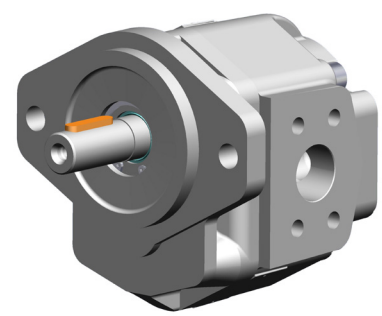


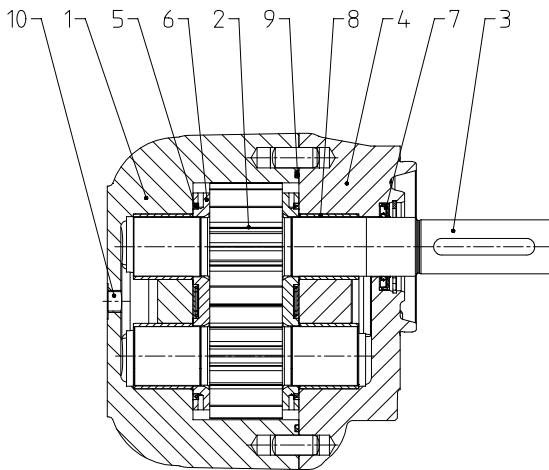
KRACHT®

- | Gear Pumps
- | Flow Measurement
- | Hydraulics
- | Valves

High-Pressure Gear Motors **KM 3**



Construction



- 1 Housing
- 2 Gearing
- 3 Drive shaft end
- 4 Flange cover
- 5 Pressure field sealing for axial clearance compensation
- 6 Sliding plates
- 7 Rotary shaft lip-type seal
- 8 Plain bearing
- 9 Housing seal
- 10 Drain port

Function

The construction (design principle) and materials of the KRACHT KM 3 series external gear motors make them perfect for use under the most extreme operating conditions. The main components form the housing and flange cover (see sectional drawing). They are dynamically highly loadable, 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. The tooth flanks of the gear made of hardened case-hardened steel are ground to achieve the best running properties. The high number of teeth ($z = 14$) in combination with a tooth shape developed for the special requirements of the hydraulics as well as the optimal layout of the expansion slots in the trapped-oil area achieve a considerable reduction in the volume flow variation and thus the pressure pulsation.

This leads to significantly lower noise level values in the motors and even in whole systems and machines. The function of the axial-tolerance compensation, indispensable for high-pressure pumps, is implemented by the sliding plates located beside the gear. They feature hydraulically-loaded pressure-fields, through which a compensation of the axial tolerance allowance is guaranteed at every working pressure. The sliding plates are structured to implement viscosity-independent backlash compensation. This ensures high volumetric and mechanical efficiency at every operating point.

Multiple motor combinations are supported. Surface-mounted valves (overpressure valves with fixed and proportional adjustment and directional control valves for changing the direction of rotation) are also possible. A suction valve can be supplied as an integrated valve. Motors with one or two directions of rotation can be

selected. With two directions of rotation, the connections are the same size and a leakage oil connection is available. These motors can be loaded with pressure in the outlet. The variant "one direction of rotation" corresponds to a clockwise or anticlockwise rotating pump. The counter-clockwise rotating motor is equal to a right rotating pump and a clockwise rotating motor is equal to a left rotating pump. These designs do not have a leakage oil connection but are internally connected to the discharge side and cannot be loaded with pressure in the outlet. For dimensions and weights please refer to the data sheet High Pressure Gear Pumps KP 2/KP 3.

Notes:

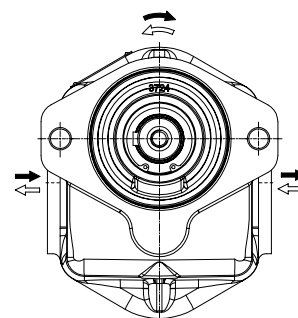
1. External loads

Forces acting on the output shaft end from outside influence the function of the bearing glands. Under certain circumstances, radial forces can be absorbed depending on size and direction of action. Axial forces are not permissible.

2. Direction of rotation

The following definition applies to the direction of rotation when looking at the output shaft end:

- Clockwise rotating shaft: Oil flow from left to right.
- Counter-clockwise rotating shaft: Oil flow from right to left.



