

Made in Germany

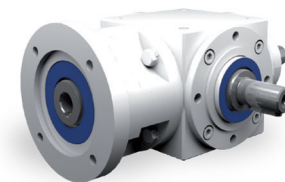
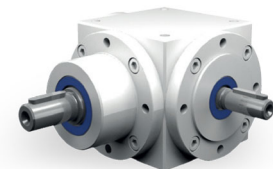
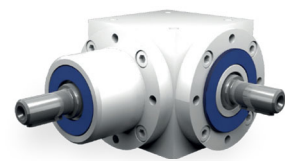
# ATEK

## ANTRIEBSTECHNIK

### Das Winkelgetriebe



Bevel gearboxes  
Type: V, VS, VL



Miniature  
bevel gearboxes

Bevel  
gearboxes

Hygiene-design  
gearboxes

Hybrid  
gearboxes

Worm  
gearboxes

Gearbox  
motors

Servo gearboxes  
(precision gearboxes)

Special  
gearboxes

ATEX  
gearboxes

Gear sets

Service

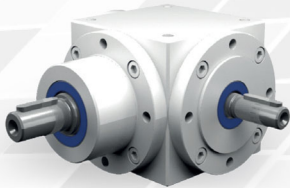


## 6.1 Type overview



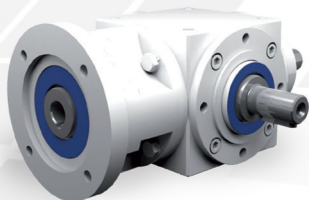
### Type V – Standard bevel gearboxes

Gear ratios:  $i = 1:1$  to  $6:1$   
Maximum output torque: 5400 Nm  
9 gearbox sizes with edge lengths of 065 to 350 mm  
Low-backlash construction < 6 angular minutes possible  
Housing made of grey cast iron or steel



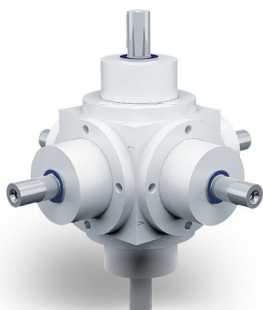
### Type VS – Type V with step-up ratio

Gear ratios:  $i = 1:1.5$  and  $1:2$   
Maximum output torque: 1200 Nm  
6 gearbox sizes with edge lengths of 090 to 260 mm  
Low-backlash construction < 10 angular minutes possible  
Larger shaft diameter ( $N_2$ ), slowly rotating  
Housing made of grey cast iron or steel



### Type VL – Type V with flange

Gear ratios:  $i = 1:1$  to  $6:1$   
Maximum output torque: 2310 Nm  
8 gearbox sizes with edge lengths of 065 to 260 mm  
Low-backlash construction < 6 angular minutes possible  
Suitable for fitting IEC standard motors  
Drive side with hollow-bored shaft and flange  
Housing made of grey cast iron or steel



### Multi shaft gearbox – with additional shafts

for gear ratios of  $1.5:1$  to  $6:1$  with type V  
for gear ratios of  $1.5:1$  to  $2:1$  with type VS  
with solid shaft or hollow shaft  
up to 6 shaft ends

## 6.2 General construction

A bevel gearbox enables alternatively stepping-down or stepping-up.

The axles intersect in the gearbox in an angle of 90°. The edge length of the housing is reflected in the gearbox size (example: V 120 – housing edge length 120 mm).

### 6.2.1 Toothing

ATEK bevel gearboxes have gear sets with high-quality spiral toothing made of hardened carburised steel. A gear set comprises one bevel pinion (small number of teeth / small diameter) and one bevel gear (large number of teeth / large diameter). Gear sets with spiral toothing offer the advantage of very favourable engagement factors (high meshing ratio). Therefore they are predestined for usage with high loads, combined with optimal running smoothness and high transmission accuracy.

### 6.2.2 Construction types

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

Construction type	No. of gear sets	Additional gears
A0 through E0	1 gear set	
F0 through K0	1 gear set	+ 1 bevel pinion or bevel gear
Branch-off gearbox	1 gear set	+ 2–3 bevel pinions/gears

Table 6.2.2-1

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

Example of order code: V 090 1:1 A0 - 1.1 -1000 /0000

### 6.2.3 Threaded mounting holes

All 6 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:

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
0	-	3, 5, 6
1, 2, 3, 4, 5, 6	1, 2, 4	3, 5, 6
9	1, 2, 4	3, 5, 6

Table 6.2.3-1

The standard version has the order code 9.

Example of order code for mounting option 9: V 090 1:1 A0 - 9.1 -1000 /0000

Other mounting options must be enquired.

### 6.2.4 Installation position

The installation position is defined by the gearbox side directed downwards during operation and will be indicated by the associated numeral. 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.

Please contact us for consultation if the angle of the gearbox side directed downwards deviates more than 15° from the horizontal position.

For an optimal technical design of the gearboxes, we principally ask to specify the installation position.

Example of order code for installation position 2: V 090 1:1 A0 - 1.2 -1000 /0000

### 6.2.5 Shaft designation – allocation to the gearbox sides

The fast-rotating shaft has the speed  $n_1$  and is identified by  $N_1$ .

The bevel pinion is located on this shaft. The slowly rotating shaft has the speed  $n_2$  and is identified by  $N_2$ .

The bevel gear is located on this shaft.

The gearbox sides are identified by the numerals 1 to 6 (see Figure 4.3.1-1; Gearbox sides)

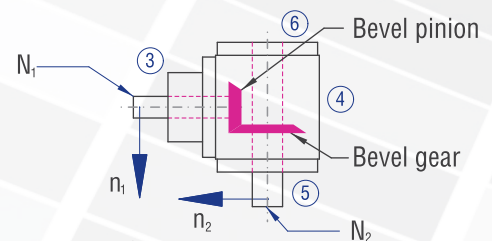


Figure 6.2.5-1; Shaft designations

### 6.2.6 Preferred direction of rotation

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

# 6 Bevel gearboxes

## 6.2.7 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.

## 6.2.8 Lubrication

With the bevel gearboxes, different conditions for the lubrication will arise depending on gearbox size, rotational speed, on-period, temperature, and type of application. The decisive variable is the circumferential speed of the bevel gear. Depending thereon, different oil quantities and viscosities will be 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: V 090 1:1 C0 - 1.1 -1000 /B0

Here, /B0 means:

	Abbreviation	Explanation	Reference
Letter	B	Oil viscosity 220	Table 6.2.8-1
Numeral	0	no venting	Table 6.2.8-2

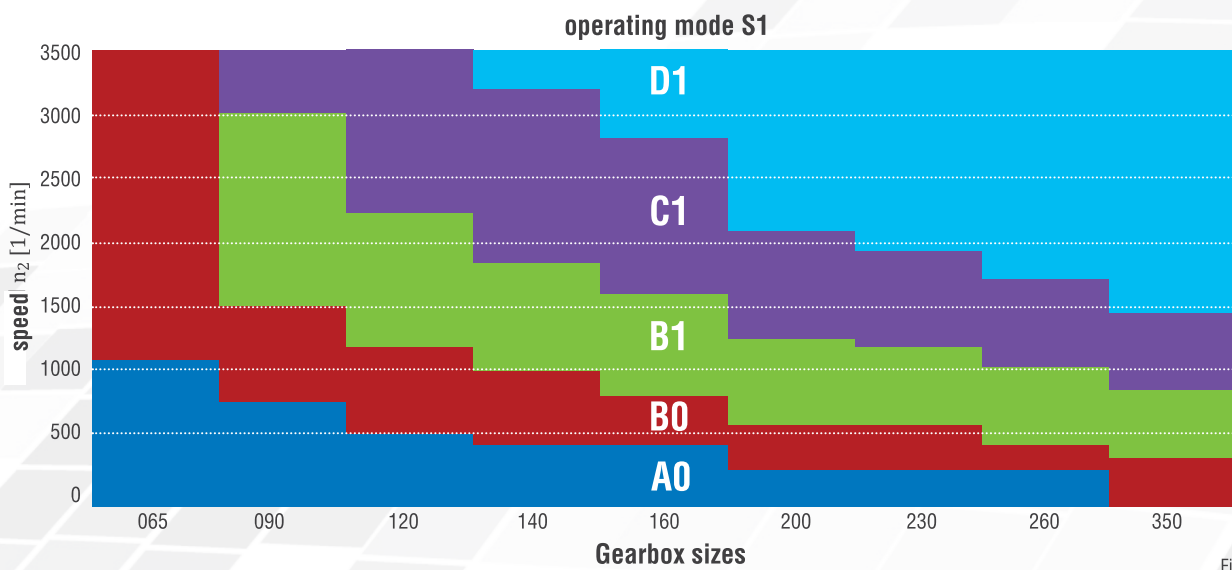


Figure 6.2.8-1

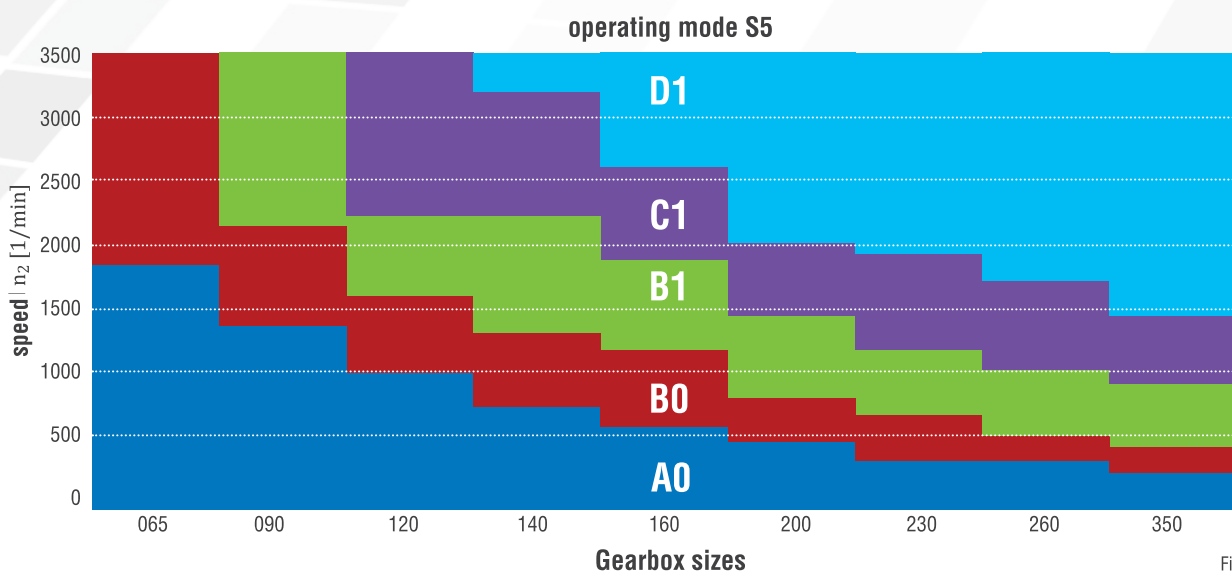


Figure 6.2.8-2

For the abbreviations, refer to the following tables.

## Oil viscosity table

Letter	Viscosity
A	460
B	220
C	68
D	Injection lubrication
F	Fluid grease

Table 6.2.8-1

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.

Numeral	Vent filter
0	No
1	Yes

Table 6.2.8-2

## 6.2.9 Vent filter

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

Gearbox size	V065	V090	V120	V140	V160	V200	V230	V350
Pipe thread	G1/4	G1/4	G3/8	G3/8	G1/2	G1/2	G1/2	G1/2

The position of the filter will be specified in the order documents. Please refer to the following table for the position of the filter. The meaning here, for example: /B1-E4 = oil viscosity 220; vent filter on side 4.

