Made in Germany

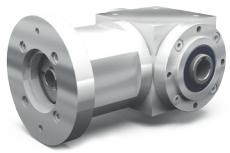
ATEK

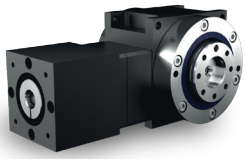
ANTRIEBSTECHNIK

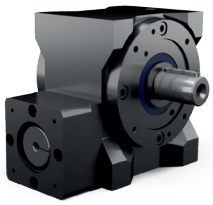
Das Winkelgetriebe

Servo gearboxes (precision gearboxes)

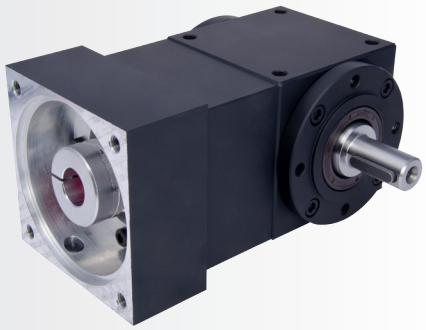
Type: LC, VC, HC, SC



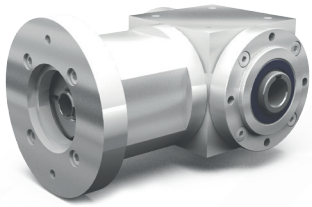




11 Servo gearboxes (precision gearboxes)

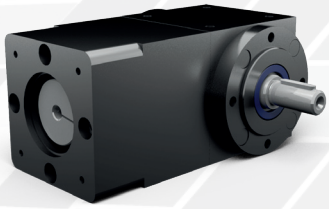


11.1 Type overview



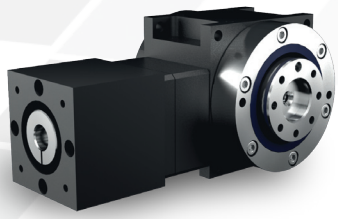
Type LC – Servo miniatur bevel gearboxes

Gear ratios: i = 1:1 to 4:1
Maximum output torque: 16 Nm
2 gearbox sizes with edge lengths of 035 to 45 mm
Suitable for fitting IEC standard motors
Low-backlash construction < 10 angular minutes possible
Housing made of aluminium



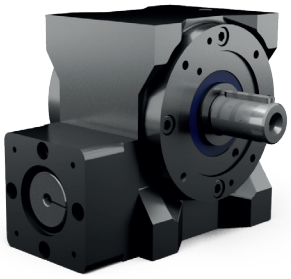
Type VC – Servo bevel gearboxes

Gear ratios: i = 1:1 to 6:1
Maximum acceleration torque on output: 700 Nm
6 gearbox sizes with edge lengths of 065 to 200 mm
Minimised circumferential backlash (optional)
Housing made of grey cast iron
Bevel gearboxes suitable for fitting servo-motors
Non-positive connection between motor and gearbox



Type HC – Servo hypoid gearboxes

Gear ratios: i = 3:1 to 15:1
Maximum acceleration torque on output: 2160 Nm
6 gearbox sizes; centre-to-centre distance: 090 to 260 mm
Minimised circumferential backlash (optional)
Housing made of aluminium
Hypoid gearboxes suitable for fitting servo-motors
Non-positive connection between motor and gearbox



Type SC – Servo worm gearboxes

Gear ratios: i = 5:1 to 26:1 (i > 26 upon request)
Maximum acceleration torque on output: 1100 Nm
5 gearbox sizes; centre-to-centre distance: 040 to 100 mm
Minimised circumferential backlash (optional)
Housing made of grey cast iron
Worm gearboxes suitable for fitting servo-motors
Non-positive connection between motor and gearbox

11.1.1 General

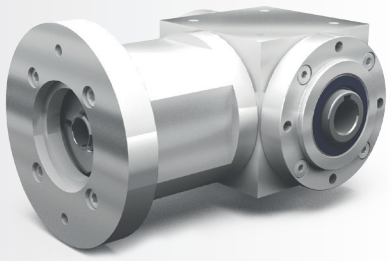
Special servo gearboxes have been developed for the requirements of highly dynamic servo-motors. The proven ATEK bevel gearbox and worm gearbox series form the basis for them. The combination of a large number of motor flanges and an insertable, zero-play clamp coupling enables the adaptation to the most servo-motors.

Due to the modular system, a later replacement of the motor flange and the coupling half on the motor side is very easy.

11.2 Type LC – Servo miniatur bevel gearboxes

11.2.1 Features

Gear ratios: i = 1:1 to 4:1
Maximum output torque: 16 Nm
2 gearbox sizes with edge lengths of 035 to 45 mm
Suitable for fitting IEC standard motors
Low-backlash construction < 10 angular minutes possible
Housing made of aluminium



The L-series miniature bevel gearboxes can be extended by a flange to attach a motor.

11.2.2 Models

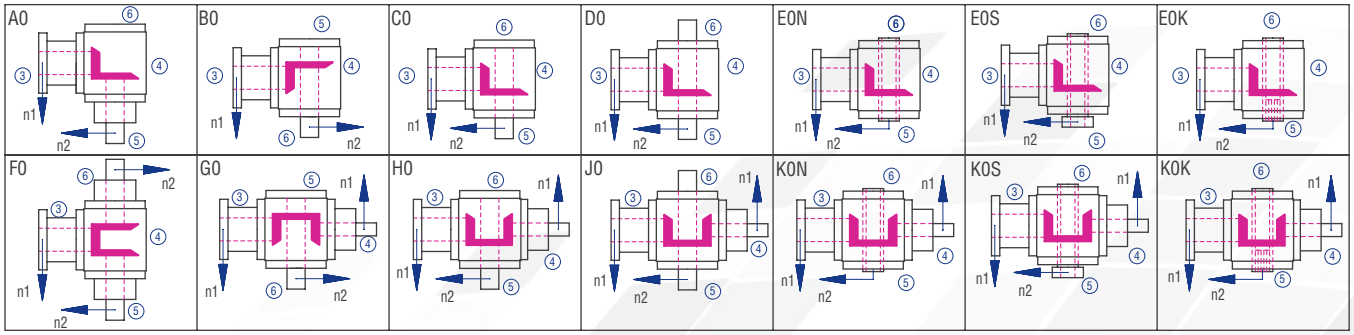


Figure **11.2.2-1; Models**

11.2.3 Gearbox sides

The example shows the Model C0

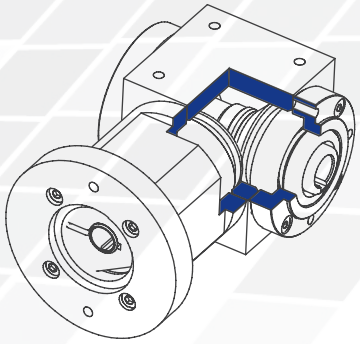


Figure **11.2.3-1; Gearbox sides**

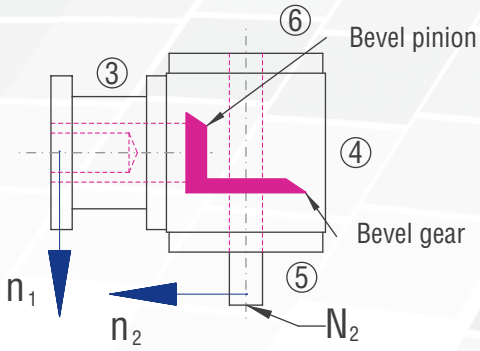


Figure **11.2.3-2; Shaft designations**

11.2.4 Order code

The order code reflects the customer specifications. Example:

Type	Size	Gear ratio	Model	Fixing side	Installation position	Speed n_2	Design
LC	045	1:1	C0-	1.	1-	1500	/0000
Description	Housing edge length;		Figure 5.3.2-1; Models;	Gearbox side on which fixing is made; Figure 4.3.1-1 Gearbox sides	Gearbox side directed downwards; Figure 4.3.1-1 Gearbox sides	Slowly rotating shaft;	Standard

Table **11.2.4-1**

11.2.5 Characteristics

Characteristic	Standard	Option
Toothing	Bevel gear set, spiral-toothed	See chapter 5.2
Housing / Flanges	Aluminium	See chapter 5.2
Threaded mounting holes	On all housing surfaces without flange and on all flanges.	See chapter 5.2.2
Shaft	Drive shaft with clamping hub; fit with ISO 6 tolerance with parallel keyway: according to DIN 6885	See chapter 4.6.2
Hollow shaft	Fit with ISO H7 tolerance with parallel keyway: according to DIN 6885	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 5.2.9
Protection class	IP 54	See chapter 4.5
Corrosion protection	-	See chapter 5.2.10
Bearing life L10h	more than 15,000h	See chapter 4.9.1
Oil change intervals	Not required	See chapter 5.2.7
Lubricants	Synthetic lubricants	See chapter 5.2.7

11.2.6 Dimensions

The dimensions of the gearboxes are identical with those of the L-type gearboxes
The motor-specific adapter flanges are under development. Please enquire gearboxes for your case of application.

11.3.1 General construction

The VC gearbox type is based on the proven type V bevel gearboxes. The edge length of the housing is reflected in the gearbox size (example: VC 120 – housing edge length 120 mm).

11.3.2 Toothing

VC servo 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.

11.3.3 Models

Due to the modular system, different gearbox Models can be configured.
The variants differ in type and number of the shafts, the rotational direction of the shafts and their support by bearings.

11.3.4 Threaded mounting holes

All sides of the gearboxes are machined and may be used as mounting surfaces.
All flanges always have threaded mounting holes. 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	-	5, 6
1, 2, 3, 4, 5, 6	1, 2, 4	5, 6
9	1, 2, 4	5, 6

Table **11.3.4-1**

The standard version of the mounting / fastening has the order code 9.
Please enquire other mounting options.

11.3.5 Installation position

The installation position is defined by the gearbox side directed downwards during operation and will be indicated by the corresponding gearbox side. The gearboxes can be used in all installation positions. The technically most favourable and thus recommended installation position is the position in which the shafts are horizontal. These are the installation positions 1 and 2.

11.3.6 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 bevel pinion is located on this shaft.
The slowly rotating shaft has the speed $\mathbf{n_2}$ and is identified by $\mathbf{N_2}$. The bevel gear is located on this shaft.

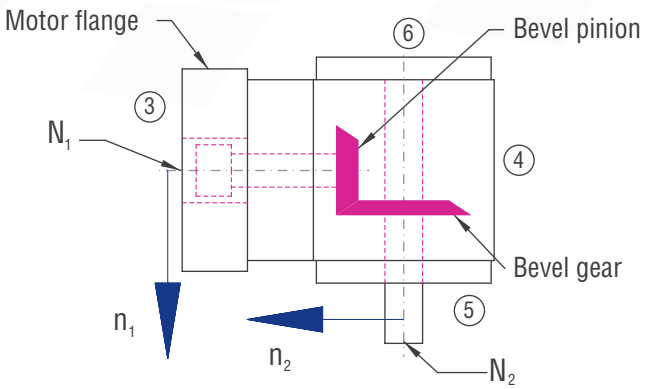


Figure **11.3.6-1**

11.3.7 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.

11.3.8 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.

11.3.9 Lubrication (abbreviation code)

(Chapter as in “Bevel gearboxes”, chapter 6.2.8) Different conditions for the lubrication of the toothing and the roller bearings will arise depending on gearbox size, installation position, rotational speed and on-period. In order to ensure these optimally, different oil quantities and viscosities are used. These will be defined by ATEK based on your ordering details (rotational speed, on-period, and ambient temperature). They will be reflected in the type designation.
You can find the itemisation in the example: VC 090 1:1 C0 -9.9- 2000/B0

Here, B0 means:

	Abbreviation	Explanation	Reference
Letter	B	Oil viscosity 220	Table 11.3.9-1
Numeral	0	no venting	Table 11.3.9-2

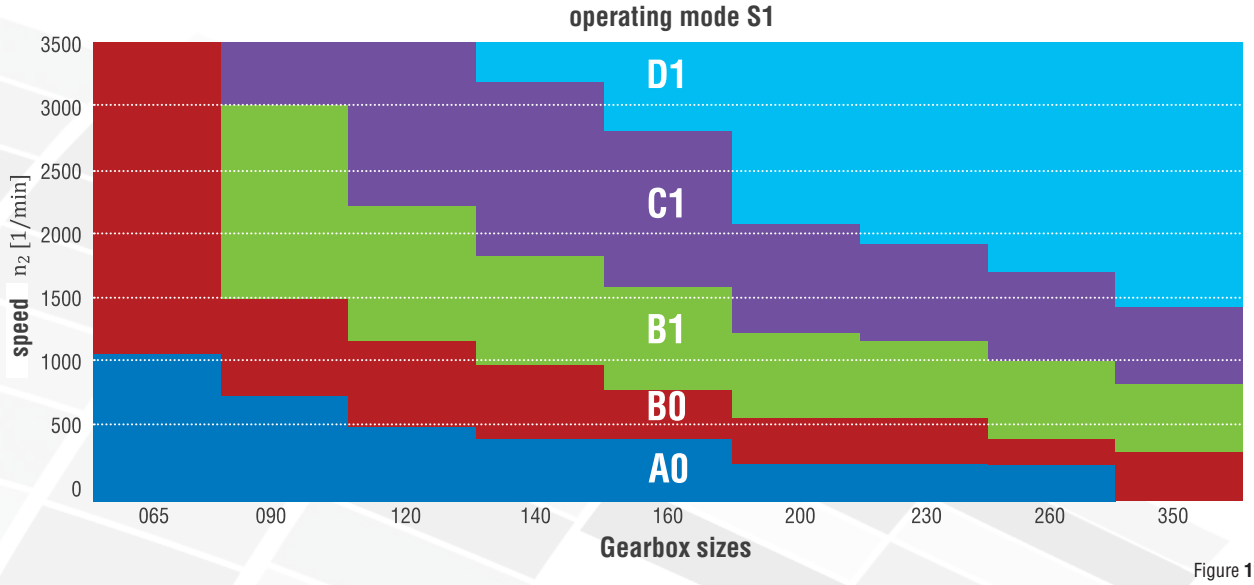


Figure **11.3.9-1**

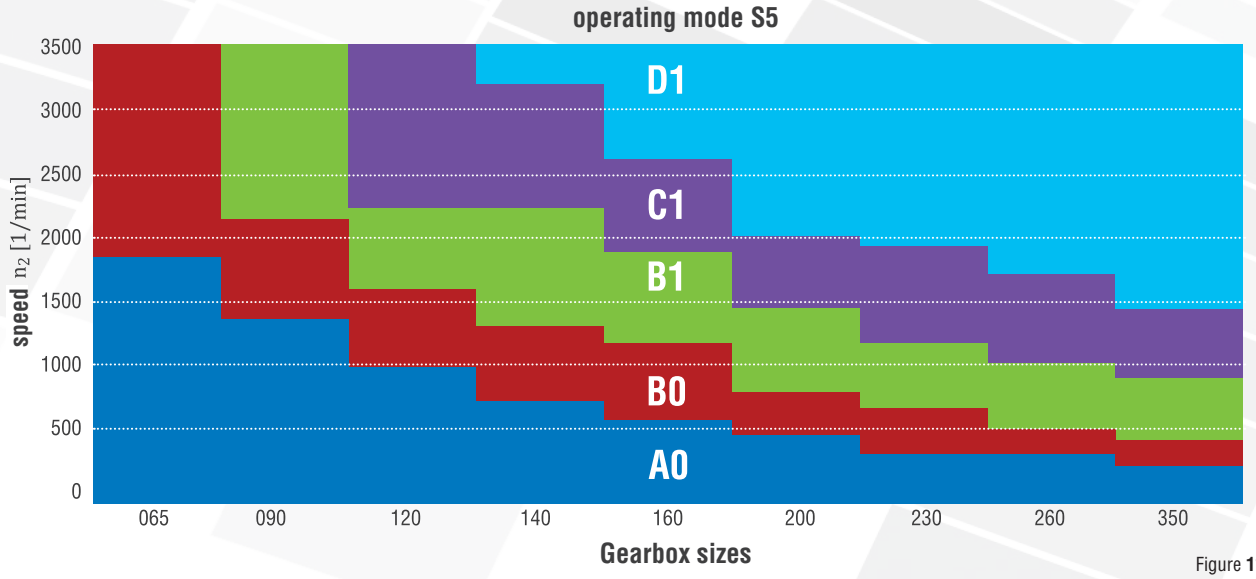


Figure **11.3.9-2**

Numeral 1	Oil viscosity
A	460
B	220
C	68
D	Injection lubrication
F	Fluid grease

Table 11.3.9-1

Depending on the gearbox size, injection lubrication may be necessary in case of high rotational speeds.
In case of very low rotational speeds, lubrication by fluid grease is also possible. At operating temperatures over 50°C, high pressure will develop through air expansion in the gearbox. Then a permanent pressure compensation must be ensured. To this end, the use of a vent filter is prescribed.

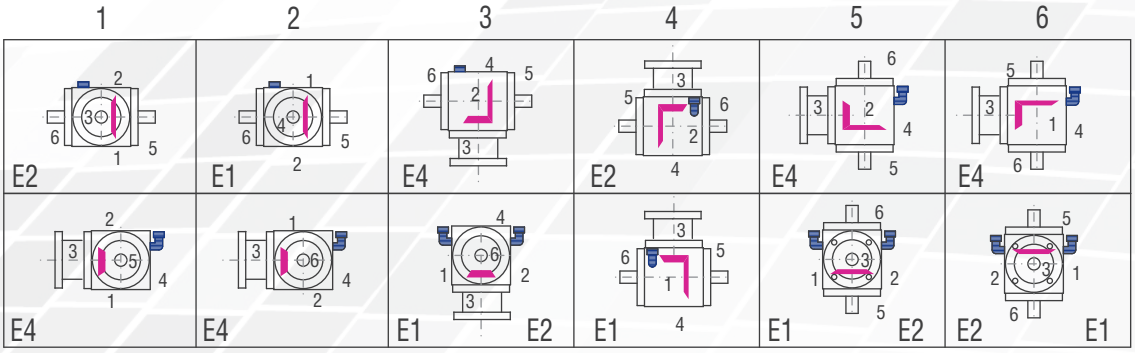
Numeral 2	Vent filter
0	No
1	Yes

Table 11.3.9-2

11.3.10 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 (included in the delivery) may be required. The position will be specified in the order documents. Please refer to the following table for the position of the filter. Here, E4, for example, means: Venting on side 4.

Installation position



Straight standard filter Filter with pipe elbows

Figure 11.3.10-1

11.3.11 Low-backlash construction

For optimal 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

All ATEK bevel gearboxes can be delivered as low-backlash types.

Ordering option	Gear set	1:1 2:1	3:1 4:1 5:1 6:1
/0000	Standard	<=20 arcmin	<=20 arcmin
/S2	Standard	<=10 arcmin	<=10 arcmin
/S1	Standard	<=6 arcmin	u.r.
/S0	Special gear set	<=4 arcmin	u.r.

Table 11.3.11-1

Abbreviation: u.r. – upon request

11.3.12 Connection of drive shaft to coupling

For torque transmission, a space-saving, zero-play connection in the form of a cone is implemented in the drive shaft. In case of extreme overloads, this non-positive connection is cut, thus preventing damage to the motor-side and gearbox-side elements. After an overload, our service department must be contacted.

11.3.13 Coupling

Two congruent coupling halves are positively connected by means of a plastic toothed ring under pretensioning. In case of extreme peak tensions and impact loads (emergency shut-off), a damping action is achieved through a slight distortion in the elastic range. The coupling is axially insertable and compensates angle errors as well as misalignments in the radial and axial direction. A later changeover to another motor is easily possible. The motor-side coupling hub is available in the following variants:

KN	KNN	SN
Clamping hub	Clamping hub with groove	Tension ring hub
For motor shafts without parallel key	1 For motor shafts with parallel key	For motor shafts without parallel key

Depending on the variant KN or KNN/SN, different torques can be transmitted.

Design of the coupling

Due to the dynamic characteristics of the servo-motors, the permissible acceleration torque and the emergency-stop torque must be considered when designing the servo gearboxes. The correct coupling hub can be selected by means of the table below on the basis of the maximum permissible torques on the motor shaft, acceleration torques (T_{1B}) and emergency-stop torques (T_{1Not}). These values must also be permissible on the gearbox!

Coupling Size	Hub	Coupling torques allowed [Nm]	Motor shaft diameter d [mm]										
			9	11	14	16	19	24	28	32	38	42	45
K 14	KN	T_{1B} [Nm]	5.3	5.6	6.1	6.5							
		T_{1NOT} [Nm]	7	9	13	15							
	KNN/SN	T_{1B} [Nm]	10	10	10	10							
		T_{1NOT} [Nm]	22	25	25	25							
K 19	KN	T_{1B} [Nm]	17	17	17	17	17	17					
		T_{1NOT} [Nm]	30	30	32	32	34	34					
	KNN/SN	T_{1B} [Nm]		17	17	17	17						
		T_{1NOT} [Nm]		30	32	34	34						
K 24	KN	T_{1B} [Nm]		35	36	39	39	43	46				
		T_{1NOT} [Nm]		45	45	50	60	65	70				
	KNN/SN	T_{1B} [Nm]		48	48	48	48	48	48				
		T_{1NOT} [Nm]			80	100	120	120	120				
K 28	KN	T_{1B} [Nm]			80	81	85	91	97	102	109		
		T_{1NOT} [Nm]			80	100	130	140	148	156	167		
	KNN/SN	T_{1B} [Nm]				128	128	128	128	128	128		
		T_{1NOT} [Nm]				140	240	240	240	240	240		
K 38	KN	T_{1B} [Nm]				94	98	104	109	113	122	126	130
		T_{1NOT} [Nm]				120	125	130	136	142	152	158	164
	KNN/SN	T_{1B} [Nm]						260	260	260	260	260	260
		T_{1NOT} [Nm]						500	500	500	500	500	500

Table **11.3.13-1**

11.3.14 Motor mounting

The servo-motor will be bolted to the motor flange of the gearbox on side 3. The flange number of the motor flange for the respective gearbox size is to be determined in Table 11.3.14-1.

Motor flange

ZK: Diameter of centring circle
LK: Diameter of pitch circles
L: Length of motor shaft
d: Diameter of motor shaft
i: Centring height
s: Thread

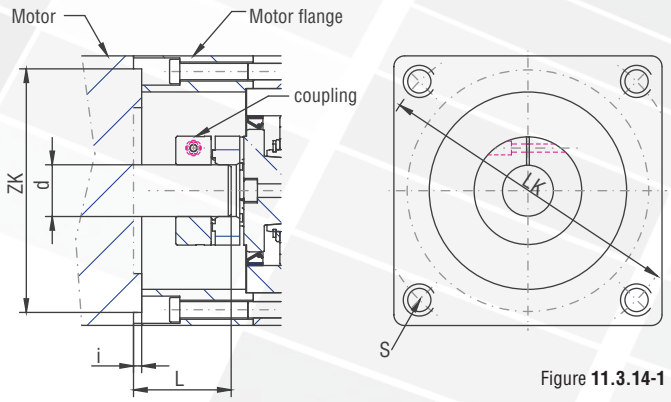


Figure **11.3.14-1**

The values for the centring height (i) and the thread sizes (s) can be found on the respective pages.

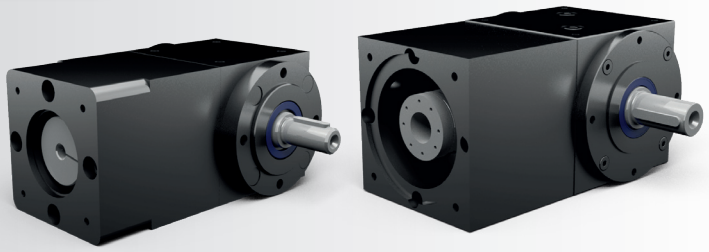
Fitting dimensions of the servo-motor – gearbox size/flange no. (selection)

d [mm] less than or equal to	Gearbox size	Flange no.	L [mm]	LK [mm]	ZK [mm]
11	065	001	23	63	40
	065	002	23	63	40
	065	102	23	75	60
	065	202	23	90	60
14	065	103	30	75	60
	065	104	30	75	60
	065	201	30	90	60
	065	301	30	95	50
	065	401	30	100	80
	065	501	30	115	95
19	090	103	40	75	60
	090	201	40	90	60
	090	301	40	95	50
	090	401	40	100	80
	090	501	40	115	95
	090	601	40	130	95
	090	611	40	130	110
	090	701	40	145	110
	090	802	40	165	110
24	120	103	50	75	60
	120	201	50	90	60
	120	301	50	95	50
	120	401	50	100	80
	120	501	50	115	95
	120	601	50	130	95
	120	611	50	130	110
	120	701	50	145	110
	120	802	50	165	110
	120	811	50	165	130
32	140	403	60	100	80
	140	502	60	115	95
	140	601	60	130	95
	140	611	60	130	110
	140	616	60	130	110
	140	701	60	145	110
	140	802	60	165	110
	140	811	60	165	130
	140	902	60	215	130
	140	911	60	215	180
	160	403	60	100	80
	160	502	60	115	95
	160	601	60	130	95
	160	611	60	130	110
	160	616	60	130	110
	160	701	60	145	110
	160	802	60	165	110
	160	811	60	165	130
	160	902	60	215	130
	160	911	60	215	180
	200	614	60	130	110
	200	616	60	130	110
	200	802	60	165	110
	200	811	60	165	130
	200	902	60	215	130
	200	913	60	215	180
38	140	931	80	215	180
	160	931	80	215	180
	200	915	80	215	180

Table **11.3.14-1**

11.3.15 Features

Gear ratios: i = 1:1 to 6:1
Maximum acceleration torques up to T_{2B} = 700 Nm
6 gearbox sizes with edge lengths of 065 to 200 mm
High efficiency
Minimized circumferential backlash (optional)
Bevel gearboxes suitable for fitting servo-motors
Zero-play three-piece claw coupling



065 – 140 mm 160 – 200 mm

11.3.15.1 Models

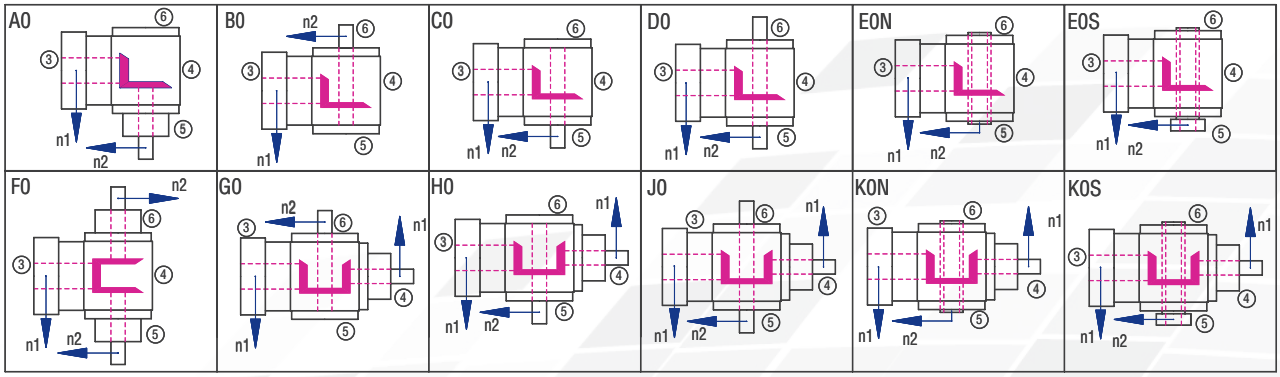


Figure **11.3.15-1; Models**

11.3.15.2 Gearbox sides

The example shows the Model C0

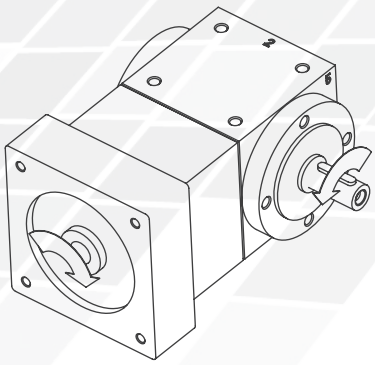


Figure **11.3.15-3; Gearbox sides**

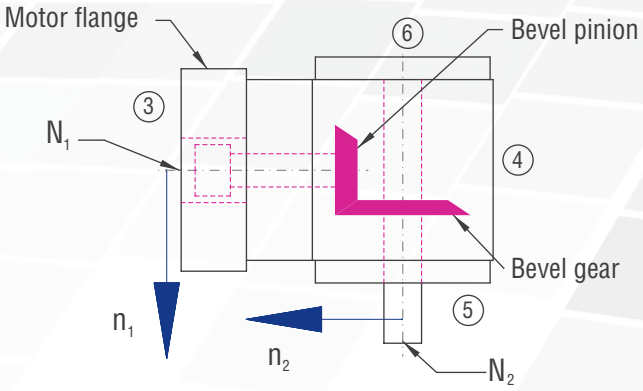


Figure **11.3.15-2; Gearbox sides**

11.3.15.3 Order code

The order code reflects the customer specifications. Example:

Type	Size	Gear ratio	Model	Fixing side	Installation position	Speed n_2	Design
VC	065	2:1	C0-	1.	1-	1500	/KN
Description	Size; Table 11.3.15-1	Table 11.3.15-1	Figure 11.3.15-1, Models	Gearbox side on which fixing is made; Table 11.3.4-1	Side directed downwards; Figure 4.3.1-1 Gearbox sides	Slowly rotating shaft; Table 11.3.15-1	Clamping hub
V080-	/	14 x 30	No. 301				
Flange		Motor shaft Ø x length	Flange no.				

11.3.15.4 Overview of performance data

Selection table: gearbox size; gear ratio; rotational speed
Depending on the diameter of the motor shaft, lower torques may be possible in the operating mode S5.

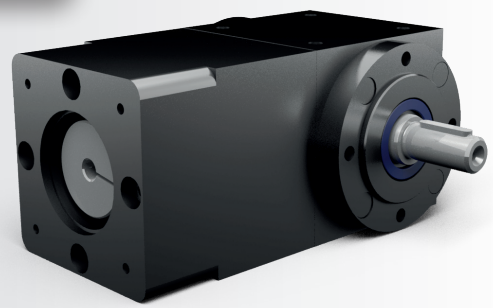
Operating mode S1		Gear ratio						
		1:1	1.5:1	2:1	3:1	4:1	5:1	6:1
Gearbox sizes		T_{2N} [Nm]	T_{2N} [Nm]	T_{2N} [Nm]	T_{2N} [Nm]	T_{2N} [Nm]	T_{2N} [Nm]	T_{2N} [Nm]
065	4000	3.6	5.4	7.2	7.2			
	3000	4.8	7.2	9.6	9.6			
	2400	6	9	10	10			
	1500	8	10	10	10			
090	4000	8	12	17	21	21	21	21
	3000	11	17	23	23	23	23	23
	2400	14	21	24	24	25	25	25
	1500	17	25	27	27	27	27	27
120	4000		21	28	42	52	52	45
	3000	18	28	37	56	60	60	54
	2400	23	35	46	63	67	65	59
	1500	37	56	73	74	74	72	64
140	4000		34	45	68	85	90	85
	3000		45	60	90	103	100	95
	2400	37	56	75	113	111	105	102
	1500	60	90	120	130	120	115	108
160	4000				102	136	160	115
	3000		68	90	136	180	180	130
	2400	56	85	113	170	200	198	137
	1500	90	136	181	230	220	215	145
200	4000				177	235	275	190
	3000			157	235	314	300	210
	2400		147	196	294	393	340	225
	1500	157	236	314	472	455	380	240

Operating mode S2	Gear ratio						
	1:1	1.5:1	2:1	3:1	4:1	5:1	6:1
$T_{2N\ [Nm]}$	8	10	10	8	0	0	0
$T_{2B\ [Nm]}$	15	17	17	15	0	0	0
T_{2Not}	23	25	25	20	0	0	0
N_{1max}	4400	6000	6000	6000	0	0	0
$T_{2N\ [Nm]}$	25	25	25	23	23	23	23
$T_{2B\ [Nm]}$	40	37	36	36	36	36	31
T_{2Not}	50	50	60	60	60	50	45
N_{1max}	3200	4800	6000	6000	6000	6000	6000
$T_{2N\ [Nm]}$	50	61	65	58	60	60	54
$T_{2B\ [Nm]}$	70	105	98	95	87	92	71
T_{2Not}	150	140	140	140	140	120	110
N_{1max}	2400	3600	4800	6000	6000	6000	6000
$T_{2N\ [Nm]}$	120	113	110	110	105	100	95
$T_{2B\ [Nm]}$	180	200	190	177	162	143	122
T_{2Not}	260	280	280	260	260	220	200
N_{1max}	2100	3000	4200	5000	6000	6000	6000
$T_{2N\ [Nm]}$	180	185	185	190	180	180	130
$T_{2B\ [Nm]}$	350	330	320	280	270	270	200
T_{2Not}	480	500	550	400	400	380	350
N_{1max}	1800	2500	3200	4500	5000	6000	6000
$T_{2N\ [Nm]}$	350	330	320	420	350	300	210
$T_{2B\ [Nm]}$	700	690	600	630	550	505	315
T_{2Not}	980	850	800	850	800	800	625
N_{1max}	1500	2250	3000	4000	4500	5000	6000

Table **11.3.15-1**

	Operating mode	On-period
S1	Continuous operation	10 greater than 60% of the cycle time or longer than 20 minutes
S5	Cyclic operation	less than 60% of the process procedure and less than 20 minutes

11.3.16 Type VC 065 – Servo bevel gearboxes



Characteristics

Characteristic	Standard	Option
Toothing	Spiral-toothed, hardened bevel gears	See chapter 11.3.2
Gear ratio	1:1 to 3:1	
Housing / Flanges	Grey cast iron / aluminium	
Threaded mounting holes	On all housing surfaces without flange and on all flanges.	See chapter 11.3.4
Shaft	Material 1 C45, shaft ends greased Fit with ISO 6 tolerance with parallel keyway: according to DIN 6885 Sheet 1	See chapter 4.6.2
Hollow shaft	Material 1 C45, 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	< 20 arcmin	See chapter 11.3.11
Protection class	IP 54	See chapter 4.5
Corrosion protection	Prime coat; layer thickness > 40 µm	See chapter 4.4.1
Bearing life L10h	more than 15,000h	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 11.3.9
Lubricants	Synthetic lubricants	See chapter 11.3.9
Motor flange	Aluminium	See chapter 11.3.14
Coupling	Insertable, flexible claw coupling, suitable for servo-motors For smooth motor shafts — clamping hub — KN For smooth motor shafts — tension ring hub — SN For motor shafts with parallel key — clamping hub with groove — KNN	See chapter 11.3.13

Torques in operating mode S1

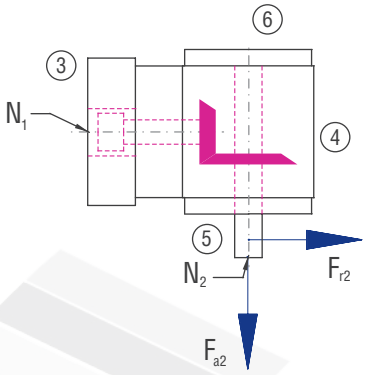
Gear ratio i [-]	1:1		1.5:1		2:1		3:1		4:1		5:1		6:1	
n1 [rpm]	T_{2N} [Nm]	n_2 [rpm]	T_{2N} [Nm]	n_2 [rpm]	T_{2N} [Nm]	n_2 [rpm]	T_{2N} [Nm]	n_2 [rpm]	T_{2N} [Nm]	n_2 [rpm]	T_{2N} [Nm]	n_2 [rpm]	T_{2N} [Nm]	n_2 [rpm]
4000	3.6	4000	5.4	2667	7.2	2000	7.2	1333						
3000	4.8	3000	7.2	2000	9.6	1500	9.6	1000						
2400	6	2400	9	1600	10	1200	10	800						
1500	8	1500	10	1000	10	750	10	500						

Torques in operating mode S5, dynamic operation

Gear ratio i [-]				1:1	1.5:1	2:1	3:1	4:1	5:1	6:1
T_{2N} in S5 [Nm]				8	10	10	8			
n_{1max} in S5 [rpm]				4400	6000	6000	6000			
Coupling size	**Motor shaft d [mm]**	**Coupling type**		**1:1**	**1.5:1**	**2:1**	**3:1**	**4:1**	**5:1**	**6:1**
K14	9	KN	T_{2B} [Nm]	5.3	8.0	10.6	15.0			
			T_{2NOT} [Nm]	7.0	10.5	14.0	20.0			
		KNN	T_{2B} [Nm]	10.0	15.0	17.0	15.0			
			T_{2NOT} [Nm]	22.0	25.0	25.0	20.0			
		SN	T_{2B} [Nm]	10.0	15.0	17.0	15.0			
			T_{2NOT} [Nm]	22.0	25.0	25.0	20.0			
	11	KN	T_{2B} [Nm]	5.6	8.4	11.2	15.0			
			T_{2NOT} [Nm]	9.0	13.5	18.0	20.0			
		KNN	T_{2B} [Nm]	10.0	15.0	17.0	15.0			
			T_{2NOT} [Nm]	23.0	25.0	25.0	20.0			
		SN	T_{2B} [Nm]	10.0	15.0	17.0	15.0			
			T_{2NOT} [Nm]	23.0	25.0	25.0	20.0			
	14	KN	T_{2B} [Nm]	6.1	9.1	12.2	15.0			
			T_{2NOT} [Nm]	13.0	19.5	25.0	20.0			
		KNN	T_{2B} [Nm]	10.0	15.0	17.0	15.0			
			T_{2NOT} [Nm]	23.0	25.0	25.0	20.0			
		SN	T_{2B} [Nm]	10.0	15.0	17.0	15.0			
			T_{2NOT} [Nm]	23.0	25.0	25.0	20.0			
	16	KN	T_{2B} [Nm]	6.5	9.8	13.0	15.0			
			T_{2NOT} [Nm]	15.0	22.5	25.0	20.0			
		KNN	T_{2B} [Nm]	10.0	15.0	17.0	15.0			
			T_{2NOT} [Nm]	23.0	25.0	25.0	20.0			
		SN	T_{2B} [Nm]	10.0	15.0	17.0	15.0			
			T_{2NOT} [Nm]	23.0	25.0	25.0	20.0			

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



Gearbox inertia moments/mass

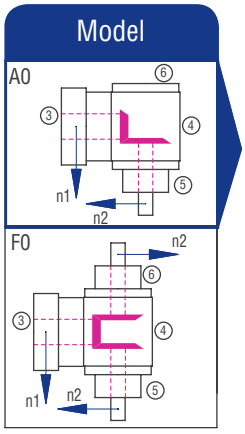
Inertia moment J_1 related to the fast-rotating shaft (N_1)

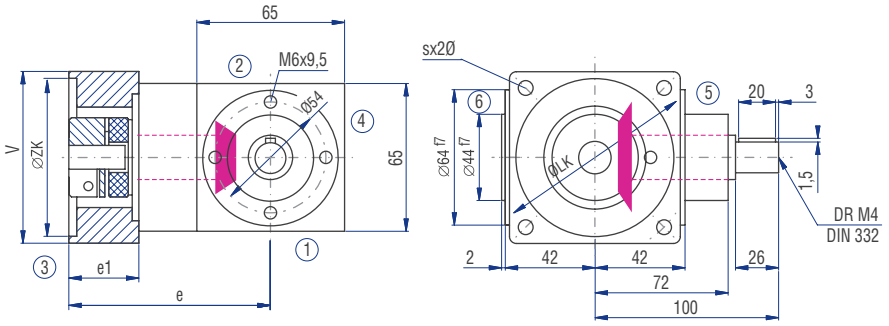
Model	Inertia moment [kgcm²]							Mass ca. [kg]
	1:1	1.5:1	2:1	3:1	4:1	5:1	6:1	
A0	0.4740	0.2110	0.1830	0.1830				3.6
B0	0.4680	0.3190	0.2590	0.1940				3.5
C0	0.4680	0.3190	0.2590	0.1940				3.5
D0	0.4780	0.3230	0.2620	0.2380				3.6
E0N	0.5200	0.3710	0.3110	0.2320				3.4
E0S	0.6460	0.4968	0.4370	0.3570				3.4
F0	0.7080	0.2600	0.2040	0.1910				4.0
G0	0.7540	0.4730	0.3950	0.3200				3.9
H0	0.7540	0.4730	0.3950	0.3200				3.9

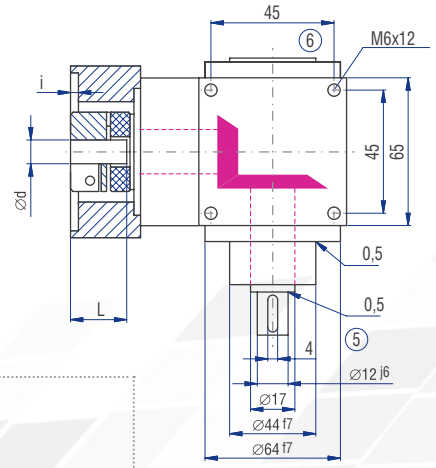
The mass of the gearbox may deviate depending on the flange size and the gear ratio.

