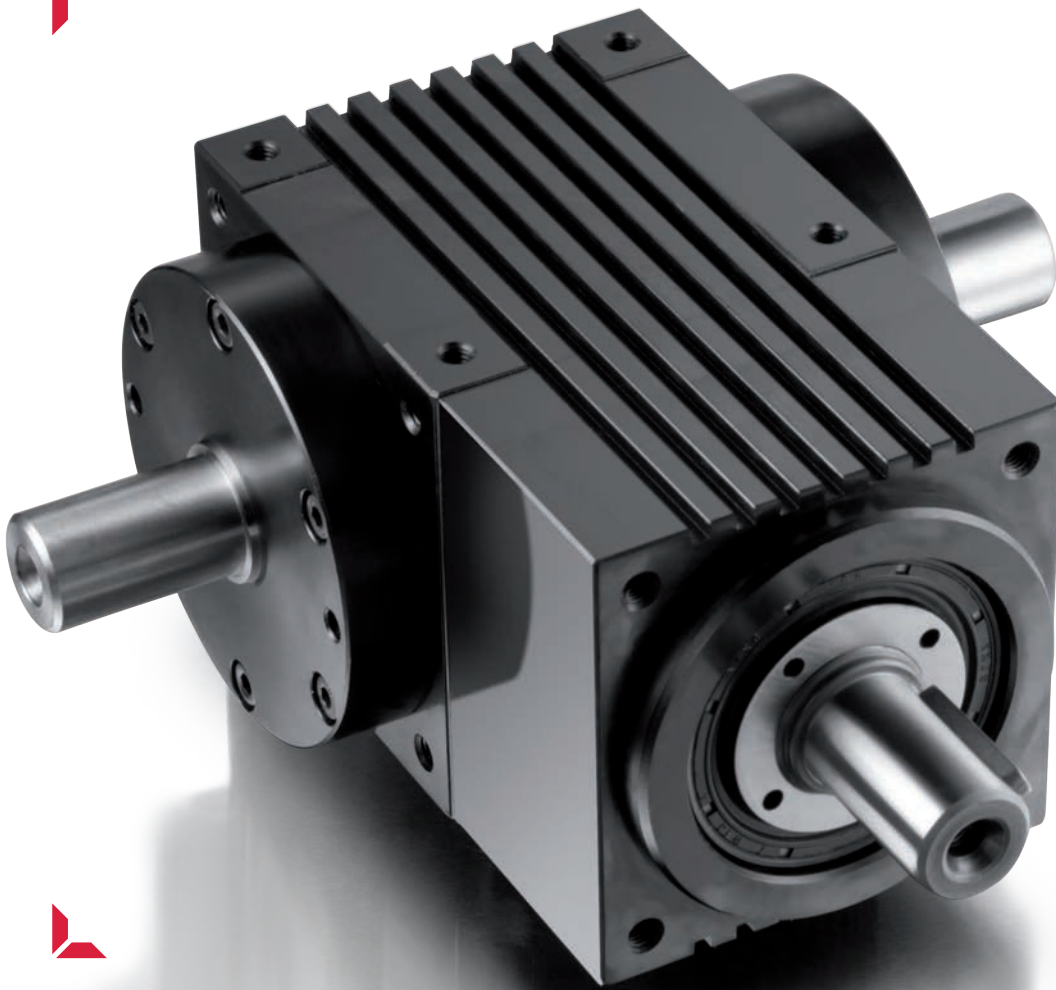


BM – spiral bevel gear boxes

Solid and Hollow Shaft Design



Cycloidal gear boxes



Planetary gear boxes



Bevel gear boxes



Planetary bevel gear boxes



Hypoid gear boxes

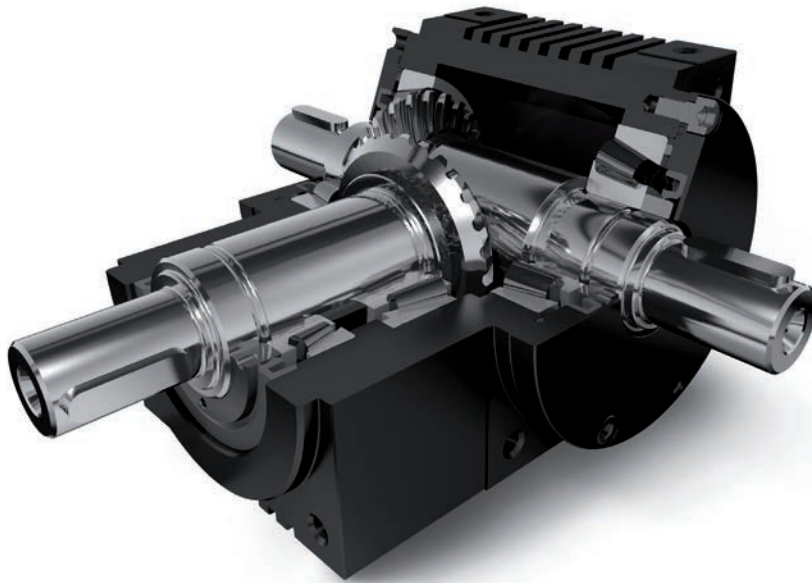


Gear technology

EPPINGER BM bevel gear boxes

The BM series of bevel gear boxes is predestined for all gear box applications which require compact dimensions and maximum torque transfer at best efficiency rates. Precision of the axes and bearing

seats, combined with Gleason bevel gears to take high loads, are the basis for minimized tooth clearance and optimal transmission properties. Presently the gear boxes are available in 5 sizes, each with a ratio of $i = 1 : 1$.



FEATURES AND BENEFITS OF THE NEW BM BEVEL GEAR BOX SERIES

THE HOUSING:

- single-component steel housing with maximum precision of axes and bearing seats, all integrated directly into the housing
- high power density of the gear boxes through compact housing dimensions
- drive-sided gear box interface offers the option of direct connection of planetary gear box pre-stages, as well as secure mounting of motor flanges
- mounting threads on all sides of the housing allow for stable attachment of the gear box in various installation positions

THE GEARS:

- heavy duty bevel gears, designed and manufactured according to the Gleason process, result in optimal gearing efficiency, high transmission precision and reduced stress on the bearings
- friction-locked, zero backlash connection of the crown gears on the drive shaft reduces the mass of the gearing component and centers zero backlash connection

- precise gear setting by measuring the gear box components and 100% running test of the gear boxes in assembly

SHAFTS AND BEARINGS:

- steel alloy shafts with precise bearing seats as basis for precise and heavy duty taper roller bearings
- extremely precise positioning and setting of bearings through the use of ground steel shims and splinting of the inner rings

THE RANGE OF GEAR BOXES:

- presently 5 gear box sizes with a ratio of $i = 1 : 1$
- gear box can be supplied with solid or hollow shafts in standard and customized designs
- best efficiency when high transmission performance is required. High efficiency levels of course result in a reduction of energy costs.

