

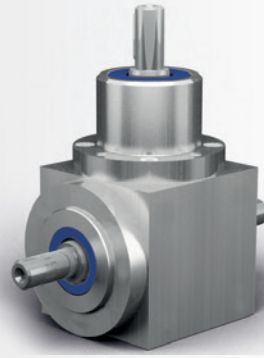
ATEK

ANTRIEBSTECHNIK

Type HDV –
Hygiene-design gearboxes



 **FLOHR**
INDUSTRIETECHNIK GMBH



7.1 Type overview



Type HDV – Hygiene-design bevel gearboxes

Gear ratios: $i = 1:1$ to $6:1$
Maximum output torque: 430 Nm
4 gearbox sizes with edge lengths of 065 to 140 mm
Low-backlash construction < 10 angular minutes possible
All outside parts made of VA steel

7.2 Type HDV – Hygiene-design bevel gearboxes

The HDV-series gearboxes are intended for the use in food and pharmaceutical industries (including offshore and rough conditions). They are based on our proven standard gearboxes from the range of single-stage bevel gearboxes (V series) and have therefore the same external dimensions.

They vary in the following features:

- All outside parts are made of high-quality stainless steel.
- The shaft seal rings installed in the type have an additional dust lip.
- The housing and the flanges do not contain any bores or other dust pockets.
- Required mounting bores will be drilled application-specifically according to your specifications.
- The dimensions of the gearboxes are identical to those of the type-V gearboxes.
- Etched type plate
- No vent filters
- Surface roughness < Ra 0.8
- NOTOX lubrication

7.2.1 General construction

The axles intersect in the gearbox in an angle of 90°. Housing, cover(s) and shafts are made of stainless steel. The edge length of the housing is reflected in the gearbox size (example: HDV 065 – housing edge length 65 mm).

7.2.2 Toothing

ATEK bevel gearboxes have gear sets with high-quality spiral toothing made of hardened carburised steel. A gear set comprises one bevel pinion (small number of teeth / small diameter) and one bevel gear (large number of teeth / large diameter).

Gear sets with spiral toothing offer the advantage of very favourable engagement factors (high meshing ratio). Therefore they are predestined for usage with high loads, combined with optimal running smoothness and high transmission accuracy.

7.2.3 Construction types

Due to the modular system, different gearbox construction types can be configured. The construction types vary in

| Construction type | consists of: | |
|-------------------|--------------|--------------------------------|
| A0 through E0 | 1 gear set | |
| F0 through K0 | 1 gear set | + 1 bevel pinion or bevel gear |

Table 7.2.3-1

The variants differ in type and number of the shafts, the rotational direction of the shafts and their support by bearings.

7.2.4 Threaded mounting holes

All 6 sides of the gearboxes are machined and may be used as mounting surfaces. The standard version has no threaded mounting holes. Threaded mounting holes will be drilled according to your requirements.

You have the following available ordering options:

| Order code | Threaded mounting holes are in the housing surfaces on the gearbox side | Threaded mounting holes are in the flanges on the gearbox side |
|------------|---|--|
| 0 | - | - |
| 1 | 1 | |
| 2 | 2 | |
| 3 | | 3 |
| 4 | 4 | |
| 5 | | 5 |
| 6 | | 6 |

Table 7.2.4-1

7 Hygiene-design gearboxes

The standard version of the mounting / fastening has the order code 0.

Example of order code: HDV 090 1:1D0 1.1 500/0000

The size and the position of the threaded mounting holes correspond to those of the type V (page 29 and following)

| | HDV 065 | HDV 090 | HDV 120 | HDV 140 |
|-------------------|---------|---------|----------|----------|
| Thread size | M6 x 12 | M8 x 14 | M10 x 16 | M10 x 20 |
| Grid spacing (mm) | 45 | 70 | 100 | 110 |

Tabelle 7.2.4-2

7.2.5 Installation position

The gearboxes can be used in all installation positions. The recommended installation position is the position in which the shafts are horizontal. These are the installation positions 1 and 2. The installation position is defined by the gearbox side directed downwards during operation and will be indicated by the corresponding gearbox side. Please contact us for consultation if the angle of the gearbox side directed downwards deviates more than 15° from the horizontal position.

7.2.6 Shaft designation – allocation to the gearbox sides

The fast-rotating shaft has the speed n_1 and is identified by N_1 . The bevel pinion is located on this shaft.

The slowly rotating shaft has the speed n_2 and is identified by N_2 . The bevel gear is located on this shaft. The gearbox sides are identified by the numerals 1 to 6 (see Figure 4.3.1-1 Gearbox sides)

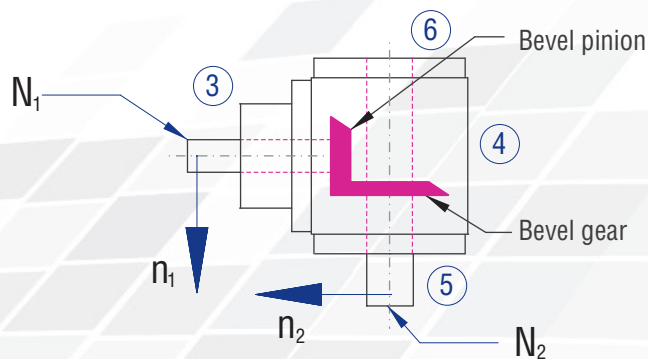


Figure 7.2.6-1; Shaft designations

7.2.7 Preferred direction of rotation

If the clockwise (CW) direction of rotation (viewing direction from shaft end face of the fast-rotating shaft towards the gearbox centre) is selected, a 1 to 2 dB(A) lower noise level is generated.

7.2.8 Efficiency

The achievable efficiency depends on rotational speed, torque, installation position, sealing, and lubricant type.

With gearboxes having only one gear set, an efficiency of 97% can be achieved. With gearboxes having several gear meshings, an efficiency of 94% can be achieved. The efficiencies specified in the tables relate to the permissible nominal load and are guidance values for run-in gearboxes at operating temperature with standard sealing and filled with oil of viscosity grade 220.

7.2.9 Lubrication

The HDV-series gearboxes have lifetime NOTOX lubrication.

7.2.10 Vent filter

No venting is provided.

7.2.11 Low-backlash construction

For low-friction running, the tooth space in the gear set is manufactured larger than the tooth. When the direction of rotation is changed, this results in a rotation angle until the counter-rotating tooth flanks contact each other. This rotation angle is called circumferential backlash.

Circumferential backlash, measuring method

The circumferential backlash is measured after the drive shaft (N1) has been fixed. A force of around 2% of the nominal torque is applied to the output shaft (N2) in both rotational directions. A tooth backlash will result between the two final positions. This can be measured as rotation angle and is indicated in minutes of arc [arcmin].

Circumferential backlash, type

| Ordering option | Gear set | 1:1 2:1 | 3:1 4:1 5:1 6:1 |
|-----------------|------------------|------------------|------------------|
| /0000 | Standard | ≤ 30 arcmin | ≤ 30 arcmin |
| /S2 | Standard | ≤ 10 arcmin | ≤ 10 arcmin |
| /S1 | Standard | ≤ 6 arcmin | u.r. |
| /S0 | Special gear set | ≤ 4 arcmin | u.r. |

Abbreviations: ✓ - yes, is possible

7.2.12 Corrosion protection

Housing, flanges and shafts are made of rust-proof stainless steel.

7.2 Type HDV – Hygiene-design bevel gearboxes



7.2.13 Features

Gear ratios: $i = 1:1$ to $6:1$
 Maximum output torque: 430 Nm
 4 gearbox sizes with edge lengths of 065 to 140 mm
 Low-backlash construction < 10 angular minutes possible
 All outside parts made of VA steel

7.2.14 Models

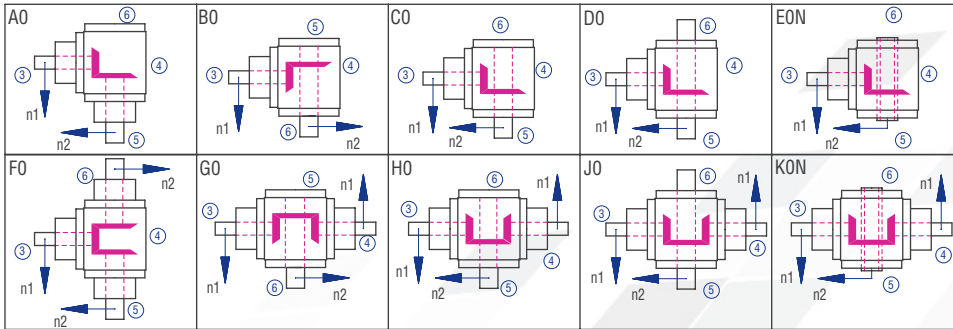


Figure 7.2.14-1; Models

7.2.15 Gearbox sides

The example shows the Model C0

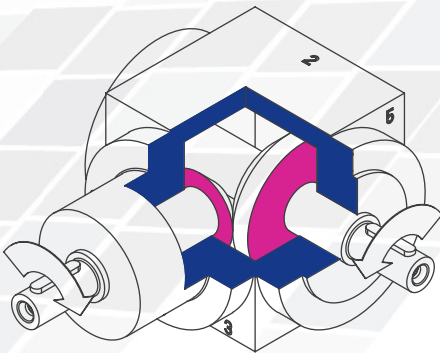


Figure 7.2.15-1; Gearbox sides

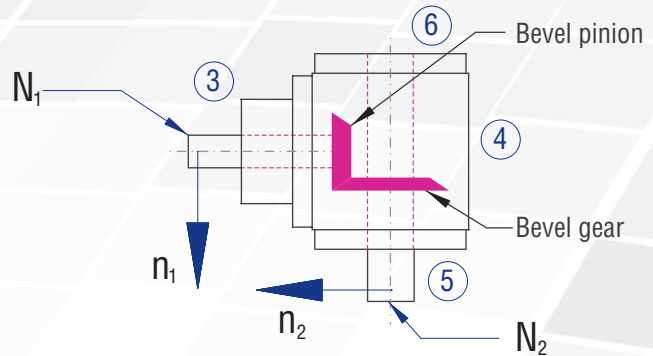


Figure 7.2.15-2; Shaft designations

7.2.16 Order code

The order code reflects the customer specifications. Example:

| Type | Size | Gear ratio | Model | Fixing side | Installation position | Speed n_2 | Design |
|-------------|-------------------------------------|----------------|-------------------------|---|---|---------------------------------------|-------------|
| HDV | 065 | 1:1 | C0- | 1. | 1- | 500 | /0000 |
| Description | Housing edge length; Table 7.2.17-1 | Table 7.2.17-1 | Figure 7.2.14-1; Models | Side on which fixing is made; Table 7.2.4-1; Figure 4.3.1-1 Gearbox sides | Side directed downwards; Figure 4.3.1-1 Gearbox sides | Slowly rotating shaft; Table 7.2.17-1 | S1 Standard |