Inertia moments Coupling J [kgcm²]

K14	KN	KNN	SN
d [mm]	J [kgcm²]	J [kgcm²]	J [kgcm²]
6	0.029	0.000	0.069
9	0.029	0.029	0.069
11	0.029	0.029	0.067
14	0.028	0.028	0.656
16	0.000	0.000	0.000





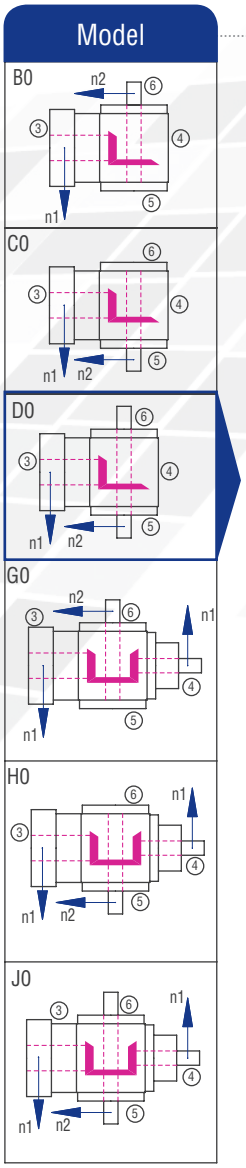


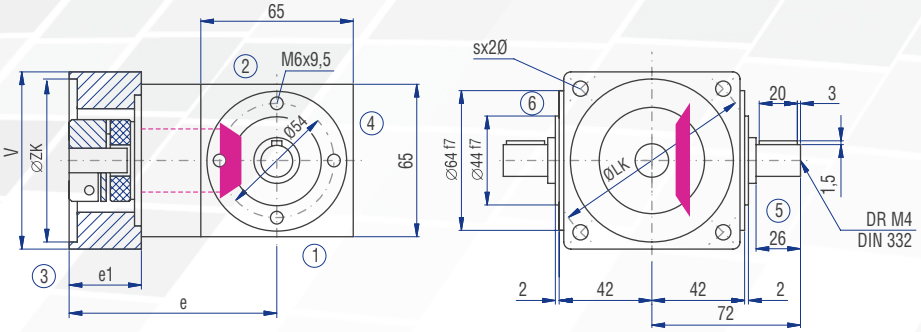
Motor mounting dimensions

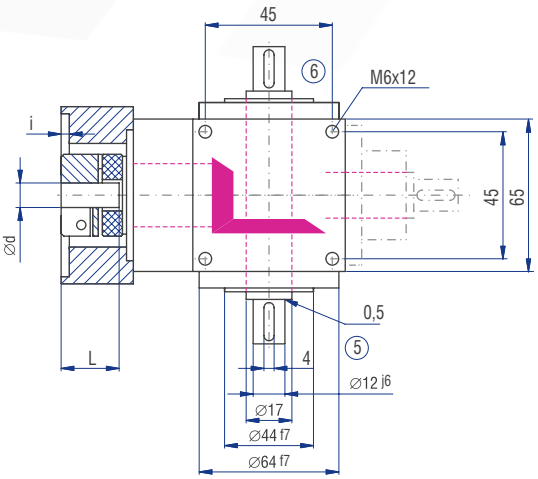
Flange no.	V [mm]	ZK [mm]	Thread	LK [mm]	Shaft dxl [mm]	i [mm]	e [mm]	e1 [mm]
001	65	40	M4	63	11*23	3	104.5	30
002	65	40	M5	63	11*23	3	104.5	30
102	70	60	M5	75	11*23	3	101.0	26.5
103	70	60	M6	90	14*30	3	119.5	45
104	70	60	M5	75	14*30	3	119.5	45
201	80	60	M5	75	14*30	4	119.5	45
202	80	60	M5	90	11*23	4	101.0	26.5
301	80	50	M6	95	14*30	4	119.5	45
401	90	80	M6	100	14*30	4	119.5	45
501	100	95	M8	115	14*30	4	119.5	45

Table **11.3.16-1**

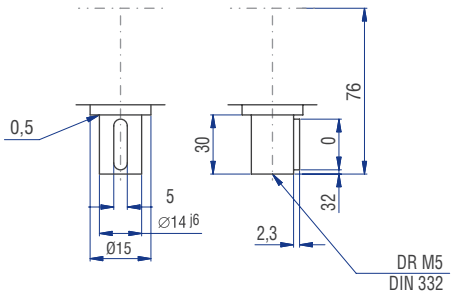
The dimensions e and e1 will change for the coupling type “clamping hub with groove” (KNN). Please contact us for consultation!



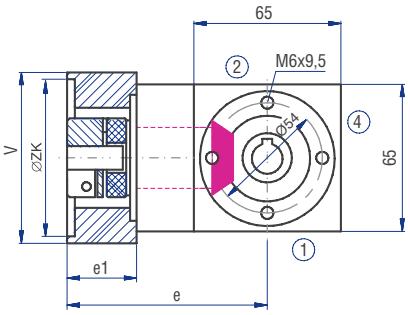


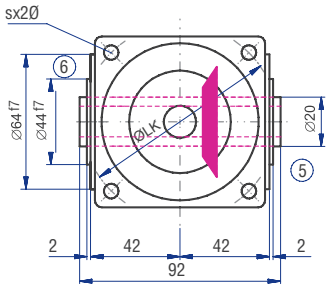


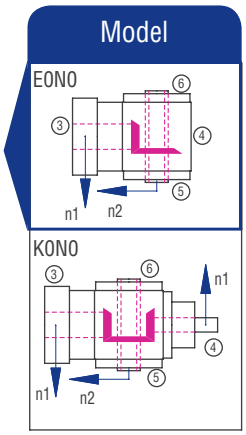
Implementation VV

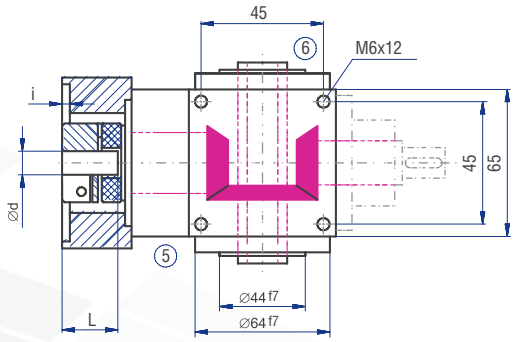


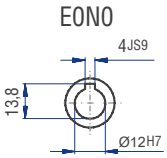
The dimensions of the Models not shown can be figured by mirroring available dimensions.
The shaft dimensions on side 4 follow from the dimensions of type A0.

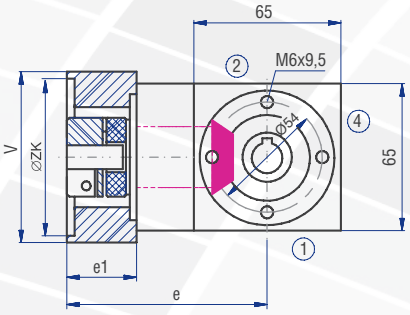

65
M6x9,5
V
ØZK
Ø54
65
e1
e

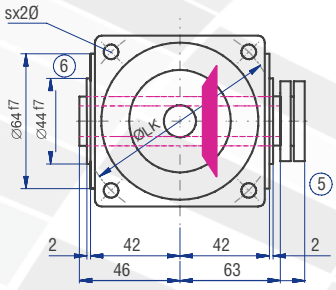

sx2Ø
Ø64 f7
Ø44 f7
ØLK
Ø20
2
42
42
2
92

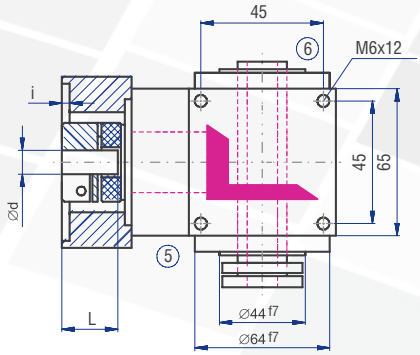

Model
E0N0
n1
n2
K0N0
n1
n2

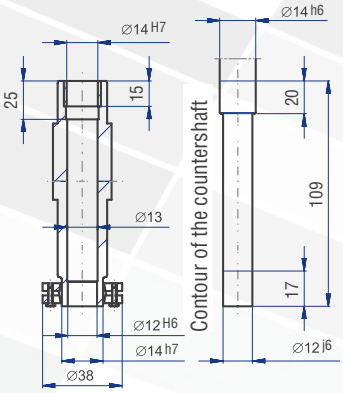

45
M6x12
i
Ød
45
65
L
Ø44 f7
Ø64 f7

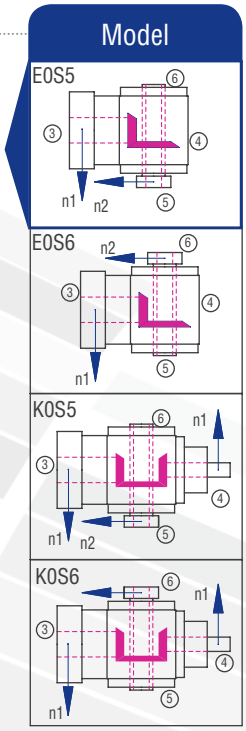

E0N0
4JS9
13,8
Ø12H7


65
M6x9,5
V
ØZK
Ø54
65
e1
e

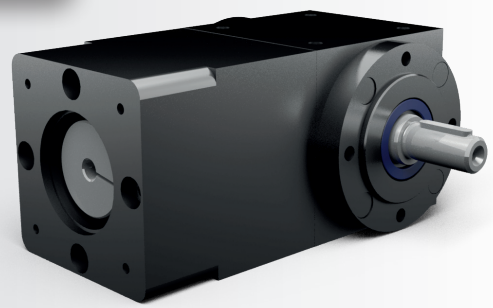

sx2Ø
Ø64 f7
Ø44 f7
ØLK
2
42
42
2
46
63


45
M6x12
i
Ød
45
65
L
Ø44 f7
Ø64 f7


Ø14 H7
Ø14 h6
25
15
20
109
17
Ø13
Contour of the countershaft
Ø12 H6
Ø14 h7
Ø12 j6
Ø38


Model
E0S5
n1
n2
E0S6
n2
n1
K0S5
n1
n2
K0S6
n1
n1

11.3.17 Type VC 090 – Servo bevel gearboxes



Characteristics

Characteristic	Standard	Option
Toothing	Spiral-toothed, hardened bevel gears	See chapter 11.3.2
Gear ratio	1:1 to 6:1	
Housing / Flanges	Grey cast iron / aluminium	
Threaded mounting holes	On all housing surfaces without flange and on all flanges.	See chapter 11.3.4
Shaft	Material 1 C45, shaft ends greased Fit with ISO 6 tolerance with parallel keyway: according to DIN 6885 Sheet 1	See chapter 4.6.2
Hollow shaft	Material 1 C45, 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	< 20 arcmin	See chapter 11.3.11
Protection class	IP 54	See chapter 4.5
Corrosion protection	Prime coat; layer thickness > 40 µm	See chapter 4.4.1
Bearing life L10h	more than 15,000h	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 11.3.9
Lubricants	Synthetic lubricants	See chapter 11.3.9
Motor flange	Aluminium	See chapter 11.3.14
Coupling	Insertable, flexible claw coupling, suitable for servo-motors For smooth motor shafts — clamping hub — KN For smooth motor shafts — tension ring hub — SN For motor shafts with parallel key — clamping hub with groove — KNN	See chapter 11.3.13

Torques in operating mode S1

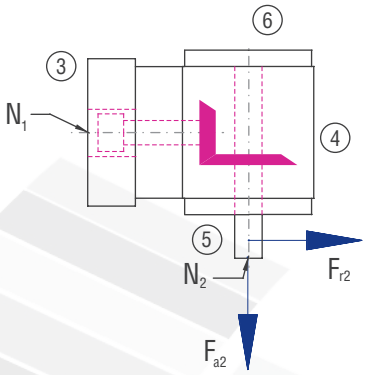
Gear ratio i [-]	1:1		1.5:1		2:1		3:1		4:1		5:1		6:1	
n1 [rpm]	T_{2N} [Nm]	n_2 [rpm]	T_{2N} [Nm]	n_2 [rpm]	T_{2N} [Nm]	n_2 [rpm]	T_{2N} [Nm]	n_2 [rpm]	T_{2N} [Nm]	n_2 [rpm]	T_{2N} [Nm]	n_2 [rpm]	T_{2N} [Nm]	n_2 [rpm]
4000	8	4000	12	2667	17	2000	21	1333	21	1000	21	800	21	667
3000	11	3000	17	2000	23	1500	23	1000	23	750	23	600	23	500
2400	14	2400	21	1600	24	1200	24	800	25	600	25	480	25	400
1500	17	1500	25	1000	27	750	27	500	27	375	27	300	27	250

Torques in operating mode S5, dynamic operation

Gear ratio i [-]				1:1	1.5:1	2:1	3:1	4:1	5:1	6:1
T_{2N} in S5 [Nm]				25	25	25	23	23	23	23
n_{1max} in S5 [rpm]				3200	4800	6000	6000	6000	6000	6000
Coupling size	Motor shaft d [mm]	Coupling type		1:1	1.5:1	2:1	3:1	4:1	5:1	6:1
K19	9	KN	T_{2B} [Nm]	17.0	25.5	34.0	36.0	36.0	36.0	31.0
			T_{2NOT} [Nm]	30.0	45.0	60.0	60.0	60.0	50.0	45.0
	11	KN	T_{2B} [Nm]	17.0	25.5	34.0	36.0	36.0	36.0	31.0
			T_{2NOT} [Nm]	30.0	45.0	60.0	60.0	60.0	50.0	45.0
		KNN	T_{2B} [Nm]	17.0	25.5	34.0	36.0	36.0	36.0	31.0
			T_{2NOT} [Nm]	30.0	45.0	60.0	60.0	60.0	50.0	45.0
		SN	T_{2B} [Nm]	17.0	25.5	34.0	36.0	36.0	36.0	31.0
			T_{2NOT} [Nm]	30.0	45.0	60.0	60.0	60.0	50.0	45.0
	14	KN	T_{2B} [Nm]	17.0	25.5	34.0	36.0	36.0	36.0	31.0
			T_{2NOT} [Nm]	32.0	48.0	60.0	60.0	60.0	50.0	45.0
		KNN	T_{2B} [Nm]	17.0	25.5	34.0	36.0	36.0	36.0	31.0
			T_{2NOT} [Nm]	32.0	48.0	60.0	60.0	60.0	50.0	45.0
		SN	T_{2B} [Nm]	17.0	25.5	34.0	36.0	36.0	36.0	31.0
			T_{2NOT} [Nm]	32.0	48.0	60.0	60.0	60.0	50.0	45.0
	16	KN	T_{2B} [Nm]	17.0	25.5	34.0	36.0	36.0	36.0	31.0
			T_{2NOT} [Nm]	32.0	48.0	60.0	60.0	60.0	50.0	45.0
		KNN	T_{2B} [Nm]	17.0	25.5	34.0	36.0	36.0	36.0	31.0
			T_{2NOT} [Nm]	34.0	50.0	60.0	60.0	60.0	50.0	45.0
		SN	T_{2B} [Nm]	17.0	25.5	34.0	36.0	36.0	36.0	31.0
			T_{2NOT} [Nm]	34.0	50.0	60.0	60.0	60.0	50.0	45.0
	19	KN	T_{2B} [Nm]	17.0	25.5	34.0	36.0	36.0	36.0	31.0
			T_{2NOT} [Nm]	34.0	50.0	60.0	60.0	60.0	50.0	45.0
		KNN	T_{2B} [Nm]	17.0	25.5	34.0	36.0	36.0	36.0	31.0
			T_{2NOT} [Nm]	34.0	50.0	60.0	60.0	60.0	50.0	45.0
		SN	T_{2B} [Nm]	17.0	25.5	34.0	36.0	36.0	36.0	31.0
			T_{2NOT} [Nm]	34.0	50.0	60.0	60.0	60.0	50.0	45.0
	24	KN	T_{2B} [Nm]	17.0	25.5	34.0	36.0	36.0	36.0	31.0
			T_{2NOT} [Nm]	34.0	50.0	60.0	60.0	60.0	50.0	45.0

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



Gearbox inertia moments/mass

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

Model	Inertia moment [kgcm²]							Mass ca. [kg]
	1:1	1.5:1	2:1	3:1	4:1	5:1	6:1	
A0	3.0540	2.3340	1.4510	1.2330	1.1450	1.1010	1.0700	6.6
B0	3.6690	2.7900	1.6950	1.3410	1.2060	1.1400	1.0970	6.9
C0	3.6690	2.7900	1.6950	1.3410	1.2060	1.1401	1.0970	6.9
D0	3.6974	2.8023	1.7020	1.3441	1.2075	1.1412	1.0980	7.0
E0N	3.5654	2.7440	1.6690	1.3294	1.1992	1.1360	1.0940	6.5
E0S	4.2360	3.0420	1.8370	1.4040	1.2412	1.1630	1.1130	6.7
F0	4.5140	3.1480	1.7490	1.4240	1.2610	1.1820	1.1220	7.8
G0	4.9490	3.7030	2.5190	2.0870	1.4890	1.4140	1.3670	8.4
H0	4.9490	3.7030	2.5190	2.0870	1.4890	1.4140	1.3670	8.4
J0	4.9770	3.7160	2.5260	2.0900	1.4910	1.4150	1.3680	8.5
K0N	4.8450	3.6570	2.4930	2.0760	1.4820	1.4100	1.3650	8.0
K0S	5.5160	3.9550	2.6600	2.1500	1.5240	1.4360	1.3830	8.2

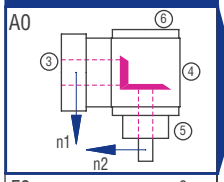
The mass of the gearbox may deviate depending on the flange size and the gear ratio.

Inertia moments Coupling J [kgcm²]

K19	KN	KNN	SN
d [mm]	J [kgcm²]	J [kgcm²]	J [kgcm²]
9	0.204	0.204	0.315
11	0.204	0.204	0.314
14	0.202	0.202	0.310
16	0.200	0.200	0.298
19	0.196	0.196	0.293
24	0.000	0.000	0.000

Model

A0



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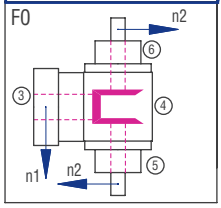
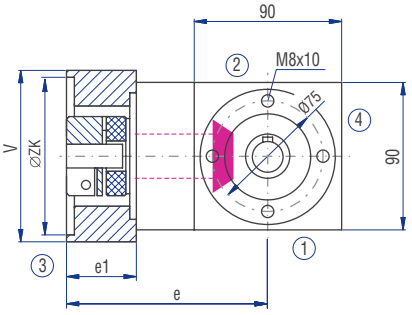
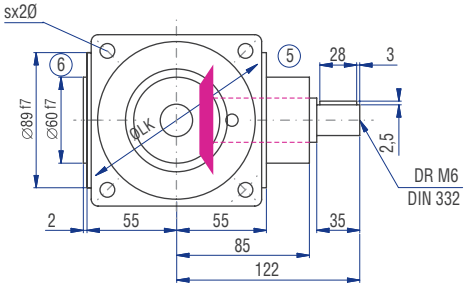
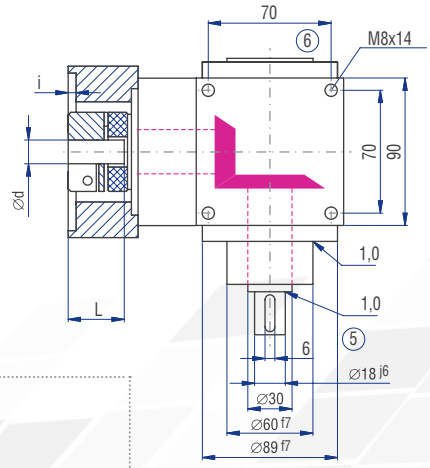








Motor mounting dimensions

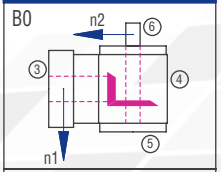
Flange no.	V [mm]	ZK [mm]	Thread	LK [mm]	Shaft dxl [mm]	i [mm]	e [mm]	e1 [mm]
103	90	60	M6	75	19*40	3	140.0	45
201	90	60	M5	90	19*40	3	140.0	45
301	90	50	M6	95	19*40	4	140.0	45
401	90	80	M6	100	19*40	4	140.0	45
501	100	95	M8	115	19*40	4	140.0	45
601	115	95	M8	130	19*40	4	140.0	45
611	115	110	M8	130	19*40	5	140.0	45
701	120	110	M8	145	19*40	5	140.0	45
802	140	110	M10	165	19*40	5		45

Table **11.3.17-1**

The dimensions e and e1 will change for the coupling type “clamping hub with groove” (KNN). Please contact us for consultation!

Model

B0



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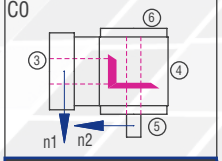
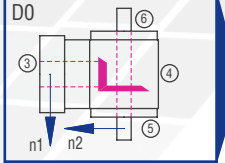
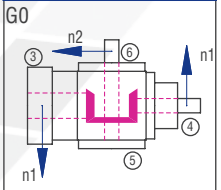


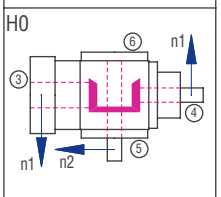
D0



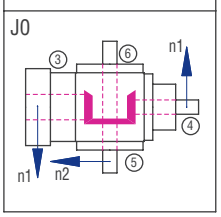
G0

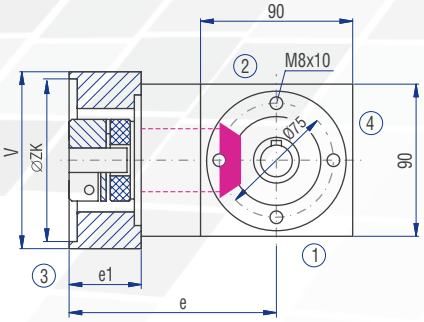


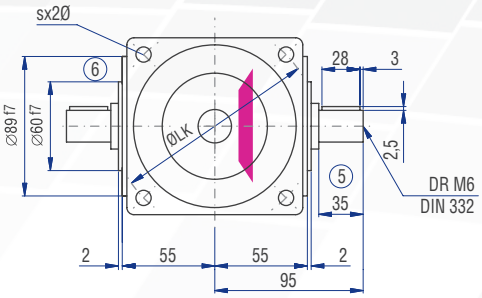
H0

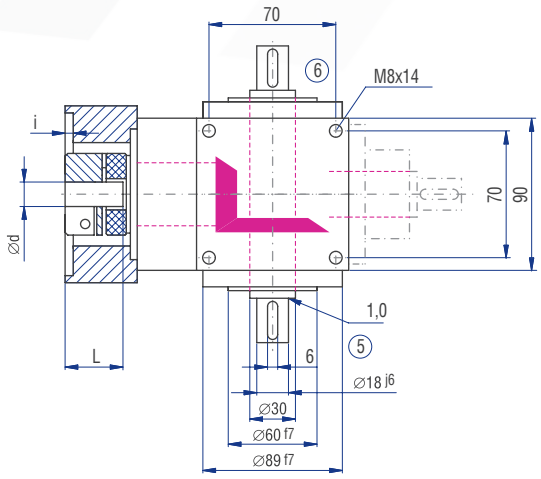


J0

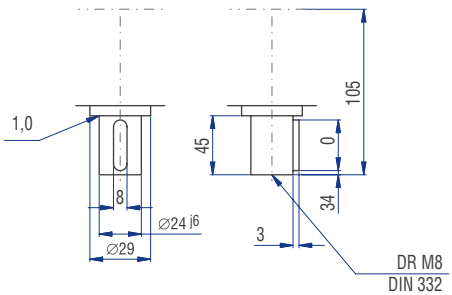




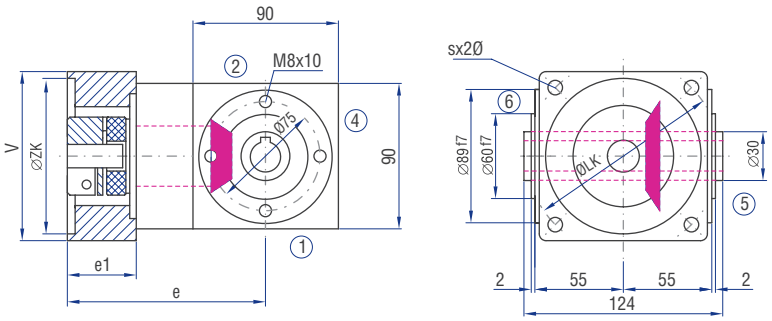


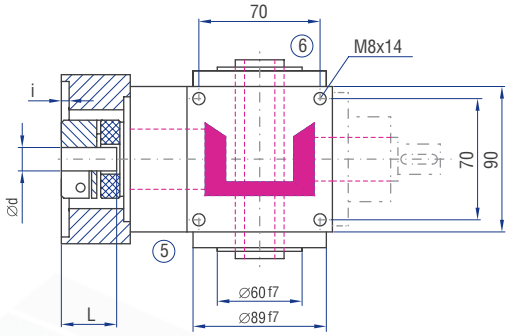


Implementation VV

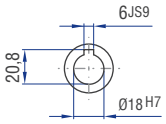


The dimensions of the Models not shown can be figured by mirroring available dimensions.
The shaft dimensions on side 4 follow from the dimensions of type A0.

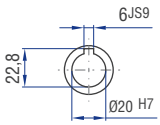




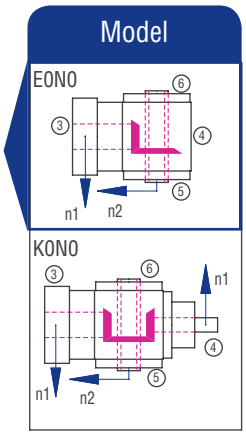
EONO

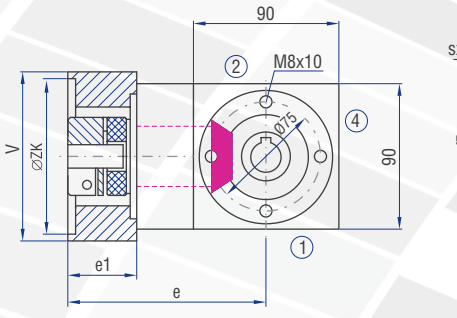


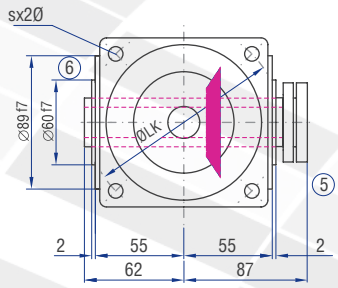
SH

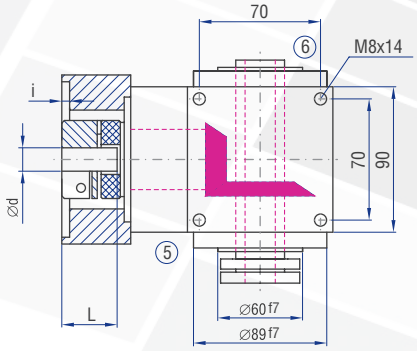


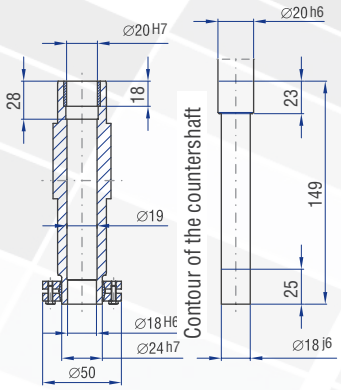
Model



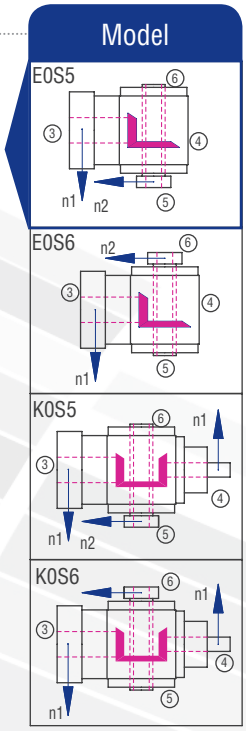








Model



11.3.18 Type VC 120 – Servo bevel gearboxes

Characteristics

Characteristic	Standard	Option
Toothing	Spiral-toothed, hardened bevel gears	See chapter 11.3.2
Gear ratio	1:1 to 6:1	
Housing / Flanges	Grey cast iron / aluminium	
Threaded mounting holes	On all housing surfaces without flange and on all flanges.	See chapter 11.3.4
Shaft	Material 1 C45, shaft ends greased Fit with ISO 6 tolerance with parallel keyway: according to DIN 6885 Sheet 1	See chapter 4.6.2
Hollow shaft	Material 1 C45, 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	< 20 arcmin	See chapter 11.3.11
Protection class	IP 54	See chapter 4.5
Corrosion protection	Prime coat; layer thickness > 40 µm	See chapter 4.4.1
Bearing life L10h	more than 15,000h	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 11.3.9
Lubricants	Synthetic lubricants	See chapter 11.3.9
Motor flange	Aluminium	See chapter 11.3.14
Coupling	Insertable, flexible claw coupling, suitable for servo-motors For smooth motor shafts — clamping hub — KN For smooth motor shafts — tension ring hub — SN For motor shafts with parallel key — clamping hub with groove — KNN	See chapter 11.3.13

Torques in operating mode S1

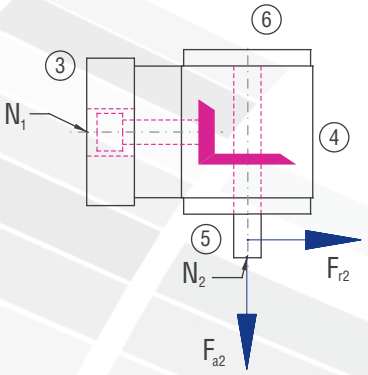
Gear ratio i [-]	1:1		1.5:1		2:1		3:1		4:1		5:1		6:1	
n1 [rpm]	T_{2N} [Nm]	n_2 [rpm]	T_{2N} [Nm]	n_2 [rpm]	T_{2N} [Nm]	n_2 [rpm]	T_{2N} [Nm]	n_2 [rpm]	T_{2N} [Nm]	n_2 [rpm]	T_{2N} [Nm]	n_2 [rpm]	T_{2N} [Nm]	n_2 [rpm]
4000		4000	21	2667	28	2000	42	1333	52	1000	52	800	45	667
3000	18	3000	28	2000	37	1500	56	1000	60	750	60	600	54	500
2400	23	2400	35	1600	46	1200	63	800	67	600	65	480	59	400
1500	37	1500	56	1000	73	750	74	500	74	375	72	300	64	250

Torques in operating mode S5, dynamic operation

Gear ratio i [-]				1:1	1.5:1	2:1	3:1	4:1	5:1	6:1
T_{2N} in S5 [Nm]				50	61	65	58	60	60	54
n_{1max} in S5 [rpm]				2400	3600	4800	6000	6000	6000	6000
Coupling size	**Motor shaft d [mm]**	**Coupling type**		**1:1**	**1.5:1**	**2:1**	**3:1**	**4:1**	**5:1**	**6:1**
K24	11	KN	T_{2B} [Nm]	35.0	52.5	70.0	95.0	87.0	92.0	71.0
			T_{2NOT} [Nm]	45.0	67.5	90.0	135.0	140.0	120.0	110.0
		KNN	T_{2B} [Nm]	48.0	72.0	96.0	95.0	87.0	92.0	71.0
			T_{2NOT} [Nm]	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		SN	T_{2B} [Nm]	48.0	72.0	96.0	95.0	87.0	92.0	71.0
			T_{2NOT} [Nm]	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	14	KN	T_{2B} [Nm]	36.0	54.0	72.0	95.0	87.0	92.0	71.0
			T_{2NOT} [Nm]	45.0	67.5	90.0	135.0	140.0	120.0	110.0
		KNN	T_{2B} [Nm]	48.0	72.0	96.0	95.0	87.0	92.0	71.0
			T_{2NOT} [Nm]	80.0	120.0	140.0	140.0	140.0	120.0	110.0
		SN	T_{2B} [Nm]	48.0	72.0	96.0	95.0	87.0	92.0	71.0
			T_{2NOT} [Nm]	80.0	120.0	140.0	140.0	140.0	120.0	110.0
	16	KN	T_{2B} [Nm]	39.0	58.5	78.0	95.0	87.0	92.0	71.0
			T_{2NOT} [Nm]	50.0	75.0	100.0	140.0	140.0	120.0	110.0
		KNN	T_{2B} [Nm]	48.0	72.0	96.0	95.0	87.0	92.0	71.0
			T_{2NOT} [Nm]	100.0	140.0	140.0	140.0	140.0	120.0	110.0
		SN	T_{2B} [Nm]	48.0	72.0	96.0	95.0	87.0	92.0	71.0
			T_{2NOT} [Nm]	100.0	140.0	140.0	140.0	140.0	120.0	110.0
	19	KN	T_{2B} [Nm]	39.0	58.5	78.0	95.0	87.0	92.0	71.0
			T_{2NOT} [Nm]	60.0	90.0	120.0	140.0	140.0	120.0	110.0
		KNN	T_{2B} [Nm]	48.0	72.0	96.0	95.0	87.0	92.0	71.0
			T_{2NOT} [Nm]	120.0	140.0	140.0	140.0	140.0	120.0	110.0
		SN	T_{2B} [Nm]	48.0	72.0	96.0	95.0	87.0	92.0	71.0
			T_{2NOT} [Nm]	120.0	140.0	140.0	140.0	140.0	120.0	110.0
	24	KN	T_{2B} [Nm]	43.0	64.5	86.0	95.0	87.0	92.0	71.0
			T_{2NOT} [Nm]	65.0	97.5	130.0	140.0	140.0	120.0	110.0
		KNN	T_{2B} [Nm]	48.0	72.0	96.0	95.0	87.0	92.0	71.0
			T_{2NOT} [Nm]	120.0	140.0	140.0	140.0	140.0	120.0	110.0
		SN	T_{2B} [Nm]	48.0	72.0	96.0	95.0	87.0	92.0	71.0
			T_{2NOT} [Nm]	120.0	140.0	140.0	140.0	140.0	120.0	110.0
	28	KN	T_{2B} [Nm]	46.0	69.0	92.0	95.0	87.0	92.0	71.0
			T_{2NOT} [Nm]	70.0	105.0	140.0	140.0	140.0	120.0	110.0
		KNN	T_{2B} [Nm]	48.0	72.0	96.0	95.0	87.0	92.0	71.0
			T_{2NOT} [Nm]	120.0	140.0	140.0	140.0	140.0	120.0	110.0
		SN	T_{2B} [Nm]	48.0	72.0	96.0	95.0	87.0	92.0	71.0
			T_{2NOT} [Nm]	120.0	140.0	140.0	140.0	140.0	120.0	110.0

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



Gearbox inertia moments/mass

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

Model	Inertia moment [kgcm²]							Mass ca. [kg]
	1:1	1.5:1	2:1	3:1	4:1	5:1	6:1	
A0	12.4450	6.8580	5.7210	4.6470	4.2780	4.0580	3.9250	17.6
B0	16.9680	8.8470	6.7790	5.1170	4.5420	4.2270	4.0430	17.3
C0	16.9680	8.8473	6.7790	5.1172	4.5420	4.2271	4.0430	17.3
D0	17.2660	8.9795	6.8534	5.1502	4.5610	4.2390	4.0511	17.5
E0N	16.8600	8.7992	6.7520	5.1051	4.5352	4.2230	4.0400	17.0
E0S	18.6470	9.5940	7.1990	5.3040	4.6470	4.2942	4.0894	17.3
F0	17.9750	9.8050	7.3040	5.4560	4.7980	4.4060	4.1750	20.0
G0	22.2170	11.3550	9.1130	6.8500	5.4300	4.7690	4.5740	19.7
H0	22.2170	11.3550	9.1130	6.8500	5.4300	4.7690	4.5740	19.7
J0	22.5140	11.4880	9.1880	6.8830	5.4490	4.7810	4.5820	19.9
K0N	22.1090	11.3070	9.0860	6.8380	5.4240	4.7640	4.5710	19.4
K0S	23.8960	12.1020	9.5330	7.0360	5.5350	4.8360	4.6200	19.7

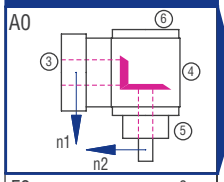
Inertia moments Coupling J [kgcm²]

K24	KN	KNN	SN
d [mm]	J [kgcm²]	J [kgcm²]	J [kgcm²]
11	0.812	0.812	1.374
14	0.810	0.810	1.360
16	0.808	0.808	1.350
19	0.803	0.803	1.340
24	0.787	0.787	1.290
28	0.765	0.765	1.274

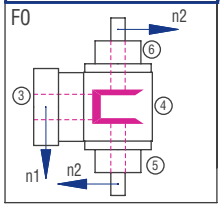
The mass of the gearbox may deviate depending on the flange size and the gear ratio.

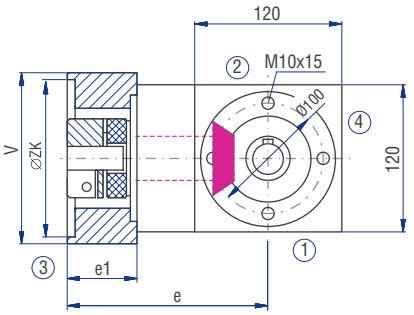
Model

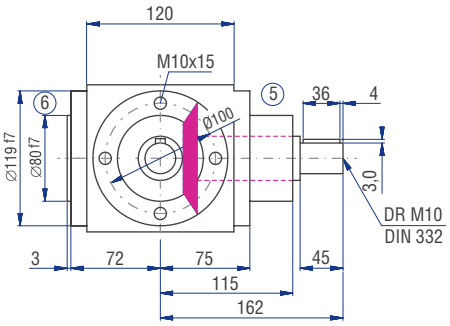
A0

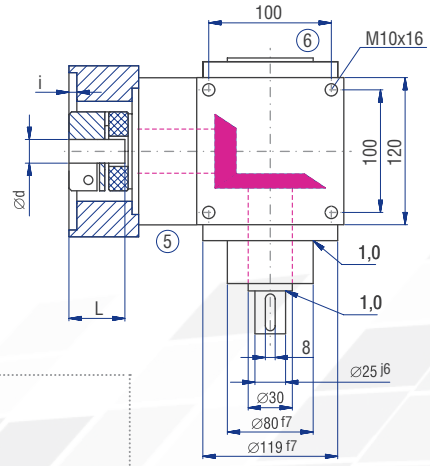


F0









Motor mounting dimensions

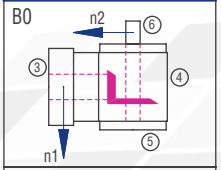
Flange no.	V [mm]	ZK [mm]	Thread	LK [mm]	Shaft dxl [mm]	i [mm]	e [mm]	e1 [mm]
103	120	60	M6	75	24*50	3	170.0	54
201	120	60	M5	90	24*50	3	170.0	54
301	120	50	M6	95	24*50	4	170.0	54
401	120	80	M6	100	24*50	4	170.0	54
501	120	95	M8	115	24*50	4	170.0	54
601	120	95	M8	130	24*50	4	170.0	54
611	120	110	M8	130	24*50	5	170.0	54
701	120	110	M8	145	24*50	5	170.0	54
802	140	110	M10	165	24*50	5	170.0	54
811	140	130	M10	165	24*50	5	170.0	54

Table **11.3.18-1**

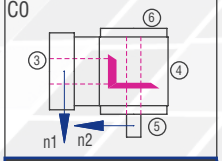
The dimensions e and e1 will change for the coupling type “clamping hub with groove” (KNN). Please contact us for consultation!

Model

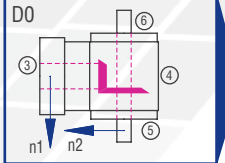
B0



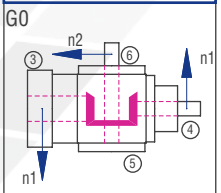
C0



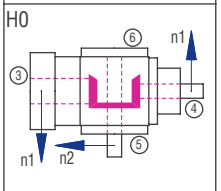
D0



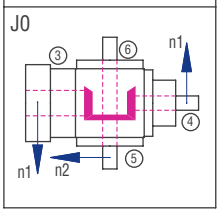
G0

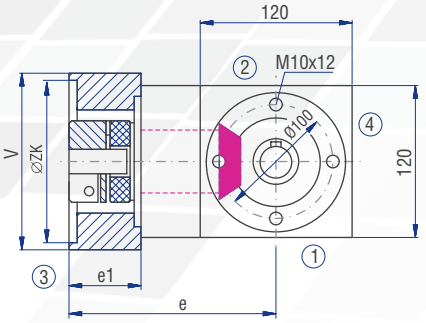


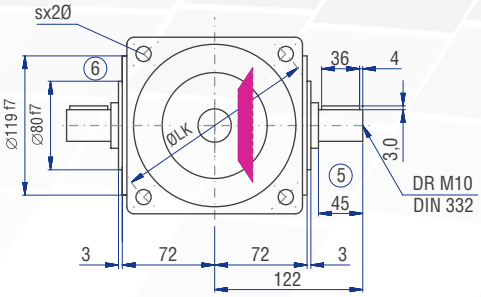
H0

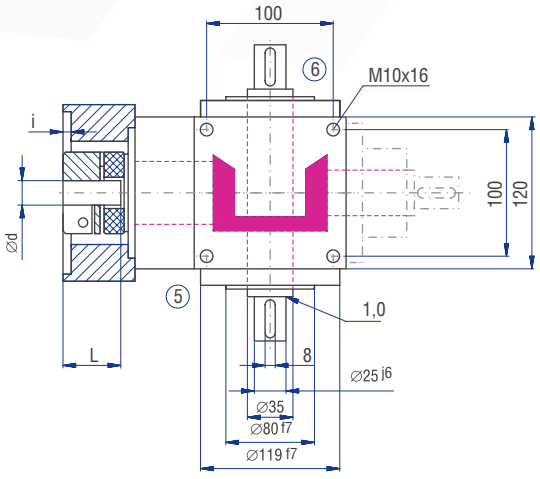


J0

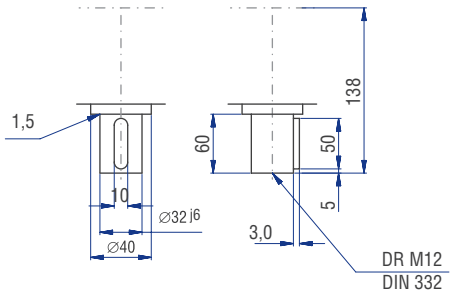




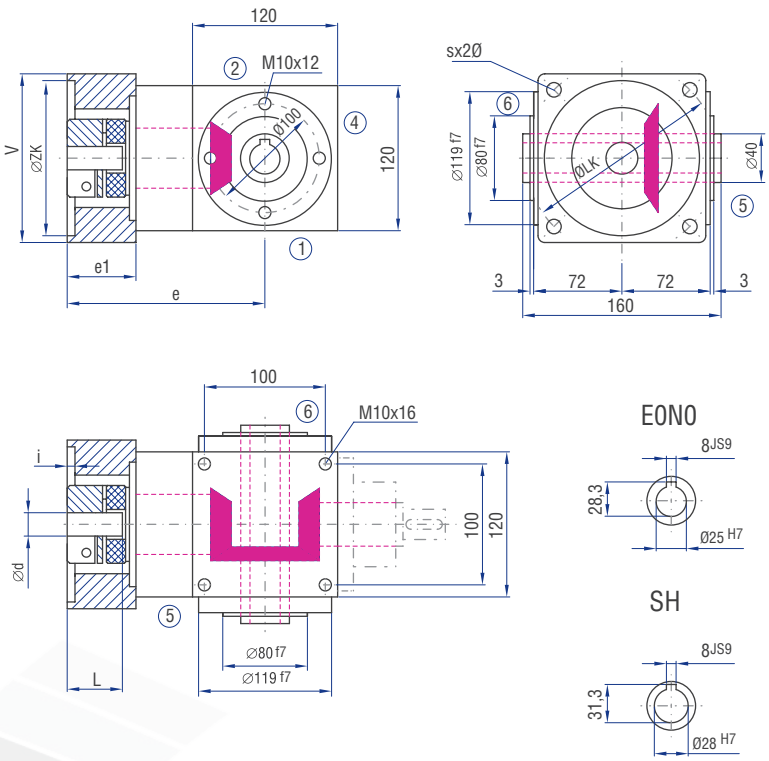


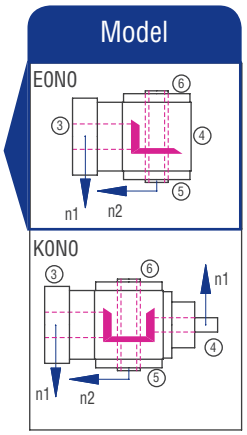


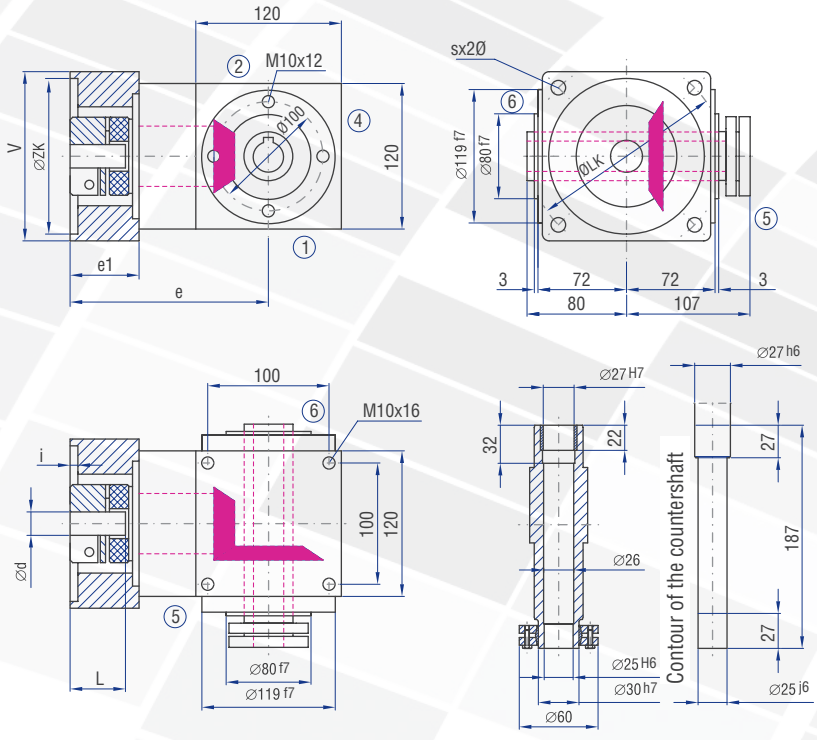
Implementation VV

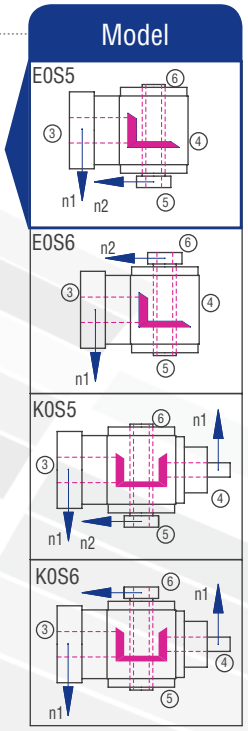


The dimensions of the Models not shown can be figured by mirroring available dimensions.
The shaft dimensions on side 4 follow from the dimensions of type A0.