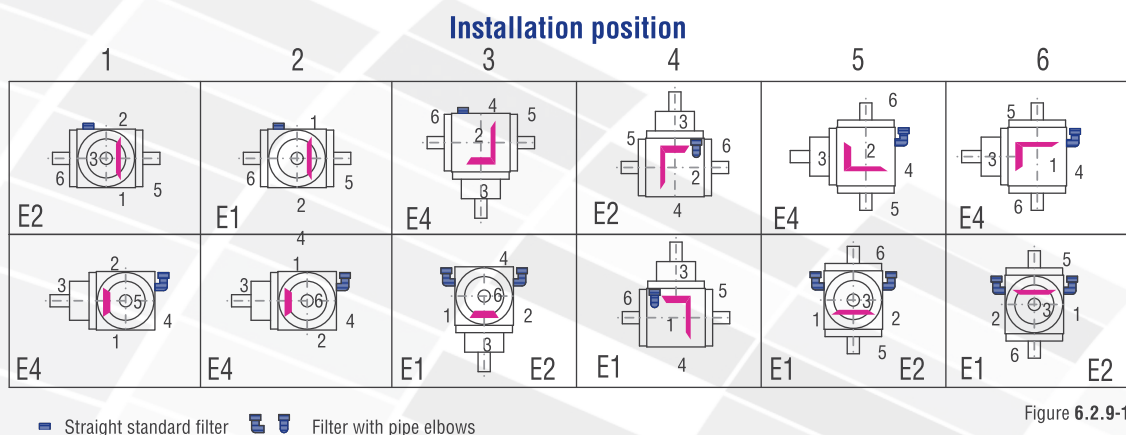


Figure 6.2.9-1

## 6.2.10 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 shaft **N**<sub>1</sub> has been fixed. A force of around 2% of the nominal torque is applied to the shaft **N**<sub>2</sub> 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. (u.r. – upon request)

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

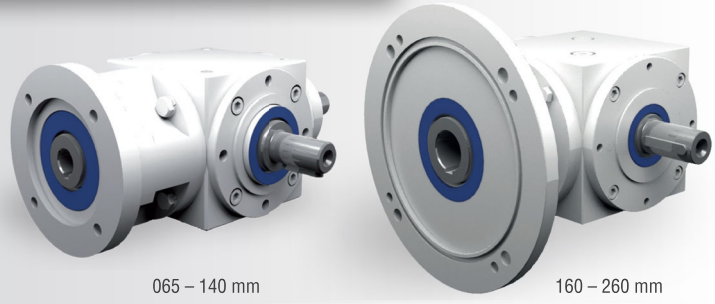
Abbreviation: u.r. – upon request

Table 6.2.10-1

# 6.5 Type VL – Type V with flange for motor mounting

## 6.5.1 Features

- Gear ratios:  $i = 1:1$  to  $6:1$
- Maximum output torque: 2310 Nm
- 8 gearbox sizes with edge lengths of 065 to 260 mm
- Low-backlash construction < 6 angular minutes possible
- Suitable for fitting IEC standard motors
- Drive side with hollow-bored shaft and flange
- Housing made of grey cast iron or steel



## 6.5.2 Models

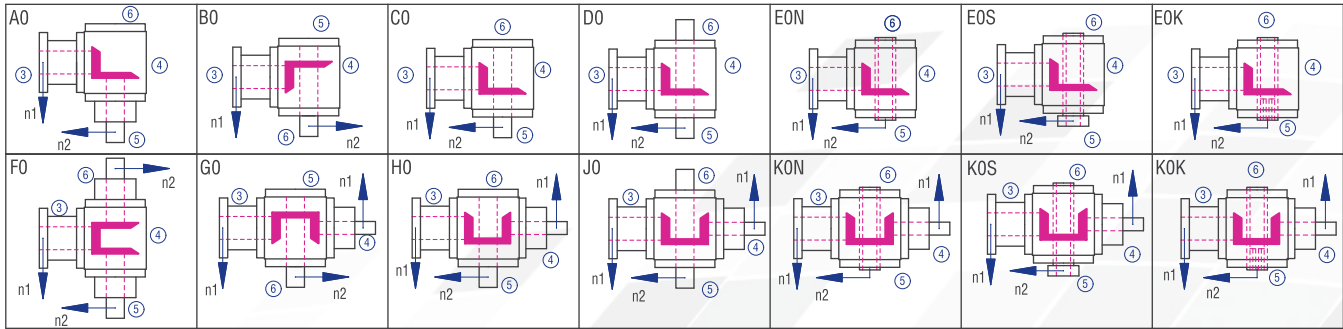


Figure 6.5.2-1; Models

## 6.5.3 Gearbox sides

The example shows the Model C0

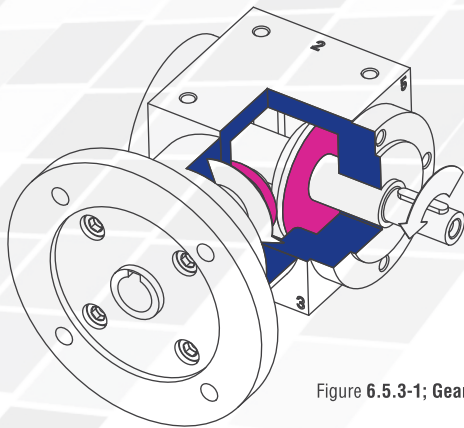


Figure 6.5.3-1; Gearbox sides

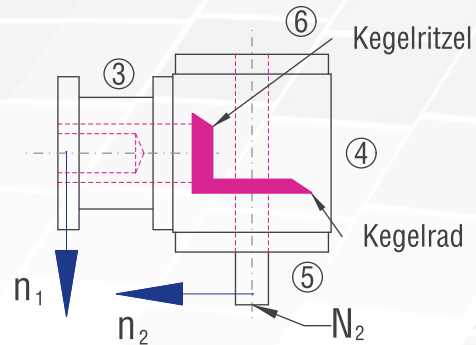


Figure 6.5.3-2; Shaft designations

## 6.5.4 Order code

The order code reflects the customer specifications. Example:

Type	Size	Gear ratio	Model	Fixing side	Installation position	Speed $n_2$	Design
VL	065	1:1	CO-	1.	1-	1500	/0000
<b>Description</b>	Size Table 6.5.5-1	Table 6.5.5-1	Figure 6.5.2-1	Gearbox side on which fixing is made; Table 6.2.3-1; Figure 4.3.1-1; Gearbox sides	Gearbox side directed downwards; Figure 4.3.1-1 Gearbox sides	Slowly rotating shaft; Table 6.5.5-1	Standard
	D120	/14x30					
	Flange diameter	Shaft diameter x length					

Table 6.5.4-1

## 6.5.5 Overview of performance data

P <sub>1</sub> [kW]	n <sub>2</sub> [rpm]	T <sub>2</sub> [Nm]	T <sub>2N</sub> [Nm]	T <sub>2 max</sub> [Nm]	i [-]	IEC motor	Gearbox size	P <sub>1NT</sub> [kW]
0.12	1340	0.81	11	25	1:1	063A-4	065	1.6
	893	1.22	11	25	1.5:1	063A-4	065	1.6
	670	1.62	11	25	2:1	063A-4	065	1.6
	593	1.84	13	25	1.5:1	063B-6	065	1.6
	447	2.44	11	23	3:1	063A-4	065	1.6
	296	3.68	12	23	3:1	063B-6	065	1.6
0.18	2680	0.61	10	25	1:1	063A-2	065	1.6
	1787	0.91	10	25	1.5:1	063A-2	065	1.6
	1340	1.22	10	25	1:1	063B-4	065	1.6
	893	1.83	10	25	1.5:1	063B-4	065	1.6
	670	2.44	10	25	2:1	063B-4	065	1.6
	593	2.75	10	25	1.5:1	071A-6	065	1.6
	450	3.63	11	23	3:1	063B-4	065	1.6
	445	3.67	10	25	2:1	071A-6	065	1.6
	335	4.87	27	70	4:1	063B-4	090	3.8
	296	5.52	11	23	3:1	071A-6	065	1.6
	268	6.09	27	60	5:1	063B-4	090	3.8
	224	7.29	25	50	6:1	063B-4	090	3.8
	178	9.17	31	60	5:1	071A-6	090	3.8
	167	9.75	32	70	4:1	080A-8	090	3.8
	148	11.03	29	50	6:1	071A-6	090	3.8
	112	14.58	30	50	6:1	080A-8	090	3.8
0.25	2700	0.84	10	25	1:1	063B-2	065	1.6
	1800	1.26	10	25	1.5:1	063B-2	065	1.6
	1350	1.68	10	25	1:1	071A-4	065	1.6
	890	2.55	10	25	1:1	071B-6	065	1.6
	675	3.36	10	25	2:1	071A-4	065	1.6
	540	4.20	23	60	5:1	063B-2	090	3.8
	450	5.04	27	70	3:1	071A-4	090	3.8
	450	5.04	11	25	3:1	071A-4	065	1.6
	337	6.72	27	70	4:1	071A-4	090	3.8
	296	7.65	31	70	3:1	071B-6	090	3.8
	270	8.40	27	60	5:1	071A-4	090	3.8
	225	10.08	25	50	6:1	071A-4	090	3.8
	178	12.74	31	60	5:1	071B-6	090	3.8
	148	15.33	29	50	6:1	071B-6	090	3.8
	134	16.93	32	60	5:1	080B-8	090	3.8
	112	20.25	30	50	6:1	080B-8	090	3.8
0.37	2800	1.20	10	25	1:1	071A-2	065	1.6
	1400	2.40	10	25	2:1	071A-2	065	1.6
	1350	2.49	10	25	1:1	071B-4	065	1.6
	933	3.60	10	23	3:1	071A-2	065	1.6
	900	3.73	29	40	1.5:1	071B-4	090	3.8
	675	4.97	10	25	2:1	071B-4	065	1.6
	675	4.97	27	30	2:1	071B-4	090	3.8
	600	5.59	32	40	1.5:1	080A-6	090	3.8
	560	5.99	23	60	5:1	071A-2	090	3.8
	450	7.46	27	70	3:1	071B-4	090	3.8
	337	9.95	27	70	4:1	071B-4	090	3.8
	270	12.43	27	60	5:1	071B-4	090	3.8
	225	14.92	25	50	6:1	071B-4	090	3.8
	180	18.65	31	60	5:1	080A-6	090	3.8
	150	22.38	29	50	6:1	080A-6	090	3.8
	0.55	2810	1.78	10	25	1:1	071B-2	065
1873		2.66	10	23	1.5:1	071B-2	065	1.6
1405		3.55	10	25	2:1	071B-2	065	1.6
936		5.33	10	23	3:1	071B-2	065	1.6
936		5.33	23	70	3:1	071B-2	090	3.8
906		5.50	29	40	1.5:1	080A-4	090	3.8
702		7.10	23	70	4:1	071B-2	090	3.8
680		7.34	27	30	2:1	080A-4	090	3.8
600		8.32	32	40	1.5:1	080B-6	090	3.8
562		8.88	23	60	5:1	071B-2	090	3.8
453		11.01	27	70	3:1	080A-4	090	3.8
340		14.68	27	70	4:1	080A-4	090	3.8
300		16.63	31	70	3:1	080B-6	090	3.8
272		18.35	72	140	5:1	080A-4	120	6.2
227		21.98	25	50	6:1	080A-4	090	3.8
180		27.72	31	60	5:1	080B-6	090	3.8
172	28.93	82	155	4:1	090L-8	120	6.2	
150	33.27	67	120	6:1	080B-6	120	6.2	
138	36.16	86	140	5:1	090L-8	120	6.2	
115	43.39	69	120	6:1	090L-8	120	6.2	
0.75	1880	3.62	25	40	1.5:1	080A-2	090	3.8
	1410	4.83	23	30	2:1	080A-2	090	3.8
	1360	5.00	32	105	1:1	080B-4	090	3.8
	940	7.24	23	70	3:1	080A-2	090	3.8
	906	7.50	29	40	1.5:1	080B-4	090	3.8
	705	9.65	23	70	4:1	080A-2	090	3.8
	680	10.01	27	30	2:1	080B-4	090	3.8
	606	11.22	86	100	1.5:1	090S-6	120	6.2
	564	12.06	27	60	5:1	080A-2	090	3.8
	453	15.01	27	70	3:1	080B-4	090	3.8
	340	20.01	27	70	4:1	080B-4	090	3.8
	303	22.43	82	155	3:1	090S-6	120	6.2
	272	25.02	72	140	5:1	080B-4	120	6.2
	227	29.98	64	120	6:1	080B-4	120	6.2
	182	37.39	80	140	5:1	090S-6	120	6.2
	152	44.77	67	113	6:1	090S-6	120	6.2
138	49.31	86	140	5:1	100LA-8	120	6.2	
115	59.17	69	118	6:1	100LA-8	120	6.2	
1.1	2820	3.54	27	105	1:1	080B-2	090	3.8
	1880	5.31	25	40	1.5:1	080B-2	090	3.8
	1410	7.08	23	30	2:1	080B-2	090	3.8
	940	10.62	23	70	3:1	080B-2	090	3.8
	920	10.85	78	100	1.5:1	090S-4	120	6.2
	705	14.16	23	70	4:1	080B-2	090	3.8
	690	14.46	73	80	2:1	090S-4	120	6.2
	606	16.45	86	100	1.5:1	090L-6	120	6.2
	564	17.69	60	140	5:1	080B-2	120	6.2
	460	21.70	74	155	3:1	090S-4	120	6.2
	345	28.93	74	155	4:1	090S-4	120	6.2
	303	32.90	82	155	3:1	090L-6	120	6.2
	276	36.16	72	140	5:1	090S-4	120	6.2
	227	43.87	79	155	4:1	090L-6	120	6.2
	182	54.83	80	140	5:1	090L-6	120	6.2
	152	65.66	67	120	6:1	090L-6	120	6.2
138	72.32	86	140	5:1	100LB-8	120	6.2	
1.5	1420	9.58	56	80	2:1	090S-2	120	6.2
	946	14.38	58	155	3:1	090S-2	120	6.2
	920	14.79	78	100	1.5:1	090L-4	120	6.2
	710	19.17	60	155	4:1	090S-2	120	6.2
	690	19.72	73	80	2:1	090L-4	120	6.2
	613	22.19	78	100	1.5:1	100LA-6	120	6.2
	568	23.96	60	140	5:1	090S-2	120	6.2
	460	29.58	74	155	3:1	090L-4	120	6.2
	345	39.45	74	155	4:1	090L-4	120	6.2
	306	44.38	82	155	3:1	100LA-6	120	6.2
	276	49.31	72	140	5:1	090L-4	120	6.2
	230	59.17	64	120	6:1	090L-4	120	6.2
	184	73.96	80	140	5:1	100LA-6	120	6.2
	154	88.37	113	200	6:1	100LA-6	140	10
	140	97.21	130	250	5:1	112M-8	140	10
	117	116.31	118	200	6:1	112M-8	140	10
2.2	1893	10.54	61	100	1.5:1	090L-2	120	6.2
	1420	14.06	56	80	2:1	090L-2	120	6.2
	940	21.23	78	100	1.5:1	100LA-4	120	6.2
	710	28.11	60	155	4:1	090L-2	120	6.2
	626	31.85	80	100	1.5:1	112M-6	120	6.2
	568	35.14	60	140	5:1	090L-2	120	6.2
	470	42.47	74	155	3:1	100LA-4	120	6.2
	352	56.62	74	155	4:1	100LA-4	120	6.2
	313	63.70	82	155	3:1	112M-6	120	6.2
	188	106.17	124	250	5:1	112M-6	140	10
	157	127.13	165	200	6:1	112M-6	160	15
	141	141.56	240	420	5:1	132SB-8	160	15
	118	169.15	178	200	6:1	132SB-8	160	15

