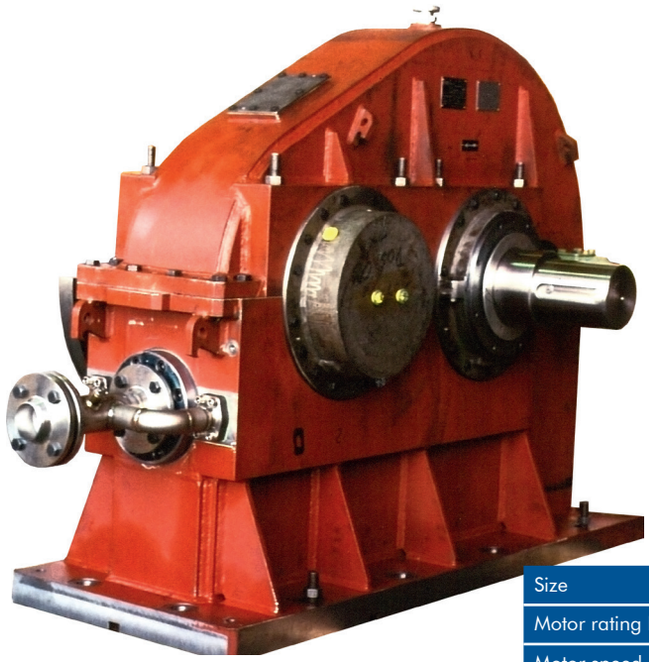
# Turbo gear drive systems

GearTec AG

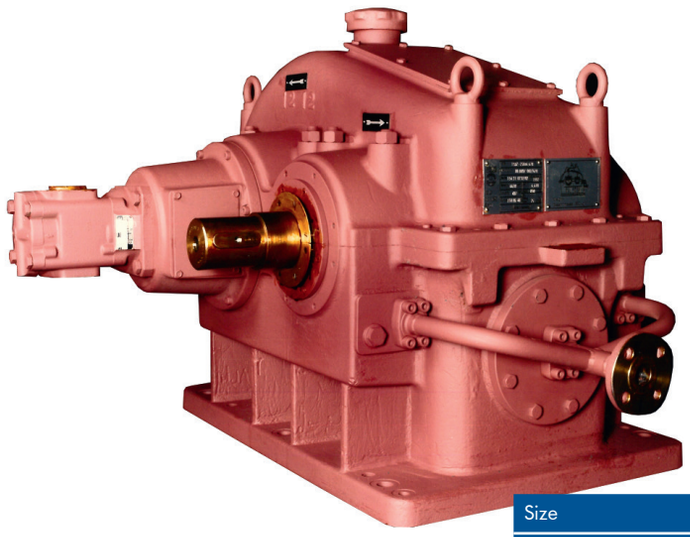
GEARTEC AG

# Turbo-Helical Gear Units

**References:**
**more than 1,000 units**



| Single-helical gear drive TSG 1 | |
|---|---|
| Size | 250 up to 1,050 |
| Motor rating P (kW) | 100 up to 4,400 |
| Motor speed $n_1$ (rpm) | 1,000 up to 3,600 |
| Output speed $n_2$ (rpm) | 4,500 up to 37,400 |
| Bearings fitted | plain journal bearings |
| Used for | oil and gas industry, compressor drive |



| Single-helical gear drive TSG 2 | |
|---|---|
| Size | 160 up to 800 (12 sizes available) |
| Motor rating P (kW) | 370 up to 30,000 |
| Motor speed $n_1$ (rpm) | 3,500 up to 15,000 |
| Output speed $n_2$ (rpm) | 1,000 up to 4,950 |
| Bearings fitted | plain journal bearings |
| Used for | power generation plant, steam turbine |

**General Specification**

The series „Turbo-Helical Gear Units" includes gear units in the range of centre distance of a=160 mm up to 800 m. The centre distances have been standardized according to standard numbers. The ratio range is between i = 1 and i = 8. Larger centre distances, larger ratios as well as centre distances deviating from the series of standard numbers can be realized as spezial designs on request.

**Gear Unit**

The gear units of this series can be designed as:

- gear units with single-helical gearing and end-thrust bearings on the pinion and gear shaft (tapered land or tilting pad design),
- gear units with double-helical gearing or single-helical gearing with thrust collar and gear side end-thrust bearing (tapered land or tilting pad design),
- special design: Gear units with single-helical gearing, with gear hollow shaft, and integrated torsional shaft as well as end-thrust bearings on the pinion and gear shaft (tapered land or tilting pad design),
- special design: Gear units with single-helical gearing, with pinion and gear hollow shaft, and integrated torsional shafts as well as gear side end-thrust bearing (tapered land or tilting pad design).

The housings of the gear units are designed in three different ranges depending on the ratio.

**Housing**

Torsionally rigid housings with massive ribs consist of cast iron. They are so designed as to minimize vibrations and to ensure a very silent running. The housings can be designed as welded construction on costumers request. From a centre distance of a = 560 upwards, the housings are equipped with an oil sump in order to limit the vertical expansion caused by the oil heating. All housings have got inspection apertures, exausters, lifting facilities , and mounting surfaces for alignment.

**Gearing**

The pinion shafts and gears consist of alloyed case-hardening steels, the gearing is case-hardened and ground as well as optimized with regard to its geometry according to the respective use. In case of need, the gearings are corrected in order to compensate sags/deformations and to optain an optimum contact pattern under full load conditions.

**Bearing**

For the shaft bearing there are usually used heavy-duty sliding bearings divided into two. Here circular cylindrical, lobe- or tilting pad type bearings are intended depending on the operating conditions. The axial forces are taken by axial collars on the radial bearings or by separate end-thrust bearings.

**Lubrication and Cooling**

In principle there has been intended a pressure circulating lubrication in order to supply points of tooth engagement and bearings as well as to ensure the heat removal. The pressure circulating lubrication can be realized by flanged oil pump, separate lube-system or by connecting the gear unit to the available supply systems.

**Shafts**

Non-toothed shafts are made of steel highly hardened and tempered. The basic units are dynamically balanced according to the requirements on the running qualities of the turbo-helical gear units. The shaft journals can be supplied as a cylindrical, taper or a flange design.

**Monitoring**

The gear units are equipped with machine thermometers attached to the bearings according to standard. The furnishing of the gear units with further monitoring devices or the establishment of connection facilities for control of the oil pressure, oil temperature, bearing temperature, shaft vibration, axial vibrations etc. are possible.

**Design**

In particular the rationally symmetrical components are specifically optimized for the respective use by means of the application of CAD. For the gearing design there can be fulfilled the general national and international regulations of design (DIN, AGMA, API, classification societies etc.). The design of the sliding bearings is carried out on the basis of the theory of hydrodynamic lubrication. Special calculation methods (e. g. FEM ) can be used for critical basic units and selected problems.

**Sealings**

The packing of the shaft outlets is realized by means of non-contacting labyrinth seals.

