# 06
# BEVEL GEARBOXES

# "CHARACTER ROBOTS CAN CREATE ROBOTS WITH EMPATHY."

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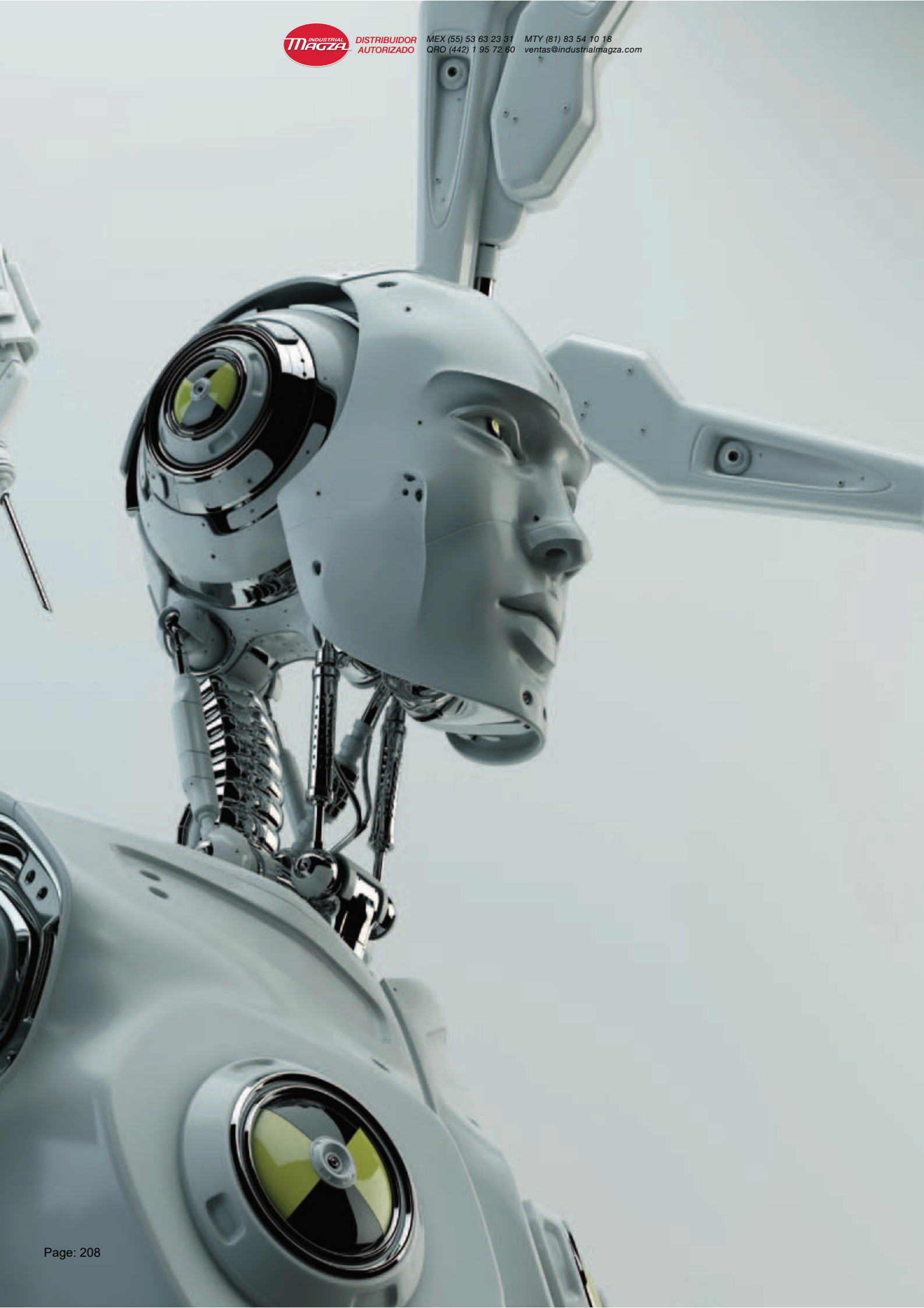


NIASA

# Bevel gearboxes
# ACCESORIES

## BEVEL GEARBOX BG

### GENERAL INFORMATION

**NIASA bevel gearboxes** are encased in robust cast metal housings and have hardened bevel gears pairs with spiral toothing and amply dimensioned rolling bearings. Spiral bevel gears have the significant benefit of very favourable meshing characteristics (high contact ratio). They are therefore especially well suited for operation under high load factors and when the highest smoothness of running and a high degree of trans-mission precision are required.

The curved teeth are more resistant to distortion than are straight or helical teeth. A further benefit is their relative insensitivity to elastic distortion of wheels, shafts and bearings. The gearboxes are thus able to transmit extreme shock loads. A total of ten different standard versions are available, with further variations as multi-shaft gear-boxes. All gearboxes may be installed in any mounting position and may have mounting holes on all sides.

#### Transmission ratios

Transmission ratios of 1 - 1.5 - 2 - 3 - 4 - 5 and 6:1 are available as standard. All transmission ratios are mathematically precise. The gears can be used for gearing down and gearing up. Special transmission ratios are available. Please contact us for details.

#### Efficiency

**NIASA bevel gearboxes** are 94 - 98 % efficient, depending on rpm, mounting position, sealing and type of lubrication.

The efficiency level refers to the nominal power output from the transmission. In certain mounting positions, the bevel gears are completely immersed in the lubricant. In this case, churning loss in larger gearboxes and at high circumferential velocities of the wheels can be considerable and **NIASA** should be consulted.

In general, it should be noted that starting efficiency is always lower than operating efficiency. The resulting increased breakaway torque should be taken into consideration when determining the driving power required.

#### Low-backlash version

For standard bevel gearbox units have – depending on gear size and ratio – a backlash of 10 to 30 angular minutes. Neverthless all **NIASA bevel gearboxes** can be supplied in a low-backlash version.

When the drive shaft is locked, tooth backlash on the slowly-running shaft is measured on a 100 mm lever arm with a measuring force of 3% of the rated torque and then is given as a torsion angle.

The following values can be set with standard gear sets:

Design S1: i = 1:1 to 2:1 < 6 angular minutes
Design S2: i = 3:1 to 6:1 < 10 angular minutes

Tighter values can be obtained from specially selected gears (Design S0). Consult us for detailed information.

#### Mounting Side

To indicate clearly the positions of different gearbox features, the sides of the gearbox are numbered 1 to 6.

All six sides of the gearbox are machined and can be used as mounting surfaces. The flanges and neck flanges are fitted with threaded holes as standard equipment. The following ordering options are available:

Code
a: only in the flange surfaces
b: on all gearbox sides without flanges
c: on all gearbox sides with flange/neck flange

#### Preferred rotational direction

**NIASA bevel gearboxes** can normally be run in either rotational direction. The spiral direction of the gear set and the rotational direction used are key factors termining the forces evolved within the unit. In most instances permissible torque transmission can be maximized by using the gear pairing such that the driving gear rotates in the same direction as the spiralling. This arrangement creates a more favourable contact point which reduces gear distortion. This also reduces noise from the gear pairing by 1-2 that the axial forces caused by the spiral meshing push the gears apart. In The pinion gear always has a left-handed spiral; accordingly, the large gear has a right-handed spiral.

## Shaft seals

**NIASA bevel gearboxes** are supplied with oil-tight shaft seals as standard equipment. Shaft seals with dust lips (Model AS) can be included on the input and output shafts as an option on request to protect against water and dust.

If extreme operating environments or high gearbox temperatures are expected, bevel gears can be supplied with optional FKM shaft seals (from VITON). Special seals are available for extremely corrosive operating environments. In such cases, please consult us and provide detailed information on the application in question.

## Corrosion-resistant bevel gearboxes

**NIASA corrosion-resistant bevel gearboxes** are outstanding for applications in which drive units are exposed to corrosive substances. Nickel- plated housing components and stainless-steel shafts are provided in these versions as standard equipment. The shaft seals are selected in accordance with the individual application at hand.

**NIASA bevel gearboxes** are also available in full stainless steel versions if required for extreme applications. Please enquire for further information.

## Anti-Corrosion Surface Protection

**NIASA bevel gears** are supplied with a primer coat only as standard equipment. Surface-protected versions are available as options for special operating environments:

i: normal environmental conditions
relative humid. less than 60 % (std equipment)
ii: low corrosive emission levels in environment
relative humidity less than 90 %
iii: medium corrosive emission levels in environment
relative humidity less than 100 %
iv: corrosivity category > C3
as defined in DIN ISO 12944-2

| Environ-ment | Coating thickness (µm) | Coating thickness |
|---|---|---|
| i | 10 - 40 | 1 ∃ primer (2-component wash primer / priming by zinc phosphating) |
| ii | 40 - 60 | 1 ∃ spray primer (1 x 2-component covering lacquer) |
| iii | 60 - 90 | 2 ∃ spray primer (1 x 2-component covering lacquer) |
| iv | > 100 | suited for your individual (application, please enquire) |

## Lubrication

**NIASA bevel gearboxes** are supplied oil-filled and are maintenance-free under normal operating conditions. With extreme requirements or increased demands on durability we recommend to change the oil after approx. 15,000 hours of operation.

The peripheral speed of the bevel gearboxes, the power that is to be transferred, and the operating conditions are crucial for the choice of the lubricant. Consult us for further information. Modern synthetic high-tech lubricants are available for choice. For transmission application in the Pharma or Foodstuffs industry, proven lubricants with NSF release (USDA-H1) can be selected.

**NIASA bevel gearboxes** are lubricated for a lifetime. The amount of lubricant has been internally determined for each assembly position. Naturally, biological-degradable oils or lubricants for extreme operating conditions can be supplied. For this purpose please contact us.

Also under normal operating conditions the transmission temperature can rise to over 50 °C because of the small convection surface. If the transmission exceeds this temperature during use the included aeration filter must be fitted in order to avoid overpressure in the transmission and thus a leakage. Sufficient fresh air supply must be ensured.

If the unit is intended for use under extreme ambient conditions (dust, moisture, etc.) please consult us. With intermittent operation or other operating conditions in which a rise in temperature of the transmission to over 50 °C is not expected, the aeration hole is not required.

For certain lubrication types, the gearbox is supplied with a vent filter. Let us know your application and will determine the best lubricant and eventual filter and its location.

## Long-term storage version

**NIASA bevel gearboxes** can be supplied in an optional version suitable for long-term storage. In this version, they receive a special preservative treatment and are supplied in airtight packaging which must not be opened until the unit is to be used. Consult us for more information.

NIASA

## Bevel gearboxes

# ACCESORIES

# BEVEL GEARBOX BG

### SELECTION CRITERIA

The permissible nominal input power ratings P1N and the nominal output torques T2N given in the tables are valid only for shock-free operation, ten hours operation per day and ten start-ups per hour, with an input power of 2.5 times the rated power being permitted during start-up. The thermal nominal power ratings P1Nt and output torque ratings T2Nt apply for an ambient temperature of 20 °C and 100% operating time. The maximum output torques T2max may be reached frequently for brief loading peaks, but may not be exceeded.

The required input power or output torque must be calculated on the basis of the operating factors for the determination of the gearbox size.

| Mechanical | Thermal |
|---|---|
| **P1m = P1xf1xf2xf3** | **P1t = P1xf3xf4xf5** |
| **T2m = T2xf1xf2xf3** | **T2t = T2xf3xf4xf5** |

The formulae take account of the mechanical and thermal effects. The following conditions apply for selection of gearbox size:

**P1m<P1N P1t<P1Nt ; T2m<T2N T2t<T2N**

The values given in the specification tables apply for lubrication by synthetic oils, based on an oil temperature of 95 °C. Determination of the thermal limit is not necessary if special measures are used (eg. an oil cooler) to ensure that the permissible oil temperature is never exceeded.

The permissible torques may be exceeded in special cases, eg. very short running times or static loading only. Please consult us for detailed information.

Exploitation of the maximum output torques T2max may make a press fit on the output shaft necessary, as the normal feather key connection is not always adequate.