Table 6.5.5-1

Bevel gearboxes

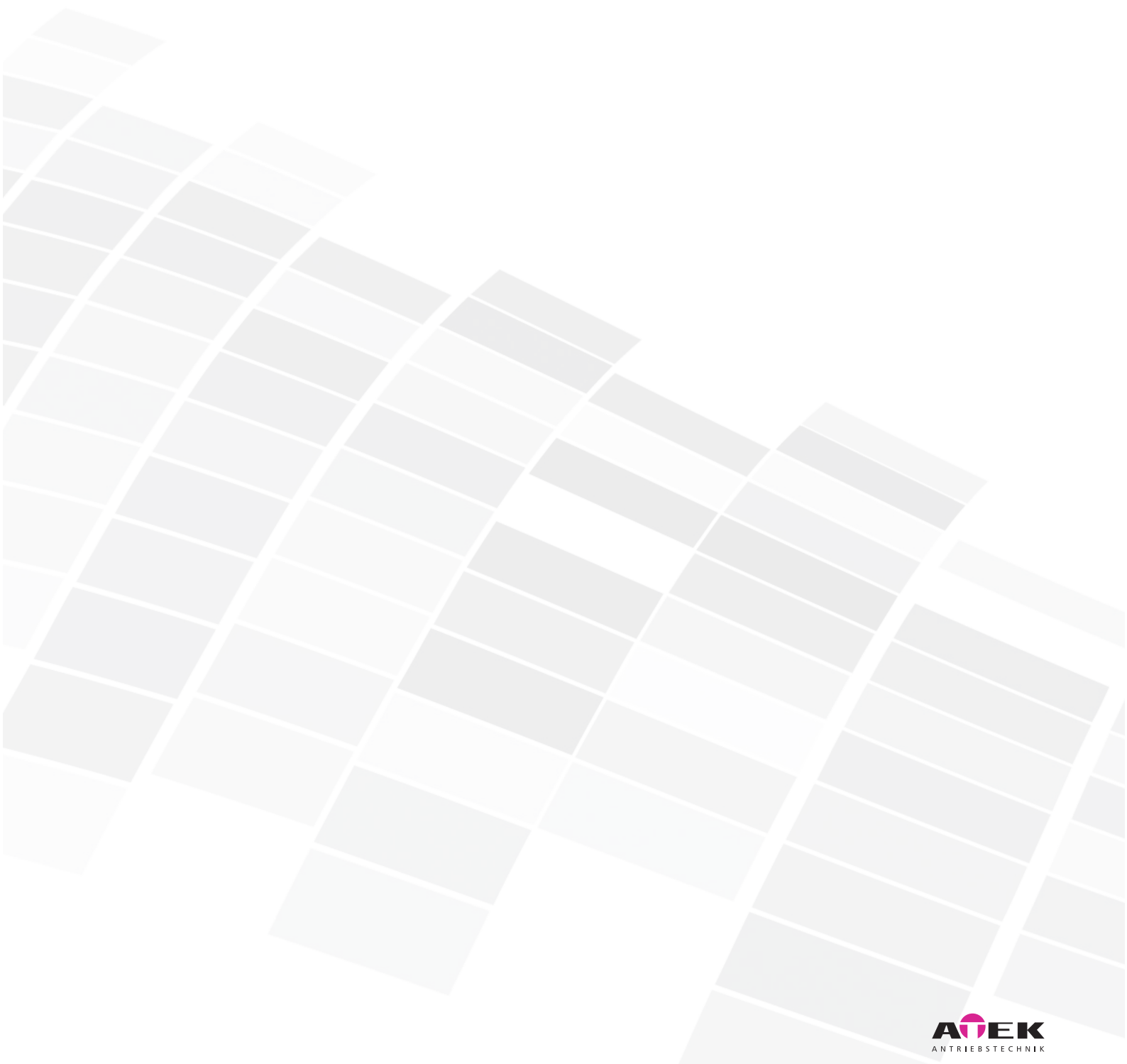
# 6.5 Type VL – Type V with flange for motor mounting

P <sub>1</sub> [kW]	n <sub>2</sub> [rpm]	T <sub>2</sub> [Nm]	T <sub>2N</sub> [Nm]	T <sub>2 max</sub> [Nm]	i [-]	IEC motor	Gearbox size	P <sub>1NT</sub> [kW]
3	1880	3.62	25	40	1.5:1	080A-2	090	3.8
	1410	4.83	23	30	2:1	080A-2	090	3.8
	1360	5.00	32	105	1:1	080B-4	090	3.8
	940	7.24	23	70	3:1	080A-2	090	3.8
	906	7.50	29	40	1.5:1	080B-4	090	3.8
	705	9.65	23	70	4:1	080A-2	090	3.8
	680	10.01	27	30	2:1	080B-4	090	3.8
	606	11.22	86	100	1.5:1	090S-6	120	6.2
	564	12.06	27	60	5:1	080A-2	090	3.8
	453	15.01	27	70	3:1	080B-4	090	3.8
	340	20.01	27	70	4:1	080B-4	090	3.8
	303	22.43	82	155	3:1	090S-6	120	6.2
	272	25.02	72	140	5:1	080B-4	120	6.2
	227	29.98	64	120	6:1	080B-4	120	6.2
	182	37.39	80	140	5:1	090S-6	120	6.2
152	44.77	67	113	6:1	090S-6	120	6.2	
4	138	49.31	86	140	5:1	100LA-8	120	6.2
	115	59.17	69	118	6:1	100LA-8	120	6.2
	2820	3.54	27	105	1:1	080B-2	090	3.8
	1880	5.31	25	40	1.5:1	080B-2	090	3.8
	1410	7.08	23	30	2:1	080B-2	090	3.8
	940	10.62	23	70	3:1	080B-2	090	3.8
	920	10.85	78	100	1.5:1	090S-4	120	6.2
	705	14.16	23	70	4:1	080B-2	090	3.8
	690	14.46	73	80	2:1	090S-4	120	6.2
	606	16.45	86	100	1.5:1	090L-6	120	6.2
	564	17.69	60	140	5:1	080B-2	120	6.2
	460	21.70	74	155	3:1	090S-4	120	6.2
	345	28.93	74	155	4:1	090S-4	120	6.2
	303	32.90	82	155	3:1	090L-6	120	6.2
	276	36.16	72	140	5:1	090S-4	120	6.2
227	43.87	79	155	4:1	090L-6	120	6.2	
5.5	182	54.83	80	140	5:1	090L-6	120	6.2
	152	65.66	67	120	6:1	090L-6	120	6.2
	138	72.32	86	140	5:1	100LB-8	120	6.2
	1420	9.58	56	80	2:1	090S-2	120	6.2
	946	14.38	58	155	3:1	090S-2	120	6.2
	920	14.79	78	100	1.5:1	090L-4	120	6.2
	710	19.17	60	155	4:1	090S-2	120	6.2
	690	19.72	73	80	2:1	090L-4	120	6.2
	613	22.19	78	100	1.5:1	100LA-6	120	6.2
	568	23.96	60	140	5:1	090S-2	120	6.2
	460	29.58	74	155	3:1	090L-4	120	6.2
	345	39.45	74	155	4:1	090L-4	120	6.2
	306	44.38	82	155	3:1	100LA-6	120	6.2
	276	49.31	72	140	5:1	090L-4	120	6.2
	230	59.17	64	120	6:1	090L-4	120	6.2
184	73.96	80	140	5:1	100LA-6	120	6.2	
154	88.37	113	200	6:1	100LA-6	140	10	
140	97.21	130	250	5:1	112M-8	140	10	
7.5	117	116.31	118	200	6:1	112M-8	140	10
	1893	10.54	61	100	1.5:1	090L-2	120	6.2
	1420	14.06	56	80	2:1	090L-2	120	6.2
	940	21.23	78	100	1.5:1	100LA-4	120	6.2
	710	28.11	60	155	4:1	090L-2	120	6.2
	626	31.85	80	100	1.5:1	112M-6	120	6.2
	568	35.14	60	140	5:1	090L-2	120	6.2
	470	42.47	74	155	3:1	100LA-4	120	6.2
	352	56.62	74	155	4:1	100LA-4	120	6.2
	313	63.70	82	155	3:1	112M-6	120	6.2
	188	106.17	124	250	5:1	112M-6	140	10
	157	127.13	165	200	6:1	112M-6	160	15
	141	141.56	240	420	5:1	132SB-8	160	15
	118	169.15	178	200	6:1	132SB-8	160	15
	240	283.5	485	860	4:1	160MB-6	200	26
192	354.4	420	860	5:1	160MB-6	200	26	
160	425.3	540	1000	6:1	160MB-6	230	34	
144	472.5	1100	1910	5:1	160LB-8	260	42	
144	472.5	770	1200	5:1	160LB-8	230	34	

