Made in Germany

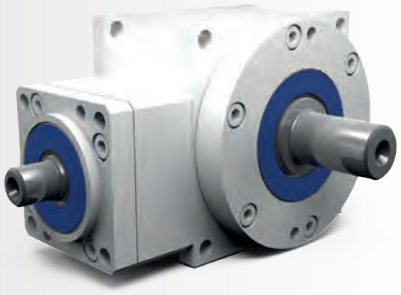
ATEK

ANTRIEBSTECHNIK

Das Winkelgetriebe

Hypoid gearboxes
Type H

8 Hypoid gearboxes



8.1 Type overview

Type H – Hypoid gearboxes

Gear ratios: i = 3:1 to 15:1
Maximum output torque: 1450 Nm
6 gearbox sizes with edge lengths of 090 to 260 mm
Low-backlash construction < 4 angular minutes possible
Housing made of aluminium

8.2 General construction

The axles intersect in the gearbox at the distance A in an angle of 90°.

Gearbox size	090	115	140	170	215	260
A [mm]	9	14	18	23	32	42

The edge length of the housing is reflected in the gearbox size (example: H 090: the housing edge length is 90 mm, with the viewing direction towards the output side of the gearbox). The housings are made of aluminium, the shaft suspension units are made of steel or casting.

8.2.1 Toothing

ATEK hypoid gearboxes have gear sets with high-quality hypoid toothing made of hardened carburised steel. A gear set comprises one pinion shaft (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. On hypoid gear sets, the axial offset between pinion shaft and gear results in higher sliding motion rates in the tooth contact. This makes it possible to achieve especially great running smoothness and a high transmission accuracy.

8.2.2 Construction types

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

Construction type	consists of:
B0 through E0	1 gear set

Table **8.2.2-1**

The variants differ in the type of the shafts, the rotational direction thereof, and the possibility to use a robot flange interface (B0R and C0R).

8.2.3 Threaded mounting holes

The sides 1 and 2 of the gearboxes are machined and may be used as mounting surfaces. The flange on side 3 has also threaded mounting holes. On the sides 5 and 6, fastening can be made via through bores.
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	-	3
9	1, 2	3

Table **8.2.3-1**

Please enquire other mounting options.
The standard version of the mounting / fastening has the order code 9.
Example of order code: H 090 12:1 D0 9.1

8.2.4 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. Example of order code for the installation position 1: H 090 12:1 D0 9.1

8.2.5 Shaft designation – allocation to the gearbox sides

The fast-rotating shaft has the speed $\mathbf{n_1}$ and is identified by $\mathbf{N_1}$. The hypoid pinion is located on this shaft. The slowly rotating shaft has the speed $\mathbf{n_2}$ and is identified by $\mathbf{N_2}$. The hypoid 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)

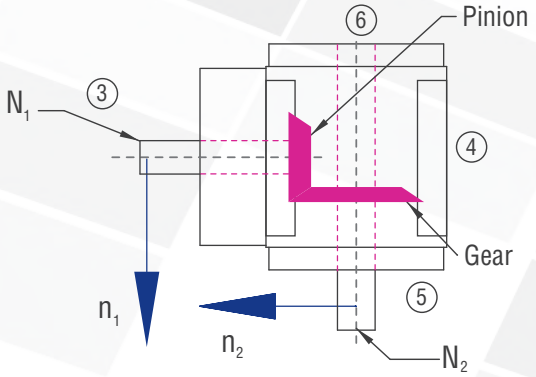


Figure **8.2.5-1; Shaft designations**

8.2.6 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 lower noise level is generated.

8.2.7 Efficiency

The achievable efficiency depends on rotational speed, torque, installation position, sealing, and lubricant type. The efficiency is about 95%. The efficiency specified relates to the permissible nominal load and is a guidance value for run-in gearboxes at operating temperature with standard sealing.

8.2.8 Lubrication

The H-series gearboxes have lifetime lubrication.

8.2.9 Vent filter

If venting is required (B1 or C1) the gearboxes will be delivered with a vent filter. The vent bores will be equipped with screw plugs for transport. The vent filter will be enclosed as a separate item and must be mounted in the intended position prior to commissioning. An elbow may be required. Please adhere to the operating instructions!

8.2.10 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 (N_1) has been fixed. A force of around 2% of the nominal torque is applied to the output shaft (N_2) 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

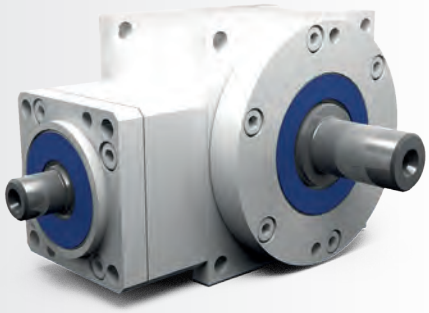
Ordering option	Gear set	090 - 115	140 - 260
/0000	Standard	<=5 arcmin	<=4 arcmin
/S2	Standard	-	-
/S1	Standard	-	-
/S0	Special gear set	<=3 arcmin	<=2 arcmin

Table **8.2.10-1**

8.3 Type H – Standard hypoid gearboxes

8.3.1 Features

Gear ratios: i = 3:1 to 15:1
Maximum output torque: 1450 Nm
6 gearbox sizes with edge lengths of 090 to 260 mm
Low-backlash construction < 4 angular minutes possible
Housing made of aluminium



8.3.2 Models

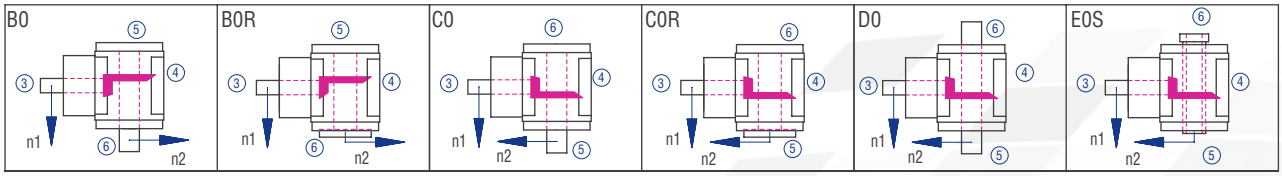


Figure **8.3.2-1; Models**

8.3.3 Gearbox sides

The example shows the Model C0

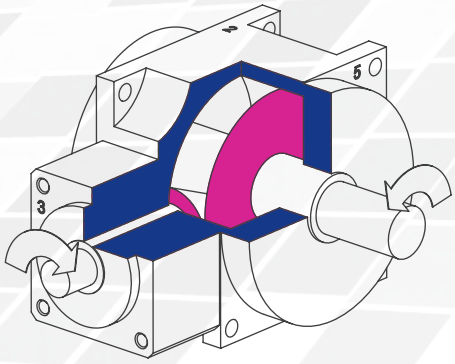


Figure **8.3.3-2; Gearbox sides**

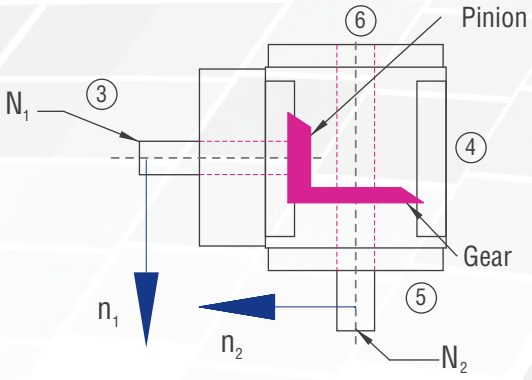


Figure **8.3.3-1; Shaft designations**

8.3.4 Order code

The order code reflects the customer specifications. Example:

Type	Size	Gear ratio	Model	Fixing side	Installation position	Speed n_2	Design
H	090	12:1	C0-	1.	1-	200	/S1
Description	Size; Table 8.3.5-1	Table 8.3.5-1	Figure 8.3.2-1; Models	Side on which fixing is made; Table 8.2.3-1; Figure 4.3.1-1 Gearbox sides	Side directed downwards; Figure 4.3.1-1 Gearbox sides	Slowly rotating shaft	S1 Standard

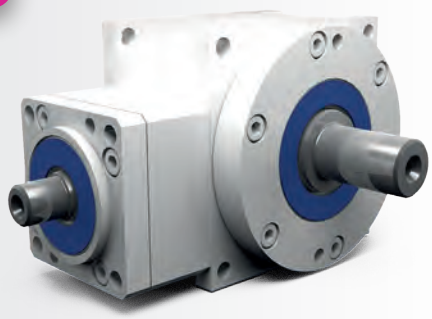
8.3.5 Overview of performance data

Selection table: gearbox size; gear ratio; rotational speed

			3:1			4:1			5:1			6:1			8:1			10:1			12:1			15:1		
size	N_{1MAX} [rpm]	N_1 [rpm]	T_{2N} [Nm]	T_{2B} [Nm]	T_{2NOT} [Nm]	T_{2N} [Nm]	T_{2B} [Nm]	T_{2NOT} [Nm]	T_{2N} [Nm]	T_{2B} [Nm]	T_{2NOT} [Nm]	T_{2N} [Nm]	T_{2B} [Nm]	T_{2NOT} [Nm]	T_{2N} [Nm]	T_{2B} [Nm]	T_{2NOT} [Nm]	T_{2N} [Nm]	T_{2B} [Nm]	T_{2NOT} [Nm]	T_{2N} [Nm]	T_{2B} [Nm]	T_{2NOT} [Nm]	T_{2N} [Nm]	T_{2B} [Nm]	T_{2NOT} [Nm]
	8000	3900																			25	39	51	25	39	51
090		3200										36	54	72	36	54	72	36	54	72						
		2100	36	54	72	36	54	72	36	54	72															
	8000	3300																			51	77	102	51	77	102
115		2700										71	107	143	71	107	143	71	107	143						
		1800	71	107	143	71	107	143	71	107	143															
	7000	2800																			97	145	193	97	145	193
140		2200										142	215	286	142	215	286	142	215	286						
		1500	142	215	286	142	215	286	142	215	286															
	6000	2300																			182	275	365	182	275	365
170		1800										266	398	528	266	398	528	266	398	528						
		1150	266	398	528	266	398	528	266	398	528															
	5000	1600																			512	767	1022	512	767	1022
215		1200										723	1084	1450	723	1084	1450	723	1084	1450						
		700	723	1084	1450	723	1084	1450	723	1084	1450															
	4500	1300																			1023	1533	2044	1023	1533	2044
260		1000										1444	2165	2880	1444	2165	2880	1444	2165	2880						
		550	1444	2165	2880	1444	2165	2880	1444	2165	2880															

Table **8.3.5-1**

8.3.6 Type H 090 – Standard hypoid gearboxes

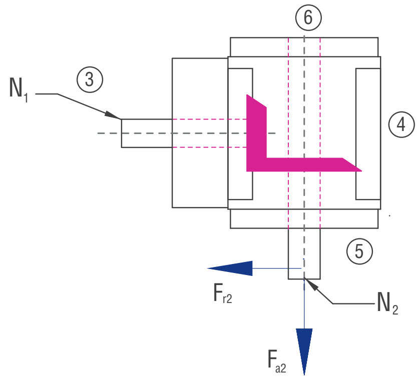


Characteristics

Characteristic	Standard	Option
Toothing	Spiral-toothed, hardened hypoid bevel gears	See chapter 8.2.1
Gear ratio	3:1 to 15:1	
Housing / Flanges	Aluminium / steel or casting	
Threaded mounting holes	On the sides 1, 2 and 3	See chapter 8.2.3
Shaft	Material 1 C45, shaft ends greased Fit with ISO 6 tolerance	See chapter 4.6.2
Hollow shaft	Material 1 C45, shafts greased Fit with ISO 6 tolerance	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	< 5 arcmin	See chapter 8.2.10
Protection class	IP 64	See chapter 4.5
Corrosion protection	Prime coat; layer thickness >40 µm	See chapter 4.4
Bearing life L10h	more than 30,000h in S5 operation	See chapter 4.9.1
Oil change intervals	Not required if the oil temperature is kept < 90°C. The lifetime of the bearings can be increased by the factor 1.5 if the oil is changed after the first 500 service hours and then every 5000 service hours.	See chapter 8.2.8
Lubricants	Synthetic lubricants	See chapter 8.2.8