7.2.17 Overview of performance data

| Size | n ₁ [rpm] | 1:1 | | | 1.5:1 | | | 2:1 | | | 3:1 | | | 4:1 | | | 5:1 | | | 6:1 | | | | |
|------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|--|--|
| | | n ₂ [rpm] | P _{1N} [kW] | T _{2N} [Nm] | n ₂ [rpm] | P _{1N} [kW] | T _{2N} [Nm] | n ₂ [rpm] | P _{1N} [kW] | T _{2N} [Nm] | n ₂ [rpm] | P _{1N} [kW] | T _{2N} [Nm] | n ₂ [rpm] | P _{1N} [kW] | T _{2N} [Nm] | n ₂ [rpm] | P _{1N} [kW] | T _{2N} [Nm] | n ₂ [rpm] | P _{1N} [kW] | T _{2N} [Nm] | | |
| 065 | 3000 | 3000 | 3000 | 3,31 | 10 | 2000 | 2,20 | 10 | 1500 | 1,65 | 10 | 1000 | 1,10 | 10 | | | | | | | | | | |
| | 2400 | 2400 | 2400 | 2,65 | 10 | 1600 | 1,76 | 10 | 1200 | 1,32 | 10 | 800 | 0,88 | 10 | | | | | | | | | | |
| | 1500 | 1500 | 1500 | 1,82 | 11 | 1000 | 1,21 | 11 | 750 | 0,91 | 11 | 500 | 0,61 | 11 | | | | | | | | | | |
| | 1000 | 1000 | 1000 | 1,32 | 12 | 667 | 0,88 | 12 | 500 | 0,66 | 12 | 333 | 0,44 | 12 | | | | | | | | | | |
| | 750 | 750 | 750 | 1,07 | 13 | 500 | 0,72 | 13 | 375 | 0,54 | 13 | 250 | 0,33 | 12 | | | | | | | | | | |
| | 500 | 500 | 500 | 0,83 | 15 | 333 | 0,55 | 15 | 250 | 0,41 | 15 | 167 | 0,24 | 13 | | | | | | | | | | |
| | 250 | 250 | 250 | 0,47 | 17 | 167 | 0,31 | 17 | 125 | 0,23 | 17 | 83 | 0,12 | 13 | | | | | | | | | | |
| | 50 | 50 | 50 | 0,10 | 18 | 33 | 0,07 | 18 | 25 | 0,05 | 18 | 17 | 0,03 | 14 | | | | | | | | | | |
| 090 | 3000 | 3000 | 3000 | 8,93 | 27 | 2000 | 5,51 | 25 | 1500 | 3,80 | 23 | 1000 | 2,54 | 23 | 750 | 1,90 | 23 | 600 | 1,52 | 23 | 500 | 1,25 | | |
| | 2400 | 2400 | 2400 | 7,41 | 28 | 1600 | 4,59 | 26 | 1200 | 3,17 | 24 | 800 | 2,12 | 24 | 600 | 1,65 | 25 | 480 | 1,32 | 25 | 400 | 1,09 | | |
| | 1500 | 1500 | 1500 | 5,29 | 32 | 1000 | 3,20 | 29 | 750 | 2,23 | 27 | 500 | 1,49 | 27 | 375 | 1,12 | 27 | 300 | 0,89 | 27 | 250 | 0,74 | | |
| | 1000 | 1000 | 1000 | 3,75 | 34 | 667 | 2,35 | 32 | 500 | 1,71 | 31 | 333 | 1,14 | 31 | 250 | 0,85 | 31 | 200 | 0,68 | 31 | 167 | 0,53 | | |
| | 750 | 750 | 750 | 3,06 | 37 | 500 | 1,93 | 35 | 375 | 1,32 | 32 | 250 | 0,88 | 32 | 188 | 0,66 | 32 | 150 | 0,53 | 32 | 125 | 0,40 | | |
| | 500 | 500 | 500 | 2,20 | 40 | 333 | 1,36 | 37 | 250 | 0,94 | 34 | 167 | 0,63 | 34 | 125 | 0,47 | 34 | 100 | 0,37 | 34 | 83 | 0,27 | | |
| | 250 | 250 | 250 | 1,21 | 44 | 167 | 0,74 | 40 | 125 | 0,50 | 36 | 83 | 0,33 | 36 | 63 | 0,25 | 36 | 50 | 0,20 | 36 | 42 | 0,14 | | |
| | 50 | 50 | 50 | 0,28 | 50 | 33 | 0,16 | 45 | 25 | 0,10 | 37 | 17 | 0,07 | 37 | 13 | 0,05 | 37 | 10 | 0,04 | 37 | 8 | 0,03 | | |
| 120 | 3000 | 3000 | 3000 | 21,82 | 66 | 2000 | 13,45 | 61 | 1500 | 9,26 | 56 | 1000 | 6,39 | 58 | 750 | 4,96 | 60 | 600 | 3,97 | 60 | 500 | 2,95 | | |
| | 2400 | 2400 | 2400 | 18,52 | 70 | 1600 | 11,46 | 65 | 1200 | 8,07 | 61 | 800 | 5,56 | 63 | 600 | 4,43 | 67 | 480 | 3,44 | 65 | 400 | 2,53 | | |
| | 1500 | 1500 | 1500 | 13,56 | 82 | 1000 | 8,60 | 78 | 750 | 6,03 | 73 | 500 | 4,08 | 74 | 375 | 3,06 | 74 | 300 | 2,38 | 72 | 250 | 1,75 | | |
| | 1000 | 1000 | 1000 | 10,14 | 92 | 667 | 6,32 | 86 | 500 | 4,46 | 81 | 333 | 3,01 | 82 | 250 | 2,18 | 79 | 200 | 1,76 | 80 | 167 | 1,22 | | |
| | 750 | 750 | 750 | 8,51 | 103 | 500 | 5,18 | 94 | 375 | 3,55 | 86 | 250 | 2,40 | 87 | 188 | 1,69 | 82 | 150 | 1,42 | 86 | 125 | 0,94 | | |
| | 500 | 500 | 500 | 6,34 | 115 | 333 | 3,85 | 100 | 250 | 2,54 | 92 | 167 | 1,66 | 90 | 125 | 1,16 | 84 | 100 | 0,98 | 89 | 83 | 0,63 | | |
| | 250 | 250 | 250 | 3,39 | 123 | 167 | 1,99 | 100 | 125 | 1,35 | 98 | 83 | 0,87 | 95 | 63 | 0,60 | 87 | 50 | 0,51 | 92 | 42 | 0,33 | | |
| | 50 | 50 | 50 | 0,72 | 130 | 33 | 0,41 | 100 | 25 | 0,29 | 107 | 17 | 0,21 | 110 | 13 | 0,12 | 90 | 10 | 0,10 | 95 | 8 | 0,06 | | |
| 140 | 3000 | 3000 | 3000 | 39,68 | 120 | 2000 | 24,91 | 113 | 1500 | 16,53 | 100 | 1000 | 12,12 | 110 | 750 | 8,51 | 103 | 600 | 6,61 | 100 | 500 | 5,18 | | |
| | 2400 | 2400 | 2400 | 37,04 | 140 | 1600 | 22,22 | 126 | 1200 | 14,68 | 111 | 800 | 11,46 | 130 | 600 | 7,34 | 111 | 480 | 5,56 | 105 | 400 | 4,58 | | |
| | 1500 | 1500 | 1500 | 26,78 | 162 | 1000 | 17,08 | 155 | 750 | 11,41 | 138 | 500 | 8,05 | 146 | 375 | 4,96 | 120 | 300 | 3,80 | 115 | 250 | 2,95 | | |
| | 1000 | 1000 | 1000 | 20,28 | 184 | 667 | 12,87 | 175 | 500 | 8,38 | 152 | 333 | 5,87 | 160 | 250 | 3,75 | 136 | 200 | 2,73 | 124 | 167 | 2,06 | | |
| | 750 | 750 | 750 | 16,20 | 196 | 500 | 10,47 | 190 | 375 | 6,86 | 166 | 250 | 4,60 | 167 | 188 | 3,06 | 148 | 150 | 2,15 | 130 | 125 | 1,61 | | |
| | 500 | 500 | 500 | 11,46 | 208 | 333 | 7,34 | 200 | 250 | 4,96 | 180 | 167 | 3,20 | 174 | 125 | 2,12 | 154 | 100 | 1,50 | 136 | 83 | 1,09 | | |
| | 250 | 250 | 250 | 5,92 | 215 | 167 | 3,76 | 204 | 125 | 2,62 | 190 | 83 | 1,62 | 177 | 63 | 1,12 | 162 | 50 | 0,79 | 143 | 42 | 0,56 | | |
| | 50 | 50 | 50 | 1,21 | 220 | 33 | 0,76 | 210 | 25 | 0,55 | 200 | 17 | 0,34 | 180 | 13 | 0,23 | 170 | 10 | 0,17 | 150 | 8 | 0,11 | | |

Table 7.2.17-1

Hygiene-design
gearboxes

7.2.18 Type HDV 065 – Hygiene-design bevel gearboxes



Characteristics

| Characteristic | Standard | Option |
|---------------------------------|--|--------------------|
| Toothing | Spiral toothed bevel gear set | See chapter 7.2.2 |
| Gear ratios | 1:1 to 3:1 | |
| Housing / Flanges | 1.4581 / 1.4305 | See chapter 7.2.1 |
| Threaded mounting holes | Customer-specific | See chapter 7.2.4 |
| Shaft | 1.4305, shaft ends greased Fit with ISO 6 tolerance with parallel keyway: according to DIN 6885 Sheet 1 | See chapter 4.6.2 |
| Hollow shaft | 1.4305, shafts greased Fit with ISO 7 tolerance with parallel keyway: according to DIN 6885 Sheet 1 | See chapter 4.6.3 |
| Radial shaft seal ring: | NBR, form A | See chapter 4.8 |
| Ambient temperature | -10°C to +90°C. The values of the performance tables are valid for +20°C | See chapter 4.9.3 |
| Circumferential backlash | < 30 arcmin | See chapter 7.2.11 |
| Protection class | IP 56 | See chapter 4.5 |
| Corrosion protection | - | See chapter 7.2.12 |
| Bearing life L10h: | more than 15,000h | See chapter 4.9.1 |
| Oil change intervals | Not required | See chapter 7.2.9 |
| Lubricants | Synthetic lubricant, NSF-approved (NOTOX) | See chapter 7.2.9 |
| Type plate | Etched | |

Performance data

| n_1 [rpm] | 1:1 | | | 1.5:1 | | | 2:1 | | | 3:1 | | | 4:1 | | | 5:1 | | | 6:1 | | | |
|-----------------|----------------|------------------|------------------|----------------|------------------|------------------|----------------|------------------|------------------|----------------|------------------|------------------|----------------|------------------|------------------|----------------|------------------|------------------|----------------|------------------|------------------|--|
| | n_2 [rpm] | P_{1N} [kW] | T_{2N} [Nm] | n_2 [rpm] | P_{1N} [kW] | T_{2N} [Nm] | n_2 [rpm] | P_{1N} [kW] | T_{2N} [Nm] | n_2 [rpm] | P_{1N} [kW] | T_{2N} [Nm] | n_2 [rpm] | P_{1N} [kW] | T_{2N} [Nm] | n_2 [rpm] | P_{1N} [kW] | T_{2N} [Nm] | n_2 [rpm] | P_{1N} [kW] | T_{2N} [Nm] | |
| 3000 | 3000 | 3.31 | 10 | 2000 | 2.20 | 10 | 1500 | 1.65 | 10 | 1000 | 1.10 | 10 | | | | | | | | | | |
| 2400 | 2400 | 2.65 | 10 | 1600 | 1.76 | 10 | 1200 | 1.32 | 10 | 800 | 0.88 | 10 | | | | | | | | | | |
| 1500 | 1500 | 1.82 | 11 | 1000 | 1.21 | 11 | 750 | 0.91 | 11 | 500 | 0.61 | 11 | | | | | | | | | | |
| 1000 | 1000 | 1.32 | 12 | 667 | 0.88 | 12 | 500 | 0.66 | 12 | 333 | 0.44 | 12 | | | | | | | | | | |
| 750 | 750 | 1.07 | 13 | 500 | 0.72 | 13 | 375 | 0.54 | 13 | 250 | 0.33 | 12 | | | | | | | | | | |
| 500 | 500 | 0.83 | 15 | 333 | 0.55 | 15 | 250 | 0.41 | 15 | 167 | 0.24 | 13 | | | | | | | | | | |
| 250 | 250 | 0.47 | 17 | 167 | 0.31 | 17 | 125 | 0.23 | 17 | 83 | 0.12 | 13 | | | | | | | | | | |
| 50 | 50 | 0.10 | 18 | 33 | 0.07 | 18 | 25 | 0.05 | 18 | 17 | 0.03 | 14 | | | | | | | | | | |
| P_{1Nt} [kW] | 1.4 | | | 1.4 | | | 1.4 | | | 1.4 | | | | | | | | | | | | |
| T_{2max} [Nm] | 25 | | | 25 | | | 25 | | | 23 | | | | | | | | | | | | |

The mass of the gearbox may deviate depending on the gear ratio.

Permissible radial force F_{r1} and axial force F_{a1} on shaft N_1

The permissible radial forces depend on torque, rotational speed and direction.