The efficiency data given in the specification tables relate to the permissible rated loading of the transmissions and are guide values for fully run-in gearboxes running at operational temperature with standard seals.

Please refer to us for further details such as additional loads, start-up and operating efficiencies, low backlash or increased friction from special seals.

**NIASA bevel gearboxes** are designed for a service life of 12,000 operating hours when using the appropriate factors in selection. The prerequisite for this service life is correct installation and commissioning and proper servicing in accordance with the operating instructions for our bevel gears.

### Operational factor f1

| Driving motor | Load group | Operating hours / day | | | |
|---|---|---|---|---|---|
| | | < 0,5 | 3 | 10 | 24 |
| **Electro motor** | a | 0,8 | 0,9 | 1 | 1,25 |
| **Hydraulic motor** | b | 0,9 | 1 | 1,25 | 1,5 |
| **Turbine** | c | 1 | 1,25 | 1,5 | 1,75 |

**a: Low loading/shock-free**
*Filling machines, elevators, light screw conveyors, light conveyor belts, blowers, small agitators, control machines, assembly lines, auxiliary drives for machine tools, centrifuges, packaging machinery.*

**b: Medium loading/light shocks**
*Reel winders, agitators, plate conveyors, calenders, lifts, mixers, balancing machines, heavy-duty conveyor belts, sheet metal bending machines, road-building machinery, planing machines, shears, extruders, main drives for machine tools, kneading machines, weaving looms, light table rollers.*

**c: Heavy load/heavy shocks**
*Excavators, heavy-duty mixers, presses, muller mixers, rolling mills, heavy-duty table rollers, cold reduction mills, stone crushers, eccentric presses, cutter heads, folding machines, rubber belt conveyors (batch loads), bark peeling drums, run ning gears, punching presses, piston pumps, rotary furnaces, mills, plate filters.*

### Start-up factor f2

A prerequisite for application of the start-up factor is that the start-up torque (or braking torque) of the driving machine does not exceed 2.5 times the rated torque of the transmission:
T1A < 2.5 x T1N = 9550 x P1N / n1

| Start-ups / h | up to 10 | 10-60 | 60-500 | 500-1500 |
|---|---|---|---|---|
| **f2** | 1 | 1,1 | 1,2 | 1,3 |

### Lubrication factor f3

The lubrication factor must be taken into consideration when mineral oil is used since the efficiency, service life and permissible oil temperature depend to a great extent on the quality of the oil used.

| | Sinthetic oil | Mineral oil |
|---|---|---|
| **f3** | 1 | 1,1 |

### Temperature factor f4

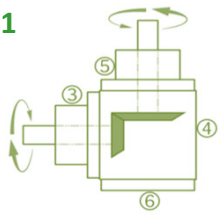
| Ambient temp. °C | 10 | 20 | 30 | 40 | 50 |
|---|---|---|---|---|---|
| **f4** | 0,9 | 1 | 1,15 | 1,4 | 1,7 |

### Operating time per hour factor f5

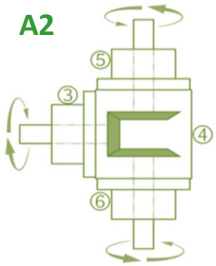
| ED in % | 100 | 80 | 60 | 40 | 20 |
|---|---|---|---|---|---|
| **f5** | 1 | 0,95 | 0,86 | 0,75 | 0,56 |

## MODELS AND ROTATIONAL DIRECTIONS

**A1**

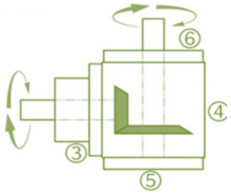



**A2**

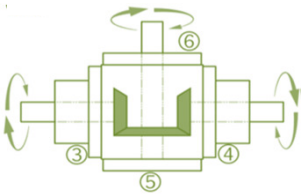



They have shafts with single bearings. The input and output sides are symmetrical at transmission ratios between 1:1 and 2:1.

**B1**

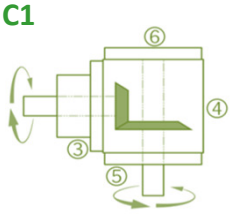



**B2**




The output shaft has bearings on both sides and extends out away from the side where its bevel gearbox is located. In this design the shafts have the same direction of rotation.

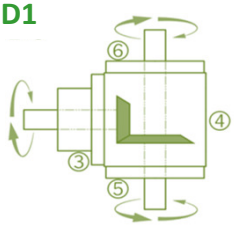
**C1**



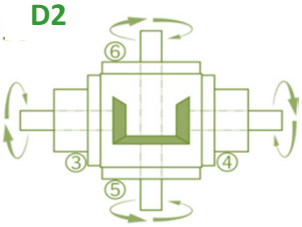

**C2**


The output shaft has bearings on both sides and extends out to the side where its bevel gearbox is located. In this design the shafts have opposing directions of rotation.

**D1**

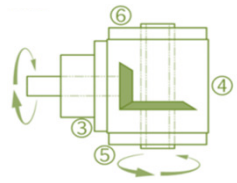



**D2**

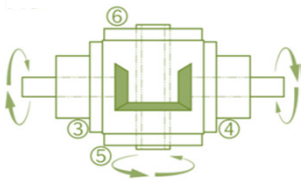



They have a straight-through output shaft. If units are intended for arrangement in series, they can be supplied with reinforced straight-through shafts and bearings.

**E1**




**E2**




They have a straight-through hollow shaft. The following options are available:
- without keyway, - with spline profile, - with polygonal profile.

## Bevel gearboxes

# ACCESORIES

## BEVEL GEARBOX BG

### SIZE SELECTION

| i | n1 (rpm) | n2 (rpm) | | BEVEL GEARBOX SIZE | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | BG-065 | BG-090 | BG-120 | BG-140 | BG-160 | BG-200 | BG-230 | BG-260 | BG-350 |
| 1:1 - 6:1 | | | P1Nt | 1,60 | 3,80 | 6,20 | 10,00 | 15,00 | 26,00 | 34,00 | 42,00 | 90,00 |
| 1:1 | 3000 | 3000 | P1N | 3,31 | 8,93 | 21,82 | 39,68 | | | | | |
| | | | T2N | 10,00 | 27,00 | 66,00 | 120,00 | | | | | |
| | 2400 | 2400 | P1N | 2,65 | 7,41 | 18,52 | 37,03 | 57,67 | | | | |
| | | | T2N | 10,00 | 28,00 | 70,00 | 140,00 | 218,00 | | | | |
| | 1500 | 1500 | P1N | 1,82 | 5,29 | 13,56 | 26,78 | 42,99 | 74,40 | 87,63 | 157,07 | 267,84 |
| | | | T2N | 11,00 | 32,00 | 82,00 | 162,00 | 260,00 | 450,00 | 530,00 | 950,00 | 1620,00 |
| | 1000 | 1000 | P1N | 1,32 | 3,75 | 10,14 | 20,28 | 31,96 | 56,21 | 71,65 | 115,73 | 210,53 |
| | | | T2N | 12,00 | 34,00 | 92,00 | 184,00 | 290,00 | 510,00 | 650,00 | 1050,00 | 1910,00 |
| | 750 | 750 | P1N | 1,07 | 3,06 | 8,51 | 16,20 | 25,63 | 45,88 | 60,76 | 96,72 | 195,92 |
| | | | T2N | 13,00 | 37,00 | 103,00 | 196,00 | 310,00 | 555,00 | 735,00 | 1170,00 | 2370,00 |
| | 500 | 500 | P1N | 0,83 | 2,20 | 6,34 | 11,46 | 18,19 | 34,17 | 45,19 | 72,75 | 155,41 |
| | | | T2N | 15,00 | 40,00 | 115,00 | 208,00 | 330,00 | 620,00 | 820,00 | 1320,00 | 2820,00 |
| | 250 | 250 | P1N | 0,47 | 1,21 | 3,39 | 5,92 | 9,64 | 19,56 | 26,73 | 42,44 | 94,52 |
| | | | T2N | 17,00 | 44,00 | 123,00 | 215,00 | 350,00 | 710,00 | 970,00 | 1540,00 | 3440,00 |
| | 50 | 50 | P1N | 0,10 | 0,28 | 0,72 | 1,21 | 2,09 | 4,13 | 7,00 | 9,64 | 24,47 |
| | | | T2N | 18,00 | 50,00 | 130,00 | 220,00 | 380,00 | 750,00 | 1270,00 | 1750,00 | 4440,00 |
| | | | **T2max** | **25,00** | **105,00** | **220,00** | **430,00** | **660,00** | **1090,00** | **1500,00** | **2310,00** | **5400,00** |
| 1,5:1 | 3000 | 2000 | P1N | 2,20 | 5,51 | 13,45 | 24,91 | 40,78 | 72,75 | 99,20 | 189,58 | |
| | | | T2N | 10,00 | 25,00 | 61,00 | 113,00 | 185,00 | 330,00 | 450,00 | 860,00 | |
| | 2400 | 1600 | P1N | 1,76 | 4,59 | 11,46 | 22,22 | 36,15 | 63,49 | 91,35 | 158,72 | |
| | | | T2N | 10,00 | 26,00 | 65,00 | 126,00 | 205,00 | 360,00 | 518,00 | 900,00 | |
| | 1500 | 1000 | P1N | 1,21 | 3,20 | 8,60 | 17,08 | 27,78 | 48,17 | 72,20 | 104,71 | 206,19 |
| | | | T2N | 11,00 | 29,00 | 78,00 | 155,00 | 252,00 | 437,00 | 655,00 | 950,00 | 1870,00 |
| | 1000 | 666,7 | P1N | 0,88 | 2,35 | 6,32 | 12,87 | 20,59 | 37,13 | 56,21 | 77,19 | 188,55 |
| | | | T2N | 12,00 | 32,00 | 86,00 | 175,00 | 280,00 | 505,00 | 765,00 | 1050,00 | 2560,00 |
| | 750 | 500 | P1N | 0,72 | 1,93 | 5,18 | 10,47 | 16,26 | 30,31 | 45,47 | 64,48 | 141,42 |
| | | | T2N | 13,00 | 35,00 | 94,00 | 190,00 | 295,00 | 550,00 | 825,00 | 1170,00 | 2560,00 |
| | 500 | 333,3 | P1N | 0,55 | 1,36 | 3,85 | 7,34 | 11,56 | 22,57 | 33,79 | 47,72 | 112,63 |
| | | | T2N | 15,00 | 37,00 | 105,00 | 200,00 | 315,00 | 615,00 | 920,00 | 1300,00 | 3070,00 |
| | 250 | 166,7 | P1N | 0,31 | 0,74 | 1,99 | 3,76 | 6,07 | 12,70 | 20,57 | 27,43 | 67,11 |
| | | | T2N | 17,00 | 40,00 | 108,00 | 204,00 | 330,00 | 690,00 | 1120,00 | 1490,00 | 3650,00 |
| | 50 | 33,3 | P1N | 0,07 | 0,16 | 0,41 | 0,76 | 1,29 | 2,73 | 4,89 | 6,18 | 16,34 |
| | | | T2N | 18,00 | 45,00 | 113,00 | 210,00 | 355,00 | 750,00 | 1330,00 | 1700,00 | 4500,00 |
| | | | **T2max** | **25,00** | **80,00** | **169,00** | **358,00** | **650,00** | **980,00** | **1400,00** | **2100,00** | **5200,00** |
| 2:1 | 3000 | 1500 | P1N | 1,65 | 3,80 | 9,26 | 16,53 | 28,11 | 51,25 | 87,63 | 133,92 | |
| | | | T2N | 10,00 | 23,00 | 56,00 | 100,00 | 170,00 | 310,00 | 530,00 | 810,00 | |
| | 2400 | 1200 | P1N | 1,32 | 3,17 | 8,07 | 14,68 | 25,53 | 45,24 | 80,02 | 112,43 | |
| | | | T2N | 10,00 | 24,00 | 61,00 | 111,00 | 193,00 | 342,00 | 605,00 | 850,00 | |
| | 1500 | 750 | P1N | 0,91 | 2,23 | 6,03 | 11,41 | 20,25 | 35,13 | 59,11 | 78,53 | 200,06 |
| | | | T2N | 11,00 | 27,00 | 73,00 | 138,00 | 245,00 | 425,00 | 715,00 | 950,00 | 2420,00 |
| | 1000 | 500 | P1N | 0,66 | 1,71 | 4,46 | 8,38 | 14,88 | 27,56 | 45,19 | 57,87 | 155,41 |
| | | | T2N | 12,00 | 31,00 | 81,00 | 152,00 | 270,00 | 500,00 | 820,00 | 1050,00 | 2820,00 |
| | 750 | 375 | P1N | 0,54 | 1,32 | 3,55 | 6,86 | 11,57 | 22,32 | 36,79 | 48,36 | 129,37 |
| | | | T2N | 13,00 | 32,00 | 86,00 | 166,00 | 280,00 | 540,00 | 890,00 | 1170,00 | 3130,00 |
| | 500 | 250 | P1N | 0,41 | 0,94 | 2,54 | 4,96 | 8,27 | 16,81 | 26,73 | 35,27 | 94,52 |
| | | | T2N | 15,00 | 34,00 | 92,00 | 180,00 | 300,00 | 610,00 | 970,00 | 1280,00 | 3430,00 |
| | 250 | 125 | P1N | 0,23 | 0,50 | 1,35 | 2,62 | 4,41 | 9,37 | 16,88 | 20,12 | 54,15 |
| | | | T2N | 17,00 | 36,00 | 98,00 | 190,00 | 320,00 | 680,00 | 1225,00 | 1460,00 | 3930,00 |
| | 50 | 25 | P1N | 0,05 | 0,10 | 0,29 | 0,55 | 0,98 | 2,07 | 3,66 | 4,55 | 12,79 |
| | | | T2N | 18,00 | 37,00 | 107,00 | 200,00 | 355,00 | 750,00 | 1330,00 | 1650,00 | 4640,00 |
| | | | **T2max** | **25,00** | **80,00** | **169,00** | **320,00** | **650,00** | **980,00** | **1400,00** | **2100,00** | **5000,00** |
| 3:1 | 3000 | 1000 | P1N | 1,10 | 2,54 | 6,39 | 12,12 | 20,94 | 46,29 | 44,09 | 85,97 | |
| | | | T2N | 10,00 | 23,00 | 58,00 | 110,00 | 190,00 | 420,00 | 400,00 | 780,00 | |
| | 2400 | 800 | P1N | 0,88 | 2,12 | 5,56 | 11,46 | 17,81 | 39,24 | 39,68 | 72,39 | 160,48 |
| | | | T2N | 10,00 | 24,00 | 63,00 | 130,00 | 202,00 | 445,00 | 450,00 | 821,00 | 1820,00 |
| | 1500 | 500 | P1N | 0,61 | 1,49 | 4,08 | 8,05 | 12,68 | 28,38 | 29,76 | 49,60 | 122,35 |
| | | | T2N | 11,00 | 27,00 | 74,00 | 146,00 | 230,00 | 515,00 | 540,00 | 900,00 | 2220,00 |
| | 1000 | 333,3 | P1N | 0,44 | 1,14 | 3,01 | 5,87 | 8,99 | 20,37 | 23,33 | 36,34 | 96,26 |
| | | | T2N | 12,00 | 31,00 | 82,00 | 160,00 | 245,00 | 555,00 | 635,00 | 990,00 | 2620,00 |
| | 750 | 250 | P1N | 0,33 | 0,88 | 2,40 | 4,60 | 6,89 | 15,98 | 19,29 | 28,93 | 81,29 |
| | | | T2N | 12,00 | 32,00 | 87,00 | 167,00 | 250,00 | 580,00 | 700,00 | 1050,00 | 2950,00 |
| | 500 | 166,7 | P1N | 0,24 | 0,63 | 1,66 | 3,20 | 4,79 | 11,04 | 14,07 | 20,43 | 59,34 |
| | | | T2N | 13,00 | 34,00 | 90,00 | 174,00 | 260,00 | 600,00 | 765,00 | 1110,00 | 3230,00 |
| | 250 | 83,3 | P1N | 0,12 | 0,33 | 0,87 | 1,62 | 2,56 | 5,76 | 7,58 | 11,16 | 34,26 |
| | | | T2N | 13,00 | 36,00 | 95,00 | 177,00 | 280,00 | 630,00 | 825,00 | 1220,00 | 3730,00 |
| | 50 | 16,7 | P1N | 0,03 | 0,07 | 0,21 | 0,34 | 0,57 | 1,29 | 1,63 | 2,55 | 7,79 |
| | | | T2N | 14,00 | 37,00 | 110,00 | 180,00 | 305,00 | 690,00 | 870,00 | 1360,00 | 4240,00 |
| | | | **T2max** | **23,00** | **70,00** | **155,00** | **280,00** | **457,00** | **910,00** | **1300,00** | **1940,00** | **4500,00** |

