High Pressure Gear Motors

KM 1
According to its configuration – the Design principle is illustrated by the Sectional figure above – the KRACHT External Gear-Type Motor Series KM 1 is classified in the category of the so-called Gland-Type Bearing Motors. All essential functional parts as the gearing and the gland bearings are located in an aluminium housing manufactured of a high strength extrusion alloy which is 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 pinion shaft and the pinion. Highest manufacturing quality is assured by grinding and honing of the tooth flanks.

The surfaces of the journals are super finished. An important reduction of the type dependent deviation of the volumetric flow and of the pressure pulsation was achieved on the basis of the great teeth number \( z = 13 \) and the specially shaped teeth.

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

If requested the engines with built up special valve can be delivered.

Multiple engine combinations are possible. The optimal design of the pressure fields guarantees very good efficiencies over a wide pressure/speed range on the one hand – at the nominal working point for instance a total efficiency of 90% and above is reached – and ensures a smooth starting behaviour of the motor on the other hand and that already at a low rate of the input flow.

As the pressure fields are symmetrically arranged the motors can be used as well for clockwise as for anticlockwise rotation (reversible working modes).

The pressure relief of the shaft seal is effected by the drain port to be found in the end cover, (note the max. permissible drain pressure) so that the motors may be pressurized at the outlet side, hence follows that it is possible to connect together several motors in series.

For high speed Operation the shaft seal must be of FKM-material, refer to page 5.

The combination of 2 motors for instance coupled together and provided with a common supply line makes a Flow Divider with a high dividing accuracy.

**Note:**

External loads
Radial or Axial loads acting on the shaft end impair the functions of the gland bearings. Radial loads can possibly be absorbed in dependence on the extent and the direction of the loads.

Axial loads are NOT permissible.

To absorb external loads the motor type with outboard bearing must be used.

New (on request):
These engines are also available with reduced flank clearance. This results in lower pulsation and considerably improved start-up behaviour.
High Pressure Gear Motors KM 1

**General Characteristics**

- **Mounting**: flange and foot-type
- **Pipe connection**: flange-type
- **Direction of rotation**: clockwise and anticlockwise
- **Weight**: refer to dimensional sheet
- **Fitting position**: optional
- **Permissible ambient temperature range**:
  - \( \theta_{u_{\text{min}}} = -20^\circ\text{C} \)
  - \( \theta_{u_{\text{max}}} = +60^\circ\text{C} \)

**Working Characteristics**

**Working pressures**

<table>
<thead>
<tr>
<th>Input side</th>
<th>Output side</th>
</tr>
</thead>
<tbody>
<tr>
<td>( p_{1_{\max}} ) = refer to technical data</td>
<td>( p_{2_{\max}} = 120 \text{ bar} )</td>
</tr>
</tbody>
</table>

- **Drain pressure**: \( p_{T_{\max}} = 2 \text{ bar} \)
- **Short time**: \( p_{T_{\max}} = 5 \text{ bar} \)

**Fluid temperature range**:

- \( \theta_{m_{\max}} = 90^\circ\text{C} \) for NBR rotary shaft lip-type seal
- \( 100^\circ\text{C} \) for FKM rotary shaft lip-type seal

- **Viscosity range**:
  - \( \nu_{\min} = 10 \text{ mm}^2/\text{s} \)
  - \( \nu_{\max} = 600 \text{ mm}^2/\text{s} \)

- **Filtration**:
  - ISO 4406 : 1999 code 21/19/16 (NAS 1638 class 10)

- **Grade of filtration**:
  - \( \beta_{25} \geq 75 \) for ... 300 bar
  - \( \beta_{40} \geq 75 \) for ... 100 bar

- **Recommended Viscosity range**:
  - \( \nu = 30 \ldots 45 \text{ mm}^2/\text{s} \)

- **Characteristic curves**: refer to pages 6 – 10

- **Hydraulic fluids**:
  - Mineral oil acc. DIN 51524/25
  - Mineral oil acc. 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)

**Materials**

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

**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: Oil flow from left to right.
- Drive shaft end rotating anticlockwise: Oil flow from right to left.