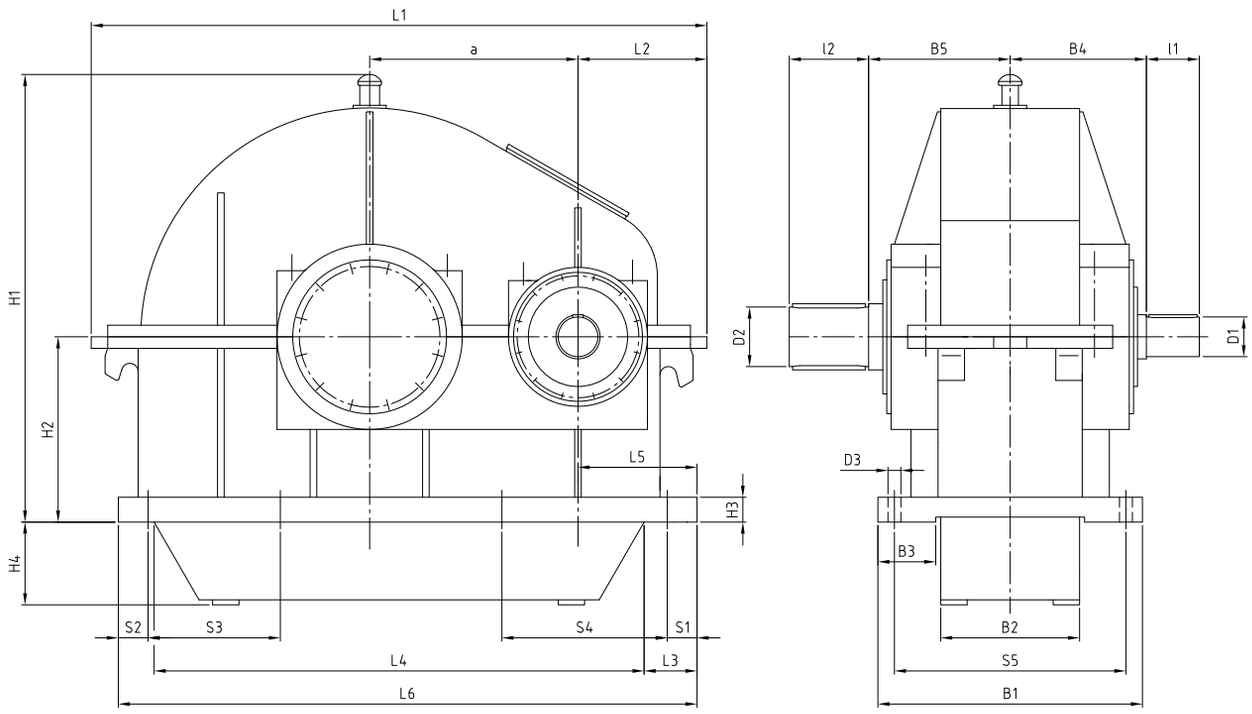
**Additional Equipment**

Additional equipment such as couplings, coupling claddings, rotor barring gears, soft starters, pumps, lube systems etc. belong to the scope of delivery on costumer's request.

**Test Stand Running**

On the test stand there can be simulated conditions similar to the operation and is ensured an extensive control of all component including acquisition of measuring values. The general representation of the gear unit is not strictly binding. The weights given in the tables are averages (without oil filling) and are subject to the technical development. This also refers to the dimensions.