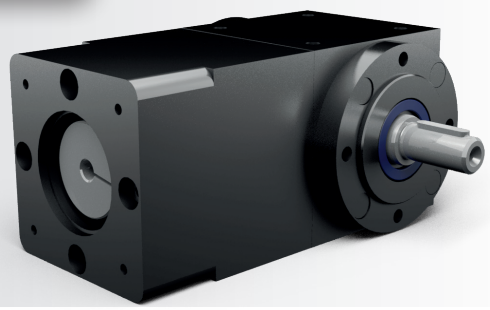

120
M10x12
V
ØZK
Ø100
120
e1
e
sx2Ø
Ø119 f7
Ø80 f7
ØLK
Ø40
3
72
72
3
160
100
M10x16
i
Ød
100
120
L
Ø80 f7
Ø119 f7
E0N0
8JS9
28,3
Ø25 H7
SH
8JS9
31,3
Ø28 H7


Model
E0N0
K0N0
n1
n2


120
M10x12
V
ØZK
Ø100
120
e1
e
sx2Ø
Ø119 f7
Ø80 f7
ØLK
3
72
72
3
80
107
100
M10x16
i
Ød
100
120
L
Ø80 f7
Ø119 f7
Ø27 H7
32
22
Ø26
Ø25 H6
Ø30 h7
Ø60
Contour of the countershaft
Ø27 h6
27
187
27
Ø25 j6


Model
E0S5
E0S6
K0S5
K0S6
n1
n2

11.3.19 Type VC 140 – Servo bevel gearboxes



Characteristics

Characteristic	Standard	Option
Toothing	Spiral-toothed, hardened bevel gears	See chapter 11.3.2
Gear ratio	1:1 to 6:1	
Housing / Flanges	Grey cast iron / aluminium	
Threaded mounting holes	On all housing surfaces without flange and on all flanges.	See chapter 11.3.4
Shaft	Material 1 C45, shaft ends greased Fit with ISO 6 tolerance with parallel keyway: according to DIN 6885 Sheet 1	See chapter 4.6.2
Hollow shaft	Material 1 C45, 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	< 20 arcmin	See chapter 11.3.11
Protection class	IP 54	See chapter 4.5
Corrosion protection	Prime coat; layer thickness > 40 µm	See chapter 4.4.1
Bearing life L10h	more than 15,000h	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 11.3.9
Lubricants	Synthetic lubricants	See chapter 11.3.9
Motor flange	Aluminium	See chapter 11.3.14
Coupling	Insertable, flexible claw coupling, suitable for servo-motors For smooth motor shafts — clamping hub — KN For smooth motor shafts — tension ring hub — SN For motor shafts with parallel key — clamping hub with groove — KNN	See chapter 11.3.13

Torques in operating mode S1

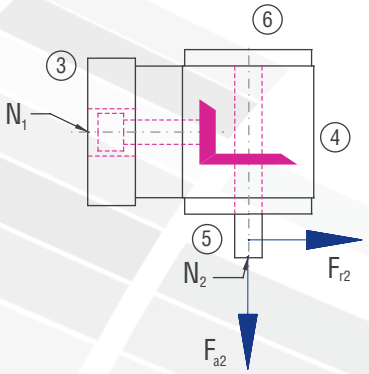
Gear ratio i [-]	1:1		1.5:1		2:1		3:1		4:1		5:1		6:1	
n1 [rpm]	T_{2N} [Nm]	n_2 [rpm]	T_{2N} [Nm]	n_2 [rpm]	T_{2N} [Nm]	n_2 [rpm]	T_{2N} [Nm]	n_2 [rpm]	T_{2N} [Nm]	n_2 [rpm]	T_{2N} [Nm]	n_2 [rpm]	T_{2N} [Nm]	n_2 [rpm]
4000		4000	34	2667	45	2000	68	1333	85	1000	90	800	85	667
3000		3000	45	2000	60	1500	90	1000	103	750	100	600	95	500
2400	37	2400	56	1600	75	1200	113	800	111	600	105	480	102	400
1500	60	1500	90	1000	120	750	130	500	120	375	115	300	108	250

Torques in operating mode S5, dynamic operation

Gear ratio i [-]				1:1	1.5:1	2:1	3:1	4:1	5:1	6:1
T_{2N} in S5 [Nm]				120	113	110	110	105	100	95
n_{1max} in S5 [rpm]				2100	3000	4200	5000	6000	6000	6000
Coupling size	Motor shaft d [mm]	Coupling type		1:1	1.5:1	2:1	3:1	4:1	5:1	6:1
K28	14	KN	T_{2B} [Nm]	80.0	120.0	160.0	177.0	162.0	143.0	122.0
			T_{2NOT} [Nm]	80.0	120.0	160.0	240.0	260.0	220.0	200.0
	16	KN	T_{2B} [Nm]	81.0	121.5	162.0	177.0	162.0	143.0	122.0
			T_{2NOT} [Nm]	100.0	150.0	200.0	260.0	260.0	220.0	200.0
		KNN	T_{2B} [Nm]	128.0	192.0	190.0	177.0	162.0	143.0	122.0
			T_{2NOT} [Nm]	140.0	210.0	280.0	260.0	260.0	220.0	200.0
		SN	T_{2B} [Nm]	128.0	192.0	190.0	177.0	162.0	143.0	122.0
			T_{2NOT} [Nm]	140.0	210.0	280.0	260.0	260.0	220.0	200.0
	19	KN	T_{2B} [Nm]	85.0	127.5	170.0	177.0	162.0	143.0	122.0
			T_{2NOT} [Nm]	130.0	195.0	260.0	260.0	260.0	220.0	200.0
		KNN	T_{2B} [Nm]	128.0	192.0	190.0	177.0	162.0	143.0	122.0
			T_{2NOT} [Nm]	240.0	280.0	280.0	260.0	260.0	220.0	200.0
		SN	T_{2B} [Nm]	128.0	192.0	190.0	177.0	162.0	143.0	122.0
			T_{2NOT} [Nm]	240.0	280.0	280.0	260.0	260.0	220.0	200.0
	24	KN	T_{2B} [Nm]	91.0	136.5	182.0	177.0	162.0	143.0	122.0
			T_{2NOT} [Nm]	140.0	210.0	280.0	260.0	260.0	220.0	200.0
		KNN	T_{2B} [Nm]	128.0	192.0	190.0	177.0	162.0	143.0	122.0
			T_{2NOT} [Nm]	240.0	280.0	280.0	260.0	260.0	220.0	200.0
		SN	T_{2B} [Nm]	128.0	192.0	190.0	177.0	162.0	143.0	122.0
			T_{2NOT} [Nm]	240.0	280.0	280.0	260.0	260.0	220.0	200.0
	28	KN	T_{2B} [Nm]	97.0	145.5	190.0	177.0	162.0	143.0	122.0
			T_{2NOT} [Nm]	148.0	222.0	280.0	260.0	260.0	220.0	200.0
		KNN	T_{2B} [Nm]	128.0	192.0	190.0	177.0	162.0	143.0	122.0
			T_{2NOT} [Nm]	240.0	280.0	280.0	260.0	260.0	220.0	200.0
		SN	T_{2B} [Nm]	128.0	192.0	190.0	177.0	162.0	143.0	122.0
			T_{2NOT} [Nm]	240.0	280.0	280.0	260.0	260.0	220.0	200.0
	32	KN	T_{2B} [Nm]	102.0	153.0	190.0	177.0	162.0	143.0	122.0
			T_{2NOT} [Nm]	156.0	234.0	280.0	260.0	260.0	220.0	200.0
		KNN	T_{2B} [Nm]	128.0	192.0	190.0	177.0	162.0	143.0	122.0
			T_{2NOT} [Nm]	240.0	280.0	280.0	260.0	260.0	220.0	200.0
		SN	T_{2B} [Nm]	128.0	192.0	190.0	177.0	162.0	143.0	122.0
			T_{2NOT} [Nm]	240.0	280.0	280.0	260.0	260.0	220.0	200.0
	38	KN	T_{2B} [Nm]	109.0	163.5	190.0	177.0	162.0	143.0	122.0
			T_{2NOT} [Nm]	167.0	250.5	280.0	260.0	260.0	220.0	200.0
		KNN	T_{2B} [Nm]	128.0	192.0	190.0	177.0	162.0	143.0	122.0
			T_{2NOT} [Nm]	240.0	280.0	280.0	260.0	260.0	220.0	200.0
		SN	T_{2B} [Nm]	128.0	192.0	190.0	177.0	162.0	143.0	122.0
			T_{2NOT} [Nm]	240.0	280.0	280.0	260.0	260.0	220.0	200.0

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



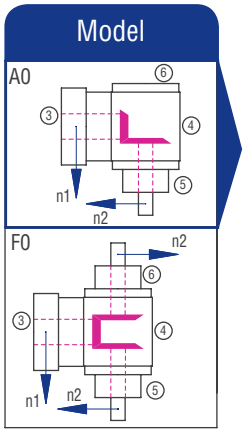
Gearbox inertia moments/mass

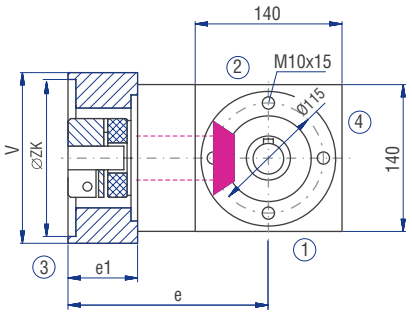
Inertia moment J_1 related to the fast-rotating shaft (N_1)

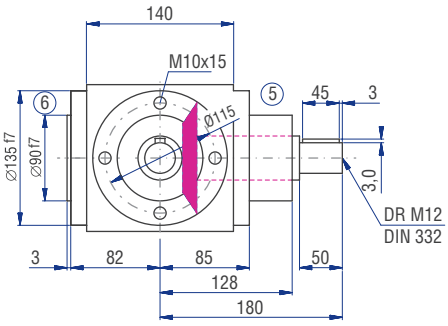
Model	Inertia moment [kgcm²]							Mass ca. [kg]
	1:1	1.5:1	2:1	3:1	4:1	5:1	6:1	
A0	29.1040	17.6100	13.2250	10.3390	9.2700	8.8650	8.6550	26.0
B0	40.2700	22.7860	16.3860	11.4390	9.7640	9.2930	8.9250	25.5
C0	40.2700	22.7860	16.3860	11.4390	9.7640	9.2930	8.9250	25.5
D0	41.2520	23.2230	16.6310	11.5480	9.8250	9.3320	8.9520	26.0
E0N	36.8340	21.2590	15.5260	11.0570	9.5490	9.1560	8.8300	25.0
E0S	43.2350	24.1040	17.1270	11.7690	9.9490	9.4120	9.0070	25.7
F0	40.9040	25.1660	16.9500	12.2160	10.4510	9.6410	9.2220	30.0
G0	53.4040	28.8060	21.7780	16.4150	10.7860	10.3000	9.9310	29.7
H0	53.4040	28.8060	21.7780	16.4150	10.7860	10.3000	9.9310	29.7
J0	54.3860	29.2430	22.0240	16.5250	10.8480	10.3390	9.9580	30.2
K0N	49.9670	27.2790	20.9190	16.0340	10.5720	10.1620	9.8360	29.2
K0S	56.3690	30.1240	22.5200	16.7450	10.9720	10.4180	10.0130	29.9

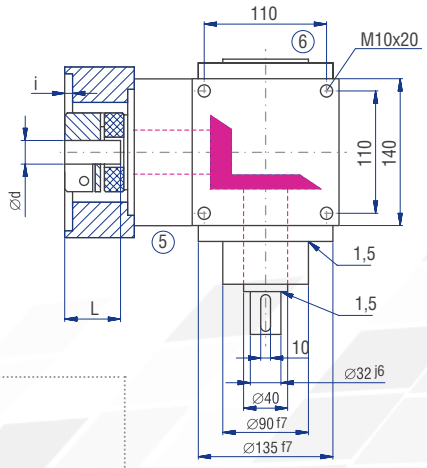
Inertia moments Coupling J [kgcm²]

K28	KN	KNN	SN
d [mm]	J [kgcm²]	J [kgcm²]	J [kgcm²]
14	0.000	0.000	0.000
16	1.827	1.827	3.366
19	1.821	1.821	3.350
24	1.804	1.804	3.270
28	1.779	1.779	3.190
32	1.741	1.741	3.030
38	1.649	1.649	2.898







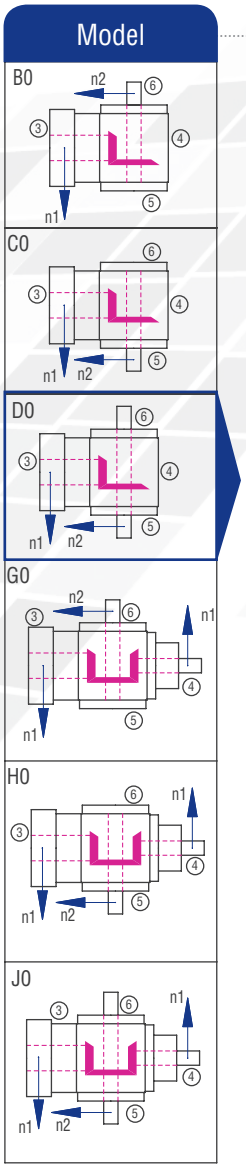


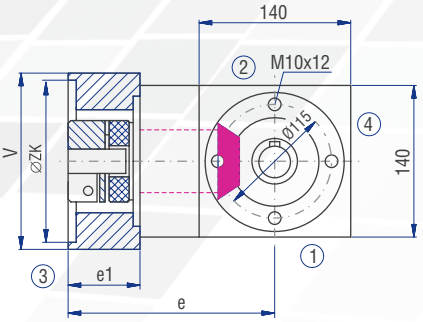
Motor mounting dimensions

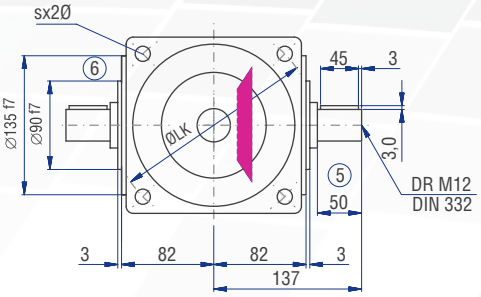
Flange no.	V [mm]	ZK [mm]	Thread	LK [mm]	Shaft dxl [mm]	i [mm]	e [mm]	e1 [mm]
403	140	80	M6	100	32*60	4	196.0	61
502	140	95	M8	115	32*60	4	196.0	61
601	140	95	M8	130	32*60	4	196.0	61
611	140	110	M8	130	32*60	5	196.0	61
616	140	110	M10	130	32*60	5	196.0	61
701	140	110	M8	145	32*60	5	196.0	61
802	140	110	M10	165	32*60	5	196.0	61
811	140	130	M10	165	32*60	5	196.0	61
902	200	130	M12	215	32*60	6	196.0	61
911	200	180	M12	215	32*60	6	196.0	61
931	200	180	M12	215	38*80	6	241.0	107

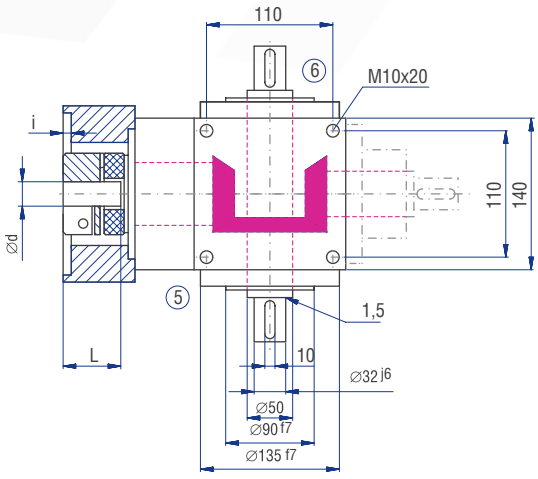
Table **11.3.19-1**

The dimensions e and e1 will change for the coupling type “clamping hub with groove” (KNN). Please contact us for consultation!

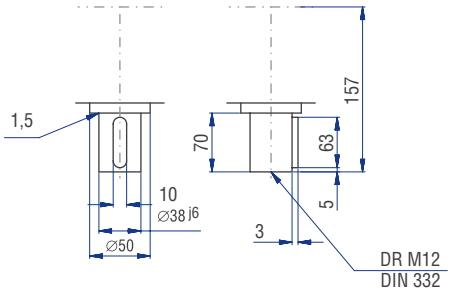




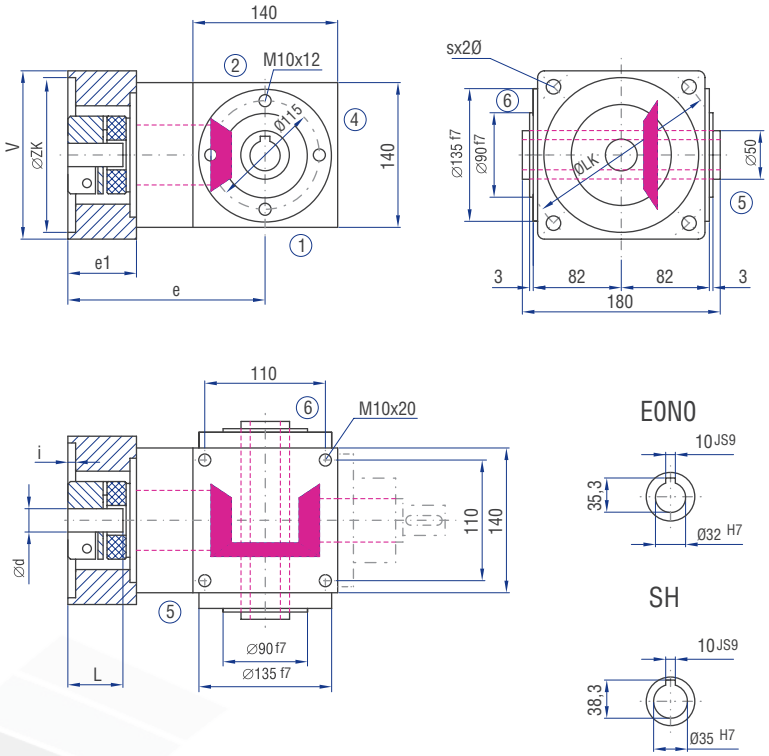


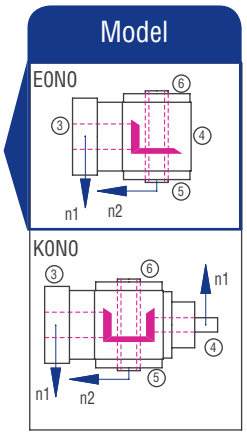


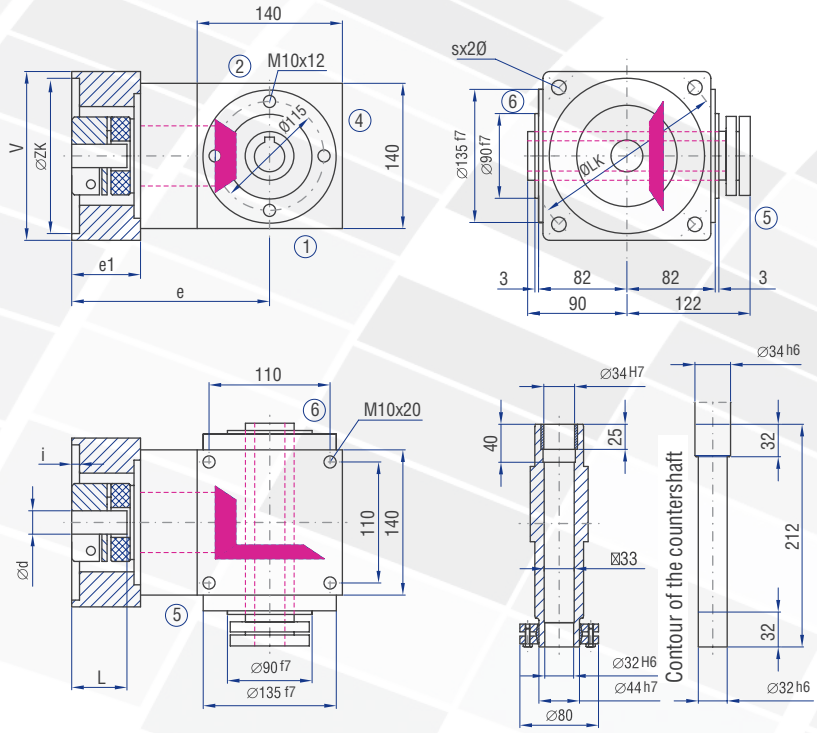
Implementation VV

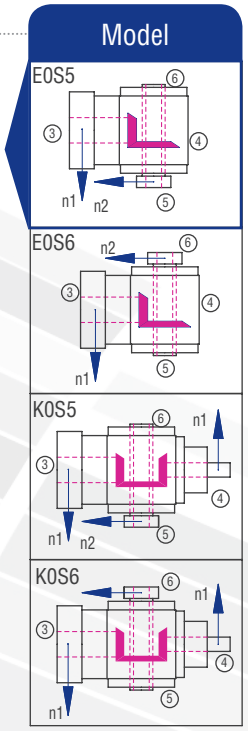


The dimensions of the Models not shown can be figured by mirroring available dimensions.
The shaft dimensions on side 4 follow from the dimensions of type A0.

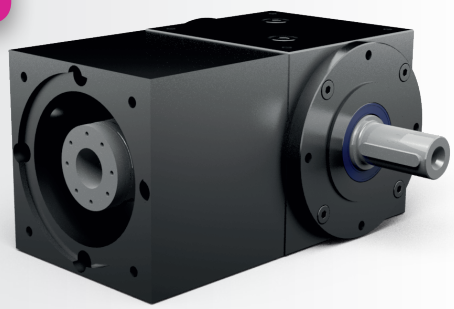

140
M10x12
Ø115
V
ØZK
140
e1
e
sx2Ø
Ø135 f7
Ø90 f7
ØLK
Ø50
3
82
82
3
180
110
M10x20
i
Ød
110
140
Ø90 f7
Ø135 f7
L
EONO
10 JS9
35,3
Ø32 H7
SH
10 JS9
38,3
Ø35 H7


Model
EONO
n1
n2
KONO
n1
n1
n2


140
M10x12
Ø115
V
ØZK
140
e1
e
sx2Ø
Ø135 f7
Ø90 f7
ØLK
3
82
82
3
90
122
110
M10x20
i
Ød
110
140
Ø90 f7
Ø135 f7
L
Ø34 H7
Ø34 h6
40
25
32
212
32
Ø33
Contour of the countershaft
Ø32 H6
Ø44 h7
Ø80
Ø32 h6


Model
EOS5
n1
n2
EOS6
n2
n1
KOS5
n1
n1
n2
KOS6
n1
n1

11.3.20 Type VC 160 – Servo bevel gearboxes



Characteristics

Characteristic	Standard	Option
Toothing	Spiral-toothed, hardened bevel gears	See chapter 11.3.2
Gear ratio	1:1 to 6:1	
Housing / Flanges	Grey cast iron / aluminium	
Threaded mounting holes	On all housing surfaces without flange and on all flanges.	See chapter 11.3.4
Shaft	Material 1 C45, shaft ends greased Fit with ISO 6 tolerance with parallel keyway: according to DIN 6885 Sheet 1	See chapter 4.6.2
Hollow shaft	Material 1 C45, 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	< 20 arcmin	See chapter 11.3.11
Protection class	IP 54	See chapter 4.5
Corrosion protection	Prime coat; layer thickness > 40 µm	See chapter 4.4.1
Bearing life L10h	more than 15,000h	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 11.3.9
Lubricants	Synthetic lubricants	See chapter 11.3.9
Motor flange	Aluminium	See chapter 11.3.14
Coupling	Insertable, flexible claw coupling, suitable for servo-motors For smooth motor shafts — clamping hub — KN For smooth motor shafts — tension ring hub — SN For motor shafts with parallel key — clamping hub with groove — KNN	See chapter 11.3.13

Torques in operating mode S1

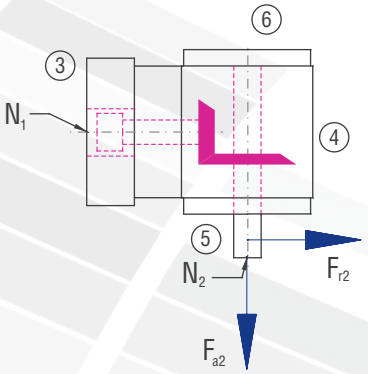
Gear ratio i [-]	1:1		1.5:1		2:1		3:1		4:1		5:1		6:1	
n1 [rpm]	T_{2N} [Nm]	n_2 [rpm]	T_{2N} [Nm]	n_2 [rpm]	T_{2N} [Nm]	n_2 [rpm]	T_{2N} [Nm]	n_2 [rpm]	T_{2N} [Nm]	n_2 [rpm]	T_{2N} [Nm]	n_2 [rpm]	T_{2N} [Nm]	n_2 [rpm]
4000		4000		2667		2000	102	1333	136	1000	160	800	115	667
3000		3000	68	2000	90	1500	136	1000	180	750	180	600	130	500
2400	56	2400	85	1600	113	1200	170	800	200	600	198	480	137	400
1500	90	1500	136	1000	181	750	230	500	220	375	215	300	145	250

Torques in operating mode S5, dynamic operation

Gear ratio i [-]				1:1	1.5:1	2:1	3:1	4:1	5:1	6:1
T_{2N} in S5 [Nm]				180	185	185	190	180	180	130
n_{1max} in S5 [rpm]				1800	2500	3200	4500	5000	6000	6000
Coupling size	Motor shaft d [mm]	Coupling type		1:1	1.5:1	2:1	3:1	4:1	5:1	6:1
K28	14	KN	T_{2B} [Nm]	80.0	120.0	160.0	240.0	270.0	270.0	200.0
			T_{2NOT} [Nm]	80.0	120.0	160.0	240.0	320.0	380.0	350.0
	16	KN	T_{2B} [Nm]	81.0	121.5	162.0	243.0	270.0	270.0	200.0
			T_{2NOT} [Nm]	100.0	150.0	200.0	300.0	400.0	380.0	350.0
		KNN	T_{2B} [Nm]	128.0	192.0	256.0	280.0	270.0	270.0	200.0
			T_{2NOT} [Nm]	140.0	210.0	280.0	400.0	400.0	380.0	350.0
		SN	T_{2B} [Nm]	128.0	192.0	256.0	280.0	270.0	270.0	200.0
			T_{2NOT} [Nm]	140.0	210.0	280.0	400.0	400.0	380.0	350.0
	19	KN	T_{2B} [Nm]	85.0	127.5	170.0	255.0	270.0	270.0	200.0
			T_{2NOT} [Nm]	130.0	195.0	260.0	390.0	400.0	380.0	350.0
		KNN	T_{2B} [Nm]	128.0	192.0	256.0	280.0	270.0	270.0	200.0
			T_{2NOT} [Nm]	240.0	360.0	480.0	400.0	400.0	380.0	350.0
		SN	T_{2B} [Nm]	128.0	192.0	256.0	280.0	270.0	270.0	200.0
			T_{2NOT} [Nm]	240.0	360.0	480.0	400.0	400.0	380.0	350.0
	24	KN	T_{2B} [Nm]	91.0	136.5	182.0	273.0	270.0	270.0	200.0
			T_{2NOT} [Nm]	140.0	210.0	280.0	400.0	400.0	380.0	350.0
		KNN	T_{2B} [Nm]	128.0	192.0	256.0	280.0	270.0	270.0	200.0
			T_{2NOT} [Nm]	240.0	360.0	480.0	400.0	400.0	380.0	350.0
		SN	T_{2B} [Nm]	128.0	192.0	256.0	280.0	270.0	270.0	200.0
			T_{2NOT} [Nm]	240.0	360.0	480.0	400.0	400.0	380.0	350.0
	28	KN	T_{2B} [Nm]	97.0	145.5	194.0	280.0	270.0	270.0	200.0
			T_{2NOT} [Nm]	148.0	222.0	296.0	400.0	400.0	380.0	350.0
		KNN	T_{2B} [Nm]	128.0	192.0	256.0	280.0	270.0	270.0	200.0
			T_{2NOT} [Nm]	240.0	360.0	480.0	400.0	400.0	380.0	350.0
		SN	T_{2B} [Nm]	128.0	192.0	256.0	280.0	270.0	270.0	200.0
			T_{2NOT} [Nm]	240.0	360.0	480.0	400.0	400.0	380.0	350.0
	32	KN	T_{2B} [Nm]	102.0	153.0	204.0	280.0	270.0	270.0	200.0
			T_{2NOT} [Nm]	156.0	234.0	312.0	400.0	400.0	380.0	350.0
		KNN	T_{2B} [Nm]	128.0	192.0	256.0	280.0	270.0	270.0	200.0
			T_{2NOT} [Nm]	240.0	360.0	480.0	400.0	400.0	380.0	350.0
		SN	T_{2B} [Nm]	128.0	192.0	256.0	280.0	270.0	270.0	200.0
			T_{2NOT} [Nm]	240.0	360.0	480.0	400.0	400.0	380.0	350.0
	38	KN	T_{2B} [Nm]	109.0	163.5	218.0	280.0	270.0	270.0	200.0
			T_{2NOT} [Nm]	167.0	250.5	334.0	400.0	400.0	380.0	350.0
		KNN	T_{2B} [Nm]	128.0	192.0	256.0	280.0	270.0	270.0	200.0
			T_{2NOT} [Nm]	240.0	360.0	480.0	400.0	400.0	380.0	350.0
		SN	T_{2B} [Nm]	128.0	192.0	256.0	280.0	270.0	270.0	200.0
			T_{2NOT} [Nm]	240.0	360.0	480.0	400.0	400.0	380.0	350.0

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]
< 220	2000	1000	2800	1400	3300	1650	4000	2000	5000	2500	6500	3250
> 220	1670	835	2340	1170	2750	1375	3340	1670	4170	2085	5420	2710



Gearbox inertia moments/mass

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

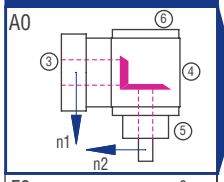
Model	Inertia moment [kgcm²]							Mass ca. [kg]
	1:1	1.5:1	2:1	3:1	4:1	5:1	6:1	
A0	35.1340	36.4980	23.1260	16.3090	14.3010	13.6770	12.8680	38.5
B0	37.0520	37.5230	25.4770	17.3860	15.0700	14.1140	13.1640	38.0
C0	37.0520	37.5230	25.4770	17.3860	15.0700	14.1140	13.1640	38.0
D0	38.0810	37.9810	25.7340	17.5000	15.1340	14.1550	13.1930	38.5
E0N	39.8840	38.6400	26.0420	17.6370	15.2110	14.2040	13.2290	37.0
E0S	46.1740	41.4360	27.6150	18.3360	15.6040	14.4560	13.4030	37.6
F0	49.9340	54.4540	32.2260	20.0090	16.4450	15.2490	13.8350	45.0
G0	51.8870	50.5670	34.1270	24.6890	20.5770	15.7940	14.8420	44.5
H0	51.8870	50.5670	34.1270	24.6890	20.5770	15.7940	14.8420	44.5
J0	52.9160	51.0240	34.3840	24.8030	20.6420	15.8350	14.8710	45.0
K0N	54.7190	51.6840	34.6920	24.9400	20.7190	15.8840	14.9070	44.0
K0S	61.0090	54.4800	36.2650	25.6390	21.1120	16.1360	15.0810	44.5

Inertia moments Coupling J [kgcm²]

K28	KN	KNN	SN
d [mm]	J [kgcm²]	J [kgcm²]	J [kgcm²]
14	0.000	0.000	0.000
16	1.827	1.827	3.366
19	1.821	1.821	3.350
24	1.804	1.804	3.270
28	1.779	1.779	3.190
32	1.741	1.741	3.030
38	1.649	1.649	2.898

Model

A0



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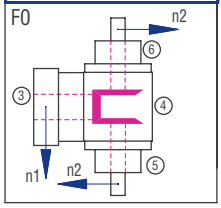
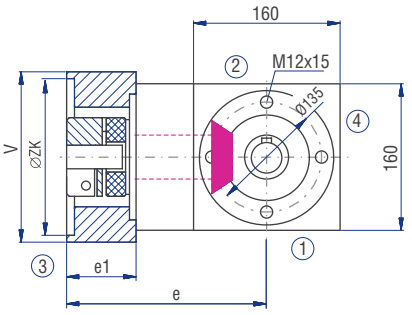
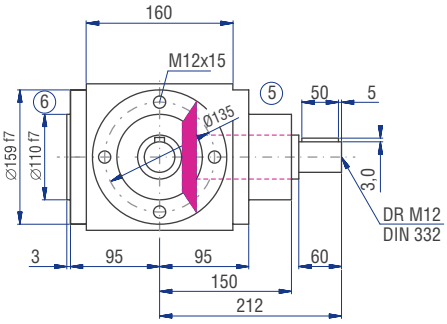
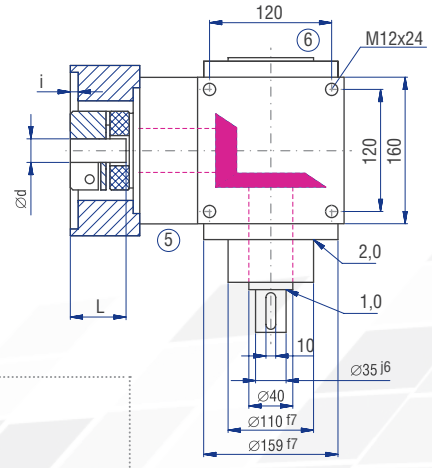








Motor mounting dimensions

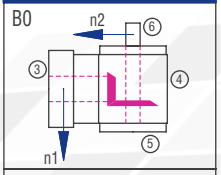
Flange no.	V [mm]	ZK [mm]	Thread	LK [mm]	Shaft dxl [mm]	i [mm]	e [mm]	e1 [mm]
403	160	80	M6	100	32*60	4	215.0	62
502	160	95	M8	115	32*60	4	215.0	62
601	160	95	M8	130	32*60	4	215.0	62
611	160	110	M8	130	32*60	5	215.0	62
616	160	110	M10	130	32*60	5	215.0	62
701	160	110	M8	145	32*60	5	215.0	62
802	160	110	M10	165	32*60	5	215.0	62
811	160	130	M10	165	32*60	5	215.0	62
902	200	130	M12	215	32*60	6	215.0	62
911	200	180	M12	215	32*60	6		62
931	200	180	M12	215	38*80	6	260.0	62

Table **11.3.20-1**

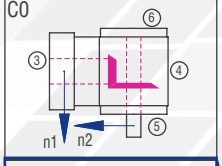
The dimensions e and e1 will change for the coupling type “clamping hub with groove” (KNN). Please contact us for consultation!

Model

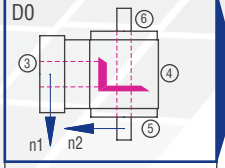
B0



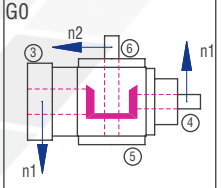
C0



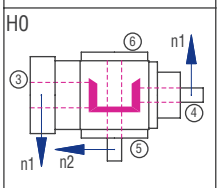
D0



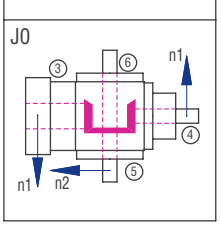
G0

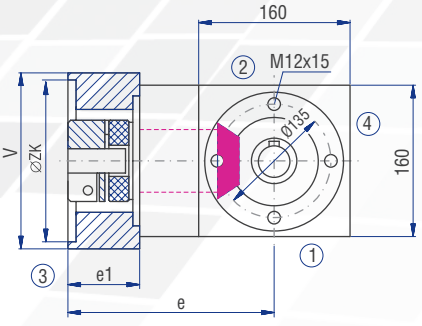


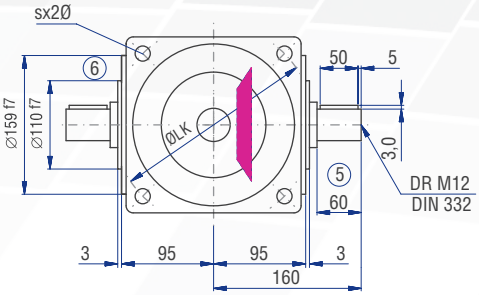
H0

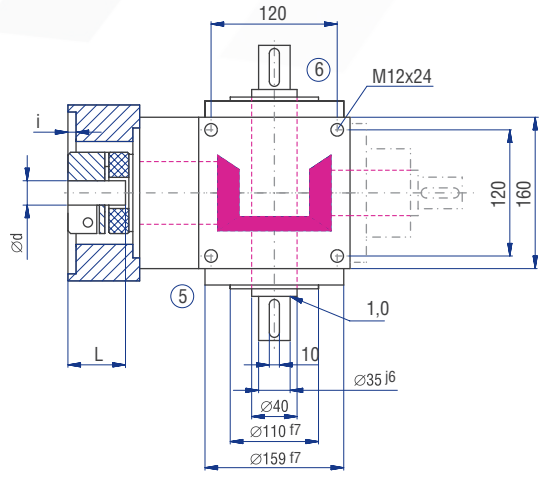


J0

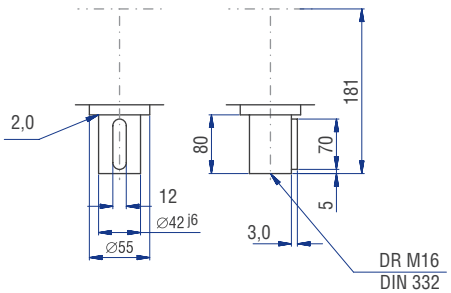




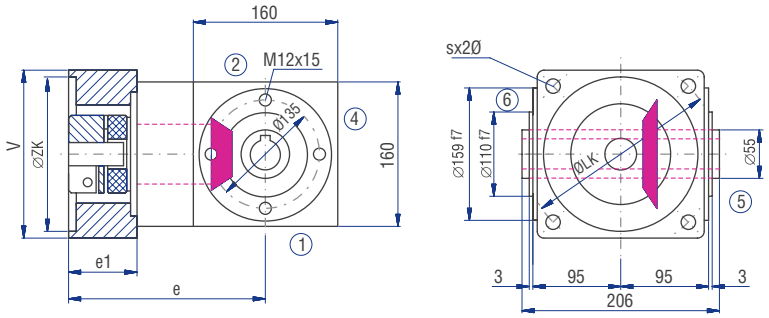


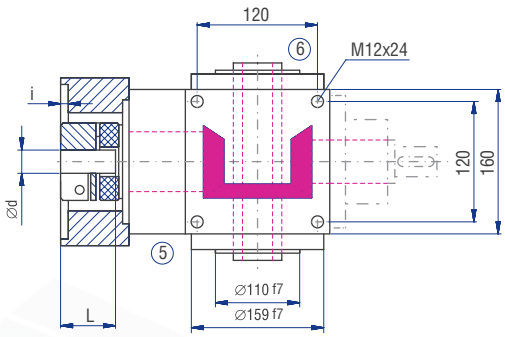


Implementation VV



The dimensions of the Models not shown can be figured by mirroring available dimensions.
The shaft dimensions on side 4 follow from the dimensions of type A0.