**Options Hydraulic Fan Drive Solutions**

- KM 1 with pressure relief valve (standard and space optimized)
- KM 1 with proportional valve (standard and space optimized)
- KM 1 with proportional valve and reversible unit (standard and space optimized)
- KM 1 with ON-OFF function
- KM 1 with pressure relief valve and reversible unit
- KM 1 with thermostatic valve and pressure relief valve
- KM 1 with thermostatic valve and pressure relief valve with reversible unit
Technical Data

<table>
<thead>
<tr>
<th>Nominal motor displacement</th>
<th>Geom. motor displacement</th>
<th>max. pressure</th>
<th>Rated pressure</th>
<th>Working pressure</th>
<th>max. working speed</th>
<th>Moment of inertia</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>V_g cm³/r</td>
<td>P_max bar</td>
<td>P_st bar</td>
<td>P_o bar</td>
<td>n_max 1/min</td>
<td>J x 10^-6 kg m²</td>
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<tr>
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<td>4 NM</td>
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<td>25.21</td>
<td>25.97</td>
<td>200</td>
<td>180</td>
<td>150</td>
<td>3000</td>
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</table>

Note: Allowed torque for the shaft end follow!

Calculation Formulas for Hydraulic Pumps and Motors

Characteristic data, formula signs, units

1. Discharge flow / input flow Q₂ l/min
2. Pump / motor displacement V_g cm³/r
3. Pressure p bar
4. Speed n 1/min
5. Torque M Nm
6. Power P kW
7. Total efficiency ηtot —
8. Volumetric efficiency ηvol —
9. Hydr./mech. efficiency ηhm —
10. Flow velocity v m/s
11. Piping diameter d mm

General

Approximate values for KRACHT products in the nominal working point:

| KP | ≈ 0.85 | ηvol | ≈ 0.93 |
| KM | ≈ 0.85 | ηtot | ≈ 0.93 |

Time / Pressure chart

Maximum pressure △ pressure peak
Rated pressure p_N < 6s △ 50 % ED
see time / pressure chart
max. perm. working cycles: 30/min
Pressures as specified are applicable to v ≥ 30 mm²/s

Characteristic data for:

Volumetric flow

Discharge flow Q₂ = \( \frac{V_g \cdot n_1 \cdot \eta_{vol}}{10^3} \) l/min

Input flow Q₁ = \( \frac{V_g \cdot n_2}{10^3 \cdot \eta_{vol}} \) l/min

Torque

Drive torque M₁ = \( \frac{p \cdot V_g}{20 \cdot \pi \cdot \eta_{hm}} \) [Nm]

Output torque M₂ = \( \frac{\Delta p \cdot V_g}{20 \cdot \pi} \) [Nm]

Power

Input power P₁ = \( \frac{p \cdot Q_2}{600 \cdot \eta_{tot}} \) [kW]

Output power P₂ = \( \frac{\Delta p \cdot Q_1 \cdot \eta_{tot}}{600} \) [kW]
High Pressure Gear Motors KM 1

Guidance for use of the Characteristic Curves

Required: Torque output M at speed n
Unknown: Pressure difference Δp and the required Input flow Q

Example: M = 45 Nm → ①
n = 1400 1/min ↑ ②

The Intersection of ① and ② is the motor working point with:
Δp = 142 bar → ③
Q = 32.2 l/min ↓ ④

Characteristic Curves for Type KM 1/5.5

Characteristic values applicable to viscosity ν = 34 mm²/s · Dispersion of the speed values n = ± 75 1/min
Dispersion of the torque output M = ± 1.1 Nm at Δp = constant and Q = constant
Characteristic Curves for Type KM 1/8