**Main Dimensions**

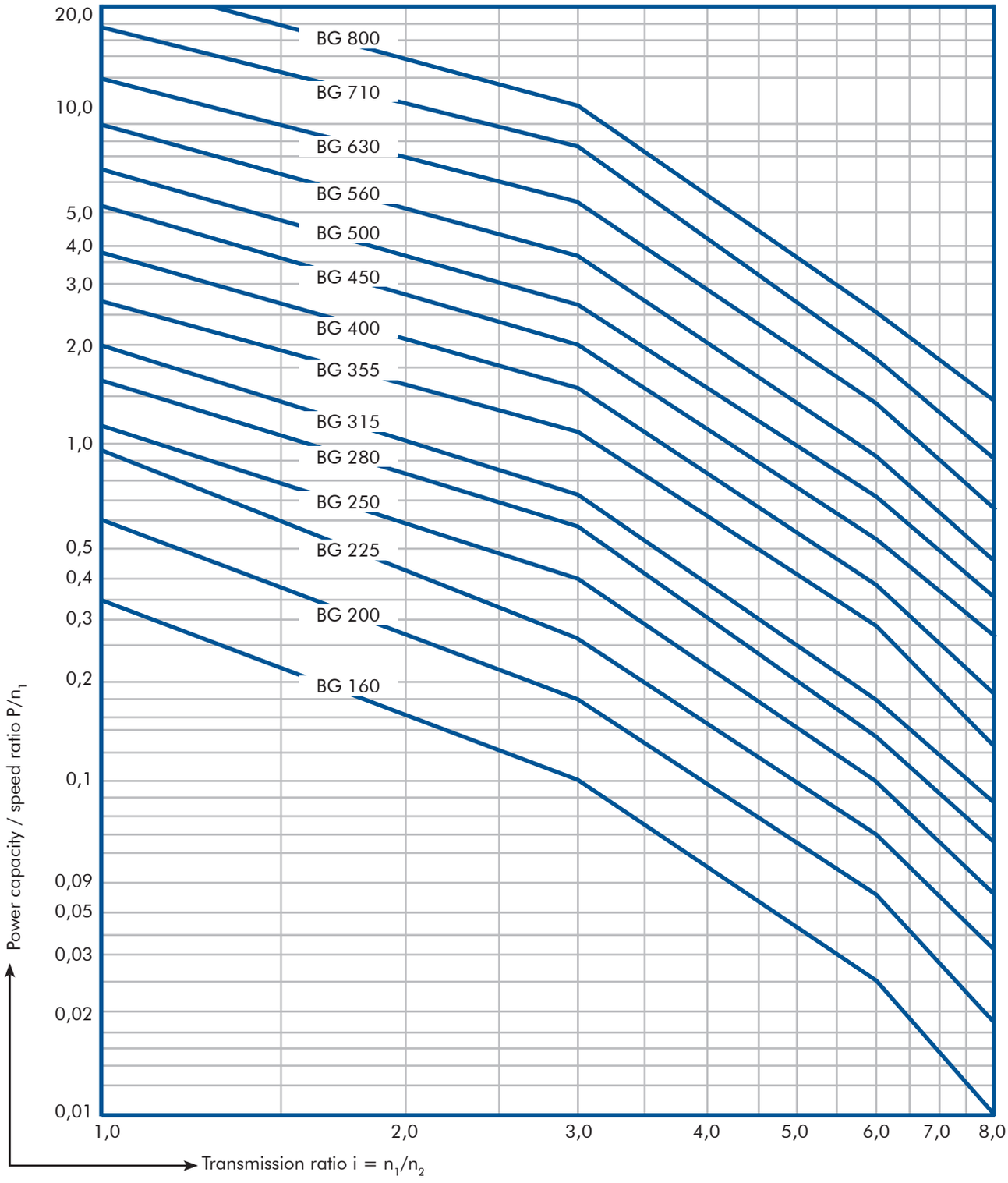


| BG | i* | a | D1 | l1 | D2 | l2 | L1 | L2 | L3 | L4 | L5 | L6 | B1 | B2 | B3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | | 80 | 170 | 90 | 170 | 630 | 250 | | | 250 | 550 | 535 | | 105 |
| **160** | 2 | 160 | 45 | 110 | 80 | 170 | 570 | 190 | - | - | 190 | 500 | 380 | - | 85 |
| | 3 | | 28 | 60 | 60 | 140 | 555 | 175 | | | 175 | 480 | 320 | | 75 |
| | 1 | | 90 | 170 | 100 | 210 | 750 | 270 | | | 270 | 620 | 580 | | 110 |
| **200** | 2 | 200 | 55 | 110 | 80 | 170 | 700 | 220 | - | - | 220 | 600 | 490 | - | 85 |
| | 3 | | 40 | 110 | 65 | 140 | 640 | 180 | | | 180 | 560 | 350 | | 80 |
| | 1 | | 100 | 210 | 110 | 210 | 850 | 290 | | | 290 | 700 | 630 | | 125 |
| **225** | 2 | 225 | 65 | 140 | 100 | 210 | 765 | 235 | - | - | 235 | 650 | 530 | - | 125 |
| | 3 | | 40 | 110 | 80 | 170 | 720 | 200 | | | 200 | 615 | 430 | | 105 |
| | 1 | | 110 | 210 | 130 | 250 | 880 | 300 | | | 300 | 780 | 740 | | 150 |
| **250** | 2 | 250 | 90 | 170 | 110 | 210 | 820 | 240 | - | - | 240 | 720 | 620 | - | 150 |
| | 3 | | 55 | 110 | 90 | 170 | 795 | 215 | | | 215 | 690 | 520 | | 140 |
| | 1 | | 140 | 250 | 160 | 300 | 910 | 315 | | | 315 | 8800 | 750 | | 135 |
| **280** | 2 | 280 | 85 | 170 | 125 | 210 | 880 | 255 | - | - | 255 | 740 | 630 | - | 135 |
| | 3 | | 50 | 110 | 100 | 201 | 855 | 220 | | | 220 | 715 | 560 | | 135 |
| | 1 | | 140 | 250 | 160 | 300 | 1,005 | 340 | | | 340 | 900 | 850 | | 170 |
| **315** | 2 | 315 | 110 | 210 | 140 | 250 | 960 | 265 | - | - | 265 | 820 | 650 | - | 135 |
| | 3 | | 65 | 140 | 125 | 210 | 945 | 230 | | | 230 | 810 | 600 | | 135 |
| | 1 | | 160 | 300 | 180 | 300 | 1,085 | 360 | | | 360 | 950 | 850 | | 155 |
| **355** | 2 | 355 | 100 | 210 | 160 | 300 | 1,040 | 270 | - | - | 270 | 890 | 680 | - | 130 |
| | 3 | | 65 | 140 | 130 | 250 | 1,025 | 240 | | | 240 | 845 | 600 | | 130 |
| | 1 | | 180 | 300 | 220 | 350 | 1,210 | 380 | | | 380 | 1,120 | 1,020 | | 220 |
| **400** | 2 | 400 | 110 | 210 | 180 | 300 | 1,160 | 290 | - | - | 290 | 1,030 | 760 | - | 150 |
| | 3 | | 70 | 140 | 140 | 250 | 1,140 | 245 | | | 245 | 990 | 630 | | 125 |
| | 1 | | 200 | 350 | 240 | 410 | 1,300 | 415 | | | 415 | 1,180 | 1,140 | | 235 |
| **450** | 2 | 450 | 125 | 210 | 210 | 350 | 1,280 | 310 | - | - | 310 | 1,110 | 850 | - | 170 |
| | 3 | | 80 | 170 | 160 | 300 | 1,250 | 260 | | | 260 | 1,050 | 730 | | 170 |
| | 1 | | 210 | 350 | 250 | 410 | 1,470 | 430 | | | 430 | 1,270 | 1,180 | | 235 |
| **500** | 2 | 500 | 140 | 250 | 220 | 350 | 1,400 | 320 | - | - | 320 | 1,180 | 860 | - | 170 |
| | 3 | | 90 | 170 | 200 | 350 | 1,370 | 265 | | | 265 | 1,170 | 710 | | 150 |
| | 1 | | 220 | 350 | 280 | 470 | 1,575 | 465 | | 1,110 | 465 | 1,450 | 1,300 | 830 | 150 |
| **560** | 2 | 560 | 160 | 300 | 250 | 410 | 1,510 | 340 | 175 | 950 | 340 | 1,300 | 940 | 620 | 100 |
| | 3 | | 100 | 210 | 200 | 350 | 1,485 | 275 | | 950 | 275 | 1,300 | 770 | 500 | 100 |
| | 1 | | 240 | 410 | 320 | 470 | 1,810 | 520 | | 1,300 | 520 | 1,620 | 1,400 | 915 | 200 |
| **630** | 2 | 630 | 160 | 300 | 280 | 470 | 1,720 | 380 | 160 | 1,240 | 380 | 1,560 | 1,040 | 715 | 120 |
| | 3 | | 100 | 210 | 210 | 350 | 1,680 | 330 | | 1,210 | 330 | 1,530 | 880 | 580 | 120 |
| | 1 | | 280 | 470 | 340 | 550 | 2,020 | 610 | | 1,600 | 610 | 1,900 | 1,530 | 980 | 200 |
| **710** | 2 | 710 | 220 | 350 | 320 | 470 | 1,920 | 430 | 150 | 1,540 | 430 | 1,840 | 1,300 | 780 | 170 |
| | 3 | | 125 | 210 | 250 | 410 | 1,870 | 350 | | 1,350 | 350 | 1,650 | 930 | 580 | 130 |
| | 1 | | 280 | 470 | 380 | 550 | 2,200 | 625 | | 1,770 | 625 | 2,000 | 1,620 | 1,105 | 300 |
| **800** | 2 | 800 | 210 | 350 | 360 | 550 | 2,115 | 455 | 115 | 1,720 | 455 | 1,950 | 1,330 | 890 | 260 |
| | 3 | | 125 | 210 | 260 | 410 | 1,050 | 370 | | 1,660 | 370 | 1,890 | 960 | 660 | 120 |

Note: D1, l1, D2, l2 are maximum values which are matched to the couplings used. Shaft ends according to DIN 6885.

| BG | i* | a | B4 | B5 | H1 | H2 | H3 | H4 | S1 | S2 | S3 | S4 | S5 | D3 | m (t) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | | 280 | 280 | | | | | | | | | 490 | 18 | 0.4 |
| **160** | 2 | 160 | 205 | 205 | 500 | 250 | 25 | - | 60 | - | 200 | - | 335 | | 0.3 |
| | 3 | | 175 | 175 | | | | | | | | | 290 | 14 | 0.2 |
| | 1 | | 330 | 330 | | | | | | | | | 520 | 22 | 0.6 |
| **200** | 2 | 200 | 260 | 260 | 590 | 300 | 32 | - | 75 | 75 | 210 | - | 430 | | 0.5 |
| | 3 | | 195 | 195 | | | | | | | | | 300 | 18 | 0.3 |
| | 1 | | 560 | 560 | | | | | | | | | 570 | 22 | 0.8 |
| **225** | 2 | 225 | 280 | 280 | 650 | 315 | 36 | - | 75 | 75 | 260 | - | 470 | | 0.5 |
| | 3 | | 235 | 235 | | | | | | | | | 380 | 18 | 0.4 |
| | 1 | | 410 | 410 | | | | | | | | | 690 | | 1 |
| **250** | 2 | 250 | 310 | 310 | 715 | 355 | 40 | - | 75 | 75 | 300 | - | 570 | 22 | 0.8 |
| | 3 | | 245 | 245 | | | | | | | | | 490 | | 0.6 |
| | 1 | | 415 | 415 | | | | | | | | | 690 | | 1.4 |
| **280** | 2 | 280 | 330 | 330 | 770 | 400 | 45 | - | 90 | 90 | 280 | - | 570 | 26 | 1 |
| | 3 | | 270 | 270 | | | | | | | | | 500 | | 0.8 |
| | 1 | | 468 | 468 | | | | | | | | | 790 | | 2 |
| **315** | 2 | 315 | 365 | 365 | 850 | 450 | 50 | - | 90 | 90 | 340 | - | 590 | 26 | 1.5 |
| | 3 | | 290 | 290 | | | | | | | | | 540 | | 1 |
| | 1 | | 465 | 465 | | | | | | | | | 780 | | 2.3 |
| **355** | 2 | 355 | 365 | 365 | 950 | 500 | 55 | - | 100 | 100 | 375 | - | 610 | 33 | 1.6 |
| | 3 | | 300 | 300 | | | | | | | | | 530 | | 1.3 |
| | 1 | | 580 | 585 | | | | | | | | | 970 | | 3.4 |
| **400** | 2 | 400 | 440 | 440 | 1,025 | 525 | 60 | - | 130 | 130 | 450 | - | 680 | 33 | 2.3 |
| | 3 | | 355 | 355 | | | | | | | | | 550 | | 1.8 |
| | 1 | | 630 | 630 | | | | | | | | | 1,050 | | 4.7 |
| **450** | 2 | 450 | 460 | 460 | 1,100 | 560 | 65 | - | 120 | 120 | 450 | - | 760 | 39 | 3.1 |
| | 3 | | 365 | 365 | | | | | | | | | 640 | | 2.3 |
| | 1 | | 650 | 650 | | | | | | | | | 1,090 | | 4.7 |
| **500** | 2 | 500 | 490 | 490 | 1,200 | 630 | 70 | - | 130 | 130 | 475 | - | 770 | 39 | 4.1 |
| | 3 | | 395 | 395 | | | | | | | | | 620 | | 3.2 |
| | 1 | | 710 | 710 | | | | | | | 450 | 425 | 1,200 | | 7.1 |
| **560** | 2 | 560 | 560 | 560 | 1,150 | 500 | 70 | 250 | 150 | 150 | 425 | 300 | 840 | 39 | 5.5 |
| | 3 | | 415 | 415 | | | | | | | 480 | 235 | 670 | | 3.7 |
| | 1 | | 760 | 760 | | | | | | | 500 | 520 | 1,300 | | 9.6 |
| **630** | 2 | 630 | 580 | 580 | 1,260 | 560 | 75 | 250 | 140 | 140 | 580 | 380 | 940 | 45 | 7 |
| | 3 | | 450 | 450 | | | | | | | 620 | 320 | 780 | | 5 |
| | 1 | | 825 | 825 | | | | | | | 700 | 700 | 1,430 | | 13.2 |
| **710** | 2 | 710 | 710 | 710 | 1,350 | 560 | 80 | 300 | 150 | 150 | 800 | 500 | 1,200 | 45 | 12 |
| | 3 | | 495 | 495 | | | | | | | 650 | 350 | 830 | | 6.7 |
| | 1 | | 880 | 800 | | | | | | | 640 | 640 | 1,520 | | 16.1 |
| **800** | 2 | 800 | 735 | 735 | 1,470 | 630 | 90 | 300 | 160 | 160 | 730 | 450 | 1,230 | 45 | 14 |
| | 3 | | 530 | 530 | | | | | | | 760 | 360 | 880 | | 8.2 |