They must be calculated for the respective case of application. Please enquire these.

| n_1 [rpm] | 3000 | | 1000 | | 500 | | 250 | | 100 | | 50 | |
|-------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| T_2 [Nm] | F_r [N] | F_a [N] | F_r [N] | F_a [N] | F_r [N] | F_a [N] | F_r [N] | F_a [N] | F_r [N] | F_a [N] | F_r [N] | F_a [N] |
| < 12 | 180 | 90 | 250 | 125 | 300 | 150 | 350 | 175 | 450 | 225 | 550 | 275 |
| > 12 | 150 | 75 | 210 | 105 | 250 | 125 | 290 | 145 | 380 | 190 | 460 | 230 |

Permissible radial force F_{r2} and axial force F_{a2} on shaft N_2

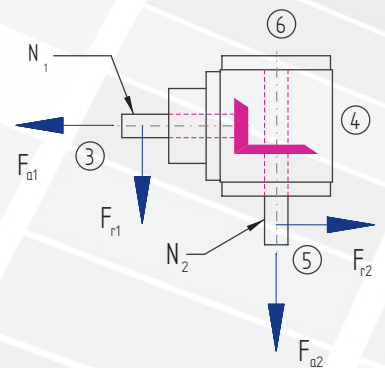
| n_2 [rpm] | 3000 | | 1000 | | 500 | | 250 | | 100 | | 50 | |
|-------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| T_2 [Nm] | F_r [N] | F_a [N] | F_r [N] | F_a [N] | F_r [N] | F_a [N] | F_r [N] | F_a [N] | F_r [N] | F_a [N] | F_r [N] | F_a [N] |
| < 12 | 300 | 150 | 400 | 200 | 500 | 250 | 650 | 325 | 750 | 375 | 900 | 450 |
| > 12 | 250 | 125 | 330 | 165 | 420 | 210 | 540 | 270 | 630 | 315 | 750 | 375 |

Inertia moments/mass

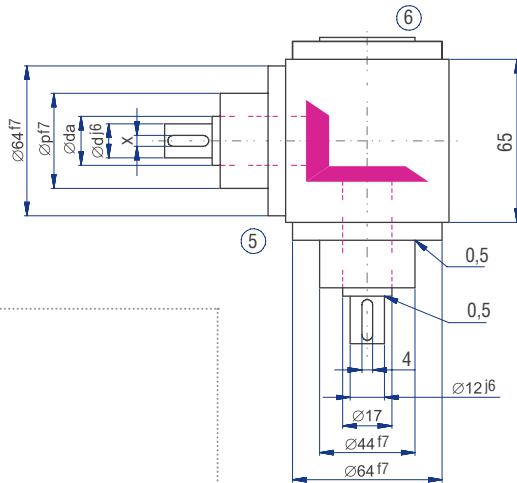
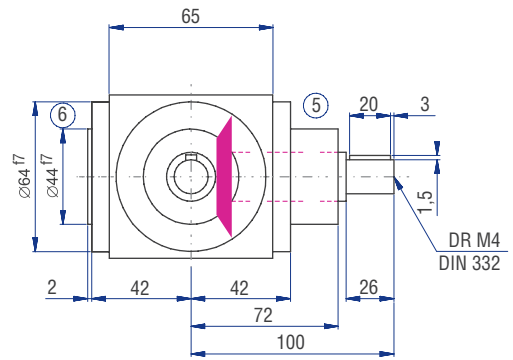
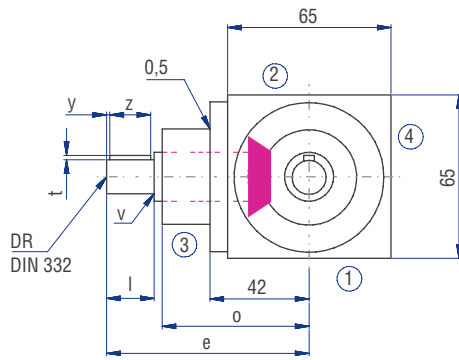
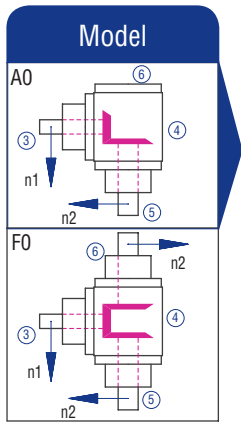
The mass of the gearbox may deviate depending on the gear ratio.

| Model | Inertia moment [kgcm ²] | | | | | | |
|-------|-------------------------------------|--------|--------|--------|-----|-----|-----|
| | 1:1 | 1.5:1 | 2:1 | 3:1 | 4:1 | 5:1 | 6:1 |
| AO | 0.3888 | 0.2406 | 0.1839 | 0.1036 | | | |
| BO | 0.4231 | 0.3111 | 0.2330 | 0.1001 | | | |
| CO | 0.4231 | 0.3111 | 0.2330 | 0.1001 | | | |
| DO | 0.4330 | 0.3155 | 0.2355 | 0.1012 | | | |
| EON | 0.4754 | 0.3634 | 0.2853 | 0.1524 | | | |
| EOS | 0.6012 | 0.4892 | 0.4111 | 0.2782 | | | |
| FO | 0.5832 | 0.3270 | 0.2325 | 0.1252 | | | |
| GO | 0.6175 | 0.4653 | 0.3683 | 0.1821 | | | |
| HO | 0.6175 | 0.4653 | 0.3683 | 0.1821 | | | |
| JO | 0.6274 | 0.4697 | 0.3708 | 0.1832 | | | |
| KON | 0.6698 | 0.5176 | 0.4206 | 0.2344 | | | |
| KOS | 0.7956 | 0.6434 | 0.5464 | 0.3602 | | | |

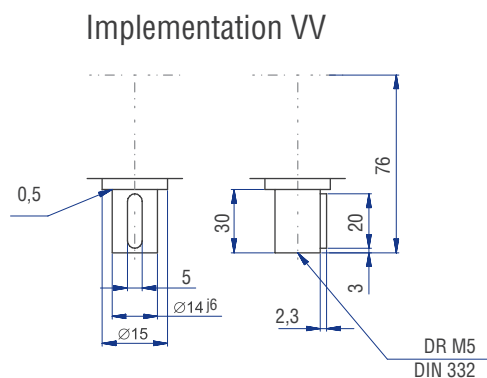
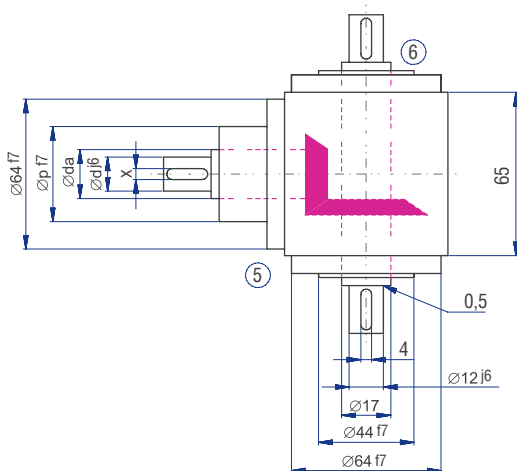
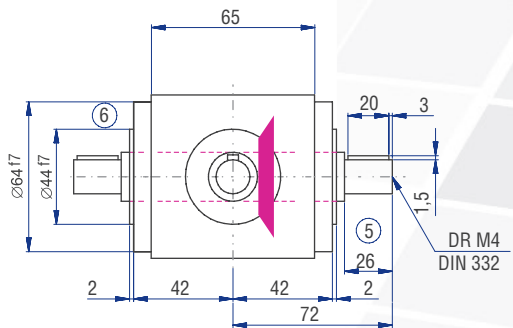
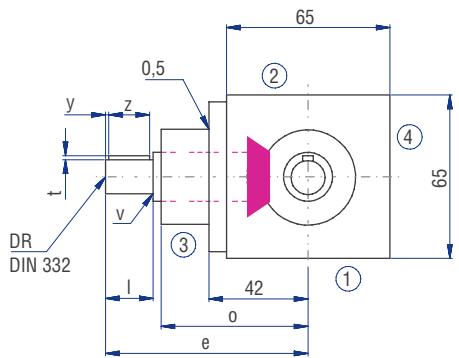
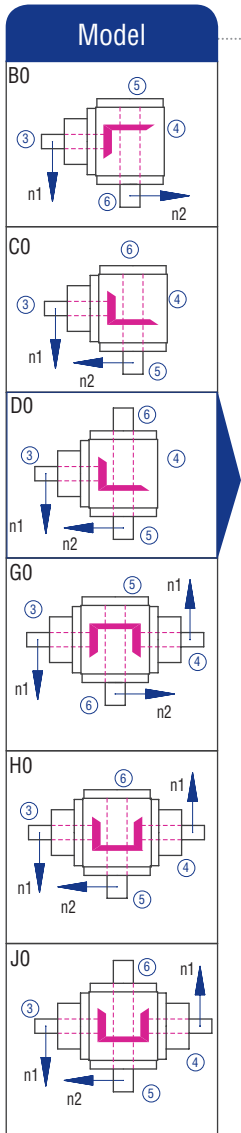
| Mass [kg] |
|-----------|
| 2.3 |
| 2.2 |
| 2.2 |
| 2.3 |
| 2.1 |
| 2.1 |
| 2.7 |
| 2.6 |
| 2.6 |
| 2.7 |
| 2.5 |
| 2.5 |



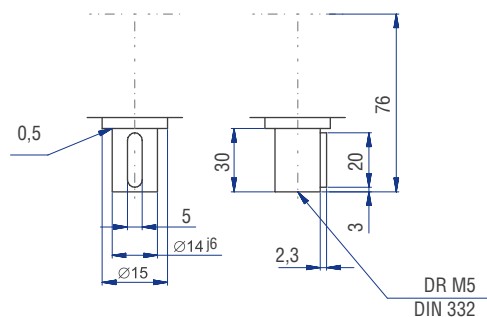
7.2.18 Type HDV 065 – Hygiene-design bevel gearboxes



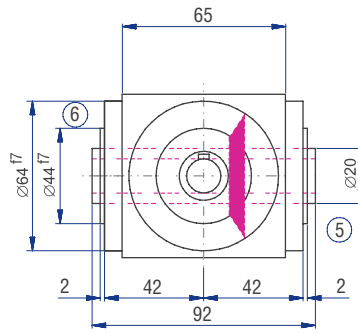
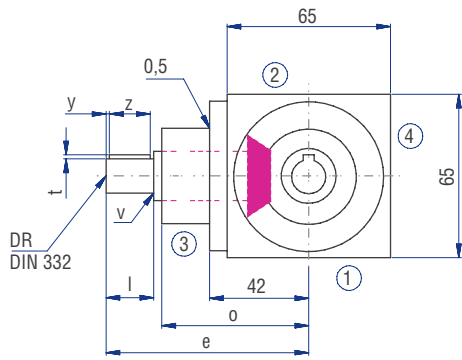
| | Gear ratio | | | | | | |
|---------|------------|-------|-----|-----|-----|-----|-----|
| | 1:1 | 1.5:1 | 2:1 | 3:1 | 4:1 | 5:1 | 6:1 |
| d [mm] | 12 | 12 | 12 | 12 | | | |
| da [mm] | 17 | 17 | 17 | 17 | | | |
| l [mm] | 26 | 26 | 26 | 26 | | | |
| v [mm] | 0.5 | 0.5 | 0.5 | 0.5 | | | |
| x [mm] | 4 | 4 | 4 | 4 | | | |
| y [mm] | 3 | 3 | 3 | 3 | | | |
| z [mm] | 20 | 20 | 20 | 20 | | | |
| t [mm] | 1.5 | 1.5 | 1.5 | 1.5 | | | |
| e [mm] | 100 | 100 | 100 | 100 | | | |
| o [mm] | 72 | 72 | 72 | 72 | | | |
| p [mm] | 44 | 44 | 44 | 44 | | | |
| DR M | 4 | 4 | 4 | 4 | | | |



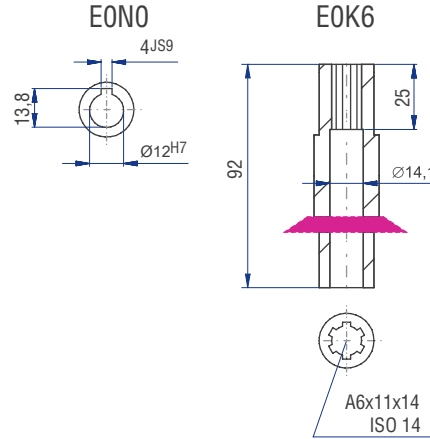
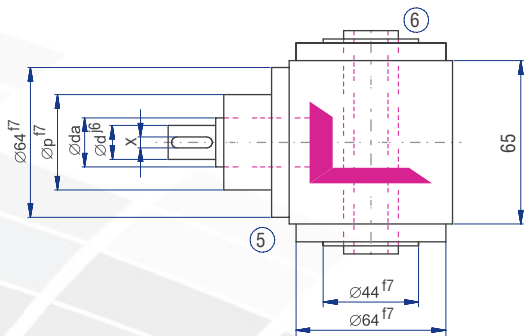
Implementation VV



The dimensions of the Models not shown can be figured by mirroring available dimensions.