Performance data

N_1 [rpm]	N_{1MAX} [rpm]	3:1			4:1			5:1			6:1			8:1			10:1			12:1			15:1		
		T_{2N} [Nm]	T_{2B} [Nm]	T_{2NOT} [Nm]	T_{2N} [Nm]	T_{2B} [Nm]	T_{2NOT} [Nm]	T_{2N} [Nm]	T_{2B} [Nm]	T_{2NOT} [Nm]	T_{2N} [Nm]	T_{2B} [Nm]	T_{2NOT} [Nm]	T_{2N} [Nm]	T_{2B} [Nm]	T_{2NOT} [Nm]	T_{2N} [Nm]	T_{2B} [Nm]	T_{2NOT} [Nm]	T_{2N} [Nm]	T_{2B} [Nm]	T_{2NOT} [Nm]	T_{2N} [Nm]	T_{2B} [Nm]	T_{2NOT} [Nm]
3900	8000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	25	39	51	25	39	51
3200	8000	0	0	0	0	0	0	0	0	0	36	54	72	36	54	72	36	54	72	0	0	0	0	0	0
2100	8000	36	54	72	36	54	72	36	54	72	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0



Permissible radial force F_{r2} and axial force F_{a2} on shaft N2

3:1		4:1		5:1		6:1		8:1		10:1		12:1		15:1	
F_{r2} [N]	F_{a2} [N]	F_{r2} [N]	F_{a2} [N]	F_{r2} [N]	F_{a2} [N]	F_{r2} [N]	F_{a2} [N]	F_{r2} [N]	F_{a2} [N]	F_{r2} [N]	F_{a2} [N]	F_{r2} [N]	F_{a2} [N]	F_{r2} [N]	F_{a2} [N]
3300	1650	3300	1650	3300	1650	3300	1650	3300	1650	3300	1650	3300	1650	3300	1650

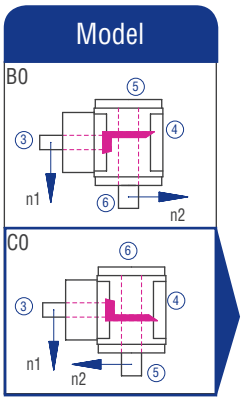
Gearbox inertia moments/mass

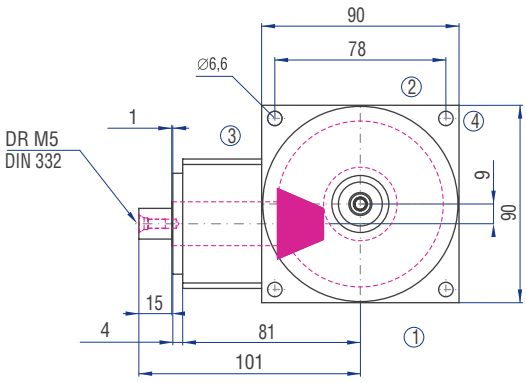
Inertia moment J_1 related to the fast-rotating shaft (N_1)

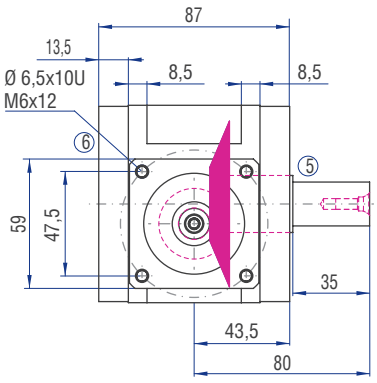
Inertia moment [kgcm^2]								
3:1	4:1	5:1	6:1	8:1	10:1	12:1	15:1	Mass ca. [kg]
0,3900	0,3000	0,2300	0,2200	0,1700	0,1500	0,1400	0,1300	3.5

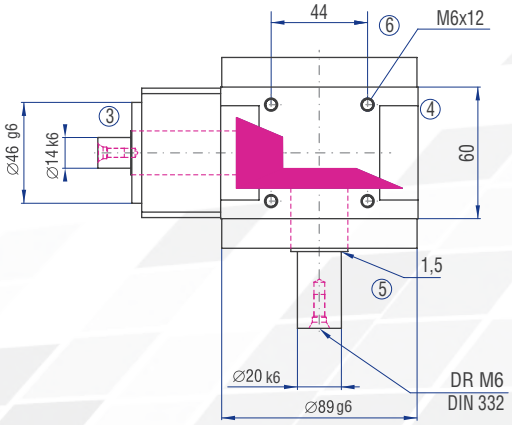
The mass of the gearbox may deviate depending on the type and the gear ratio.

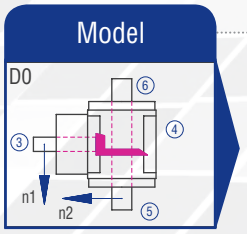
8.3.6 Type H 090 – Standard hypoid gearboxes

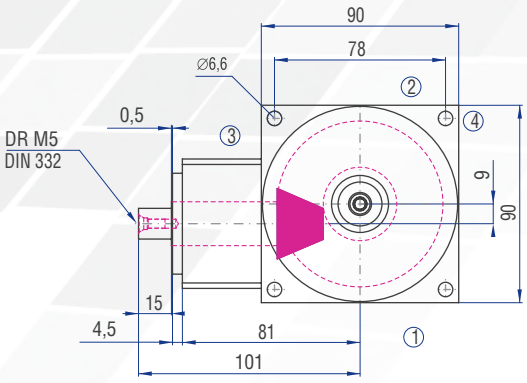


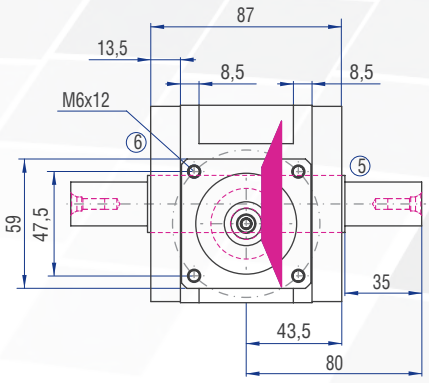


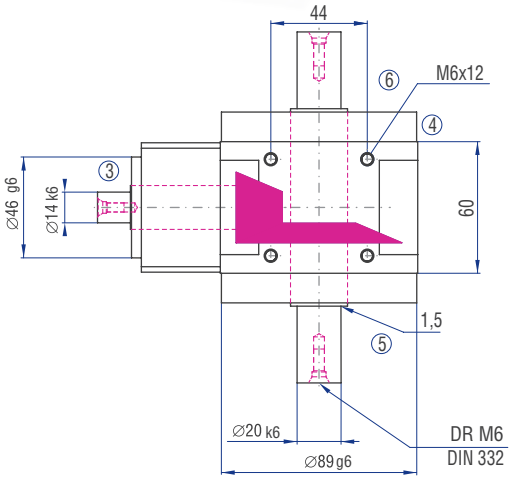




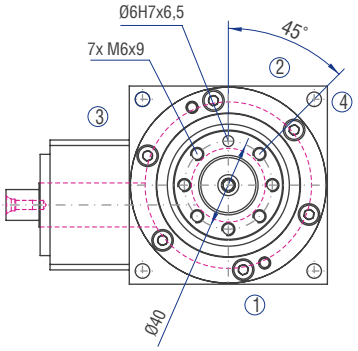


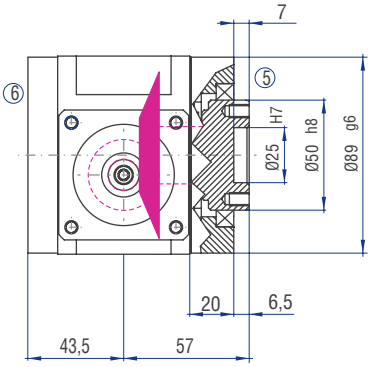






The dimensions of the Models not shown can be figured by mirroring available dimensions.


Ø6H7x6,5
7x M6x9
45°
Ø40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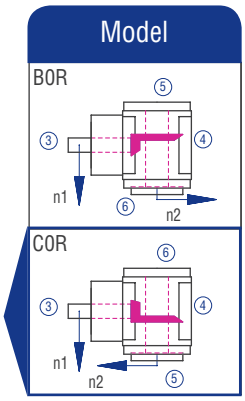
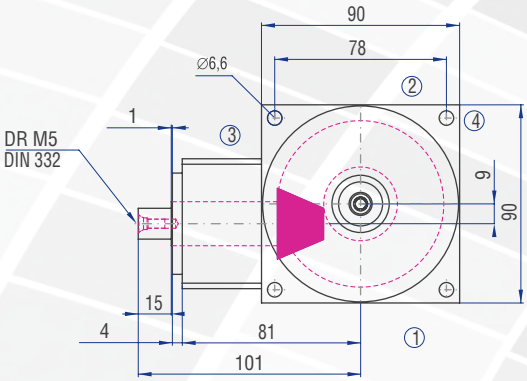
H7
Ø25
h8
Ø50
g6
Ø89
20
6,5
43,5
57


Model
B0R
C0R
n1
n2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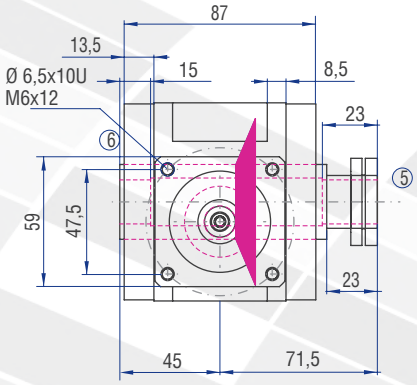
78
Ø6,6
1
DR M5
DIN 332
9
90
15
4
81
101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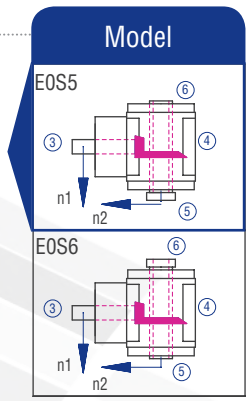
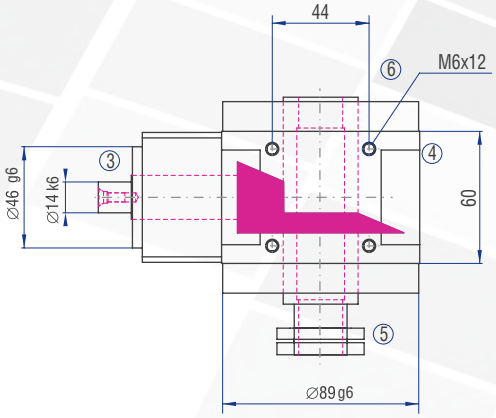
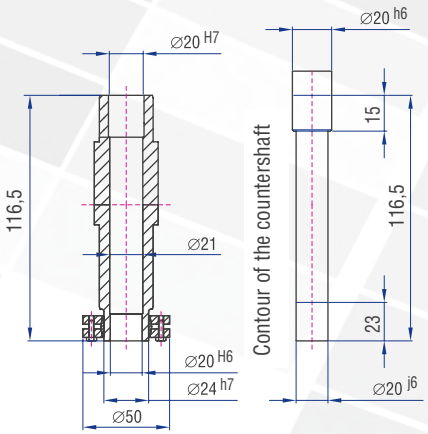
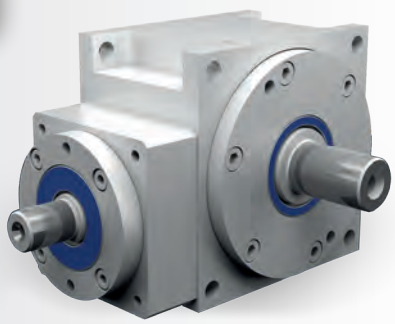
13,5
15
8,5
Ø 6,5x10U
M6x12
23
59
47,5
23
45
71,5