Materials

Housing	Grey cast iron / Spheroidal cast iron
Bearing	Multi-compound plain bearing bushes
Shafts and gears	Case hardening steel acc. to DIN 17210 surface hardened and ground
Seals	NBR rotary shaft lip-type seal and PU pressure field seal $\vartheta \leq 90^\circ\text{C}$ FKM rotary shaft lip-type seal and PU pressure field seal $\vartheta \leq 100^\circ\text{C}$

Characteristics

Mounting	Flange
Pipe connection	Flange
Direction of rotation	Right, left, right and left
Weight	See dimension sheets
Mounting position	optional
Ambient temperature	$\vartheta_{u \min} = -20^\circ\text{C}$ $\vartheta_{u \max} = 60^\circ\text{C}$
Working pressure input	$p_{\max} = 315 \text{ bar}$ (see technical data)
Leak-oil pressure	5 bar max (n = 1000) 3 bar max (n = 2000)
Working pressure output	$p_{\max} = 150 \text{ bar}$
Media temperature	$\vartheta_{m \max} = 90^\circ\text{C}$ NBR rotary shaft lip-type seal and PU pressure field seal $\vartheta_{m \max} = 100^\circ\text{C}$ 100 °C FKM rotary shaft lip-type seal and PU pressure field seal
Viscosity	$v_{\min} = 10 \text{ mm}^2/\text{s}$ $v_{\max} = 1000 \text{ mm}^2/\text{s}$
Recommended oil cleanliness	according to ISO 4406:1999 Code 21/19/16 according to NAS 1638 Klasse 10
Recommended viscosity range	$v = 30 \dots 45 \text{ mm}^2/\text{s}$
Characteristic curves	see pages 6 to 8
Hydraulic fluids	Mineral oil according to DIN 51524/25 Motor oil as per DIN 51511 Organic oils of the "HEES" Group can be used up to 70 °C and at approx. 20 % reduced maximum pressure (please inquire)

Calculation formulas for hydraulic pumps and motors

Characteristics, formula signs, units

1. Discharge flow/input flow	Q	l/min
2. Geom. discharge volume/input 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

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

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

Characteristics for:	Volume- tric flow	Discharge flow	$Q_2 = \frac{V_g \cdot n_1 \cdot \eta_{vol}}{10^3} \left[\frac{l}{min} \right]$	Input flow	$Q_1 = \frac{V_g \cdot n_2}{10^3 \cdot \eta_{vol}} \left[\frac{l}{min} \right]$
	Torque	Drive torque	$M_1 = \frac{p \cdot V_g}{20 \cdot \pi \cdot \eta_{hm}} [Nm]$	Output torque	$M_2 = \frac{\Delta p \cdot V_g \cdot \eta_{hm}}{20 \cdot \pi} [Nm]$
	Power	Input Power	$P_1 = \frac{p \cdot Q_2}{600 \cdot \eta_{tot}} [kW]$	Output power	$P_2 = \frac{\Delta p \cdot Q_1 \cdot \eta_{tot}}{600} [kW]$

