honed
Direction of rotation
1 Clockwise
2 Anticlockwise
Selection: flange mounting cover
F 2 bolt square flange, LA = 60/60; Ø Z = 50
G 4 bolt rectangular flange, LA = 72/100; Ø Z = 80
only in connection with K-shafts
(special number 446)
Seals
1 NBR ϑ ≤ 90 °C
2 FKM ϑ ≤ 110 °C
Nominal displacement
3 / 4 / 5.5 / 8 / 11 / 16 / 20
Size 1
Product code
Code-No. for special construction

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
Wood druff key 3 x 6.5
DIN 6888

The direction of rotation as represented is clockwise.

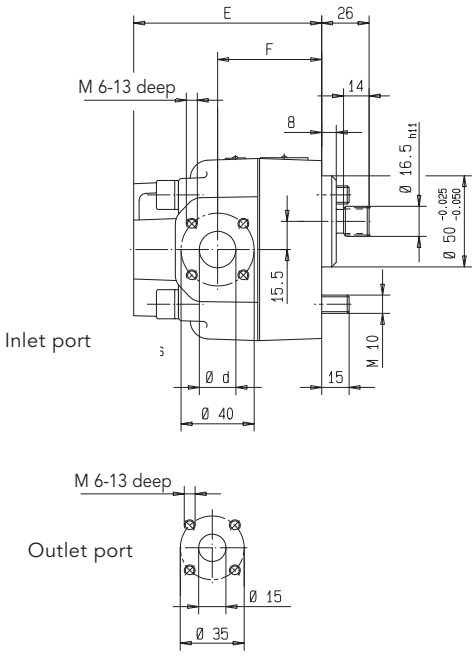
In case of anticlockwise rotation the inlet and outlet ports are

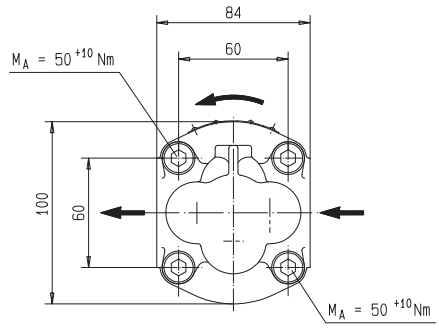
Ordering example:

KP 1/11 F10A K00 2KL1

	Nominal displacement						
	3	**4**	**5.5**	**8**	**11**	**16**	**20**
d	Ø15	Ø15	Ø15	Ø20	Ø20	Ø20	Ø20
E	103	103	103	103	103	103	105
F	54.8	57	57	57	57	57	63
Weight kg	4.4	4.4	4.2	4.3	4.4	4.4	4.6

F-Flange, Involute Spline Shaft End





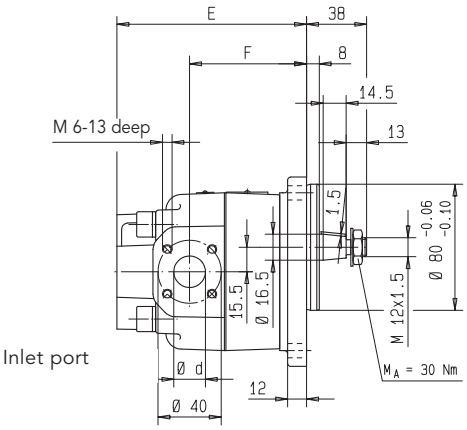
Gear shaft profile
B17x14 DIN 5482
gear-tooth thickness Sw = 3.206
Off-set profiling = +0.6

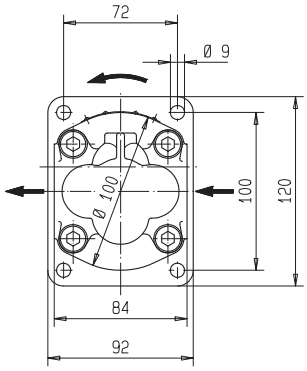
Ordering example:

KP 1/11 F10A X00 2KL1

	Nominal displacement						
	3	**4**	**5.5**	**8**	**11**	**16**	**20**
d	Ø15	Ø15	Ø15	Ø20	Ø20	Ø20	Ø20
E	103	103	103	103	103	103	105
F	54.8	57	57	57	57	57	63
Weight kg	4.2	4.2	4.0	4.1	4.2	4.2	4.4