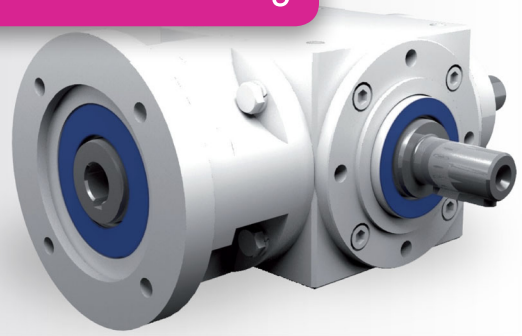
Table 6.5.5-1

P <sub>1</sub> [kW]	n <sub>2</sub> [rpm]	T <sub>2</sub> [Nm]	T <sub>2N</sub> [Nm]	T <sub>2 max</sub> [Nm]	i [-]	IEC motor	Gearbox size	P <sub>1NT</sub> [kW]
9	2910	28.06	120	430	1:1	132MA-2	140	10
	1940	42.09	113	210	1.5:1	132MA-2	140	10
	1430	57.10	260	660	1:1	132MC-4	160	15
	1430	57.10	162	430	1:1	132MC-4	140	10
	970	84.18	190	457	3:1	132MA-2	160	15
	953	85.65	252	360	1.5:1	132MC-4	160	15
	953	85.65	155	210	1.5:1	132MC-4	140	10
	727	112.24	180	422	4:1	132MA-2	160	15
	715	114.20	138	180	2:1	132MC-4	140	10
	715	114.20	245	320	2:1	132MC-4	160	15
	582	140.30	180	420	5:1	132MA-2	160	15
	476	171.30	230	457	3:1	132MC-4	160	15
	357	228.40	220	422	4:1	132MC-4	160	15
	286	285.50	380	860	5:1	132MC-4	200	26
	238	342.59	490	1000	6:1	132MC-4	230	34
11	1940	51.40	330	600	1.5:1	160MA-2	200	26
	1465	68.10	450	1090	1:1	160MB-4	200	26
	976	102.20	437	600	1.5:1	160MB-4	200	26
	732	136.20	425	530	2:1	160MB-4	200	26
	640	155.90	505	600	1.5:1	160LA-6	200	26
	582	171.50	300	860	5:1	160MA-2	200	26
	488	204.40	515	910	3:1	160MB-4	200	26
	366	272.50	455	860	4:1	160MB-4	200	26
	293	340.60	380	860	5:1	160MB-4	200	26
	240	415.80	485	860	4:1	160LA-6	200	26
	192	519.80	990	1910	5:1	160LA-6	260	42
	182	546.80	1100	1940	4:1	180L-8	260	42
	146	683.50	1100	1910	5:1	180L-8	260	42
	1953	69.70	330	600	1.5:1	160MB-2	200	26
	1465	92.90	450	1090	1:1	160LA-4	230	34
1465	92.90	450	1090	1:1	160LA-4	200	26	
15	976	139.30	437	600	1.5:1	160LA-4	200	26
	732	185.80	425	530	2:1	160LA-4	200	26
	646	210.40	505	600	1.5:1	180L-6	200	26
	586	232.20	300	860	5:1	160MB-2	200	26
	488	278.70	515	910	3:1	160LA-4	200	26
	366	371.60	455	860	4:1	160LA-4	200	26
	293	464.50	880	1910	5:1	160LA-4	260	42
	242	561.18	675	1300	4:1	180L-6	230	34
	242	561.20	1050	1940	4:1	180L-6	260	42
	194	701.50	990	1910	5:1	180L-6	260	42
	146	932.10	1100	1910	5:1	200LB-8	260	42
	1960	85.60	330	600	1.5:1	160L-2	200	26
	1470	114.20	450	1090	1:1	180M-4	200	26
	980	171.30	437	600	1.5:1	180M-4	200	26
	975	172.10	1050	2310	1:1	200LA-6	230	34
975	172.10	1050	2310	1:1	200LA-6	260	42	
18.5	735	228.40	425	530	2:1	180M-4	200	26
	650	258.20	1000	1000	1.5:1	200LA-6	260	42
	588	285.40	300	860	5:1	160L-2	200	26
	490	342.50	515	910	3:1	180M-4	200	26
	490	342.53	366	1000	6:1	160L-2	230	34
	367	456.70	455	860	4:1	180M-4	200	26
	325	516.43	635	1300	3:1	200LA-6	230	34
	325	516.40	990	1940	3:1	200LA-6	260	42
	294	570.90	880	1910	5:1	180M-4	260	42
	294	570.88	635	1200	5:1	180M-4	230	34
	243	690.70	1050	1940	4:1	200LA-6	260	42
	195	860.70	990	1910	5:1	200LA-6	260	42
	1470	135.80	450	1090	1:1	180L-4	230	34
	1470	135.80	450	1090	1:1	180L-4	200	26
	980	203.70	437	600	1.5:1	180L-4	200	26
735	271.60	425	530	2:1	180L-4	200	26	
650	307.10	1000	1000	1.5:1	200LB-6	260	42	
590	338.29	510	1200	5:1	180M-2	230	34	
22	490	407.30	515	910	3:1	180L-4	200	26
	487	409.80	1050	1200	2:1	200LB-6	260	42
	367	543.90	900	1940	4:1	180L-4	260	42
	367	543.12	600	1300	4:1	180L-4	230	34
	294	678.90	880	1910	5:1	180L-4	260	42
	243	821.40	1050	1940	4:1	200LB-6	260	42





## 6.5.6 Type VL 065 – Type V with flange for motor mounting



### Characteristics

Characteristic	Standard	Option
<b>Toothing</b>	Bevel gear set, spiral-toothed	See chapter 6.2.1
<b>Gear ratio</b>	1:1 to 3:1	
<b>Housing / Flanges</b>	Grey cast iron	
<b>Threaded mounting hole</b>	On all housing surfaces without flange and on all flanges.	See chapter 6.2.3
<b>Shaft</b>	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
<b>Hollow shaft</b>	Material 1 C45, shafts greased Fit with ISO 7 tolerance with parallel keyway: according to DIN 6885 Sheet 1	See chapter 4.6.3
<b>Radial shaft seal ring</b>	NBR, form A	See chapter 4.8
<b>Ambient temperature</b>	-10°C to +90°C. The values of the performance tables are valid for +20°C	See chapter 4.9.3
<b>Circumferential backlash</b>	< 30 arcmin	See chapter 6.2.10
<b>Protection class</b>	IP 54	See chapter 4.5
<b>Corrosion protection</b>	Prime coat; layer thickness > 40 µm	See chapter 4.4.1
<b>Bearing life L10h</b>	more than 15,000h	See chapter 4.9.1
<b>Oil change intervals</b>	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 6.2.8
<b>Lubricants</b>	Synthetic lubricants	See chapter 6.2.8
<b>Flange</b>	Suited for the mounting of IEC motors	
<b>Coupling</b>	Three-piece claw coupling	

## Performance data

$n_1$ [rpm]	1:1			1.5:1			2:1			3:1			4:1			5:1			6:1			
	$n_2$ [rpm]	$P_{1N}$ [kW]	$T_{2N}$ [Nm]	$n_2$ [rpm]	$P_{1N}$ [kW]	$T_{2N}$ [Nm]	$n_2$ [rpm]	$P_{1N}$ [kW]	$T_{2N}$ [Nm]	$n_2$ [rpm]	$P_{1N}$ [kW]	$T_{2N}$ [Nm]	$n_2$ [rpm]	$P_{1N}$ [kW]	$T_{2N}$ [Nm]	$n_2$ [rpm]	$P_{1N}$ [kW]	$T_{2N}$ [Nm]	$n_2$ [rpm]	$P_{1N}$ [kW]	$T_{2N}$ [Nm]	
3000	3000	3.31	10	2000	2.20	10	1500	1.65	10	1000	1.10	10										
2400	2400	2.65	10	1600	1.76	10	1200	1.32	10	800	0.88	10										
1500	1500	1.82	11	1000	1.21	11	750	0.91	11	500	0.61	11										
1000	1000	1.32	12	667	0.88	12	500	0.66	12	333	0.44	12										
750	750	1.07	13	500	0.72	13	375	0.54	13	250	0.33	12										
500	500	0.83	15	333	0.55	15	250	0.41	15	167	0.24	13										
250	250	0.47	17	167	0.31	17	125	0.23	17	83	0.12	13										
50	50	0.10	18	33	0.07	18	25	0.05	18	17	0.03	14										
$P_{1Nt}$ [kW]		1.6			1.6			1.6			1.6											
$T_{2max}$ [Nm]		25			25			25			23											

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

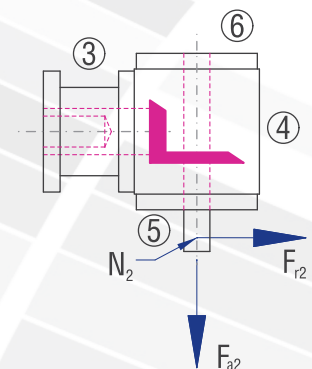
$n_2$ [rpm]	3000		1000		500		250		100		50	
$T_{2N}$ [Nm]	$F_r$ [N]	$F_a$ [N]	$F_r$ [N]	$F_a$ [N]	$F_r$ [N]	$F_a$ [N]	$F_r$ [N]	$F_a$ [N]	$F_r$ [N]	$F_a$ [N]	$F_r$ [N]	$F_a$ [N]
< 12	300	150	400	200	500	250	650	325	750	375	900	450
> 12	250	125	330	165	420	210	540	270	630	315	750	375

## Inertia moments/mass

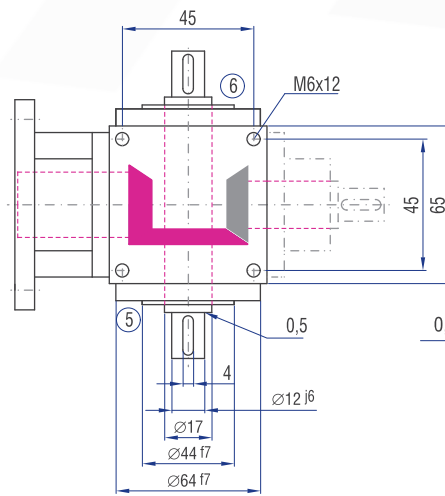
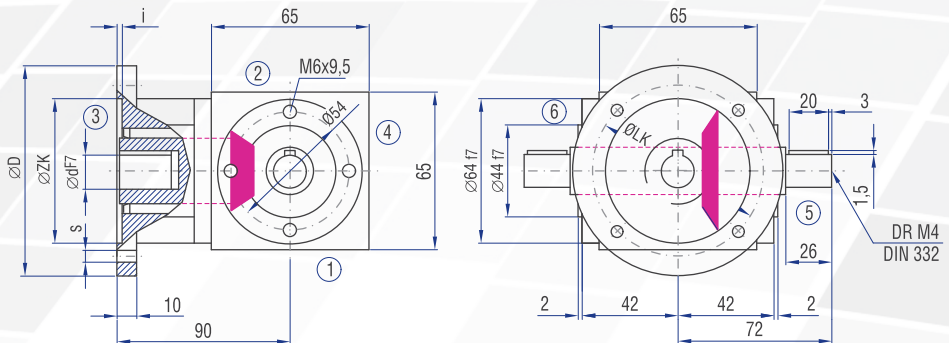
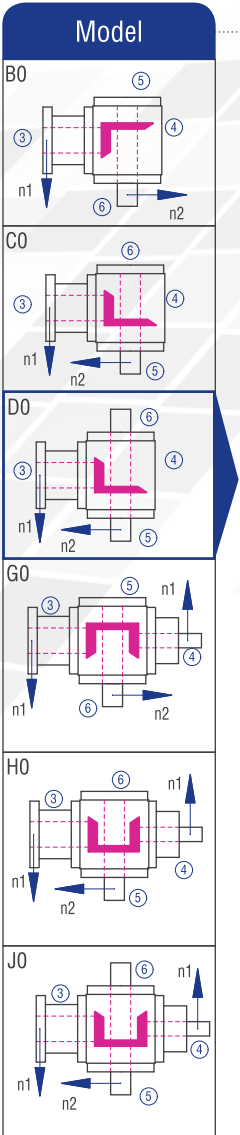
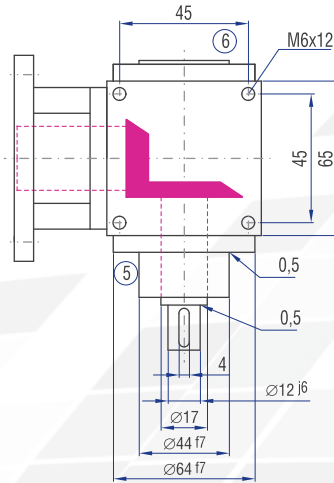
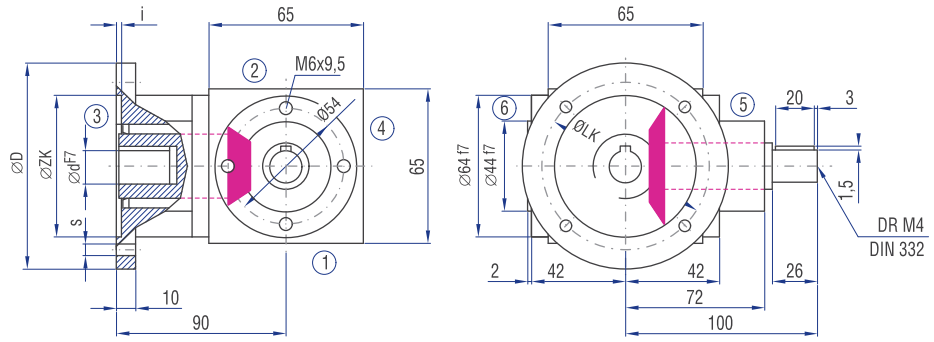
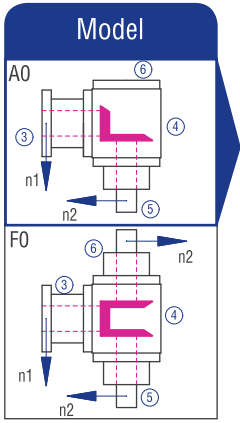
Inertia moment  $J_1$  related to the fast-rotating shaft ( $N_1$ )