Implementation



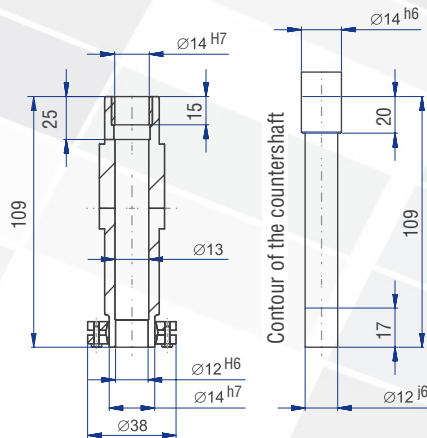
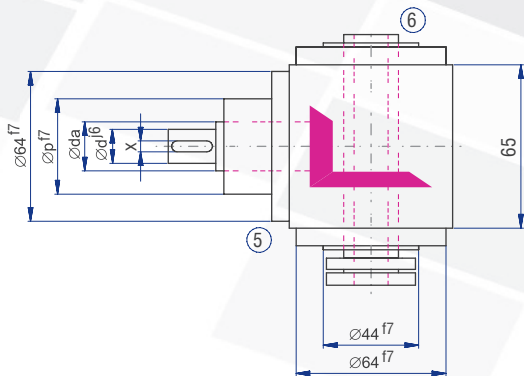
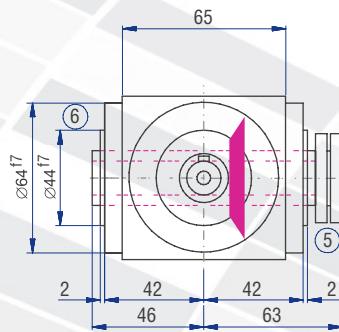
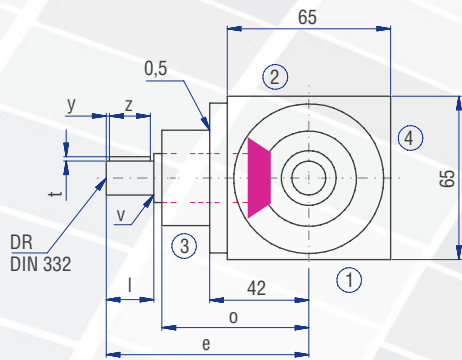
Model

EONO

KONO

EOK6

KOK6



Model

EOS5

EOS6

KOS5

KOS6



Characteristics

| Characteristic | Standard | Option |
|---------------------------------|--|--------------------|
| Toothing | Spiral toothed bevel gear set | See chapter 7.2.2 |
| Gear ratios | 1:1 to 6:1 | |
| Housing / Flanges | 1.4581 / 1.4305 | See chapter 7.2.1 |
| Threaded mounting holes | Customer-specific | See chapter 7.2.4 |
| Shaft | 1.4305, shaft ends greased Fit with ISO 6 tolerance with parallel keyway: according to DIN 6885 Sheet 1 | See chapter 4.6.2 |
| Hollow shaft | 1.4305, shafts greased Fit with ISO 7 tolerance with parallel keyway: according to DIN 6885 Sheet 1 | See chapter 4.6.3 |
| Radial shaft seal ring: | NBR, form A | See chapter 4.8 |
| Ambient temperature | -10°C to +90°C. The values of the performance tables are valid for +20°C | See chapter 4.9.3 |
| Circumferential backlash | < 30 arcmin | See chapter 7.2.11 |
| Protection class | IP 56 | See chapter 4.5 |
| Corrosion protection | - | See chapter 7.2.12 |
| Bearing life L10h: | more than 15,000h | See chapter 4.9.1 |
| Oil change intervals | Not required | See chapter 7.2.9 |
| Lubricants | Synthetic lubricant, NSF-approved (NOTOX) | See chapter 7.2.9 |
| Type plate | Etched | |

Performance data

| n_1 [rpm] | 1:1 | | | 1.5:1 | | | 2:1 | | | 3:1 | | | 4:1 | | | 5:1 | | | 6:1 | | |
|-----------------|----------------|------------------|------------------|----------------|------------------|------------------|----------------|------------------|------------------|----------------|------------------|------------------|----------------|------------------|------------------|----------------|------------------|------------------|----------------|------------------|------------------|
| | n_2 [rpm] | P_{1N} [kW] | T_{2N} [Nm] | n_2 [rpm] | P_{1N} [kW] | T_{2N} [Nm] | n_2 [rpm] | P_{1N} [kW] | T_{2N} [Nm] | n_2 [rpm] | P_{1N} [kW] | T_{2N} [Nm] | n_2 [rpm] | P_{1N} [kW] | T_{2N} [Nm] | n_2 [rpm] | P_{1N} [kW] | T_{2N} [Nm] | n_2 [rpm] | P_{1N} [kW] | T_{2N} [Nm] |
| 3000 | 3000 | 8.93 | 27 | 2000 | 5.51 | 25 | 1500 | 3.80 | 23 | 1000 | 2.54 | 23 | 750 | 1.90 | 23 | 600 | 1.52 | 23 | 500 | 1.25 | 23 |
| 2400 | 2400 | 7.41 | 28 | 1600 | 4.59 | 26 | 1200 | 3.17 | 24 | 800 | 2.12 | 24 | 600 | 1.65 | 25 | 480 | 1.32 | 25 | 400 | 1.09 | 25 |
| 1500 | 1500 | 5.29 | 32 | 1000 | 3.20 | 29 | 750 | 2.23 | 27 | 500 | 1.49 | 27 | 375 | 1.12 | 27 | 300 | 0.89 | 27 | 250 | 0.74 | 27 |
| 1000 | 1000 | 3.75 | 34 | 667 | 2.35 | 32 | 500 | 1.71 | 31 | 333 | 1.14 | 31 | 250 | 0.85 | 31 | 200 | 0.68 | 31 | 167 | 0.53 | 29 |
| 750 | 750 | 3.06 | 37 | 500 | 1.93 | 35 | 375 | 1.32 | 32 | 250 | 0.88 | 32 | 188 | 0.66 | 32 | 150 | 0.53 | 32 | 125 | 0.40 | 29 |
| 500 | 500 | 2.20 | 40 | 333 | 1.36 | 37 | 250 | 0.94 | 34 | 167 | 0.63 | 34 | 125 | 0.47 | 34 | 100 | 0.37 | 34 | 83 | 0.27 | 29 |
| 250 | 250 | 1.21 | 44 | 167 | 0.74 | 40 | 125 | 0.50 | 36 | 83 | 0.33 | 36 | 63 | 0.25 | 36 | 50 | 0.20 | 36 | 42 | 0.14 | 30 |
| 50 | 50 | 0.28 | 50 | 33 | 0.16 | 45 | 25 | 0.10 | 37 | 17 | 0.07 | 37 | 13 | 0.05 | 37 | 10 | 0.04 | 37 | 8 | 0.03 | 33 |
| P_{1Nt} [kW] | 3.4 | | | 3.4 | | | 3.4 | | | 3.4 | | | 3.4 | | | 3.4 | | | 3.4 | | |
| T_{2max} [Nm] | 105 | | | 45 | | | 80 | | | 70 | | | 70 | | | 60 | | | 50 | | |

The mass of the gearbox may deviate depending on the gear ratio.

Permissible radial force F_{r1} and axial force F_{a1} on shaft N_1

The permissible radial forces depend on torque, rotational speed and direction.

They must be calculated for the respective case of application. Please enquire these.

| n_1 [rpm] | 3000 | | 1000 | | 500 | | 250 | | 100 | | 50 | |
|-------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| T_2 [Nm] | F_r [N] | F_a [N] | F_r [N] | F_a [N] | F_r [N] | F_a [N] | F_r [N] | F_a [N] | F_r [N] | F_a [N] | F_r [N] | F_a [N] |
| < 30 | 300 | 150 | 400 | 200 | 470 | 235 | 580 | 290 | 700 | 350 | 800 | 400 |
| > 30 | 250 | 125 | 330 | 165 | 390 | 195 | 490 | 245 | 590 | 295 | 670 | 335 |

Permissible radial force F_{r2} and axial force F_{a2} on shaft N_2

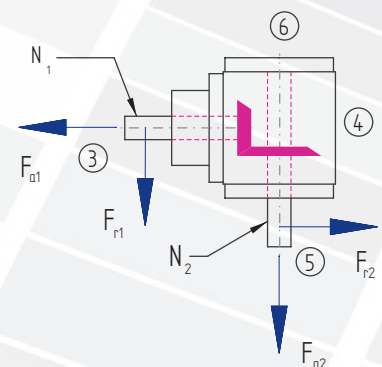
| n_2 [rpm] | 3000 | | 1000 | | 500 | | 250 | | 100 | | 50 | |
|-------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| T_2 [Nm] | F_r [N] | F_a [N] | F_r [N] | F_a [N] | F_r [N] | F_a [N] | F_r [N] | F_a [N] | F_r [N] | F_a [N] | F_r [N] | F_a [N] |
| < 30 | 500 | 250 | 660 | 330 | 800 | 400 | 950 | 475 | 1250 | 625 | 1500 | 750 |
| > 30 | 420 | 210 | 550 | 275 | 670 | 335 | 790 | 395 | 1040 | 520 | 1250 | 625 |

Inertia moments/mass

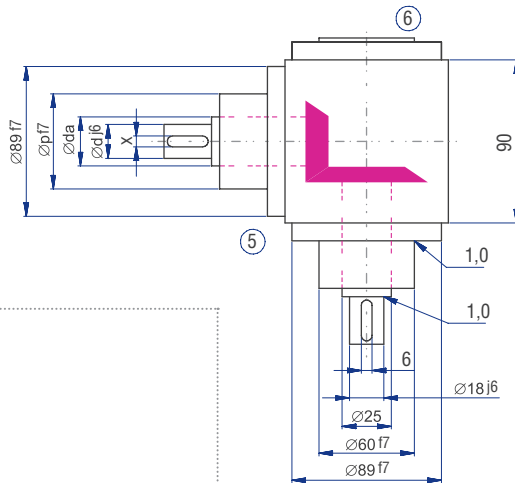
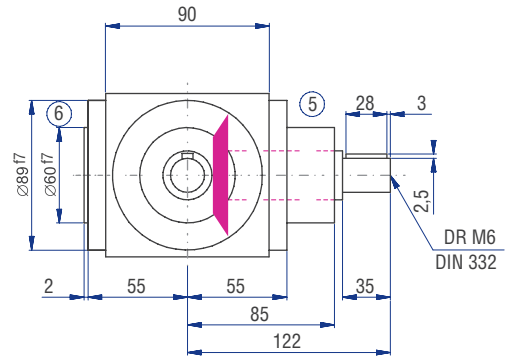
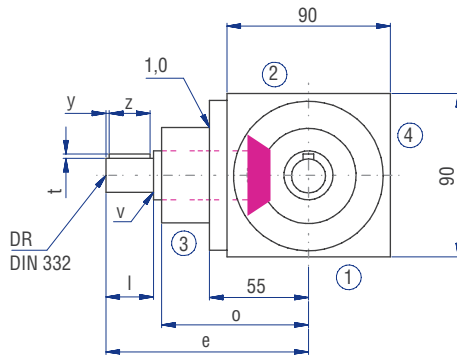
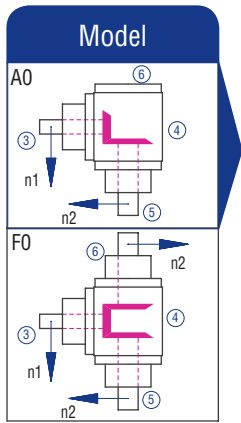
The mass of the gearbox may deviate depending on the gear ratio.

| Model | Inertia moment [kgcm ²] | | | | | | |
|-------|-------------------------------------|--------|--------|--------|--------|--------|--------|
| | 1:1 | 1.5:1 | 2:1 | 3:1 | 4:1 | 5:1 | 6:1 |
| AO | 2.5590 | 1.4822 | 1.1437 | 0.8884 | 0.3631 | 0.3248 | 0.3062 |
| BO | 3.3543 | 2.1833 | 1.3652 | 1.0465 | 0.4607 | 0.3933 | 0.3502 |
| CO | 3.3543 | 2.1833 | 1.3652 | 1.0465 | 0.4607 | 0.3933 | 0.3502 |
| DO | 3.3827 | 2.1959 | 1.3723 | 1.0496 | 0.4625 | 0.3945 | 0.3510 |
| EON | 3.2507 | 2.1372 | 1.3393 | 1.0350 | 0.4542 | 0.3892 | 0.3473 |
| EOS | 3.9213 | 2.4353 | 1.5069 | 1.1095 | 0.4961 | 0.4160 | 0.3660 |
| FO | 3.8385 | 2.0508 | 1.4636 | 1.0305 | 0.4430 | 0.3760 | 0.3418 |
| GO | 4.6338 | 3.0968 | 2.1890 | 1.7927 | 0.7438 | 0.6669 | 0.6209 |
| HO | 4.6338 | 3.0968 | 2.1890 | 1.7927 | 0.7438 | 0.6669 | 0.6209 |
| JO | 4.6622 | 3.1094 | 2.1961 | 1.7958 | 0.7456 | 0.6681 | 0.6217 |
| KON | 4.5302 | 3.0507 | 2.1631 | 1.7812 | 0.7373 | 0.6628 | 0.6180 |
| KOS | 5.2008 | 3.3488 | 2.3307 | 1.8557 | 0.7792 | 0.6896 | 0.6367 |