| i | n1 (rpm) | n2 (rpm) | | BEVEL GEARBOX SIZE | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | BG-065 | BG-090 | BG-120 | BG-140 | BG-160 | BG-200 | BG-230 | BG-260 | BG-350 |
| 1:1 - 6:1 | | | P1Nt | 1,60 | 3,80 | 6,20 | 10,00 | 15,00 | 26,00 | 34,00 | 42,00 | 90,00 |
| **4:1** | 3000 | 750 | P1N | | 1,90 | 4,96 | 8,51 | 14,88 | 28,93 | 36,37 | 57,87 | |
| | | | T2N | | 23,00 | 60,00 | 103,00 | 180,00 | 350,00 | 440,00 | 700,00 | |
| | 2400 | 600 | P1N | | 1,65 | 4,43 | 7,34 | 13,23 | 26,45 | 32,74 | 51,58 | 113,75 |
| | | | T2N | | 25,00 | 67,00 | 111,00 | 200,00 | 400,00 | 495,00 | 780,00 | 1720,00 |
| | 1500 | 375 | P1N | | 1,12 | 3,06 | 4,96 | 9,09 | 18,81 | 24,80 | 37,20 | 78,95 |
| | | | T2N | | 27,00 | 74,00 | 120,00 | 220,00 | 455,00 | 600,00 | 900,00 | 1910,00 |
| | 1000 | 250 | P1N | | 0,85 | 2,18 | 3,75 | 6,61 | 13,36 | 18,60 | 28,93 | 58,14 |
| | | | T2N | | 31,00 | 79,00 | 136,00 | 240,00 | 485,00 | 675,00 | 1050,00 | 2110,00 |
| | 750 | 187,5 | P1N | | 0,66 | 1,69 | 3,06 | 5,17 | 10,54 | 15,19 | 22,73 | 47,95 |
| | | | T2N | | 32,00 | 82,00 | 148,00 | 250,00 | 510,00 | 735,00 | 1100,00 | 2320,00 |
| | 500 | 125 | P1N | | 0,47 | 1,16 | 2,12 | 3,58 | 7,23 | 10,95 | 16,26 | 34,72 |
| | | | T2N | | 34,00 | 84,00 | 154,00 | 260,00 | 525,00 | 795,00 | 1180,00 | 2520,00 |
| | 250 | 62,5 | P1N | | 0,25 | 0,60 | 1,12 | 1,86 | 3,79 | 5,99 | 8,61 | 19,43 |
| | | | T2N | | 36,00 | 87,00 | 162,00 | 270,00 | 550,00 | 870,00 | 1250,00 | 2820,00 |
| | 50 | 12,5 | P1N | | 0,05 | 0,12 | 0,23 | 0,39 | 0,80 | 1,35 | 1,82 | 4,17 |
| | | | T2N | | 37,00 | 90,00 | 170,00 | 280,00 | 580,00 | 980,00 | 1320,00 | 3030,00 |
| | | | **T2max** | | **70,00** | **155,00** | **280,00** | **422,00** | **860,00** | **1300,00** | **1940,00** | **3500,00** |
| **5:1** | 3000 | 600 | P1N | | 1,52 | 3,97 | 6,61 | 11,90 | 19,84 | 33,73 | 46,29 | |
| | | | T2N | | 23,00 | 60,00 | 100,00 | 180,00 | 300,00 | 510,00 | 700,00 | |
| | 2400 | 480 | P1N | | 1,32 | 3,44 | 5,56 | 10,48 | 17,99 | 29,10 | 40,21 | 78,83 |
| | | | T2N | | 25,00 | 65,00 | 105,00 | 198,00 | 340,00 | 550,00 | 760,00 | 1490,00 |
| | 1500 | 300 | P1N | | 0,89 | 2,38 | 3,80 | 7,11 | 12,57 | 21,00 | 29,10 | 56,54 |
| | | | T2N | | 27,00 | 72,00 | 115,00 | 215,00 | 380,00 | 635,00 | 880,00 | 1710,00 |
| | 1000 | 200 | P1N | | 0,68 | 1,76 | 2,73 | 4,96 | 9,26 | 15,76 | 21,82 | 42,33 |
| | | | T2N | | 31,00 | 80,00 | 124,00 | 225,00 | 420,00 | 715,00 | 990,00 | 1920,00 |
| | 750 | 150 | P1N | | 0,53 | 1,42 | 2,15 | 3,97 | 7,27 | 12,73 | 18,19 | 35,88 |
| | | | T2N | | 32,00 | 86,00 | 130,00 | 240,00 | 440,00 | 770,00 | 1100,00 | 2170,00 |
| | 500 | 100 | P1N | | 0,37 | 0,98 | 1,50 | 2,76 | 5,18 | 9,15 | 13,23 | 26,67 |
| | | | T2N | | 34,00 | 89,00 | 136,00 | 250,00 | 470,00 | 830,00 | 1200,00 | 2420,00 |
| | 250 | 50 | P1N | | 0,20 | 0,51 | 0,79 | 1,49 | 2,78 | 5,07 | 7,11 | 16,09 |
| | | | T2N | | 36,00 | 92,00 | 143,00 | 270,00 | 505,00 | 920,00 | 1290,00 | 2920,00 |
| | 50 | 10 | P1N | | 0,04 | 0,10 | 0,17 | 0,32 | 0,58 | 1,09 | 1,47 | 3,56 |
| | | | T2N | | 37,00 | 95,00 | 150,00 | 290,00 | 525,00 | 990,00 | 1330,00 | 3230,00 |
| | | | **T2max** | | **60,00** | **140,00** | **250,00** | **420,00** | **860,00** | **1200,00** | **1910,00** | **3500,00** |
| **6:1** | 3000 | 500 | P1N | | 1,25 | 2,95 | 5,18 | 7,09 | 11,45 | 20,17 | 27,27 | |
| | | | T2N | | 23,00 | 54,00 | 94,00 | 129,00 | 208,00 | 366,00 | 495,00 | |
| | 2400 | 400 | P1N | | 1,09 | 2,53 | 4,58 | 5,98 | 9,60 | 18,08 | 23,12 | 56,88 |
| | | | T2N | | 25,00 | 57,00 | 104,00 | 136,00 | 218,00 | 410,00 | 524,00 | 1290,00 |
| | 1500 | 250 | P1N | | 0,74 | 1,75 | 2,95 | 3,95 | 6,54 | 13,50 | 16,36 | 41,61 |
| | | | T2N | | 27,00 | 64,00 | 107,00 | 143,00 | 237,00 | 490,00 | 594,00 | 1510,00 |
| | 1000 | 166,7 | P1N | | 0,53 | 1,22 | 2,06 | 3,01 | 4,74 | 9,92 | 12,93 | 31,41 |
| | | | T2N | | 29,00 | 66,00 | 112,00 | 164,00 | 258,00 | 540,00 | 702,00 | 1710,00 |
| | 750 | 125 | P1N | | 0,40 | 0,94 | 1,61 | 2,43 | 3,98 | 7,78 | 10,91 | 24,25 |
| | | | T2N | | 29,00 | 68,00 | 117,00 | 176,00 | 289,00 | 565,00 | 792,00 | 1760,00 |
| | 500 | 83,3 | P1N | | 0,27 | 0,63 | 1,09 | 1,72 | 2,79 | 5,42 | 8,06 | 16,72 |
| | | | T2N | | 29,00 | 69,00 | 119,00 | 187,00 | 304,00 | 590,00 | 878,00 | 1820,00 |
| | 250 | 41,7 | P1N | | 0,14 | 0,33 | 0,56 | 0,92 | 1,44 | 2,82 | 4,35 | 9,28 |
| | | | T2N | | 30,00 | 71,00 | 121,00 | 199,00 | 311,00 | 610,00 | 940,00 | 2020,00 |
| | 50 | 8,3 | P1N | | 0,03 | 0,06 | 0,11 | 0,18 | 0,28 | 0,57 | 0,87 | 1,95 |
| | | | T2N | | 33,00 | 66,00 | 120,00 | 197,00 | 306,00 | 625,00 | 951,00 | 2120,00 |
| | | | **T2max** | | **50,00** | **120,00** | **200,00** | **350,00** | **625,00** | **1000,00** | **1730,00** | **2300,00** |