Dimensions are subject to the technical development. Ratio range: i*=1 for 1.10 i 2.8; i*=2 for 2.8 i 5.6; i*=3 for 5.6 i 8.0




P - Nominal power of the driving machinery (kW)

$n_1$ - Speed of the high-speed shaft ($min^{-1}$)

$n_2$ - Speed of the low-speed shaft ($min^{-1}$)

| a i | 1.12 | 2.8 | 3.15 | 5.6 | 6.3 | 8 |
|---|---|---|---|---|---|---|
| 160 | 19.1 | | | 20 | | |
| 200 | 19.1 | | | 20 | | |
| 225 | 17.3 | 19.1 | | 20 | | |
| 250 | 13.6 | 17.3 | 19.1 | | 20 | |
| 280 | 11.2 | 15.2 | 19.1 | | 20 | |
| 315 | 10.8 | 13.6 | 15.2 | | 20 | |
| 355 | 10.6 | 13 | 14 | | 20 | |
| 400 | 9.5 | 10.6 | 12.5 | 17.3 | 20 | |
| 450 | 8.5 | 9.5 | 11.9 | 16.2 | 19.1 | 20 |
| 500 | 8 | 9 | 10 | 15.2 | 17.3 | 20 |
| 560 | 7.6 | 8.5 | 9.5 | 13.6 | 15.2 | 19.1 |
| 630 | 7.2 | 8 | 9.5 | 11.9 | 13.6 | 15.2 |
| 710 | 6.3 | 7 | 7.6 | 10.8 | 11.9 | 13.5 |
| 800 | 5.8 | 6.5 | 7 | 9.5 | 10.5 | 11.5 |

Maximum pemissible speeds on the high-speed shaft $n_1$ (1,000 $min^{-1}$ )

Remark:
Power diagramm and speed table apply to the standard design and are useful for the preselection of the gearing size. In case of selecting an optimum size, of critical conditions, and of speed exeeding we ask for your inquiry.

Example for Ordering:
Turbo-Helical Gear Unit with single-helical gearing Size 355
Ratio i = 3.15
**TSG 1-355x3.15**

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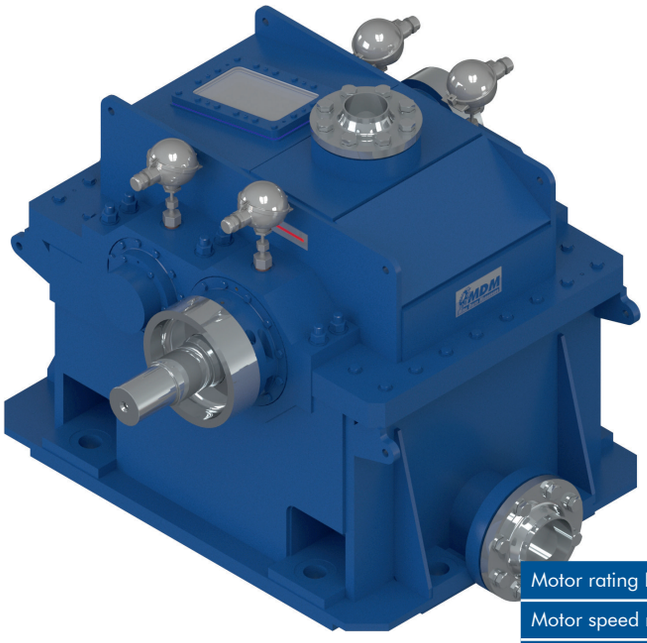
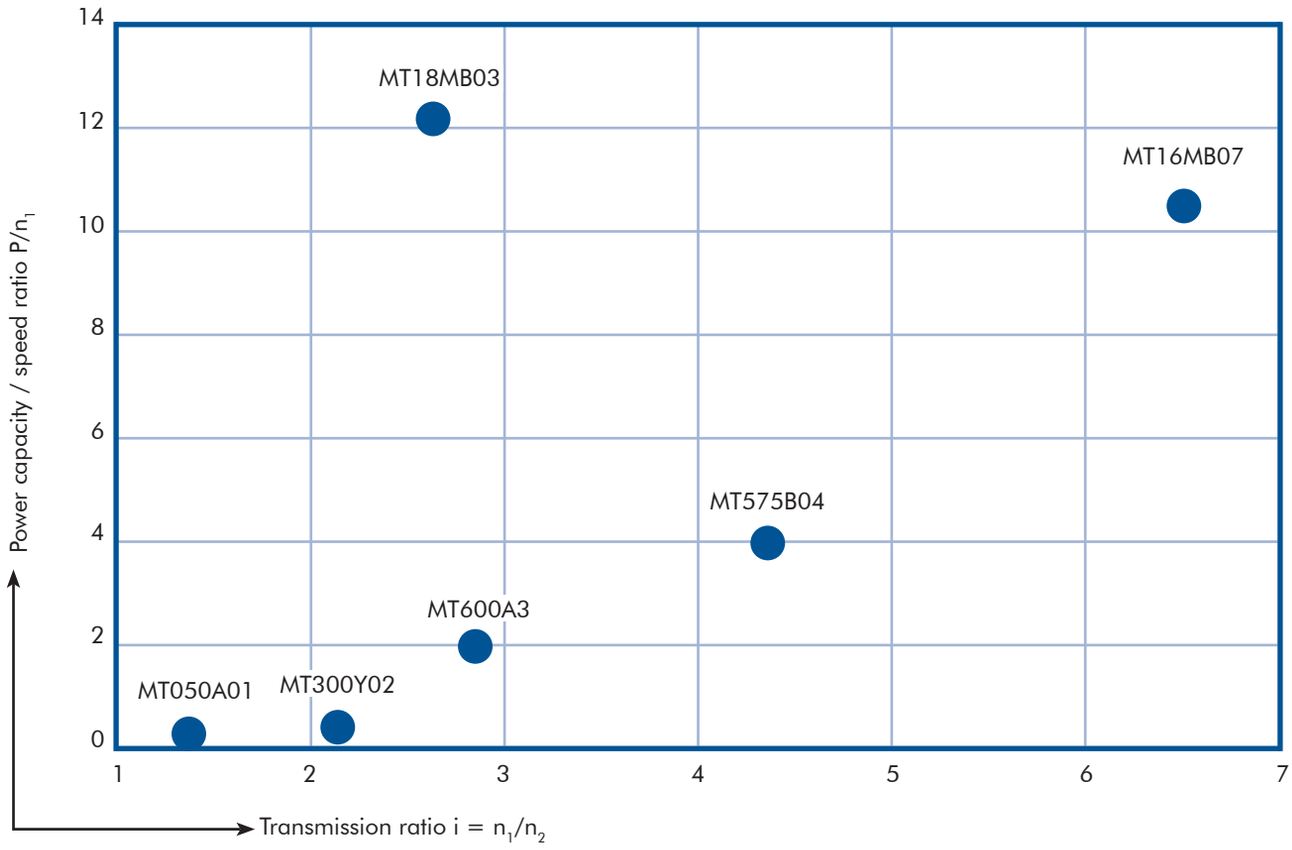