Model
E0S5
E0S6
n1
n2


44
M6x12
Ø46 g6
Ø14 k6
60
Ø89 g6


Ø20 H7
116,5
Ø21
Ø20 H6
Ø24 h7
Ø50
Contour of the countershaft
Ø20 h6
15
116,5
23
Ø20 j6

8.3.7 Type H 115 – Standard hypoid gearboxes

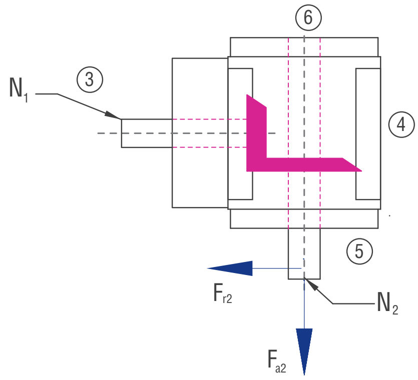


Characteristics

Characteristic	Standard	Option
Toothing	Spiral-toothed, hardened hypoid bevel gears	See chapter 8.2.1
Gear ratio	3:1 to 15:1	
Housing / Flanges	Aluminium / steel or casting	
Threaded mounting holes	On the sides 1, 2 and 3	See chapter 8.2.3
Shaft	Material 1 C45, shaft ends greased Fit with ISO 6 tolerance	See chapter 4.6.2
Hollow shaft	Material 1 C45, shafts greased Fit with ISO 6 tolerance	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	< 5 arcmin	See chapter 8.2.10
Protection class	IP 64	See chapter 4.5
Corrosion protection	Prime coat; layer thickness >40 µm	See chapter 4.4
Bearing life L10h	more than 30,000h in S5 operation	See chapter 4.9.1
Oil change intervals	Not required if the oil temperature is kept < 90°C. The lifetime of the bearings can be increased by the factor 1.5 if the oil is changed after the first 500 service hours and then every 5000 service hours.	See chapter 8.2.8
Lubricants	Synthetic lubricants	See chapter 8.2.8

Performance data

N_1 [rpm]	N_{1MAX} [rpm]	3:1			4:1			5:1			6:1			8:1			10:1			12:1			15:1		
		T_{2N} [Nm]	T_{2B} [Nm]	T_{2NOT} [Nm]	T_{2N} [Nm]	T_{2B} [Nm]	T_{2NOT} [Nm]	T_{2N} [Nm]	T_{2B} [Nm]	T_{2NOT} [Nm]	T_{2N} [Nm]	T_{2B} [Nm]	T_{2NOT} [Nm]	T_{2N} [Nm]	T_{2B} [Nm]	T_{2NOT} [Nm]	T_{2N} [Nm]	T_{2B} [Nm]	T_{2NOT} [Nm]	T_{2N} [Nm]	T_{2B} [Nm]	T_{2NOT} [Nm]	T_{2N} [Nm]	T_{2B} [Nm]	T_{2NOT} [Nm]
3300	8000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	51	77	102	51	77	102
2700	8000	0	0	0	0	0	0	0	0	0	71	107	143	71	107	143	71	107	143	0	0	0	0	0	0
1800	8000	71	107	143	71	107	143	71	107	143	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0



Permissible radial force F_{r2} and axial force F_{a2} on shaft N2

3:1		4:1		5:1		6:1		8:1		10:1		12:1		15:1	
F_{r2} [N]	F_{a2} [N]	F_{r2} [N]	F_{a2} [N]	F_{r2} [N]	F_{a2} [N]	F_{r2} [N]	F_{a2} [N]	F_{r2} [N]	F_{a2} [N]	F_{r2} [N]	F_{a2} [N]	F_{r2} [N]	F_{a2} [N]	F_{r2} [N]	F_{a2} [N]
4900	2450	4900	2450	4900	2450	4900	2450	4900	2450	4900	2450	4900	2450	4900	2450

Gearbox inertia moments/mass

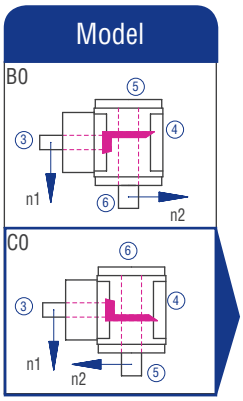
Inertia moment J_1 related to the fast-rotating shaft (N_1)

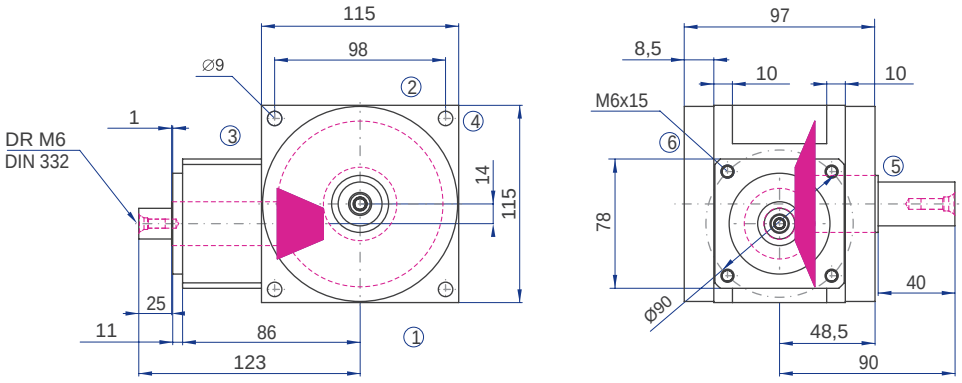
Inertia moment [kgcm²]							
3:1	4:1	5:1	6:1	8:1	10:1	12:1	15:1
0,9800	0,7300	0,5800	0,5200	0,4300	0,3800	0,3600	0,3400

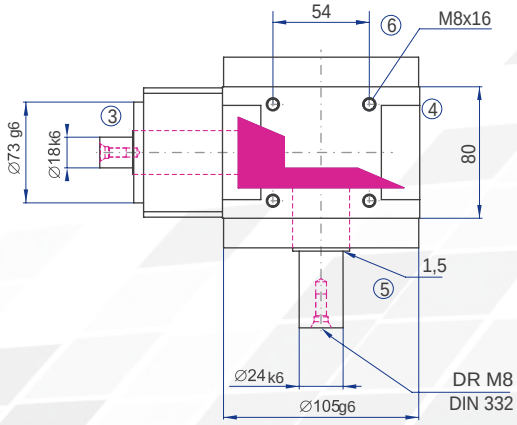
Mass ca. [kg]
5.5

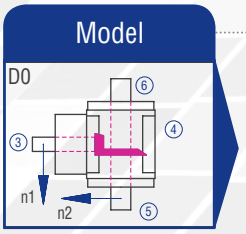
The mass of the gearbox may deviate depending on the type and the gear ratio.

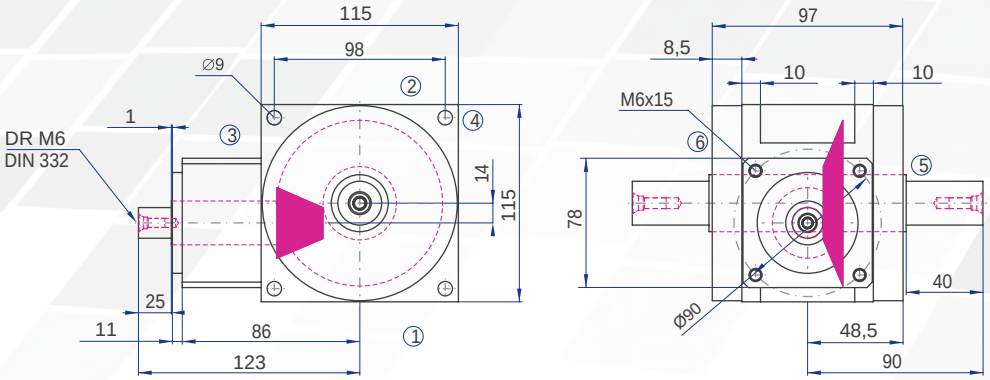
8.3.7 Type H 115 – Standard hypoid gearboxes

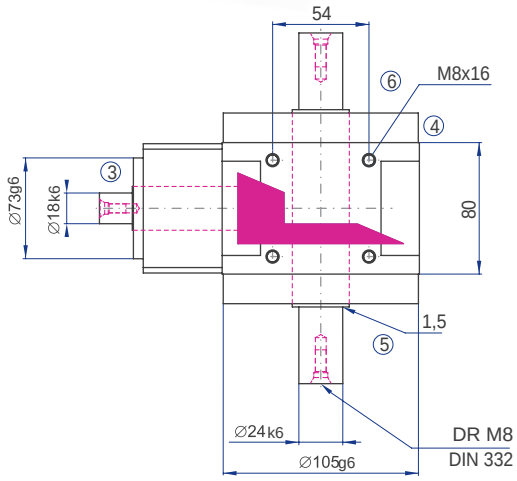




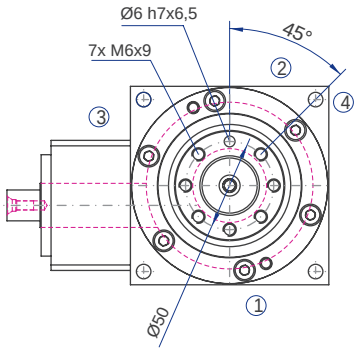


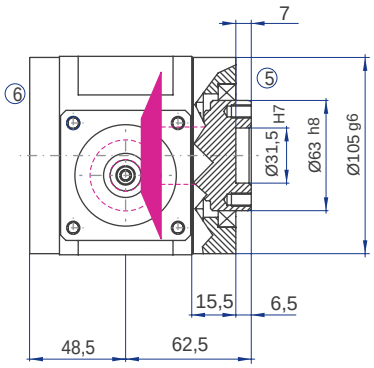


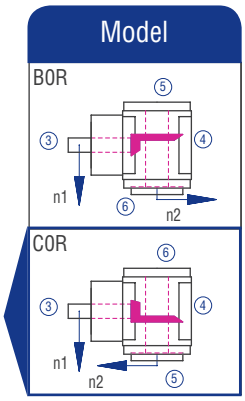


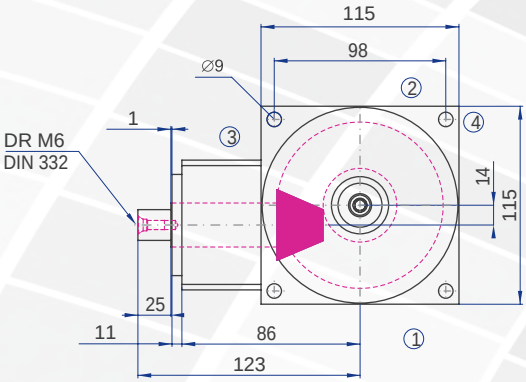


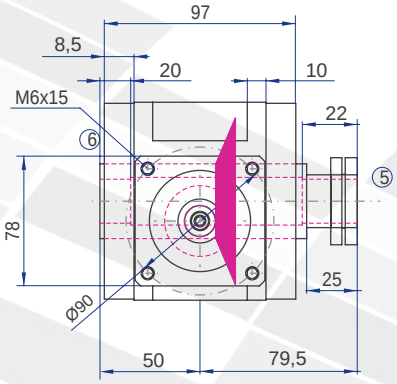
The dimensions of the Models not shown can be figured by mirroring available dimensions.