**TERMS**

| | |
|---|---|
| **i** | Transmission ratio |
| **n1** | Speed of faster-running shaft (rpm) |
| **n2** | Speed of slower-running shaft (rpm) |
| **P1N** | Permissible rated input power, mechanical (kW) |
| **P1Nt** | Permissible rated input power, thermal (kW) |
| **T2N** | Permissible rated output torque, mechanical (Nm) |
| **T2max** | Maximum permissible output torque (Nm) |

## Bevel gearboxes

# ACCESORIES

## BEVEL GEARBOX BG

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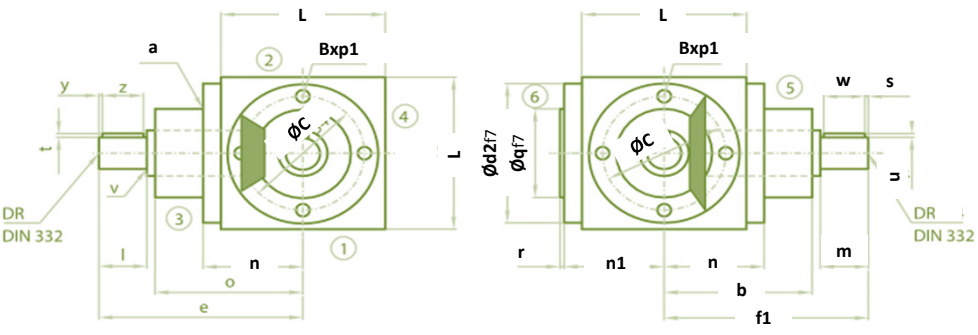
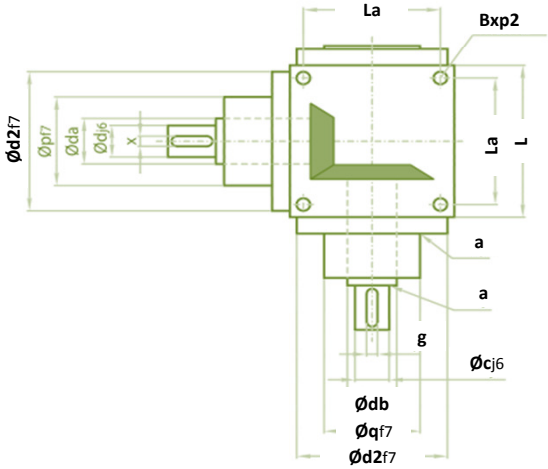
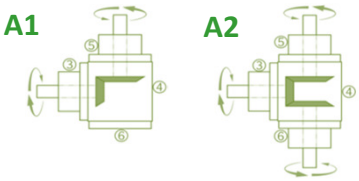
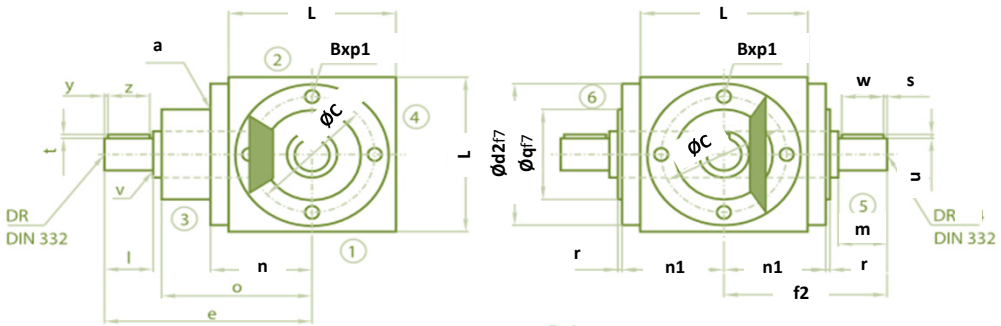
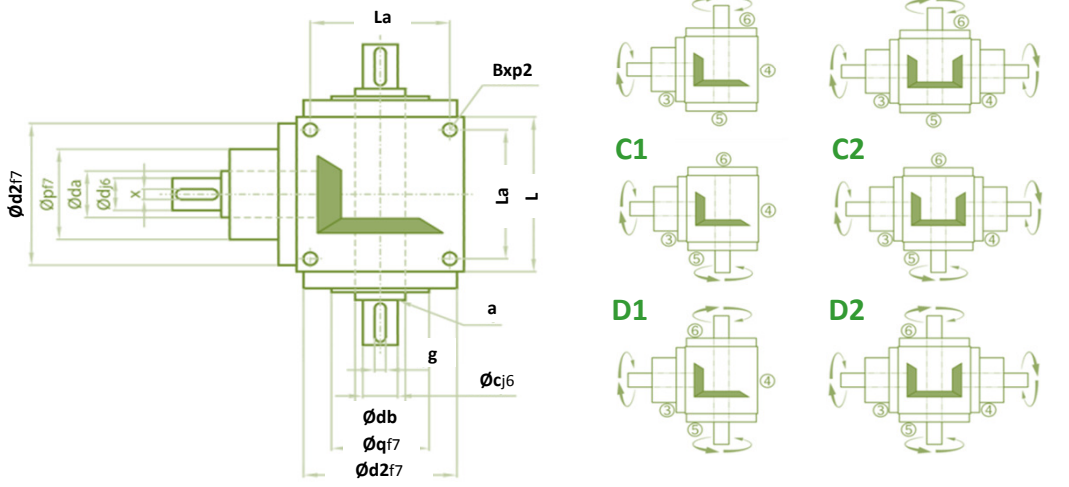
### DIMENSIONS: BG-065 / BG-090 / BG-120 / BG-140

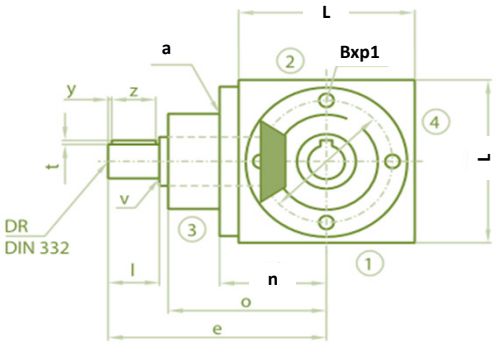


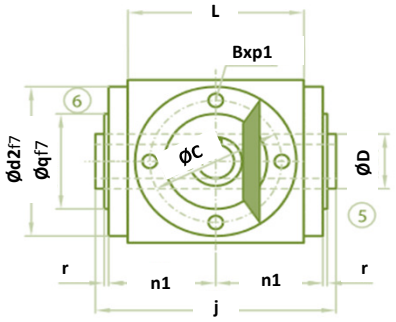



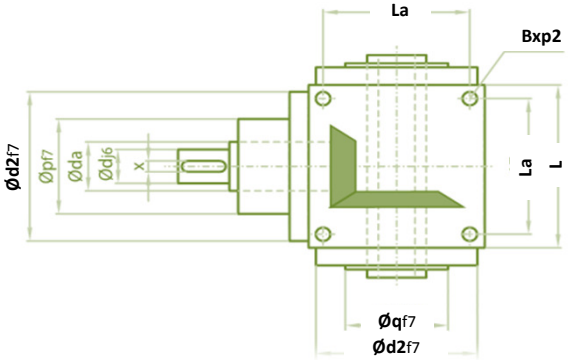



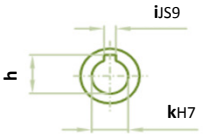





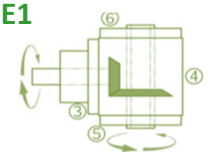




Standard




E1



E2

| Size > | BG-065 | | BG-090 | | | | BG-120 | | | | BG-140 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ratio >>> | i=1:1-i=2:1 | i=3:1 | i=1:1-i=2:1 | i=3:1 | i=4:1 | i=5:1 i=6:1 | i=1:1-i=2:1 | i=3:1 | i=4:1 | i=5:1 i=6:1 | i=1:1-i=2:1 | i=3:1 | i=4:1 | i=5:1 i=6:1 |
| **a** | 0,5 | | 1 | | | | 1 | | | | 1,5 | | | |
| **b** | 72 | | 85 | | | | 115 | | | | 128 | | | |
| **B** | M6 | | M8 | | | | M10 | | | | M10 | | | |
| **c** | 12 | | 18 | | | | 25 | | | | 32 | | | |
| **C** | 54 | | 75 | | | | | | | | | | | |
| **d** | 12 | 12 | 18 | 12 | 12 | 12 | 25 | 20 | 20 | 15 | 32 | 28 | 24 | 24 |
| **D** | 20 | | 30 | | | | 40 | | | | 50 | | | |
| **d2** | 64 | | 89 | | | | 119 | | | | 135 | | | |
| **da** | 17 | 17 | 25 | 20 | 20 | 20 | 30 | 25 | 25 | 20 | 40 | 40 | 40 | 40 |
| **db** | 17 | | 30 | | | | 30 | | | | 40 | | | |
| **DR** | M4 | M4 | M6 | M4 | M4 | M4 | M10 | M6 | M6 | M5 | M12 | M10 | M8 | M8 |
| **e** | 100 | 100 | 122 | 122 | 132 | 132 | 162 | 162 | 172 | 162 | 180 | 180 | 195 | 195 |
| **f1** | 100 | | 122 | | | | 162 | | | | 180 | | | |
| **f2** | 72 | | 95 | | | | 122 | | | | 137 | | | |
| **g** | 4 | | 6 | | | | 8 | | | | 10 | | | |
| **h** | 13,8 | | 20,8 | | | | 28,3 | | | | 35,3 | | | |
| **i** | 4 | | 6 | | | | 8 | | | | 10 | | | |
| **j** | 92 | | 124 | | | | 160 | | | | 180 | | | |
| **k** | 12 | | 18 | | | | 25 | | | | 32 | | | |
| **l** | 26 | | 35 | | | | 45 | | | | 50 | | | |
| **L** | 65 | | 90 | | | | 120 | | | | 140 | | | |
| **La** | 45 | | 70 | | | | 100 | | | | 110 | | | |
| **m** | 26 | | 35 | | | | 45 | | | | 50 | | | |
| **n** | 42 | | 55 | | | | 75 | | | | 85 | | | |
| **n1** | 42 | | 55 | | | | 72 | | | | 82 | | | |
| **o** | 72 | 72 | 85 | 85 | 95 | 95 | 115 | 115 | 125 | 125 | 128 | 128 | 143 | 143 |
| **p** | 44 | 44 | 60 | 60 | 60 | 60 | 80 | 80 | 80 | 70 | 90 | 90 | 85 | 85 |
| **p1** | 9,5 | | 10 | | | | 12 | | | | 12 | | | |
| **p2** | 12 | | 14 | | | | 16 | | | | 20 | | | |
| **q** | 44 | | 60 | | | | 80 | | | | 90 | | | |
| **r** | 2 | | 2 | | | | 3 | | | | 3 | | | |
| **s** | 3 | | 3 | | | | 4 | | | | 3 | | | |
| **t** | 1,5 | 1,5 | 2,5 | 1,5 | 1,5 | 1,5 | 3 | 2,5 | 2,5 | 2 | 3 | 3 | 3 | 3 |
| **u** | 1,5 | | 2,5 | | | | 3 | | | | 3 | | | |
| **v** | 0,5 | 0,5 | 1 | 0,5 | 0,5 | 0,5 | 1 | 1 | 1 | 0,5 | 1,5 | 1 | 1 | 1 |
| **w** | 20 | | 28 | | | | 36 | | | | 45 | | | |
| **x** | 4 | 4 | 6 | 4 | 4 | 4 | 8 | 6 | 6 | 5 | 10 | 8 | 8 | 8 |
| **y** | 3 | 3 | 3 | 3 | 3 | 3 | 4 | 4 | 4 | 4 | 3 | 3 | 3 | 3 |
| **z** | 20 | 20 | 28 | 28 | 28 | 28 | 36 | 36 | 36 | 28 | 45 | 45 | 45 | 45 |