| | Gear drive MT300Y02 |
|---|---|
| Motor rating P (kW) | 3,000 |
| Motor speed $n_1$ (rpm) | 8,545.5 |
| Transmission ratio i | 2.152 |
| Output speed $n_2$ (rpm) | 18,385.70 |
| Output torque (kNm) | 1.56 |
| Bearings fitted | plain journal bearings |
| Weight (kg) | approx. 900 |
| Used for | oil and gas industry |

| | Gear drive MT600A03 |
|---|---|
| Motor rating P (kW) | 6,000 |
| Motor speed $n_1$ (rpm) | 3,000 |
| Transmission ratio i | 2.848 |
| Output speed $n_2$ (rpm) | 8,545,50 |
| Output torque (kNm) | 6.71 |
| Bearings fitted | plain journal bearings |
| Weight (kg) | approx. 2,500 |
| Used for | oil and gas industry |

| | MT575B04 | MT18MB03 | MT16MB07 | MT050A01 | MT300Y02 | MT600A03 |
|---|---|---|---|---|---|---|
| Nominal power P (kW) | 5,750 | 18,200 | 15,700 | 500 | 3,000 | 6,000 |
| Transmission ratio i | 4.353 | 2.641 | 6.515 | 1.38 | 2.15 | 2.85 |
| Revolutions at Input shaft $n_1$ ($min^{-1}$) | 1,450 | 1,500 | 1,500 | 2,975 | 8,546 | 3,000 |
| Revolutions at Output shaft $n_2$ ($min^{-1}$) | 6,312 | 3,962 | 9,773 | 4,106 | 18,386 | 8,546 |
| Service factor $K_A$ | 1.59 | 1.66 | 1.71 | - | 1.8 | 1.8 |
| Motor rating $P/n_1$ | 3.966 | 12.133 | 10.467 | 0.168 | 0.351 | 2 |




Example:

The gear drives MT300Y02 and MT600A03 are an alternative set of gearboxes for compressor stations with the following technical characteristics:

Mass capacity kg/f: 9.53 (9.73)

Volume capacity at suction conditions $m^3$/min: 355 (345)

Final gas pressure MPa: 3.82

Gas density kg/$m^3$: 0.83 (0.913)

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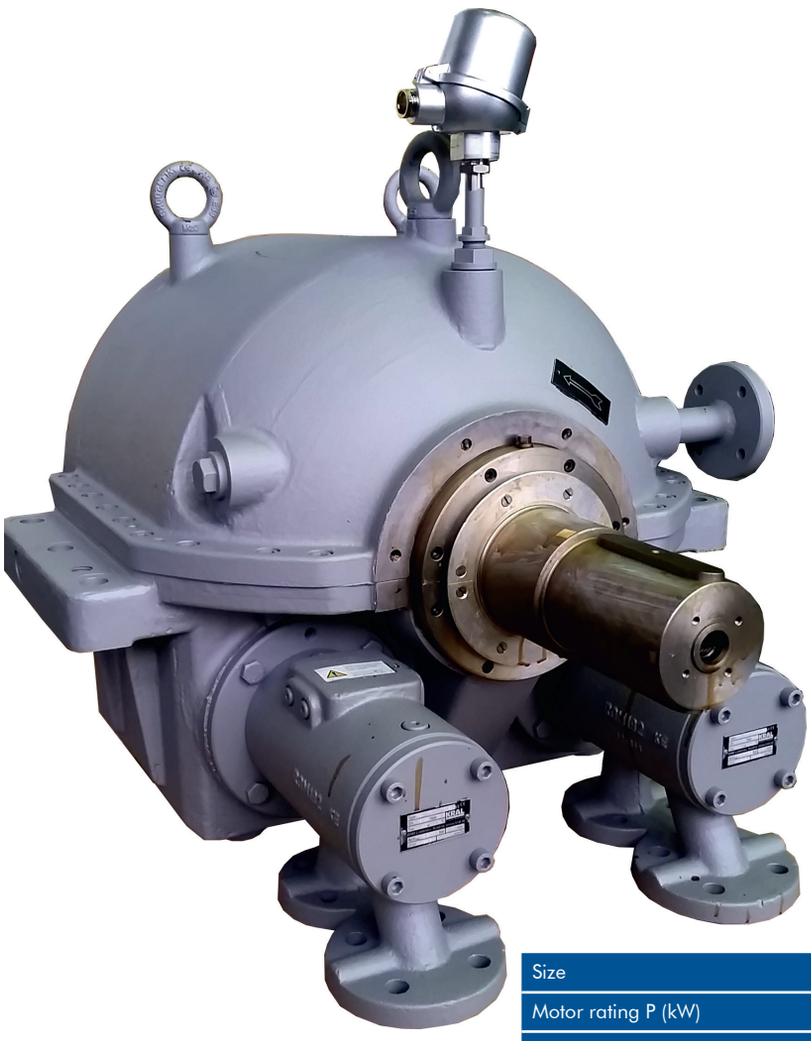
# Turbo-Planetary Gear Units

**References:**
**more than 2,000 units**



| | Planetary gear drive TPG (HUG) - type A/B |
|---|---|
| Size | 16 up to 50 (8 sizes available) |
| Motor rating P (kW) | 1,600 up to 12,500 |
| Motor speed $n_1$ (rpm) | 276 up to 6,300 |
| Output speed $n_2$ (rpm) | 1,500 up to 20,000 |
| Bearings fitted | plain journal bearings |
| Used for | power generation plant, steam turbine |

**General Specification**

The turbo-planetary gear unit are produced as types A and B in eight sizes.The type A is provided with rotaring planet carrier, the output shaft and the drive shaft have the same senses of rotation. In the case of the type - provided with fixed planet carrier the output shaft and the drive shaft have opposite senses of rotation. The two types may be used for both the increase and the reduction of the speed. These single-stage turbo-planetary gear unit are mounted, above all in the driving units of centrifugal compressors, generators, turbines and pumps.