Performance data

| | Abbreviation | Unit | Ratio | BM075 | BM090 | BM110 | BM140 | BM170 | BM210 | BM240 | BM280 |
|--|----------------|-------------------|------------------|---|------------|------------|------------|------------|------------------------|-------|-------|
| Nominal output torque | T2N | Nm | i = 1 : 1 | 80 | 130 | 300 | 570 | 1050 | In process of planning | | |
| Max. output torque ¹ | T2max | Nm | | 160 | 260 | 600 | 1140 | 2100 | | | |
| Nominal speed | n1N | rpm | i = 1 : 1 | 1800 | 1500 | 1100 | 900 | 850 | | | |
| Max. nominal speed ² | n1max | rpm | | 3000 | 2500 | 2000 | 2000 | 1500 | | | |
| Permissible radial load ^{3,4} | FR1max | N | | 1500 | 2000 | 3500 | 5500 | 7800 | | | |
| | FR2max | N | | 2000 | 2700 | 4500 | 7200 | 11000 | | | |
| Permissible axial load ⁴ | FA1max | N | | 800 | 1000 | 1800 | 2800 | 4000 | | | |
| | FA2max | N | | 1000 | 1400 | 2300 | 3800 | 5500 | | | |
| Tooth clearance output shaft | jt | arcmin | standard reduced | ≤13 ≤ 8 | ≤12 ≤ 7 | ≤11 ≤ 7 | ≤10 ≤ 6 | ≤10 ≤ 6 | | | |
| Efficiency at nominal load | η | % | | > 98 | | | | | | | |
| Operating noise ⁵ | Lpa | db(A) | | 70 | 73 | 75 | 76 | 77 | | | |
| Service life | Lh | h | | > 15.000 | | | | | | | |
| Oil filling ⁶ | | ltr | | 0.06 | 0.09 | 0.16 | 0.35 | 0.80 | | | |
| Lubrication | | | | Synthetic oil, ISO VG 150 (up to size 140 ind.) | | | | | | | |
| Operating temperatures | | °C | | -30 to 100 | | | | | | | |
| Weight ⁷ | | kg | | 5.5 | 8.9 | 15.7 | 31.1 | 48.0 | | | |
| As-delivered condition | | | | Housing and flanges burnished black | | | | | | | |
| Mass moment of inertia ⁸ | I ₁ | kgcm ² | | Upon request | | | | | | | |