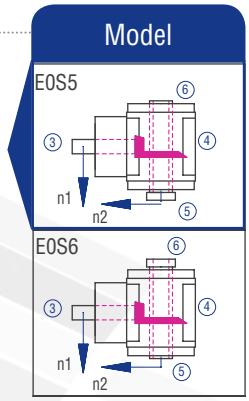

Ø6 h7x6,5
7x M6x9
45°
Ø50

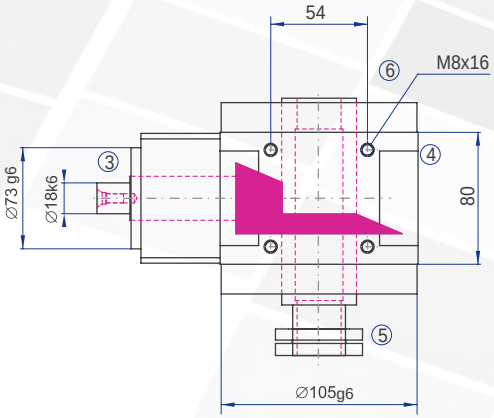

7
Ø31,5 H7
Ø63 h8
Ø105 g6
15,5
6,5
48,5
62,5

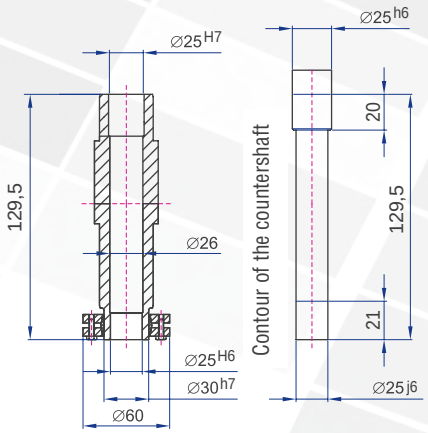

Model
B0R
C0R
n1
n2


115
98
Ø9
DR M6
DIN 332
1
14
115
25
11
86
123

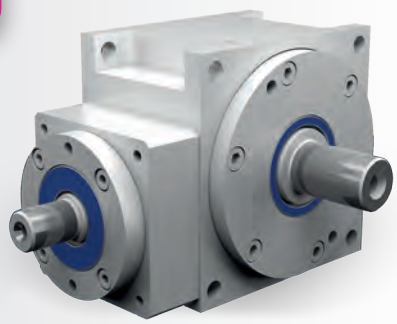

97
8,5
20
10
M6x15
22
78
25
Ø90
50
79,5


Model
E0S5
E0S6
n1
n2


54
M8x16
Ø73 g6
Ø18k6
80
Ø105g6


Ø25 H7
129,5
Ø26
Ø25 H6
Ø30 h7
Ø60
Contour of the countershaft
Ø25 h6
20
129,5
21
Ø25 j6

8.3.8 Type H 140 – Standard hypoid gearboxes

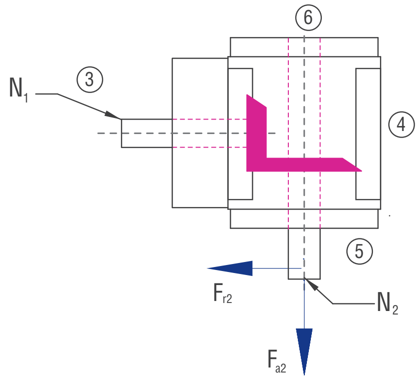


Characteristics

Characteristic	Standard	Option
Toothing	Spiral-toothed, hardened hypoid bevel gears	See chapter 8.2.1
Gear ratio	3:1 to 15:1	
Housing / Flanges	Aluminium / steel or casting	
Threaded mounting holes	On the sides 1, 2 and 3	See chapter 8.2.3
Shaft	Material 1 C45, shaft ends greased Fit with ISO 6 tolerance	See chapter 4.6.2
Hollow shaft	Material 1 C45, shafts greased Fit with ISO 6 tolerance	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	< 4 arcmin	See chapter 8.2.10
Protection class	IP 64	See chapter 4.5
Corrosion protection	Prime coat; layer thickness >40 µm	See chapter 4.4
Bearing life L10h	more than 30,000h in S5 operation	See chapter 4.9.1
Oil change intervals	Not required if the oil temperature is kept < 90°C. The lifetime of the bearings can be increased by the factor 1.5 if the oil is changed after the first 500 service hours and then every 5000 service hours.	See chapter 8.2.8
Lubricants	Synthetic lubricants	See chapter 8.2.8

Performance data

		3:1			4:1			5:1			6:1			8:1			10:1			12:1			15:1		
N_1 [rpm]	N_{1MAX} [rpm]	T_{2N} [Nm]	T_{2B} [Nm]	T_{2NOT} [Nm]	T_{2N} [Nm]	T_{2B} [Nm]	T_{2NOT} [Nm]	T_{2N} [Nm]	T_{2B} [Nm]	T_{2NOT} [Nm]	T_{2N} [Nm]	T_{2B} [Nm]	T_{2NOT} [Nm]	T_{2N} [Nm]	T_{2B} [Nm]	T_{2NOT} [Nm]	T_{2N} [Nm]	T_{2B} [Nm]	T_{2NOT} [Nm]	T_{2N} [Nm]	T_{2B} [Nm]	T_{2NOT} [Nm]	T_{2N} [Nm]	T_{2B} [Nm]	T_{2NOT} [Nm]
2800	7000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	97	145	193	97	145	193
2200	7000	0	0	0	0	0	0	0	0	0	142	215	286	142	215	286	142	215	286	0	0	0	0	0	0
1500	7000	142	215	286	142	215	286	142	215	286	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0



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

3:1		4:1		5:1		6:1		8:1		10:1		12:1		15:1	
F_{r2} [N]	F_{a2} [N]	F_{r2} [N]	F_{a2} [N]	F_{r2} [N]	F_{a2} [N]	F_{r2} [N]	F_{a2} [N]	F_{r2} [N]	F_{a2} [N]	F_{r2} [N]	F_{a2} [N]	F_{r2} [N]	F_{a2} [N]	F_{r2} [N]	F_{a2} [N]
7200	3600	7200	3600	7200	3600	7200	3600	7200	3600	7200	3600	7200	3600	7200	3600

Gearbox inertia moments/mass

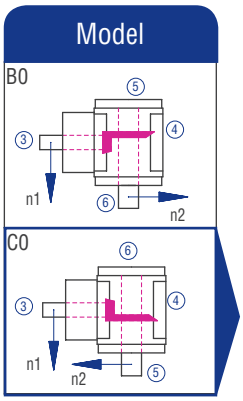
Inertia moment J_1 related to the fast-rotating shaft (N_1)

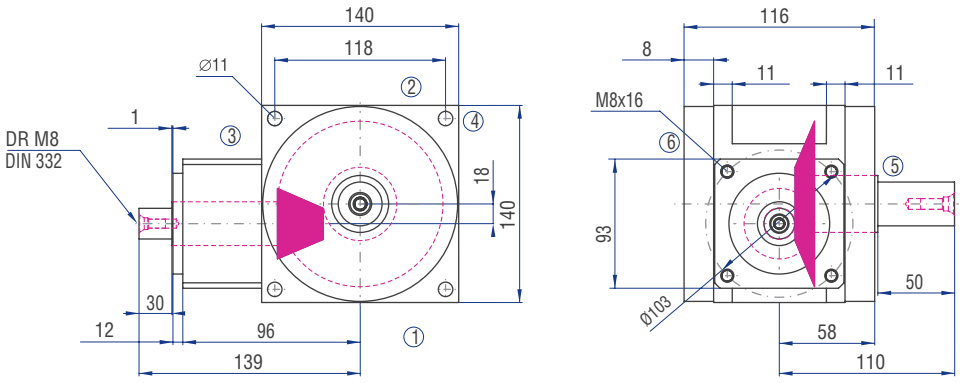
Inertia moment [$kgcm^2$]							
3:1	4:1	5:1	6:1	8:1	10:1	12:1	15:1
2,4200	1,7700	1,4100	1,4100	1,1200	1,0000	0,8800	0,8100

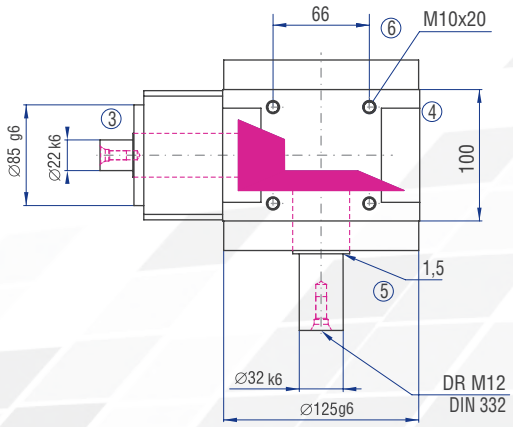
Mass ca. [kg]
9.5

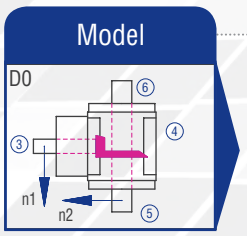
The mass of the gearbox may deviate depending on the type and the gear ratio.