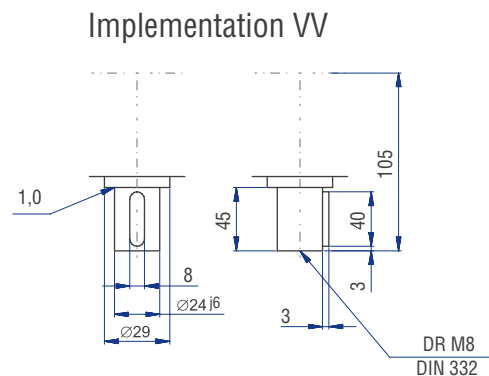
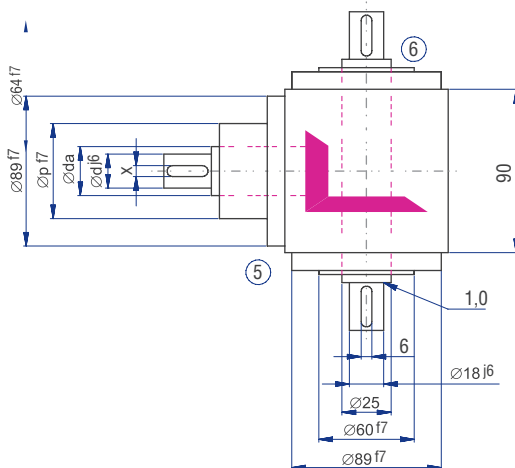
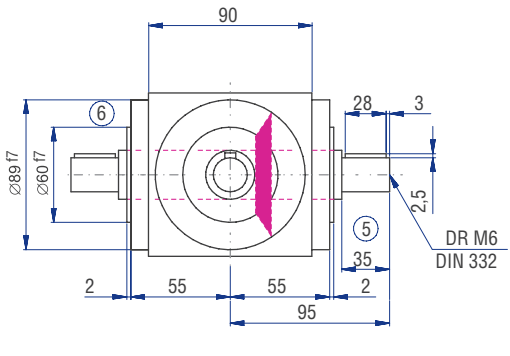
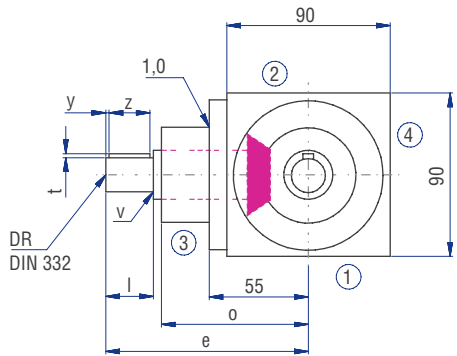
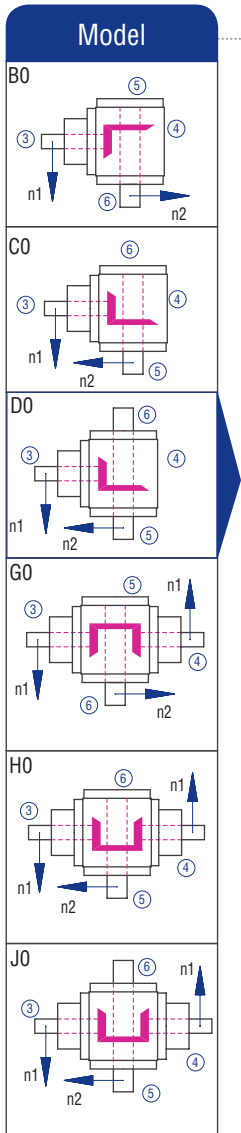
| Mass [kg] |
|-----------|
| 5.1 |
| 5.4 |
| 5.4 |
| 5.5 |
| 5.0 |
| 5.2 |
| 6.3 |
| 6.9 |
| 6.9 |
| 7.0 |
| 6.5 |
| 6.7 |



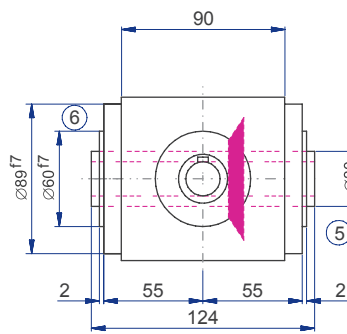
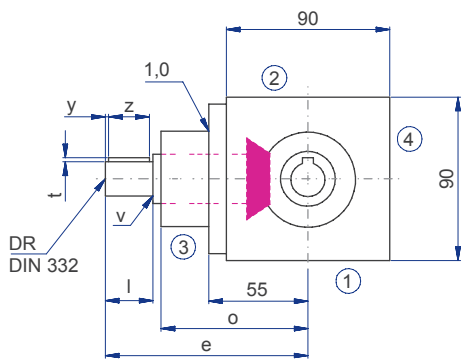
7.2.19 Type HDV 090 – Hygiene-design bevel gearboxes



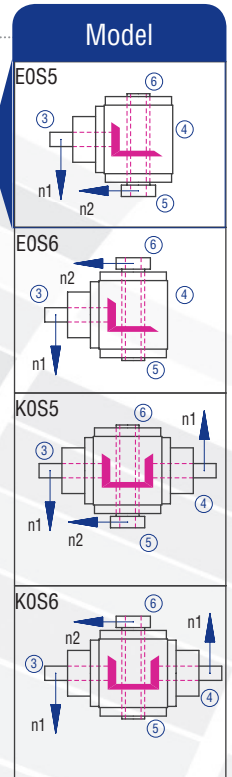
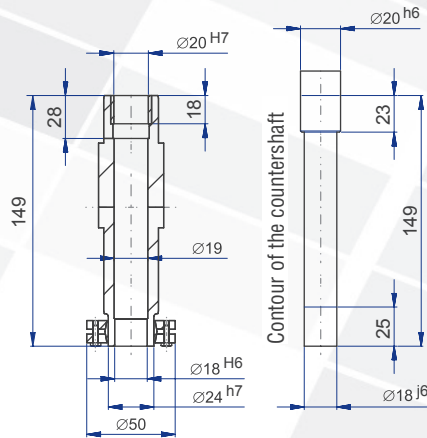
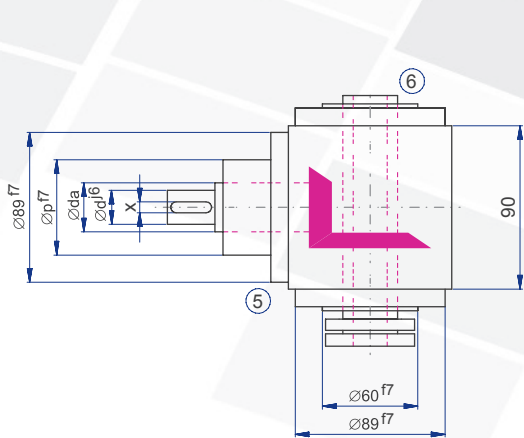
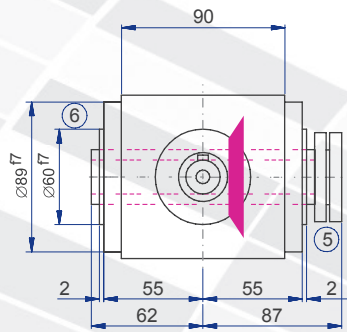
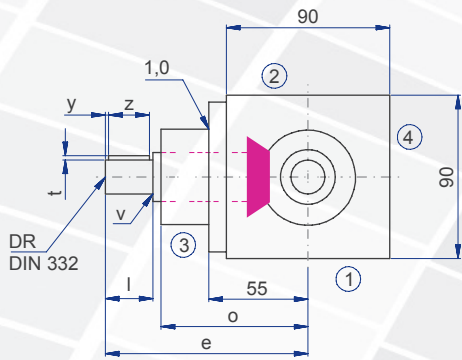
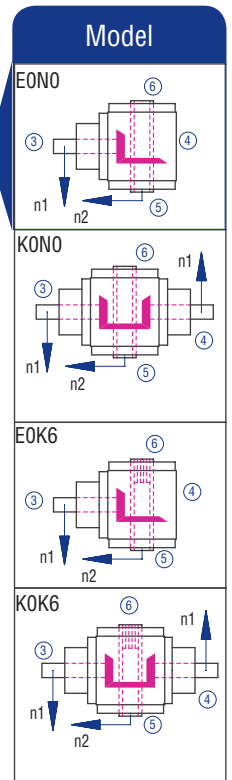
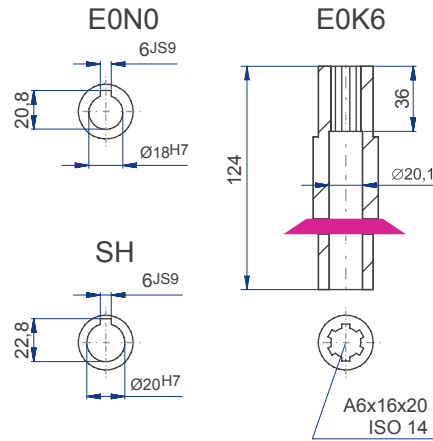
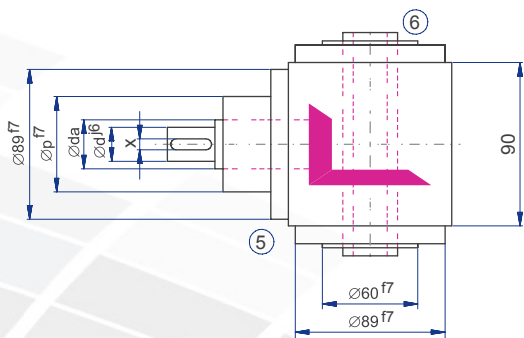
| | Gear ratio | | | | | | |
|---------|------------|-------|-----|-----|-----|-----|-----|
| | 1:1 | 1.5:1 | 2:1 | 3:1 | 4:1 | 5:1 | 6:1 |
| d [mm] | 18 | 18 | 18 | 12 | 12 | 12 | 12 |
| da [mm] | 25 | 25 | 25 | 20 | 20 | 20 | 20 |
| l [mm] | 35 | 35 | 35 | 35 | 35 | 35 | 35 |
| v [mm] | 1 | 1 | 1 | 0.5 | 0.5 | 0.5 | 0.5 |
| x [mm] | 6 | 6 | 6 | 4 | 4 | 4 | 4 |
| y [mm] | 3 | 3 | 3 | 3 | 3 | 3 | 3 |
| z [mm] | 28 | 28 | 28 | 28 | 28 | 28 | 28 |
| t [mm] | 2.5 | 2.5 | 2.5 | 1.5 | 1.5 | 1.5 | 1.5 |
| e [mm] | 122 | 122 | 122 | 122 | 132 | 132 | 132 |
| o [mm] | 85 | 85 | 85 | 85 | 95 | 95 | 95 |
| p [mm] | 60 | 60 | 60 | 60 | 60 | 60 | 60 |
| DR M | 6 | 6 | 6 | 4 | 4 | 4 | 4 |

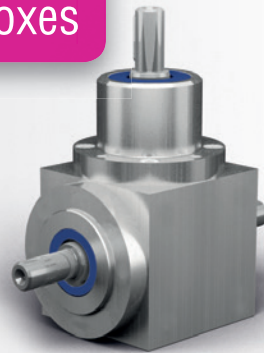


The dimensions of the Models not shown can be figured by mirroring available dimensions.