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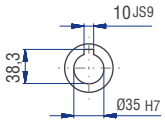
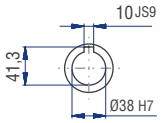
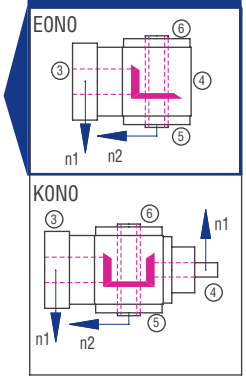
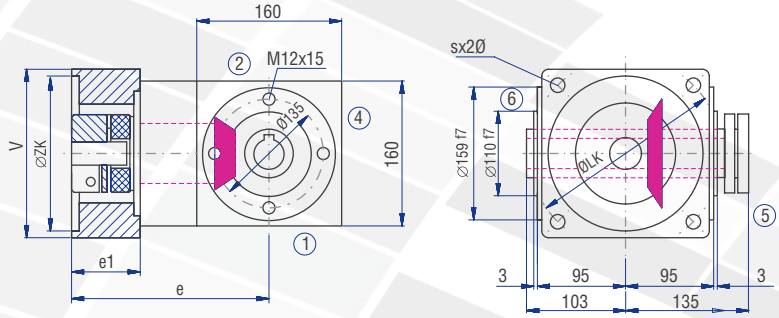


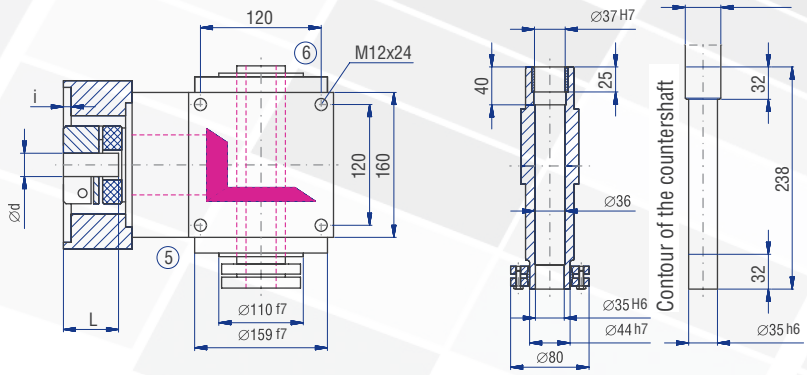
SH



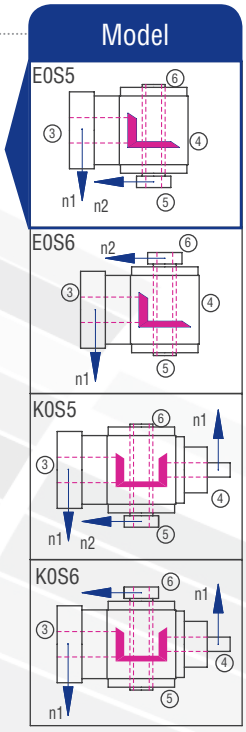
Model



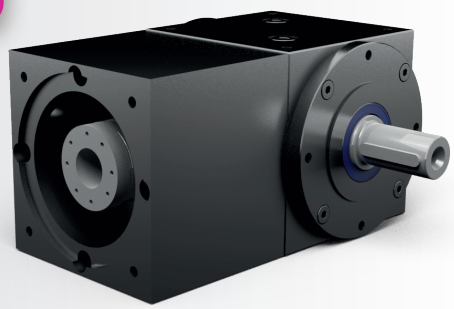




Model



11.3.21 Type VC 200 – Servo bevel gearboxes



Characteristics

Characteristic	Standard	Option
Toothing	Spiral-toothed, hardened bevel gears	See chapter 11.3.2
Gear ratio	1:1 to 6:1	
Housing / Flanges	Grey cast iron / aluminium	
Threaded mounting holes	On all housing surfaces without flange and on all flanges.	See chapter 11.3.4
Shaft	Material 1 C45, shaft ends greased Fit with ISO 6 tolerance with parallel keyway: according to DIN 6885 Sheet 1	See chapter 4.6.2
Hollow shaft	Material 1 C45, 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	< 20 arcmin	See chapter 11.3.11
Protection class	IP 54	See chapter 4.5
Corrosion protection	Prime coat; layer thickness > 40 µm	See chapter 4.4.1
Bearing life L10h	more than 15,000h	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 11.3.9
Lubricants	Synthetic lubricants	See chapter 11.3.9
Motor flange	Aluminium	See chapter 11.3.14
Coupling	Insertable, flexible claw coupling, suitable for servo-motors For smooth motor shafts — clamping hub — KN For smooth motor shafts — tension ring hub — SN For motor shafts with parallel key — clamping hub with groove — KNN	See chapter 11.3.13

Torques in operating mode S1

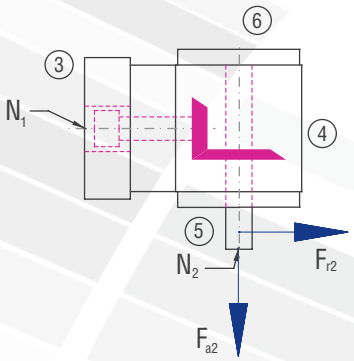
Gear ratio i [-]	1:1		1.5:1		2:1		3:1		4:1		5:1		6:1	
n1 [rpm]	T_{2N} [Nm]	n_2 [rpm]	T_{2N} [Nm]	n_2 [rpm]	T_{2N} [Nm]	n_2 [rpm]	T_{2N} [Nm]	n_2 [rpm]	T_{2N} [Nm]	n_2 [rpm]	T_{2N} [Nm]	n_2 [rpm]	T_{2N} [Nm]	n_2 [rpm]
4000		4000		2667		2000	177	1333	235	1000	275	800	190	667
3000		3000		2000	157	1500	235	1000	314	750	300	600	210	500
2400		2400	147	1600	196	1200	294	800	393	600	340	480	225	400
1500	157	1500	236	1000	314	750	472	500	455	375	380	300	240	250

Torques in operating mode S5, dynamic operation

Gear ratio i [-]				1:1	1.5:1	2:1	3:1	4:1	5:1	6:1
T_{2N} in S5 [Nm]				350	330	320	420	350	300	210
n_{1max} in S5 [rpm]				1500	2250	3000	4000	4500	5000	6000
Coupling size	Motor shaft d [mm]	Coupling type		1:1	1.5:1	2:1	3:1	4:1	5:1	6:1
K38	16	KN	T_{2B} [Nm]	94.0	141.0	188.0	282.0	376.0	470.0	315.0
			T_{2NOT} [Nm]	120.0	180.0	240.0	360.0	480.0	600.0	625.0
	19	KN	T_{2B} [Nm]	98.0	147.0	196.0	294.0	392.0	490.0	315.0
			T_{2NOT} [Nm]	125.0	187.5	250.0	375.0	500.0	625.0	625.0
	24	KN	T_{2B} [Nm]	104.0	156.0	208.0	312.0	416.0	505.0	315.0
			T_{2NOT} [Nm]	130.0	195.0	260.0	390.0	520.0	650.0	625.0
		KNN	T_{2B} [Nm]	260.0	390.0	520.0	630.0	550.0	505.0	315.0
			T_{2NOT} [Nm]	500.0	750.0	800.0	850.0	800.0	800.0	625.0
		SN	T_{2B} [Nm]	260.0	390.0	520.0	630.0	550.0	505.0	315.0
			T_{2NOT} [Nm]	500.0	750.0	800.0	850.0	800.0	800.0	625.0
	28	KN	T_{2B} [Nm]	109.0	163.5	218.0	327.0	436.0	505.0	315.0
			T_{2NOT} [Nm]	136.0	204.0	272.0	408.0	544.0	680.0	625.0
		KNN	T_{2B} [Nm]	260.0	390.0	520.0	630.0	550.0	505.0	315.0
			T_{2NOT} [Nm]	500.0	750.0	800.0	850.0	800.0	800.0	625.0
		SN	T_{2B} [Nm]	260.0	390.0	520.0	630.0	550.0	505.0	315.0
			T_{2NOT} [Nm]	500.0	750.0	800.0	850.0	800.0	800.0	625.0
	32	KN	T_{2B} [Nm]	113.0	169.5	226.0	339.0	452.0	505.0	315.0
			T_{2NOT} [Nm]	142.0	213.0	284.0	426.0	568.0	710.0	625.0
		KNN	T_{2B} [Nm]	260.0	390.0	520.0	630.0	550.0	505.0	315.0
			T_{2NOT} [Nm]	500.0	750.0	800.0	850.0	800.0	800.0	625.0
		SN	T_{2B} [Nm]	260.0	390.0	520.0	630.0	550.0	505.0	315.0
			T_{2NOT} [Nm]	500.0	750.0	800.0	850.0	800.0	800.0	625.0
	38	KN	T_{2B} [Nm]	122.0	183.0	244.0	366.0	488.0	505.0	315.0
			T_{2NOT} [Nm]	152.0	228.0	304.0	456.0	608.0	760.0	625.0
		KNN	T_{2B} [Nm]	260.0	390.0	520.0	630.0	550.0	505.0	315.0
			T_{2NOT} [Nm]	500.0	750.0	800.0	850.0	800.0	800.0	625.0
		SN	T_{2B} [Nm]	260.0	390.0	520.0	630.0	550.0	505.0	315.0
			T_{2NOT} [Nm]	500.0	750.0	800.0	850.0	800.0	800.0	625.0
	42	KN	T_{2B} [Nm]	126.0	189.0	252.0	378.0	504.0	505.0	315.0
			T_{2NOT} [Nm]	158.0	237.0	316.0	474.0	632.0	790.0	625.0
		KNN	T_{2B} [Nm]	260.0	390.0	520.0	630.0	550.0	505.0	315.0
			T_{2NOT} [Nm]	500.0	750.0	800.0	850.0	800.0	800.0	625.0
		SN	T_{2B} [Nm]	260.0	390.0	520.0	630.0	550.0	505.0	315.0
			T_{2NOT} [Nm]	500.0	750.0	800.0	850.0	800.0	800.0	625.0
	45	KN	T_{2B} [Nm]	130.0	195.0	260.0	390.0	520.0	505.0	315.0
			T_{2NOT} [Nm]	164.0	246.0	328.0	492.0	656.0	800.0	625.0
		KNN	T_{2B} [Nm]	260.0	390.0	520.0	630.0	550.0	505.0	315.0
			T_{2NOT} [Nm]	500.0	750.0	800.0	850.0	800.0	800.0	625.0
		SN	T_{2B} [Nm]	260.0	390.0	520.0	630.0	550.0	505.0	315.0
			T_{2NOT} [Nm]	500.0	750.0	800.0	850.0	800.0	800.0	625.0

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]
< 500	3200	1600	4300	2150	5000	2500	6500	3250	8000	4000	10000	5000
> 500	2670	1335	3580	1790	4170	2085	5420	2710	6670	3335	8330	4165



Gearbox inertia moments/mass

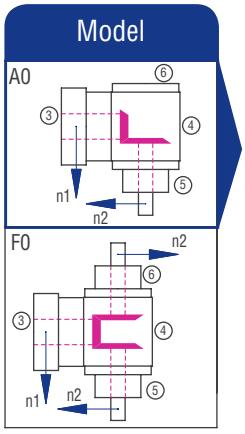
Inertia moment J_1 related to the fast-rotating shaft (N_1)

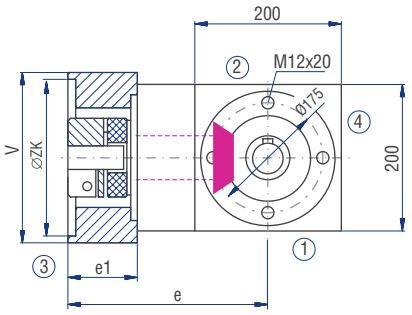
Model	Inertia moment [kgcm²]							Mass ca. [kg]
	1:1	1.5:1	2:1	3:1	4:1	5:1	6:1	
A0	132.0410	109.2390	82.6690	54.0970	42.2810	38.6590	35.9260	64.0
B0	185.5150	119.4940	86.1880	55.8380	43.3230	40.0860	36.8890	60.0
C0	185.5200	119.4940	86.1880	55.8380	43.3230	40.0860	36.8890	60.0
D0	188.6320	120.8800	86.9670	56.1850	43.5180	40.2110	36.9750	62.0
E0N	212.2100	124.9400	91.0000	56.8660	43.9640	41.0160	37.5350	60.0
E0S	233.2300	134.2820	96.2560	59.2020	45.2780	41.8570	38.1180	61.3
F0	192.6410	171.8170	129.6190	74.4520	53.4810	46.3870	41.3200	72.0
G0	246.1410	150.2440	107.3410	67.9340	53.7990	43.8080	40.5930	70.0
H0	246.1410	150.2440	107.3410	67.9340	53.7990	43.8080	40.5930	70.0
J0	249.2580	151.6290	108.1200	68.2810	53.9940	43.9330	40.6790	72.0
K0N	272.8310	155.6890	112.1530	68.9620	54.4400	44.7380	41.2390	70.0
K0S	293.8530	165.0320	117.4090	71.2980	55.7540	45.5790	41.8220	71.3

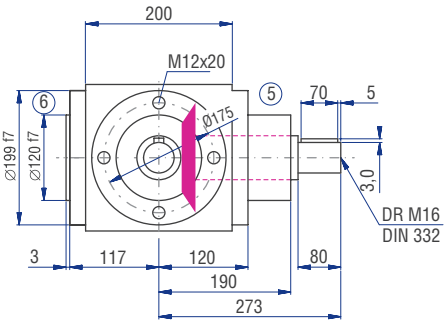
Inertia moments Coupling J [kgcm²]

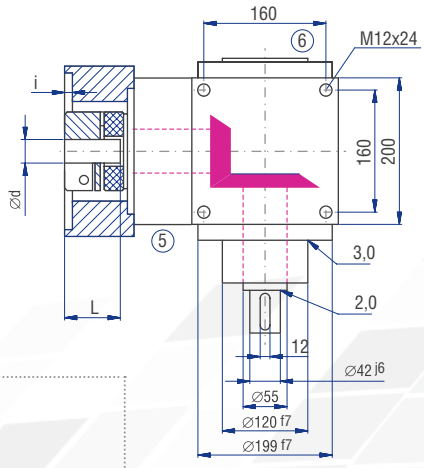
K38	KN	KNN	SN
d [mm]	J [kgcm²]	J [kgcm²]	J [kgcm²]
16	0.000	0.000	0.000
19	0.000	0.000	0.000
24	5.267	5.267	10.100
28	5.234	5.234	9.950
32	5.185	5.185	9.730
38	5.066	5.066	9.380
42	4.949	4.949	9.218
45	4.835	4.835	8.731

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







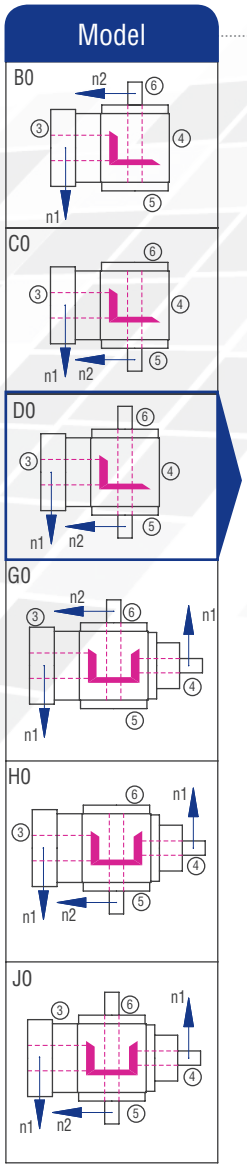


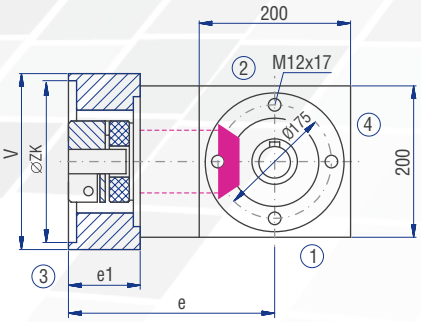
Motor mounting dimensions

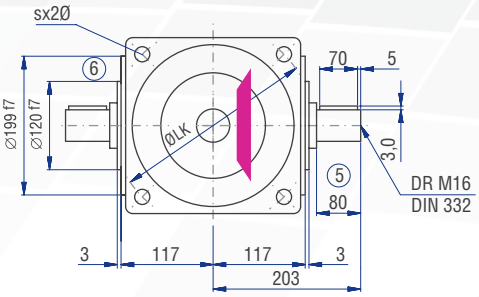
Flange no.	V [mm]	ZK [mm]	Thread	LK [mm]	Shaft dxl [mm]	i [mm]	e [mm]	e1 [mm]
614	200	110	M8	130	32*60	5	262.0	76
616	200	110	M10	130	32*60	5	262.0	76
802	200	110	M10	165	32*60	5	262.0	76
811	200	130	M10	165	32*60	5	262.0	76
902	200	130	M12	215	32*60	6	262.0	76
913	200	180	M12	215	32*60	6	262.0	76
915	200	180	M12	215	38*80	6	274.0	88

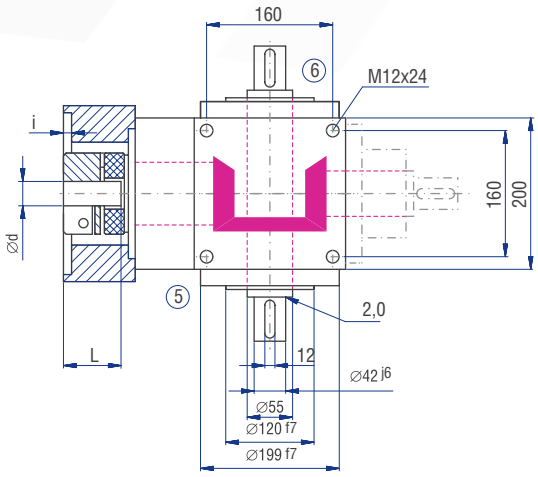
Table **11.3.21-1**

The dimensions e and e1 will change for the coupling type “clamping hub with groove” (KNN). Please contact us for consultation!

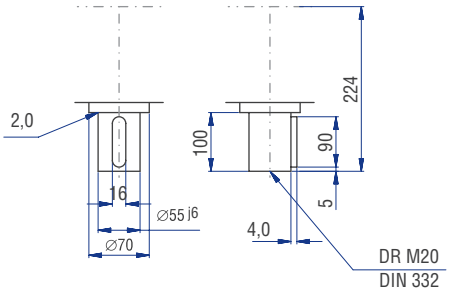




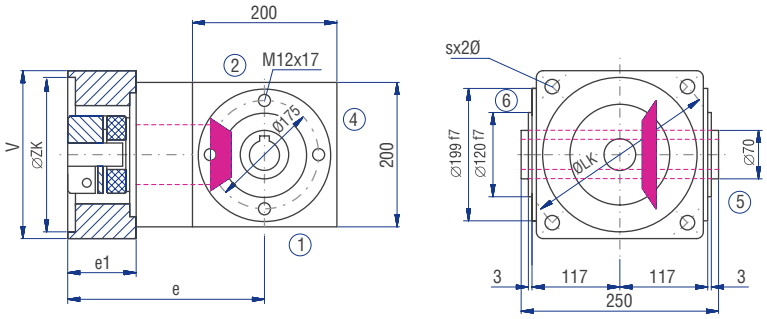


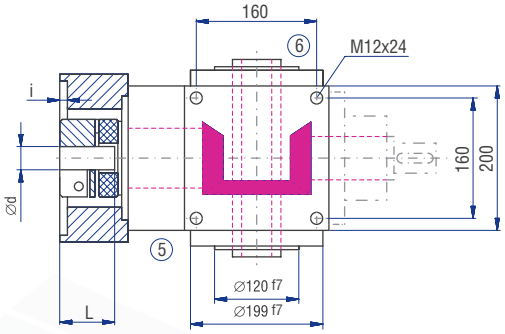


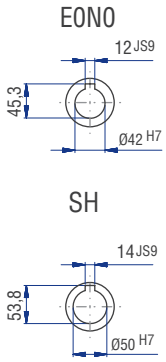
Implementation VV

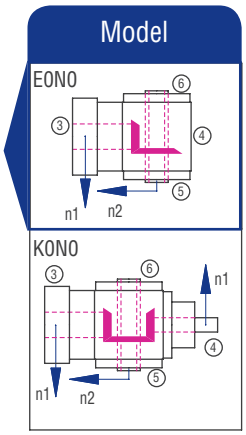


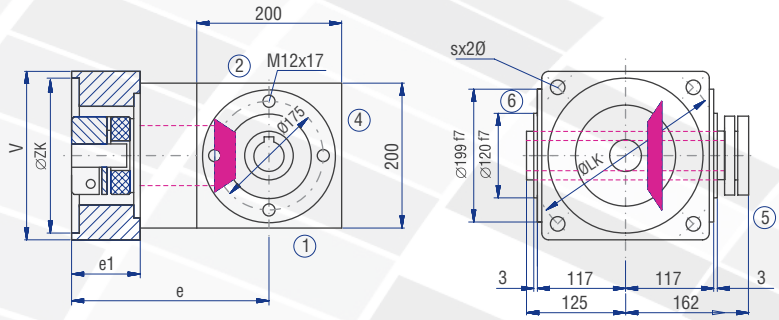
The dimensions of the Models not shown can be figured by mirroring available dimensions.
The shaft dimensions on side 4 follow from the dimensions of type A0.

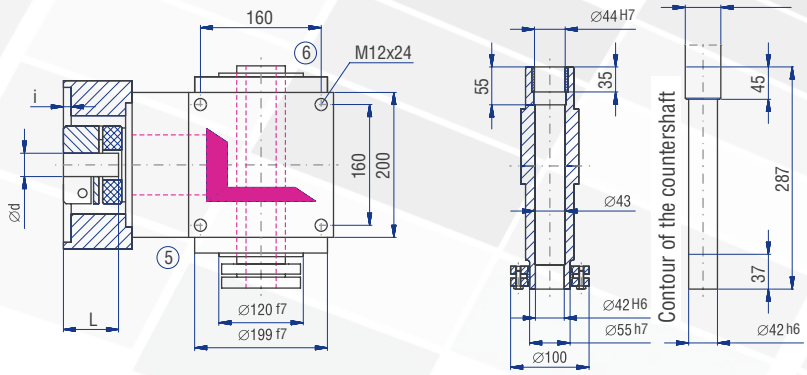

200
M12x17
Ø175
V
ØZK
200
e1
e
sx2Ø
Ø199 f7
Ø120 f7
ØLK
Ø70
3
117
117
3
250

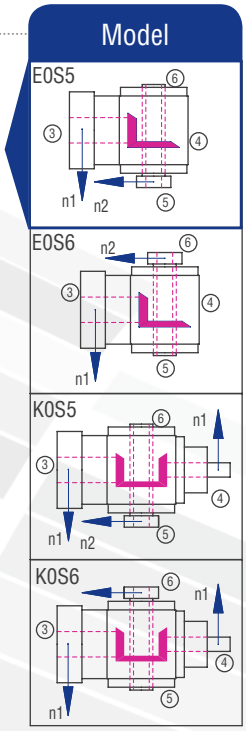

160
M12x24
i
Ød
160
200
L
Ø120 f7
Ø199 f7


E0N0
12 JS9
45.3
Ø42 H7
SH
14 JS9
53.8
Ø50 H7


Model
E0N0
K0N0
n1
n2


200
M12x17
Ø175
V
ØZK
200
e1
e
sx2Ø
Ø199 f7
Ø120 f7
ØLK
3
117
117
3
125
162


160
M12x24
i
Ød
160
200
L
Ø120 f7
Ø199 f7
Ø44 H7
55
35
Ø43
Ø42 H6
Ø55 h7
Ø100
Contour of the countershaft
Ø44 h6
45
287
37
Ø42 h6


Model
E0S5
E0S6
K0S5
K0S6
n1
n2

11.4.1 General construction

The HC gearbox type is based on the proven type H bevel gearboxes.
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: HC 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.

11.4.2 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.

11.4.3 Models

Due to the modular system, different gearbox Models can be configured.

Model	consists of:
B0 through E0	1 gear set

Table **11.4.3-1**

The variants differ in the type of the shafts, the rotational direction thereof, and the possibility to use a robot flange interface (BR0 and CR0).

11.4.4 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:

Gearbox size	Ordering options	Threaded mounting holes are in the housing surfaces on the gearbox side	Threaded mounting holes are in the flanges on the gearbox side
040-250	1	1	5.6
040-100	2	1.2	5.6
040-100	4	1.4	5.6
040-100	5	1.5	5.6
040-100	6	1.6	5.6

Table **11.4.4-1**

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

11.4.5 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. Example of order code for the installation position 1: HC 090 12:1 D0 9.1

11.4.6 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.

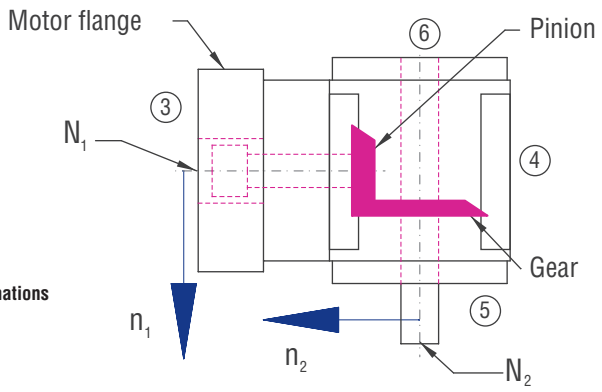


Figure **11.4.6-1; Shaft designations**

11.4.7 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 lower noise level is generated.

11.4.8 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.

11.4.9 Lubrication

The H-series gearboxes have lifetime lubrication.

11.4.10 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!

11.4.11 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 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	Standard	<=3 arcmin	<=2 arcmin

Table **11.4.11-1**

11.4.12 Connection of drive shaft to coupling

For torque transmission, a zero-play coupling is located on the drive shaft

11.4.13 Coupling

The coupling compensates angle errors as well as misalignments in the radial and axial direction.
A later changeover to another motor is possible. The motor-side coupling hub is available in the following variants:

BK	BKN
Bellows coupling	Bellows coupling
For motor shafts without parallel key	For motor shafts with parallel key

Design of the coupling

Torque T_1 [Nm] that can be transmitted by the coupling at a motor shaft diameter **d [mm]**

d [mm]	Gearbox size					
	090	115	140	170	215	260
5	7					
6	10					
7	9					
8	10.5	18				
9	12	20				
10	12	22				
11	12	33.1				
12	12	33.8				
13	12					
14	12	35	65			
15	12	35	65			
16	12	35	65			
17	12					
18	12	35	65			
19	12	35	65	150		
20	12	35	65			
21	12					
22	12					
24	12	35	65			
25		35	65		360	360
28		35	65			
30		35	65		360	360
32			65			
35			65		360	360
38			65			
40					360	800
42				150		
45					360	360
50					360	360
55					360	360
60					360	360
75						800

11.4.14 Motor mounting

The servo-motor will be bolted to the motor flange of the gearbox.
The flange number of the motor flange for the respective gearbox size is to be determined in Table 11.4.14-1.

Motor flange

The motor flange adapts the mounting bores of the servo-motor and gearbox flange. You can find the available flanges in Table 11.4.14-1.
Please contact us for other flanges.

ZK: Diameter of centring circle
LK: Diameter of pitch circles
L: Length of motor shaft
d: Diameter of motor shaft
i: Centring height
s: Thread

The values for the centring height (i) and the thread sizes (s) can be found on the respective pages.

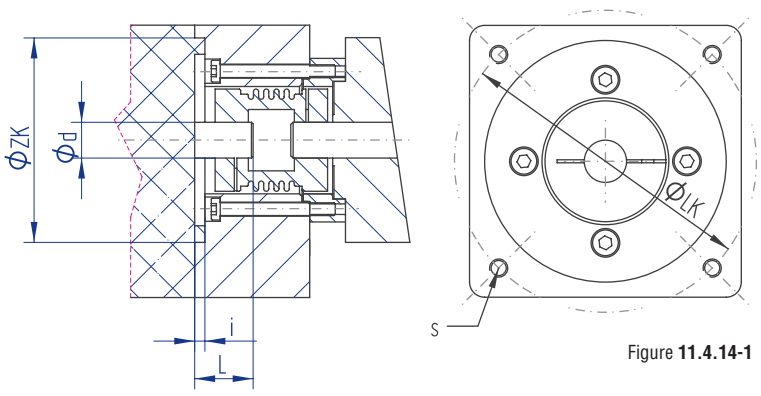


Figure **11.4.14-1**

Allocation: Fitting dimensions of the servo-motor – gearbox size/flange no. (selection)

d min [mm]	d max [mm]	L min [mm]	L max [mm]	LK [mm]	ZK [mm]	Gearbox size	Flange no.
3	24	21	38	63	40	090	001
3	24	21	38	63	40	090	002
3	24	21	38	75	60	090	104
5	24	22	50	75	60	090	104
3	24	21	38	90	60	090	201
3	24	21	38	95	50	090	301
5	24	22	50	95	50	090	301
5	24	22	50	100	80	090	401
5	24	22	50	115	95	090	501
5	24	22	50	130	95	090	601
5	24	22	50	130	110	090	611
5	24	22	50	145	110	090	701
5	24	22	50	165	110	090	802
3	24	17.5	34.5	70	40	090	950
3	24	21	38	70	50	090	952
5	24	22	50	90	70	090	954
5	24	37	65	115	95	090	955
5	24	40	68	145	110	090	956
5	24	22	50	90	70	090	959
3	24	21	38	70	50	090	963
3	24	21	38	46	30	090	964
3	24	21	38	100	50	090	967
5	24	37	65	130	95	090	975
5	24	29	57	100	80	090	977
5	24	37	65	130	110	090	980
5	24	37	65	100	80	090	987
8	26	24	53	63	40	115	001
8	26	24	53	75	60	115	104
8	26	24	53	95	50	115	301
10	30	35.5	60	95	50	115	301
8	26	24	53	100	80	115	401
10	30	35.5	60	100	80	115	401
8	26	24	53	115	95	115	502
10	30	35.5	60	115	95	115	502
8	26	24	53	130	95	115	601
10	30	35.5	60	130	95	115	601
8	26	24	53	130	110	115	611
10	30	35.5	60	130	110	115	611
8	28	24	53	145	110	115	701
10	30	35.5	60	145	110	115	701
8	26	24	53	90	70	115	954
8	26	24	53	90	70	115	959
10	30	40.5	65	145	110	115	959
10	30	35.5	60	90	70	115	960
8	26	24	53	70	50	115	964
10	30	40.5	65	130	110	115	967
10	30	40.5	65	130	95	115	971
10	30	42.5	67	100	80	115	972
8	26	24	53	70	50	115	986

Table **11.4.14-1**

11.4 Type HC – Servo hypoid gearboxes

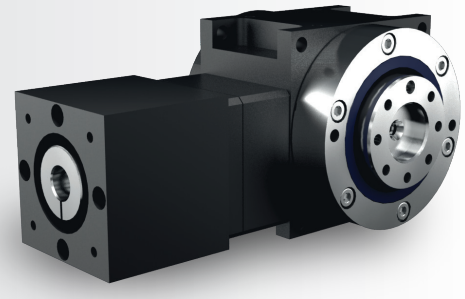
d min [mm]	d max [mm]	L min [mm]	L max [mm]	LK [mm]	ZK [mm]	Gearbox size	Flange no.
14	38	31.5	60	95	50	140	301
14	38	31.5	60	100	80	140	401
14	38	32	60	115	95	140	502
14	38	31.5	60	115	95	140	502
14	38	32	60	130	95	140	601
14	38	31.5	60	130	95	140	601
14	38	32	60	130	110	140	611
14	38	31.5	60	130	110	140	611
14	38	31.5	60	145	110	140	701
14	38	32	60	165	110	140	802
14	38	31.5	60	165	110	140	802
14	38	32	60	165	130	140	811
14	38	32	60	215	130	140	902
14	38	32	60	215	180	140	911
14	38	52	80	215	180	140	932
14	38	47.5	76	145	110	140	950
14	38	37	66	145	110	140	951
14	38	31.5	60	90	70	140	960
14	38	38.5	67	100	80	140	972
19	42	39	65	115	95	170	502
19	42	39	65	130	95	170	601
19	42	39	65	130	110	170	611
19	42	39	65	165	110	170	802
19	42	39	65	165	130	170	811
19	42	46	80	165	130	170	811
19	42	39	65	215	130	170	902
19	42	46	80	215	130	170	902
19	42	39	65	215	180	170	911
19	42	46	80	215	180	170	912
19	42	84	110	215	180	170	931
19	42	77.5	103	215	180	170	932
19	42	44	70	145	110	170	951
19	42	46	80	200	114.3	170	952
19	42	84	110	200	114.3	170	952
24	60	44.5	82	165	130	215	811
24	60	44.5	82	215	130	215	902
24	60	44.5	82	215	180	215	913
24	60	56.5	94	200	114.3	215	952
24	60	72.5	110	300	250	215	960
24	60	56.5	94	265	230	215	961
24	60	79.5	117	215	180	215	963
24	60	44.5	75	165	130	260	811
24	60	44.5	75	215	130	260	902
24	60	44.5	75	215	180	260	913
40	75	61.5	110	350	300	260	916
24	60	50	87	200	114.3	260	952
24	60	50	87	265	230	260	961
24	60	72.5	103	300	250	260	962
24	60	79.5	110	215	180	260	963

Table **11.4.14-1**

11.4 Type HC – Servo hypoid gearboxes

11.4.15 Features

Gear ratios: i = 3:1 to 15:1 (others upon request)
Maximum acceleration torque on output: 2160 Nm
6 gearbox sizes with edge lengths of 090 to 260 mm
Minimised circumferential backlash (optional)
Housing made of aluminium
Hypoid gearboxes suitable for fitting servo-motors



11.4.15.1 Models

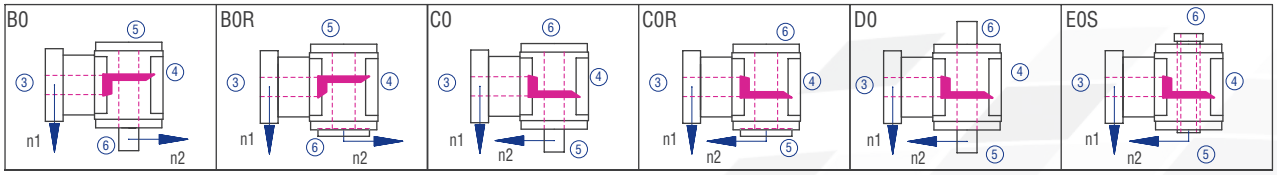


Figure **11.4.15-1; Models**

11.4.15.2 Gearbox sides

The example shows the Model C0

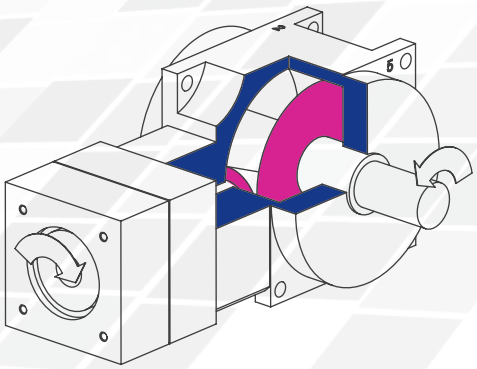


Figure **11.4.15-3; Gearbox sides**

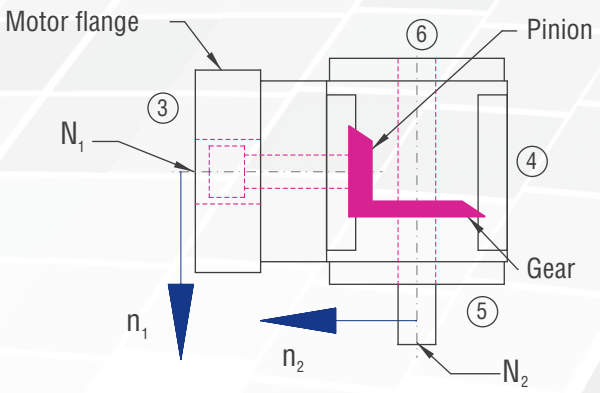


Figure **11.4.15-2; Shaft designations**

11.4.15.3 Order code

The order code reflects the customer specifications. Example:

Type	Size	Gear ratio	Model	Fixing side	Installation position	Speed n_2	Design
HC	090	12:1	C0-	1.	1-	200	/S1
Description	Size; Table 11.4.15-1	Table 11.4.15-1	Figure 11.4.15-1, Models	Side on which fixing is made; Table 11.4.4-1; Figure 4.3.1-1 Gearbox sides	Side directed downwards; Figure 4.3.1-1 Gearbox sides	Slowly rotating shaft	Low-backlash S1
		V080-	/	14 x 30	No. 301		
		Flange		Motor shaft Ø x length	Flange no.		

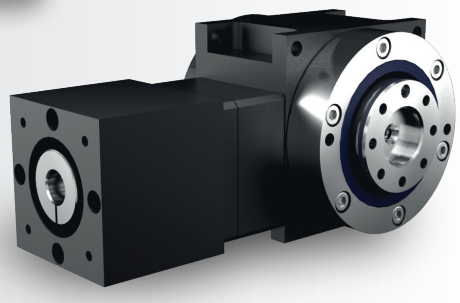
11.4.15.4 Overview of performance data

Selection table: gearbox size; gear ratio; rotational speed

			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]
090	8000	3200	36	54	72	36	54	72						
		3900							26	40	52	25	38	50
115	8000	2700	71	107	143	71	107	143						
		3300							52	79	108	50	75	100
140	7000	2200	142	215	289	143	215	290						
		2800							98	146	195	97	145	194
170	6000	1800	267	398	529	267	398	530						
		2300							188	280	370	182	278	369
215	5000	1200	723	1084	1450	723	1084	1450						
		1600							512	767	1022	512	767	1022
260	4500	1000	1444	2165	2887	1444	2165	2887						
		1300							1023	1533	2044	1023	1533	2044

Table **11.4.15-1**

11.4.16 Type HC 090 – Servo hypoid gearboxes

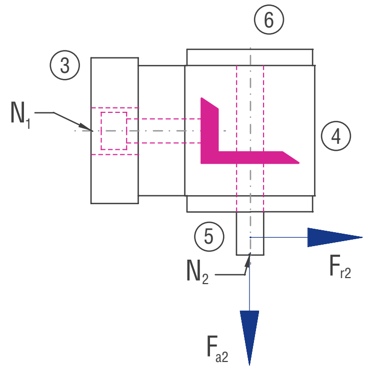


Characteristics

Characteristic	Standard	Option
Toothing	Spiral-toothed, hardened bevel gears	See chapter 11.4.2
Gear ratio	8:1 to 15:1	
Housing / Flanges	Aluminium / steel	
Threaded mounting holes	On the sides 1 and 2 and on the drive flange	See chapter 11.4.4
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 11.4.11
Protection class	IP 54	See chapter 4.5
Corrosion protection	Prime coat; layer thickness > 40 µm	See chapter 4.4.1
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 11.4.9
Lubricants	Synthetic lubricants	See chapter 11.4.9
Motor flange	Aluminium	
Coupling	Insertable, flexible claw coupling, suitable for servo-motors For motor shafts without parallel key Bellows coupling BK For motor shafts with parallel key Bellows coupling BKN	See chapter 11.4.13

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
0,3900	0,3000	0,2300	0,2200	0,1700	0,1500	0,1400	0,1300

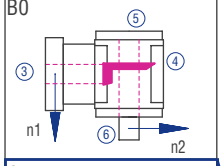
Mass ca. [kg]
3.5

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

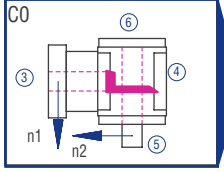
ATEK ANTRIEBSTECHNIK

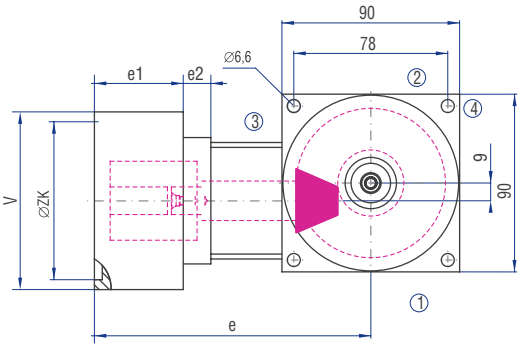
Model

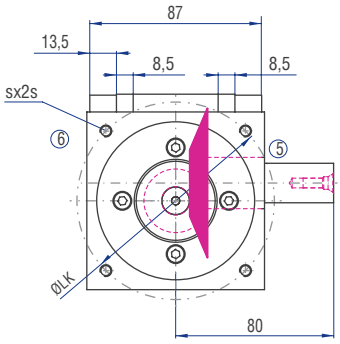
B0

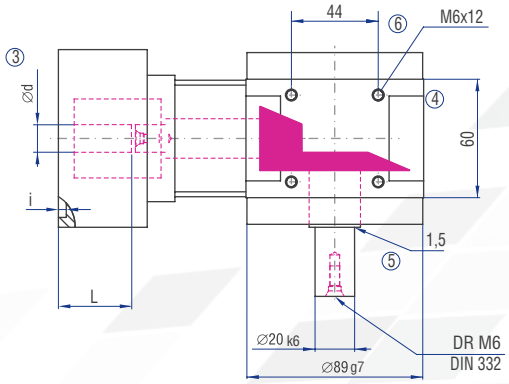


C0



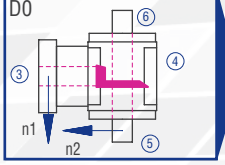


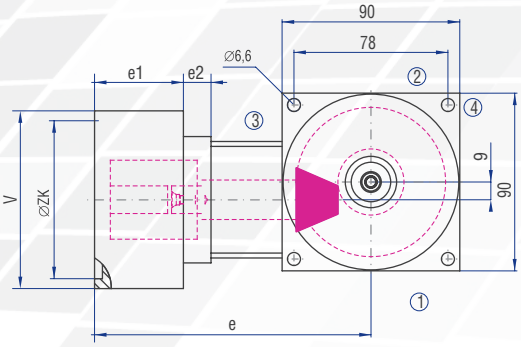


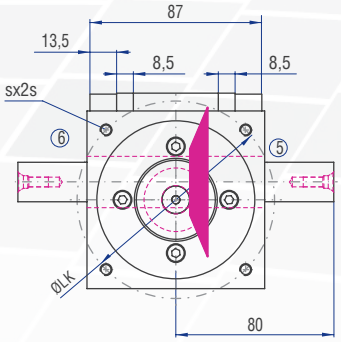


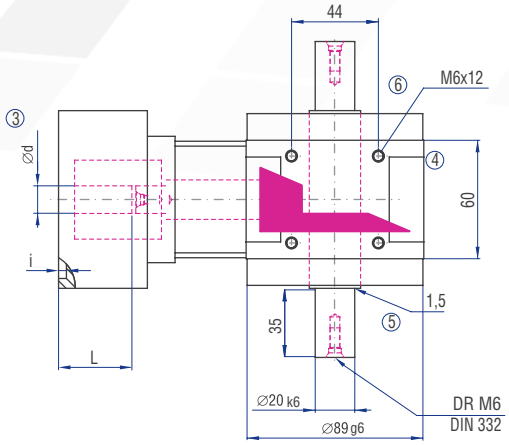
Model

D0

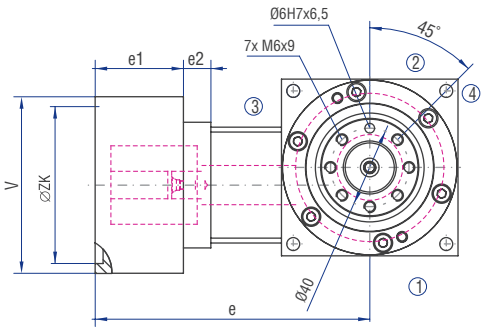


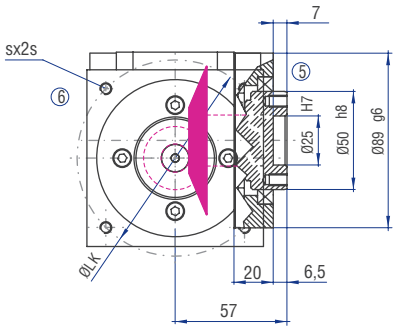


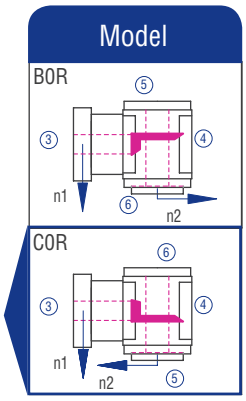


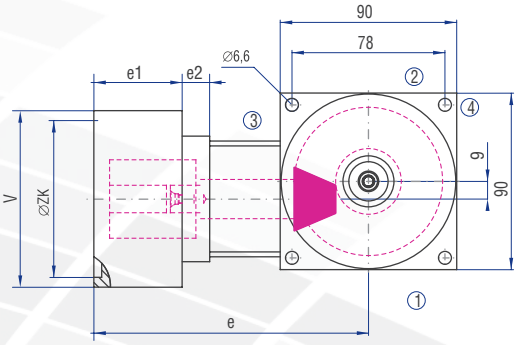


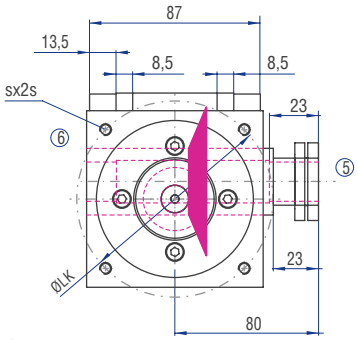
The dimensions of the Models not shown can be figured by mirroring available dimensions.