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## BEVEL GEARBOX BG

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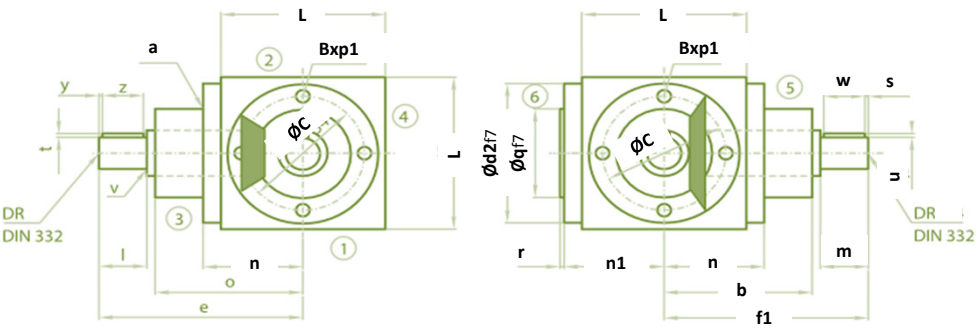
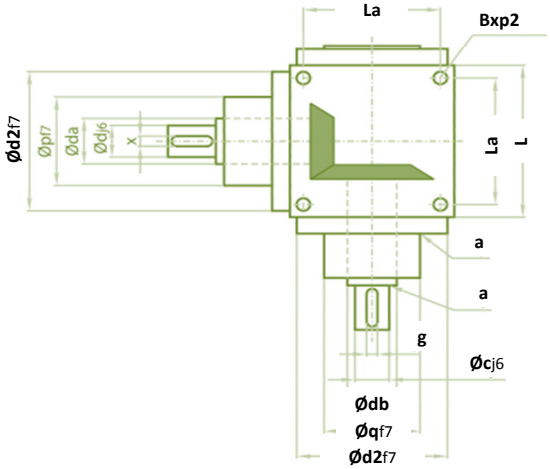
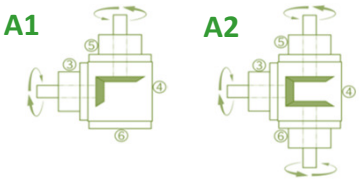
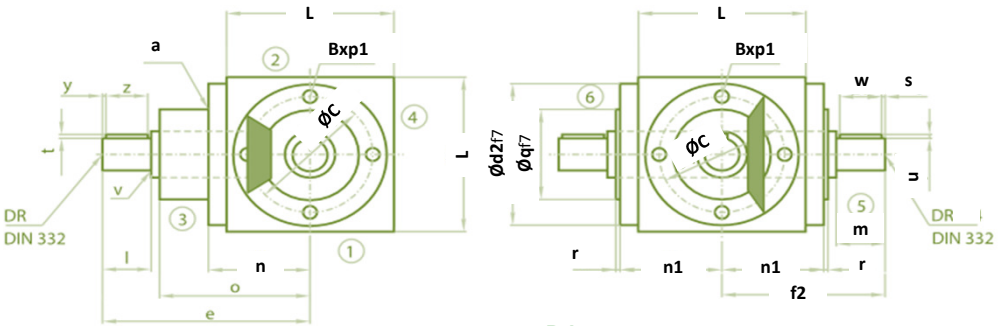
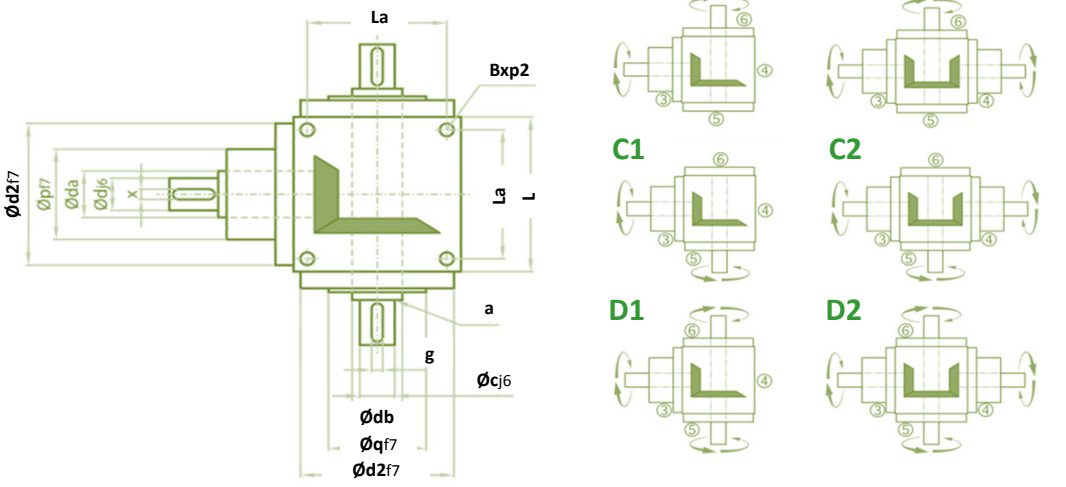
### DIMENSIONS: BG-160 / BG-200 / BG-230

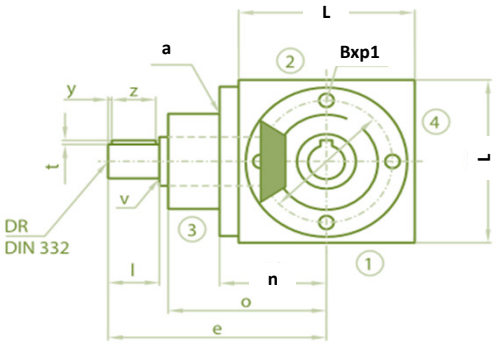


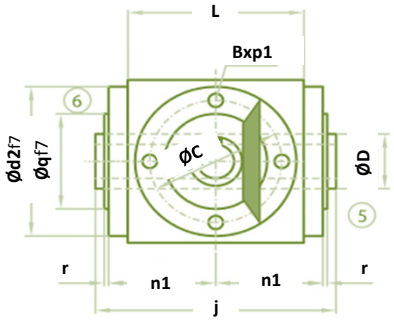



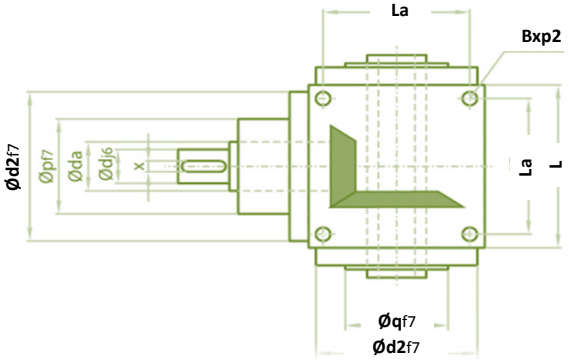



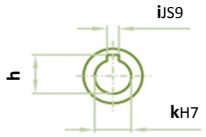





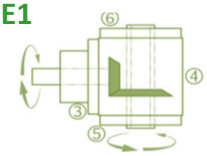




Standard




E1



E2

| Size > | BG-160 | | | | BG-200 | | | | BG-230 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ratio >>> | i=1:1-i=2:1 | i=3:1 | i=4:1 | i=5:1 i=6:1 | i=1:1-i=2:1 | i=3:1 | i=4:1 | i=5:1 i=6:1 | i=1:1-i=2:1 | i=3:1 | i=4:1 | i=5:1 i=6:1 |
| **a** | 2 | | | | 3 | | | | 5 | | | |
| **b** | 150 | | | | 190 | | | | 213 | | | |
| **B** | M12 | | | | M12 | | | | M16 | | | |
| **c** | 35 | | | | 42 | | | | 55 | | | |
| **C** | 135 | | | | 175 | | | | 200 | | | |
| **d** | 35 | 28 | 24 | 24 | 42 | 35 | 35 | 28 | 55 | 40 | 40 | 35 |
| **D** | 55 | | | | 70 | | | | 80 | | | |
| **d2** | 159 | | | | 199 | | | | 225 | | | |
| **da** | 40 | 40 | 40 | 25 | 55 | 40 | 40 | 30 | 60 | 50 | 50 | 45 |
| **db** | 40 | | | | 55 | | | | 60 | | | |
| **DR** | M12 | M10 | M8 | M8 | M16 | M12 | M12 | M10 | M20 | M16 | M16 | M16 |
| **e** | 212 | 212 | 232 | 232 | 273 | 261 | 261 | 261 | 305 | 310 | 310 | 300 |
| **f1** | 212 | | | | 273 | | | | 305 | | | |
| **f2** | 160 | | | | 203 | | | | 230 | | | |
| **g** | 10 | | | | 12 | | | | 16 | | | |
| **h** | 38,3 | | | | 45,3 | | | | 59,3 | | | |
| **i** | 10 | | | | 12 | | | | 16 | | | |
| **j** | 206 | | | | 250 | | | | 285 | | | |
| **k** | 35 | | | | 42 | | | | 55 | | | |
| **l** | 60 | 60 | 60 | 60 | 80 | 68 | 68 | 68 | 90 | 80 | 80 | 70 |
| **L** | 160 | | | | 200 | | | | 230 | | | |
| **La** | 120 | | | | 160 | | | | 180 | | | |
| **m** | 60 | | | | 80 | | | | 90 | | | |
| **n** | 95 | | | | 120 | | | | 135 | | | |
| **n1** | 95 | | | | 117 | | | | 132 | | | |
| **o** | 150 | 150 | 170 | 170 | 190 | 190 | 190 | 190 | 213 | 228 | 228 | 228 |
| **p** | 110 | 100 | 100 | 100 | 120 | 120 | 120 | 110 | 150 | 140 | 140 | 140 |
| **p1** | 15 | | | | 20 | | | | 20 | | | |
| **p2** | 24 | | | | 24 | | | | 20 | | | |
| **q** | 110 | | | | 120 | | | | 149 | | | |
| **r** | 3 | | | | 3 | | | | 4 | | | |
| **s** | 5 | | | | 5 | | | | 5 | | | |
| **t** | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 2,5 | 3 | 3 | 3 |
| **u** | 3 | | | | 3 | | | | 4 | | | |
| **v** | 1,5 | 1 | 1 | 0,5 | 2 | 1 | 1 | | 1 | 1 | 1 | 1 |
| **w** | 50 | | | | 70 | | | | 80 | | | |
| **x** | 10 | 8 | 8 | 8 | 12 | 10 | 10 | 8 | 16 | 12 | 12 | 10 |
| **y** | 5 | 5 | 5 | 5 | 5 | 3 | 3 | 3 | 5 | 5 | 0 | 3 |
| **z** | 50 | 50 | 50 | 50 | 70 | 63 | 63 | 63 | 80 | 70 | 70 | 63 |