Characteristic values applicable to viscosity $\nu = 34 \text{ mm}^2/\text{s}$ · Dispersion of the speed values $n = \pm 75 \text{ 1/min}$
Dispersion of the torque output $M = \pm 1.6 \text{ Nm} \text{ at } \Delta p = \text{ constant and } Q = \text{ constant}$

Characteristic Curves for Type KM 1/11

Characteristic values applicable to viscosity $\nu = 34 \text{ mm}^2/\text{s}$ · Dispersion of the speed values $n = \pm 75 \text{ 1/min}$
Dispersion of the torque output $M = \pm 1.6 \text{ Nm} \text{ at } \Delta p = \text{ constant and } Q = \text{ constant}$
Characteristic Curves for Type KM 1/14

Characteristic values applicable to viscosity $\nu = 34 \text{ mm}^2/\text{s}$ · Dispersion of the speed values $n = \pm 75 \text{ 1/min}$
Dispersion of the torque output $M = \pm 2.8 \text{ Nm}$ at $\Delta p =$ constant and $Q =$ constant

Characteristic Curves for Type KM 1/16

Characteristic values applicable to viscosity $\nu = 34 \text{ mm}^2/\text{s}$ · Dispersion of the speed values $n = \pm 75 \text{ 1/min}$
Dispersion of the torque output $M = \pm 2.8 \text{ Nm}$ at $\Delta p =$ constant and $Q =$ constant
### High Pressure Gear Motors KM 1

#### Characteristic Curves for Type KM 1/19

Characteristic values applicable to viscosity \( \nu = 34 \text{ mm}^2/\text{s} \). Dispersion of the speed values \( n = \pm 75 \text{ 1/min} \)
Dispersion of the torque output \( M = \pm 2.8 \text{ Nm} \) at \( \Delta p = \text{constant} \) and \( Q = \text{constant} \)

#### Characteristic Curves for Type KM 1/22

Characteristic values applicable to viscosity \( \nu = 34 \text{ mm}^2/\text{s} \). Dispersion of the speed values \( n = \pm 75 \text{ 1/min} \)
Dispersion of the torque output \( M = \pm 2.8 \text{ Nm} \) at \( \Delta p = \text{constant} \) and \( Q = \text{constant} \)
Characteristic Curves for Type KM 1/25

Characteristic values applicable to viscosity $\nu = 34 \text{ mm}^2/\text{s}$. Dispersion of the speed values $n = \pm 75 \text{ 1/min}$. Dispersion of the torque output $M = \pm 2.8 \text{ Nm}$ at $\Delta p$ = constant and $Q$ = constant.
# High Pressure Gear Motors KM 1

## Type Key

### Shaft ends
- **F** with two parallel flats $M_{\text{max}} = 40\ \text{Nm}$
- **K** Taper 1: $5 \ M_{\text{max}} = 160\ \text{Nm}$
- **M** Taper 1: $8 \ M_{\text{max}} = 160\ \text{Nm}$
- **S** Involute spline SAE-A, DP 16/32, $\alpha = 30^\circ$, $z = 9$, $M_{\text{max}} = 55\ \text{Nm}$
- **X** Involute spline B 17 x 14, DIN 5482, $M_{\text{max}} = 70\ \text{Nm}$

### Housing ports
- **A** $\phi 15$ with LK 35
- **C** $\phi ½$ (on request)
- **D** M 22 x 1.5 (on request)
- **J** 7/8 – 14 UNF (on request)
- **Q** $\phi 13.5$ with LK 30.2

### Outboard flanges or bearing resp.
- **0** without
- **L** Bearing series: light
- **P** Bearing series: heavy
- **R** Mounting angle

### Ordering example

```
KM 1/ 5.5 G 3 0 A K 0 A 4 N L 1/ .
```

### End cover (adaptor pieces)
- **A** End cover (standard type)
- **B** End cover with side drain port
- **F** Adaptor piece for multi-stage pump types KM1 coupled with KM1 only