Model	Inertia moment [kgcm <sup>2</sup> ]						
	1:1	1.5:1	2:1	3:1	4:1	5:1	6:1
A0	0.62060	0.48590	0.43630	0.37670			
B0	0.65490	0.55640	0.48540	0.37320			
C0	0.65490	0.55640	0.48540	0.37320			
D0	0.66480	0.56080	0.48790	0.37430			
E0N	0.70720	0.60870	0.53770	0.42550			
E0S	0.83300	0.73450	0.66350	0.55130			
F0	0.81500	0.57230	0.48490	0.39830			
G0	0.84930	0.71060	0.62070	0.45520			
H0	0.84930	0.71060	0.62070	0.45520			
J0	0.85920	0.71500	0.62320	0.45630			
K0N	0.90160	0.76290	0.67300	0.50750			
K0S	1.02740	0.88870	0.79880	0.63330			

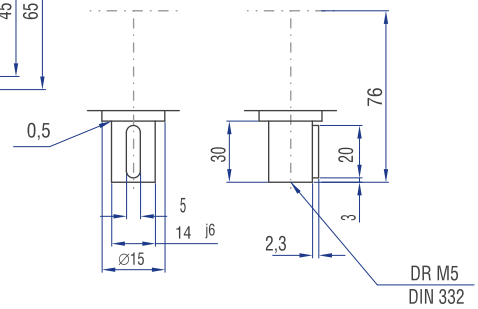
Mass [kg]
3.3
3.2
3.2
3.3
3.1
3.1
3.7
3.6
3.6
3.7
3.5
3.5



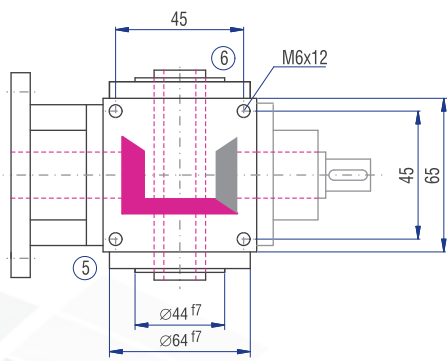
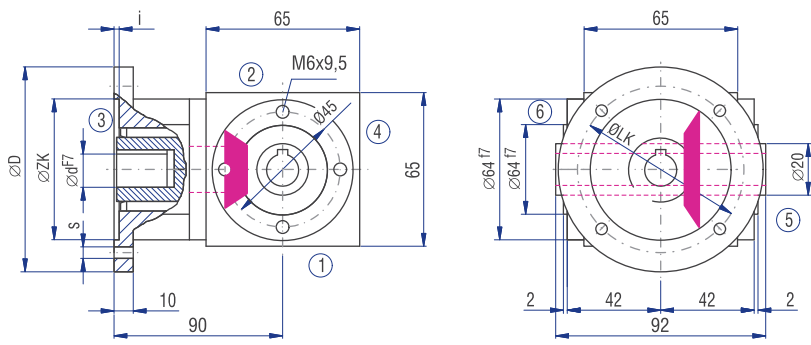
# 6.5.6 Type VL 065 – Type V with flange for motor mounting



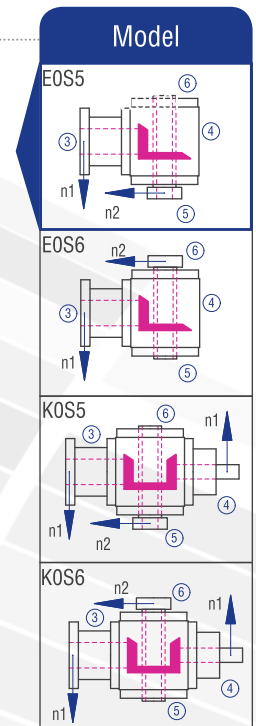
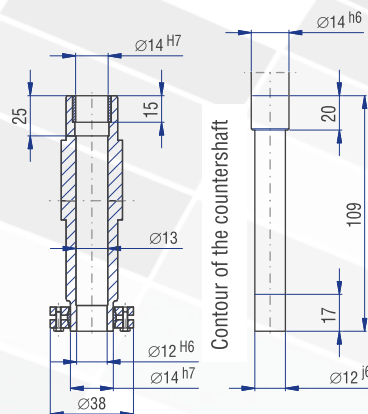
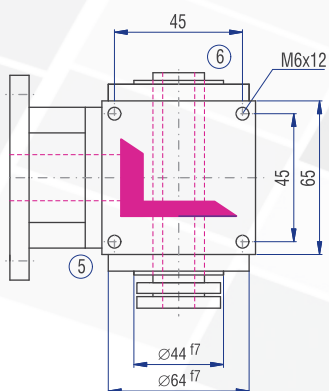
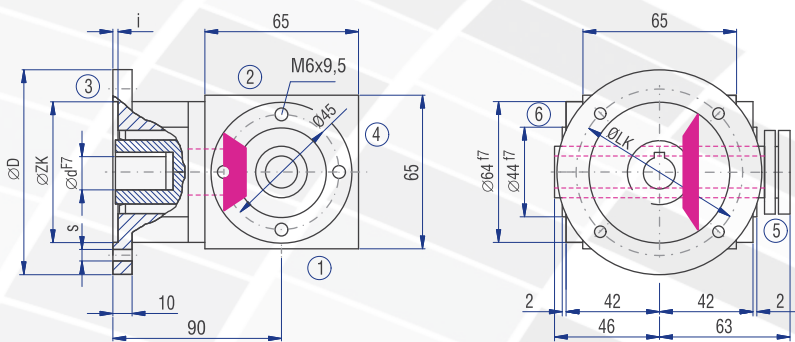
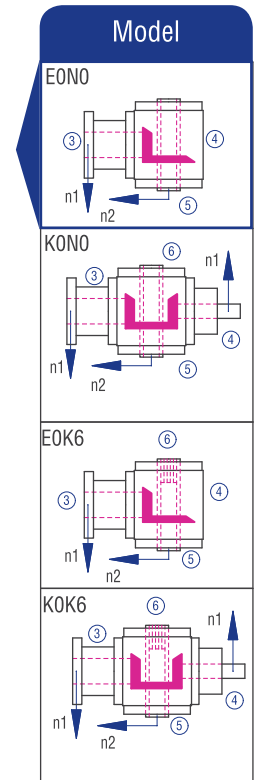
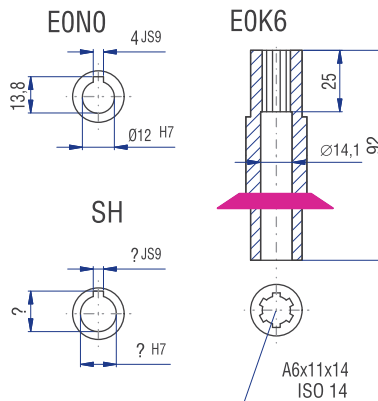
Implementation VV  
on demand



IEC motor	Model	Shaft (dxl)	D [mm]	LK [mm]	ZK [mm]	s [mm]	i [mm]
63	B14	11x23	120	100	80	7	3
	B5	11x23	140	115	95	9	3
71	B14	14x30	105	85	70	7	3
	B14	14x30	140	115	95	9	3

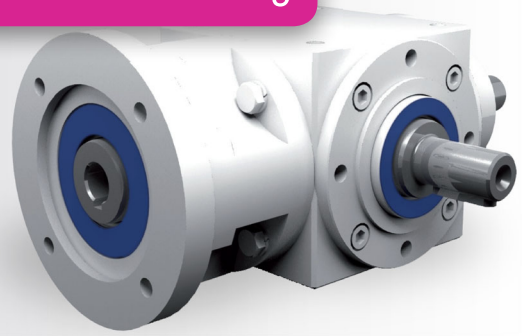


### Implementation



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.

## 6.5.7 Type VL 090 – Type V with flange for motor mounting



### Characteristics

Characteristic	Standard	Option
<b>Toothing</b>	Bevel gear set, spiral-toothed	See chapter 6.2.1
<b>Gear ratio</b>	1:1 to 6:1	
<b>Housing / Flanges</b>	Grey cast iron	
<b>Threaded mounting hole</b>	On all housing surfaces without flange and on all flanges.	See chapter 6.2.3
<b>Shaft</b>	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
<b>Hollow shaft</b>	Material 1 C45, shafts greased Fit with ISO 7 tolerance with parallel keyway: according to DIN 6885 Sheet 1	See chapter 4.6.3
<b>Radial shaft seal ring</b>	NBR, form A	See chapter 4.8
<b>Ambient temperature</b>	-10°C to +90°C. The values of the performance tables are valid for +20°C	See chapter 4.9.3
<b>Circumferential backlash</b>	< 30 arcmin	See chapter 6.2.10
<b>Protection class</b>	IP 54	See chapter 4.5
<b>Corrosion protection</b>	Prime coat; layer thickness > 40 µm	See chapter 4.4.1
<b>Bearing life L10h</b>	more than 15,000h	See chapter 4.9.1
<b>Oil change intervals</b>	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 6.2.8
<b>Lubricants</b>	Synthetic lubricants	See chapter 6.2.8
<b>Flange</b>	Suited for the mounting of IEC motors	
<b>Coupling</b>	Three-piece claw coupling	

## Performance data

$n_1$ [rpm]	1:1			1.5:1			2:1			3:1			4:1			5:1			6:1			
	$n_2$ [rpm]	$P_{1N}$ [kW]	$T_{2N}$ [Nm]	$n_2$ [rpm]	$P_{1N}$ [kW]	$T_{2N}$ [Nm]	$n_2$ [rpm]	$P_{1N}$ [kW]	$T_{2N}$ [Nm]	$n_2$ [rpm]	$P_{1N}$ [kW]	$T_{2N}$ [Nm]	$n_2$ [rpm]	$P_{1N}$ [kW]	$T_{2N}$ [Nm]	$n_2$ [rpm]	$P_{1N}$ [kW]	$T_{2N}$ [Nm]	$n_2$ [rpm]	$P_{1N}$ [kW]	$T_{2N}$ [Nm]	
3000	3000	8.93	27	2000	5.51	25	1500	3.80	23	1000	2.54	23	750	1.90	23	600	1.52	23	500	1.25	23	
2400	2400	7.41	28	1600	4.59	26	1200	3.17	24	800	2.12	24	600	1.65	25	480	1.32	25	400	1.09	25	
1500	1500	5.29	32	1000	3.20	29	750	2.23	27	500	1.49	27	375	1.12	27	300	0.89	27	250	0.74	27	
1000	1000	3.75	34	667	2.35	32	500	1.71	31	333	1.14	31	250	0.85	31	200	0.68	31	167	0.53	29	
750	750	3.06	37	500	1.93	35	375	1.32	32	250	0.88	32	188	0.66	32	150	0.53	32	125	0.40	29	
500	500	2.20	40	333	1.36	37	250	0.94	34	167	0.63	34	125	0.47	34	100	0.37	34	83	0.27	29	
250	250	1.21	44	167	0.74	40	125	0.50	36	83	0.33	36	63	0.25	36	50	0.20	36	42	0.14	30	
50	50	0.28	50	33	0.16	45	25	0.10	37	17	0.07	37	13	0.05	37	10	0.04	37	8	0.03	33	
$P_{1Nt}$ [kW]		3.8			3.8			3.8			3.8			3.8			3.8					
$T_{2max}$ [Nm]		105			80			80			70			70			60			50		

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

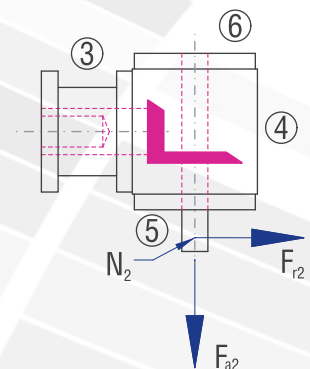
$n_2$ [rpm]	3000		1000		500		250		100		50	
$T_{2N}$ [Nm]	$F_r$ [N]	$F_a$ [N]	$F_r$ [N]	$F_a$ [N]	$F_r$ [N]	$F_a$ [N]	$F_r$ [N]	$F_a$ [N]	$F_r$ [N]	$F_a$ [N]	$F_r$ [N]	$F_a$ [N]
< 30	500	250	660	330	800	400	950	475	1250	625	1500	750
> 30	420	210	550	275	670	335	790	395	1040	520	1250	625