Typical values for KM 3 at nominal operating point

η _{tot}	η _{vol}
~ 0.86	~ 0.95

Technical data

KM 3 ... 6DL

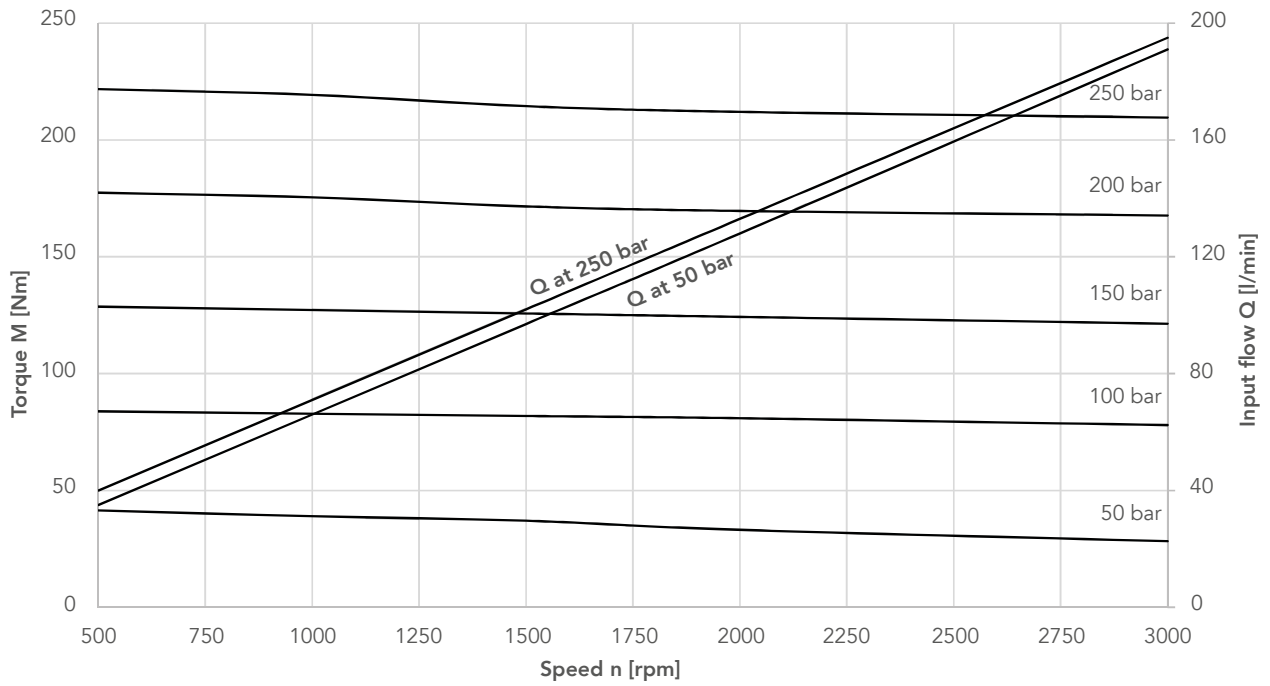
Input volume nominal size	Geom. displacement volume	Max. working pressure	Pressure peak	Max. speed	Moment of inertia x 10 ⁻⁵	Lowest speed
	V _g [cm ³ /rev]	p _b [bar]	p _{max} [bar]	N _{max} [rpm]	J [kg m ²]	n _{min} [rpm]
63	62.5	230	280	3000	169	400
71	70.6	230	280	3000	187	400
82	81.0	210	250	3000	210	400
100	99.5	210	250	2700	252	400
112	111.1	200	230	2700	277	400
125	123.8	200	230	2500	306	400

KM 3 ... 6VL

Input volume nominal size	Geom. displacement volume	Max. working pressure	Pressure peak	Max. speed	Moment of inertia x 10 ⁻⁵	Lowest speed
	V _g [cm ³ /rev]	p _b [bar]	p _{max} [bar]	N _{max} [rpm]	J [kg m ²]	n _{min} [rpm]
63	62.5	280	315	3000	169	500
71	70.6	280	315	3000	187	500
82	81.0	280	315	3000	210	500
100	99.5	280	315	2700	252	500
112	111.1	250	280	2700	277	500
125	123.8	230	280	2500	306	500