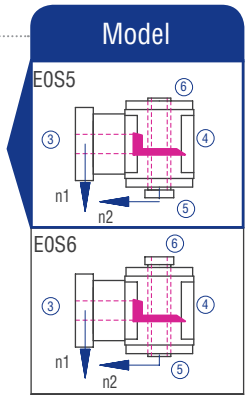


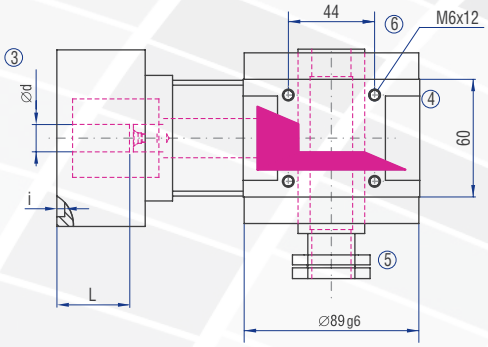


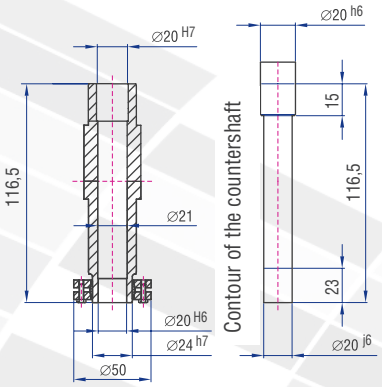






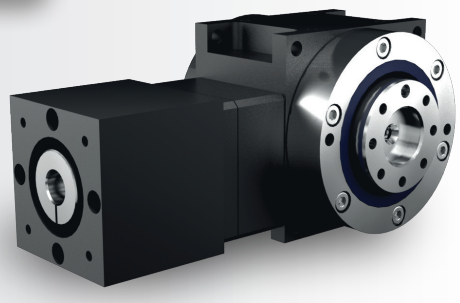






Flange no.	d min [mm]	d max [mm]	L min [mm]	L max [mm]	LK [mm]	ZK [mm]	Thread (s)	□ V [mm]	i [mm]	e [mm]	e1 [mm]	e2 [mm]
001	3	24	21	38	63	40	M4	64	3.5	140	30	29
002	3	24	21	38	63	40	M5	64	3.5	140	30	29
104	3	24	21	38	75	60	M5	70	4	140	45	14
104	5	24	22	50	75	60	M5	88	3.5	152	45	26
201	3	24	21	38	90	60	M5	80	4	140	45	14
301	3	24	21	38	95	50	M6	80	4	140	45	14
301	5	24	22	50	95	50	M6	88	3.5	152	45	26
401	5	24	22	50	100	80	M6	88	4	152	45	26
501	5	24	22	50	115	95	M8	100	4	152	45	26
601	5	24	22	50	130	95	M8	120	4.5	152	45	26
611	5	24	22	50	130	110	M8	115	4.5	152	45	26
701	5	24	22	50	145	110	M8	120	4.5	152	45	26
802	5	24	22	50	165	110	M10	140	5	152	45	26
950	3	24	17.5	34.5	70	40	M4	64	3.5	136.5	26.5	29
952	3	24	21	38	70	50	M5	70	4	140	45	14
954	5	24	22	50	90	70	M5	88	4	152	45	26
955	5	24	37	65	115	95	M8	100	4	167	60	26
956	5	24	40	68	145	110	M8	120	10	170	63	26
959	5	24	22	50	90	70	M6	88	4	152	45	26
963	3	24	21	38	70	50	M4	70	4	140	45	14
964	3	24	21	38	46	30	M4	64	4	140	45	14
967	3	24	21	38	100	50	M6	90	3	140	45	14
975	5	24	37	65	130	95	M8	120	4.5	167	60	26
977	5	24	29	57	100	80	M6	88	6	159	52	26
980	5	24	37	65	130	110	M8	115	4.5	167	60	26
987	5	24	37	65	100	80	M6	88	4	167	60	26

11.4.17 Type HC 115 – Servo hypoid gearboxes

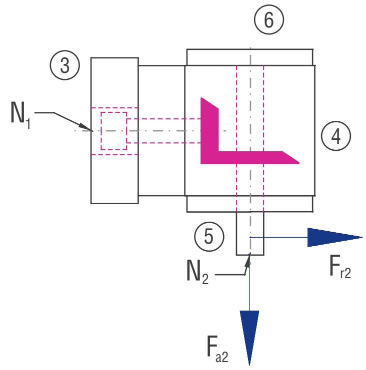


Characteristics

Characteristic	Standard	Option
Toothing	Spiral-toothed, hardened bevel gears	See chapter 11.4.2
Gear ratio	8:1 to 15:1	
Housing / Flanges	Aluminium / steel	
Threaded mounting holes	On the sides 1 and 2 and on the drive flange	See chapter 11.4.4
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 11.4.11
Protection class	IP 54	See chapter 4.5
Corrosion protection	Prime coat; layer thickness > 40 µm	See chapter 4.4.1
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 11.4.9
Lubricants	Synthetic lubricants	See chapter 11.4.9
Motor flange	Aluminium	
Coupling	Insertable, flexible claw coupling, suitable for servo-motors For motor shafts without parallel key Bellows coupling BK For motor shafts with parallel key Bellows coupling BKN	See chapter 11.4.13

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]
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)

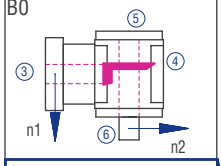
Inertia moment [kgcm^2]							
3:1	4:1	5:1	6:1	8:1	10:1	12:1	15:1
0,9800	0,7300	0,5800	0,5200	0,4300	0,3800	0,3600	0,3400

Mass ca. [kg]
5.5

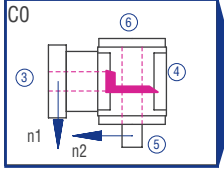
The mass of the gearbox may deviate depending on the type and the gear ratio.

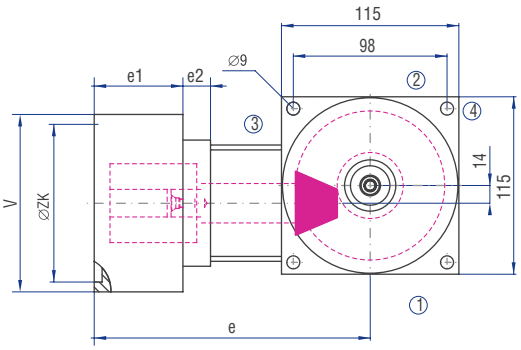
Model

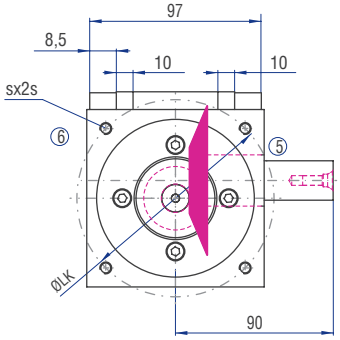
B0

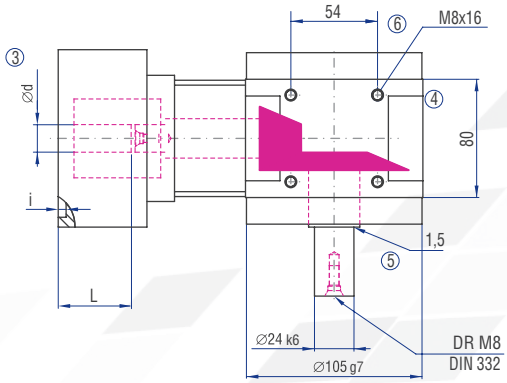


C0



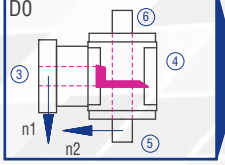


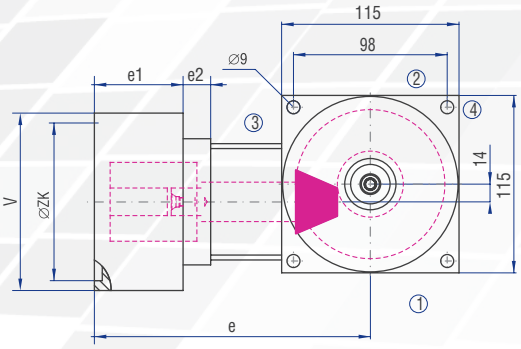


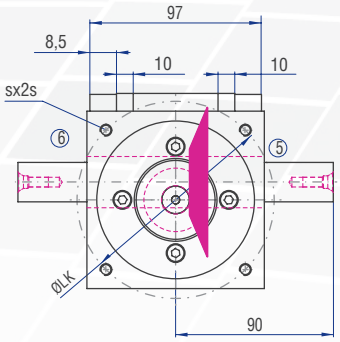


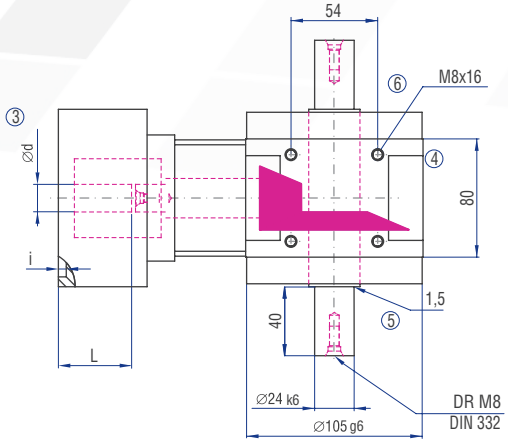
Model

D0

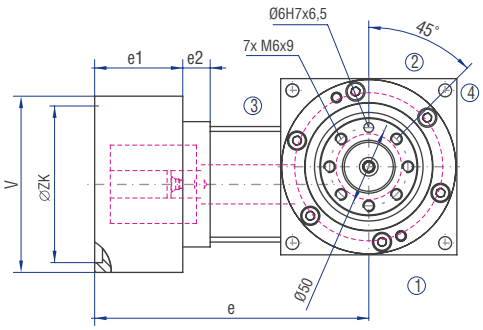


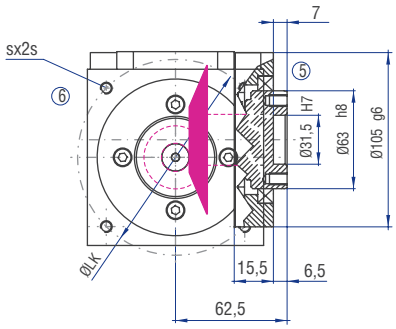


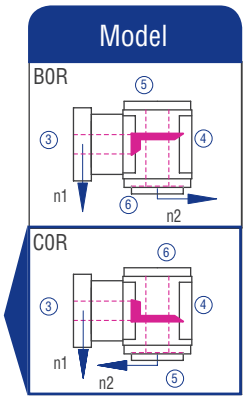


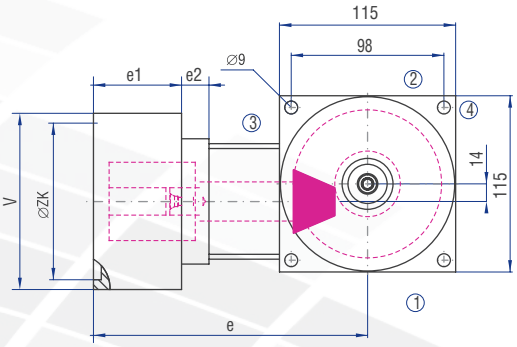


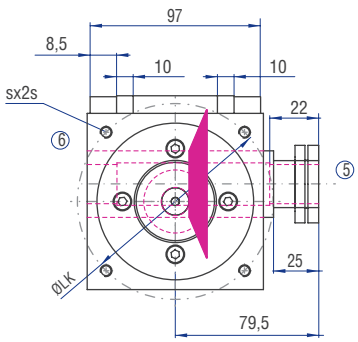
The dimensions of the Models not shown can be figured by mirroring available dimensions.

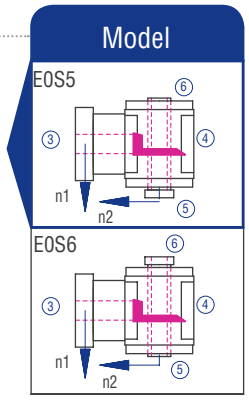


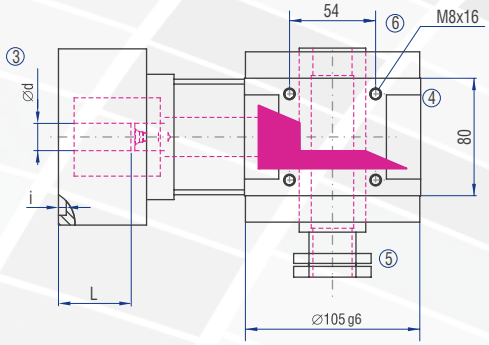


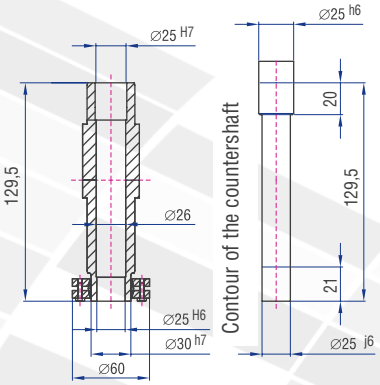






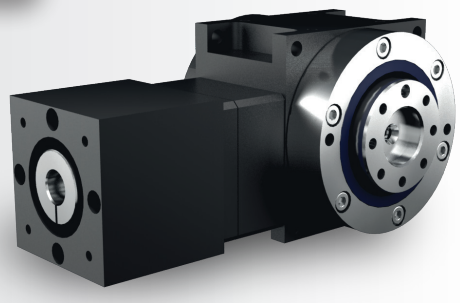






Flange no.	d min [mm]	d max [mm]	L min [mm]	L max [mm]	LK [mm]	ZK [mm]	Thread (s)	□ V [mm]	i [mm]	e [mm]	e1 [mm]	e2 [mm]
001	8	26	24	53	63	40	M4	88	3	177.5	45	46
104	8	26	24	53	75	60	M5	88	3.5	177.5	45	46
301	8	26	24	53	95	50	M6	88	3.5	177.5	45	46
301	10	30	35.5	60	95	50	M6	119	3	184.5	54	44
401	8	26	24	53	100	80	M6	88	4	177.5	45	46
401	10	30	35.5	60	100	80	M6	119	5	184.5	54	44
502	8	26	24	53	115	95	M8	100	4	177.5	45	46
502	10	30	35.5	60	115	95	M8	119	27	184.5	54	44
601	8	26	24	53	130	95	M8	120	4.5	177.5	45	46
601	10	30	35.5	60	130	95	M8	119	27	184.5	54	44
611	8	26	24	53	130	110	M8	115	4.5	177.5	45	46
611	10	30	35.5	60	130	110	M8	119	27	184.5	54	44
701	8	28	24	53	145	110	M8	120	4.5	177.5	45	46
701	10	30	35.5	60	145	110	M8	119	27	184.5	54	44
954	8	26	24	53	90	70	M5	88	4	177.5	45	46
959	8	26	24	53	90	70	M6	88	4	177.5	45	46
959	10	30	40.5	65	145	110	M8	119	32	189.5	59	44
960	10	30	35.5	60	90	70	M6	119	8	184.5	54	44
964	8	26	24	53	70	50	M4	88	4	177.5	45	46
967	10	30	40.5	65	130	110	M8	119	32	189.5	59	44
971	10	30	40.5	65	130	95	M8	119	32	189.5	59	44
972	10	30	42.5	67	100	80	M6	119	5	191.5	61	44
986	8	26	24	53	70	50	M5	88	4	177.5	45	46

11.4.18 Type HC 140 – Servo hypoid gearboxes

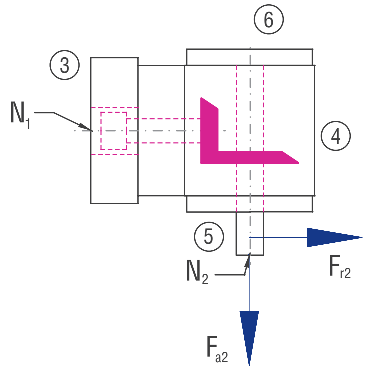


Characteristics

Characteristic	Standard	Option
Toothing	Spiral-toothed, hardened bevel gears	See chapter 11.4.2
Gear ratio	8:1 to 15:1	
Housing / Flanges	Aluminium / steel	
Threaded mounting holes	On the sides 1 and 2 and on the drive flange	See chapter 11.4.4
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 11.4.11
Protection class	IP 54	See chapter 4.5
Corrosion protection	Prime coat; layer thickness > 40 µm	See chapter 4.4.1
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 11.4.9
Lubricants	Synthetic lubricants	See chapter 11.4.9
Motor flange	Aluminium	
Coupling	Insertable, flexible claw coupling, suitable for servo-motors For motor shafts without parallel key Bellows coupling BK For motor shafts with parallel key Bellows coupling BKN	See chapter 11.4.13

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 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]
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)

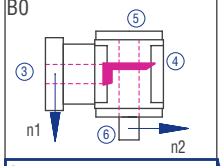
Inertia moment [kgcm^2]								Mass ca. [kg]
3:1	4:1	5:1	6:1	8:1	10:1	12:1	15:1	
2,4200	1,7700	1,4100	1,4100	1,1200	1,0000	0,8800	0,8100	9.5

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

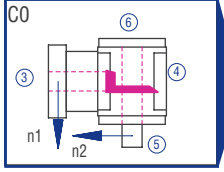
11.4.18 Type HC 140 – Servo hypoid gearboxes

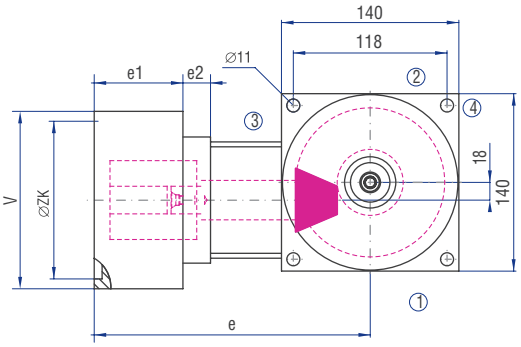
Model

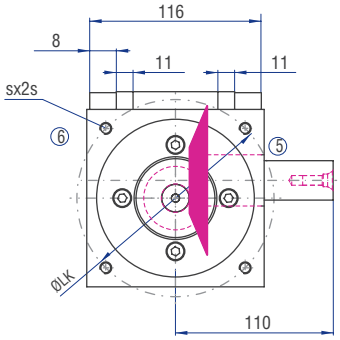
B0

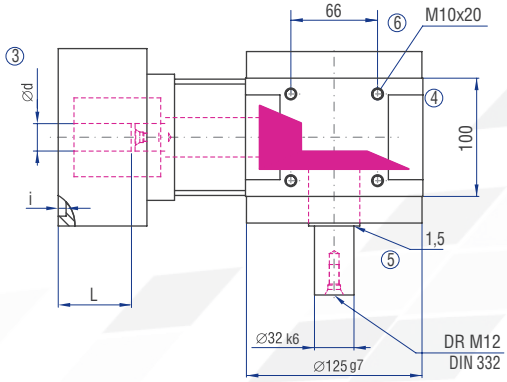


C0



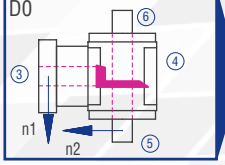


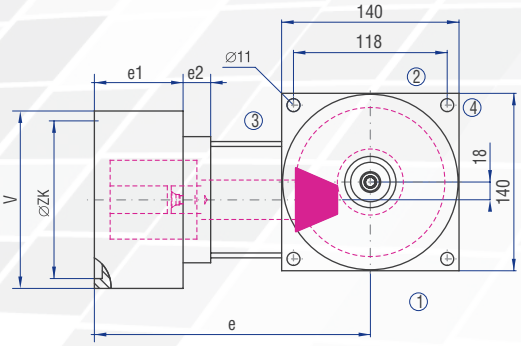


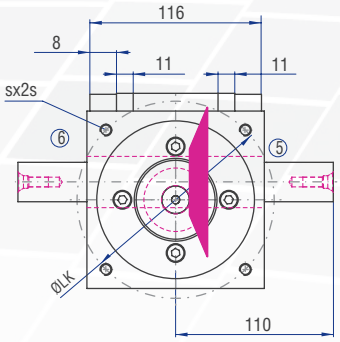


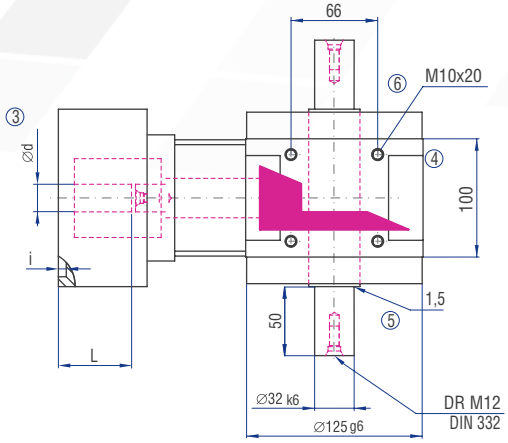
Model

D0

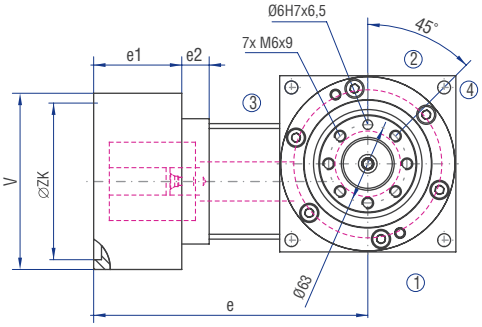


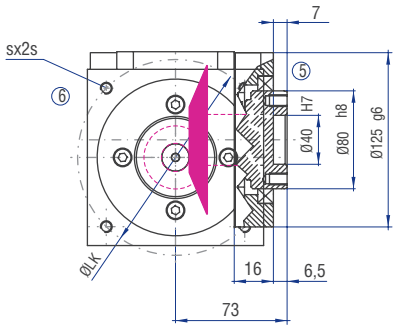


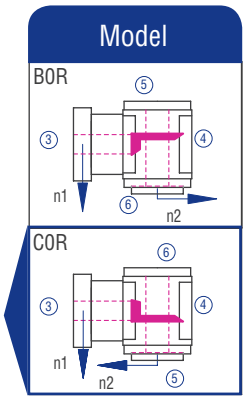


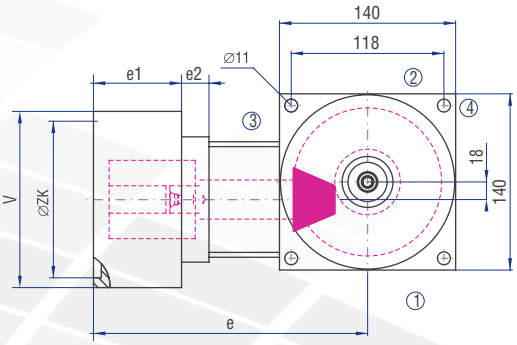


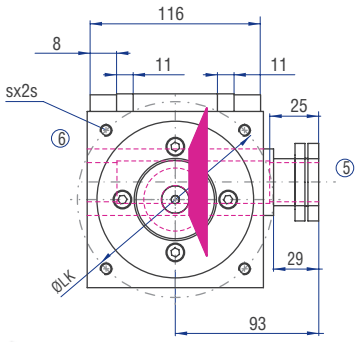
The dimensions of the Models not shown can be figured by mirroring available dimensions.

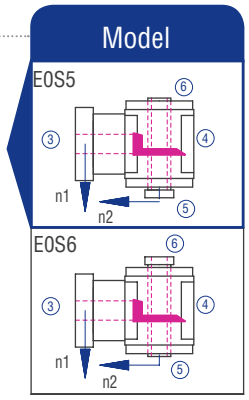


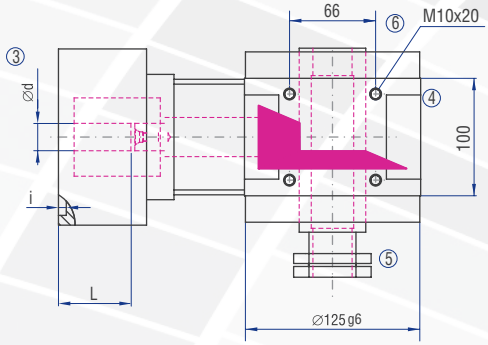


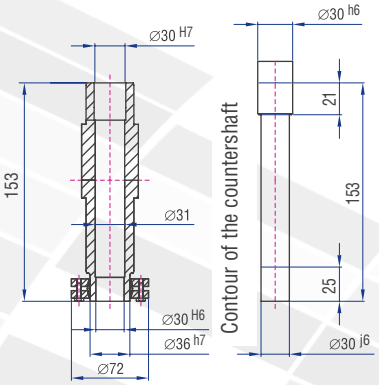






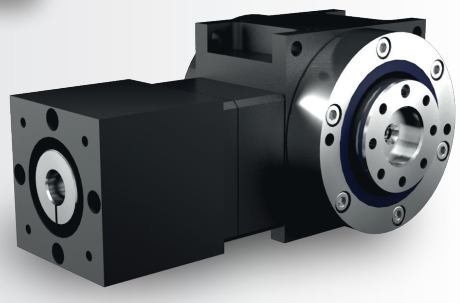






Flange no.	d min [mm]	d max [mm]	L min [mm]	L max [mm]	LK [mm]	ZK [mm]	Thread (s)	□ V [mm]	i [mm]	e [mm]	e1 [mm]	e2 [mm]
301	14	38	31.5	60	95	50	M6	119	3	200	54	50
401	14	38	31.5	60	100	80	M6	119	5	200	54	50
502	14	38	32	60	115	95	M8	137	6	200.5	61	43.5
502	14	38	31.5	60	115	95	M8	119	27	200	54	50
601	14	38	32	60	130	95	M8	137	6	200.5	61	43.5
601	14	38	31.5	60	130	95	M8	119	27	200	54	50
611	14	38	32	60	130	110	M8	137	25	200.5	61	43.5
611	14	38	31.5	60	130	110	M8	119	27	200	54	50
701	14	38	31.5	60	145	110	M8	119	27	200	54	50
802	14	38	32	60	165	110	M10	137	5	200.5	61	43.5
802	14	38	31.5	60	165	110	M10	140	27	200	54	50
811	14	38	32	60	165	130	M10	137	16	200.5	61	43.5
902	14	38	32	60	215	130	M12	200	6	200.5	61	43.5
911	14	38	32	60	215	180	M12	200	5	200.5	61	43.5
932	14	38	52	80	215	180	M12	200	17	220.5	99.5	25
950	14	38	47.5	76	145	110	M8	119	7	216	70	50
951	14	38	37	66	145	110	M8	137	32	205.5	66	43.5
960	14	38	31.5	60	90	70	M6	119	8	200	54	50
972	14	38	38.5	67	100	80	M6	119	5	207	61	50

11.4.19 Type HC 170 – Servo hypoid gearboxes

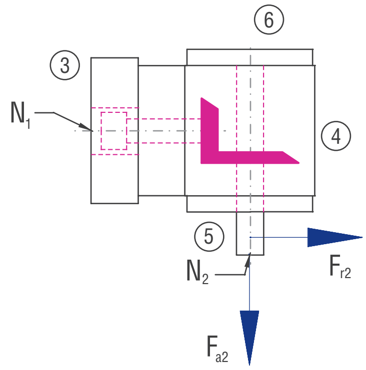


Characteristics

Characteristic	Standard	Option
Toothing	Spiral-toothed, hardened bevel gears	See chapter 11.4.2
Gear ratio	8:1 to 15:1	
Housing / Flanges	Aluminium / steel	
Threaded mounting holes	On the sides 1 and 2 and on the drive flange	See chapter 11.4.4
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 11.4.11
Protection class	IP 54	See chapter 4.5
Corrosion protection	Prime coat; layer thickness > 40 µm	See chapter 4.4.1
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 11.4.9
Lubricants	Synthetic lubricants	See chapter 11.4.9
Motor flange	Aluminium	
Coupling	Insertable, flexible claw coupling, suitable for servo-motors For motor shafts without parallel key Bellows coupling BK For motor shafts with parallel key Bellows coupling BKN	See chapter 11.4.13

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]
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 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]
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)

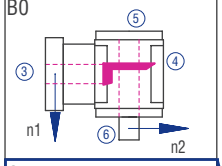
Inertia moment [$kgcm^2$]								Mass ca. [kg]
3:1	4:1	5:1	6:1	8:1	10:1	12:1	15:1	
7,1200	5,0900	4,0000	3,6500	2,8500	2,4600	2,2500	2,0700	15.5

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

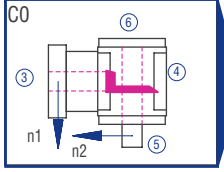
11.4.19 Type HC 170 – Servo hypoid gearboxes

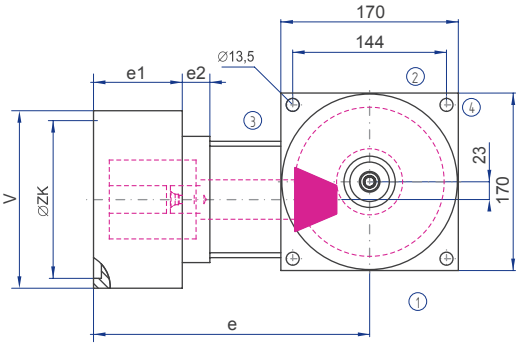
Model

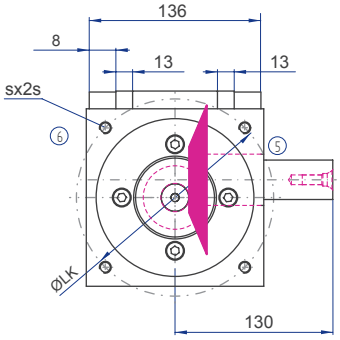
B0

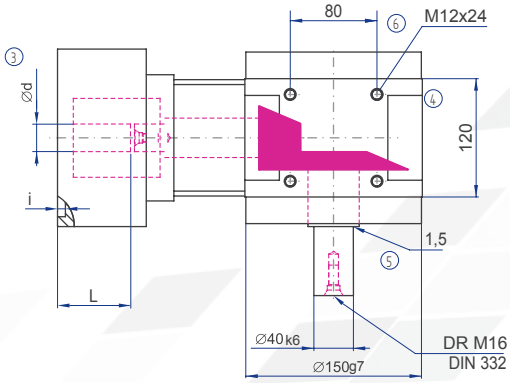


C0



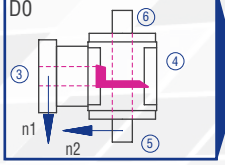


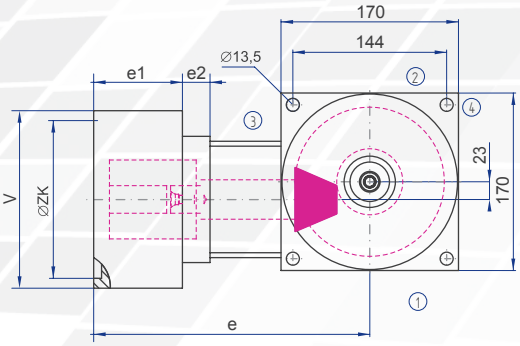


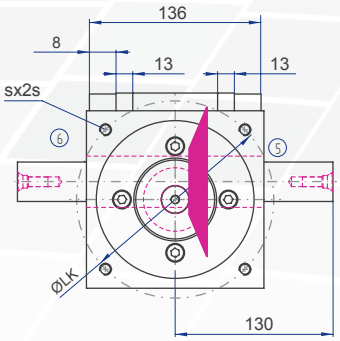


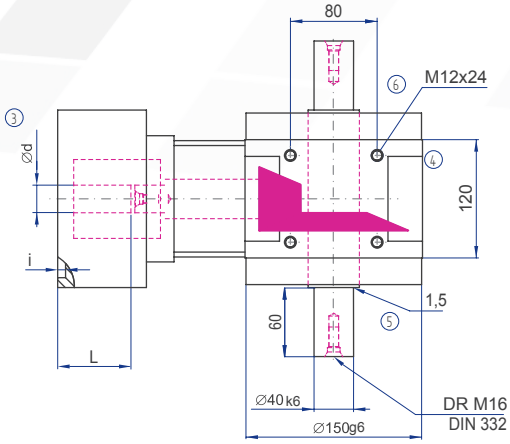
Model

D0

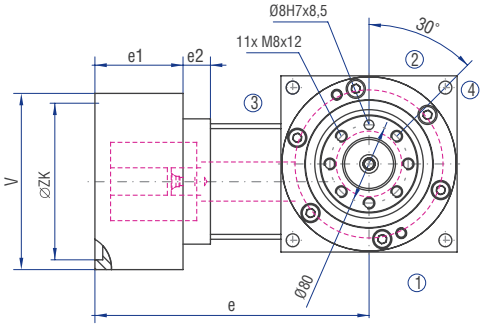


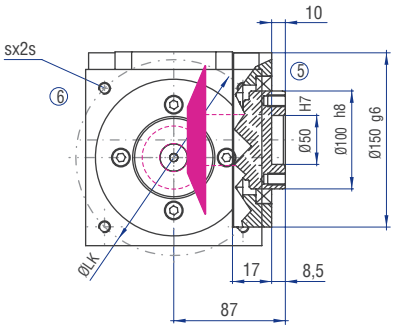


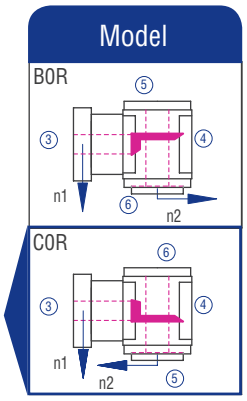


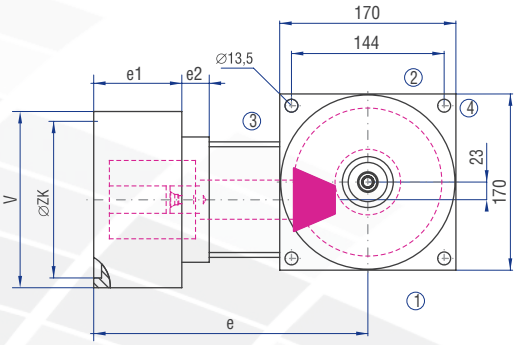


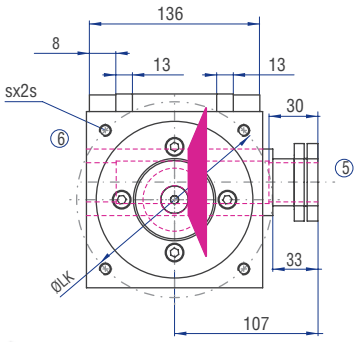
The dimensions of the Models not shown can be figured by mirroring available dimensions.

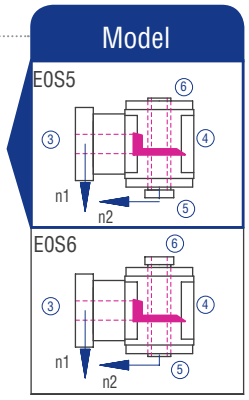


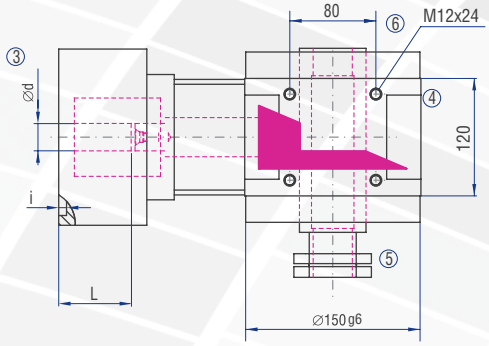


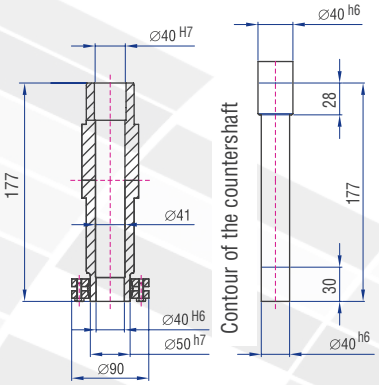






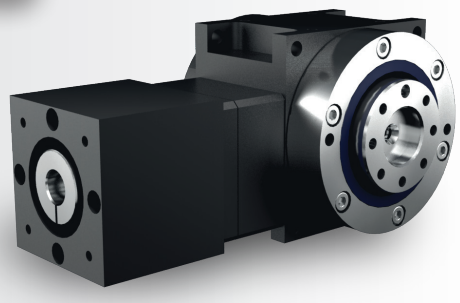






Flange no.	d min [mm]	d max [mm]	L min [mm]	L max [mm]	LK [mm]	ZK [mm]	Thread (s)	□ V [mm]	i [mm]	e [mm]	e1 [mm]	e2 [mm]
502	19	42	39	65	115	95	M8	137	6	226.5	61	53.5
601	19	42	39	65	130	95	M8	137	6	226.5	61	53.5
611	19	42	39	65	130	110	M8	137	25	226.5	61	53.5
802	19	42	39	65	165	110	M10	137	5	226.5	61	53.5
811	19	42	39	65	165	130	M10	137	16	226.5	61	53.5
811	19	42	46	80	165	130	M10	157	5	242	62	68
902	19	42	39	65	215	130	M12	200	6	226.5	61	53.5
902	19	42	46	80	215	130	M12	200	5	242	62	68
911	19	42	39	65	215	180	M12	200	5	226.5	61	53.5
912	19	42	46	80	215	180	M12	200	5	242	62	68
931	19	42	84	110	215	180	M12	200	17	271.5	106	53.5
932	19	42	77.5	103	215	180	M12	200	17	265	99.5	53.5
951	19	42	44	70	145	110	M8	137	32	231.5	66	53.5
952	19	42	46	80	200	114.3	M12	200	6	242	62	68
952	19	42	84	110	200	114.3	M12	200	6	271.5	106	53.5

11.4.20 Type HC 215 – Servo hypoid gearboxes

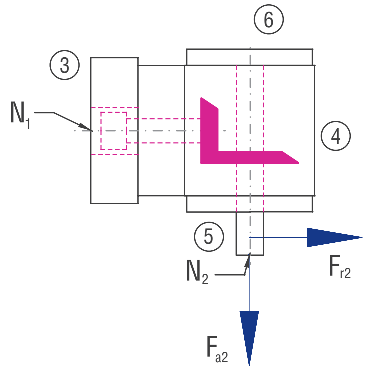


Characteristics

Characteristic	Standard	Option
Toothing	Spiral-toothed, hardened bevel gears	See chapter 11.4.2
Gear ratio	8:1 to 15:1	
Housing / Flanges	Aluminium / steel	
Threaded mounting holes	On the sides 1 and 2 and on the drive flange	See chapter 11.4.4
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 11.4.11
Protection class	IP 54	See chapter 4.5
Corrosion protection	Prime coat; layer thickness > 40 µm	See chapter 4.4.1
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 11.4.9
Lubricants	Synthetic lubricants	See chapter 11.4.9
Motor flange	Aluminium	
Coupling	Insertable, flexible claw coupling, suitable for servo-motors For motor shafts without parallel key Bellows coupling BK For motor shafts with parallel key Bellows coupling BKN	See chapter 11.4.13

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]
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)

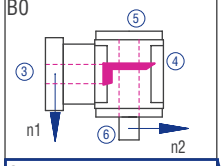
Inertia moment [kgcm²]							
3:1	4:1	5:1	6:1	8:1	10:1	12:1	15:1
26,9600	17,4400	13,5300	12,2500	8,9500	7,3800	6,4700	5,7600

Mass ca. [kg]
32.5

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

Model

B0



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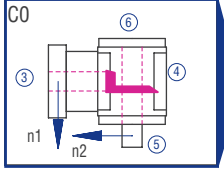
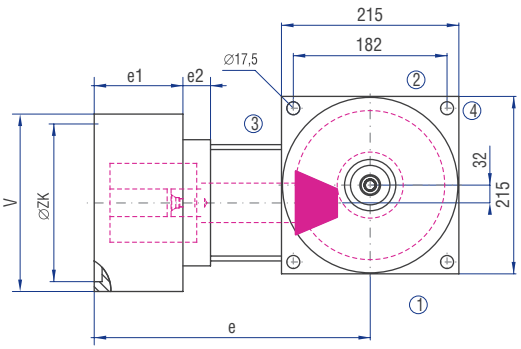
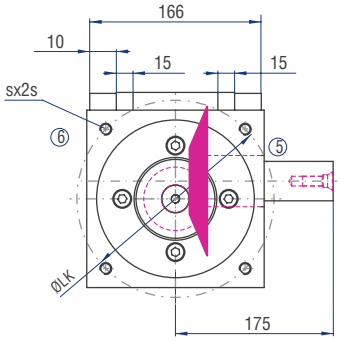
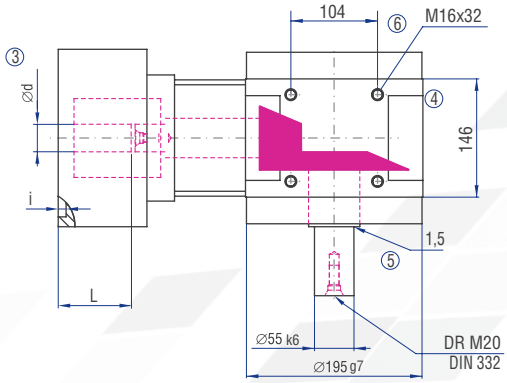


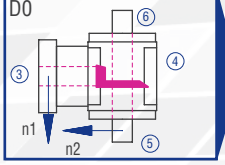


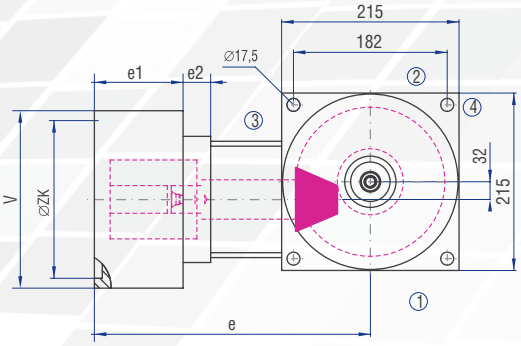


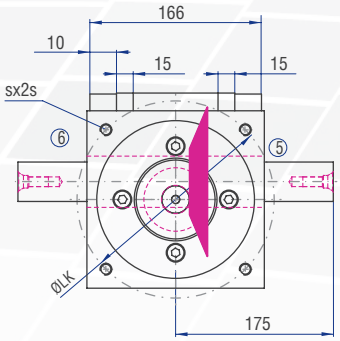


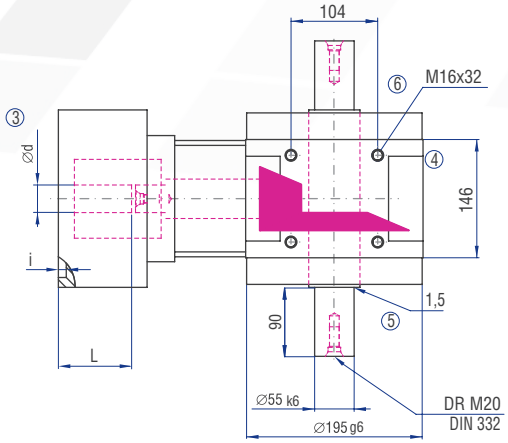
Model

D0

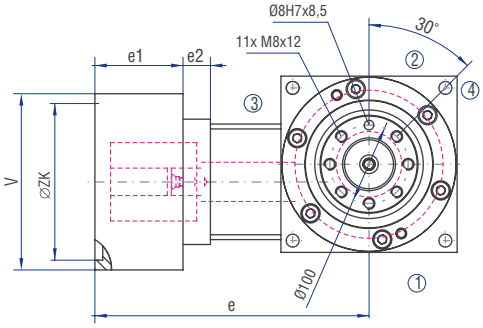


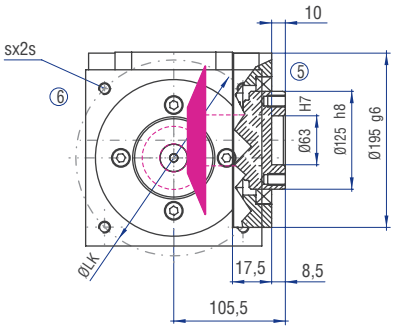


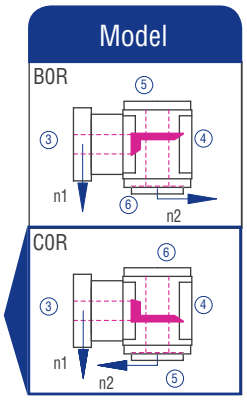


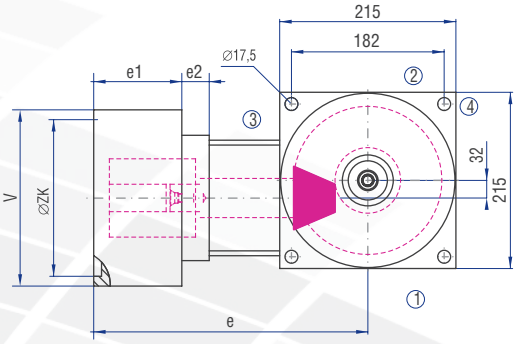


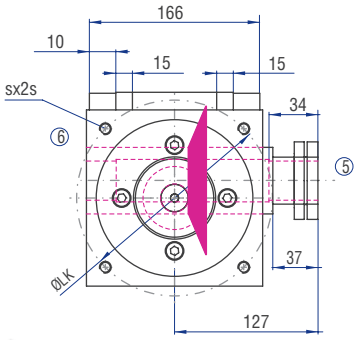
The dimensions of the Models not shown can be figured by mirroring available dimensions.