¹ 1000 x permissible short overload peaks during service life of gear boxes

² requires special measures

³ related to center of shaft journal

⁴ reduced values for nominal torque/nominal speed

⁵ for nominal speed and partial load

⁶ dependent on installation position

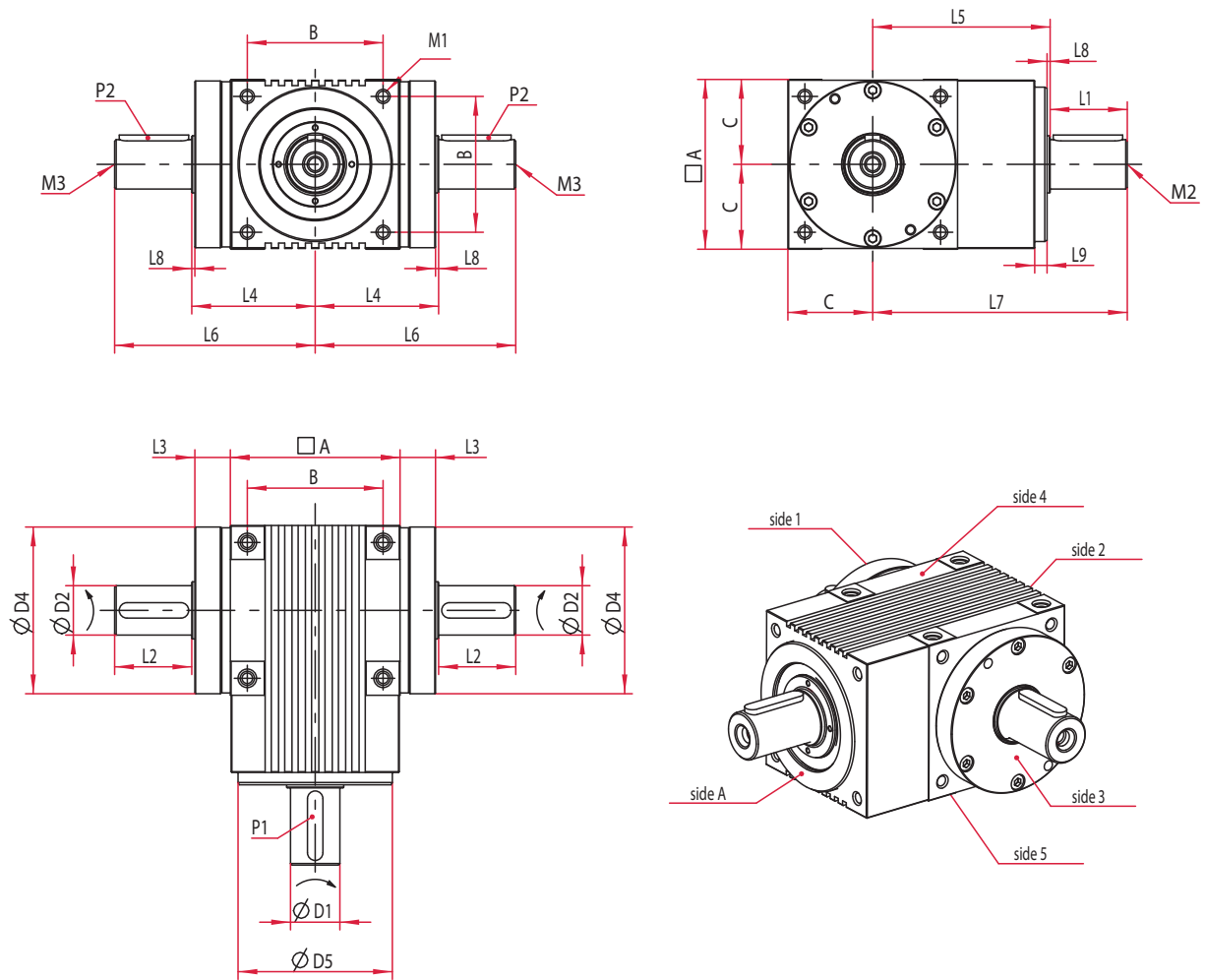
⁷ with output shaft design S13

⁸ related to the input shaft

Thermal limit rating

| | Abbreviation | Unit | BM075 | BM090 | BM110 | BM140 | BM170 | BM210 | BM240 | BM280 | |
|---|--------------------|------|-------|-------|---|-------|---------|---------|-------|-------|----|
| Thermal limit rating ⁹ | P _{therm} | kW | 5.0 | 7.5 | 11.0 | 18.0 | 26.5 | | | | |
| ⁹ at T2N, i = 1:1, RT=20°C and ED = 100% | | | | | | | | | | | |
| Definition: the thermal limit rating P _{therm} is the transferable output during continuous operation at a max. permissible oil bath temperature of 90 °C. The permissible limit values for the thermal limit rating for intermittent operation can be determined as reference values as a function of rotational speed n1 and ambient temperature by applying the correction factors given below. In this context the effective output must not exceed the permissible limit values. P _{therm, effective} < P _{therm, permissible} | | | | | Drive speed [rpm] | | 0.4*n1N | 0.7*n1N | n1N | | |
| | | | | | Correction factor K1 | | 1.0 | 0.8 | 0.5 | | |
| Example: Gear box Revolution speed ED Ambient | | | | | Switch-on time ED [%] correction factor K2 | | 100 | 80 | 60 | 40 | 20 |
| | | | | | 1.0 | | 1.2 | 1.4 | 1.6 | 1.8 | |
| Permissible thermal limit rating at: | | | | | Ambient temperature [°C] correction factor K3 | | 10 | 20 | 30 | 40 | 50 |
| P _{therm, permissible} = P _{therm} (BM140) x K1 x K2 x K3 = 18.0 kW x 0.8 x 1.2 x 0.8 = 13.8 kW | | | | | 1.20 | | 1.00 | 0.83 | 0.70 | 0.60 | |