### Design serial no.
- **4** (Specified by Kracht)

### Code for materials
- **N** Housing: Aluminium double bland bearing with multicomponent plane bearing bushes

### Second shaft end
- **0** without
- **X** Involute spline B 17 x 14, DIN 5482

### Nominal motor displacement
- **5.5 / 6.3 / 8 / 9.6 / 11 / 14 / 16 / 19 / 22 / 25**

### Size 1

### Product name

### Type of gearing
- **L** Driving and driven gears of case hardening steel (tooth flanks grinded and hones)
- **M** reduced backlash of teeth

### Direction of rotation
- **3** clockwise and anticlockwise

### Selection: flange mounting cover
- **A** SAE-A-2-bolt type, LA = 106.4; $\phi Z = 82.55$
- **F** 2 bolt square flange, LA = 60/60; $\phi Z = 50$
- **G** 4 bolt rectangular flange, LA = 72/100; $\phi Z = 80$
- **K** 4 bolt rectangular flange, LA = 71.4/96.1; $\phi Z = 36.47$
- **L** 2 bolt rectangular flange, LA = 60/60; $\phi Z = 52$
- **M** same as type F; but the bolting is mirror inverted
- **Q** 2 bolt square flange, LA = 60/60; $\phi Z = 52$ with O-ring (without shaft seal)

### Seals
- **1** NBR rotary shaft lip type seals $\theta \leq 90\ ^\circ\ \text{C}$
- **2** FKM rotary shaft lip type seals $\theta \leq 100\ ^\circ\ \text{C}$

### Code no. for special construction

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High Pressure Gear Motors KM 1

G-Flange, Tapered Shaft End

Ordering example:
**KM 1/8 G30A K0A 4NL1**

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

G-Flange, Involute Spline Shaft End

Ordering example:
**KM 1/8 G30A X0A 4NL1**

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

<table>
<thead>
<tr>
<th>Displacement Nominal size</th>
<th>5.5</th>
<th>6.3</th>
<th>8</th>
<th>9.6</th>
<th>11</th>
<th>14</th>
<th>16</th>
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<td>2.8</td>
<td>2.9</td>
<td>3.1</td>
<td>3.3</td>
</tr>
</tbody>
</table>
End Cover B

End cover B available for all types of motor.
Connection of the drain piping optional on the right or left side.

SAE A-Flange, Tapered Shaft End

Ordering example:
KM 1/8 A30A K0A 4NL1

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
High Pressure Gear Motors KM 1

SAE A-Flange, SAE A-Shaft-End

Ordering example:
KM 1/8 A30A S0A 4NL1

Shaft end: involute spline
SAE-A  z = 9; DP 16/32; α = 30°
allowed torque M_max = 55 Nm

SAE A-Flange, Involute Spline Shaft End

Ordering example:
KM 1/8 A30A X0A 4NL1

Shaft end: involute spline
B 17 x 14  DIN 5482

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</table>

Drain port

Input and outlet side equally sized
K-Flange, Tapered Shaft End 1:8

Ordering example:
KM 1/8 K30Q M0A 4NL1

Shaft end: taper 1:8
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

K-Flange, Involute Spline Shaft End

Ordering example:
KM 1/8 K30Q X0A 4NL1

Shaft end: involute spline
B 17 x 14 DIN 5482
but tooth thickness \(s_a = 3.206\)
Addendum modification = + 0.6

<table>
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<th>Displacement</th>
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</table>
F-Flange, Tapered Shaft End

Ordering example:
**KM 1/8 F30A K0A 4NL1**

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

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F-Flange, Involute Spline Shaft End

Ordering example:
**KM 1/8 F30A X0A 4NL1**

Shaft end: involute spline
B 17 x 14 DIN 5482
but tooth thickness \( S_w = 3.206 \)
Addendum modification = +0.6
M-Flange, Tapered Shaft End

Ordering example:

**KM 1/8 M30A K0A 4NL1**

 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

M-Flange, Involute Spline Shaft End

Ordering example:

**KM 1/8 M30A X0A 4NL1**

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

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</table>
High Pressure Gear Motors KM 1