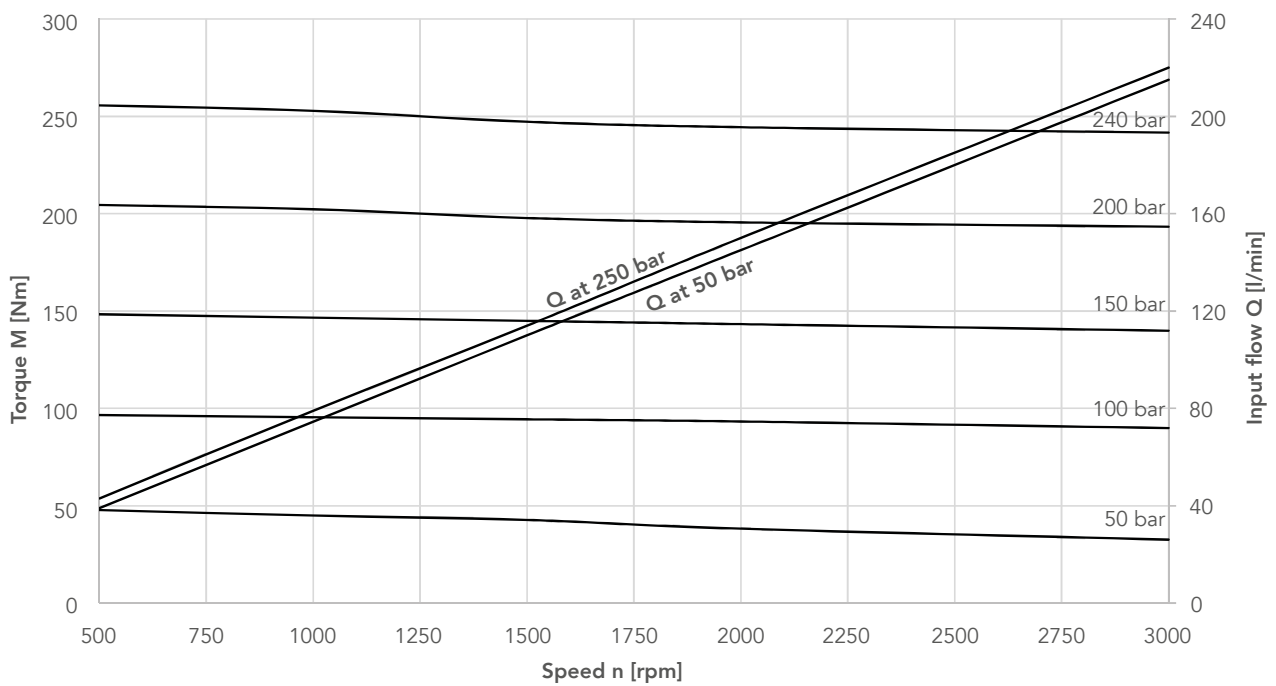
Characteristic curves KM 3/63

Characteristic curves for viscosity $\nu = 34 \text{ mm}^2/\text{s}$



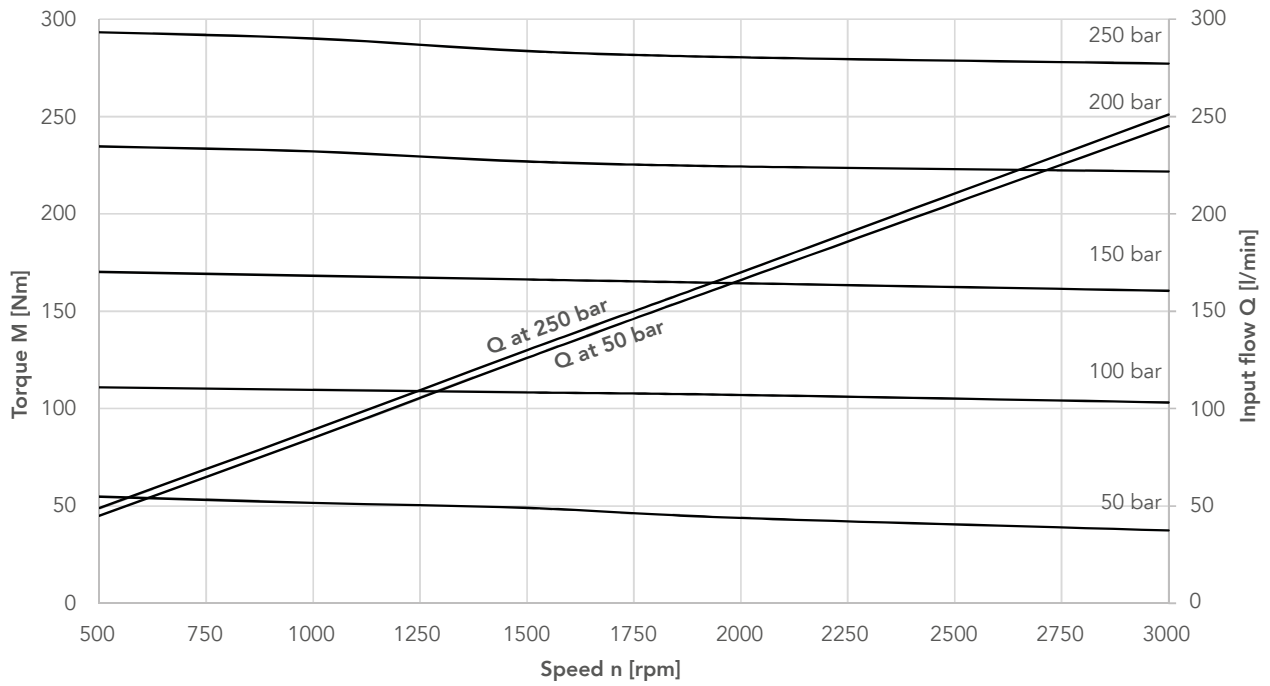
Characteristic curves KM 3/71

Characteristic curves for viscosity $\nu = 34 \text{ mm}^2/\text{s}$



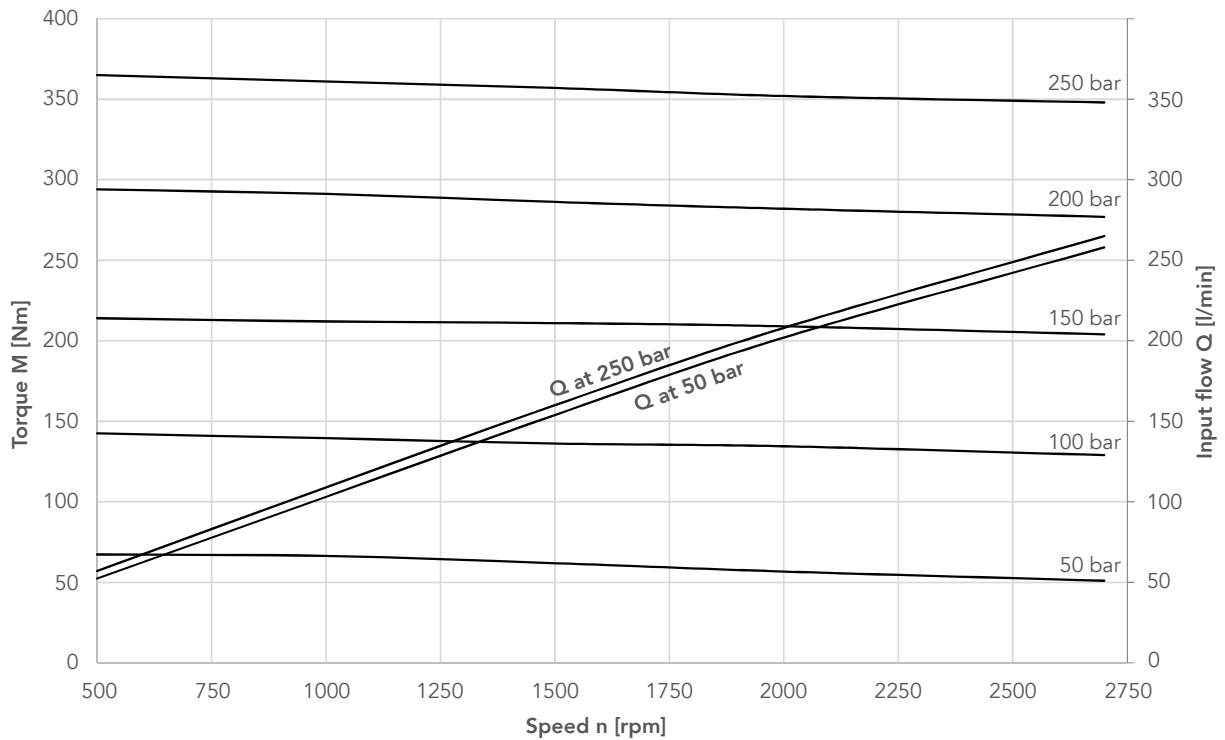
Characteristic curves KM 3/82

Characteristic curves for viscosity $\nu = 34 \text{ mm}^2/\text{s}$



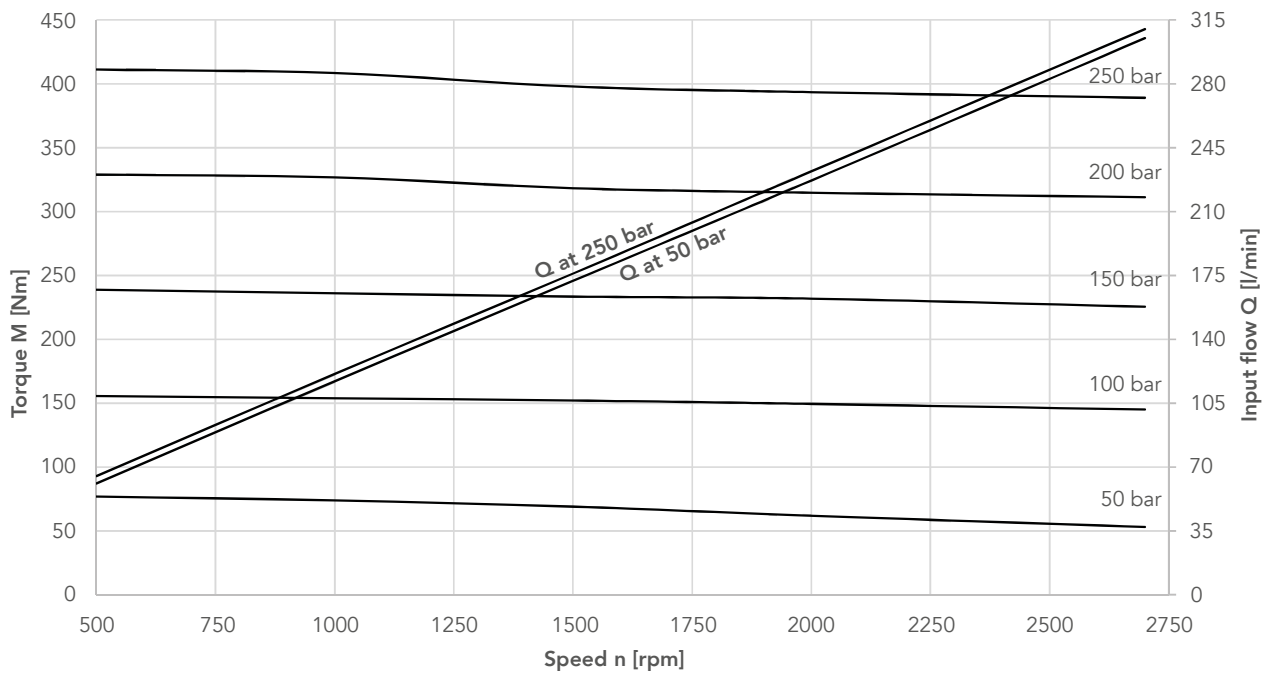
Characteristic curves KM 3/100

Characteristic curves for viscosity $\nu = 34 \text{ mm}^2/\text{s}$



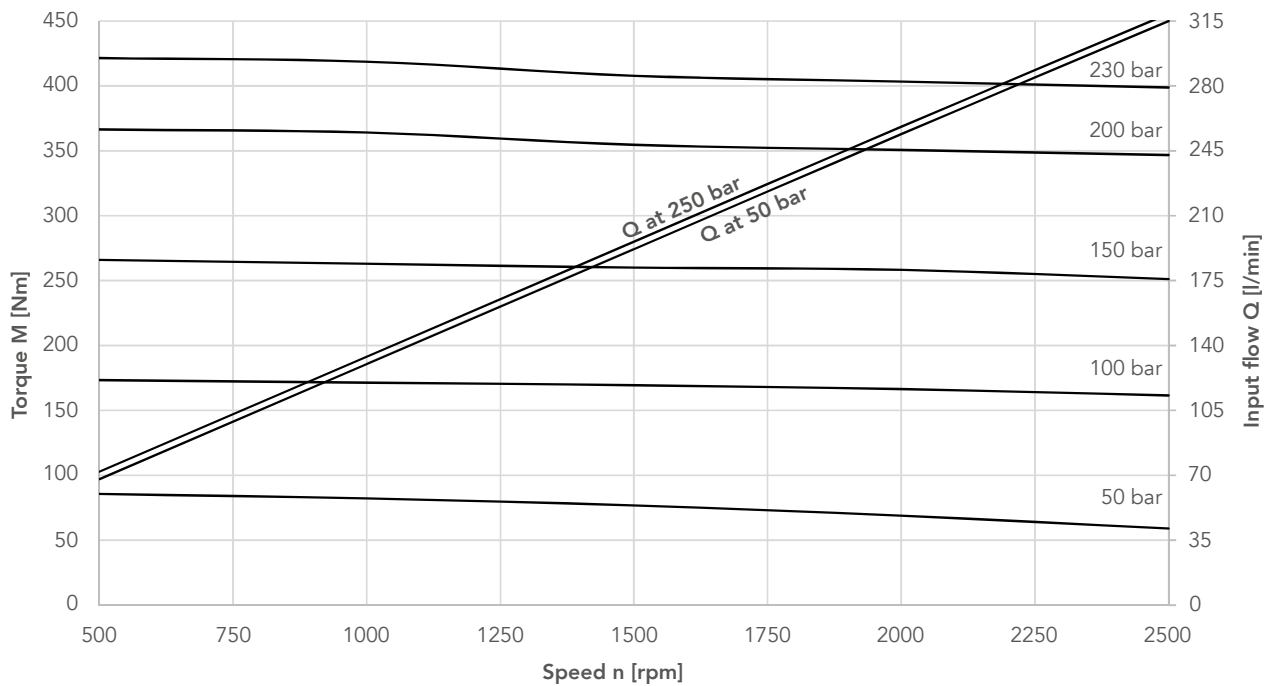
Characteristic curves KM 3/112