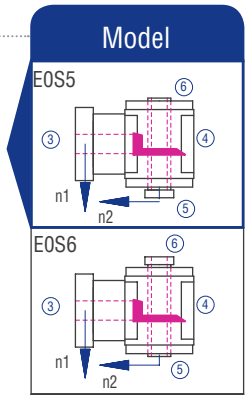


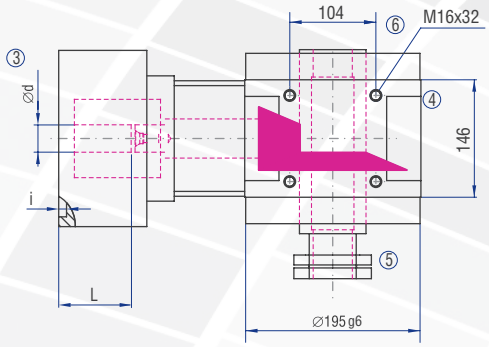


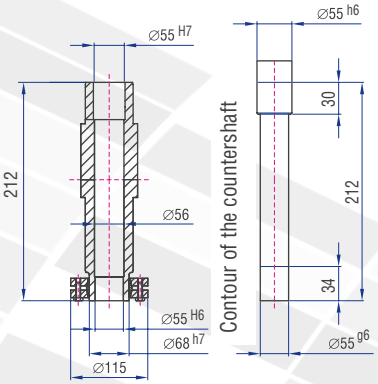






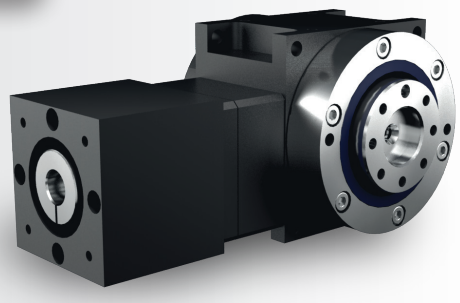






Flange no.	d min [mm]	d max [mm]	L min [mm]	L max [mm]	LK [mm]	ZK [mm]	Thread (s)	□ V [mm]	i [mm]	e [mm]	e1 [mm]	e2 [mm]
811	24	60	44.5	82	165	130	M10	198	5	280.5	76	59
902	24	60	44.5	82	215	130	M12	198	5	280.5	76	59
913	24	60	44.5	82	215	180	M12	198	4.5	280.5	76	59
952	24	60	56.5	94	200	114.3	M12	198	10	292.5	88	59
960	24	60	72.5	110	300	250	M16	264	7	308.5	141	22
961	24	60	56.5	94	265	230	M12	264	6	292.5	88	59
963	24	60	79.5	117	215	180	M12	198	4.5	315.5	111	59

11.4.21 Type HC 260 – Servo hypoid gearboxes

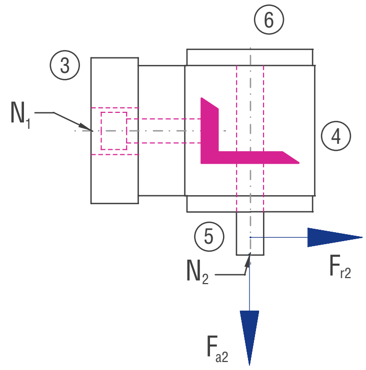


Characteristics

Characteristic	Standard	Option
Toothing	Spiral-toothed, hardened bevel gears	See chapter 11.4.2
Gear ratio	8:1 to 15:1	
Housing / Flanges	Aluminium / steel	
Threaded mounting holes	On the sides 1 and 2 and on the drive flange	See chapter 11.4.4
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 11.4.11
Protection class	IP 54	See chapter 4.5
Corrosion protection	Prime coat; layer thickness > 40 µm	See chapter 4.4.1
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 11.4.9
Lubricants	Synthetic lubricants	See chapter 11.4.9
Motor flange	Aluminium	
Coupling	Insertable, flexible claw coupling, suitable for servo-motors For motor shafts without parallel key Bellows coupling BK For motor shafts with parallel key Bellows coupling BKN	See chapter 11.4.13

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 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]
22500	11250	22500	11250	22500	11250	22500	11250	22500	11250	22500	11250	22500	11250	22500	11250

Gearbox inertia moments/mass

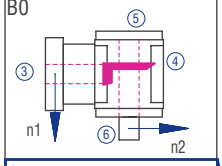
Inertia moment J_1 related to the fast-rotating shaft (N_1)

Inertia moment [$kgcm^2$]								Mass ca. [kg]
3:1	4:1	5:1	6:1	8:1	10:1	12:1	15:1	
91,4700	62,4300	44,2900	39,5500	27,0700	21,4300	18,1400	15,5300	60

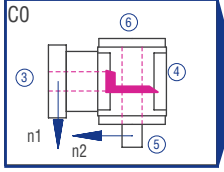
The mass of the gearbox may deviate depending on the type and the gear ratio.

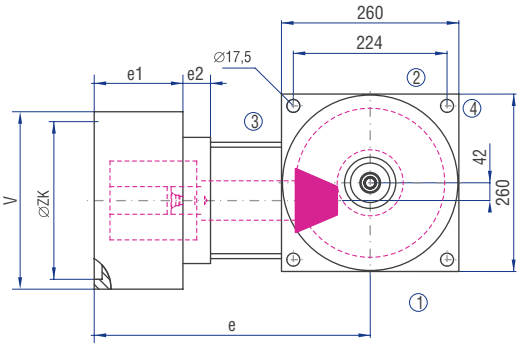
Model

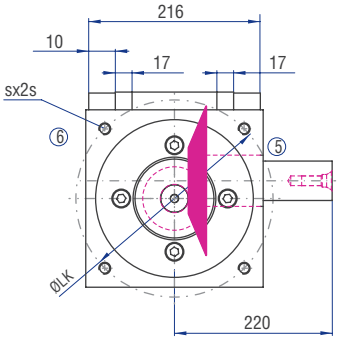
B0

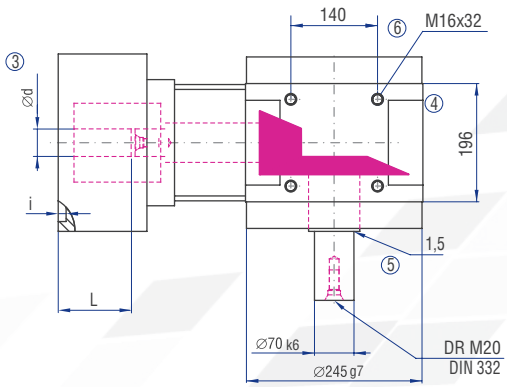


C0



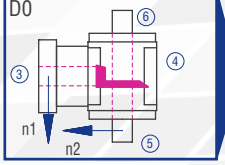


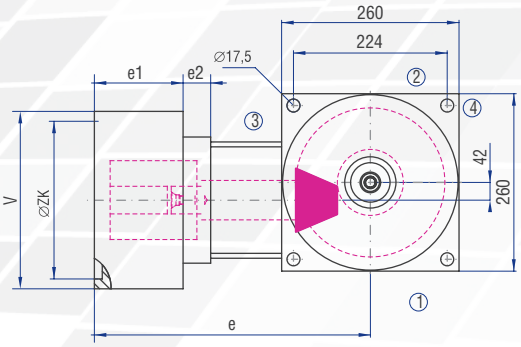


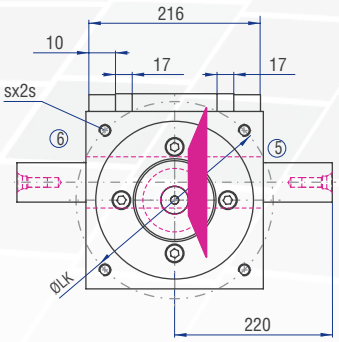


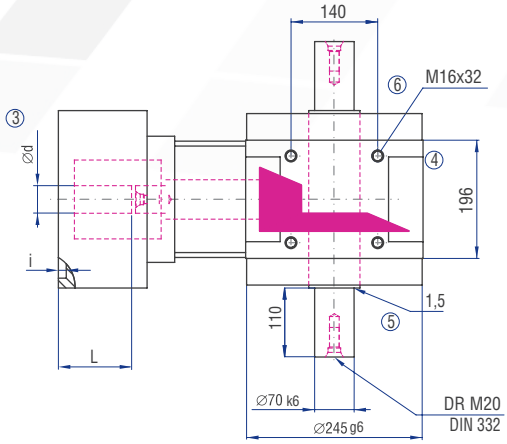
Model

D0

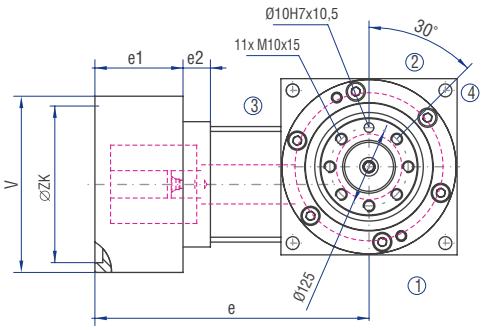


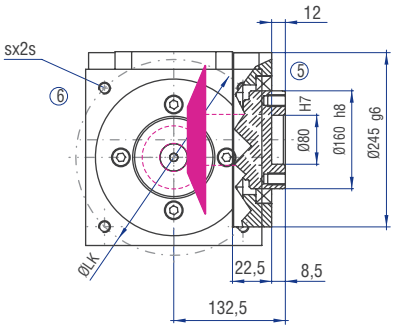


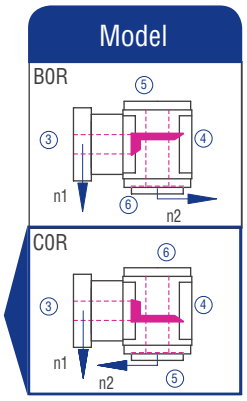


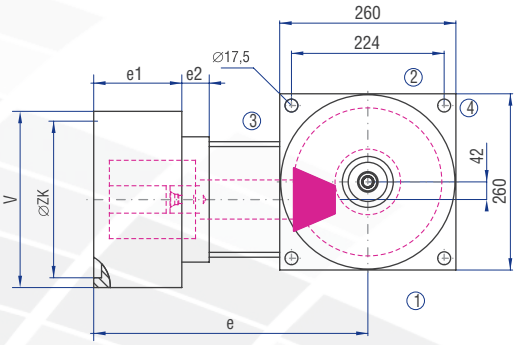


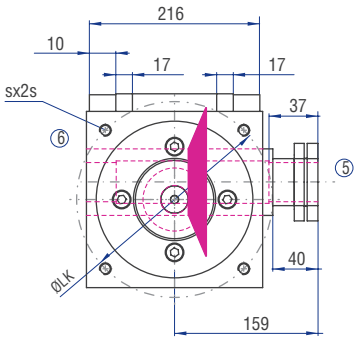
The dimensions of the Models not shown can be figured by mirroring available dimensions.

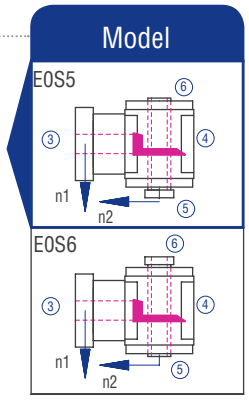


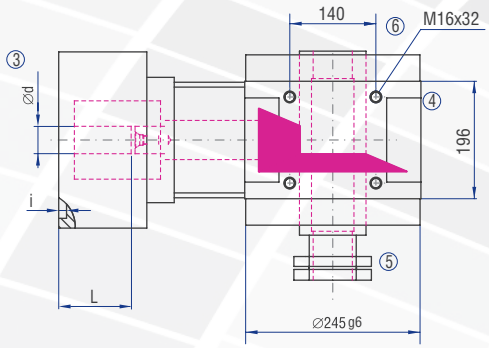


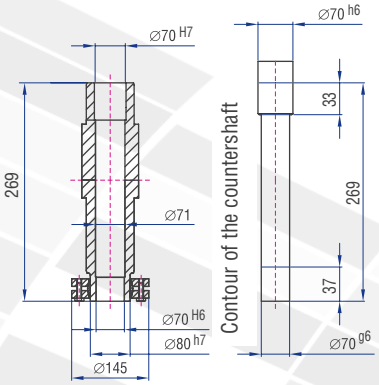












Flange no.	d min [mm]	d max [mm]	L min [mm]	L max [mm]	LK [mm]	ZK [mm]	Thread (s)	□ V [mm]	i [mm]	e [mm]	e1 [mm]	e2 [mm]
811	24	60	44.5	75	165	130	M10	198	5	312.5	76	59.5
902	24	60	44.5	75	215	130	M12	198	5	312.5	76	59.5
913	24	60	44.5	75	215	180	M12	198	4.5	312.5	76	59.5
916	40	75	61.5	110	350	300	M16	320	12	347.5	110	60.5
952	24	60	50	87	200	114.3	M12	198	10	324.5	88	59.5
961	24	60	50	87	265	230	M12	264	6	324.5	88	59.5
962	24	60	72.5	103	300	250	M16	264	6	340.5	104	59.5
963	24	60	79.5	110	215	180	M12	198	4.5	347.5	111	59.5

11.5.1 General construction

The SC AdServo gearboxes are based on the proven worm gearboxes of the S-type series. In worm gearboxes, both shafts intersect in a defined distance (A). This centre-to-centre distance is reflected in the specification of the gearbox size. (Example: S 100 – centre-to-centre distance 100 mm)

11.5.2 Toothing

A gear set consists of worm shaft and worm gear.
The worm shaft made of carburised steel is hardened, the toothing is ground. The worm gear consists of a high-quality bronze alloy, the toothing is milled.

11.5.3 Models

Due to the modular system, different gearbox Models can be configured. The variants differ in the type of the shafts, the rotational direction of the shafts, and the support by bearings.

11.5.4 Threaded mounting holes

All sides of the gearboxes are machined. The housing surface on the side 1 and the flange surfaces on the sides 5 and 6 may be used as mounting surfaces. All flanges always have threaded mounting holes.
You have the following available ordering options:

Gearbox size	Ordering options	Threaded mounting holes are in the housing surfaces on the gearbox side	Threaded mounting holes are in the flanges on the gearbox side
040-100	1	1	5, 6
040-100	2	1, 2	5, 6
040-100	3	1, 3	5, 6
040-100	4	1, 4	5, 6
040-100	5	1, 5	5, 6
040-100	6	1, 6	5, 6

Table **11.5.4-1**

The standard version has the order code 2.
Order code example: SC 050 5:1 B0 -1.2-600/0000
Please enquire other mounting options.

11.5.5 Installation position

The installation position is defined by the gearbox side directed downwards during operation and will be indicated by the corresponding numeral. The following is an order code example with the numeral 2. Order code example: SC 050 5:1 B0 -1.2-600/0000
Principally, the gearboxes can be used in all installation positions. The technically most favourable and thus recommended installation position is the installation position 1, in which the worm shaft is horizontal and located at the bottom.
For an optimal technical design of the gearboxes, we always ask to specify the installation position.
The performance data and torques listed in the selection tables are only valid if the gearboxes are used in the installation positions 1, 5 or 6.
The values must be reduced by 10%, if the worm shaft is vertical or located at the top (installation position 3, 4 or 2).

11.5.6 Shaft designation – allocation to the gearbox sides

The worm shaft is the fast-rotating shaft.
It has the speed $\mathbf{n_1}$ and is identified by $\mathbf{N_1}$.
The slowly rotating shaft has the speed $\mathbf{n_2}$ and is identified by $\mathbf{N_2}$.
The worm gear is located on this shaft.
The gearbox sides are identified by the numerals 1 to 6.
For the allocation to the gearbox sides, please refer to the following figure and the Figure 4.3.1-1 Gearbox sides.

11.5.7 Rotational direction and gear ratio

As standard, the worm gearboxes are delivered with right-handed worm gear sets. This results in the rotational directions according to Figure 11.5.6-1. In the special design, delivery with left-handed gear teeth is also possible. Please enquire this.
For the possible gear ratios, please refer to the performance tables. Principally, the actual gear ratio I_{ist} must be taken into account for the layout. In some cases, this deviates from the nominal gear ratio i.

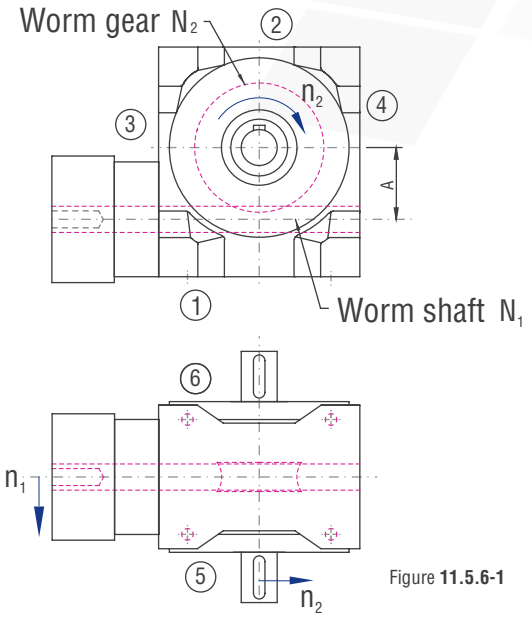


Figure **11.5.6-1**

11.5.8 Efficiency

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

Starting efficiency

The efficiency is always lower during the starting phase and in the cold operating state of the worm gearbox since the lubricating film is not formed until the sliding motion has started. Therefore a higher torque is needed. The starting efficiencies listed below are guidance values and valid for run-in gearboxes. These starting efficiencies must be taken into account for the layout.

Number of threads	Gear ratio range	Starting efficiency	Lead angle
2	26 – 15	0.56 – 0.65	10° – 12°
4	13 – 7.5	0.68 – 0.75	19° – 23°
6	5	0.74 – 0.82	28° – 32°

Table **11.5.8-1**

Operating efficiency

The tooth flanks of worm gearboxes in the as-delivered condition are not yet fully smoothed. This influence is even increased with high gear ratios. Therefore the gearboxes should be run in with approx. 50% of the nominal data, if possible, before they are operated under load. The efficiencies specified in the performance tables relate to the permissible nominal data and are guidance values for run-in gearboxes with standard sealing that have operating temperature.

11.5.9 Lubrication

Different conditions for the lubrication of the toothing and the roller bearings will arise depending on gearbox size, installation position, rotational speed and on-period. In order to ensure these optimally, different oil quantities and viscosities are used. These will be defined by ATEK based on your ordering details (rotational speed, on-period, and ambient temperature). They will be reflected in the abbreviation code of the type designation.
Example: SC 125 10:1 C0 -9.1- 200/A1

/A1 means:

	Abbreviation	Explanation	Reference
Letter	A	Oil viscosity 460	Table 11.5.9-1
Numeral	1	with venting	Table 11.5.9-2

The ATEK worm gearboxes are factory-filled with synthetic polyglycol oil and are normally maintenance-free.
Oil viscosity and venting option are dependent on the rotational speed

Operating mode: cyclic operation S1

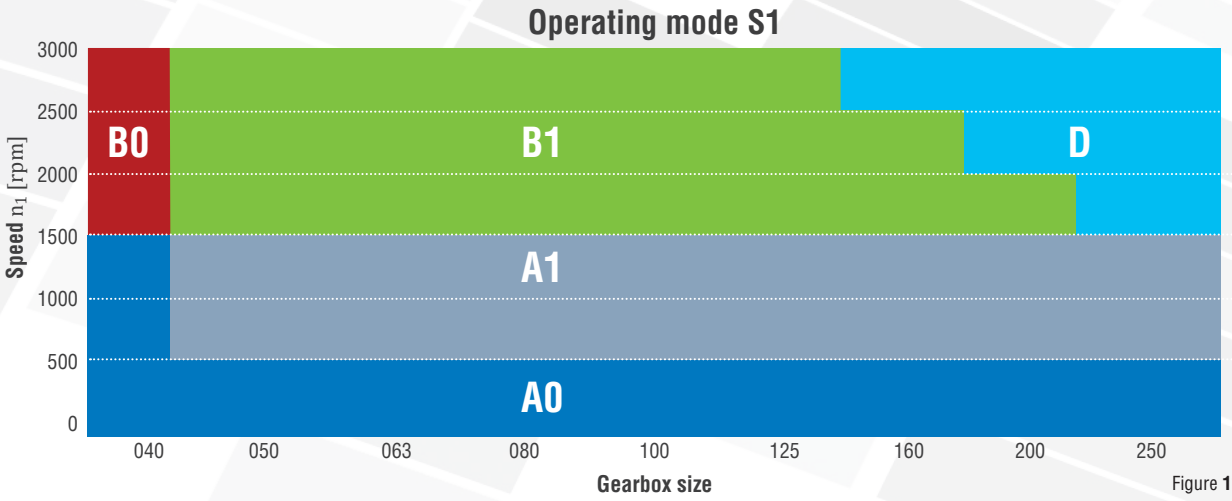


Figure **11.5.9-1**

For the meaning of the abbreviations A through E and 0, 1, please refer to the following tables.
Oil viscosity table

Letter	Viscosity
A	460
B	220
C	not available
D	Injection lubrication
F	Fluid grease

Table **11.5.9-1**

Injection lubrication may be necessary in case of high rotational speeds and large gearboxes. In case of very low rotational speeds, lubrication by fluid grease is also possible. At operating temperatures over 50°C, high pressure will develop through air expansion in the gearbox. Then a permanent pressure compensation must be ensured. To this end, the use of a vent filter is prescribed.

Numeral	Vent filter
0	No
1	Yes

Table **11.5.9-2**

11.5.10 Vent filter

If venting is required 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. The position will be specified in the order documents. Please refer to the table below for the position of the filter.
Here, E4, for example, means: Venting on side 4.

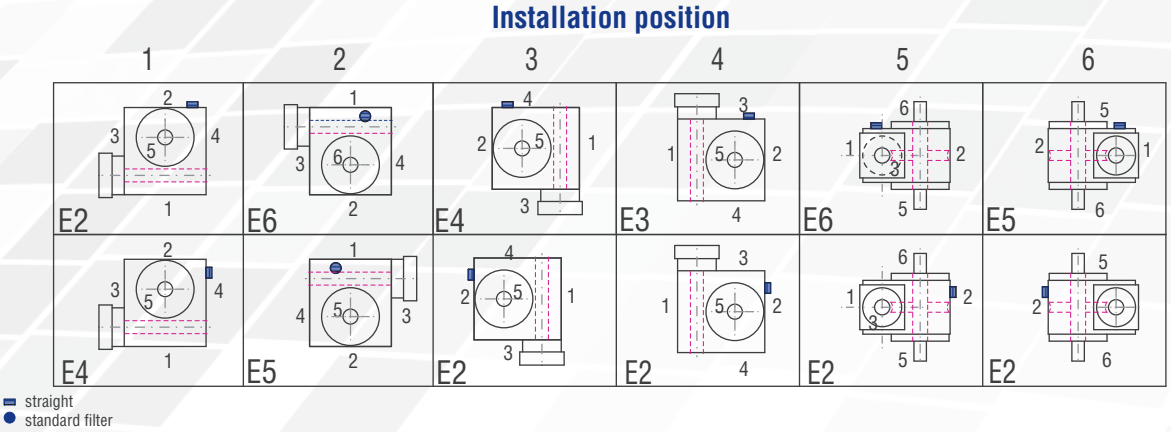


Figure **11.5.10-1**

11.5.11 Low-backlash construction

For optimal 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 ($\mathbf{N_1}$) has been fixed. A force of around 2% of the nominal torque is applied to the output shaft ($\mathbf{N_2}$) 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

All ATEK worm gearboxes can be delivered as low-backlash types. The following values can be set with standard gear sets for the different gearbox sizes:

Ordering option	Gear set	040 – 125
/0000	Standard	<=30 arcmin
/S2	Standard	<=10 arcmin
/S1	Standard	<=6 arcmin
/S0	Special gear set	<=3–6 arcmin

Table **11.5.11-1**

Abbreviation: u.r. – upon request

11.5.12 Connection of drive shaft to coupling

For torque transmission, a zero-play coupling is located on the drive shaft.

11.5.13 Coupling

Two congruent coupling halves are positively connected by means of a plastic toothed ring under pretensioning. In case of extreme peak tensions and impact loads (emergency shut-off), a damping action is achieved through a slight distortion in the elastic range. The coupling is axially insertable and compensates angle errors as well as misalignments in the radial and axial direction. A later changeover to another motor is easily possible. The motor-side coupling hub is available in the following variants:

KN	KNN	SN
Clamping hub	Clamping hub with groove	Tension ring hub
For motor shafts without parallel key	For motor shafts with parallel key	For motor shafts without parallel key

Depending on the variant KN or KNN/SN, different torques can be transmitted.

Design of the coupling

Due to the dynamic characteristics of the servo-motors, the permissible acceleration torque and the emergency-stop torque must be considered when designing the servo gearboxes. The correct coupling hub can be selected by means of the table below on the basis of the maximum permissible torques on the motor shaft, acceleration torques (T_{1B}) and emergency-stop torques (T_{1Not}).

Coupling Size	Hub	Coupling torques allowed [Nm]	Motor shaft diameter [mm]										
			9	11	14	16	19	24	28	32	38	42	45
K14	KN	T_{1B} [Nm]	5.3	5.6	6.1	6.5							
		T_{1NOT} [Nm]	7	9	13	15							
	KNN/SN	T_{1B} [Nm]	10	10	10	10							
		T_{1NOT} [Nm]	22	25	25	25							
K 19	KN	T_{1B} [Nm]	17	17	17	17	17	17					
		T_{1NOT} [Nm]	30	30	32	32	34	34					
	KNN/SN	T_{1B} [Nm]		17	17	17	17						
		T_{1NOT} [Nm]		30	32	34	34						
K 24	KN	T_{1B} [Nm]		35	36	39	39	43	46				
		T_{1NOT} [Nm]		45	45	50	60	65	70				
	KNN/SN	T_{1B} [Nm]		48	48	48	48	48	48				
		T_{1NOT} [Nm]			80	100	120	120	120				
K 28	KN	T_{1B} [Nm]			80	81	85	91	97	102	109		
		T_{1NOT} [Nm]			80	100	130	140	148	156	167		
	KNN/SN	T_{1B} [Nm]				128	128	128	128	128	128		
		T_{1NOT} [Nm]				140	240	240	240	240	240		
K 38	KN	T_{1B} [Nm]				94	98	104	109	113	122	126	130
		T_{1NOT} [Nm]				120	125	130	136	142	152	158	164
	KNN/SN	T_{1B} [Nm]						260	260	260	260	260	260
		T_{1NOT} [Nm]						500	500	500	500	500	500

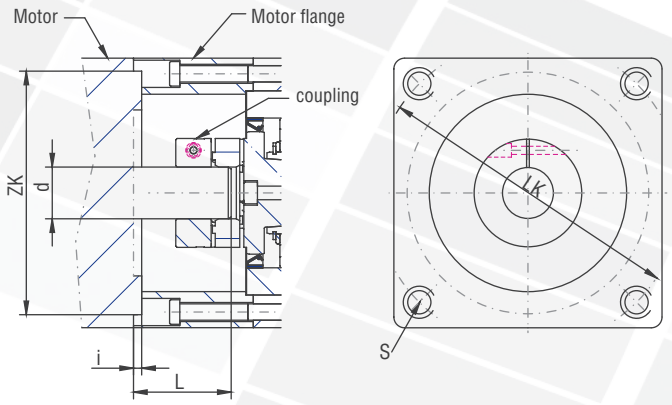
Table **11.5.13-1**

11.5.14 Motor mounting

The servo-motor will be bolted to the motor flange of the gearbox on side 3. The flange number of the motor flange for the respective gearbox size is to be determined in Table 11.5.14-1.

Motor flange

ZK: Diameter of centring circle
LK: Diameter of pitch circles
L: Length of motor shaft
d: Diameter of motor shaft
i: Centring height
s: Thread



The values for the centring height (i) and the thread sizes (s) can be found on the respective pages.

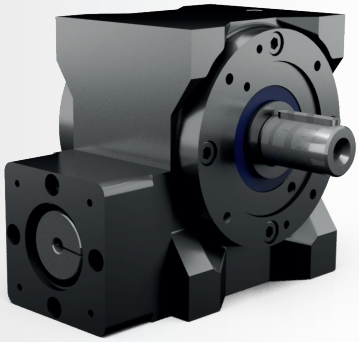
The values for the centring height (i) and the thread sizes (s) can be found on the respective pages.
Fitting dimensions of the servo-motor – gearbox size/flange no. (selection)

d [mm] less than or equal to	L [mm]	LK [mm]	ZK [mm]	Gearbox size	Flange no.
11	23	63	40	040	002
	23	63	40	040	001
	23	75	60	040	102
	23	90	60	040	202
14	30	75	60	040	104
	30	95	50	040	301
	30	90	60	040	201
	30	75	60	040	103
	30	115	95	040	501
	30	100	80	040	401
19	40	165	110	040	802
	40	130	95	040	601
	40	130	110	040	611
	40	145	110	040	701
	40	165	110	050	802
	40	130	95	050	601
	40	95	50	050	301
	40	130	110	050	611
	40	90	60	050	201
	40	75	60	050	103
	40	115	95	050	501
	40	145	110	050	701
	40	100	80	050	401
	40	165	110	063	802
	40	130	95	063	601
	40	95	50	063	301
	40	130	110	063	611
	40	90	60	063	201
	40	75	60	063	103
	40	115	95	063	501
	40	145	110	063	701
	40	100	80	063	401
24	50	165	130	050	811
	50	165	130	063	811
	50	165	110	080	802
	50	165	130	080	811
	50	130	95	080	601
	50	95	50	080	301
	50	130	110	080	611
	50	90	60	080	201
	50	75	60	080	103
	50	115	95	080	501
	50	145	110	080	701
	50	100	80	080	401
32	60	100	80	080	403
	60	130	110	080	616
	60	215	130	080	902
	60	115	95	080	502
	60	215	180	080	911
	60	165	110	100	802
	60	165	130	100	811
	60	130	95	100	601
	60	130	110	100	611
	60	145	110	100	701
	60	100	80	100	403
	60	130	110	100	616
	60	215	130	100	902
	60	115	95	100	502
	60	215	180	100	911
38	80	215	180	080	932

Table **11.5.14-1**

11.5.15 Features

Gear ratios: i = 5:1 to 26:1 (i > 26 upon request)
Maximum acceleration torques up to T_{2B} = 1100 Nm
5 gearbox sizes with 040 to 100 mm centre-to-centre distance
Optimised efficiency
Minimised circumferential backlash (optional)
Worm gearboxes with square flange, suitable for fitting servo-motors
Zero-play three-piece claw coupling



11.5.15.1 Models

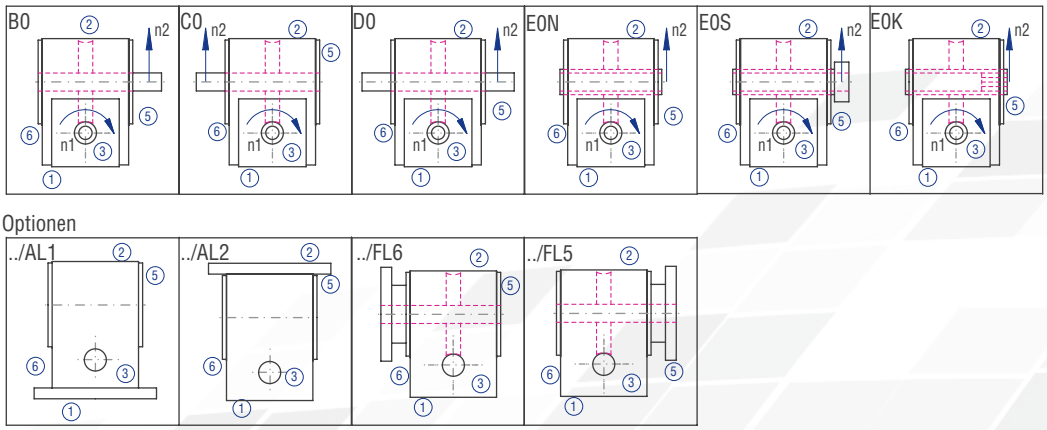


Figure **11.5.15-1; Models**

11.5.15.2 Gearbox sides

The example shows the Model B0

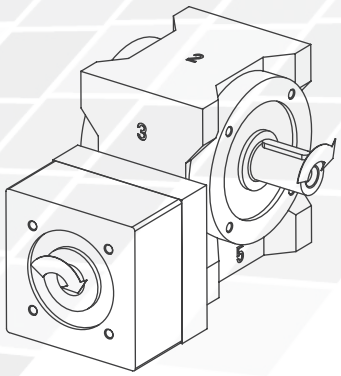


Figure **11.5.15-3; Gearbox sides**

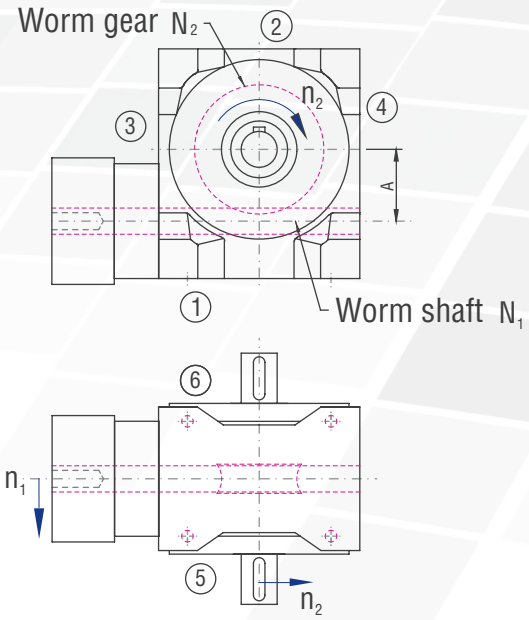


Figure **11.5.15-2; Shaft designations**

11.5.15.3 Order code

The order code reflects the customer specifications. Example:

Type	Size	Gear ratio	Model	Fixing side	Installation position	Speed n_2	Design
SC	050	5:1	B0-	1.	1-	600	/0000
Description	Size; Table 11.5.15-1	Table 11.5.15-1	Figure 11.5.15-1	Side on which fixing is made; Table 11.5.4-1	Side directed downwards; Figure 4.3.1-1 Gearbox sides	Slowly rotating shaft Table 11.5.15-1	Will be determined by ATEK
	V080-		/	14 x 30	No. 301		KN
	Flange			Motor shaft Ø x length	Flange no.		See chapter “Coupling”

11.5.15.4 Overview of performance data

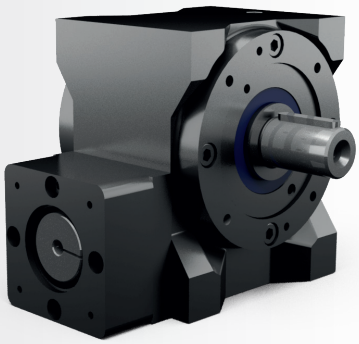
The performance data and torques listed in the selection tables are only valid if the gearboxes are used in the installation positions 1, 5 or 6. If the worm shaft is vertical or located at the top (installation position 3, 4 or 2), 90% of the values specified must be expected.
Please enquire other gear ratios.