Implementation





Characteristics

| Characteristic | Standard | Option |
|---------------------------------|--|--------------------|
| Toothing | Spiral toothed bevel gear set | See chapter 7.2.2 |
| Gear ratios | 1:1 to 6:1 | |
| Housing / Flanges | 1.4581 / 1.4305 | See chapter 7.2.1 |
| Threaded mounting holes | Customer-specific | See chapter 7.2.4 |
| Shaft | 1.4305, shaft ends greased Fit with ISO 6 tolerance with parallel keyway: according to DIN 6885 Sheet 1 | See chapter 4.6.2 |
| Hollow shaft | 1.4305, shafts greased Fit with ISO 7 tolerance with parallel keyway: according to DIN 6885 Sheet 1 | See chapter 4.6.3 |
| Radial shaft seal ring: | NBR, form A | See chapter 4.8 |
| Ambient temperature | -10°C to +90°C. The values of the performance tables are valid for +20°C | See chapter 4.9.3 |
| Circumferential backlash | < 30 arcmin | See chapter 7.2.11 |
| Protection class | IP 56 | See chapter 4.5 |
| Corrosion protection | - | See chapter 7.2.12 |
| Bearing life L10h: | more than 15,000h | See chapter 4.9.1 |
| Oil change intervals | Not required | See chapter 7.2.9 |
| Lubricants | Synthetic lubricant, NSF-approved (NOTOX) | See chapter 7.2.9 |
| Type plate | Etched | |

Performance data

| n_1 [rpm] | 1:1 | | | 1.5:1 | | | 2:1 | | | 3:1 | | | 4:1 | | | 5:1 | | | 6:1 | | |
|-----------------|----------------|------------------|------------------|----------------|------------------|------------------|----------------|------------------|------------------|----------------|------------------|------------------|----------------|------------------|------------------|----------------|------------------|------------------|----------------|------------------|------------------|
| | n_2 [rpm] | P_{1N} [kW] | T_{2N} [Nm] | n_2 [rpm] | P_{1N} [kW] | T_{2N} [Nm] | n_2 [rpm] | P_{1N} [kW] | T_{2N} [Nm] | n_2 [rpm] | P_{1N} [kW] | T_{2N} [Nm] | n_2 [rpm] | P_{1N} [kW] | T_{2N} [Nm] | n_2 [rpm] | P_{1N} [kW] | T_{2N} [Nm] | n_2 [rpm] | P_{1N} [kW] | T_{2N} [Nm] |
| 3000 | 3000 | 21.82 | 66 | 2000 | 13.45 | 61 | 1500 | 9.26 | 56 | 1000 | 6.39 | 58 | 750 | 4.96 | 60 | 600 | 3.97 | 60 | 500 | 2.95 | 54 |
| 2400 | 2400 | 18.52 | 70 | 1600 | 11.46 | 65 | 1200 | 8.07 | 61 | 800 | 5.56 | 63 | 600 | 4.43 | 67 | 480 | 3.44 | 65 | 400 | 2.53 | 57 |
| 1500 | 1500 | 13.56 | 82 | 1000 | 8.60 | 78 | 750 | 6.03 | 73 | 500 | 4.08 | 74 | 375 | 3.06 | 74 | 300 | 2.38 | 72 | 250 | 1.75 | 64 |
| 1000 | 1000 | 10.14 | 92 | 667 | 6.32 | 86 | 500 | 4.46 | 81 | 333 | 3.01 | 82 | 250 | 2.18 | 79 | 200 | 1.76 | 80 | 167 | 1.22 | 66 |
| 750 | 750 | 8.51 | 103 | 500 | 5.18 | 94 | 375 | 3.55 | 86 | 250 | 2.40 | 87 | 188 | 1.69 | 82 | 150 | 1.42 | 86 | 125 | 0.94 | 68 |
| 500 | 500 | 6.34 | 115 | 333 | 3.85 | 100 | 250 | 2.54 | 92 | 167 | 1.66 | 90 | 125 | 1.16 | 84 | 100 | 0.98 | 89 | 83 | 0.63 | 69 |
| 250 | 250 | 3.39 | 123 | 167 | 1.99 | 100 | 125 | 1.35 | 98 | 83 | 0.87 | 95 | 63 | 0.60 | 87 | 50 | 0.51 | 92 | 42 | 0.33 | 71 |
| 50 | 50 | 0.72 | 130 | 33 | 0.41 | 100 | 25 | 0.29 | 107 | 17 | 0.21 | 110 | 13 | 0.12 | 90 | 10 | 0.10 | 95 | 8 | 0.06 | 66 |
| P_{1Nt} [kW] | 5.6 | | | 5.6 | | | 5.6 | | | 5.6 | | | 5.6 | | | 5.6 | | | 5.6 | | |
| T_{2max} [Nm] | 220 | | | 100 | | | 169 | | | 155 | | | 155 | | | 140 | | | 120 | | |

The mass of the gearbox may deviate depending on the gear ratio.

Permissible radial force F_{r1} and axial force F_{a1} on shaft N_1

The permissible radial forces depend on torque, rotational speed and direction.

They must be calculated for the respective case of application. Please enquire these.

| n_1 [rpm] | 3000 | | 1000 | | 500 | | 250 | | 100 | | 50 | |
|-------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| T_2 [Nm] | F_r [N] | F_a [N] | F_r [N] | F_a [N] | F_r [N] | F_a [N] | F_r [N] | F_a [N] | F_r [N] | F_a [N] | F_r [N] | F_a [N] |
| < 80 | 470 | 235 | 620 | 310 | 720 | 360 | 900 | 450 | 1150 | 575 | 1400 | 700 |
| > 80 | 390 | 195 | 520 | 260 | 600 | 300 | 750 | 375 | 960 | 480 | 1170 | 585 |

Permissible radial force F_{r2} and axial force F_{a2} on shaft N_2

| n_2 [rpm] | 3000 | | 1000 | | 500 | | 250 | | 100 | | 50 | |
|-------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| T_2 [Nm] | F_r [N] | F_a [N] | F_r [N] | F_a [N] | F_r [N] | F_a [N] | F_r [N] | F_a [N] | F_r [N] | F_a [N] | F_r [N] | F_a [N] |
| < 80 | 750 | 375 | 1000 | 500 | 1250 | 625 | 1500 | 750 | 1900 | 950 | 2200 | 1100 |
| > 80 | 630 | 315 | 830 | 415 | 1040 | 520 | 1250 | 625 | 1580 | 790 | 1830 | 915 |

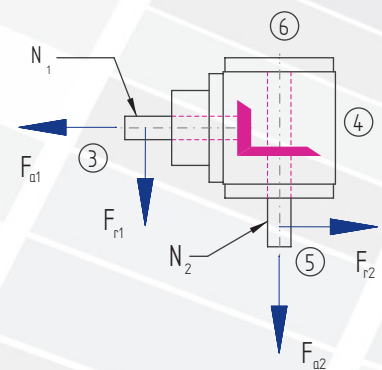
Inertia moments/mass

The mass of the gearbox may deviate depending on the gear ratio.

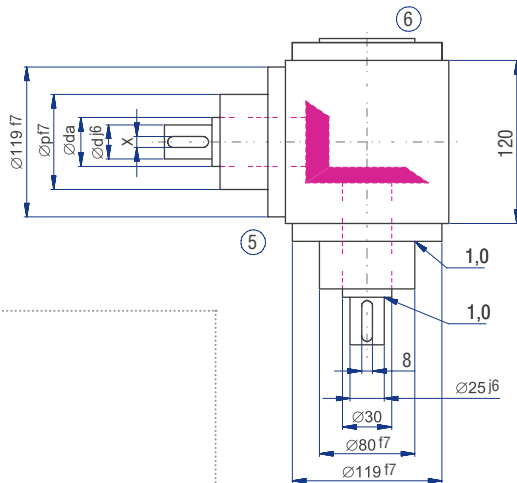
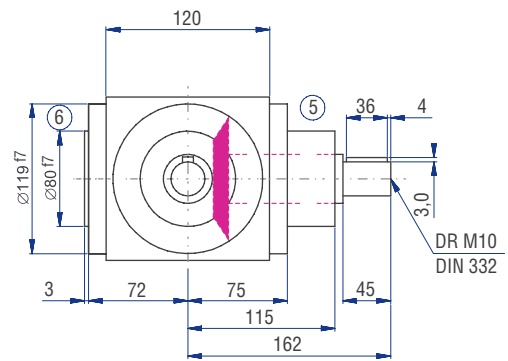
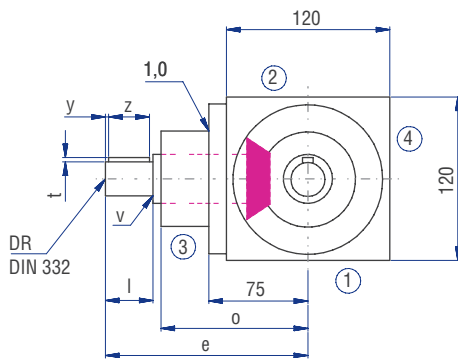
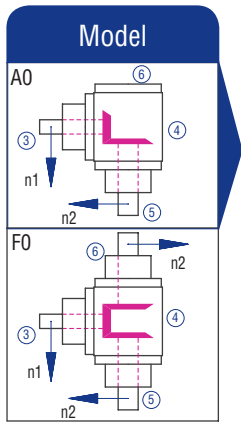
| Model | Inertia moment [kgcm ²] | | | | | | |
|-------|-------------------------------------|---------|--------|--------|--------|--------|--------|
| | 1:1 | 1.5:1 | 2:1 | 3:1 | 4:1 | 5:1 | 6:1 |
| AO | 10.4976 | 4.8409 | 3.6465 | 2.3159 | 1.2164 | 0.7516 | 0.6766 |
| BO | 15.3022 | 7.4441 | 4.9747 | 3.0123 | 1.6729 | 1.0593 | 0.8982 |
| CO | 15.3022 | 7.4441 | 4.9747 | 3.0123 | 1.6729 | 1.0593 | 0.8982 |
| DO | 15.5996 | 7.5762 | 5.0490 | 3.0453 | 1.6915 | 1.0712 | 0.9065 |
| EON | 15.1939 | 7.3959 | 4.9476 | 3.0003 | 1.6661 | 1.0550 | 0.8952 |
| EOS | 16.9812 | 8.1903 | 5.3944 | 3.1988 | 1.7778 | 1.1265 | 0.9449 |
| FO | 15.7464 | 7.1737 | 4.9587 | 2.8991 | 1.5444 | 0.9615 | 0.8224 |
| GO | 20.5510 | 9.9522 | 7.3090 | 4.7450 | 2.5612 | 1.6009 | 1.4290 |
| HO | 20.5510 | 9.9522 | 7.3090 | 4.7450 | 2.5612 | 1.6009 | 1.4290 |
| JO | 20.8484 | 10.0843 | 7.3833 | 4.7780 | 2.5798 | 1.6128 | 1.4373 |
| KON | 20.4427 | 9.9040 | 7.2819 | 4.7330 | 2.5544 | 1.5966 | 1.4260 |
| KOS | 22.2300 | 10.6984 | 7.7287 | 4.9315 | 2.6661 | 1.6681 | 1.4757 |

Mass
[kg]

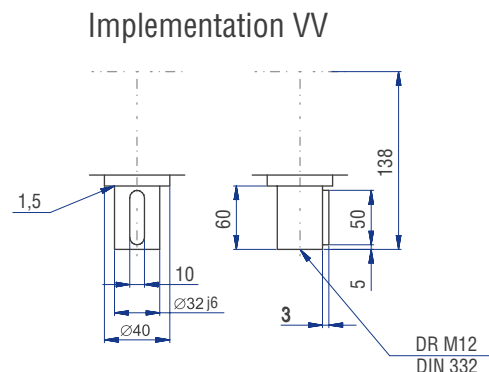
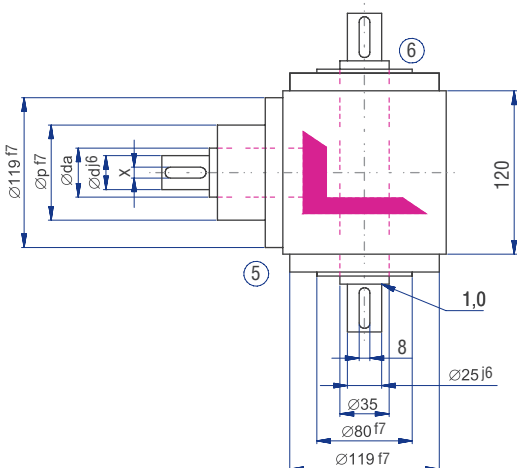
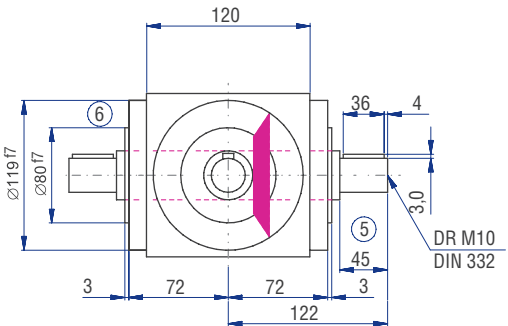
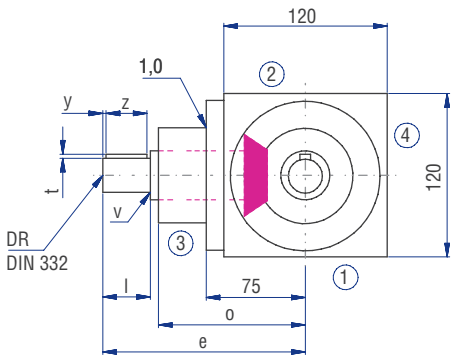
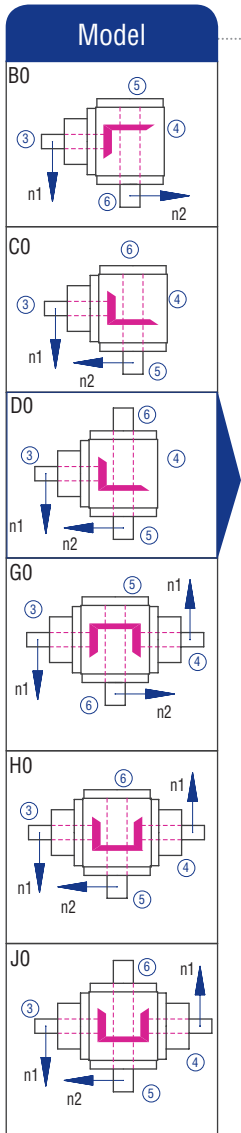
| |
|------|
| 12.6 |
| 12.3 |
| 12.3 |
| 12.5 |
| 12.0 |
| 12.3 |
| 15.0 |
| 14.7 |
| 14.7 |
| 14.9 |
| 14.4 |
| 14.7 |