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## BEVEL GEARBOX BG

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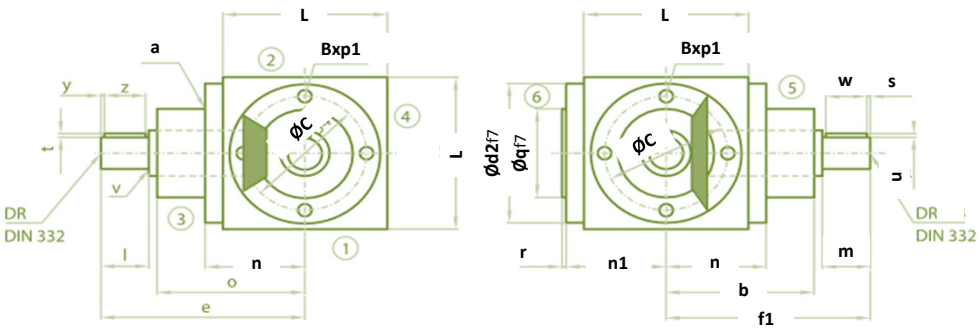
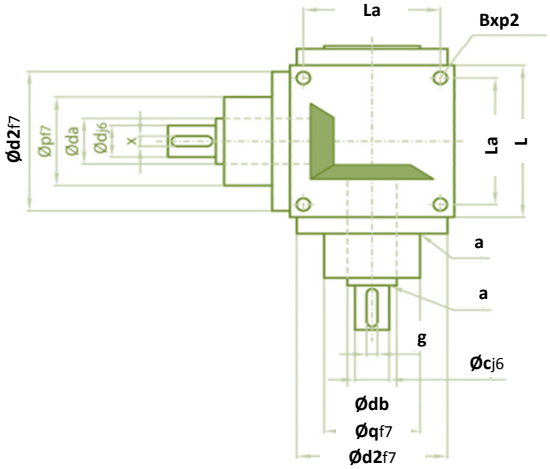
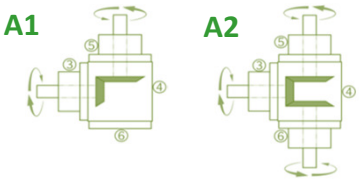
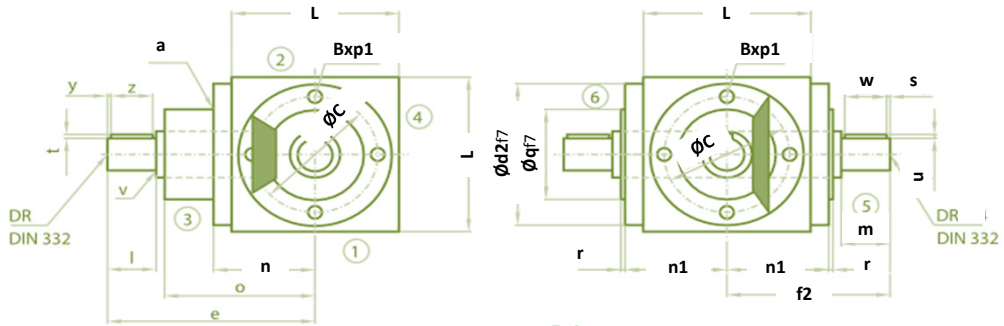
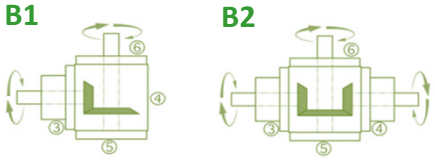
### DIMENSIONS: BG-260 / BG-350

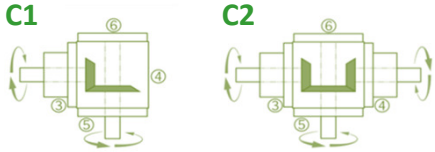


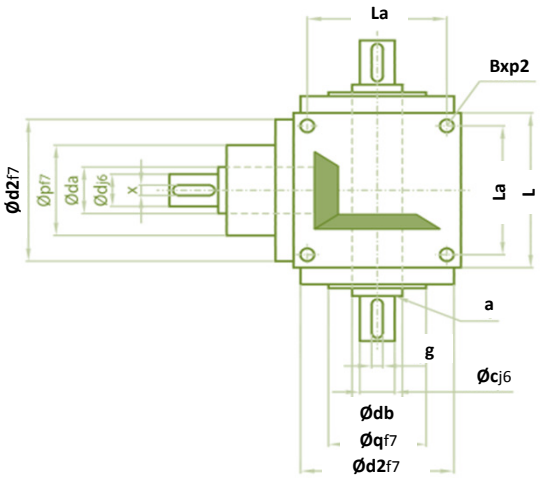



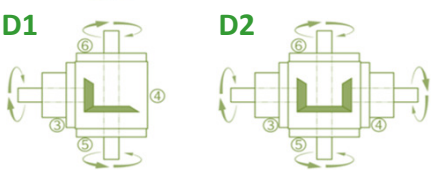



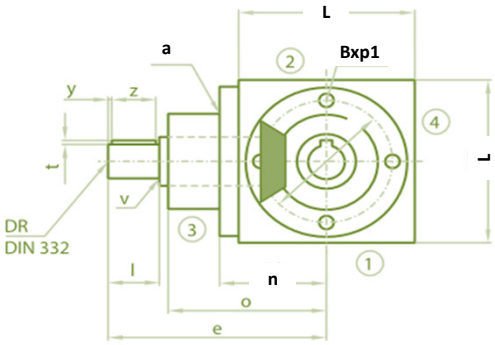



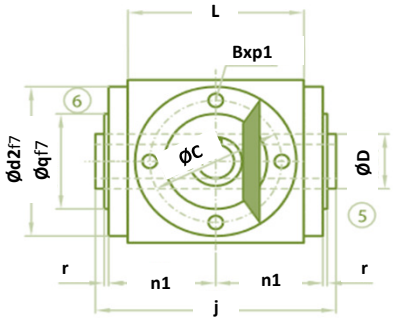



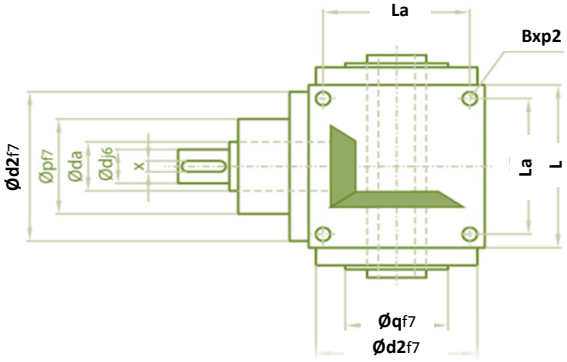



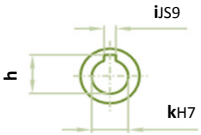





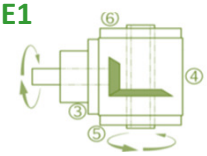




Standard




E1



E2

| Size > | BG-260 | | | | BG-350 | | | |
|---|---|---|---|---|---|---|---|---|
| Ratio >>> | i=1:1-i=2:1 | i=3:1 | i=4:1 | i=5:1 i=6:1 | i=1:1-i=2:1 | i=3:1 | i=4:1 | i=5:1 i=6:1 |
| a | 5 | | | | | | | |
| b | 265 | | | | 395 | | | |
| B | M160 | | | | M20 | | | |
| c | 60 | | | | 80 | | | |
| C | 230 | | | | 305 | | | |
| d | 60 | 45 | 45 | 45 | 80 | 65 | 65 | 55 |
| D | 80 | | | | 105 | | | |
| d2 | 255 | | | | 345 | | | |
| da | 65 | 65 | 65 | 65 | 90 | 90 | 90 | 72 |
| db | 65 | | | | 90 | | | |
| DR | M20 | | M16 | | M20 | M20 | M20 | M20 |
| e | 380 | 360 | 360 | 360 | 570 | 540 | 540 | 510 |
| f1 | 380 | | | | 570 | | | |
| f2 | 268 | | | | 410 | | | |
| g | 18 | | | | 22 | | | |
| h | 64,4 | | | | 85,4 | | | |
| i | 18 | | | | 22 | | | |
| j | | | | | | | | |
| k | 60 | | | | 80 | | | |
| l | 110 | 90 | 90 | 90 | 170 | 140 | 140 | 110 |
| L | 260 | | | | 350 | | | |
| La | 220 | | | | 285 | | | |
| m | 110 | | | | 170 | | | |
| n | 150 | | | | 198 | | | |
| n1 | 150 | | | | 205 | | | |
| o | 265 | | 265 | | 395 | 395 | 395 | 395 |
| p | 160 | 160 | 160 | 160 | 250 | 250 | 250 | 250 |
| p1 | 20 | | | | 26 | | | |
| p2 | 32 | | | | 26 | | | |
| q | 160 | | | | 250 | | | |
| r | 4 | | | | 20 | | | |
| s | 5 | | | | 5 | | | |
| t | 4 | 3,5 | 3,5 | 3,5 | 5 | 4 | 4 | 4 |
| u | 4 | | | | 5 | | | |
| v | 1 | 1,5 | 1,5 | 1,5 | 1,5 | 1,5 | 1,5 | 1,5 |
| w | 100 | | | | 160 | | | |
| x | 18 | 14 | 14 | 14 | 22 | 18 | 18 | 16 |
| y | 5 | 5 | 5 | 5 | 5 | 7,5 | 7,5 | 10 |
| z | 100 | 8 | 8 | 80 | 160 | 125 | 125 | 90 |

## Bevel gearboxes

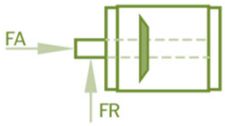
# ACCESORIES

## BEVEL GEARBOX BG

### RADIAL FORCES (N)

The permissible radial loads given in the tables are valid centrally between the shaft ends for the speeds and torques listed. The more unfavourable direction of loading was assumed in calculating these values. Higher radial loads are permissible if the direction of stress application and of radial rotation are carefully calculated. Please, consult us on this.


Axial forces FA can be absorbed without further supplementary calculation up to a level of approx. 50 % of the permissible radial forces. If the axial forces exceed these values by a significant margin or if simultaneous FR and FA forces occur, please consult us.




| Bevel gear box size | T2 (Nm) | n1 (rpm) 3000 | 1000 | 500 | 250 | 100 | 50 | n2 (rpm) 3000 | 1000 | 500 | 250 | 100 | 50 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| BG-065 | < 12 | 180 | 250 | 300 | 350 | 450 | 550 | 300 | 400 | 500 | 650 | 750 | 900 |
| | > 12 | 150 | 210 | 250 | 290 | 380 | 460 | 250 | 330 | 420 | 540 | 630 | 750 |
| BG-090 | < 30 | 300 | 400 | 470 | 580 | 700 | 800 | 500 | 660 | 800 | 950 | 1250 | 1500 |
| | > 30 | 250 | 330 | 390 | 490 | 590 | 670 | 420 | 550 | 670 | 790 | 1040 | 1250 |
| BG-120 | < 80 | 470 | 620 | 720 | 900 | 1150 | 1400 | 750 | 1000 | 1250 | 1500 | 1900 | 2200 |
| | > 80 | 390 | 520 | 600 | 750 | 960 | 1170 | 630 | 830 | 1040 | 1250 | 1580 | 1830 |
| BG-140 | < 140 | 700 | 870 | 1150 | 1370 | 1700 | 2000 | 1300 | 1700 | 2000 | 2500 | 3000 | 3800 |
| | > 140 | 590 | 730 | 960 | 1140 | 1420 | 1670 | 1083 | 1420 | 1670 | 2080 | 2500 | 3170 |
| BG-160 | < 220 | 1200 | 1600 | 1900 | 2200 | 2850 | 3300 | 2000 | 2800 | 3300 | 4000 | 5000 | 6500 |
| | > 220 | 1000 | 1340 | 1590 | 1840 | 2380 | 2750 | 1670 | 2340 | 2750 | 3340 | 4170 | 5420 |
| BG-200 | < 500 | 2200 | 1700 | 3200 | 3900 | 5000 | 6200 | 3200 | 4300 | 5000 | 6500 | 8000 | 10000 |
| | > 500 | 1840 | 1420 | 2670 | 3250 | 4170 | 5170 | 2670 | 3580 | 4170 | 5420 | 6670 | 8330 |
| BG-230 | < 750 | 4600 | 5150 | 7200 | 9450 | 11250 | 13100 | 5850 | 8650 | 10500 | 12250 | 15000 | 19000 |
| | > 750 | 3830 | 4290 | 6000 | 7870 | 9370 | 10920 | 4870 | 7210 | 8750 | 10210 | 12500 | 15830 |
| BG-260 | < 950 | 7000 | 8600 | 11200 | 15000 | 17500 | 20000 | 8500 | 13000 | 16000 | 18000 | 22000 | 28000 |
| | > 950 | 5830 | 7170 | 9330 | 12500 | 14580 | 16670 | 7080 | 10830 | 13330 | 15000 | 18330 | 23330 |
| BG-350 | < 2400 | 14500 | 15000 | 17500 | 22500 | 27500 | 33000 | 17500 | 18100 | 21100 | 26150 | 34200 | 40200 |
| | > 2400 | 12000 | 12500 | 14500 | 18700 | 23000 | 27500 | 14500 | 15080 | 17580 | 21790 | 28500 | 33500 |