**Gear Uni**ts

The erection of the gear units can be realized by centre suspension as well as by means of a food-mounted design. On the gear side of the slow-speed shaft there can be mounted auxiliary drives, e.g. for speedometers, controlle and pumps.
The gear unit should be mounted on a rugged, flat, torsionally stiff foundation which cannot be displaced, the minimum natural frequency of which exceeds considerably the maximum forcing frequency of the gear unit. If the gear unit shall be mounted on a deep foundation, the manufacturing enterprise will inform, on special request, about its functional forcing frequency.

**Housing**

The casings are made of cast iron. The housings are so designed as to minimize vibrations and to ensure a silent running. All housings are equipped with lifting facilities and mounting surfaces for alignment.

**Gearing**

All the power transmission elements of the gear unit have been made of case-hardened and heat-treated steels. The tooth profiles of the sun pinions and the planet wheels are protuberance toothed, case-hardened and ground. The sun gear and the internally toothed coupling parts are slotted and nitrided.

**Bearing**

The planet wheels and the shafts are running in special sliding bearings. All bearing points consist of cast white metal.

**Lubrication**

The tooth action points and the bearings are lubricated with the help of a pressure oil circulation system. On special request, one ore two oil pumps can be mounted to the gear unit side where the slowly running shaft is installed. Necssary oil pressure at the oil inlet of the reducer: 0.25 MPa for minimum
Oil inlet temperature: 40 °C up to 45 °C
Maximum oil outlet temperature: 80 °C
The reducers should be equipped with a collecting tank for the lubricating oil and a heat exchanger for cooling.
For lubrication an oil of high resistance to pressure and ageing should be used offering the properties to follow.

**Shafts**

Shafts are made of steel hardened and tempered. At the high-speed shaft the turbo-planetary gear unit must only be coupled with machines of which the radial bearing of their shafts is well defined. The high speed shaft end $d_1$ cannot be loaded by radial forces. Axial movement resulting from the thermal expansion are taken up. The axial movement must not exceed 3.5 mm. Additional external forces are inadmissible. The slowly running shaft $d_2$ cannot be loaded by radial forces with the exception of such ones resulting from alignment tolerances. The alignment error must not exceed the value stated in the operating instructions.

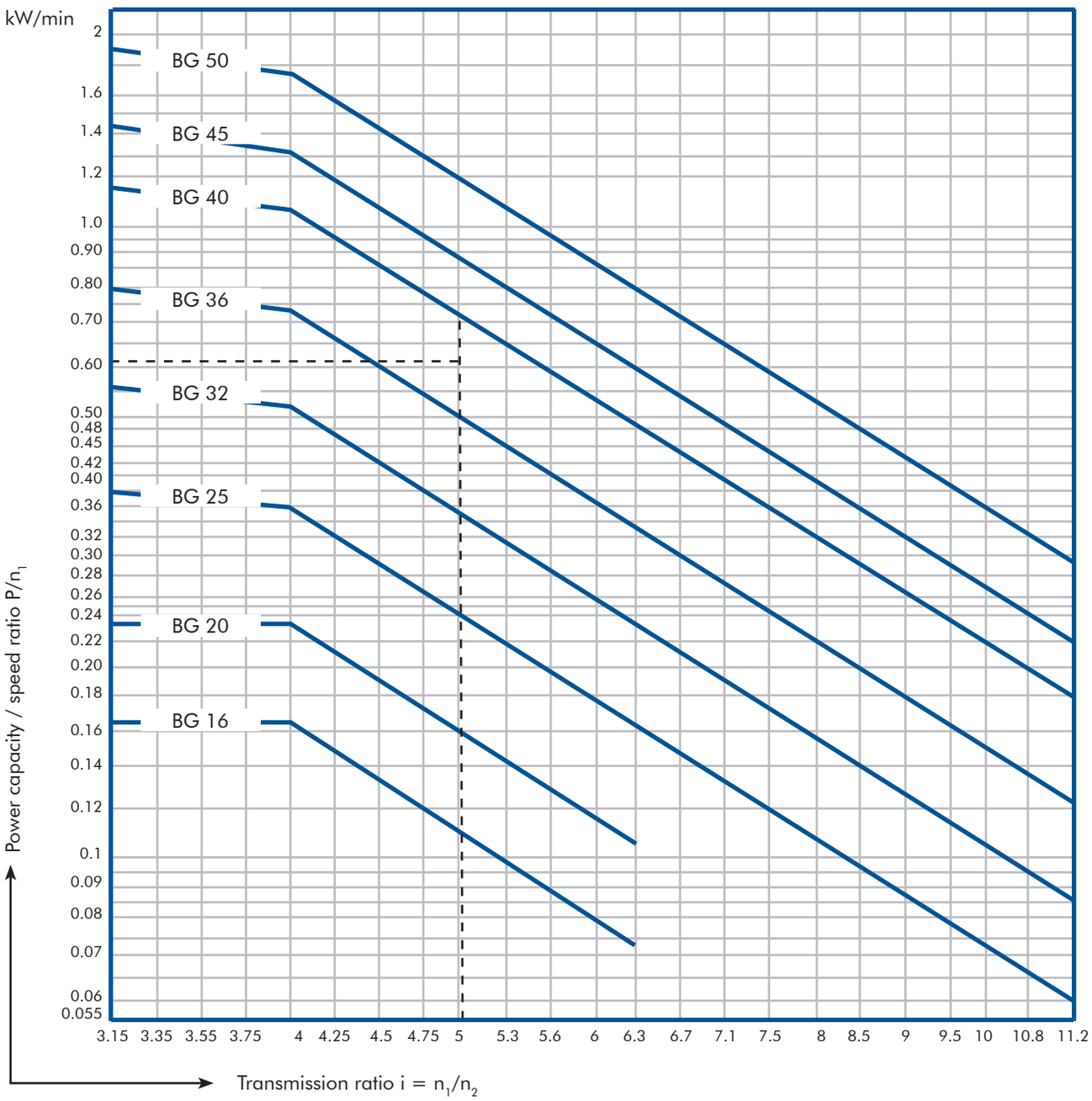
**Power Capacity Characteristics for the Determination of the size**

The power capacity characteristics of Diagrams 1 and 2 for the power capacity/speed ratio on the shaft $d_1$ are valid for uninterrupted, shockless continous operation.

During starting the twofold torque may be transmitted.

In case of varying operational conditions as well as when operating in the part load range the manufacturing enterprise should be consulted. When using synchronous motors as driving units the manufacturing enterprise should be consulted with regard to the starting operation.