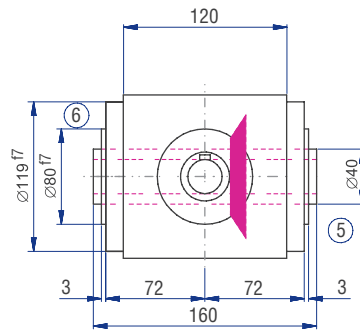
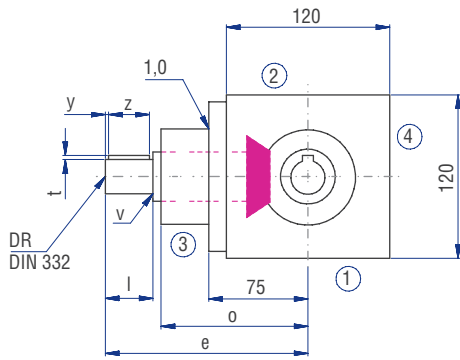
7.2.20 Type HDV 120 – Hygiene-design bevel gearboxes



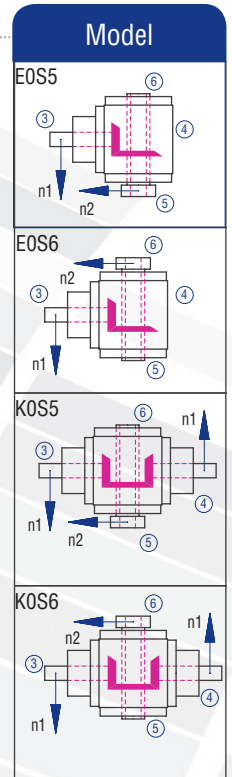
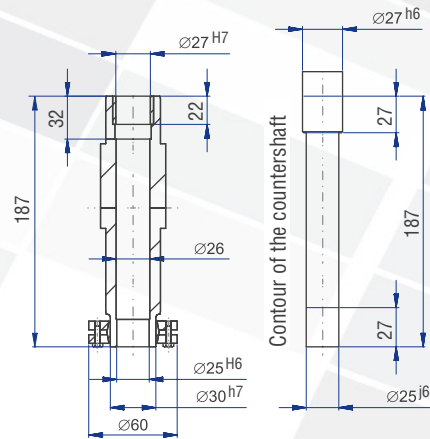
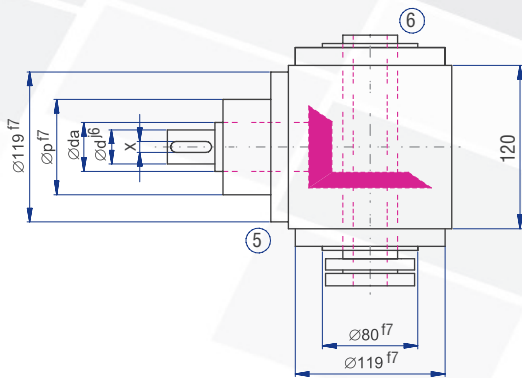
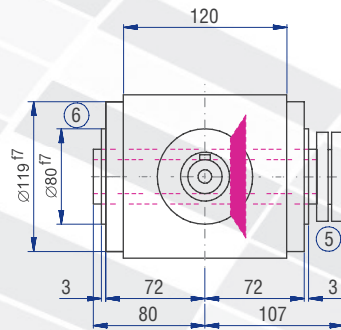
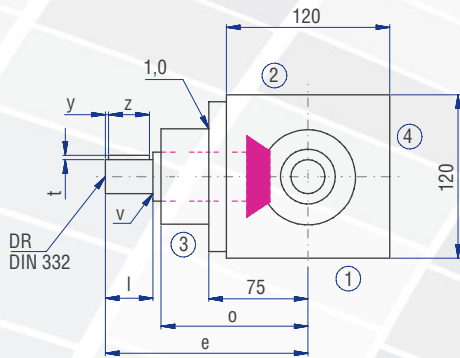
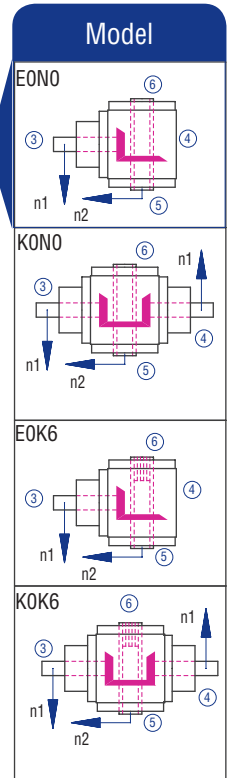
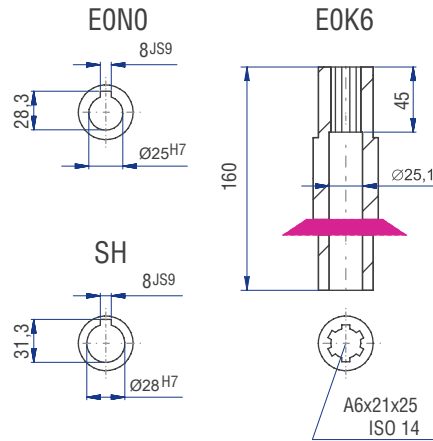
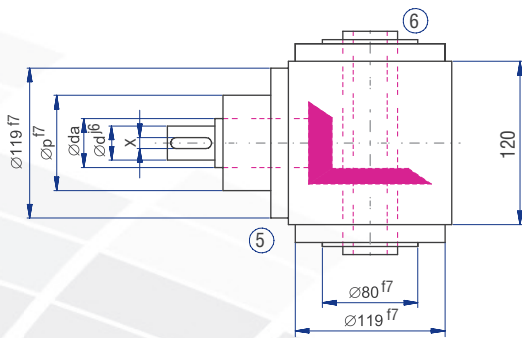
| | Gear ratio | | | | | | |
|---------|------------|-------|-----|-----|-----|-----|-----|
| | 1:1 | 1.5:1 | 2:1 | 3:1 | 4:1 | 5:1 | 6:1 |
| d [mm] | 25 | 25 | 25 | 20 | 20 | 15 | 15 |
| da [mm] | 30 | 30 | 30 | 25 | 25 | 20 | 20 |
| l [mm] | 45 | 45 | 45 | 45 | 45 | 35 | 35 |
| v [mm] | 1 | 1 | 1 | 1 | 1 | 0.5 | 0.5 |
| x [mm] | 8 | 8 | 8 | 6 | 6 | 5 | 5 |
| y [mm] | 4 | 4 | 4 | 4 | 4 | 4 | 4 |
| z [mm] | 36 | 36 | 36 | 36 | 36 | 28 | 28 |
| t [mm] | 3 | 3 | 3 | 2.5 | 2.5 | 2 | 2 |
| e [mm] | 162 | 162 | 162 | 162 | 172 | 162 | 162 |
| o [mm] | 115 | 115 | 115 | 115 | 125 | 125 | 125 |
| p [mm] | 80 | 80 | 80 | 80 | 80 | 70 | 70 |
| DR M | 10 | 10 | 10 | 6 | 6 | 5 | 5 |



The dimensions of the Models not shown can be figured by mirroring available dimensions.



Implementation





Characteristics

| Characteristic | Standard | Option |
|---------------------------------|--|--------------------|
| Toothing | Spiral toothed bevel gear set | See chapter 7.2.2 |
| Gear ratios | 1:1 to 6:1 | |
| Housing / Flanges | 1.4581 / 1.4305 | See chapter 7.2.1 |
| Threaded mounting holes | Customer-specific | See chapter 7.2.4 |
| Shaft | 1.4305, shaft ends greased Fit with ISO 6 tolerance with parallel keyway: according to DIN 6885 Sheet 1 | See chapter 4.6.2 |
| Hollow shaft | 1.4305, shafts greased Fit with ISO 7 tolerance with parallel keyway: according to DIN 6885 Sheet 1 | See chapter 4.6.3 |
| Radial shaft seal ring: | NBR, form A | See chapter 4.8 |
| Ambient temperature | -10°C to +90°C. The values of the performance tables are valid for +20°C | See chapter 4.9.3 |
| Circumferential backlash | < 30 arcmin | See chapter 7.2.11 |
| Protection class | IP 56 | See chapter 4.5 |
| Corrosion protection | - | See chapter 7.2.12 |
| Bearing life L10h: | more than 15,000h | See chapter 4.9.1 |
| Oil change intervals | Not required | See chapter 7.2.9 |
| Lubricants | Synthetic lubricant, NSF-approved (NOTOX) | See chapter 7.2.9 |
| Type plate | Etched | |

Performance data

| n_1 [rpm] | 1:1 | | | 1.5:1 | | | 2:1 | | | 3:1 | | | 4:1 | | | 5:1 | | | 6:1 | | |
|-----------------|----------------|------------------|------------------|----------------|------------------|------------------|----------------|------------------|------------------|----------------|------------------|------------------|----------------|------------------|------------------|----------------|------------------|------------------|----------------|------------------|------------------|
| | n_2 [rpm] | P_{1N} [kW] | T_{2N} [Nm] | n_2 [rpm] | P_{1N} [kW] | T_{2N} [Nm] | n_2 [rpm] | P_{1N} [kW] | T_{2N} [Nm] | n_2 [rpm] | P_{1N} [kW] | T_{2N} [Nm] | n_2 [rpm] | P_{1N} [kW] | T_{2N} [Nm] | n_2 [rpm] | P_{1N} [kW] | T_{2N} [Nm] | n_2 [rpm] | P_{1N} [kW] | T_{2N} [Nm] |
| 3000 | 3000 | 39.68 | 120 | 2000 | 24.91 | 113 | 1500 | 16.53 | 100 | 1000 | 12.12 | 110 | 750 | 8.51 | 103 | 600 | 6.61 | 100 | 500 | 5.18 | 94 |
| 2400 | 2400 | 37.04 | 140 | 1600 | 22.22 | 126 | 1200 | 14.68 | 111 | 800 | 11.46 | 130 | 600 | 7.34 | 111 | 480 | 5.56 | 105 | 400 | 4.58 | 104 |
| 1500 | 1500 | 26.78 | 162 | 1000 | 17.08 | 155 | 750 | 11.41 | 138 | 500 | 8.05 | 146 | 375 | 4.96 | 120 | 300 | 3.80 | 115 | 250 | 2.95 | 107 |
| 1000 | 1000 | 20.28 | 184 | 667 | 12.87 | 175 | 500 | 8.38 | 152 | 333 | 5.87 | 160 | 250 | 3.75 | 136 | 200 | 2.73 | 124 | 167 | 2.06 | 112 |
| 750 | 750 | 16.20 | 196 | 500 | 10.47 | 190 | 375 | 6.86 | 166 | 250 | 4.60 | 167 | 188 | 3.06 | 148 | 150 | 2.15 | 130 | 125 | 1.61 | 117 |
| 500 | 500 | 11.46 | 208 | 333 | 7.34 | 200 | 250 | 4.96 | 180 | 167 | 3.20 | 174 | 125 | 2.12 | 154 | 100 | 1.50 | 136 | 83 | 1.09 | 119 |
| 250 | 250 | 5.92 | 215 | 167 | 3.76 | 204 | 125 | 2.62 | 190 | 83 | 1.62 | 177 | 63 | 1.12 | 162 | 50 | 0.79 | 143 | 42 | 0.56 | 121 |
| 50 | 50 | 1.21 | 220 | 33 | 0.76 | 210 | 25 | 0.55 | 200 | 17 | 0.34 | 180 | 13 | 0.23 | 170 | 10 | 0.17 | 150 | 8 | 0.11 | 120 |
| P_{1Nt} [kW] | 9.0 | | | 9.0 | | | 9.0 | | | 9.0 | | | 9.0 | | | 9.0 | | | 9.0 | | |
| T_{2max} [Nm] | 430 | | | 210 | | | 320 | | | 280 | | | 280 | | | 250 | | | 200 | | |

The mass of the gearbox may deviate depending on the gear ratio.