Solid Shaft Design

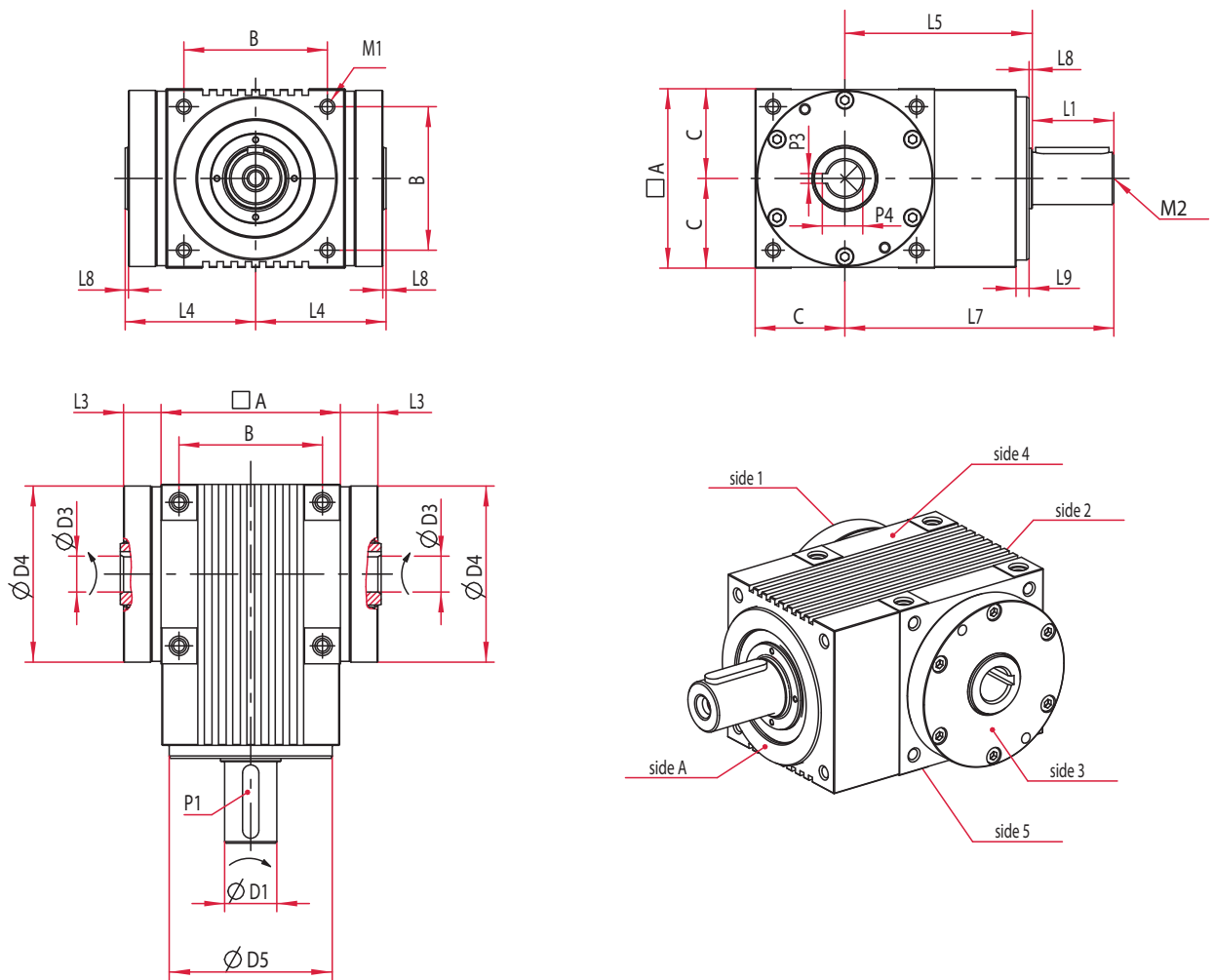


Solid Shaft Design (dimensions in mm)

| | BM075 | BM090 | BM110 | BM140 | BM170 | BM210 | BM240 | BM280 |
|--------|--------|--------|---------|---------|---------|------------------------|-------|-------|
| □ A | 75 | 90 | 110 | 140 | 170 | In process of planning | | |
| B | 60 | 72 | 88 | 110 | 134 | | | |
| C | 37.5 | 45 | 55 | 70 | 85 | | | |
| Ø D1 | 20 k6 | 25 k6 | 32 k6 | 40 k6 | 50 k6 | | | |
| Ø D2 | 20 k6 | 25 k6 | 32 k6 | 40 k6 | 50 k6 | | | |
| Ø D4 | 73 h7 | 88 h7 | 108 h7 | 135 h7 | 165 h7 | | | |
| Ø D5 | 67 g6 | 80 g6 | 100 g6 | 120 g6 | 128 g6 | | | |
| L1 | 35 | 40 | 50 | 60 | 80 | | | |
| L2 | 35 | 40 | 50 | 60 | 80 | | | |
| L3 | 18.5 | 18 | 23 | 25 | 30 | | | |
| L4 | 58 | 65 | 80 | 97 | 117 | | | |
| L5 | 90 | 100 | 115 | 145 | 175 | | | |
| L6 | 93 | 105 | 130 | 157 | 197 | | | |
| L7 | 125 | 140 | 165 | 205 | 255 | | | |
| L8 | 2 | 2 | 2 | 2 | 2 | | | |
| L9 | 6 | 8 | 8 | 8 | 10 | | | |
| P1 | 6x6x28 | 8x7x32 | 10x8x45 | 12x8x50 | 14x9x70 | | | |
| P2 | 6x6x28 | 8x7x32 | 10x8x45 | 12x8x50 | 14x9x70 | | | |
| M1 | M5x10 | M6x12 | M8x16 | M10x20 | M12x24 | | | |
| M2/M3* | M6 | M8 | M10 | M16 | M16 | | | |