# Power Capazity characteristic for the determination of the sizes A and AM - Diagramm 1




Maximum admissible speed of the shaft d2:

$n_2$ = 1,800 rpm for the sizes A 16 up to A 36 and AM up to AM 36

$n_2$ =1,800 rpm for the sizes A 40 and AM 40 i = 6

$n_2$ =1,500 rpm for the sizes A 40 and AM 40 i = 6

$n_2$ =1,500 rpm for the sizes A 45 and A 40, AM 45 and AM 50

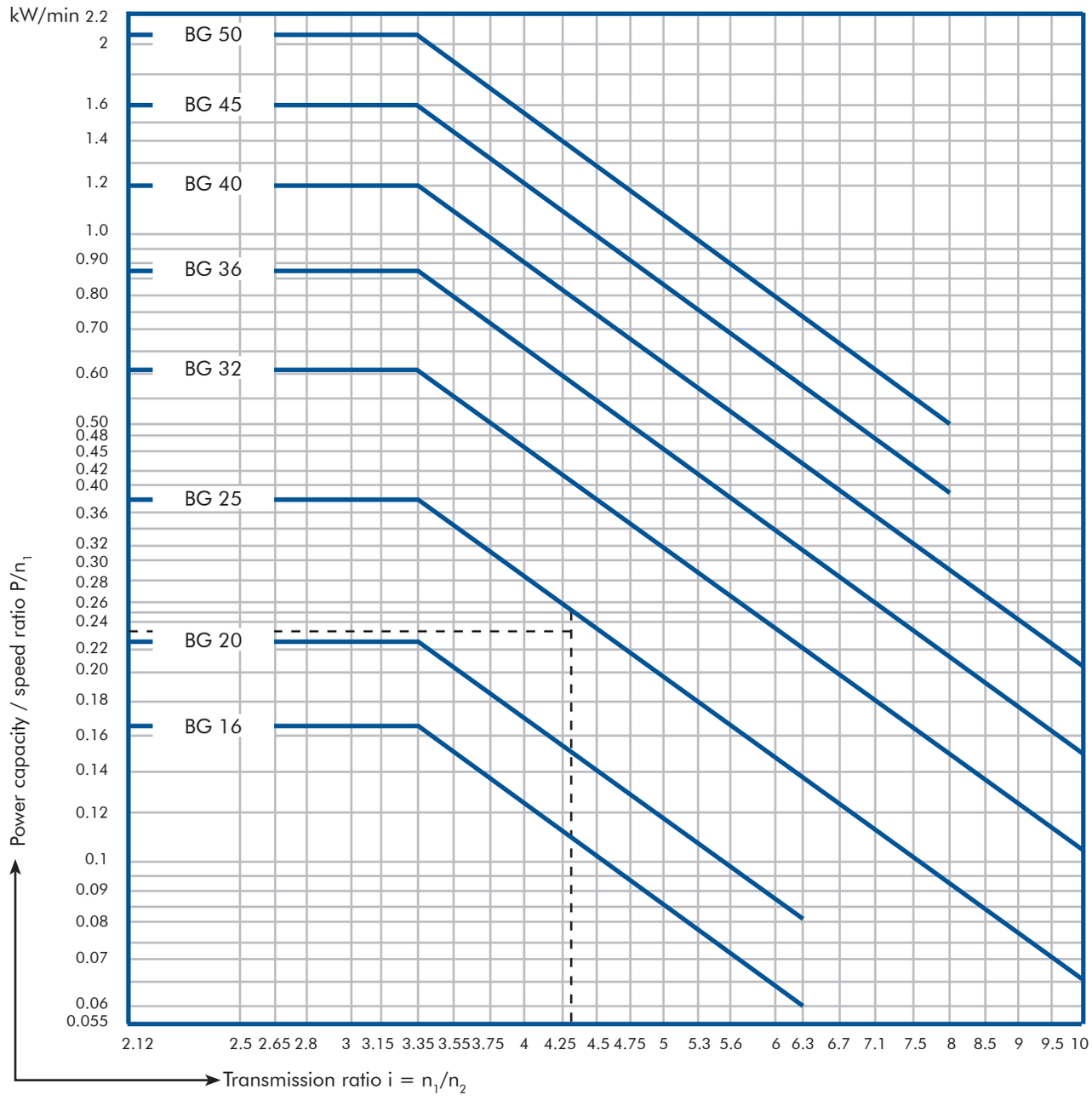
Higher speeds on request.

The transmission ratios 3.15; 4; 5; 6.3; 8; 10; 11.2 are nominal transmission ratios with a tolerance of ±3%

Other transmission ratios may be agreed upon with the manufacturing enterprise.

Example: P = 4,500 kW; $n_1$ = 7,500 rpm.; $n_2$ = 1,500 rpm.;
size A 40 or AM 40

## Power Capazity characteristic for the determination of the sizes B and BM - Diagramm 2




Maximum admissible speed of the shaft d2:

$n_2$ = 3,600 rpm for the sizes B 16 up to B 40 and BM 16 up to BM 40

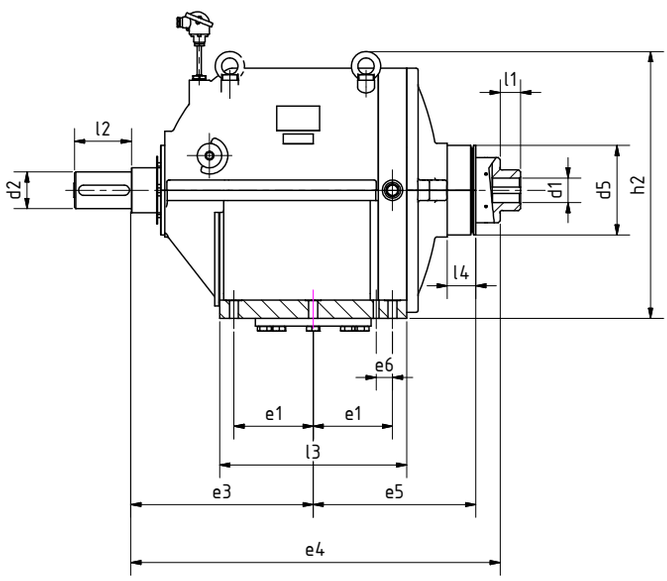
$n_2$ =1,800 rpm for the sizes B 45 up to B 50 as well as BM 45 and BM 50

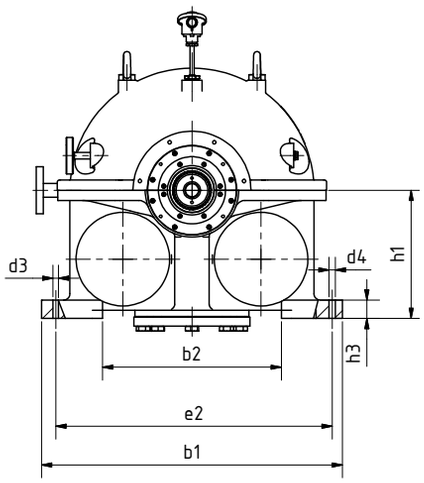
Higher speeds on request.

The transmission ratios 2.12; 2.5; 3.15; 4; 5; 6.3; 8; 10 are nominal transmission ratios with a tolerance of ±3%

Other transmission ratios may be agreed upon with the manufacturing enterprise.

Example: P = 3,000 kW; $n_1$ = 13,000 rpm.; $n_2$ = 3,000 rpm.;
size B 25 or BM 25




| Sizes | | | | | | | | | | | | | | | | | | Weight kg | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| A | B | $b_1$ | $b_2$ | $d_3$ | $d_4$ | $d_5$, $g_6$ | $e_1$ | $e_2$ | $e_3$ | $e_4$ | $e_5$ | $e_6$ | $h_1$ -1.0 | $h_2$ | $h_3$ | $l_3$ | $l_4$ | A | B |
| 16 | - | 600 | 300 | 22 | 16 | 240 | 140 | 540 | 340 | 625 | 315 | 60 | 265 | 586 | 35 | 350 | 70 | 380 | - |
| 20 | 16 | 650 | 350 | 22 | 16 | 240 | 165 | 580 | 420 | 705 | 320 | 60 | 280 | 626 | 40 | 400 | 70 | 490 | 410 |
| 25 | 20 | 740 | 440 | 22 | 16 | 220 | 195 | 670 | 447 | 887 | 400 | 60 | 315 | 656 | 45 | 460 | 70 | 680 | 650 |
| 32 | 25 | 820 | 500 | 26 | 16 | 220 | 220 | 740 | 475 | 955 | 490 | 60 | 355 | 715 | 50 | 520 | 70 | 880 | 840 |
| 36 | 32 | 900 | 540 | 33 | 25 | 360 | 255 | 810 | 472 | 975 | 510 | 75 | 400 | 815 | 55 | 600 | 800 | 1.250 | 1.050 |
| 40 | 36 | 1,000 | 600 | 33 | 25 | 360 | 270 | 900 | 560 | 1,030 | 520 | 75 | 450 | 929 | 60 | 640 | 90 | 1,700 | 1,450 |
| 45 | 40 | 1,100 | 660 | 33 | 25 | 360 | 300 | 1,000 | 635 | 1,203 | 600 | 75 | 500 | 989 | 60 | 700 | 90 | 2,400 | 2,200 |
| 50 | 45 | 1,150 | 700 | 39 | 25 | 400 | 325 | 1,050 | 700 | 1,350 | 650 | 75 | 530 | 1,039 | 65 | 750 | 100 | 3,000 | 2,700 |
| - | 50 | 1,280 | 800 | 39 | 25 | 400 | 340 | 1,160 | 760 | 1,510 | 700 | 75 | 560 | 1,138 | 65 | 800 | 100 | - | 3,450 |