Permissible radial force F_{r1} and axial force F_{a1} on shaft N_1

The permissible radial forces depend on torque, rotational speed and direction.

They must be calculated for the respective case of application. Please enquire these.

| n_1 [rpm] | 3000 | | 1000 | | 500 | | 250 | | 100 | | 50 | |
|-------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| T_2 [Nm] | F_r [N] | F_a [N] | F_r [N] | F_a [N] | F_r [N] | F_a [N] | F_r [N] | F_a [N] | F_r [N] | F_a [N] | F_r [N] | F_a [N] |
| < 140 | 700 | 350 | 870 | 435 | 1150 | 575 | 1370 | 685 | 1700 | 850 | 2000 | 1000 |
| > 140 | 590 | 295 | 730 | 365 | 960 | 480 | 1140 | 570 | 1420 | 710 | 1670 | 835 |

Permissible radial force F_{r2} and axial force F_{a2} on shaft N_2

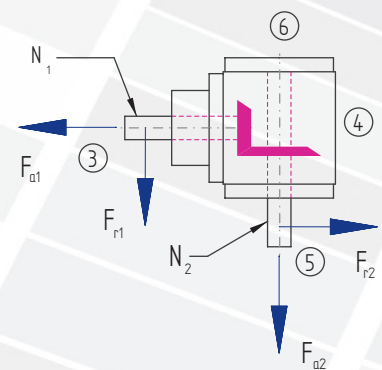
| n_2 [rpm] | 3000 | | 1000 | | 500 | | 250 | | 100 | | 50 | |
|-------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| T_2 [Nm] | F_r [N] | F_a [N] | F_r [N] | F_a [N] | F_r [N] | F_a [N] | F_r [N] | F_a [N] | F_r [N] | F_a [N] | F_r [N] | F_a [N] |
| < 140 | 1300 | 650 | 1700 | 850 | 2000 | 1000 | 2500 | 1250 | 3000 | 1500 | 3800 | 1900 |
| > 140 | 1082 | 541 | 1420 | 710 | 1670 | 835 | 2080 | 1040 | 2500 | 1250 | 3170 | 1585 |

Inertia moments/mass

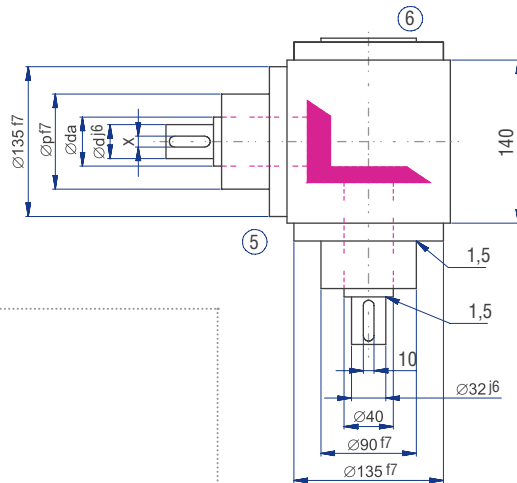
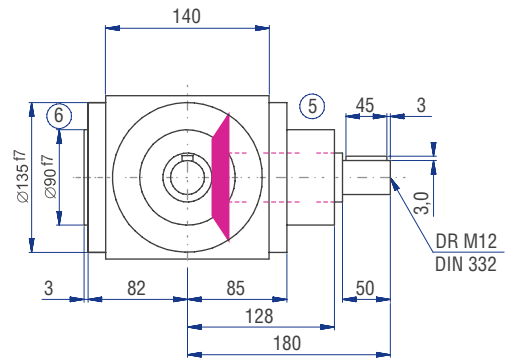
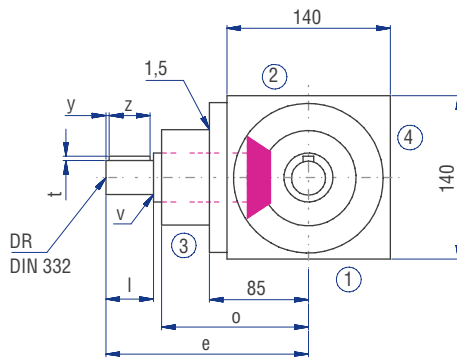
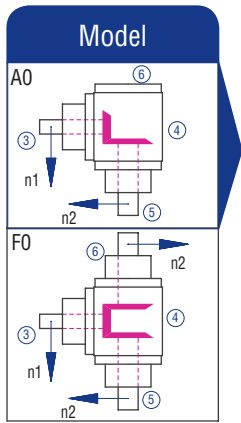
The mass of the gearbox may deviate depending on the gear ratio.

| Model | Inertia moment [kgcm ²] | | | | | | |
|-------|-------------------------------------|---------|---------|---------|--------|--------|--------|
| | 1:1 | 1.5:1 | 2:1 | 3:1 | 4:1 | 5:1 | 6:1 |
| AO | 26.2670 | 11.8569 | 8.6762 | 6.4356 | 1.8432 | 1.5320 | 1.3708 |
| BO | 36.0994 | 18.7513 | 12.2785 | 7.9547 | 2.6978 | 2.2113 | 1.8426 |
| CO | 36.0994 | 18.7513 | 12.2785 | 7.9547 | 2.6978 | 2.2113 | 1.8426 |
| DO | 37.0815 | 19.1878 | 12.5241 | 8.0639 | 2.7592 | 2.2506 | 1.8698 |
| EON | 32.6630 | 17.2240 | 11.4194 | 7.5729 | 2.4830 | 2.0739 | 1.7471 |
| EOS | 39.0643 | 20.0691 | 13.0198 | 8.2842 | 2.8831 | 2.3299 | 1.9249 |
| FO | 39.4005 | 17.6940 | 11.9596 | 7.8949 | 2.6641 | 2.0574 | 1.7356 |
| GO | 49.2329 | 24.7711 | 17.6713 | 12.9310 | 3.7202 | 3.2180 | 2.8486 |
| HO | 49.2329 | 24.7711 | 17.6713 | 12.9310 | 3.7202 | 3.2180 | 2.8486 |
| JO | 50.2150 | 25.2076 | 17.9169 | 13.0402 | 3.7816 | 3.2573 | 2.8758 |
| KON | 45.7965 | 23.2438 | 16.8122 | 12.5492 | 3.5054 | 3.0806 | 2.7531 |
| KOS | 52.1978 | 26.0889 | 18.4126 | 13.2605 | 3.9055 | 3.3366 | 2.9309 |

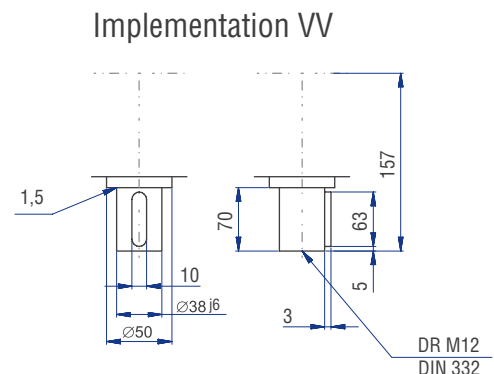
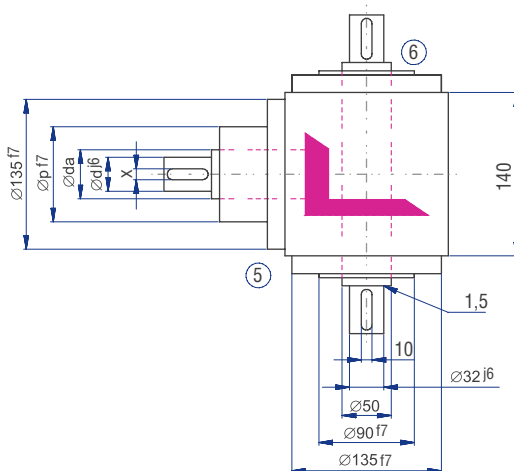
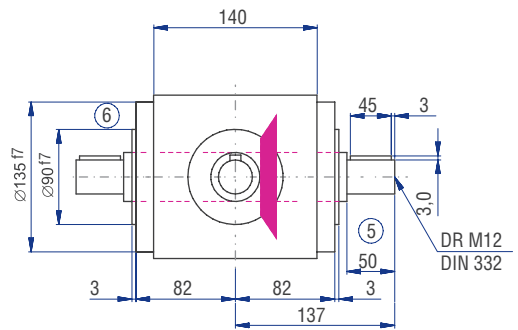
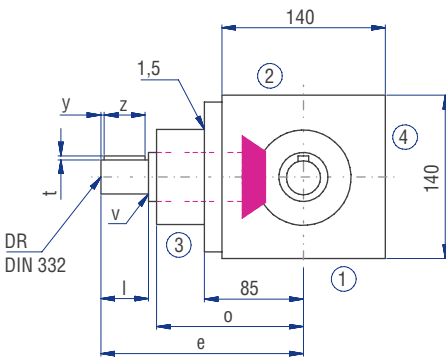
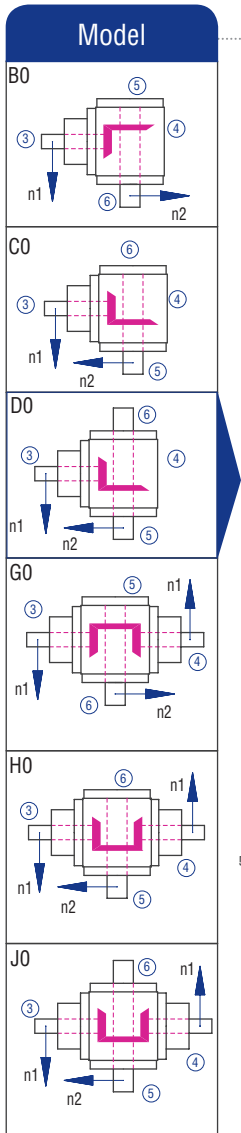
| Mass [kg] |
|-----------|
| 19.0 |
| 18.5 |
| 18.5 |
| 19.0 |
| 18.0 |
| 18.7 |
| 23.0 |
| 22.7 |
| 22.7 |
| 23.2 |
| 22.2 |
| 22.9 |



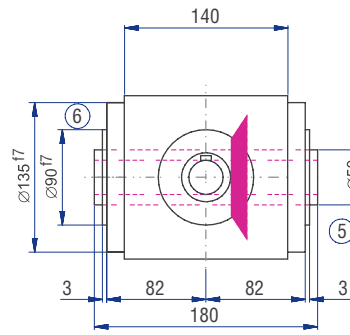
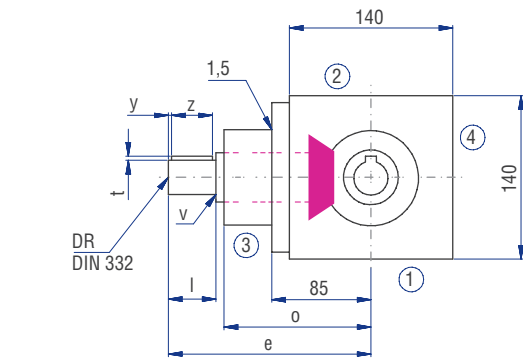
7.2.21 Type HDV 140 – Hygiene-design bevel gearboxes



| | Gear ratio | | | | | | |
|---------|------------|-------|-----|-----|-----|-----|-----|
| | 1:1 | 1.5:1 | 2:1 | 3:1 | 4:1 | 5:1 | 6:1 |
| d [mm] | 32 | 32 | 32 | 28 | 24 | 24 | 24 |
| da [mm] | 40 | 40 | 40 | 40 | 40 | 40 | 40 |
| l [mm] | 50 | 50 | 50 | 50 | 50 | 50 | 50 |
| v [mm] | 1.5 | 1.5 | 1.5 | 1 | 1 | 1 | 1 |
| x [mm] | 10 | 10 | 10 | 8 | 8 | 8 | 8 |
| y [mm] | 3 | 3 | 3 | 3 | 3 | 3 | 3 |
| z [mm] | 45 | 45 | 45 | 45 | 45 | 45 | 45 |
| t [mm] | 3 | 3 | 3 | 3 | 3 | 3 | 3 |
| e [mm] | 180 | 180 | 180 | 180 | 195 | 195 | 195 |
| o [mm] | 128 | 128 | 128 | 128 | 143 | 143 | 143 |
| p [mm] | 90 | 90 | 90 | 90 | 85 | 85 | 85 |
| DR M | 12 | 12 | 12 | 10 | 8 | 8 | 8 |



Implementation VV



Implementation