## Inertia moments/mass

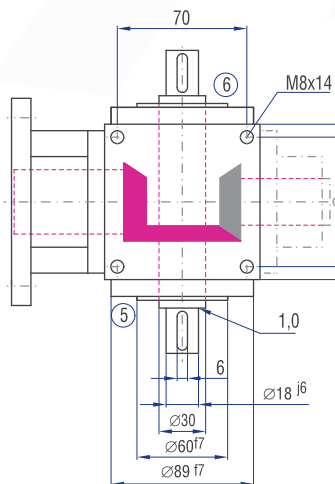
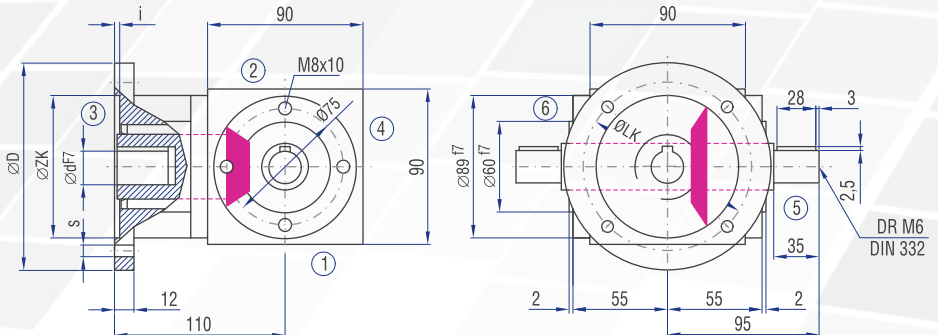
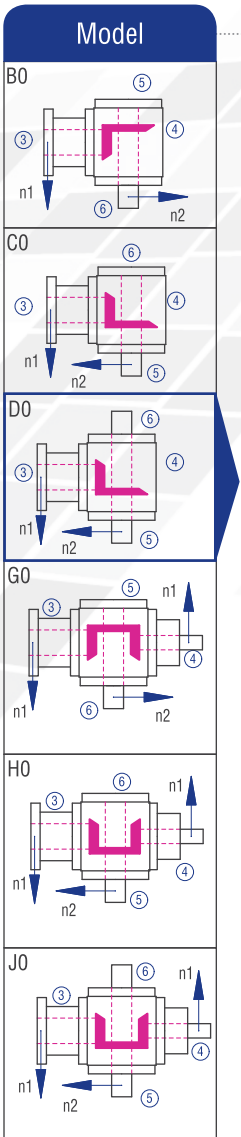
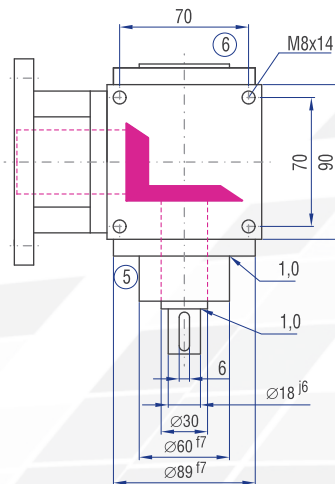
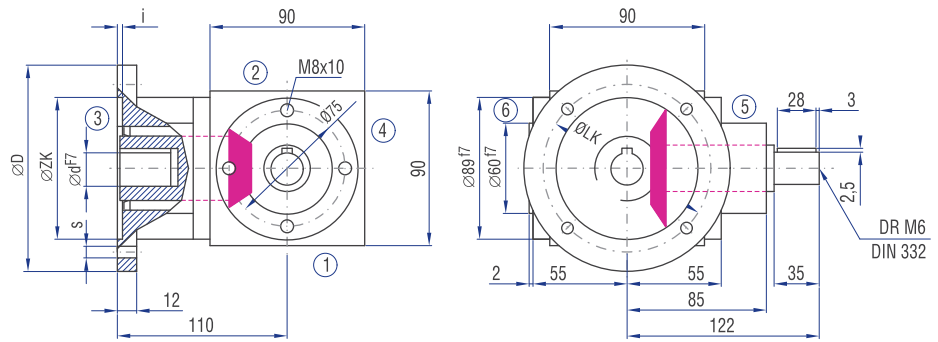
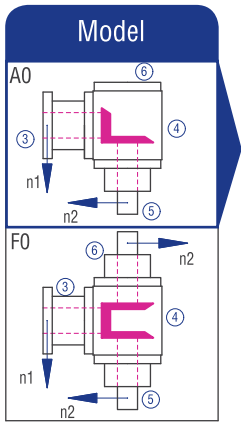
Inertia moment  $J_1$  related to the fast-rotating shaft ( $N_1$ )

Model	Inertia moment [kgcm <sup>2</sup> ]						
	1:1	1.5:1	2:1	3:1	4:1	5:1	6:1
A0	2.88400	1.82740	1.48200	1.22120	1.15050	1.09920	1.09330
B0	3.67930	2.52850	1.70350	1.37930	1.24810	1.16770	1.13730
C0	3.67930	2.52850	1.70350	1.37930	1.24810	1.16770	1.13730
D0	3.70770	2.54110	1.71060	1.38240	1.24990	1.16890	1.13810
E0N	3.57570	2.48240	1.67760	1.36780	1.24160	1.16360	1.13440
E0S	4.24630	2.78050	1.84520	1.44230	1.28350	1.19040	1.15310
F0	4.16350	2.39600	1.80190	1.36330	1.23040	1.15040	1.12890
G0	4.95880	3.44200	2.52730	2.12550	1.53120	1.44130	1.40800
H0	4.95880	3.44200	2.52730	2.12550	1.53120	1.44130	1.40800
J0	4.98720	3.45460	2.53440	2.12860	1.53300	1.44250	1.40880
K0N	4.85520	3.39590	2.50140	2.11400	1.52470	1.43720	1.40510
K0S	5.52580	3.69400	2.66900	2.18850	1.56660	1.46110	1.42380

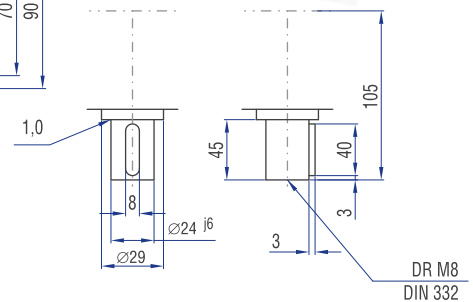
Mass [kg]
6.7
7.0
7.0
7.1
6.6
6.8
7.9
8.5
8.5
8.6
8.1
8.3



# 6.5.7 Type VL 090 – Type V with flange for motor mounting

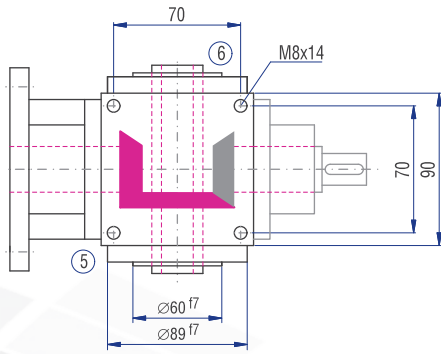
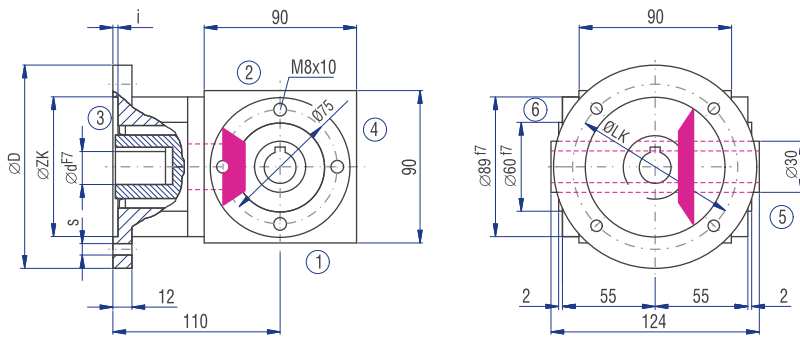


## Implementation VV

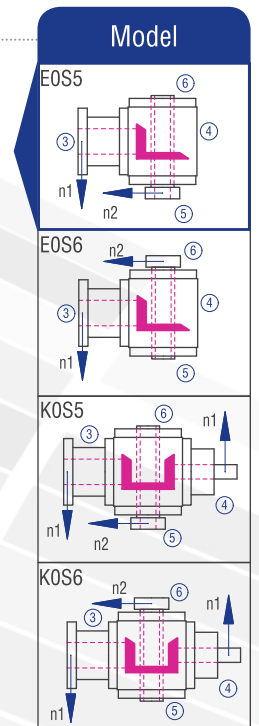
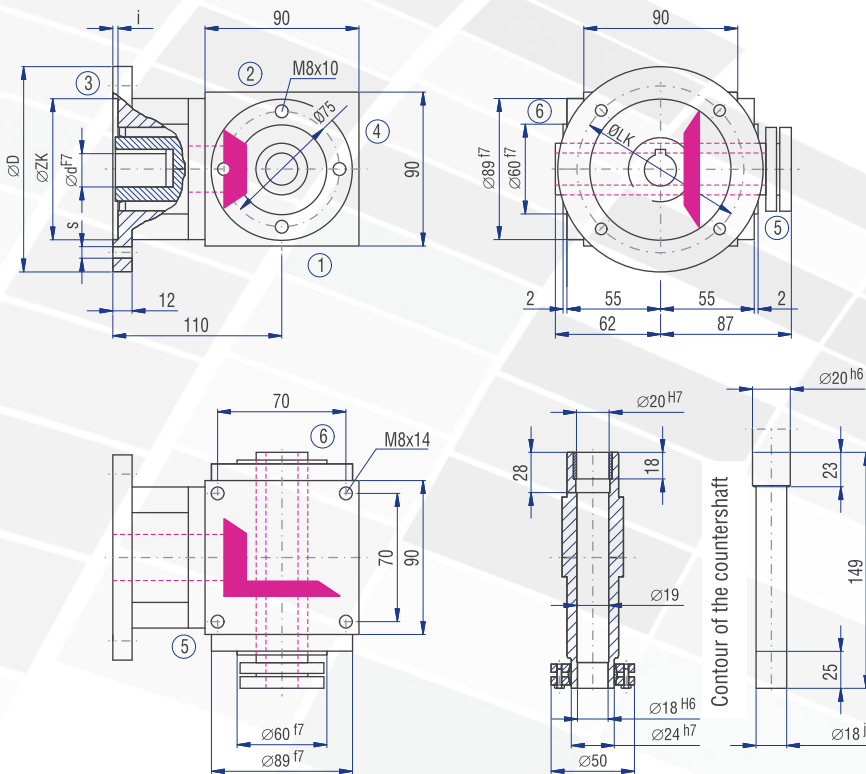
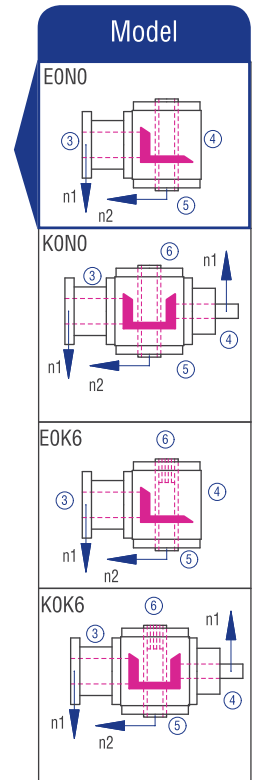
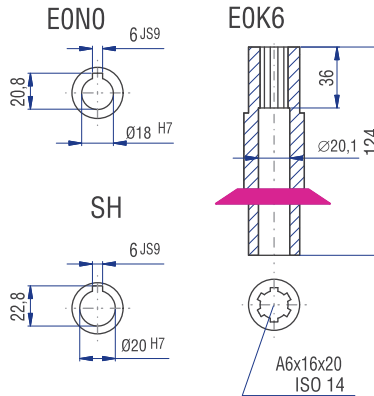


IEC motor	Model	Shaft (dxl)	D [mm]	LK [mm]	ZK [mm]	s [mm]	i [mm]
63	B14	11x23	120	100	80	7	3
	B5	11x23	140	115	95	9	3
71	B14	14x30	140	115	95	9	3
	B5	14x30	160	130	110	9	4
80	B14	19x40	120	100	80	7	3
	B14	19x40	160	130	110	9	4



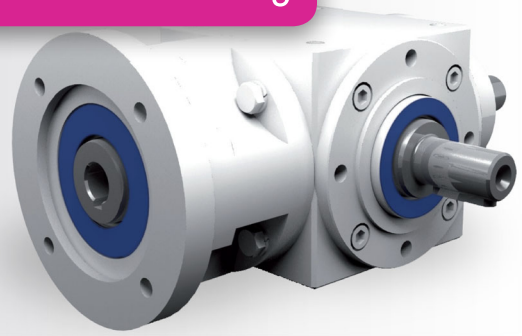


### Implementation



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.