				040	050	063	080	100
i[-]	n_1 [1/min]	i_{ist}	n_2 [1/min]	T_{2N} [Nm]	T_{2N} [Nm]	T_{2N} [Nm]	T_{2N} [Nm]	T_{2N} [Nm]
5:1	4000	29:6	828	23,0	48,0	69,0		
		30:6	800				96,0	127,0
	3000	29:6	621	28,0	60,0	89,0		
		30:6	600				132,0	173,0
	2400	29:6	497	33,0	72,0	109,0		
		30:6	480				168,0	218,0
	1500	29:6	310	37,0	83,0	129,0		
		30:6	300				204,0	263,0
7.5:1	4000	29:4	552	27,0	59,0	83,0		
		30:4	533				111,0	153,0
	3000	29:4	414	32,0	71,0	104,0		
		30:4	400				152,0	206,0
	2400	29:4	331	37,0	82,0	125,0		
		30:4	320				192,0	258,0
	1500	29:4	207	41,0	94,0	146,0		
		30:4	200				233,0	311,0
10:1	4000	38:4	421		70,0			
		39:4	410	32,0		101,0		
		40:4	400				132,0	195,0
	3000	38:4	316		83,0			
		39:4	308	37,0		124,0		
		40:4	300				177,0	257,0
	2400	38:4	253		97,0			
		39:4	246	42,0		148,0		
		40:4	240				222,0	318,0
	1500	38:4	158		110,0			
		39:4	154	48,0		171,0		
		40:4	150				267,0	380,0
13:1	4000	51:4	314		54,0	123,0		
		52:4	308	30,0				237,0
		53:4	302				163,0	
	3000	51:4	235		56,0	128,0		
		52:4	231	31,0				304,0
		53:4	226				170,0	
	2400	51:4	188		58,0	133,0		
		52:4	185	32,0				371,0
		53:4	181				177,0	
	1500	51:4	118		60,0	138,0		
		52:4	115	33,0				438,0
		53:4	113				184,0	
15:1	4000	29:2	276	30,0	62,0	96,0		
		30:2	267				130,0	186,0
	3000	29:2	207	35,0	76,0	119,0		
		30:2	200				175,0	248,0
	2400	29:2	166	40,0	91,0	142,0		
		30:2	160				221,0	309,0
	1500	29:2	103	44,0	105,0	166,0		
		30:2	100				266,0	371,0
20:1	4000	38:2	211		72,0			
		39:2	205	36,0		116,0		
		40:2	200				153,0	236,0
	3000	38:2	158		85,0			
		39:2	154	41,0		141,0		
		40:2	150				203,0	308,0
	2400	38:2	126		98,0			
		39:2	123	46,0		166,0		
		40:2	120				253,0	380,0
	1500	38:2	79		111,0			
		39:2	77	51,0		190,0		
		40:2	75				303,0	452,0
26:1	4000	51:2	157		70,0	115,0		
		52:2	154	36,0				286,0
		53:2	151				191,0	
	3000	51:2	118		73,0	135,0		
		52:2	115	37,0				361,0
		53:2	113				207,0	
	2400	51:2	94		75,0	155,0		
		52:2	92	38,0				436,0
		53:2	91				233,0	
	1500	51:2	59		77,0	175,0		
		52:2	58	39,0				511,0
		53:2	57				239,0	

	040	050	063	080	100
T_{2B} (S5) [Nm]	53	125	198	360	850
T_{2Not} (S5) [Nm]	73	150	295	610	1190
N_1 max [U/min]	6000	5000	4500	4000	3000
T_{2B} (S5) [Nm]	50	112	216	408	1006
T_{2Not} (S5) [Nm]	77	152	306	625	1090
N_1 max [U/min]	6000	5500	5000	4500	3200
T_{2B} (S5) [Nm]	39	66	151	210	523
T_{2Not} (S5) [Nm]	59	100	222	321	736
N_1 max [U/min]	6000	5800	5300	4800	3500
T_{2B} (S5) [Nm]	63	145	266	530	1025
T_{2Not} (S5) [Nm]	97	195	395	826	1610
N_1 max [U/min]	6000	5000	4500	4000	3000
T_{2B} (S5) [Nm]	58	133	259	498	1112
T_{2Not} (S5) [Nm]	90	179	355	725	1440
N_1 max [U/min]	6500	5500	5000	4500	3200
T_{2B} (S5) [Nm]	45	86	195	275	683
T_{2Not} (S5) [Nm]	77	137	295	432	980
N_1 max [U/min]	6800	5800	5300	4800	3500
T_{2B} (S5) [Nm]	58	125	223	439	932
T_{2Not} (S5) [Nm]	83	167	334	695	1360
N_1 max [U/min]	6000	5000	4500	4000	3000

Table **11.5.15-1**

11.5.16 Type SC 040 – Servo worm gearboxes



Characteristics

Characteristic	Standard	Option
Toothing	Hardened and ground worm shaft / bronze worm gear	See chapter 11.5.2
Gear ratio	5:1 to 26:1	
Housing / Flanges	Grey cast iron / aluminium	
Threaded mounting holes	On gearbox side 1 and on the flanges	See chapter 11.5.4
Shaft	Material 1 C45, shaft ends greased Fit with ISO j6 tolerance with parallel keyway: according to DIN 6885 Sheet 1	See chapter 4.6.2
Hollow shaft	Material 1 C45, shafts greased Fit with ISO H7 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	< 20 arcmin	See chapter 11.5.11
Protection class	IP 54	See chapter 4.5
Corrosion protection	Prime coat; layer thickness > 40 µm	See chapter 4.4.1
Bearing life L10h	more than 15,000h	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 11.5.9
Lubricants	Synthetic lubricants	See chapter 11.5.9
Motor flange	Aluminium	See chapter 11.5.14
Coupling	Insertable, flexible claw coupling, suitable for servo-motors For smooth motor shafts clamping hub KN For smooth motor shafts tension ring hub SN For motor shafts with parallel key clamping hub with groove KNN	See chapter 11.5.13

Torques in operating mode S1

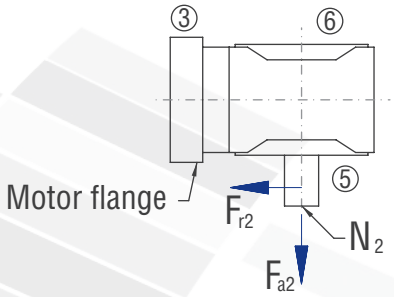
i rated	5:1		7.5:1		10:1		13:1		15:1		20:1		26:1	
i ist	29:6		29:4		39:4		52:4		29:2		39:2		52:2	
	n_2 [rpm]	T_{2N} [Nm]	n_2 [rpm]	T_{2N} [Nm]	n_2 [rpm]	T_{2N} [Nm]	n_2 [rpm]	T_{2N} [Nm]	n_2 [rpm]	T_{2N} [Nm]	n_2 [rpm]	T_{2N} [Nm]	n_2 [rpm]	T_{2N} [Nm]
4000	828	23	552	27	410	32	308	30	276	30	205	36	154	36
3000	621	28	414	32	308	37	231	31	207	35	154	41	115	37
2400	497	33	331	37	246	42	185	32	166	40	123	46	92	38
1500	310	37	207	41	154	48	115	33	103	44	77	51	58	39

Torques in operating mode S5

	i rated	5:1		7.5:1		10:1		13:1		15:1		20:1		26:1	
	T_{2N} [Nm]	41		45		43		32		48		50		38	
	n_{1max} [rpm]	6000		6000		6000		6000		6000		6500		6800	
Coupling size	d [mm]	KN	KNN/SN	KN	KNN/SN	KN	KNN/SN	KN	KNN/SN	KN	KNN/SN	KN	KNN/SN	KN	KNN/SN
K14	9	T_{2B} [Nm]	25.6	48.3	38.4	58.0	50.0	50.0	39.0	39.0	63.0	63.0	58.0	58.0	45.0	45.0
		T_{2NOT} [Nm]	33.8	73.0	50.8	83.0	68.3	77.0	59.0	59.0	97.0	97.0	90.0	90.0	77.0	77.0
	11	T_{2B} [Nm]	27.1	48.3	40.6	58.0	50.0	50.0	39.0	39.0	63.0	63.0	58.0	58.0	45.0	45.0
		T_{2NOT} [Nm]	43.5	73.0	65.3	83.0	77.0	77.0	59.0	59.0	97.0	97.0	90.0	90.0	77.0	77.0
	14	T_{2B} [Nm]	29.5	48.3	44.2	58.0	50.0	50.0	39.0	39.0	63.0	63.0	58.0	58.0	45.0	45.0
		T_{2NOT} [Nm]	62.8	73.0	83.0	83.0	77.0	77.0	59.0	59.0	97.0	97.0	90.0	90.0	77.0	77.0
	16	T_{2B} [Nm]	31.4	48.3	47.1	58.0	50.0	50.0	39.0	39.0	63.0	63.0	58.0	58.0	45.0	45.0
		T_{2NOT} [Nm]	72.5	73.0	83.0	83.0	77.0	77.0	59.0	59.0	97.0	97.0	90.0	90.0	77.0	77.0
K19	9	T_{2B} [Nm]	53.0		58.0		50.0		39.0		63.0		58.0		45.0	
		T_{2NOT} [Nm]	73.0		83.0		77.0		59.0		97.0		90.0		77.0	
	11	T_{2B} [Nm]	53.0	53.0	58.0	58.0	50.0	50.0	39.0	39.0	63.0	63.0	58.0	58.0	45.0	45.0
		T_{2NOT} [Nm]	73.0	73.0	83.0	83.0	77.0	77.0	59.0	59.0	97.0	97.0	90.0	90.0	77.0	77.0
	14	T_{2B} [Nm]	53.0	53.0	58.0	58.0	50.0	50.0	39.0	39.0	63.0	63.0	58.0	58.0	45.0	45.0
		T_{2NOT} [Nm]	73.0	73.0	83.0	83.0	77.0	77.0	59.0	59.0	97.0	97.0	90.0	90.0	77.0	77.0
	16	T_{2B} [Nm]	53.0	53.0	58.0	58.0	50.0	50.0	39.0	39.0	63.0	63.0	58.0	58.0	45.0	45.0
		T_{2NOT} [Nm]	73.0	73.0	83.0	83.0	77.0	77.0	59.0	59.0	97.0	97.0	90.0	90.0	77.0	77.0
	19	T_{2B} [Nm]	53.0	53.0	58.0	58.0	50.0	50.0	39.0	39.0	63.0	63.0	58.0	58.0	45.0	45.0
		T_{2NOT} [Nm]	73.0	73.0	83.0	83.0	77.0	77.0	59.0	59.0	97.0	97.0	90.0	90.0	77.0	77.0
	24	T_{2B} [Nm]	53.0		58.0		50.0		39.0		63.0		58.0		45.0	
		T_{2NOT} [Nm]	73.0		83.0		77.0		59.0		97.0		90.0		77.0	

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

n_2 [rpm]	200		125		75		50		30		10	
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]
		0		0		0		0		0		0
< **80**	970	485	1250	625	1380	690	1600	800	1800	900	2500	1250



Gearbox inertia moments/mass

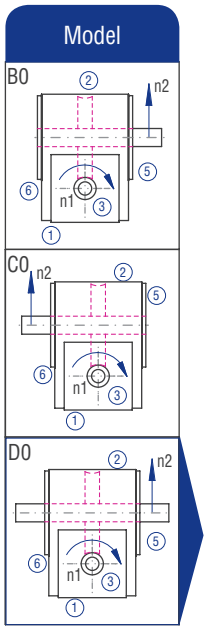
Inertia moment J_1 related to the fast-rotating shaft (N_1)

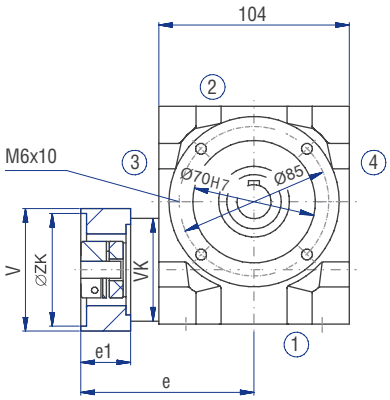
Inertia moment [kgcm²]							Mass
i rated [-]	5:1	7.5:1	10:1	13:1	15:1	20:1	26:1	ca. [kg]
J [kgcm²]	0.3307	0.2454	0.1801	0.1458	0.1943	0.1476	0.1268	7

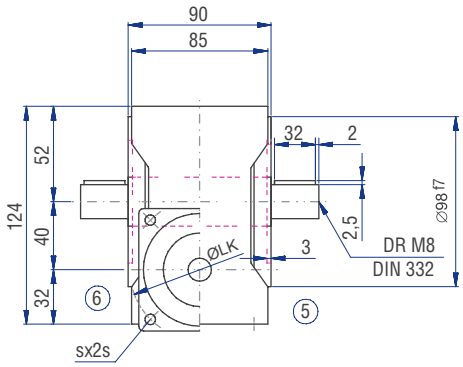
The mass of the gearbox may deviate depending on the flange size and the gear ratio.

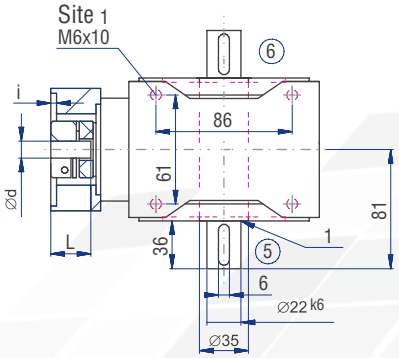
Inertia moment Coupling J

	KN	KNN	SN
	J [kgcm²]	J [kgcm²]	J [kgcm²]
K14	0.0606	0.0606	0.1446
K19	0.4229	0.4229	0.6349

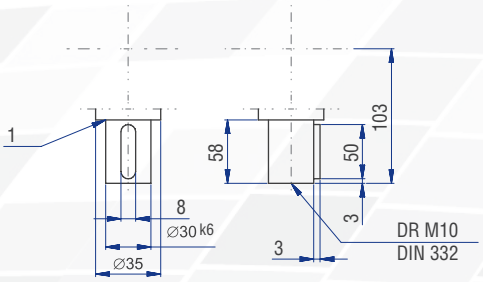


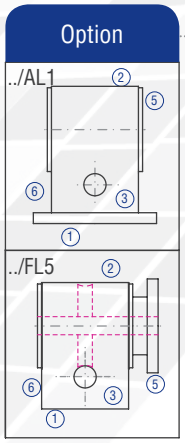


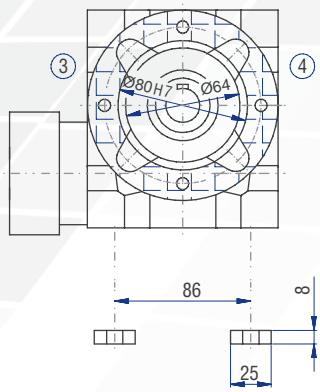


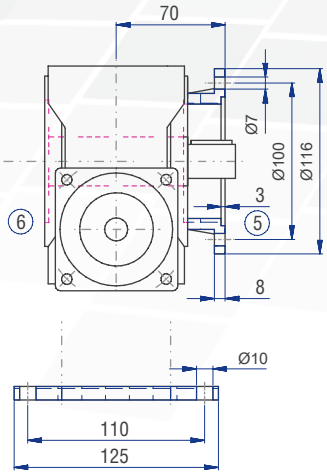


Implementation VV







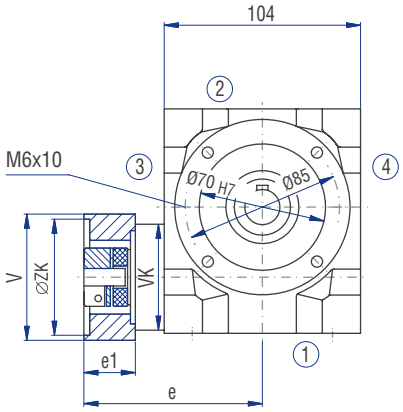


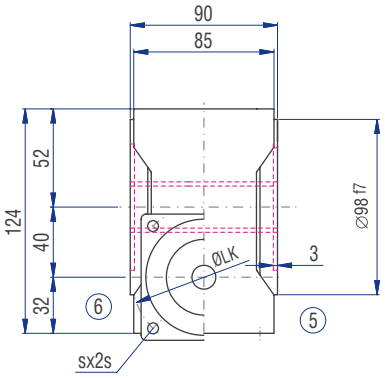
Motor dimensions

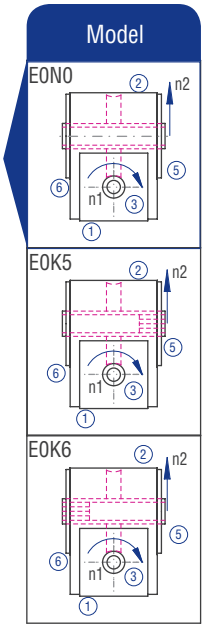
Flange no.	Motor shaft (d*l)	Thread (s)	V [mm]	ZK [mm]	LK [mm]	i [mm]	e [mm]	e1 [mm]
001	11*23	M4	65	40	63	3	93.0	30.0
002	11*23	M5	65	40	63	3	93.0	30.0
102	11*23	M5	65	60	75	3	90.0	26.5
202	11*23	M5	65	60	90	4	90.0	26.5
103	14*30	M6	65	60	75	3	108.5	45.0
104	14*30	M5	65	60	75	3	108.5	45.0
201	14*30	M5	65	60	90	4	108.5	45.0
301	14*30	M6	65	50	95	4	108.5	45.0
401	14*30	M6	65	80	100	4	108.5	45.0
501	14*30	M8	65	95	115	4	108.5	45.0
601	19*40	M8	90	95	130	4	121.0	45.0
611	19*40	M8	90	110	130	5	121.0	45.0
701	19*40	M8	90	110	145	5	121.0	45.0
802	19*40	M10	90	110	165	5	121.0	45.0

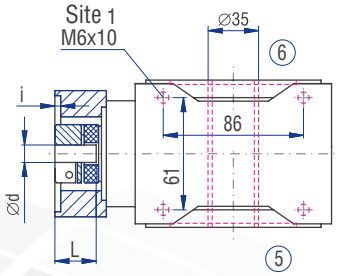
The dimensions e and e1 will change for the coupling type “clamping hub with groove” (KNN). Please contact us for consultation!

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



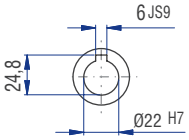


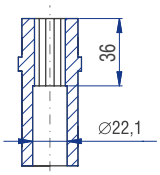


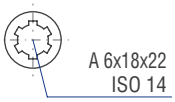


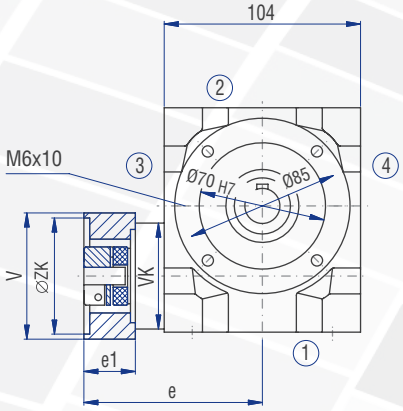
E0N0

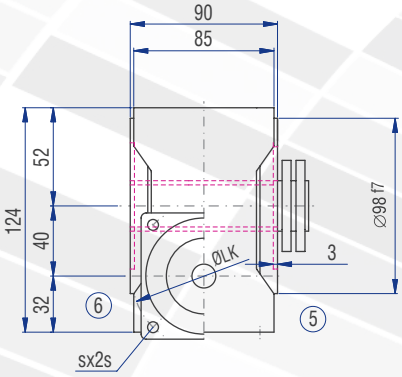
E0K5 / E0K6

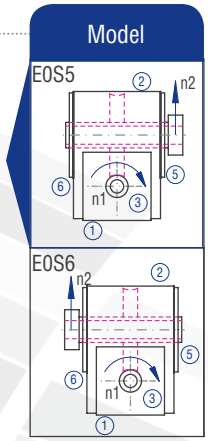


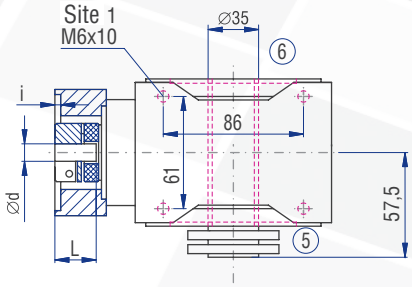


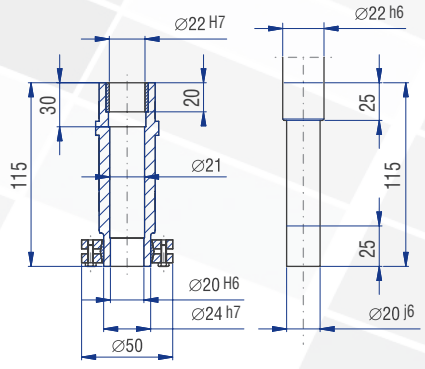




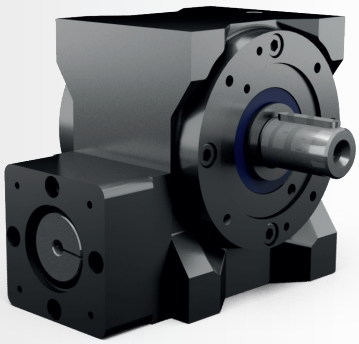








11.5.17 Type SC 050 – Servo worm gearboxes



Characteristics

Characteristic	Standard	Option
Toothing	Hardened and ground worm shaft / bronze worm gear	See chapter 11.5.2
Gear ratio	5:1 to 26:1	
Housing / Flanges	Grey cast iron / aluminium	
Threaded mounting holes	On gearbox side 1 and on the flanges	See chapter 11.5.4
Shaft	Material 1 C45, shaft ends greased Fit with ISO j6 tolerance with parallel keyway: according to DIN 6885 Sheet 1	See chapter 4.6.2
Hollow shaft	Material 1 C45, shafts greased Fit with ISO H7 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	< 20 arcmin	See chapter 11.5.11
Protection class	IP 54	See chapter 4.5
Corrosion protection	Prime coat; layer thickness > 40 µm	See chapter 4.4.1
Bearing life L10h	more than 15,000h	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 11.5.9
Lubricants	Synthetic lubricants	See chapter 11.5.9
Motor flange	Aluminium	See chapter 11.5.14
Coupling	Insertable, flexible claw coupling, suitable for servo-motors For smooth motor shafts clamping hub KN For smooth motor shafts tension ring hub SN For motor shafts with parallel key clamping hub with groove KNN	See chapter 11.5.13

Torques in operating mode S1

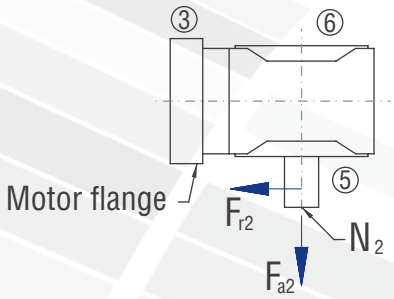
I rated I ist	5:1 29:6		7.5:1 29:4		10:1 39:4		13:1 52:4		15:1 29:2		20:1 39:2		26:1 52:2	
	n_2 [rpm]	T_{2N} [Nm]	n_2 [rpm]	T_{2N} [Nm]	n_2 [rpm]	T_{2N} [Nm]	n_2 [rpm]	T_{2N} [Nm]	n_2 [rpm]	T_{2N} [Nm]	n_2 [rpm]	T_{2N} [Nm]	n_2 [rpm]	T_{2N} [Nm]
4000	828	48	552	59	421	70	314	54	276	62	211	72	157	70
3000	621	60	414	71	316	83	235	56	207	76	158	85	118	73
2400	497	72	331	82	253	97	188	58	166	91	126	98	94	75
1500	310	83	207	94	158	110	118	60	103	105	79	111	59	77

Torques in operating mode S5

I rated T_{2N} [Nm] n_{1max} [rpm]			5:1 96 5000		7.5:1 104 5000		10:1 91 5500		13:1 59 5800		15:1 106 5000		20:1 106 5500		26:1 76 5800	
Coupling size	**d [mm]**		**KN**	**KNN/SN**	**KN**	**KNN/SN**	**KN**	**KNN/SN**	**KN**	**KNN/SN**	**KN**	**KNN/SN**	**KN**	**KNN/SN**	**KN**	**KNN/SN**
K19	9	T_{2B} [Nm]	82.2		123.3		112.0		66.0		145.0		133.0		86.0	
		T_{2NOT} [Nm]	145.0		167.0		152.0		100.0		195.0		179.0		137.0	
	11	T_{2B} [Nm]	82.2	82.2	123.3	123.3	112.0	112.0	66.0	66.0	145.0	145.0	133.0	133.0	86.0	86.0
		T_{2NOT} [Nm]	145.0	145.0	167.0	167.0	152.0	152.0	100.0	100.0	195.0	195.0	179.0	179.0	137.0	137.0
	14	T_{2B} [Nm]	82.2	82.2	123.3	123.3	112.0	112.0	66.0	66.0	145.0	145.0	133.0	133.0	86.0	86.0
		T_{2NOT} [Nm]	150.0	150.0	167.0	167.0	152.0	152.0	100.0	100.0	195.0	195.0	179.0	179.0	137.0	137.0
	16	T_{2B} [Nm]	82.2	82.2	123.3	123.3	112.0	112.0	66.0	66.0	145.0	145.0	133.0	133.0	86.0	86.0
		T_{2NOT} [Nm]	150.0	150.0	167.0	167.0	152.0	152.0	100.0	100.0	195.0	195.0	179.0	179.0	137.0	137.0
	19	T_{2B} [Nm]	82.2	82.2	123.3	123.3	112.0	112.0	66.0	66.0	145.0	145.0	133.0	133.0	86.0	86.0
		T_{2NOT} [Nm]	150.0	150.0	167.0	167.0	152.0	152.0	100.0	100.0	195.0	195.0	179.0	179.0	137.0	137.0
	24	T_{2B} [Nm]	82.2		123.3		112.0		66.0		145.0		133.0		86.0	
		T_{2NOT} [Nm]	150.0		167.0		152.0		100.0		195.0		179.0		137.0	
K24	11	T_{2B} [Nm]	125.0	125.0	125.0	125.0	112.0	112.0	66.0	66.0	145.0	145.0	133.0	133.0	86.0	86.0
		T_{2NOT} [Nm]	150.0	0.0	167.0	0.0	152.0	0.0	100.0	0.0	195.0	0.0	179.0	0.0	137.0	0.0
	14	T_{2B} [Nm]	125.0	125.0	125.0	125.0	112.0	112.0	66.0	66.0	145.0	145.0	133.0	133.0	86.0	86.0
		T_{2NOT} [Nm]	150.0	150.0	167.0	167.0	152.0	152.0	100.0	100.0	195.0	195.0	179.0	179.0	137.0	137.0
	16	T_{2B} [Nm]	125.0	125.0	125.0	125.0	112.0	112.0	66.0	66.0	145.0	145.0	133.0	133.0	86.0	86.0
		T_{2NOT} [Nm]	150.0	150.0	167.0	167.0	152.0	152.0	100.0	100.0	195.0	195.0	179.0	179.0	137.0	137.0
	19	T_{2B} [Nm]	125.0	125.0	125.0	125.0	112.0	112.0	66.0	66.0	145.0	145.0	133.0	133.0	86.0	86.0
		T_{2NOT} [Nm]	150.0	150.0	167.0	167.0	152.0	152.0	100.0	100.0	195.0	195.0	179.0	179.0	137.0	137.0
	24	T_{2B} [Nm]	125.0	125.0	125.0	125.0	112.0	112.0	66.0	66.0	145.0	145.0	133.0	133.0	86.0	86.0
		T_{2NOT} [Nm]	150.0	150.0	167.0	167.0	152.0	152.0	100.0	100.0	195.0	195.0	179.0	179.0	137.0	137.0
	28	T_{2B} [Nm]	125.0	125.0	125.0	125.0	112.0	112.0	66.0	66.0	145.0	145.0	133.0	133.0	86.0	86.0
		T_{2NOT} [Nm]	150.0	150.0	167.0	167.0	152.0	152.0	100.0	100.0	195.0	195.0	179.0	179.0	137.0	137.0

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

n_2 [rpm]	200		125		75		50		30		10	
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]
< 120	2000	1000	2400	1200	2850	1425	3350	1675	4000	2000	4800	2400
> 120	1540	770	1850	925	2190	1095	2580	1290	3080	1540	3700	1850



Gearbox inertia moments/mass

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

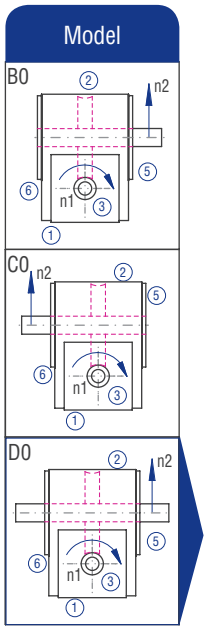
Inertia moment [kgcm²]							
i rated [-]	**5:1**	**7.5:1**	**10:1**	**13:1**	**15:1**	**20:1**	**26:1**
J [kgcm²]	0.9509	0.7327	0.5820	0.4876	0.6017	0.4996	0.4375

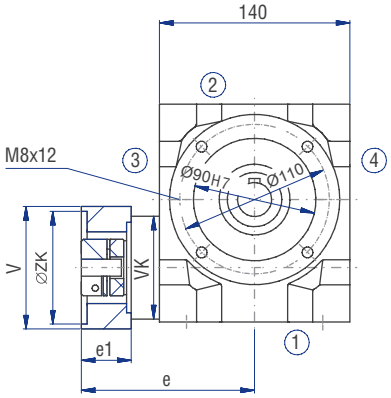
Mass ca. [kg]
13

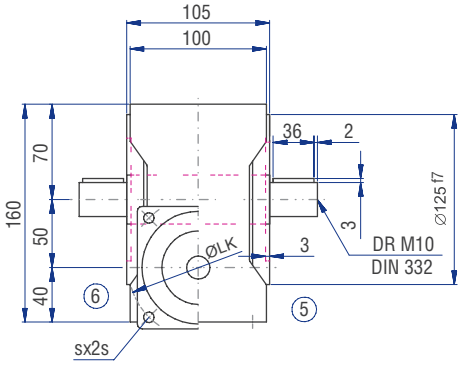
The mass of the gearbox may deviate depending on the flange size and the gear ratio.

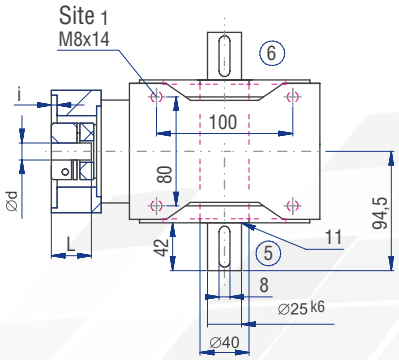
Inertia moments Coupling J

	KN	KNN	SN
	J [kgcm²]	J [kgcm²]	J [kgcm²]
K19	0.4229	0.4229	0.6349
K24	1.0910	1.0910	2.7750

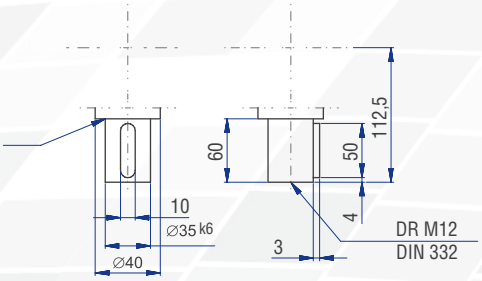


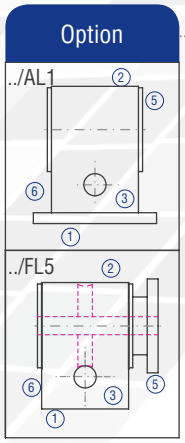


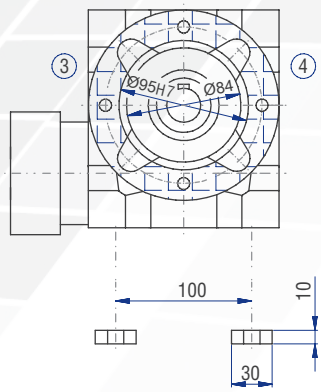


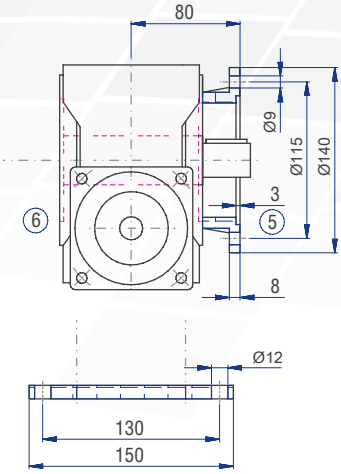


Implementation VV









Motor dimensions

Flange no.	Motor shaft (d*l)	Thread (s)	V [mm]	ZK [mm]	LK [mm]	i [mm]	e [mm]	e1 [mm]
103	19*40	M6	90	60	75	3	141.0	45.0
201	19*40	M5	90	60	90	3	141.0	45.0
301	19*40	M6	90	50	95	4	141.0	45.0
401	19*40	M6	90	80	100	4	141.0	45.0
501	19*40	M8	90	95	115	4	141.0	45.0
601	19*40	M8	90	95	130	4	141.0	45.0
611	19*40	M8	90	110	130	5	141.0	45.0
701	19*40	M8	90	110	145	5	141.0	45.0
802	19*40	M10	90	110	165	5	141.0	45.0
811	24*50	M10	120	130	165	5	155.0	54.0

The dimensions e and e1 will change for the coupling type “clamping hub with groove” (KNN). Please contact us for consultation!

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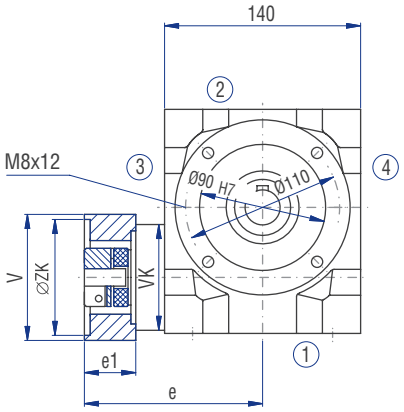
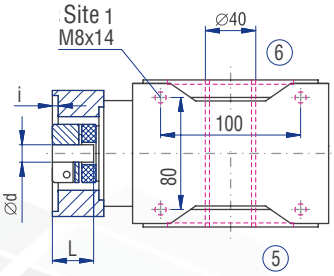
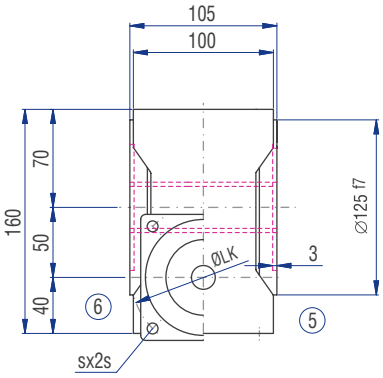
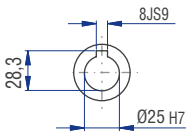
The dimensions of the Models not shown can be figured by mirroring available dimensions.



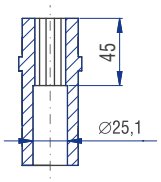


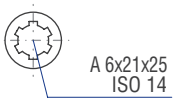


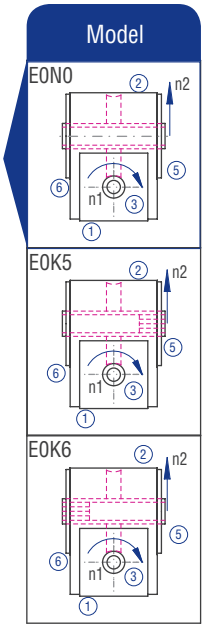
E0N0

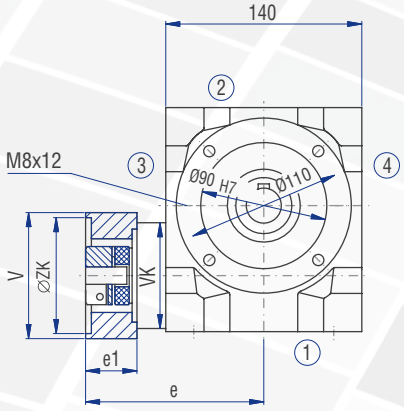


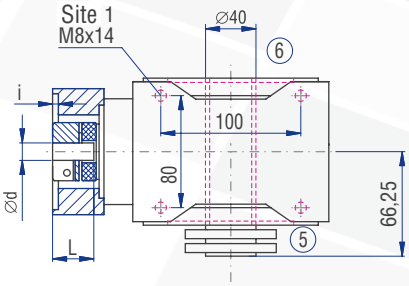
E0K5 / E0K6

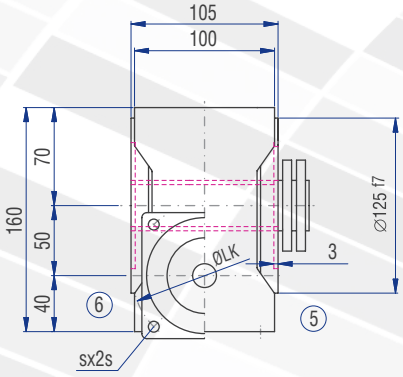


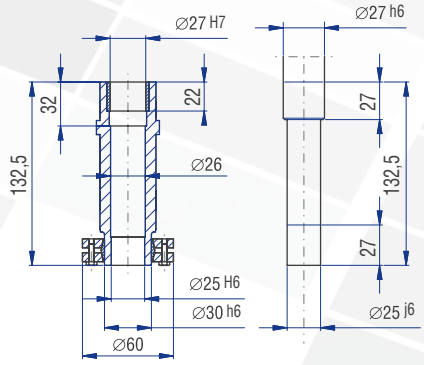


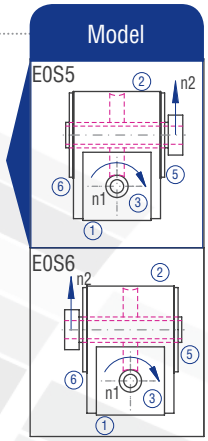




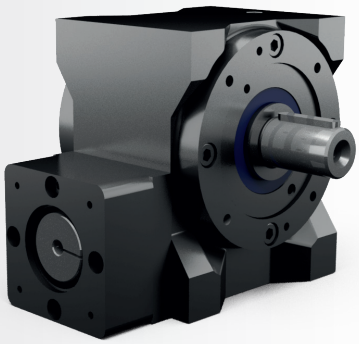








11.5.18 Type SC 063 – Servo worm gearboxes



Characteristics

Characteristic	Standard	Option
Toothing	Hardened and ground worm shaft / bronze worm gear	See chapter 11.5.2
Gear ratio	5:1 to 26:1	
Housing / Flanges	Grey cast iron / aluminium	
Threaded mounting holes	On gearbox side 1 and on the flanges	See chapter 11.5.4
Shaft	Material 1 C45, shaft ends greased Fit with ISO j6 tolerance with parallel keyway: according to DIN 6885 Sheet 1	See chapter 4.6.2
Hollow shaft	Material 1 C45, shafts greased Fit with ISO H7 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	< 20 arcmin	See chapter 11.5.11
Protection class	IP 54	See chapter 4.5
Corrosion protection	Prime coat; layer thickness > 40 µm	See chapter 4.4.1
Bearing life L10h	more than 15,000h	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 11.5.9
Lubricants	Synthetic lubricants	See chapter 11.5.9
Motor flange	Aluminium	See chapter 11.5.14
Coupling	Insertable, flexible claw coupling, suitable for servo-motors For smooth motor shafts — clamping hub — KN For smooth motor shafts — tension ring hub — SN For motor shafts with parallel key — clamping hub with groove — KNN	See chapter 11.5.13

Table 9-13

Torques in operating mode S1

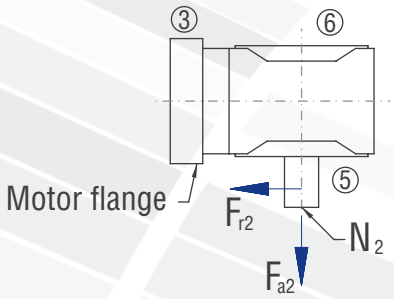
i rated i ist	5:1 29:6		7.5:1 29:4		10:1 39:4		13:1 52:4		15:1 29:2		20:1 39:2		26:1 52:2	
	n_2 [rpm]	T_{2N} [Nm]	n_2 [rpm]	T_{2N} [Nm]	n_2 [rpm]	T_{2N} [Nm]	n_2 [rpm]	T_{2N} [Nm]	n_2 [rpm]	T_{2N} [Nm]	n_2 [rpm]	T_{2N} [Nm]	n_2 [rpm]	T_{2N} [Nm]
4000	828	69	552	83	410	101	314	123	276	96	205	116	157	115
3000	621	89	414	104	308	124	235	128	207	119	154	141	118	135
2400	497	109	331	125	246	148	188	133	166	142	123	166	94	155
1500	310	129	207	146	154	171	118	138	103	166	77	190	59	175

Torques in operating mode S5

	i rated	5:1		7.5:1		10:1		13:1		15:1		20:1		26:1	
	T_{2N} [Nm]	145		157		170		135		183		186		173	
	n_{1max} [rpm]	4500		4500		5000		5300		4500		5000		5300	
Coupling size	d [mm]	KN	KNN/SN	KN	KNN/SN	KN	KNN/SN	KN	KNN/SN	KN	KNN/SN	KN	KNN/SN	KN	KNN/SN
K19	9	T_{2B} [Nm]	82.2		123.3		165.8		151.0		246.5		259.0		195.0	
		T_{2NOT} [Nm]	145.0		217.5		292.5		222.0		395.0		355.0		295.0	
	11	T_{2B} [Nm]	82.2	82.2	123.3	123.3	165.8	165.8	151.0	151.0	246.5	246.5	259.0	259.0	195.0	195.0
		T_{2NOT} [Nm]	145.0	145.0	217.5	217.5	292.5	292.5	222.0	222.0	395.0	395.0	355.0	355.0	295.0	295.0
	14	T_{2B} [Nm]	82.2	82.2	123.3	123.3	165.8	165.8	151.0	151.0	246.5	246.5	259.0	259.0	195.0	195.0
		T_{2NOT} [Nm]	154.7	154.7	232.0	232.0	306.0	306.0	222.0	222.0	395.0	395.0	355.0	355.0	295.0	295.0
	16	T_{2B} [Nm]	82.2	82.2	123.3	123.3	165.8	165.8	151.0	151.0	246.5	246.5	259.0	259.0	195.0	195.0
		T_{2NOT} [Nm]	154.7	164.3	232.0	246.5	306.0	306.0	222.0	222.0	395.0	395.0	355.0	355.0	295.0	295.0
	19	T_{2B} [Nm]	82.2	82.2	123.3	123.3	165.8	165.8	151.0	151.0	246.5	246.5	259.0	259.0	195.0	195.0
		T_{2NOT} [Nm]	164.3	164.3	246.5	246.5	306.0	306.0	222.0	222.0	395.0	395.0	355.0	355.0	295.0	295.0
	24	T_{2B} [Nm]	82.2		123.3		165.8		151.0		246.5		259.0		195.0	
		T_{2NOT} [Nm]	164.3		246.5		306.0		222.0		395.0		355.0		295.0	
K24	11	T_{2B} [Nm]	169.2	198.0	223.0	223.0	216.0	216.0	151.0	151.0	266.0	266.0	259.0	259.0	195.0	195.0
		T_{2NOT} [Nm]	217.5	0.0	326.3	0.0	306.0	0.0	222.0	0.0	395.0	0.0	355.0	0.0	295.0	0.0
	14	T_{2B} [Nm]	174.0	198.0	223.0	223.0	216.0	216.0	151.0	151.0	266.0	266.0	259.0	259.0	195.0	195.0
		T_{2NOT} [Nm]	217.5	295.0	326.3	334.0	306.0	306.0	222.0	222.0	395.0	395.0	355.0	355.0	295.0	295.0
	16	T_{2B} [Nm]	188.5	198.0	223.0	223.0	216.0	216.0	151.0	151.0	266.0	266.0	259.0	259.0	195.0	195.0
		T_{2NOT} [Nm]	241.7	295.0	334.0	334.0	306.0	306.0	222.0	222.0	395.0	395.0	355.0	355.0	295.0	295.0
	19	T_{2B} [Nm]	188.5	198.0	223.0	223.0	216.0	216.0	151.0	151.0	266.0	266.0	259.0	259.0	195.0	195.0
		T_{2NOT} [Nm]	290.0	295.0	334.0	334.0	306.0	306.0	222.0	222.0	395.0	395.0	355.0	355.0	295.0	295.0
	24	T_{2B} [Nm]	198.0	198.0	223.0	223.0	216.0	216.0	151.0	151.0	266.0	266.0	259.0	259.0	195.0	195.0
		T_{2NOT} [Nm]	295.0	295.0	334.0	334.0	306.0	306.0	222.0	222.0	395.0	395.0	355.0	355.0	295.0	295.0
	28	T_{2B} [Nm]	198.0	198.0	223.0	223.0	216.0	216.0	151.0	151.0	266.0	266.0	259.0	259.0	195.0	195.0
		T_{2NOT} [Nm]	295.0	295.0	334.0	334.0	306.0	306.0	222.0	222.0	395.0	395.0	355.0	355.0	295.0	295.0

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

n_2 [rpm]	200		125		75		50		30		10	
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]
< 220	2700	1350	3150	1575	3800	1900	4500	2250	5200	2600	5200	2600
> 220	2080	1040	2420	1210	2920	1460	3460	1730	4000	2000	4000	2000