Characteristic curves for viscosity $\nu = 34 \text{ mm}^2/\text{s}$



Characteristic curves KM 3/125

Characteristic curves for viscosity $\nu = 34 \text{ mm}^2/\text{s}$



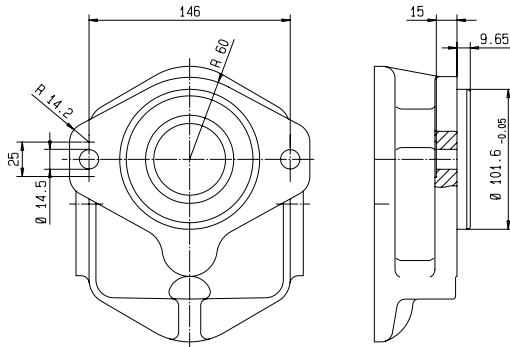
Type key

KM	3/	100	S	3	0	J	Y	0	0	6	D	L	1	/...
														Code number special construction
														Seal
														1 NBR rotary shaft lip-type seal $\vartheta \leq 90\text{ °C}$
														2 FKM rotary shaft lip-type seal $\vartheta \leq 100\text{ °C}$
														Type of gearing
														L Shaft and driven shaft pinion made of case-hardened steel (ground tooth flanks)
														Housing and bearing version
														D Grey cast iron housing with multi-compound plain bearings