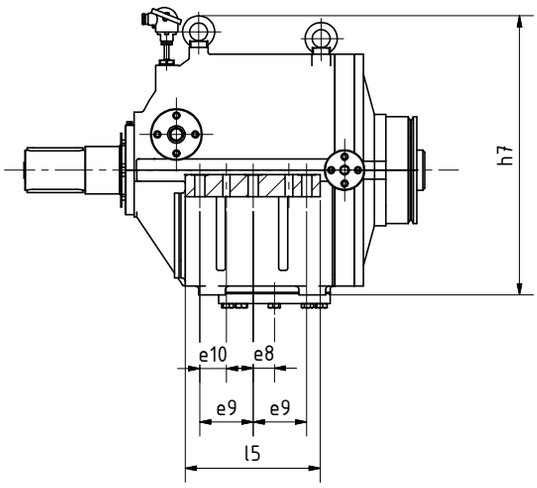
$d_4$ - Taper pins required according to DIN-7977; 2 predrilled holes for taper pins, diagonally opposed

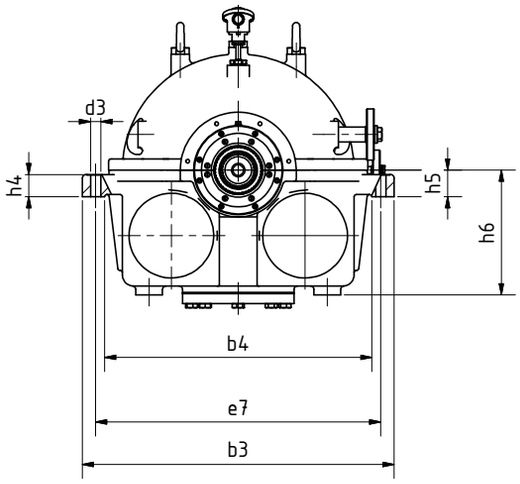
$d_5$, $e_5$, $l_4$ - Variations in the stated dimensions may be agreed upon with the manufacturing enterprise

Weight - without oil pumps and without flange execution (F); recommended values for average nominal transmission ratios

(Dimensions in mm)

# Main Dimensions AM; BM



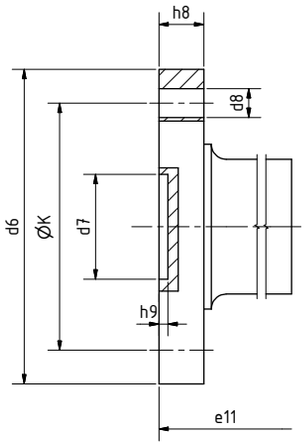




| Sizes | | | | | | | | | | | | | Weight kg | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| AM | BM | $b_3$ | $b_4$ | $e_7$ | $e_8$ | $e_9$ | $e_{10}$ | $h_4$ | $h_5$ -0.5 | $h_6$ | $l_7$ | $l_5$ | AM | BM |
| 16 | - | 660 | 560 | 600 | 35 | 105 | 50 | 50 | 60 | 256 | 586 | 273 | 380 | - |
| 20 | 16 | 700 | 600 | 640 | 47.5 | 120 | 60 | 50 | 60 | 280 | 626 | 305 | 490 | 410 |
| 25 | 20 | 800 | 700 | 740 | 42.5 | 142.5 | 60 | 50 | 60 | 315 | 656 | 355 | 680 | 650 |
| 32 | 25 | 860 | 740 | 790 | 50 | 160 | 60 | 60 | 71 | 350 | 740 | 390 | 880 | 840 |
| 36 | 32 | 950 | 825 | 870 | 57.5 | 182.5 | 75 | 60 | 71 | 400 | 815 | 445 | 1,250 | 1,050 |
| 40 | 36 | 1,100 | 900 | 1,000 | 50 | 185 | 80 | 70 | 80 | 450 | 929 | 470 | 1,700 | 1,450 |
| 45 | 40 | 1,160 | 1,020 | 1,080 | 72 | 225 | 75 | 70 | 80 | 500 | 989 | 530 | 2,400 | 2,200 |
| 50 | 45 | 1,250 | 1,100 | 1,170 | 40 | 240 | 80 | 70 | 80 | 550 | 1,059 | 600 | 3,000 | 2,700 |
| - | 50 | 1,320 | 1,160 | 1,240 | 55 | 260 | 80 | 70 | 80 | 575 | 1,153 | 620 | - | 3,450 |

Weight - without oil pumps and without flange execution (F); recommended values for average nominal transmission ratios (Dimensions in mm)

## Flange dimensions (F) of the shaft $d_2$

| Sizes | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| A; AM | B; BM | input speed | $d_6$ | $d_7$ $H_8$ | $d_8$ | $e_{11}$ | $h_8$ | $h_9$ | k ±0.05 | Weight increase kg |
| 36 | 32 | 1,500 | 380 | 140 | 38.5 | 700 | 60 | 12 | 300 | 49 |
| 40 | 36 | 1,500 | 420 | 140 | 38.5 | 700 | 60 | 12 | 330 | 56 |
| - | 40 | 3,000 | 380 | 140 | 38.5 | 755 | 60 | 12 | 300 | 49 |
| 45 | - | 1,500 | 420 | 140 | 38.5 | 755 | 60 | 12 | 330 | 56 |




## Dimension of the shaft ends

| Sizes | Shaft end with 2 fitting keys, staggered for 180° | | Hub hole with 2 hub slots, staggered for 180° | | | | | |
|---|---|---|---|---|---|---|---|---|
| | i = 2.12 up to 11.2 | | i = 2.12 up to 4 | | i > 4 up to 6.3 | | i > 6.3 up to 11.2 | |
| | $d_2$ m6 | $l_2$ | $d_1$ H6 | $l_1$ | $d_1$ H6 | $l_1$ | $d_1$ H6 | $l_1$ |
| 16 | 90 | 130 | 70 | 105 | 60 | 105 | - | - |
| 20 | 100 | 165 | 80 | 130 | 70 | 105 | - | - |
| 25 | 110 | 165 | 90 | 130 | 80 | 130 | 60 | 105 |
| 32 | 125 | 165 | 100 | 165 | 90 | 130 | 70 | 105 |
| 36 | 140 | 200 | 110 | 165 | 100 | 165 | 80 | 130 |
| 40 | 160 | 240 | 125 | 165 | 110 | 165 | 90 | 130 |
| 45 | 180 | 240 | 140 | 200 | 125 | 165 | 100 | 165 |
| 50 | 200 | 280 | 140 | 200 | 140 | 200 | 110 | 165 |

Shaft ends / Hub hole - See the main dimensions; Fitting keys, dimensions according to i DIN 6885
Hub slot width: tolerance zone J9 or P9, state, please, in case of order (J) or (P)

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