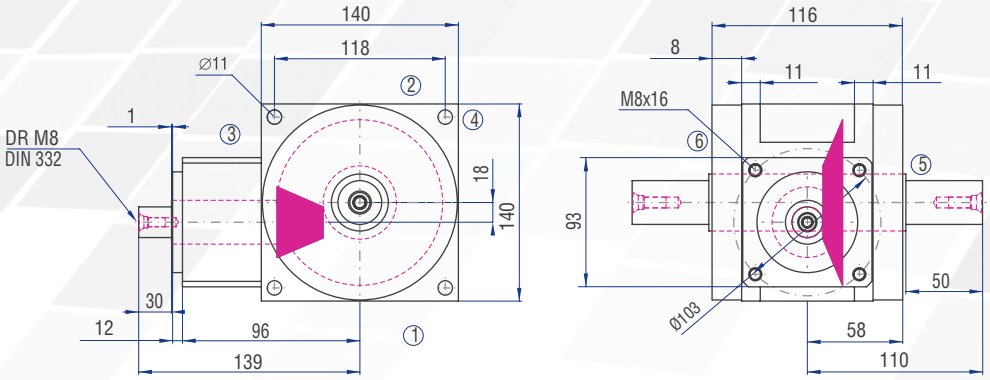
8.3.8 Type H 140 – Standard hypoid gearboxes

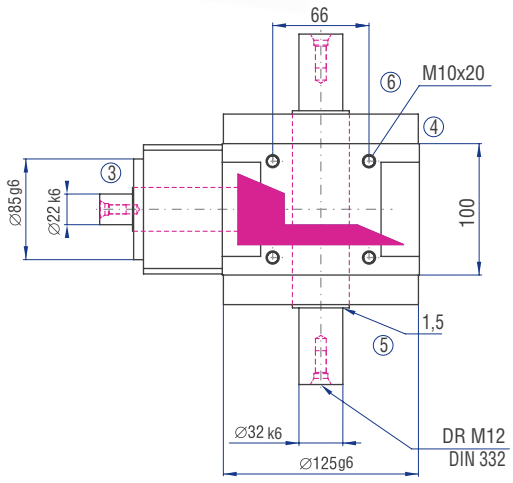




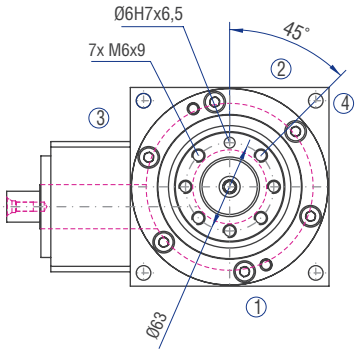


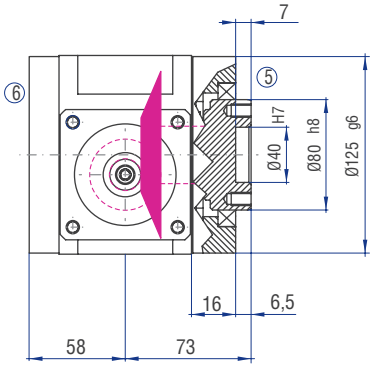


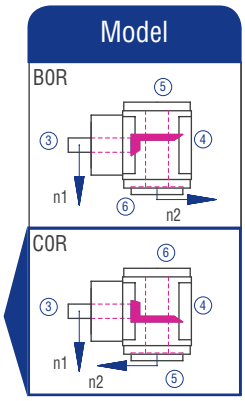


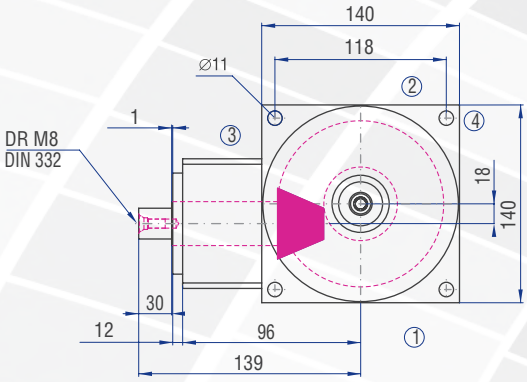


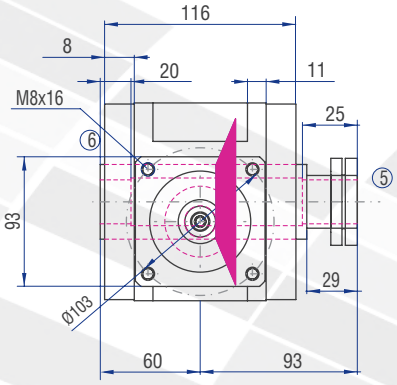
The dimensions of the Models not shown can be figured by mirroring available dimensions.

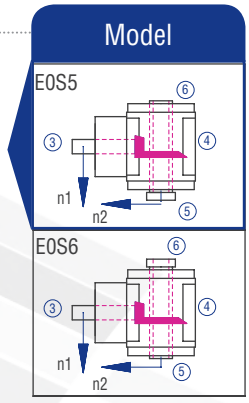

Ø6H7x6,5
7x M6x9
45°
Ø63

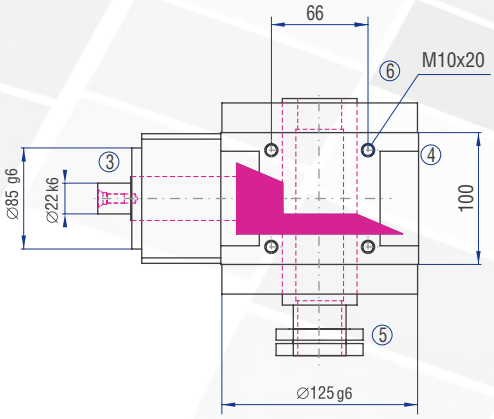

7
H7
Ø40
h8
Ø80
g6
Ø125
16
6,5
58
73

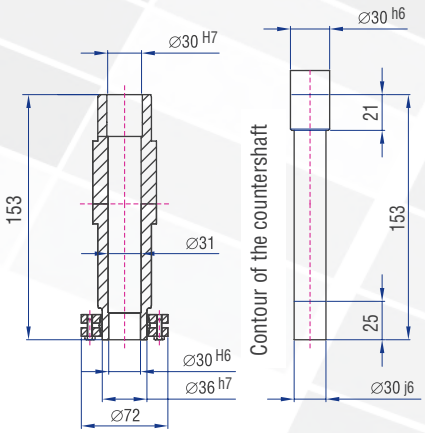

Model
B0R
C0R
n1
n2


140
118
Ø11
DR M8
DIN 332
1
18
140
30
12
96
139

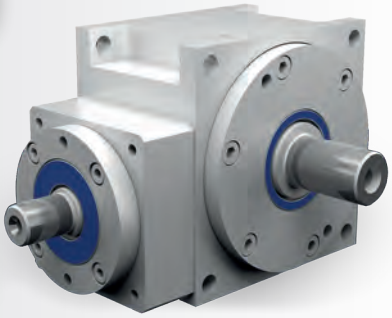

116
8
20
11
M8x16
25
93
29
Ø103
60
93


Model
E0S5
E0S6
n1
n2


66
M10x20
Ø85 g6
Ø22k6
100
Ø125 g6


Ø30 H7
153
Ø31
Ø30 H6
Ø36 h7
Ø72
Contour of the countershaft
Ø30 h6
21
153
25
Ø30 j6

8.3.9 Type H 170 – Standard hypoid gearboxes

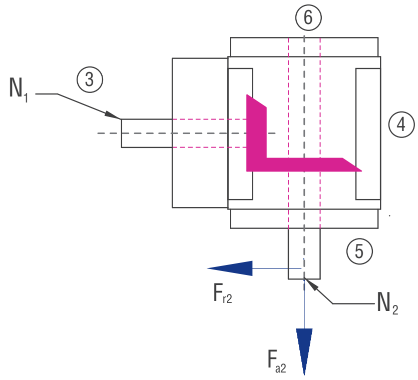


Characteristics

Characteristic	Standard	Option
Toothing	Spiral-toothed, hardened hypoid bevel gears	See chapter 8.2.1
Gear ratio	3:1 to 15:1	
Housing / Flanges	Aluminium / steel or casting	
Threaded mounting holes	On the sides 1, 2 and 3	See chapter 8.2.3
Shaft	Material 1 C45, shaft ends greased Fit with ISO 6 tolerance	See chapter 4.6.2
Hollow shaft	Material 1 C45, shafts greased Fit with ISO 6 tolerance	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	< 4 arcmin	See chapter 8.2.10
Protection class	IP 64	See chapter 4.5
Corrosion protection	Prime coat; layer thickness >40 µm	See chapter 4.4
Bearing life L10h	more than 30,000h in S5 operation	See chapter 4.9.1
Oil change intervals	Not required if the oil temperature is kept < 90°C. The lifetime of the bearings can be increased by the factor 1.5 if the oil is changed after the first 500 service hours and then every 5000 service hours.	See chapter 8.2.8
Lubricants	Synthetic lubricants	See chapter 8.2.8

Performance data

N_1 [rpm]	N_{1MAX} [rpm]	3:1			4:1			5:1			6:1			8:1			10:1			12:1			15:1		
		T_{2N} [Nm]	T_{2B} [Nm]	T_{2NOT} [Nm]	T_{2N} [Nm]	T_{2B} [Nm]	T_{2NOT} [Nm]	T_{2N} [Nm]	T_{2B} [Nm]	T_{2NOT} [Nm]	T_{2N} [Nm]	T_{2B} [Nm]	T_{2NOT} [Nm]	T_{2N} [Nm]	T_{2B} [Nm]	T_{2NOT} [Nm]	T_{2N} [Nm]	T_{2B} [Nm]	T_{2NOT} [Nm]	T_{2N} [Nm]	T_{2B} [Nm]	T_{2NOT} [Nm]	T_{2N} [Nm]	T_{2B} [Nm]	T_{2NOT} [Nm]
2300	6000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	182	275	365	182	275	365
1800	6000	0	0	0	0	0	0	0	0	0	266	398	528	266	398	528	266	398	528	0	0	0	0	0	0
1150	6000	266	398	528	266	398	528	266	398	528	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0



Permissible radial force F_{r2} and axial force F_{a2} on shaft N2

3:1		4:1		5:1		6:1		8:1		10:1		12:1		15:1	
F_{r2} [N]	F_{a2} [N]	F_{r2} [N]	F_{a2} [N]	F_{r2} [N]	F_{a2} [N]	F_{r2} [N]	F_{a2} [N]	F_{r2} [N]	F_{a2} [N]	F_{r2} [N]	F_{a2} [N]	F_{r2} [N]	F_{a2} [N]	F_{r2} [N]	F_{a2} [N]
10000	5000	10000	5000	10000	5000	10000	5000	10000	5000	10000	5000	10000	5000	10000	5000

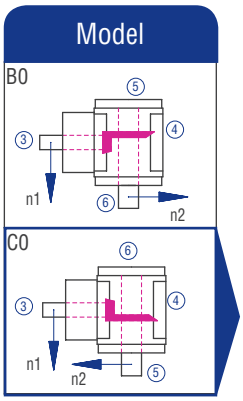
Gearbox inertia moments/mass

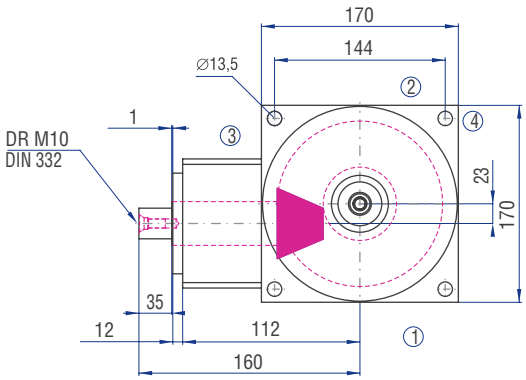
Inertia moment J_1 related to the fast-rotating shaft (N_1)

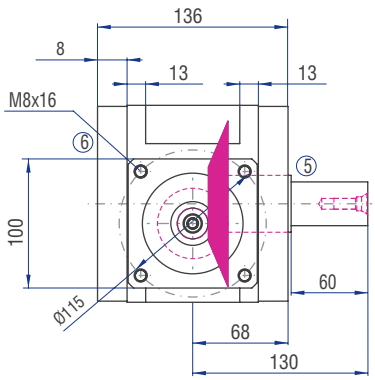
Inertia moment [$kgcm^2$]								Mass ca. [kg]
3:1	4:1	5:1	6:1	8:1	10:1	12:1	15:1	
7,1200	5,0900	4,0000	3,6500	2,8500	2,4600	2,2500	2,0700	15.5

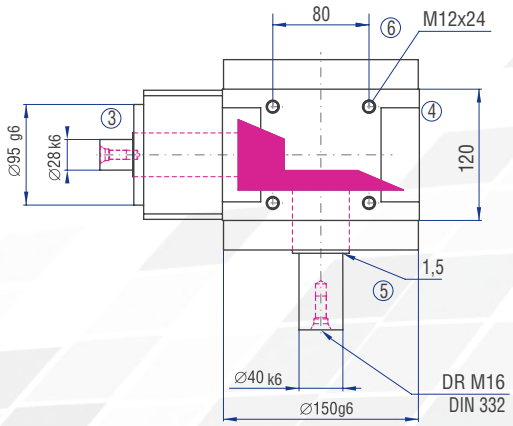
The mass of the gearbox may deviate depending on the type and the gear ratio.