### WEIGHTS (kg)

| Bevel gearbox Size | Model | Weight |
|---|---|---|
| BG-065 | A1 | 2,30 |
| | A2 | 2,70 |
| | B1 / C1 | 2,20 |
| | D1 | 2,30 |
| | B2 / C2 | 2,60 |
| | D2 | 2,70 |
| | E1 | 2,10 |
| | E2 | 2,50 |
| BG-090 | A1 | 5,10 |
| | A2 | 6,30 |
| | B1 / C1 | 5,40 |
| | D1 | 5,50 |
| | B2 / C2 | 6,90 |
| | D2 | 7,00 |
| | E1 | 5,00 |
| | E2 | 6,50 |
| BG-120 | A1 | 12,60 |
| | A2 | 15,00 |
| | B1 / C1 | 12,30 |
| | D1 | 12,50 |
| | B2 / C2 | 14,70 |
| | D2 | 14,90 |
| | E1 | 12,00 |
| | E2 | 14,40 |

| Bevel gearbox Size | Model | Weight |
|---|---|---|
| BG-140 | A1 | 19,00 |
| | A2 | 23,00 |
| | B1 / C1 | 18,50 |
| | D1 | 19,00 |
| | B2 / C2 | 22,70 |
| | D2 | 23,20 |
| | E1 | 18,00 |
| | E2 | 22,20 |
| BG-160 | A1 | 28,50 |
| | A2 | 35,00 |
| | B1 / C1 | 28,00 |
| | D1 | 28,50 |
| | B2 / C2 | 34,50 |
| | D2 | 35,00 |
| | E1 | 27,00 |
| | E2 | 34,00 |
| BG-200 | A1 | 52 |
| | A2 | 60 |
| | B1 / C1 | 48 |
| | D1 | 50 |
| | B2 / C2 | 58 |
| | D2 | 60 |
| | E1 | 48 |
| | E2 | 58 |

| Bevel gearbox Size | Model | Weight |
|---|---|---|
| BG-230 | A1 | 79 |
| | A2 | 97 |
| | B1 / C1 | 76 |
| | D1 | 78 |
| | B2 / C2 | 100 |
| | D2 | 102 |
| | E1 | 71 |
| | E2 | 95 |
| BG-260 | A1 | 85 |
| | A2 | 105 |
| | B1 / C1 | 85 |
| | D1 | 88 |
| | B2 / C2 | 109 |
| | D2 | 112 |
| | E1 | 82 |
| | E2 | 106 |
| BG-350 | A1 | 269 |
| | A2 | 340 |
| | B1 / C1 | 280 |
| | D1 | 287 |
| | B2 / C2 | 372 |
| | D2 | 379 |
| | E1 | 259 |
| | E2 | 351 |

## MOMENTS OF INERTIA J (kgcm$^2$)

Reduced to the input shaft (n1).

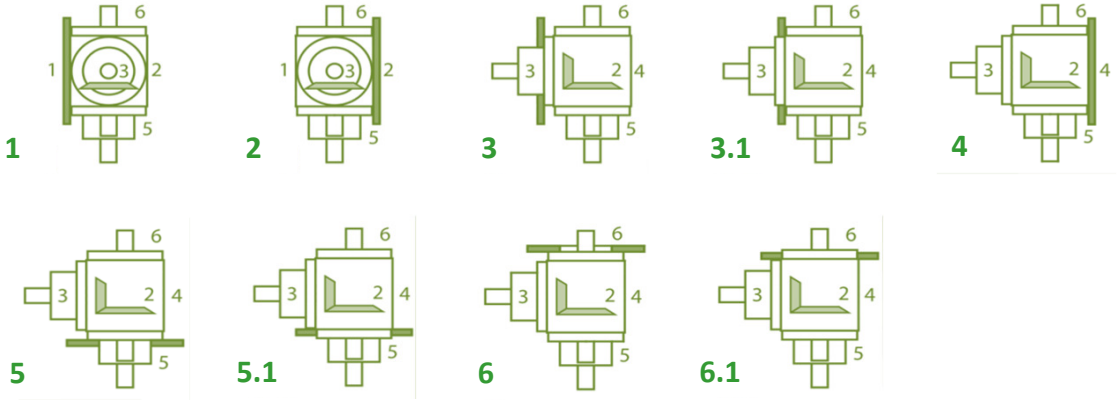
| Bevel gearbox Size | Model | Transmission ratios 1:1 | 1,5:1 | 2:1 | 3:1 | 4:1 | 5:1 | 6:1 |
|---|---|---|---|---|---|---|---|---|
| **BG-065** | A1 | 0,3888 | 0,2406 | 0,1839 | 0,1036 | | | |
| | A2 | 0,5832 | 0,3270 | 0,2325 | 0,1252 | | | |
| | B1 / C1 | 0,4231 | 0,3111 | 0,2330 | 0,1001 | | | |
| | D1 | 0,4330 | 0,3155 | 0,2355 | 0,1012 | | | |
| | B2 / C2 | 0,6175 | 0,4653 | 0,3683 | 0,1821 | | | |
| | D2 | 0,6274 | 0,4697 | 0,3708 | 0,1832 | | | |
| | E1 | 0,4754 | 0,3634 | 0,2853 | 0,1524 | | | |
| | E2 | 0,6698 | 0,5176 | 0,4206 | 0,2344 | | | |
| **BG-090** | A1 | 2,5590 | 1,4822 | 1,1437 | 0,8884 | 0,3631 | 0,3248 | 0,3062 |
| | A2 | 3,8385 | 2,0508 | 1,4636 | 1,0305 | 0,4430 | 0,3760 | 0,3418 |
| | B1 / C1 | 3,3543 | 2,1833 | 1,3652 | 1,0465 | 0,4607 | 0,3933 | 0,3502 |
| | D1 | 3,3827 | 2,1959 | 1,3723 | 1,0496 | 0,4625 | 0,3945 | 0,3510 |
| | B2 / C2 | 4,6338 | 3,0968 | 2,1890 | 1,7927 | 0,7438 | 0,6669 | 0,6209 |
| | D2 | 4,6622 | 3,1094 | 2,1961 | 1,7958 | 0,7456 | 0,6681 | 0,6217 |
| | E1 | 3,2507 | 2,1372 | 1,3393 | 1,0350 | 0,4542 | 0,3892 | 0,3473 |
| | E2 | 4,5302 | 3,0507 | 2,1631 | 1,7812 | 0,7373 | 0,6628 | 0,6180 |
| **BG-120** | A1 | 10,4976 | 4,8409 | 3,6465 | 2,3159 | 1,2164 | 0,7516 | 0,6766 |
| | A2 | 15,7464 | 7,1737 | 4,9587 | 2,8991 | 1,5444 | 0,9615 | 0,8224 |
| | B1 / C1 | 15,3022 | 7,4441 | 4,9747 | 3,0123 | 1,6729 | 1,0593 | 0,8982 |
| | D1 | 15,5996 | 7,5762 | 5,0490 | 3,0453 | 1,6915 | 1,0712 | 0,9065 |
| | B2 / C2 | 20,5510 | 9,9522 | 7,3090 | 4,7450 | 2,5612 | 1,6009 | 1,4290 |
| | D2 | 20,8484 | 10,0843 | 7,3833 | 4,7780 | 2,5798 | 1,6128 | 1,4373 |
| | E1 | 15,1939 | 7,3959 | 4,9476 | 3,0003 | 1,6661 | 1,0550 | 0,8952 |
| | E2 | 20,4427 | 9,9040 | 7,2819 | 4,7330 | 2,5544 | 1,5966 | 1,4260 |
| **BG-140** | A1 | 26,2670 | 11,8569 | 8,6762 | 6,4356 | 1,8432 | 1,5320 | 1,3708 |
| | A2 | 39,4005 | 17,6940 | 11,9596 | 7,8949 | 2,6641 | 2,0574 | 1,7356 |
| | B1 / C1 | 36,0994 | 18,7513 | 12,2785 | 7,9547 | 2,6978 | 2,2113 | 1,8426 |
| | D1 | 37,0815 | 19,1878 | 12,5241 | 8,0639 | 2,7592 | 2,2506 | 1,8698 |
| | B2 / C2 | 49,2329 | 24,7711 | 17,6713 | 12,9310 | 3,7202 | 3,2180 | 2,8486 |
| | D2 | 50,2150 | 25,2076 | 17,9169 | 13,0402 | 3,7816 | 3,2573 | 2,8758 |
| | E1 | 32,6630 | 17,2240 | 11,4194 | 7,5729 | 2,4830 | 2,0739 | 1,7471 |
| | E2 | 45,7965 | 23,2438 | 16,8122 | 12,5492 | 3,5054 | 3,0806 | 2,7531 |
| **BG-160** | A1 | 29,6710 | 19,6374 | 12,3589 | 8,9516 | 6,4348 | 2,2733 | 2,0901 |
| | A2 | 44,5065 | 26,2309 | 16,0678 | 10,6000 | 7,3620 | 2,8667 | 2,5022 |
| | B1 / C1 | 31,5527 | 32,0243 | 20,1006 | 12,0803 | 8,4198 | 3,6887 | 2,9407 |
| | D1 | 32,5820 | 32,4818 | 20,3579 | 12,1947 | 8,4841 | 3,7299 | 2,9693 |
| | B2 / C2 | 46,3882 | 45,0681 | 28,7506 | 19,3835 | 13,9274 | 5,3686 | 4,6187 |
| | D2 | 47,4175 | 45,5256 | 29,0079 | 19,4979 | 13,9917 | 5,4098 | 4,6473 |
| | E1 | 34,3851 | 33,1416 | 20,6658 | 12,3315 | 8,5611 | 3,7791 | 3,0048 |
| | E2 | 49,2206 | 46,1854 | 29,3158 | 19,6347 | 14,0687 | 5,4590 | 4,6828 |
| **BG-200** | A1 | 121,2522 | 57,6950 | 36,3095 | 18,8322 | 14,2651 | 6,1470 | 5,3881 |
| | A2 | 181,8783 | 84,6400 | 51,4661 | 25,5685 | 18,0543 | 8,5721 | 7,0721 |
| | B1 / C1 | 174,7000 | 103,5829 | 71,6215 | 34,1931 | 22,7181 | 12,8770 | 10,0616 |
| | D1 | 177,8173 | 104,9684 | 72,4008 | 34,5395 | 22,9130 | 13,0016 | 10,1482 |
| | B2 / C2 | 235,3261 | 134,3330 | 92,7745 | 46,2891 | 33,1941 | 16,5990 | 13,7656 |
| | D2 | 238,4434 | 135,7185 | 93,5538 | 46,6355 | 33,3890 | 16,7236 | 13,8522 |
| | E1 | 201,3904 | 109,0276 | 76,4341 | 35,2209 | 23,3588 | 13,8070 | 10,7075 |
| | E2 | 262,0165 | 139,7777 | 97,5871 | 47,3169 | 33,8348 | 17,5290 | 14,4115 |
| **BG-230** | | Upon request | | | | | | |
| **BG-260** | A1 | 814,2000 | 305,9333 | 194,2750 | 85,0833 | 46,7738 | 37,2840 | 31,8083 |
| | A2 | 1221,3000 | 486,8667 | 296,0500 | 130,3167 | 72,2175 | 53,5680 | 43,1167 |
| | B1 / C1 | 827,4400 | 168,2622 | 281,3350 | 117,2211 | 66,6638 | 50,0136 | 40,7039 |
| | D1 | 841,8500 | 383,5556 | 284,9375 | 52,2667 | 67,5644 | 50,5900 | 41,1042 |
| | B2 / C2 | 1234,5400 | 293,2622 | 373,8350 | 157,0711 | 87,9938 | 71,0136 | 61,2039 |
| | D2 | 1248,9500 | 508,5556 | 377,4375 | 92,1167 | 88,8944 | 71,5900 | 61,6042 |
| | E1 | 828,6900 | 413,2622 | 287,8975 | 120,1100 | 68,2888 | 51,0536 | 41,4261 |
| | E2 | 1235,7900 | 538,2622 | 380,3975 | 159,9600 | 89,6188 | 72,0536 | 61,9261 |
| **BG-350** | | Upon request | | | | | | |