														V Spheroidal cast iron with reinforced plain bearings
														Design serial no.
														6 (Internal allocation)
														Adaptor piece
														0 Standard design (without)
														2. Shaft end
														0 without
														Shaft end / shaft load capacity
														Y Cylinder shaft $\varnothing 32$; 550 Nm _{max}
														W Splined shaft profile B 28 x 25; DIN 5482; Z = 15; m = 1.75; 450 Nm _{max}
														B Splined shaft profile W 35 x 2; DIN 5480; 800 Nm _{max}
														Q Splined shaft profile SAE C; Z = 14; DP 12/24; $\alpha = 30^\circ$; 500 Nm _{max}
														Housing connection
														J SAE 1 1/4 standard 6DL SAE 1 1/4 6000 PSI 6VL
														Outboard bearing
														0 Without
														Direction of rotation*
														1 Right
														2 Left
														3 Right and left
														Flange cover version (LA = hole spacing / $\varnothing Z$ = centring diameter)
														S SAE-B-2-hole flange; LA = 146.00; $\varnothing Z$ = 101.6
														T SAE-C-2-hole flange; LA = 181.00; $\varnothing Z$ = 127.0
														V SAE-C-4-hole flange; LA = 114.55; $\varnothing Z$ = 127.0
														Nominal size / Input volume
														63 / 71 / 82 / 100 / 112 / 125
														Size 3
														Product name