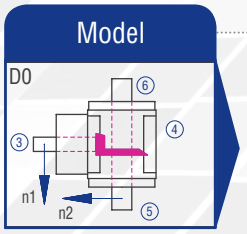
8.3.9 Type H 170 – Standard hypoid gearboxes

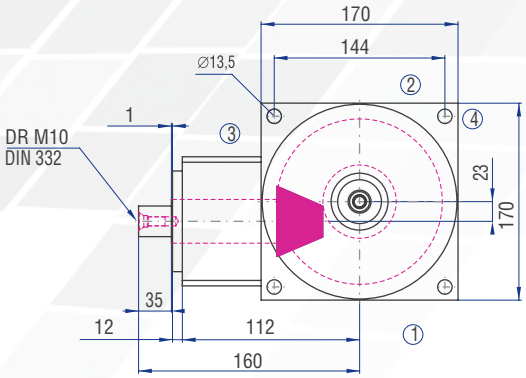


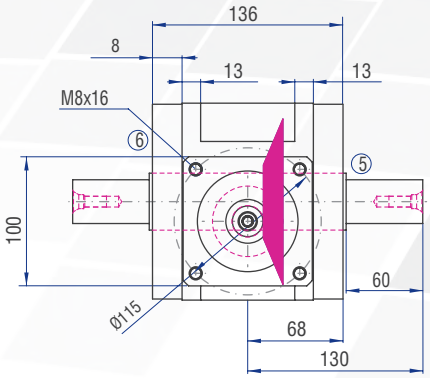


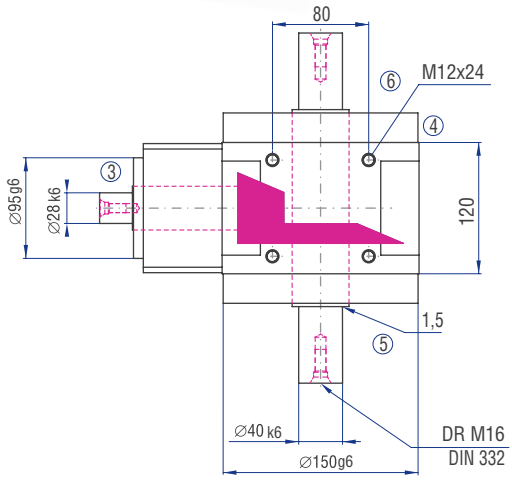




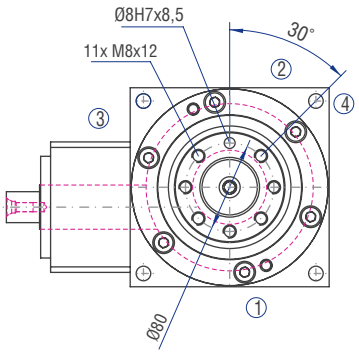


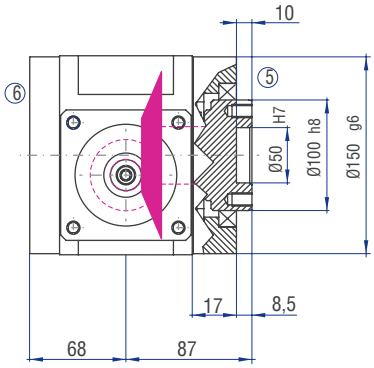


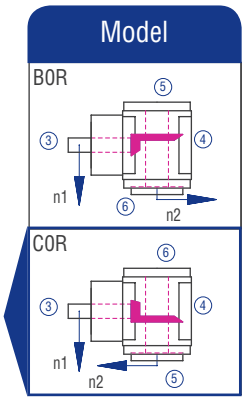


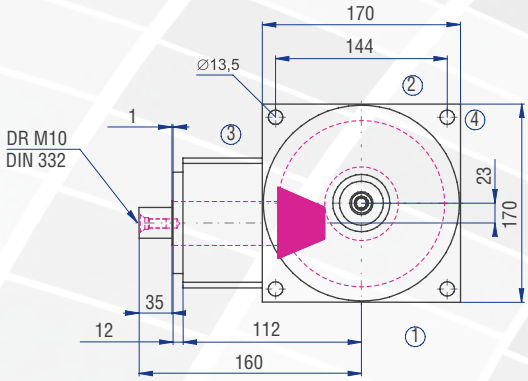


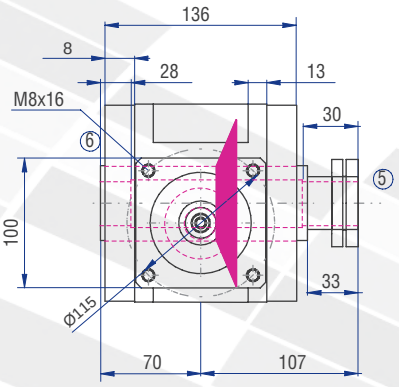
The dimensions of the Models not shown can be figured by mirroring available dimensions.

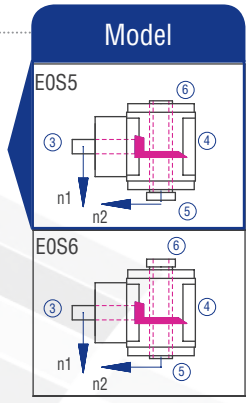

Ø8H7x8,5
11x M8x12
30°
Ø80

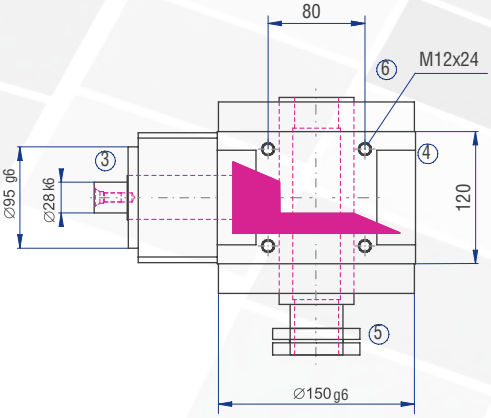

10
H7
Ø50
Ø100 h8
Ø150 g6
17
8,5
68
87

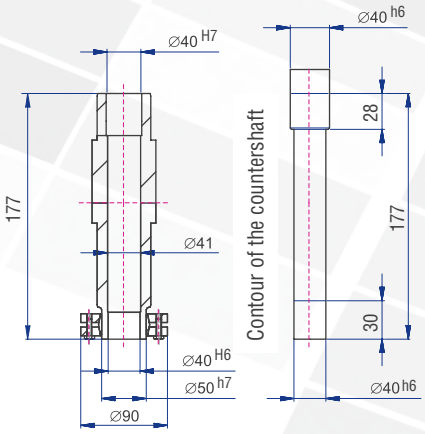

Model
B0R
C0R
n1
n2


170
144
Ø13,5
DR M10
DIN 332
1
23
170
35
12
112
160

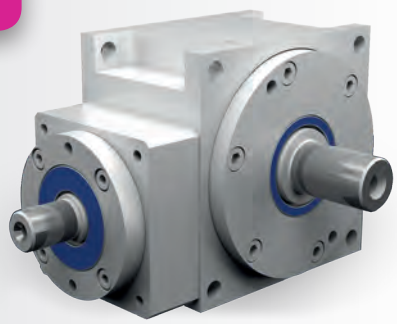

136
8
28
13
M8x16
30
100
33
Ø115
70
107


Model
E0S5
E0S6
n1
n2


80
M12x24
Ø95 g6
Ø28 k6
120
Ø150 g6


Ø40 H7
177
Ø41
Ø40 H6
Ø50 h7
Ø90
Contour of the countershaft
Ø40 h6
28
177
30
Ø40 h6

8.3.10 Type H 215 – Standard hypoid gearboxes

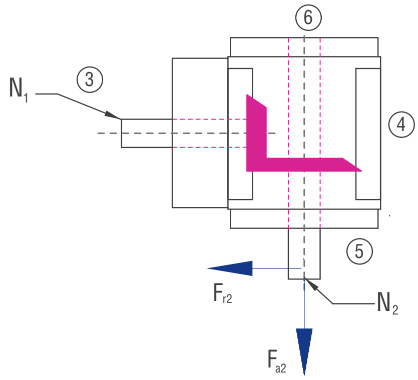


Characteristics

Characteristic	Standard	Option
Toothing	Spiral-toothed, hardened hypoid bevel gears	See chapter 8.2.1
Gear ratio	3:1 to 15:1	
Housing / Flanges	Aluminium / steel or casting	
Threaded mounting holes	On the sides 1, 2 and 3	See chapter 8.2.3
Shaft	Material 1 C45, shaft ends greased Fit with ISO 6 tolerance	See chapter 4.6.2
Hollow shaft	Material 1 C45, shafts greased Fit with ISO 6 tolerance	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	< 4 arcmin	See chapter 8.2.10
Protection class	IP 64	See chapter 4.5
Corrosion protection	Prime coat; layer thickness >40 µm	See chapter 4.4
Bearing life L10h	more than 30,000h in S5 operation	See chapter 4.9.1
Oil change intervals	Not required if the oil temperature is kept < 90°C. The lifetime of the bearings can be increased by the factor 1.5 if the oil is changed after the first 500 service hours and then every 5000 service hours.	See chapter 8.2.8
Lubricants	Synthetic lubricants	See chapter 8.2.8

Performance data

		3:1			4:1			5:1			6:1			8:1			10:1			12:1			15:1		
N_1 [rpm]	N_{1MAX} [rpm]	T_{2N} [Nm]	T_{2B} [Nm]	T_{2NOT} [Nm]	T_{2N} [Nm]	T_{2B} [Nm]	T_{2NOT} [Nm]	T_{2N} [Nm]	T_{2B} [Nm]	T_{2NOT} [Nm]	T_{2N} [Nm]	T_{2B} [Nm]	T_{2NOT} [Nm]	T_{2N} [Nm]	T_{2B} [Nm]	T_{2NOT} [Nm]	T_{2N} [Nm]	T_{2B} [Nm]	T_{2NOT} [Nm]	T_{2N} [Nm]	T_{2B} [Nm]	T_{2NOT} [Nm]	T_{2N} [Nm]	T_{2B} [Nm]	T_{2NOT} [Nm]
1600	5000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	512	767	1022	512	767	1022
1200	5000	0	0	0	0	0	0	0	0	0	723	1084	1450	723	1084	1450	723	1084	1450	0	0	0	0	0	0
700	5000	723	1084	1450	723	1084	1450	723	1084	1450	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0



Permissible radial force F_{r2} and axial force F_{a2} on shaft N2

3:1		4:1		5:1		6:1		8:1		10:1		12:1		15:1	
F_{r2} [N]	F_{a2} [N]	F_{r2} [N]	F_{a2} [N]	F_{r2} [N]	F_{a2} [N]	F_{r2} [N]	F_{a2} [N]	F_{r2} [N]	F_{a2} [N]	F_{r2} [N]	F_{a2} [N]	F_{r2} [N]	F_{a2} [N]	F_{r2} [N]	F_{a2} [N]
15000	7500	15000	7500	15000	7500	15000	7500	15000	7500	15000	7500	15000	7500	15000	7500

Gearbox inertia moments/mass

Inertia moment J_1 related to the fast-rotating shaft (N_1)