## Bevel gearboxes

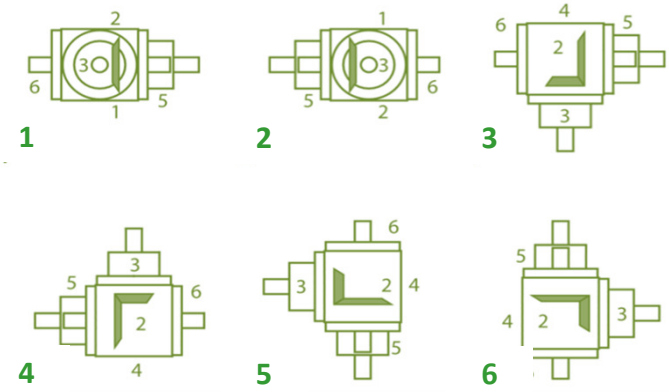
# ACCESORIES

## BEVEL GEARBOX BG

### MOUNTING SIDE

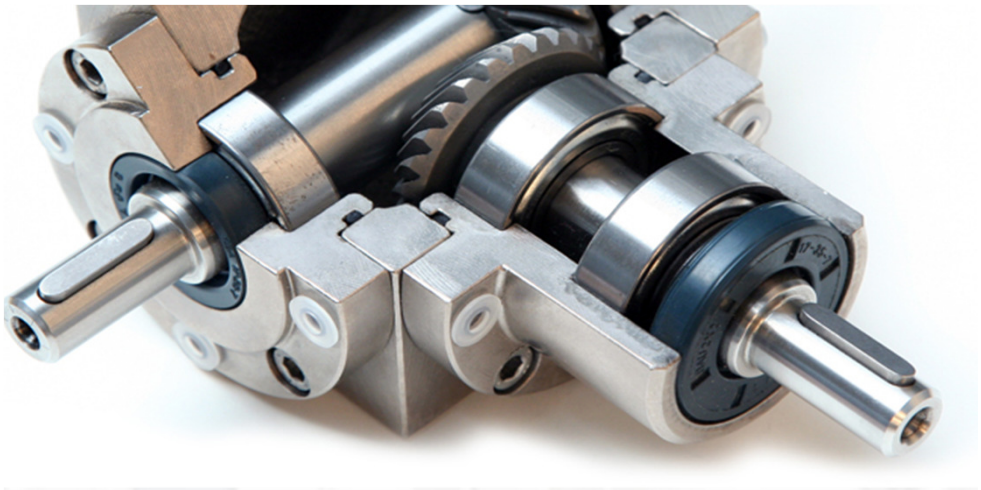



### MOUNTING CONFIGURATION (Downward-facing side)




### ORDER DESIGNATION

| | Type | Size | Ratio | Model | Mount. side | Mount. config. | n2 max | Design |
|---|---|---|---|---|---|---|---|---|
| e.g. → | BG | 065 | 1:1 | A1 | 1 | 1 | 500 | 0000 |
| | ***BG*** *NIASA Bevel gearboxes* | | | | *9: Universal* | *9: Universal* | | *0000: Standard design* |



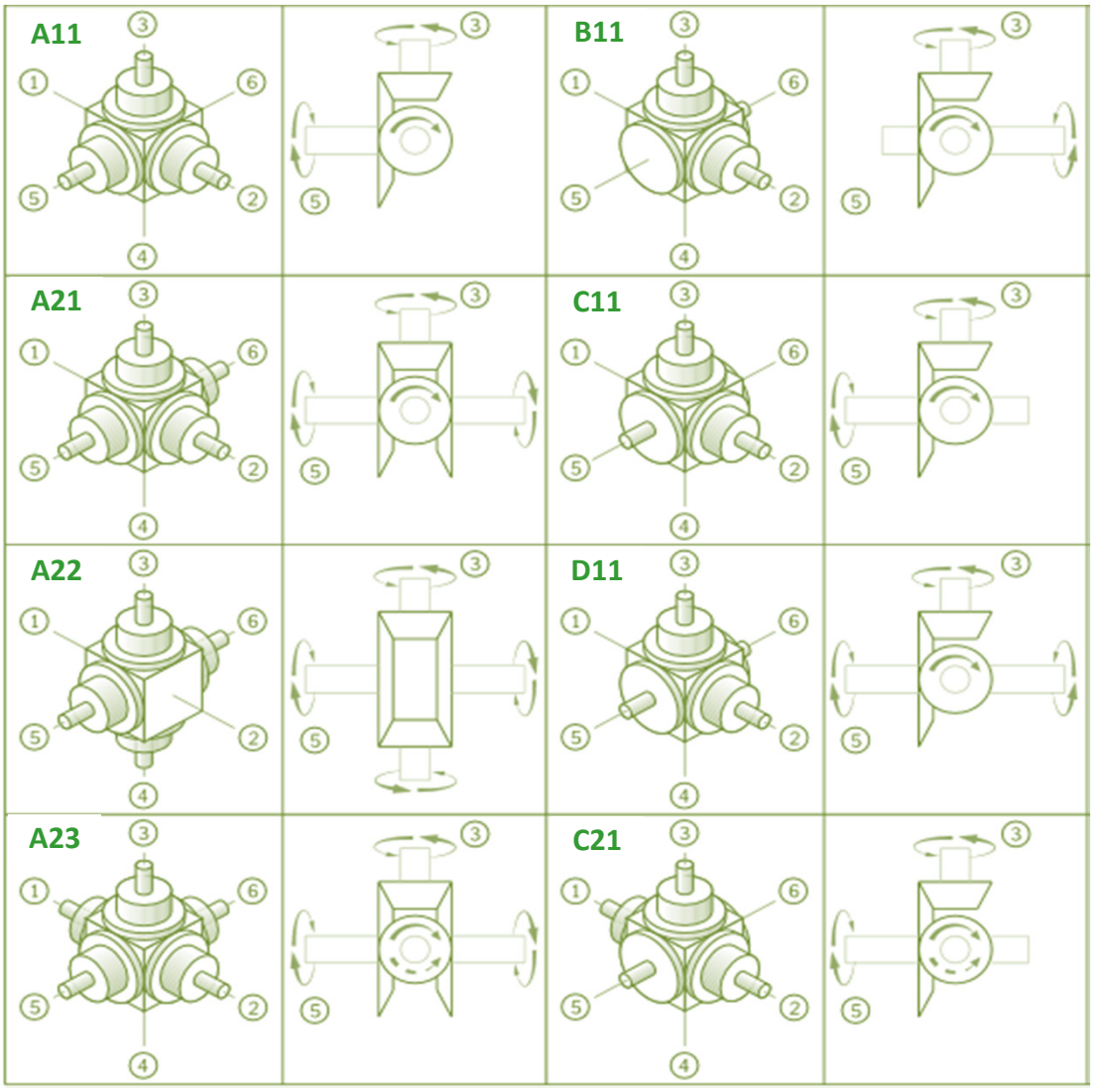
## Bevel gearboxes

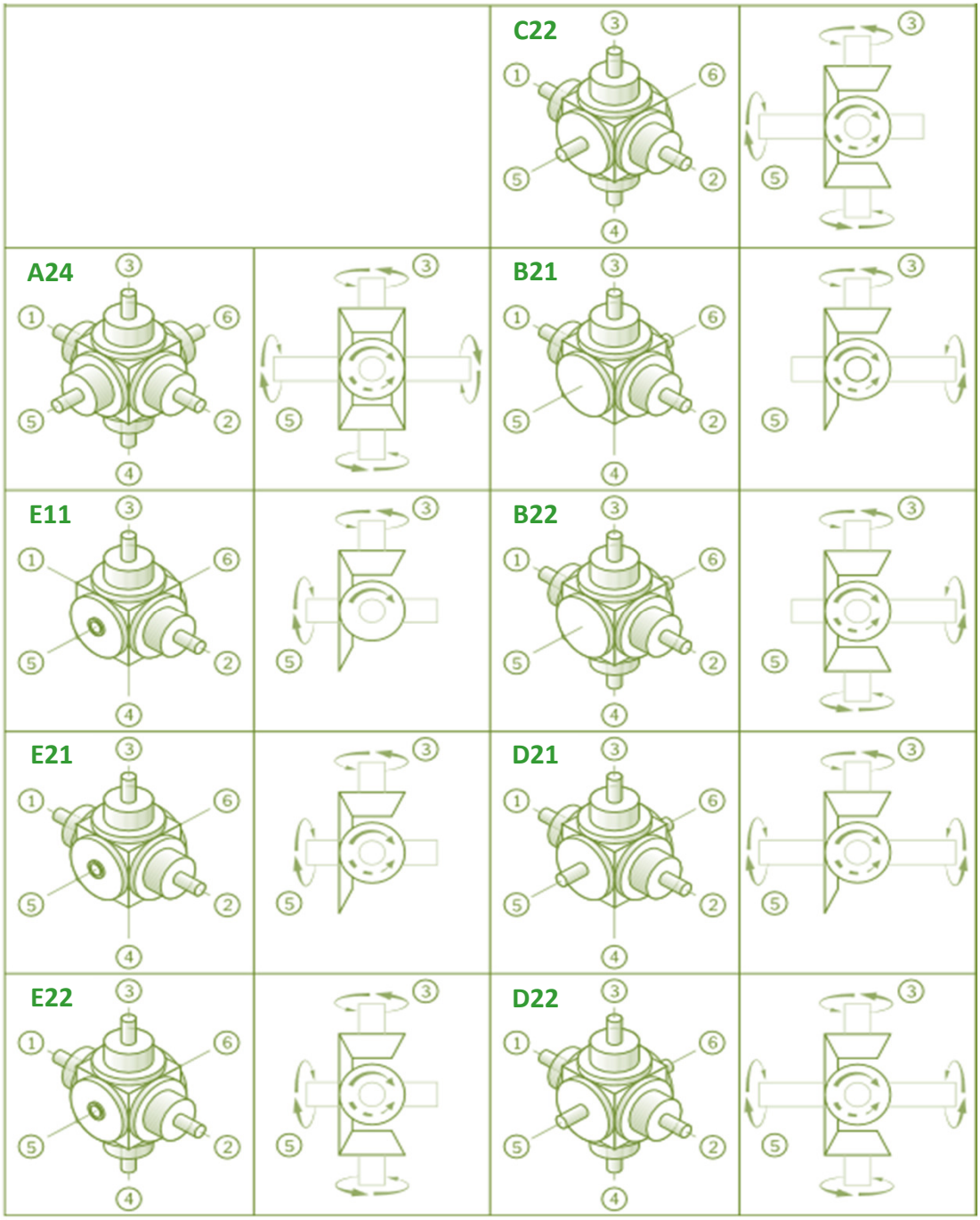
# ACCESORIES

## BEVEL GEARBOX BG

### MULTISHAFT BEVEL GEARBOXES

The modular construction of **NIASA bevel gearboxes** makes it possible to produce a wide range of design variants. The dimensions are the same as those of the standard versions. With the exception of i=1:1, all transmission ratios are available. (Exception: model A22 is also available in i=1:1)




C22
A24
B21
E11
B22
E21
D21
E22
D22