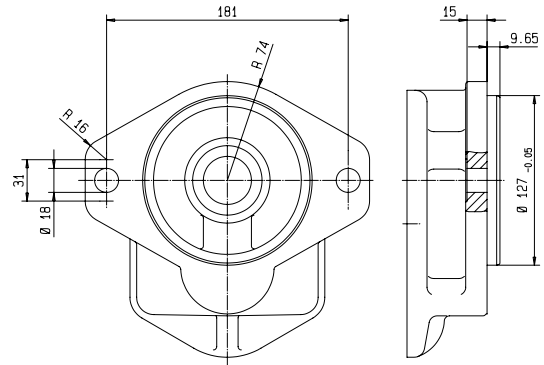
* Please note information on page 2

Flange mounting

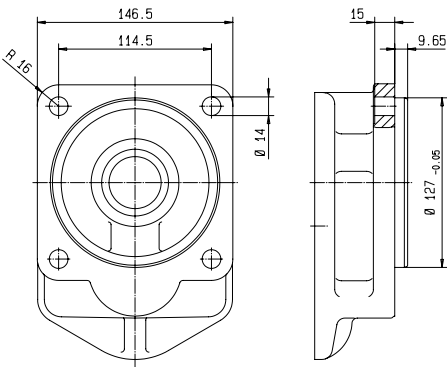
SAE-B-2-hole flange S



SAE-C-2-hole flange T



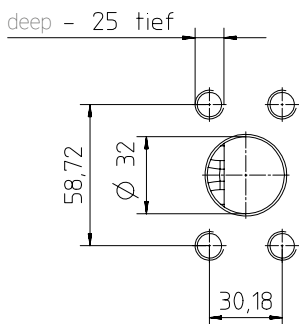
SAE-C-4-hole flange V



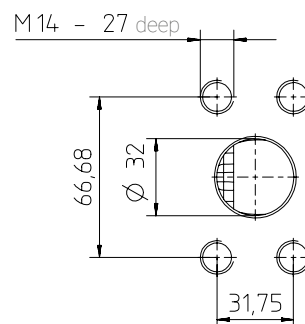
Connections

Housing connection J

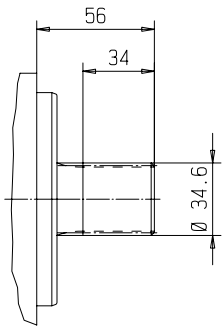
SAE 1 ¼ standard KM 3 ... 6DL



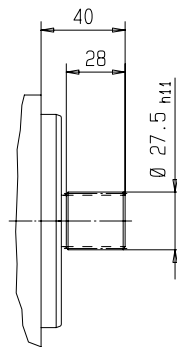
SAE 1 ¼ 6000 PSI ... KM 3 ... 6VL



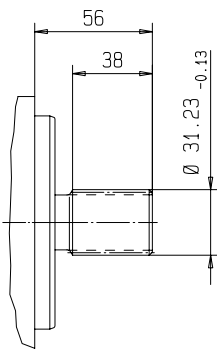
Shaft ends



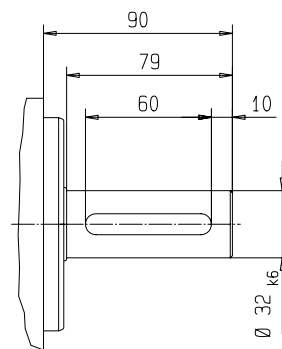
Shaft end B
Splined shaft profile W 35 x 2
DIN 5480 ab V_g 82
800 Nm_{max}



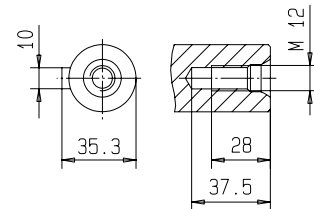
Shaft end W
Splined shaft profile B 28 x 25
DIN 5482
z = 15, m = 1.75
450 Nm_{max}



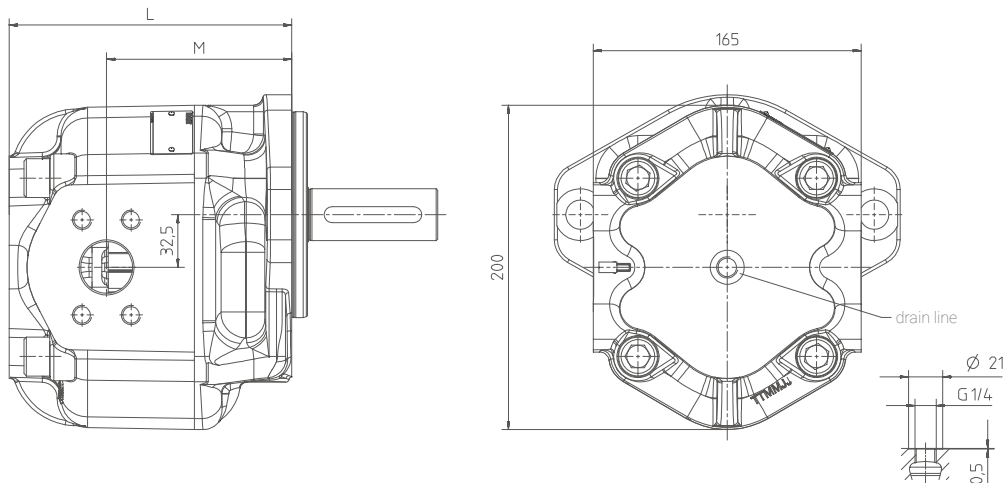
Shaft end Q
Splined shaft profile SAE-C
z = 14 DP 12/24, α = 30°
500 Nm_{max}



Shaft end Y
Cylindrical shaft
550 Nm_{max}



Dimensions, Weight



Input volume nominal size	L	M	Weight [kg]		
			Design S-flange	Design T-flange	Design V-flange
63	162	102	23.5	24.0	24.5
71			23.0	23.5	24.0
82	174	114	24.5	25.0	25.5
100			26.0	26.5	27.0
112			27.0	27.5	28.0
125	185	125	29.0	29.5	30.0

I Gear Pumps

Low and high-pressure gear pumps for lubricating oil, hydraulic, process and test bench applications, fuel and metering systems.



I Flow Measurement

Gear, turbine and screw type flow meters and electronics for volume and flow, metering and consumption in the chemical industry, hydraulic, process and test bench technology.



I Hydraulics

Single and multistage high-pressure gear pumps, gear motors and valves for construction machinery, municipal vehicles, agricultural vehicles, special vehicles and truck bodies.



I Valves

Cetop valves for all requirements stationary and mobile applications. Pressure, switching and stop valves with pipe connection for high flow rates. Special valves.



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