## 6.5.8 Type VL 120 – Type V with flange for motor mounting



### Characteristics

Characteristic	Standard	Option
<b>Toothing</b>	Bevel gear set, spiral-toothed	See chapter 6.2.1
<b>Gear ratio</b>	1:1 to 6:1	
<b>Housing / Flanges</b>	Grey cast iron	
<b>Threaded mounting hole</b>	On all housing surfaces without flange and on all flanges.	See chapter 6.2.3
<b>Shaft</b>	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
<b>Hollow shaft</b>	Material 1 C45, shafts greased Fit with ISO 7 tolerance with parallel keyway: according to DIN 6885 Sheet 1	See chapter 4.6.3
<b>Radial shaft seal ring</b>	NBR, form A	See chapter 4.8
<b>Ambient temperature</b>	-10°C to +90°C. The values of the performance tables are valid for +20°C	See chapter 4.9.3
<b>Circumferential backlash</b>	< 30 arcmin	See chapter 6.2.10
<b>Protection class</b>	IP 54	See chapter 4.5
<b>Corrosion protection</b>	Prime coat; layer thickness > 40 µm	See chapter 4.4.1
<b>Bearing life L10h</b>	more than 15,000h	See chapter 4.9.1
<b>Oil change intervals</b>	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 6.2.8
<b>Lubricants</b>	Synthetic lubricants	See chapter 6.2.8
<b>Flange</b>	Suited for the mounting of IEC motors	
<b>Coupling</b>	Three-piece claw coupling	

## Performance data

n <sub>1</sub> [rpm]	1:1			1.5:1			2:1			3:1			4:1			5:1			6:1			
	n <sub>2</sub> [rpm]	P <sub>1N</sub> [kW]	T <sub>2N</sub> [Nm]	n <sub>2</sub> [rpm]	P <sub>1N</sub> [kW]	T <sub>2N</sub> [Nm]	n <sub>2</sub> [rpm]	P <sub>1N</sub> [kW]	T <sub>2N</sub> [Nm]	n <sub>2</sub> [rpm]	P <sub>1N</sub> [kW]	T <sub>2N</sub> [Nm]	n <sub>2</sub> [rpm]	P <sub>1N</sub> [kW]	T <sub>2N</sub> [Nm]	n <sub>2</sub> [rpm]	P <sub>1N</sub> [kW]	T <sub>2N</sub> [Nm]	n <sub>2</sub> [rpm]	P <sub>1N</sub> [kW]	T <sub>2N</sub> [Nm]	
3000	3000	21.82	66	2000	13.45	61	1500	9.26	56	1000	6.39	58	750	4.96	60	600	3.97	60	500	2.95	54	
2400	2400	18.52	70	1600	11.46	65	1200	8.07	61	800	5.56	63	600	4.43	67	480	3.44	65	400	2.53	57	
1500	1500	13.56	82	1000	8.60	78	750	6.03	73	500	4.08	74	375	3.06	74	300	2.38	72	250	1.75	64	
1000	1000	10.14	92	667	6.32	86	500	4.40	80	333	3.01	82	250	2.18	79	200	1.76	80	167	1.22	66	
750	750	8.51	103	500	5.18	94	375	3.30	80	250	2.40	87	188	1.69	82	150	1.42	86	125	0.94	68	
500	500	6.34	115	333	3.70	100	250	2.20	80	167	1.66	90	125	1.16	84	100	0.98	89	83	0.63	69	
250	250	3.39	123	167	1.84	100	125	1.10	80	83	0.87	95	63	0.60	87	50	0.51	92	42	0.33	71	
50	50	0.72	130	33	0.37	100	25	0.22	80	17	0.21	110	13	0.12	90	10	0.10	95	8	0.06	66	
P <sub>1Nt</sub> [kW]		6.2			6.2			6.2			6.2			6.2			6.2					
T <sub>2max</sub> [Nm]		220			169			80			155			155			140			120		

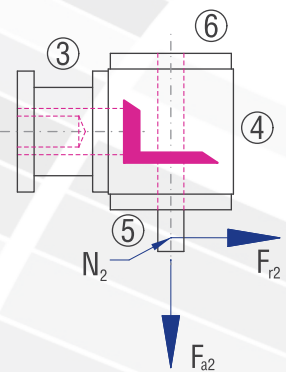
## Permissible radial force F<sub>r2</sub> and axial force F<sub>a2</sub> on shaft N<sub>2</sub>

n <sub>2</sub> [rpm]	3000		1000		500		250		100		50	
T <sub>2N</sub> [Nm]	F <sub>r</sub> [N]	F <sub>a</sub> [N]	F <sub>r</sub> [N]	F <sub>a</sub> [N]	F <sub>r</sub> [N]	F <sub>a</sub> [N]	F <sub>r</sub> [N]	F <sub>a</sub> [N]	F <sub>r</sub> [N]	F <sub>a</sub> [N]	F <sub>r</sub> [N]	F <sub>a</sub> [N]
< 80	750	375	1000	500	1250	625	1500	750	1900	950	2200	1100
> 80	630	315	830	415	1040	520	1250	625	1580	790	1830	915

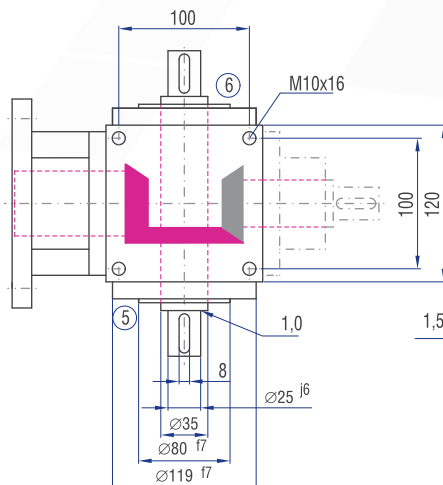
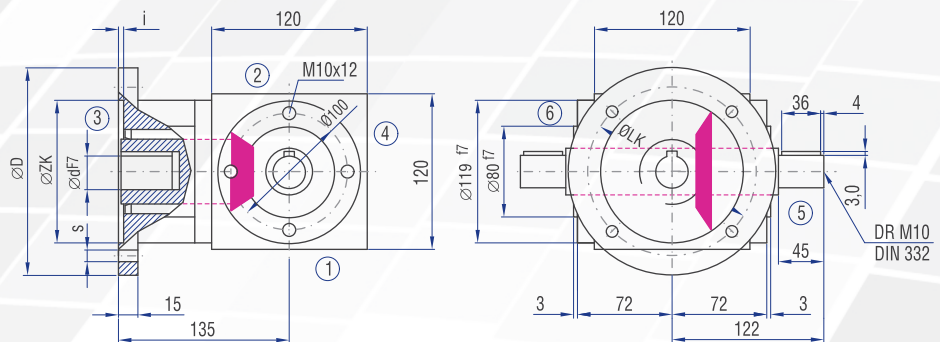
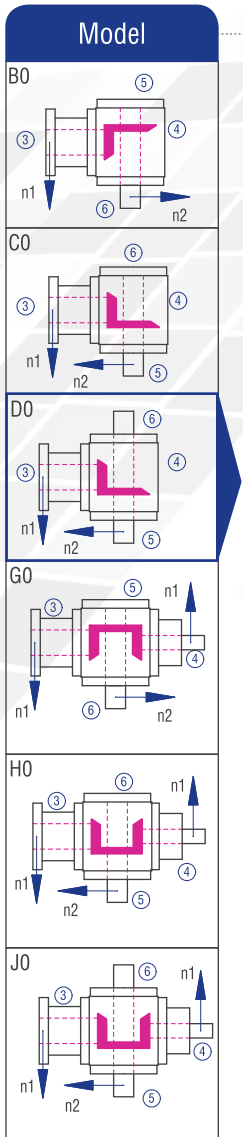
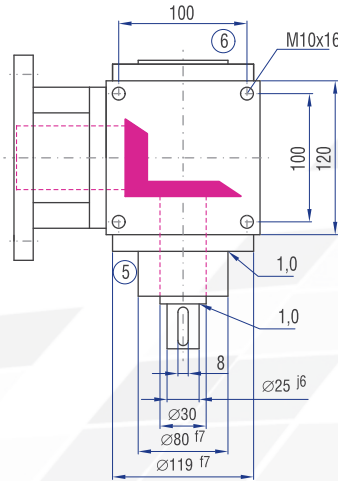
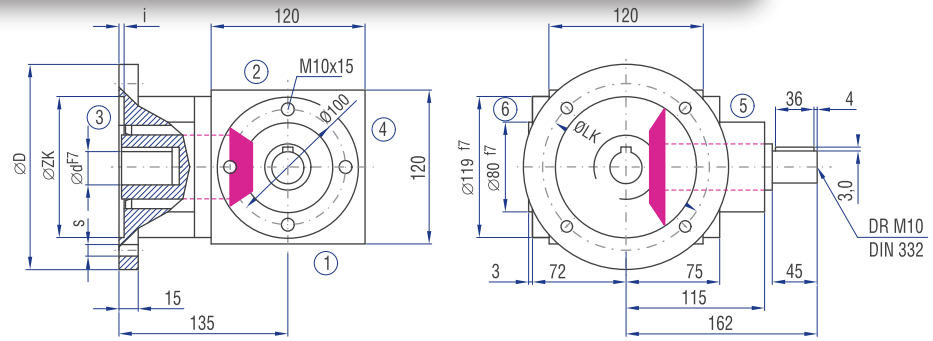
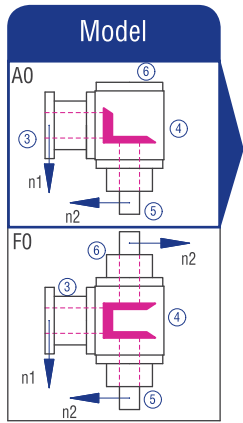
## Inertia moments/mass

Inertia moment J<sub>1</sub> related to the fast-rotating shaft (N<sub>1</sub>)

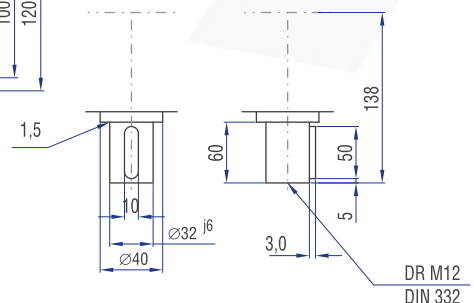
Model	Inertia moment [kgcm <sup>2</sup> ]							Mass [kg]
	1:1	1.5:1	2:1	3:1	4:1	5:1	6:1	
A0	12.5824	6.93340	5.40030	4.79750	4.46280	4.29660	4.22670	15.6
B0	17.3870	9.53660	6.72850	5.49390	4.91930	4.60430	4.44830	15.3
C0	17.3870	9.53660	6.72850	5.49390	4.91930	4.60430	4.44830	15.3
D0	17.6844	9.66870	6.80280	5.52690	4.93790	4.61620	4.45660	15.5
E0N	17.2787	9.48840	6.70140	5.48190	4.91250	4.60000	4.44530	15.0
E0S	19.0660	10.2828	7.14820	5.68040	5.02420	4.67150	4.49500	15.3
F0	17.8312	9.26620	6.71250	5.38070	4.79080	4.50650	4.37250	18.0
G0	22.6358	12.0447	9.06280	7.22660	5.80760	5.14590	4.97910	17.7
H0	22.6358	12.0447	9.06280	7.22660	5.80760	5.14590	4.97910	17.7
J0	22.9332	12.1768	9.13710	7.25960	5.82620	5.15780	4.98740	17.9
K0N	22.5275	11.9965	9.03570	7.21460	5.80080	5.14160	4.97610	17.4
K0S	24.3148	12.7909	9.48250	7.41310	5.91250	5.21310	5.02580	17.7