Outboard Bearing Type L, Tapered Shaft End





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

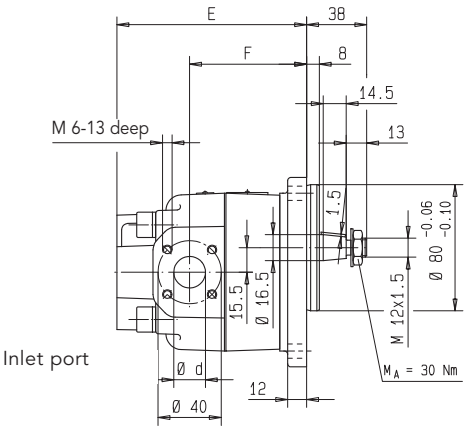
Permissible radial force N on centre shaft end (n = 1450 1/min) = 340 N

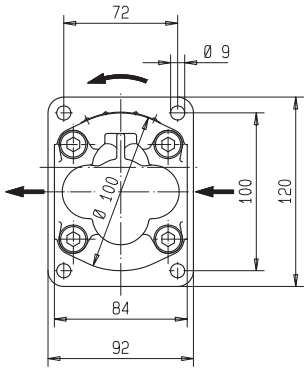
Ordering example:

KP 1/11 F1LA L00 2KL1

	Nominal displacement						
	3	**4**	**5.5**	**8**	**11**	**16**	**20**
d	Ø15	Ø15	Ø15	Ø20	Ø20	Ø20	Ø20
E	120	120	120	120	120	120	122
F	71.8	74	74	74	74	74	80
Weight kg	5.4	5.4	5.2	5.3	5.4	5.4	5.6

Outboard without Bearing Type L, Tapered Shaft End





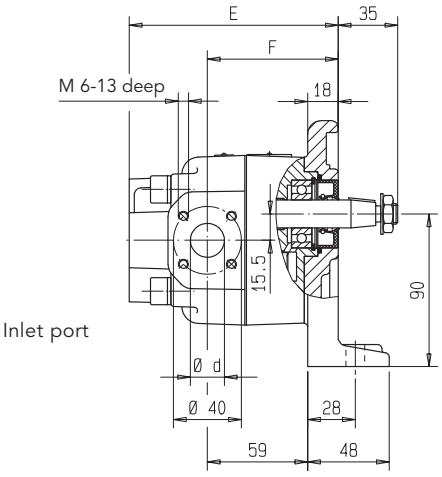
Shaft end:
Taper 1:5
Hexagon nut
BM 12 x 1.5
EN ISO 8675
Curved spring washer
B12 DIN 137
Woodruff key
3 x 6.5 DIN 6888

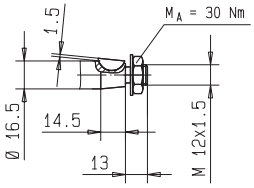
Ordering example:

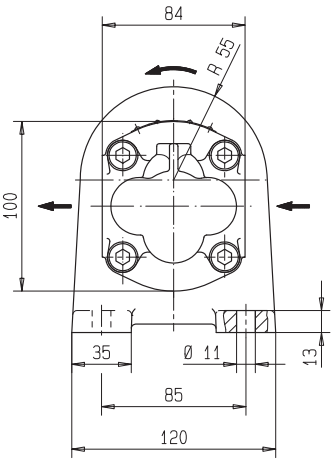
KP 1/11 G10A K00 2KL1/446

	Nominal displacement						
	3	**4**	**5.5**	**8**	**11**	**16**	**20**
d	Ø15	Ø15	Ø15	Ø20	Ø20	Ø20	Ø20
E	120	120	120	120	120	120	122
F	71.8	74	74	74	74	74	80
Weight kg	5.3	5.3	5.1	5.2	5.3	5.2	5.5

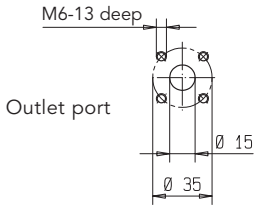
Mounting Angle, Outboard Bearing, Tapered Shaft End







Permissible radial force N on centre shaft end (n = 1450 1/min) = 340 N



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

Ordering example:

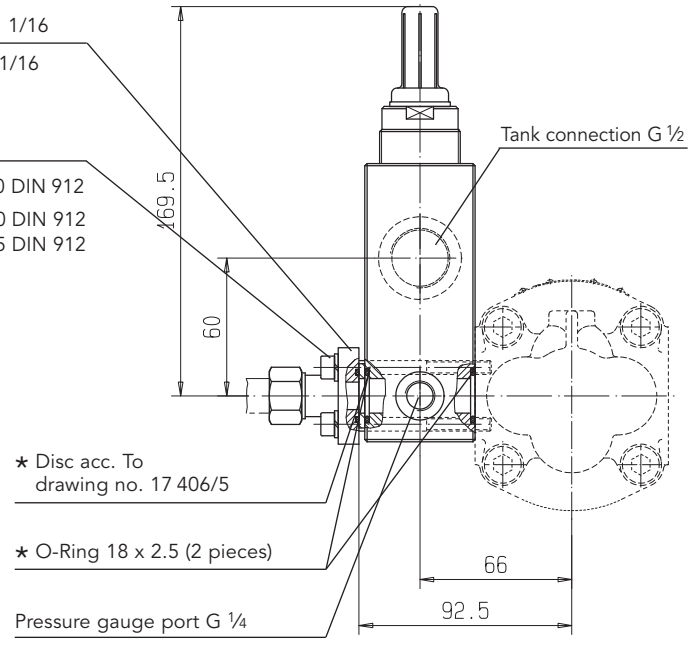
KP 1/11 F1UA L00 2KL1

	Nominal displacement						
	3	**4**	**5.5**	**8**	**11**	**16**	**20**
d	Ø15	Ø15	Ø15	Ø20	Ø20	Ø20	Ø20
E	123	123	123	12	123	123	125
F	7.4	77	77	77	77	77	83
Weight kg	6.0	6.0	5.8	5.9	6.0	6.0	6.2

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 Stck. M 6 x 70 DIN 912
b Straight flanged connection 2 Stck. M6 x 70 DIN 912
2 Stck. M6 x 85 DIN 912

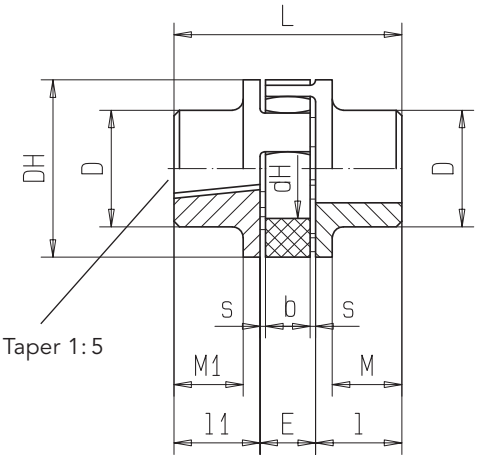


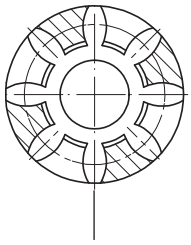
Ordering code	Set pressure P_{v1} bar	Set pressure P_{v2} bar	Discharge flow $Q_{1\ max}$ l/min	Discharge flow $Q_{2\ max}$ l/min
DBD 10 D 1 A 300	10	280	15	75
DBD 10 D 1 A 200	10	200	15	70
DBD 10 D 1 A 150	10	150	10	55
DBD 10 D 1 A 85	10	85	10	45
DBD 10 D 1 A 40	10	40	10	30
DBD 10 D 1 A 16	5	16	9	20

⋆ Extent of KRACHT delivery

Couplings and Accessories

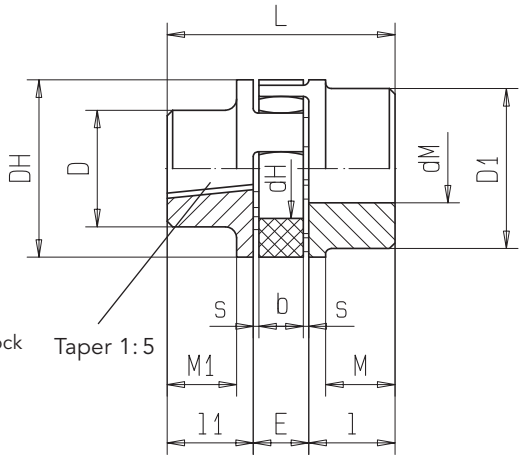
Type A





Internal flexible coupling block
of polyurethane (vulkollan)
Shore hardness: 92°
colour: Natural coloured

Type B



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 code:

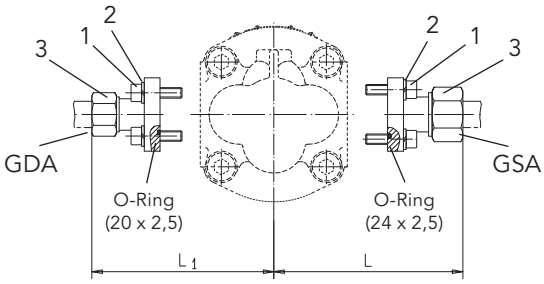
RA 24	–	K 18/17	–	Z 30/24

	Coupling Size	Weight	Dimensions													Ordering code
		kg	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	55	48	-	27	14	**RS 24-K18/17-Z50/14**
	24	0.3	30	30	18	2	14	78	24	24	56	40	-	27	19	**RA 24-K30/17-Z30/19**
	24	0.2	30	18.5	18	2	14	66	24	12.5	56	40	-	27	24	**RA 24-K18/17-Z30/24**
	38	2.6	70	18.5	24	3	18	112	62	10.5	80	78	-	38	38	**RG 38-K18/17-Z70/38**
Type B	**24/28**	0.3	30	18.5	18	2	14	66	-	12.5	56	40	56	27	28	**RA 24/28-Z18/17-Z30/28**

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 Steal

Straight Flanged Connector

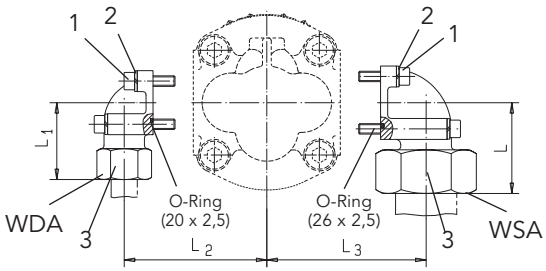


1 Hex. socket head cap screw (DIN 912 – 8.8)
2 Single coil spring lock washer (A6 DIN 127)
3 Covering nut with cutting ring (SW)

Inlet Port Pipe externa dia. mm	Ordering code	Discharge flow Q in l/min at 34 mm²/s	Dimensions L	SW	Cap screws	Weight kg
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 L_1	SW	Cap screws	Weight kg
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



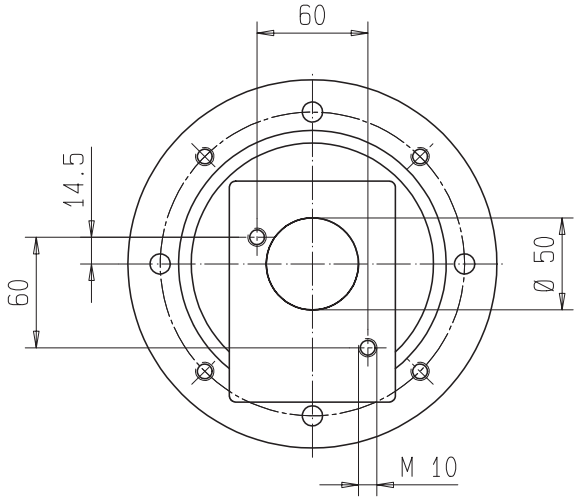
Ordering Code of a complete connection:
For the inlet port:
Straight flanged connector: **GSA 1/22**
For the outlet port:
Elbow flanged connector **WDA 1/20**

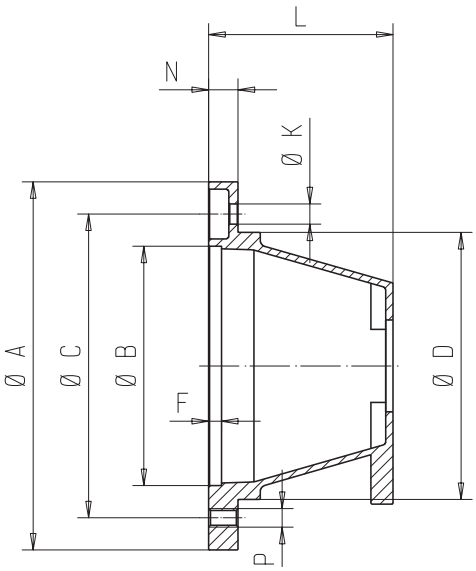
Extend of Kracht delivery: Hex. socket head cap screw acc. to DIN 912 as well as single coil spring lock washers and O-rings.