Q-Flange, Tapered Shaft End

Ordering example:
KM 1/8 Q30A K0A 4NL1

 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

Q-Flange, Involute Spline Shaft End

Ordering example:
KM 1/8 Q30A X0A 4NL1

 Shaft end: involute spline
B 17 x 14 DIN 5482
but tooth thickness Sw = 3.206
Addendum modification = + 0.6

<table>
<thead>
<tr>
<th>Displacement Nominal size</th>
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<th>6.3</th>
<th>8</th>
<th>9.6</th>
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<td>2.9</td>
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<td>3.3</td>
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</tbody>
</table>
High Pressure Gear Motors KM 1

L-Flange, Parallel Flat Shaft End, without Shaft Lip-Type Seal

Ordering example:
KM 1/8 L30A F0A 4NL1

L-Flange, Involute Spline Shaft End, without Shaft Lip-Type Seal

Ordering example:
KM 1/8 L30A X0A 4NL1/204

Displacement
Nominal size  5.5  6.3  8  9.6  11  14  16  19  22  25

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<td>F</td>
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</table>

Allowed torque $M_{\text{max}} = 40 \text{ Nm}$
High Pressure Gear Motors KM 1

Outboard Bearing L, G-Flange, Tapered Shaft End Ø 20 mm

Ordering example:
**KM 1/8 L3LA F0A 4NL1**

Shaft end: taper 1:5
Hex. lock nut BM 14 x 1.5
EN ISO 8675
Curved spring washer B14 DIN 127
Woodruff key 4 x 6.5 DIN 6888

Outboard Bearing L, G-Flange, Tapered Shaft End Ø 17 mm

Ordering example:
**KM 1/8 L3LA F0A 4NL1/324**

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

**Displacement Nominal size**
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<thead>
<tr>
<th></th>
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**Weight kg**

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<td>3.9</td>
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<td>4.3</td>
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</table>
High Pressure Gear Motors KM 1

Outboard Bearing L, F-Flange, Tapered Shaft End Ø 17 mm

Ordering example:
KM 1/8 L3LA F X 0A 4NL1/375

<table>
<thead>
<tr>
<th>Displacement</th>
<th>5.5</th>
<th>6.3</th>
<th>8</th>
<th>9.6</th>
<th>11</th>
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<td>87.3</td>
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Weight kg

3.1 | 3.2 | 3.2 | 3.3 | 3.4 | 3.5 | 3.7 | 3.8 | 4.0 | 4.2 |

Outboard Bearing L, A-Flange, Tapered Shaft End Ø 20 mm

Ordering example:
KM 1/8 L3LA F X 0A 4NL1/401

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Weight kg

4.1 | 4.2 | 4.2 | 4.3 | 4.4 | 4.5 | 4.7 | 4.8 | 5.0 | 5.2 |
Permissible radial load $F_{R,\text{max}}$ as function of the supporting distance $l$ for a given axial force $F_A$ (for $L_h = 10,000\ h$), medium wave at $l = 21.5\ \text{mm}$.
Permissible Load – Outboard Bearing P, Tapered Shaft End

Shaft end: taper 1:5
Hex. lock nut M 14 x 1.5
Curved spring washer B14
Woodruff key 4 x 6.5
Weight of the outboard bearing 3.5 kg

Ordering example:
KM 1/8 Q3PA X0A 4NL1

Permissible radial load $F_{R\,\text{max}}$ as function of the supporting distance $l$ for a given axial force $F_A$ (for $L_h = 10,000$ h), medium wave at $l = 38$ mm

Fill with 50 cm$^3$ oil (ISO VG 10-68) before assembly.
High Pressure Gear Motors KM 1

Mounting Angle, Tapered Shaft End

Ordering example:
KM 1/8 F3RA K0A 4NL1

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

<table>
<thead>
<tr>
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High Pressure Gear Motors KM 1