* Thread in shaft end acc. to form DS, DIN 332

Hollow Shaft Design



Hollow Shaft Design (dimensions in mm)

| | BM075 | BM090 | BM110 | BM140 | BM170 | BM210 | BM240 | BM280 |
|------|--------|--------|---------|---------|---------|------------------------|-------|-------|
| □ A | 75 | 90 | 110 | 140 | 170 | In process of planning | | |
| B | 60 | 72 | 88 | 110 | 134 | | | |
| C | 37.5 | 45 | 55 | 70 | 85 | | | |
| Ø D1 | 20 k6 | 25 k6 | 32 k6 | 40 k6 | 50 k6 | | | |
| Ø D3 | 14 H7 | 18 H7 | 22 H7 | 32 H7 | 40 H7 | | | |
| Ø D4 | 73 h7 | 88 h7 | 108 h7 | 135 h7 | 165 h7 | | | |
| Ø D5 | 67 g6 | 80 g6 | 100 g6 | 120 g6 | 128 g6 | | | |
| L1 | 35 | 40 | 50 | 60 | 80 | | | |
| L3 | 18.5 | 18 | 23 | 25 | 30 | | | |
| L4 | 58 | 65 | 80 | 97 | 117 | | | |
| L5 | 90 | 100 | 115 | 145 | 175 | | | |
| L7 | 125 | 140 | 165 | 205 | 255 | | | |
| L8 | 2 | 2 | 2 | 2 | 2 | | | |
| L9 | 6 | 8 | 8 | 8 | 10 | | | |
| P1 | 6x6x28 | 8x7x32 | 10x8x45 | 12x8x50 | 14x9x70 | | | |
| P3 | 5 JS9 | 6 JS9 | 6 JS9 | 10 JS9 | 12 JS9 | | | |
| P4 | 16.3 | 20.8 | 24.8 | 35.3 | 43.3 | | | |
| M1 | M5x10 | M6x12 | M8x16 | M10x20 | M12x24 | | | |
| M2* | M6 | M8 | M10 | M16 | M16 | | | |

* Thread in shaft end acc. to form DS, DIN 332

EPPINGER precision gear boxes at a glance



Our product range includes besides **bevel-, hypoid-, planetary- and cycloidal gear boxes** also **special customized gear boxes and high precision gear technology**. With our **gear motors and integrated combinations of our gear box series** we extended our portfolio. The **compact mono-bloc design** as well as our maximum **gear quality** makes our solutions **unique**.

Ordering code

| | Type of gear box | Size | Type of shaft | Ratio |
|---|------------------|--|---|-------------|
| Example for ordering: BM110 S13 1:1 | BM | 075 090 110 140 170 (210) (240) (280) | S01 - Solid shaft side 1 S03 - Solid shaft side 3 S13 - Solid shaft sides 1+3 H13 - Hollow shaft sides 1+3 | $i = 1 : 1$ |
| Upon request: motor flange, different shaft dimensions, customized solutions, fittings,.... | | | | |
| Subject to change in design. We recommend technical clarification prior to ordering. | | | | |



EPPINGER 
PRECISION GEAR SOLUTIONS