Inlet Port Pipe externa dia. mm	Ordering code	Discharge flow Q in l/min at 34 mm²/s	Dimensions L	L_3	SW	Cap screws		Weight kg
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 L_1	L_2	SW	Cap screws		Weight kg
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/..F..-Type



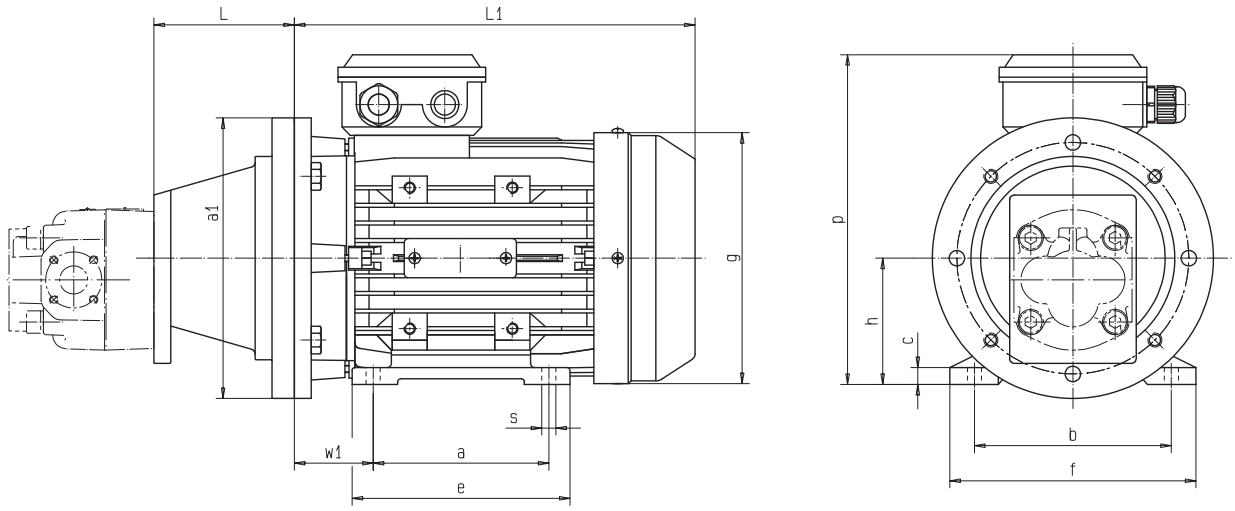


Type	Motor-size										Adapter flange weight	Coupling size	
	E-Motor	A	B	C	D	F	K	L	N	P	kg		
*** Z1/160/110**	**71**	160	110	130	110	7	9	110	13	M8	0.5	**RS24**	**-K18/17-Z50/14**
*** Z1/200/100**	**80**	200	130	165	145	7	11	100	16	M10	0.9	**RA24**	**-K30/17-Z30/19**
*** Z1/200/100**	**90**	200	130	165	145	7	11	100	16	M10	0.9	**RA24**	**-K18/17-Z30/24**
Z1/250/110	**100/112**	250	180	215	190	7	14	110	19	M12	1.2	**RA24/28**	**-K18/17-Z30/28**
Z1/300/144	**132**	300	230	265	234	7	14	144	20	M12	1.9	**RG38**	**-K18/17-Z70/38**

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.

Motor-Pump Assemblies KP 1/ . F.0A K00 2KL.



Nominal Size	Power Motor 6-pole kW	Operating 1/min	Power Motor 4-pole kW	Operating 1/min	Bell-housing	Coupling	Weight E-Motor kg 6-pole	4-pole	Bell-housing 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	1.1	1400	Z1/200/100	RA 24-K18/17-Z30/24	11.3	11.7	0.9
90 L	1.10	925	1.5	1400			14.4	14.4	
100	—	—	2.2	1420	Z1/250/110	RA 24/28-K18/17-Z30/28	—	19.2	1.2
100	1.5	945	3.0	1420			18.8	22.5	
112	2.2	955	4.0	1430			25.0	29.0	
132 S	3.0	960	5.5	1450	Z1/300/144	RG 38-K18/17-Z70/38	35.0	39.0	1.9
132 M	4.0	960	7.5	1450			47.6	48.6	

Nominal Size	Dimensions in mm											
	L	a_1	a	b	c	e	g	h	L_1	p	s	w_1
80	100	200	100	125	10	130	165	80	250	217	10	50
90 S	100	200	100	140	12	130	185	90	260	235	10	56
90 L	100	200	125	140	12	155	185	90	285	235	10	56
100	110	250	140	160	14	176	205	100	326	252	12	63
112	110	250	140	190	14	180	230	112	335	292	12	70
132 S	144	300	140	216	16	176	270	132	356	325	12	89
132 M	144	300	178	216	16	213	270	132	395	325	12	89

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

Product Portfolio

Transfer Pumps

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

Mobile Hydraulics

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

Flow Measurement

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

Industrial Hydraulics / Test Bench Construction

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

Technology Test benches / Fluid Test benches.

KP 1 Series 2/GB/11.13

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