Double Type, Tapered Shaft End

Example
Other flanges and shaft ends possible/available

Ordering example:
KM 1/8 G30A KXF 4NL1/215 +
KM 1/8 L30A X0A 4NL1/215

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<td>11 113.1 226.2 110.5 221.0 107.6 215.2 105.1 210.2 103.4 206.8 100.9 201.8</td>
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High Pressure Gear Motors KM 1

Flow Divider KM 1

Ordering example:

KM 1/16 L30A XXF 4NL1/231 +
KM 1/16 L30A X0A 4NL1/215 +
KM 1/16 L30A XXF 4NL1/231 +
KM 1/16 L30A X0A 4NL1/215

Ordering example:

KM 1/11 L30A X0A 4NL1/191 +
KM 1/11 L30A X0A 4NL1/191
High Pressure Gear Motors KM 1

### Coupling and Accessories

<table>
<thead>
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<th>Weight</th>
<th>Moment of inertia</th>
<th>Rough bore</th>
<th>Finished bore</th>
<th>Dimensions</th>
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<td>–</td>
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<td>0.0014</td>
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<td>–</td>
<td>28</td>
<td>–</td>
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</table>

| Type B | | | | | | | | | | | | | | | |
| 24/28 | 0.22 | 0.0001 | – | 20 | – | 22 | – | 28 | 30 | 18.5 | 18 | 2 | 14 | 66.5 | 24 | 12.5 | 55 | 40 | – | 27 |
| 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 |
| 38/45 | 0.82 | 0.0008 | – | 36 | – | 38 | – | 45 | 45 | 18.5 | 24 | 3 | 18 | 87.5 | 37 | 10.5 | 80 | 66 | 77 | 38 |
| 38/45 | 2.5 | 0.0020 | – | – | 38 | – | 45 | 70 | 18.5 | 24 | 3 | 18 | 112.5 | 62 | 10.5 | 80 | 66 | 78 | 38 |
| 42/55 | 1.29 | 0.0018 | 25 | – | 42 | – | 55 | 50 | 18.5 | 26 | 3 | 20 | 94.5 | 40 | 8.5 | 95 | 75 | 94 | 46 |

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

- **RA**: Hub material Al
- **RG**: Hub material part 2 and 3 GG

**Working temperature**: – 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.

**Coupling sleeve**:  
- Retaining ring 14 x 1 DIN 472  
- Internal involute A 17 x 14 DIN 5482 sheet 1  
- Coupling sleeve size 1: Part number: B.0079020001  
- Coupling KP 1 k-shaft: Partnumber: E.0187220001
**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)

<table>
<thead>
<tr>
<th>Inlet port pipe externa dia. mm</th>
<th>Ordering code</th>
<th>Rated pressure $P_N$ in bar</th>
<th>Dimensions</th>
<th>Cap screw</th>
<th>Weight kg</th>
</tr>
</thead>
<tbody>
<tr>
<td>16</td>
<td>GDA 1/16</td>
<td>315</td>
<td>82 30</td>
<td>4 x M6 x 22</td>
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<tr>
<td>15</td>
<td>GDA 1/15</td>
<td>250</td>
<td>81 27</td>
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<td>GDA 1/12</td>
<td>315</td>
<td>81 22</td>
<td>4 x M6 x 22</td>
<td>0.16</td>
</tr>
</tbody>
</table>

**Elbow Flanged Connector**

Ordering example of a complete connection:
For the inlet port: Straight flanged connector **GDA 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.

<table>
<thead>
<tr>
<th>Inlet port pipe externa dia. mm</th>
<th>Ordering code</th>
<th>Rated pressure $P_N$ in bar</th>
<th>Dimensions</th>
<th>Cap screw</th>
<th>Weight kg</th>
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<tbody>
<tr>
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<td>WDA 1/20</td>
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<td>56 67 36</td>
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<td>WDA 1/16</td>
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<td>15</td>
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<tr>
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<td>47 58.5 22</td>
<td>2 x M6 x 35 2 x M6 x 22</td>
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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.