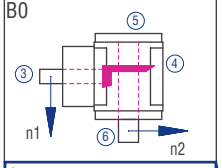
Inertia moment [kgcm^2]								
3:1	4:1	5:1	6:1	8:1	10:1	12:1	15:1	Mass ca. [kg]
26,9600	17,4400	13,5300	12,2500	8,9500	7,3800	6,4700	5,7600	32.5

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

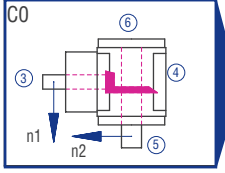
8.3.10 Type H 215 – Standard hypoid gearboxes

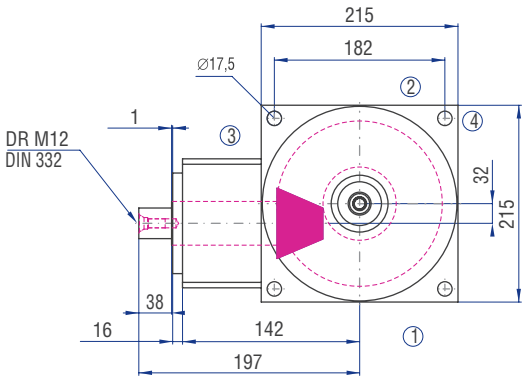
Model

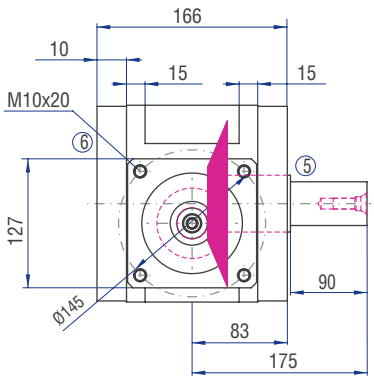
B0

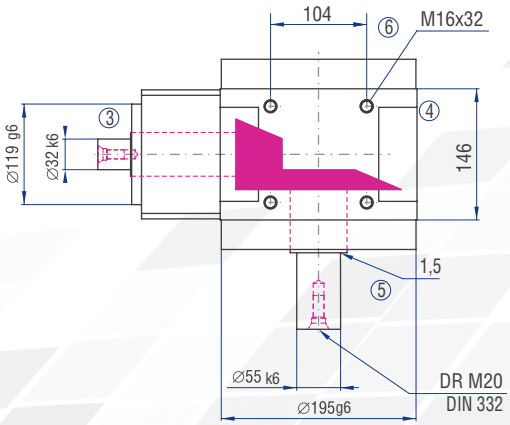


C0



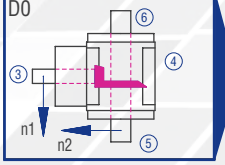


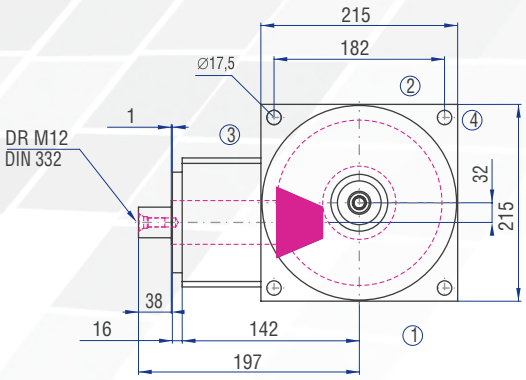


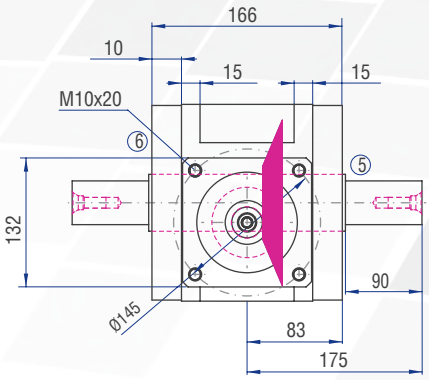


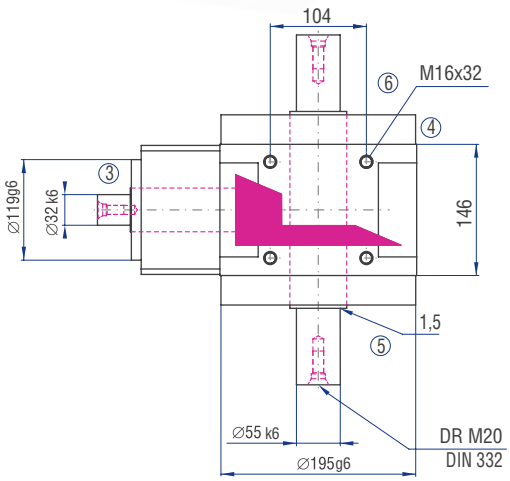
Model

D0

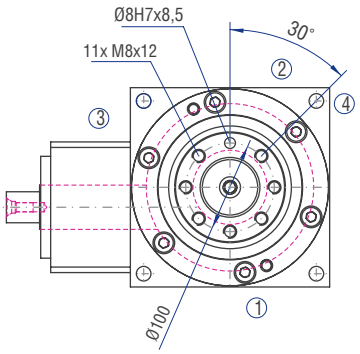


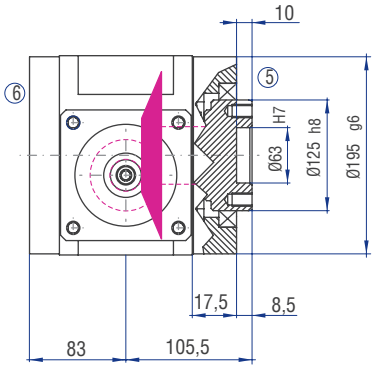


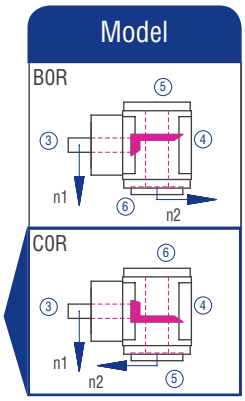


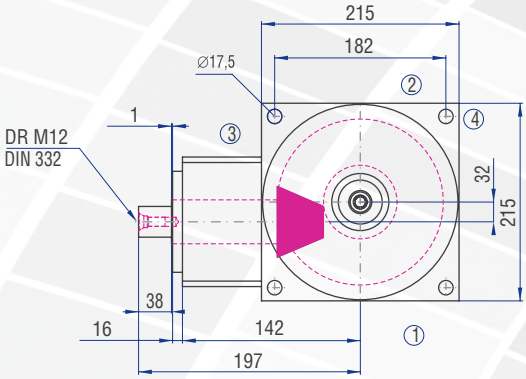


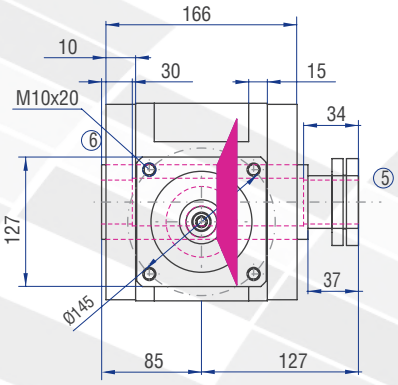
The dimensions of the Models not shown can be figured by mirroring available dimensions.

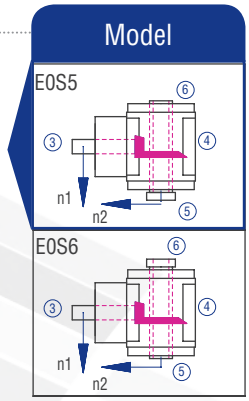

Ø8H7x8,5
11x M8x12
30°
Ø100

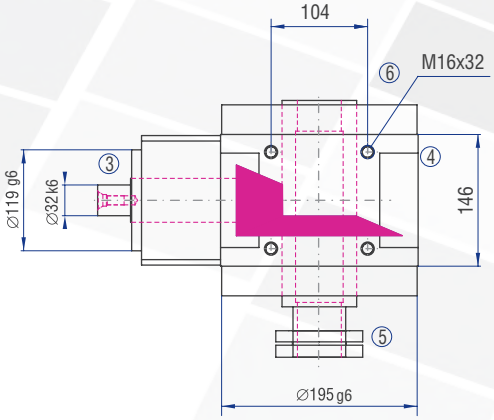

10
H7
Ø63
Ø125 h8
Ø195 g6
17,5
8,5
83
105,5

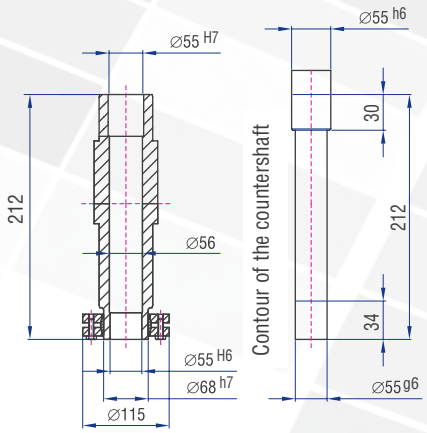

Model
B0R
C0R
n1
n2


215
182
Ø17,5
DR M12
DIN 332
1
32
215
38
16
142
197

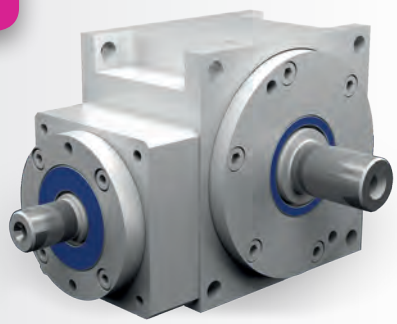

166
10
30
15
M10x20
34
127
37
Ø145
85
127


Model
E0S5
E0S6
n1
n2


104
M16x32
Ø119 g6
Ø32k6
146
Ø195 g6


Ø55 H7
212
Ø56
Ø55 H6
Ø68 h7
Ø115
Contour of the countershaft
Ø55 h6
30
212
34
Ø55 g6

8.3.11 Type H 260 – Standard hypoid gearboxes

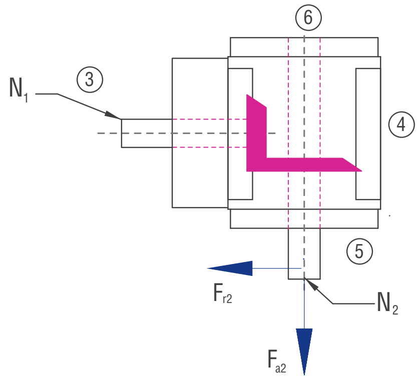


Characteristics

Characteristic	Standard	Option
Toothing	Spiral-toothed, hardened hypoid bevel gears	See chapter 8.2.1
Gear ratio	3:1 to 15:1	
Housing / Flanges	Aluminium / steel or casting	
Threaded mounting holes	On the sides 1, 2 and 3	See chapter 8.2.3
Shaft	Material 1 C45, shaft ends greased Fit with ISO 6 tolerance	See chapter 4.6.2
Hollow shaft	Material 1 C45, shafts greased Fit with ISO 6 tolerance	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	< 4 arcmin	See chapter 8.2.10
Protection class	IP 64	See chapter 4.5
Corrosion protection	Prime coat; layer thickness >40 µm	See chapter 4.4
Bearing life L10h	more than 30,000h in S5 operation	See chapter 4.9.1
Oil change intervals	Not required if the oil temperature is kept < 90°C. The lifetime of the bearings can be increased by the factor 1.5 if the oil is changed after the first 500 service hours and then every 5000 service hours.	See chapter 8.2.8
Lubricants	Synthetic lubricants	See chapter 8.2.8