Gearbox inertia moments/mass

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

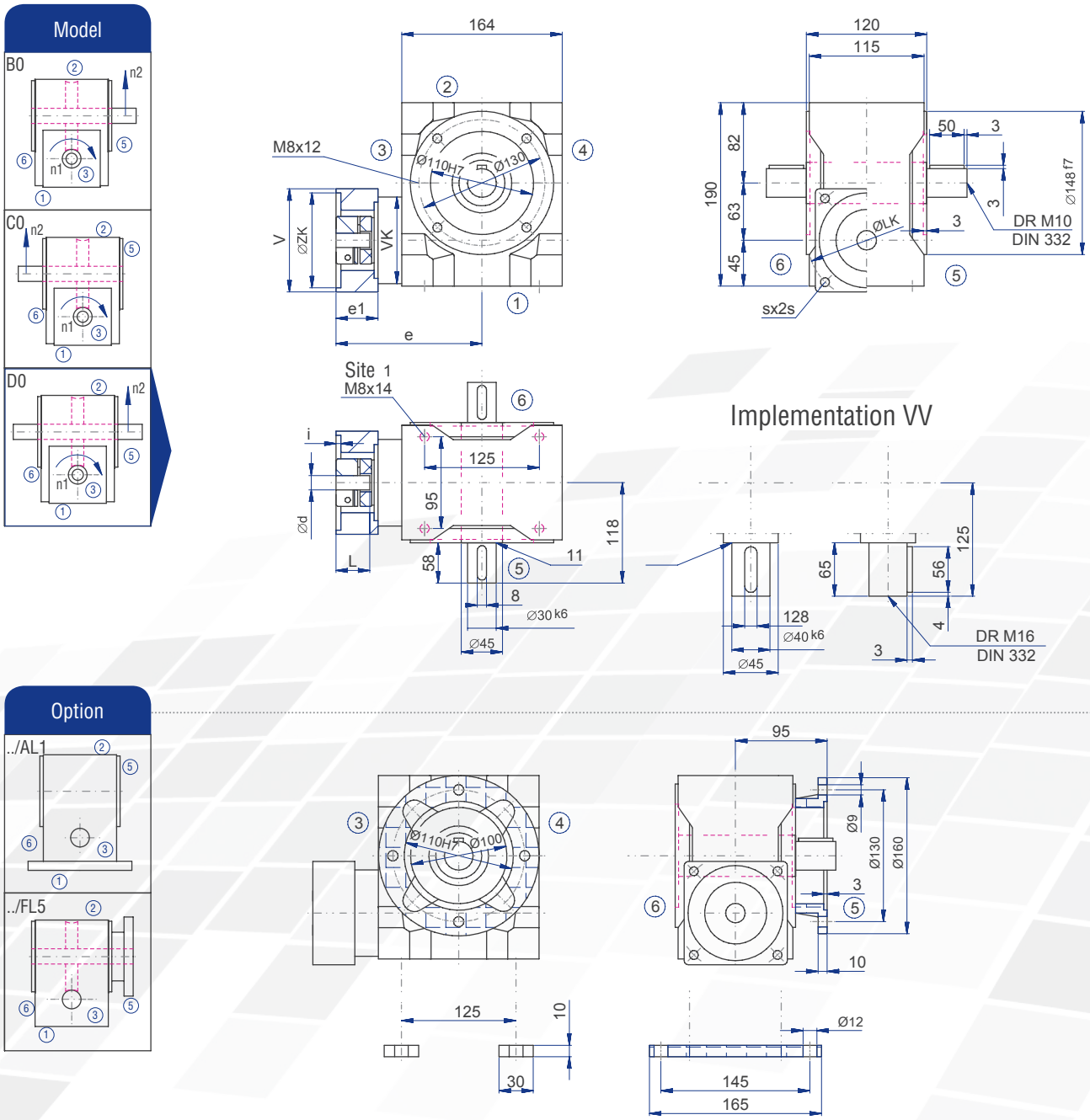
Inertia moment [kgcm²]							
i rated [-]	5:1	7.5:1	10:1	13:1	15:1	20:1	26:1
J [kgcm²]	2.1678	1.6423	1.1366	0.9368	1.3270	0.9445	0.8175

Mass ca. [kg]
20

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

Inertia moments Coupling J

	KN	KNN	SN
	J [kgcm²]	J [kgcm²]	J [kgcm²]
K19	0.4229	0.4229	0.6349
K24	1.0910	1.0910	2.7750

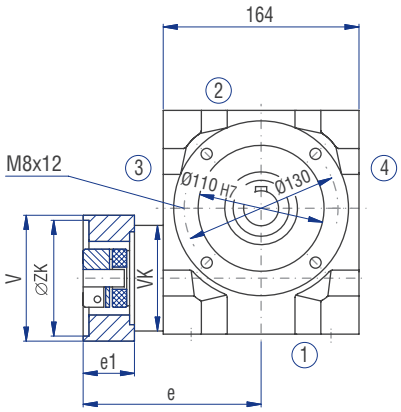


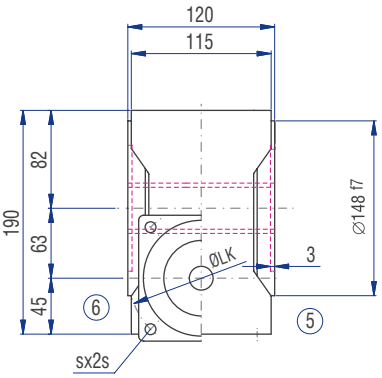
Motor dimensions

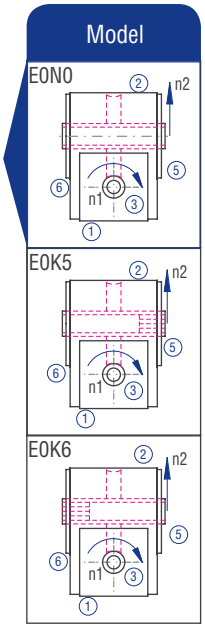
Flange no.	Motor shaft (d*l)	Thread (s)	V [mm]	ZK [mm]	LK [mm]	i [mm]	e [mm]	e1 [mm]
103	19*40	M6	90	60	75	3	154.0	45.0
201	19*40	M5	90	60	90	3	154.0	45.0
301	19*40	M6	90	50	95	4	154.0	45.0
401	19*40	M6	90	80	100	4	154.0	45.0
501	19*40	M8	90	95	115	4	154.0	45.0
601	19*40	M8	90	95	130	4	154.0	45.0
611	19*40	M8	90	110	130	5	154.0	45.0
701	19*40	M8	90	110	145	5	154.0	45.0
802	19*40	M10	90	110	165	5	154.0	45.0
811	24*50	M10	120	130	165	5	177.0	54.0

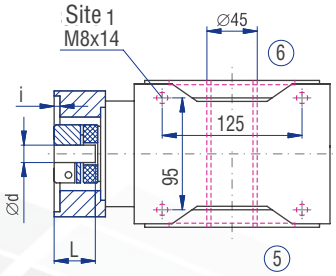
The dimensions e and e1 will change for the coupling type “clamping hub with groove” (KNN). Please contact us for consultation!

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



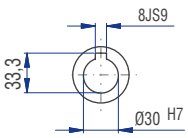


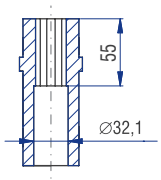


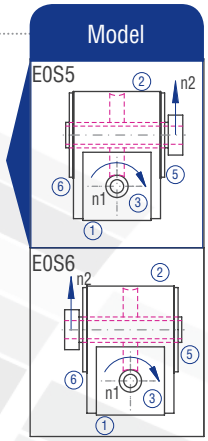


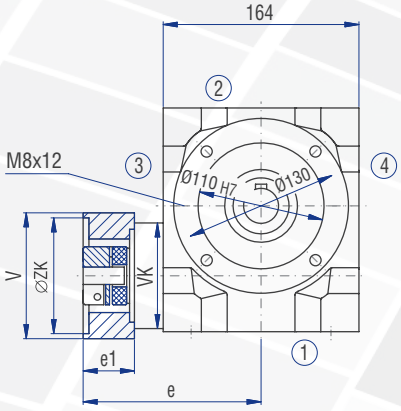
E0N0

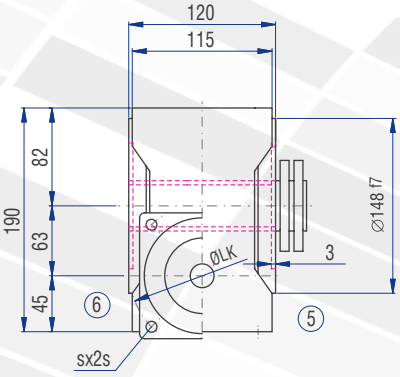
E0K5 / E0K6

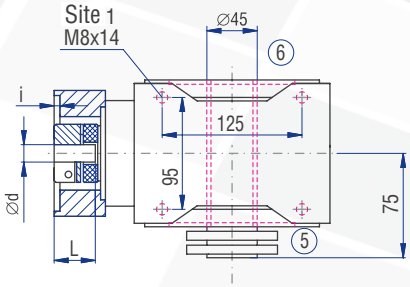


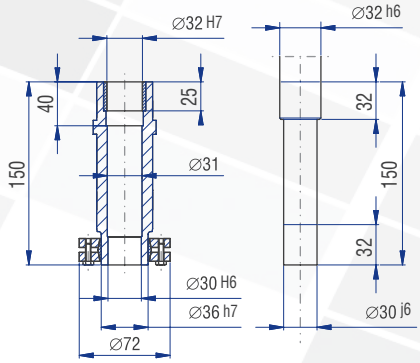




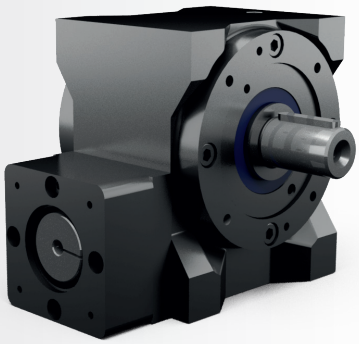








11.5.19 Type SC 080 – Servo worm gearboxes



Characteristics

Characteristic	Standard	Option
Toothing	Hardened and ground worm shaft / bronze worm gear	See chapter 11.5.2
Gear ratio	5:1 to 26:1	
Housing / Flanges	Grey cast iron / aluminium	
Threaded mounting holes	On gearbox side 1 and on the flanges	See chapter 11.5.4
Shaft	Material 1 C45, shaft ends greased Fit with ISO j6 tolerance with parallel keyway: according to DIN 6885 Sheet 1	See chapter 4.6.2
Hollow shaft	Material 1 C45, shafts greased Fit with ISO H7 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	< 20 arcmin	See chapter 11.5.11
Protection class	IP 54	See chapter 4.5
Corrosion protection	Prime coat; layer thickness > 40 µm	See chapter 4.4.1
Bearing life L10h	more than 15,000h	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 11.5.9
Lubricants	Synthetic lubricants	See chapter 11.5.9
Motor flange	Aluminium	See chapter 11.5.14
Coupling	Insertable, flexible claw coupling, suitable for servo-motors For smooth motor shafts — clamping hub — KN For smooth motor shafts — tension ring hub — SN For motor shafts with parallel key — clamping hub with groove — KNN	See chapter 11.5.13

Torques in operating mode S1

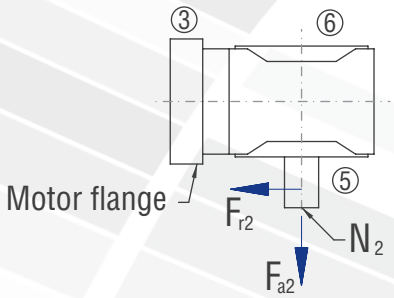
I rated I ist	5:1 29:6		7.5:1 29:4		10:1 39:4		13:1 52:4		15:1 29:2		20:1 39:2		26:1 52:2	
	n_2 [rpm]	T_{2N} [Nm]	n_2 [rpm]	T_{2N} [Nm]	n_2 [rpm]	T_{2N} [Nm]	n_2 [rpm]	T_{2N} [Nm]	n_2 [rpm]	T_{2N} [Nm]	n_2 [rpm]	T_{2N} [Nm]	n_2 [rpm]	T_{2N} [Nm]
4000	800	96	533	111	400	132	302	163	267	130	200	153	151	191
3000	600	132	400	152	300	177	226	170	200	175	150	203	113	207
2400	480	168	320	192	240	222	181	177	160	221	120	253	91	233
1500	300	204	200	233	150	267	113	184	100	266	75	303	57	239

Torques in operating mode S5

	I rated	5:1		7.5:1		10:1		13:1		15:1		20:1		26:1	
	T_{2N} [Nm]	250		289		297		187		352		344		245	
	n_{1max} [rpm]	4000		4000		4500		4800		4000		4500		4800	
Coupling size	d [mm]	KN	KNN/SN	KN	KNN/SN	KN	KNN/SN	KN	KNN/SN	KN	KNN/SN	KN	KNN/SN	KN	KNN/SN
K24	11	T_{2B} [Nm]	175.0	240.0	262.5	360.0	350.0	408.0	210.0	210.0	525.0	530.0	498.0	498.0	275.0	275.0
		T_{2NOT} [Nm]	225.0	0.0	337.5	0.0	450.0	0.0	321.0	0.0	675.0	0.0	725.0	0.0	432.0	0.0
	14	T_{2B} [Nm]	180.0	240.0	270.0	360.0	360.0	408.0	210.0	210.0	530.0	530.0	498.0	498.0	275.0	275.0
		T_{2NOT} [Nm]	225.0	400.0	337.5	600.0	450.0	625.0	321.0	321.0	675.0	826.0	725.0	725.0	432.0	432.0
	16	T_{2B} [Nm]	195.0	240.0	292.5	360.0	390.0	408.0	210.0	210.0	530.0	530.0	498.0	498.0	275.0	275.0
		T_{2NOT} [Nm]	250.0	500.0	375.0	695.0	500.0	625.0	321.0	321.0	750.0	826.0	725.0	725.0	432.0	432.0
	19	T_{2B} [Nm]	195.0	240.0	292.5	360.0	390.0	408.0	210.0	210.0	530.0	530.0	498.0	498.0	275.0	275.0
		T_{2NOT} [Nm]	300.0	600.0	450.0	695.0	600.0	625.0	321.0	321.0	826.0	826.0	725.0	725.0	432.0	432.0
	24	T_{2B} [Nm]	215.0	240.0	322.5	360.0	408.0	408.0	210.0	210.0	530.0	530.0	498.0	498.0	275.0	275.0
		T_{2NOT} [Nm]	325.0	600.0	487.5	695.0	625.0	625.0	321.0	321.0	826.0	826.0	725.0	725.0	432.0	432.0
	28	T_{2B} [Nm]	230.0	240.0	345.0	360.0	408.0	408.0	210.0	210.0	530.0	530.0	498.0	498.0	275.0	275.0
		T_{2NOT} [Nm]	350.0	600.0	525.0	695.0	625.0	625.0	321.0	321.0	826.0	826.0	725.0	725.0	432.0	432.0
K28	14	T_{2B} [Nm]	360.0		439.0		408.0		210.0		530.0		498.0		275.0	
		T_{2NOT} [Nm]	400.0		600.0		625.0		321.0		826.0		725.0		432.0	
	16	T_{2B} [Nm]	360.0	360.0	439.0	439.0	408.0	408.0	210.0	210.0	530.0	530.0	498.0	498.0	275.0	275.0
		T_{2NOT} [Nm]	500.0	610.0	695.0	695.0	625.0	625.0	321.0	321.0	826.0	826.0	725.0	725.0	432.0	432.0
	19	T_{2B} [Nm]	360.0	360.0	439.0	439.0	408.0	408.0	210.0	210.0	530.0	530.0	498.0	498.0	275.0	275.0
		T_{2NOT} [Nm]	610.0	610.0	695.0	695.0	625.0	625.0	321.0	321.0	826.0	826.0	725.0	725.0	432.0	432.0
	24	T_{2B} [Nm]	360.0	360.0	439.0	439.0	408.0	408.0	210.0	210.0	530.0	530.0	498.0	498.0	275.0	275.0
		T_{2NOT} [Nm]	610.0	610.0	695.0	695.0	625.0	625.0	321.0	321.0	826.0	826.0	725.0	725.0	432.0	432.0
	28	T_{2B} [Nm]	360.0	360.0	439.0	439.0	408.0	408.0	210.0	210.0	530.0	530.0	498.0	498.0	275.0	275.0
		T_{2NOT} [Nm]	610.0	610.0	695.0	695.0	625.0	625.0	321.0	321.0	826.0	826.0	725.0	725.0	432.0	432.0
	32	T_{2B} [Nm]	360.0	360.0	439.0	439.0	408.0	408.0	210.0	210.0	530.0	530.0	498.0	498.0	275.0	275.0
		T_{2NOT} [Nm]	610.0	610.0	695.0	695.0	625.0	625.0	321.0	321.0	826.0	826.0	725.0	725.0	432.0	432.0
	38	T_{2B} [Nm]	360.0	360.0	439.0	439.0	408.0	408.0	210.0	210.0	530.0	530.0	498.0	498.0	275.0	275.0
		T_{2NOT} [Nm]	610.0	0.0	695.0	0.0	625.0	0.0	321.0	0.0	826.0	0.0	725.0	0.0	432.0	0.0

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

n_2 [rpm]	200		125		75		50		30		10	
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]
< 430	3300	1650	3750	1875	4500	2250	5300	2650	6300	3150	7600	3800
> 430	2640	1320	3000	1500	3600	1800	4240	2120	5040	2520	6080	3040



Gearbox inertia moments/mass

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

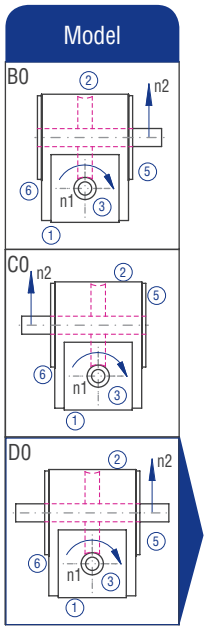
Inertia moment [kgcm²]							
i rated [-]	5:1	7.5:1	10:1	13:1	15:1	20:1	26:1
J [kgcm²]	5.8195	4.2167	2.9560	2.2634	3.2550	2.3977	1.9066

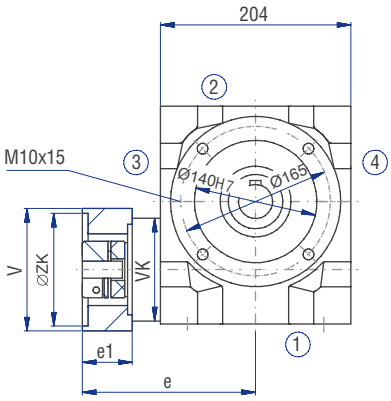
Mass ca. [kg]
30

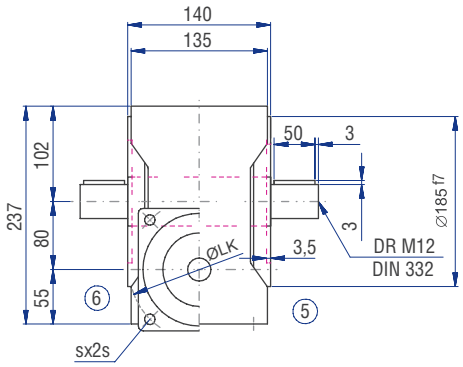
The mass of the gearbox may deviate depending on the flange size and the gear ratio.

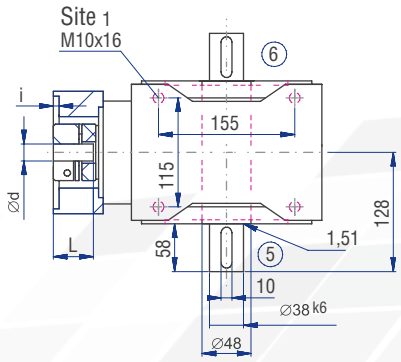
Inertia moments Coupling J

	KN	KNN	SN
	J [kgcm²]	J [kgcm²]	J [kgcm²]
K24	1.0910	1.0910	2.7750
K28	4.1710	4.1710	6.4250

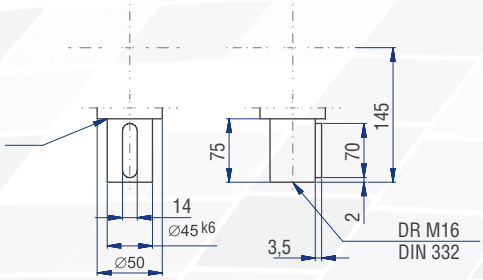


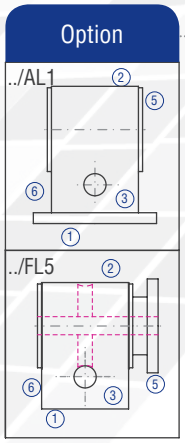


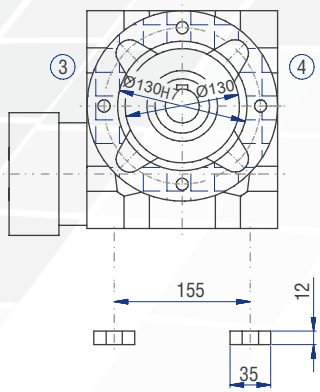


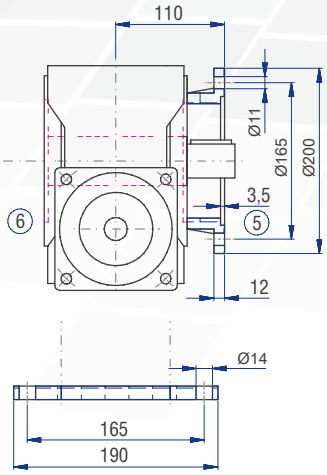


Implementation VV









Motor dimensions

Flange no.	Motor shaft (d*l)	Thread (s)	V [mm]	ZK [mm]	LK [mm]	i [mm]	e [mm]	e1 [mm]
103	24*50	M6	120	60	75	3	192.5	54.0
201	24*50	M5	120	60	90	3	192.5	54.0
301	24*50	M6	120	50	95	4	192.5	54.0
401	24*50	M6	120	80	100	4	192.5	54.0
501	24*50	M8	120	95	115	4	192.5	54.0
601	24*50	M8	120	95	130	4	192.5	54.0
611	24*50	M8	120	110	130	5	192.5	54.0
701	24*50	M8	120	110	145	5	192.5	54.0
802	24*50	M10	120	110	165	5	192.5	54.0
811	24*50	M10	120	130	165	5	192.5	54.0
403	32*60	M6	140	80	100	4	202.5	61.0
502	32*60	M8	140	95	115	4	202.5	61.0
616	32*60	M10	140	110	130	5	202.5	61.0
902	32*60	M12	140	130	215	6	202.5	61.0
911	32*60	M12	140	180	215	6	202.5	61.0
932	38*80	M12	160	180	215	6	241.0	99.5

The dimensions e and e1 will change for the coupling type “clamping hub with groove” (KNN). Please contact us for consultation!

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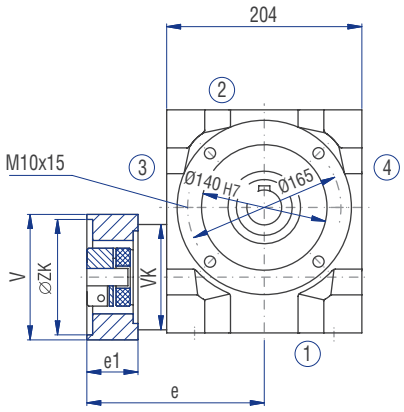
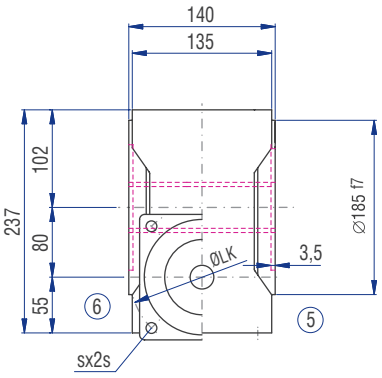
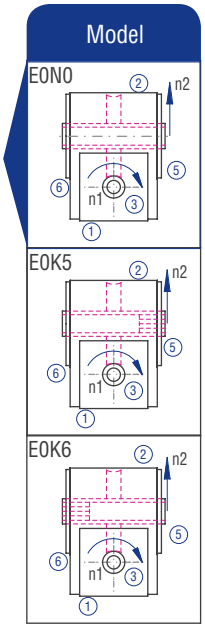
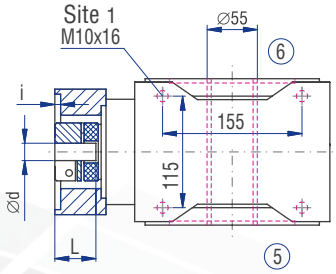
The dimensions of the Models not shown can be figured by mirroring available dimensions.



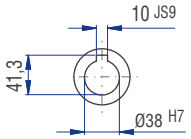


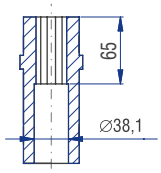


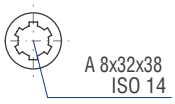


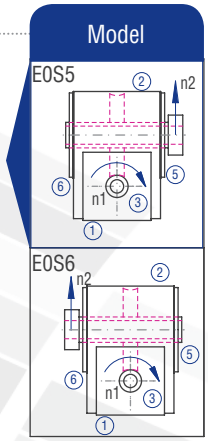
E0N0

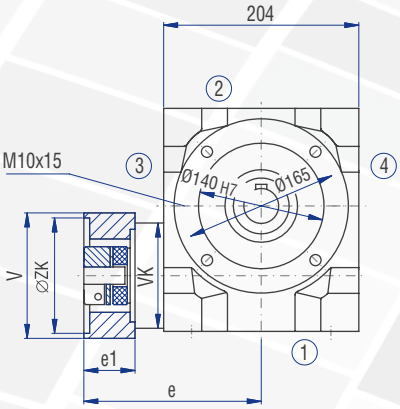
E0K5 / E0K6

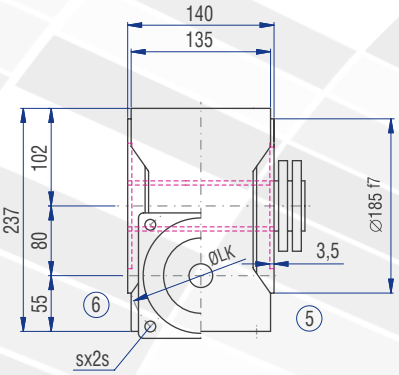


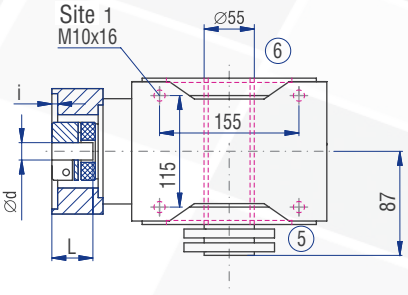


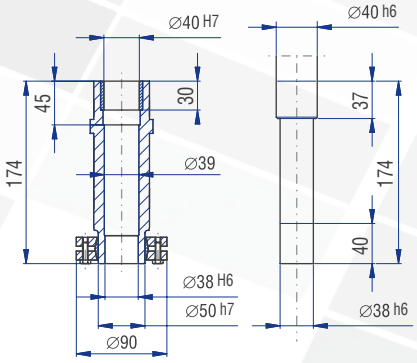




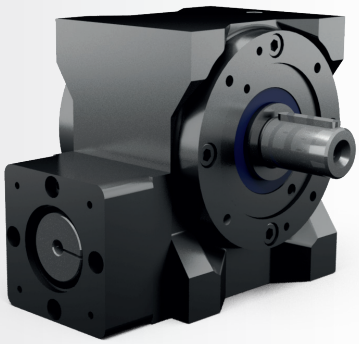








11.5.20 Type SC 100 – Servo worm gearboxes



Characteristics

Characteristic	Standard	Option
Toothing	Hardened and ground worm shaft / bronze worm gear	See chapter 11.5.2
Gear ratio	5:1 to 26:1	
Housing / Flanges	Grey cast iron / aluminium	
Threaded mounting holes	On gearbox side 1 and on the flanges	See chapter 11.5.4
Shaft	Material 1 C45, shaft ends greased Fit with ISO j6 tolerance with parallel keyway: according to DIN 6885 Sheet 1	See chapter 4.6.2
Hollow shaft	Material 1 C45, shafts greased Fit with ISO H7 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	< 20 arcmin	See chapter 11.5.11
Protection class	IP 54	See chapter 4.5
Corrosion protection	Prime coat; layer thickness > 40 µm	See chapter 4.4.1
Bearing life L10h	more than 15,000h	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 11.5.9
Lubricants	Synthetic lubricants	See chapter 11.5.9
Motor flange	Aluminium	See chapter 11.5.14
Coupling	Insertable, flexible claw coupling, suitable for servo-motors For smooth motor shafts clamping hub KN For smooth motor shafts tension ring hub SN For motor shafts with parallel key clamping hub with groove KNN	See chapter 11.5.13

Torques in operating mode S1

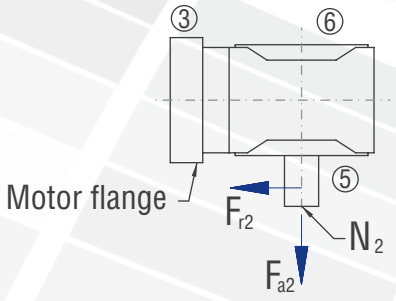
I rated I ist	5:1 29:6		7.5:1 29:4		10:1 39:4		13:1 52:4		15:1 29:2		20:1 39:2		26:1 52:2	
	n_2 [rpm]	T_{2N} [Nm]	n_2 [rpm]	T_{2N} [Nm]	n_2 [rpm]	T_{2N} [Nm]	n_2 [rpm]	T_{2N} [Nm]	n_2 [rpm]	T_{2N} [Nm]	n_2 [rpm]	T_{2N} [Nm]	n_2 [rpm]	T_{2N} [Nm]
4000	800	96	533	111	400	132	302	163	267	130	200	153	151	191
3000	600	132	400	152	300	177	226	170	200	175	150	203	113	207
2400	480	168	320	192	240	222	181	177	160	221	120	253	91	233
1500	300	204	200	233	150	267	113	184	100	266	75	303	57	239

Torques in operating mode S5

I rated T_{2N} [Nm] n_{1max} [rpm]			5:1 590 3000		7.5:1 650 3000		10:1 703 3200		13:1 464 3500		15:1 715 3000		20:1 778 3200		26:1 605 3500	
Coupling size	**d [mm]**		**KN**	**KNN/SN**	**KN**	**KNN/SN**	**KN**	**KNN/SN**	**KN**	**KNN/SN**	**KN**	**KNN/SN**	**KN**	**KNN/SN**	**KN**	**KNN/SN**
K28	14	T_{2B} [Nm]	400.0		600.0		800.0		523.0		1025.0		1112.0		683.0	
		T_{2NOT} [Nm]	400.0		600.0		800.0		736.0		1200.0		1440.0		980.0	
	16	T_{2B} [Nm]	405.0	640.0	607.5	932.0	810.0	1006.0	523.0	523.0	1025.0	1025.0	1112.0	1112.0	683.0	683.0
		T_{2NOT} [Nm]	500.0	700.0	750.0	1050.0	1000.0	1090.0	736.0	736.0	1500.0	1610.0	1440.0	1440.0	980.0	980.0
	19	T_{2B} [Nm]	425.0	640.0	637.5	932.0	850.0	1006.0	523.0	523.0	1025.0	1025.0	1112.0	1112.0	683.0	683.0
		T_{2NOT} [Nm]	650.0	1190.0	975.0	1360.0	1090.0	1090.0	736.0	736.0	1610.0	1610.0	1440.0	1440.0	980.0	980.0
	24	T_{2B} [Nm]	455.0	640.0	682.5	932.0	910.0	1006.0	523.0	523.0	1025.0	1025.0	1112.0	1112.0	683.0	683.0
		T_{2NOT} [Nm]	700.0	1190.0	1050.0	1360.0	1090.0	1090.0	736.0	736.0	1610.0	1610.0	1440.0	1440.0	980.0	980.0
	28	T_{2B} [Nm]	485.0	640.0	727.5	932.0	970.0	1006.0	523.0	523.0	1025.0	1025.0	1112.0	1112.0	683.0	683.0
		T_{2NOT} [Nm]	740.0	1190.0	1110.0	1360.0	1090.0	1090.0	736.0	736.0	1610.0	1610.0	1440.0	1440.0	980.0	980.0
	32	T_{2B} [Nm]	510.0	640.0	765.0	932.0	1006.0	1006.0	523.0	523.0	1025.0	1025.0	1112.0	1112.0	683.0	683.0
		T_{2NOT} [Nm]	780.0	1190.0	1170.0	1360.0	1090.0	1090.0	736.0	736.0	1610.0	1610.0	1440.0	1440.0	980.0	980.0
	38	T_{2B} [Nm]	545.0	640.0	817.5	932.0	1006.0	1006.0	523.0	523.0	1025.0	1025.0	1112.0	1112.0	683.0	683.0
		T_{2NOT} [Nm]	835.0	0.0	1252.5	0.0	1090.0	0.0	736.0	0.0	1610.0	0.0	1440.0	0.0	980.0	0.0
K38	16	T_{2B} [Nm]	470.0		705.0		940.0		523.0		1025.0		1112.0		683.0	
		T_{2NOT} [Nm]	600.0		900.0		1090.0		736.0		1610.0		1440.0		980.0	
	19	T_{2B} [Nm]	490.0		735.0		980.0		523.0		1025.0		1112.0		683.0	
		T_{2NOT} [Nm]	625.0		937.5		1090.0		736.0		1610.0		1440.0		980.0	
	24	T_{2B} [Nm]	520.0	850.0	780.0	932.0	1006.0	1006.0	523.0	523.0	1025.0	1025.0	1112.0	1112.0	683.0	683.0
		T_{2NOT} [Nm]	650.0	1190.0	975.0	1360.0	1090.0	1090.0	736.0	736.0	1610.0	1610.0	1440.0	1440.0	980.0	980.0
	28	T_{2B} [Nm]	545.0	850.0	817.5	932.0	1006.0	1006.0	523.0	523.0	1025.0	1025.0	1112.0	1112.0	683.0	683.0
		T_{2NOT} [Nm]	680.0	1190.0	1020.0	1360.0	1090.0	1090.0	736.0	736.0	1610.0	1610.0	1440.0	1440.0	980.0	980.0
	32	T_{2B} [Nm]	565.0	850.0	847.5	932.0	1006.0	1006.0	523.0	523.0	1025.0	1025.0	1112.0	1112.0	683.0	683.0
		T_{2NOT} [Nm]	710.0	1190.0	1065.0	1360.0	1090.0	1090.0	736.0	736.0	1610.0	1610.0	1440.0	1440.0	980.0	980.0
	38	T_{2B} [Nm]	610.0	850.0	915.0	932.0	1006.0	1006.0	523.0	523.0	1025.0	1025.0	1112.0	1112.0	683.0	683.0
		T_{2NOT} [Nm]	760.0	1190.0	1140.0	1360.0	1090.0	1090.0	736.0	736.0	1610.0	1610.0	1440.0	1440.0	980.0	980.0
	42	T_{2B} [Nm]	630.0	850.0	932.0	932.0	1006.0	1006.0	523.0	523.0	1025.0	1025.0	1112.0	1112.0	683.0	683.0
		T_{2NOT} [Nm]	790.0	1190.0	1185.0	1360.0	1090.0	1090.0	736.0	736.0	1610.0	1610.0	1440.0	1440.0	980.0	980.0
	45	T_{2B} [Nm]	650.0	850.0	932.0	932.0	1006.0	1006.0	523.0	523.0	1025.0	1025.0	1112.0	1112.0	683.0	683.0
		T_{2NOT} [Nm]	820.0	1190.0	1230.0	1360.0	1090.0	1090.0	736.0	736.0	1610.0	1610.0	1440.0	1440.0	980.0	980.0

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

n_2 [rpm]	200		125		75		50		30		10	
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]
< 800	3650	1825	4000	2000	4750	2375	5600	2800	6700	3350	9500	4750
> 800	2920	1460	3200	1600	3800	1900	4480	2240	5360	2680	7600	3800



Gearbox inertia moments/mass

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

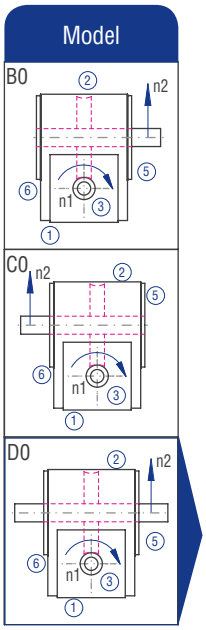
Inertia moment [kgcm²]							
i rated [-]	5:1	7.5:1	10:1	13:1	15:1	20:1	26:1
J [kgcm²]	22.3780	17.8750	14.0300	12.2840	15.1730	12.3740	11.3360

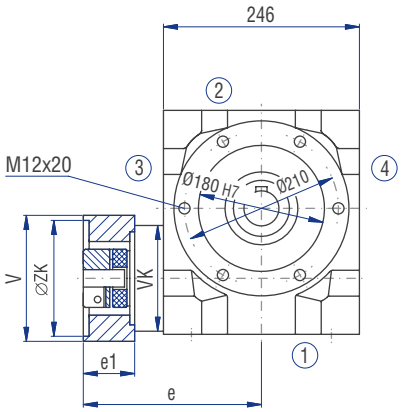
Mass ca. [kg]
53

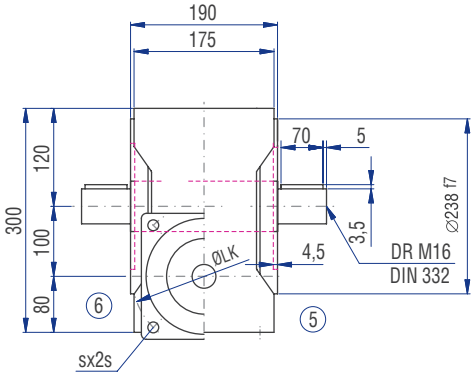
The mass of the gearbox may deviate depending on the flange size and the gear ratio.

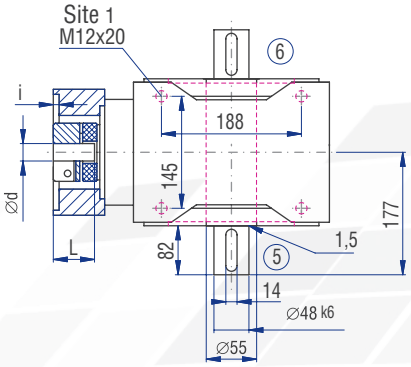
Inertia moments Coupling J

	KN	KNN	SN
	J [kgcm²]	J [kgcm²]	J [kgcm²]
	4.1710	4.1710	6.4250
K38	8.4580	8.4580	19.6460

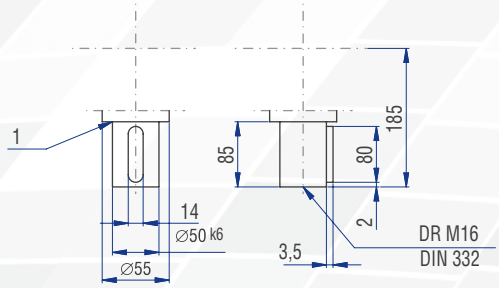


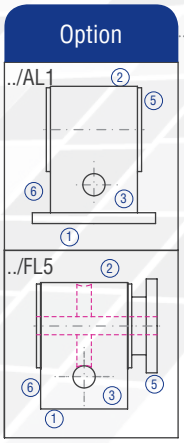


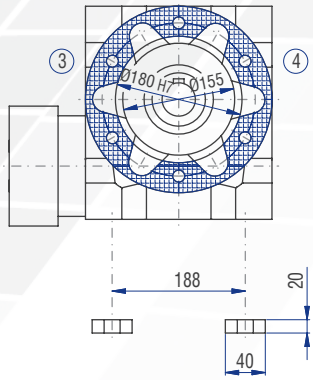


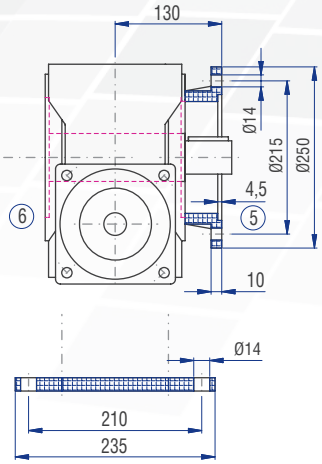


Implementation VV







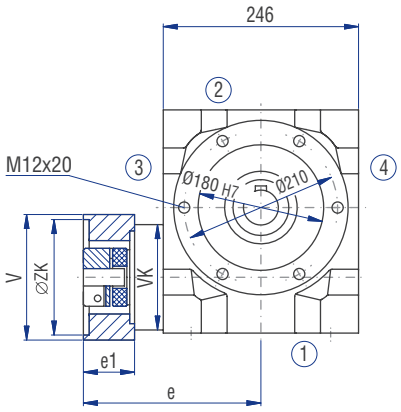


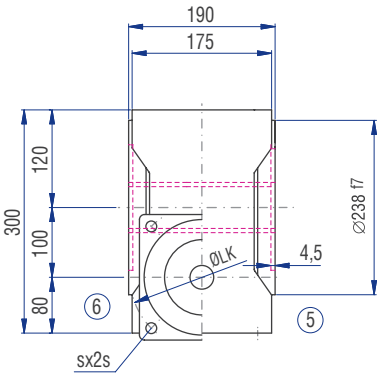
Motor dimensions

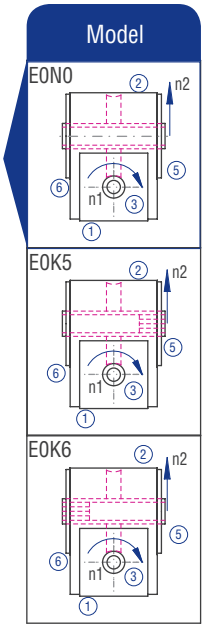
Flange no.	Motor shaft (d*l)	Thread (s)	V [mm]	ZK [mm]	LK [mm]	i [mm]	e [mm]	e1 [mm]
601	32*60	M8	160	95	130	4	242.0	62.0
611	32*60	M8	160	110	130	5	242.0	62.0
701	32*60	M8	160	110	145	5	242.0	62.0
802	32*60	M10	160	110	165	5	242.0	62.0
811	32*60	M10	160	130	165	5	242.0	62.0
403	32*60	M6	160	80	100	4	242.0	62.0
502	32*60	M8	160	95	115	4	242.0	62.0
616	32*60	M10	160	110	130	5	242.0	62.0
902	32*60	M12	160	130	215	6	242.0	62.0
911	32*60	M12	160	180	215	6	242.0	62.0

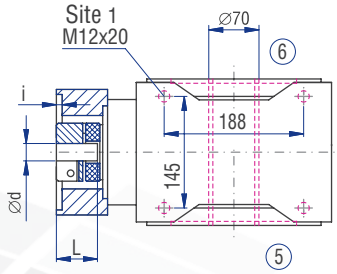
The dimensions e and e1 will change for the coupling type “clamping hub with groove” (KNN). Please contact us for consultation!

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









E0N0

E0K5 / E0K6