Performance data

		3:1			4:1			5:1			6:1			8:1			10:1			12:1			15:1		
N_1 [rpm]	N_{1MAX} [rpm]	T_{2N} [Nm]	T_{2B} [Nm]	T_{2NOT} [Nm]	T_{2N} [Nm]	T_{2B} [Nm]	T_{2NOT} [Nm]	T_{2N} [Nm]	T_{2B} [Nm]	T_{2NOT} [Nm]	T_{2N} [Nm]	T_{2B} [Nm]	T_{2NOT} [Nm]	T_{2N} [Nm]	T_{2B} [Nm]	T_{2NOT} [Nm]	T_{2N} [Nm]	T_{2B} [Nm]	T_{2NOT} [Nm]	T_{2N} [Nm]	T_{2B} [Nm]	T_{2NOT} [Nm]	T_{2N} [Nm]	T_{2B} [Nm]	T_{2NOT} [Nm]
1300	4500	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1023	1533	2044	1023	1533	2044
1000	4500	0	0	0	0	0	0	0	0	0	1444	2165	2880	1444	2165	2880	1444	2165	2880	0	0	0	0	0	0
550	4500	1444	2165	2880	1444	2165	2880	1444	2165	2880	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0



Permissible radial force F_{r2} and axial force F_{a2} on shaft N2

3:1		4:1		5:1		6:1		8:1		10:1		12:1		15:1	
F_{r2} [N]	F_{a2} [N]	F_{r2} [N]	F_{a2} [N]	F_{r2} [N]	F_{a2} [N]	F_{r2} [N]	F_{a2} [N]	F_{r2} [N]	F_{a2} [N]	F_{r2} [N]	F_{a2} [N]	F_{r2} [N]	F_{a2} [N]	F_{r2} [N]	F_{a2} [N]
22500	11250	22500	11250	22500	11250	22500	11250	22500	11250	22500	11250	22500	11250	22500	11250

Gearbox inertia moments/mass

Inertia moment J_1 related to the fast-rotating shaft (N_1)

Inertia moment [kgcm²]								
3:1	4:1	5:1	6:1	8:1	10:1	12:1	15:1	Mass ca. [kg]
91,4700	62,4300	44,2900	39,5500	27,0700	21,4300	18,1400	15,5300	60

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

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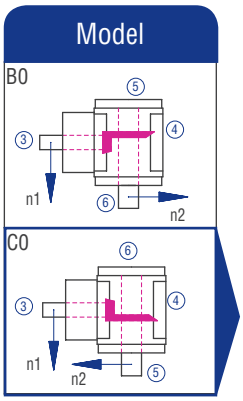
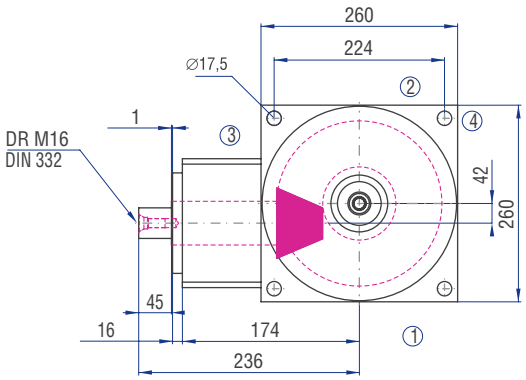
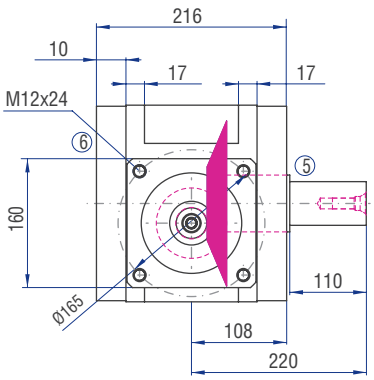
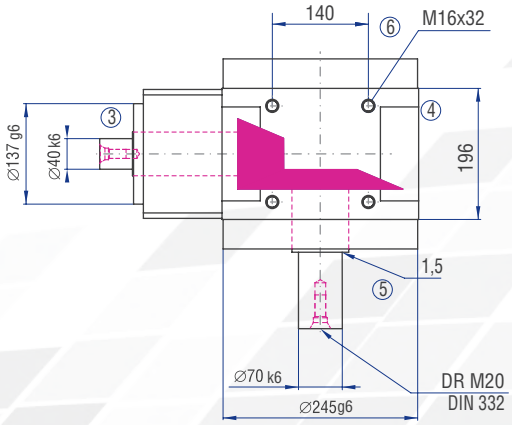
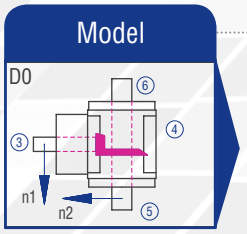
8.3.11 Type H 260 – Standard hypoid gearboxes

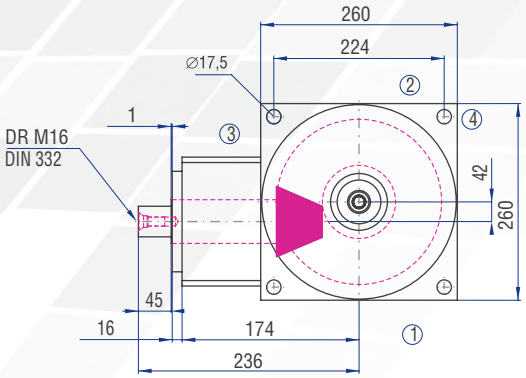


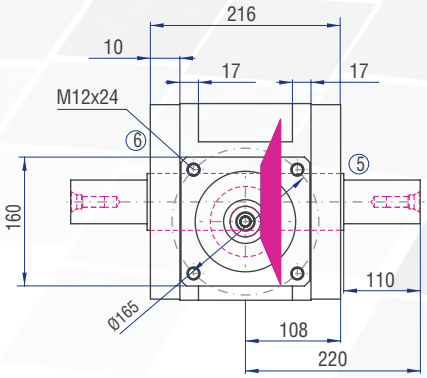


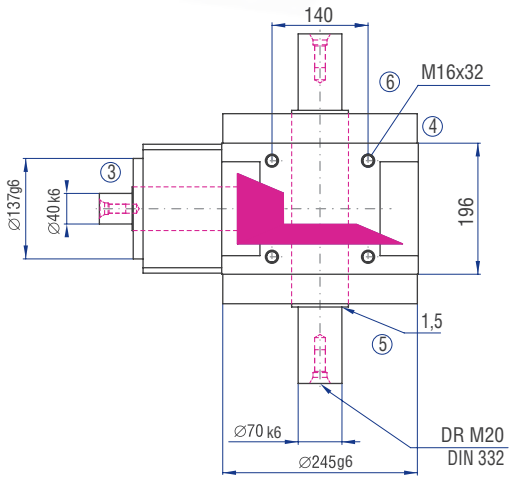




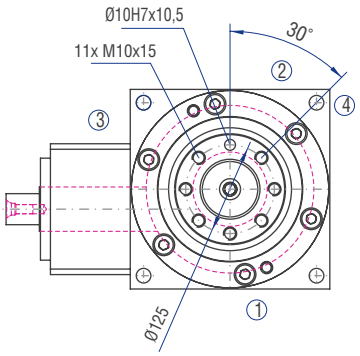


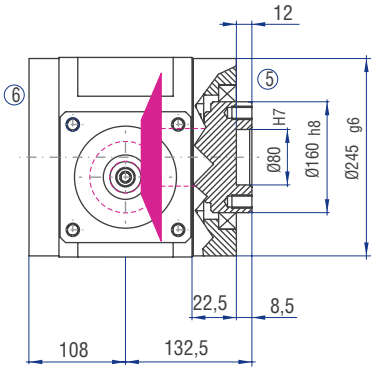


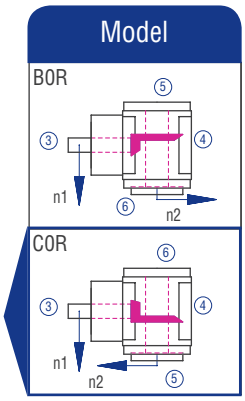


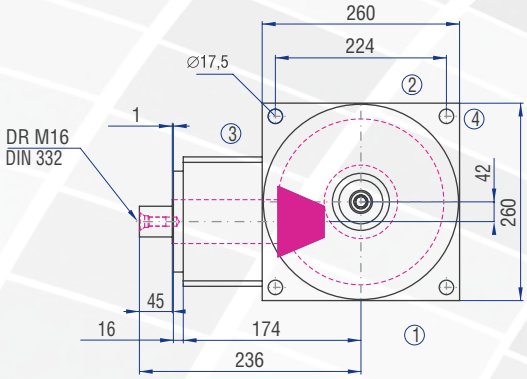


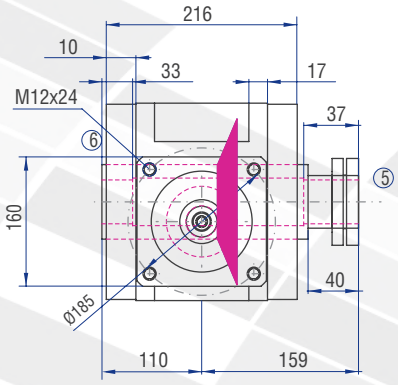
The dimensions of the Models not shown can be figured by mirroring available dimensions.

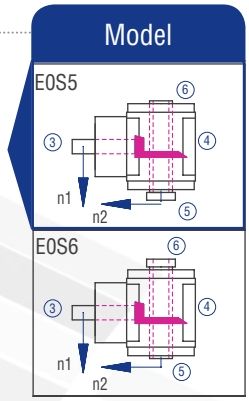

Ø10H7x10,5
11x M10x15
30°
Ø125

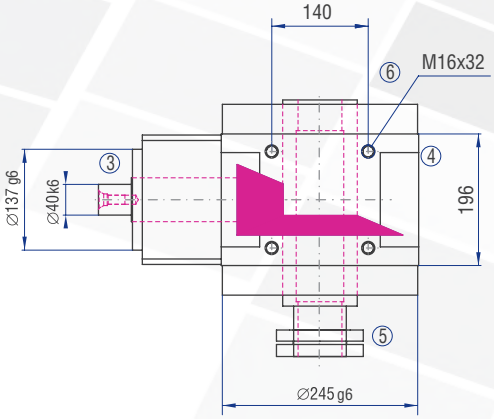

12
H7
Ø80
Ø160 h8
Ø245 g6
22,5
8,5
108
132,5

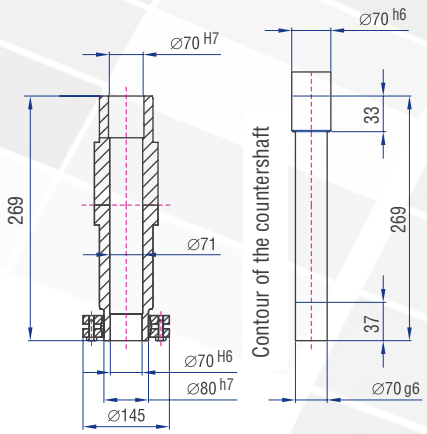

Model
B0R
C0R
n1
n2


260
224
Ø17,5
DR M16
DIN 332
42
260
45
16
174
236


216
10
33
17
M12x24
37
160
40
Ø185
110
159


Model
E0S5
E0S6
n1
n2


140
M16x32
Ø137 g6
Ø40k6
196
Ø245 g6


Ø70 H7
269
Ø71
Ø70 H6
Ø80 h7
Ø145
Contour of the countershaft
Ø70 h6
33
269
37
Ø70 g6