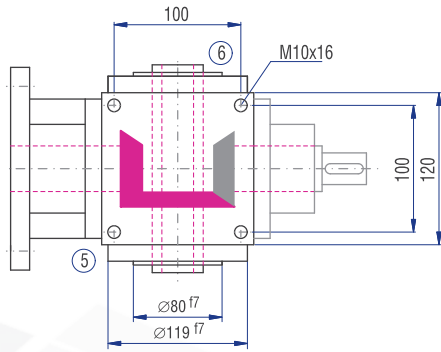
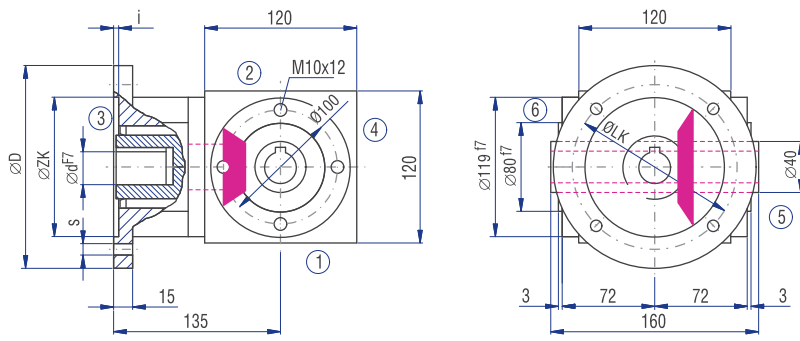
# 6.5.8 Type VL 120 – Type V with flange for motor mounting



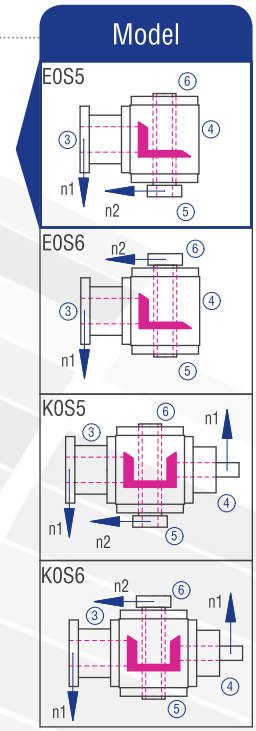
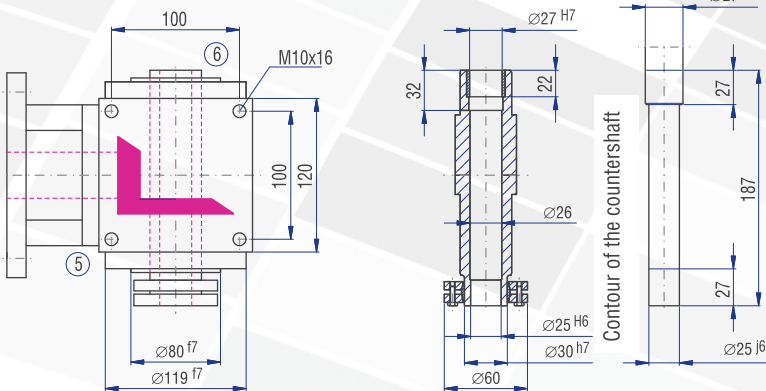
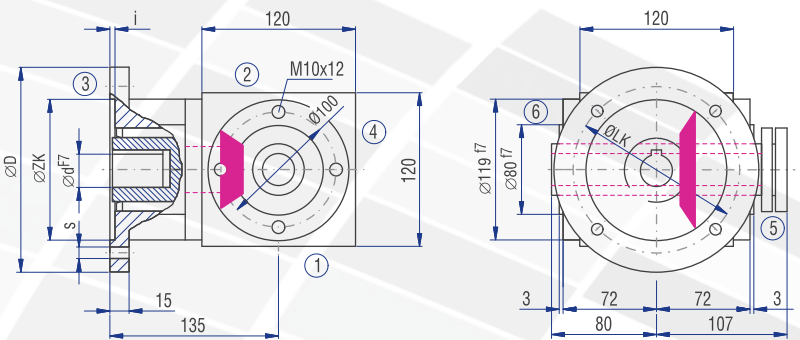
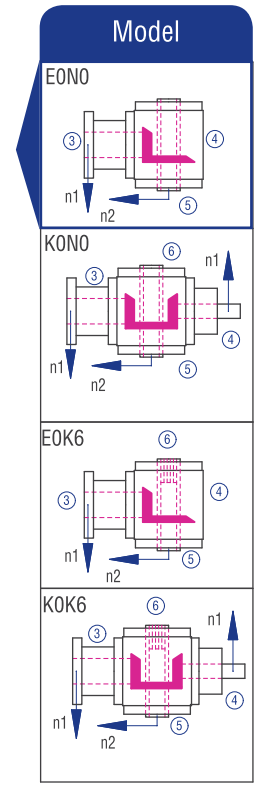
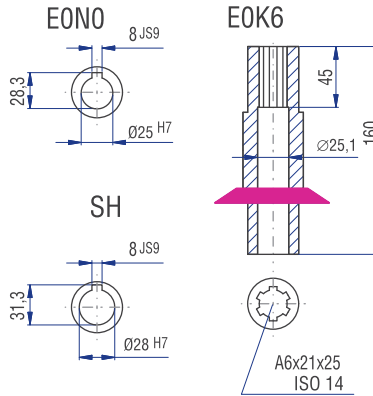
## Implementation VV



IEC motor	Model	Shaft (dxl)	D [mm]	LK [mm]	ZK [mm]	s [mm]	i [mm]
71	B14	14x30	140	115	95	9	3
	B5	19x40	160	130	110	9	4
80	B14	19x40	160	130	110	9	4
	B5	19x40	200	165	130	11	4
90	B14	24x50	160	130	110	9	4
	B5	24x50	200	165	130	11	4
100	B14	28x60	200	165	130	11	4
	B5	28x60	250	215	180	14	5
112	B14	28x60	200	165	130	11	4
	B5	28x60	250	215	180	14	5

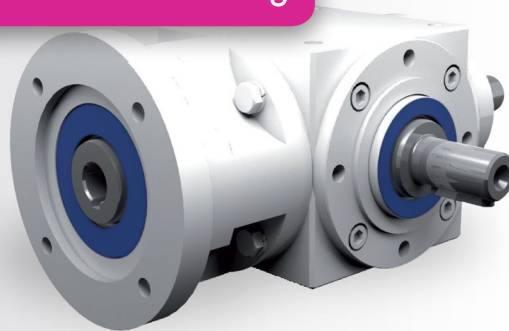


### Implementation



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.

## 6.5.9 Type VL 140 – Type V with flange for motor mounting



### Characteristics

Characteristic	Standard	Option
<b>Toothing</b>	Bevel gear set, spiral-toothed	See chapter 6.2.1
<b>Gear ratio</b>	1:1 to 6:1	
<b>Housing / Flanges</b>	Grey cast iron	
<b>Threaded mounting hole</b>	On all housing surfaces without flange and on all flanges.	See chapter 6.2.3
<b>Shaft</b>	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
<b>Hollow shaft</b>	Material 1 C45, shafts greased Fit with ISO 7 tolerance with parallel keyway: according to DIN 6885 Sheet 1	See chapter 4.6.3
<b>Radial shaft seal ring</b>	NBR, form A	See chapter 4.8
<b>Ambient temperature</b>	-10°C to +90°C. The values of the performance tables are valid for +20°C	See chapter 4.9.3
<b>Circumferential backlash</b>	< 30 arcmin	See chapter 6.2.10
<b>Protection class</b>	IP 54	See chapter 4.5
<b>Corrosion protection</b>	Prime coat; layer thickness > 40 µm	See chapter 4.4.1
<b>Bearing life L10h</b>	more than 15,000h	See chapter 4.9.1
<b>Oil change intervals</b>	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 6.2.8
<b>Lubricants</b>	Synthetic lubricants	See chapter 6.2.8
<b>Flange</b>	Suited for the mounting of IEC motors	
<b>Coupling</b>	Three-piece claw coupling	

## Performance data

n <sub>1</sub> [rpm]	1:1			1.5:1			2:1			3:1			4:1			5:1			6:1								
	n <sub>2</sub> [rpm]	P <sub>1N</sub> [kW]	T <sub>2N</sub> [Nm]	n <sub>2</sub> [rpm]	P <sub>1N</sub> [kW]	T <sub>2N</sub> [Nm]	n <sub>2</sub> [rpm]	P <sub>1N</sub> [kW]	T <sub>2N</sub> [Nm]	n <sub>2</sub> [rpm]	P <sub>1N</sub> [kW]	T <sub>2N</sub> [Nm]	n <sub>2</sub> [rpm]	P <sub>1N</sub> [kW]	T <sub>2N</sub> [Nm]	n <sub>2</sub> [rpm]	P <sub>1N</sub> [kW]	T <sub>2N</sub> [Nm]	n <sub>2</sub> [rpm]	P <sub>1N</sub> [kW]	T <sub>2N</sub> [Nm]						
3000	3000	39.68	120	2000	24.91	113	1500	16.53	100	1000	12.12	110	750	8.51	103	600	6.61	100	500	5.18	94						
2400	2400	37.04	140	1600	22.22	126	1200	14.68	111	800	11.46	130	600	7.34	111	480	5.56	105	400	4.58	104						
1500	1500	26.78	162	1000	17.08	155	750	11.41	138	500	8.05	146	375	4.96	120	300	3.80	115	250	2.95	107						
1000	1000	20.28	184	667	12.87	175	500	8.38	152	333	5.87	160	250	3.75	136	200	2.73	124	167	2.06	112						
750	750	16.20	196	500	10.47	190	375	6.86	166	250	4.60	167	188	3.06	148	150	2.15	130	125	1.61	117						
500	500	11.46	208	333	7.34	200	250	4.96	180	167	3.20	174	125	2.12	154	100	1.50	136	83	1.09	119						
250	250	5.92	215	167	3.76	204	125	2.48	180	83	1.62	177	63	1.12	162	50	0.79	143	42	0.56	121						
50	50	1.21	220	33	0.76	210	25	0.50	180	17	0.34	180	13	0.23	170	10	0.17	150	8	0.11	120						
P <sub>1Nt</sub> [kW]		10.0			10.0			10.0			10.0			10.0			10.0			10.0							
T <sub>2max</sub> [Nm]		430			358			180			280			280			250			200							

## Permissible radial force F<sub>r2</sub> and axial force F<sub>a2</sub> on shaft N<sub>2</sub>

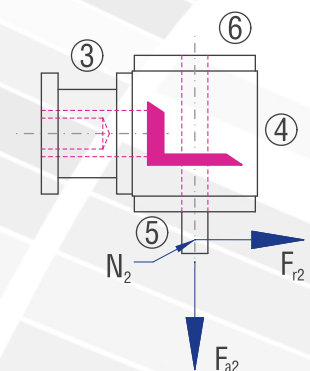
n <sub>2</sub> [rpm]	3000		1000		500		250		100		50	
T <sub>2N</sub> [Nm]	F <sub>r</sub> [N]	F <sub>a</sub> [N]	F <sub>r</sub> [N]	F <sub>a</sub> [N]	F <sub>r</sub> [N]	F <sub>a</sub> [N]	F <sub>r</sub> [N]	F <sub>a</sub> [N]	F <sub>r</sub> [N]	F <sub>a</sub> [N]	F <sub>r</sub> [N]	F <sub>a</sub> [N]
< 140	1300	650	1700	850	2000	1000	2500	1250	3000	1500	3800	1900
> 140	1082	541	1420	710	1670	835	2080	1040	2500	1250	3170	1585

## Inertia moments/mass

Inertia moment J<sub>1</sub> related to the fast-rotating shaft (N<sub>1</sub>)

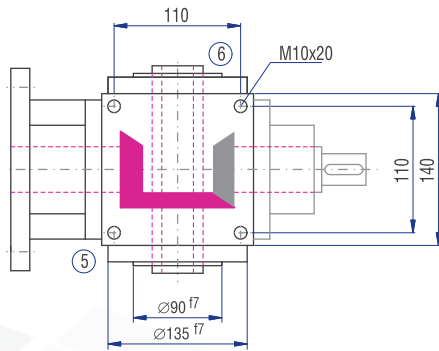
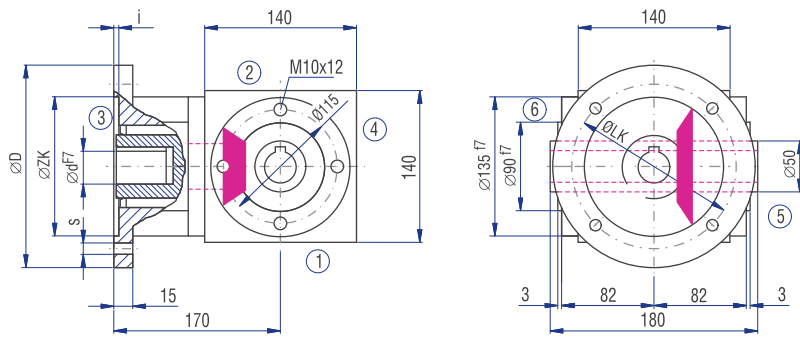
Model	Inertia moment [kgcm <sup>2</sup> ]							
	1:1	1.5:1	2:1	3:1	4:1	5:1	6:1	
A0	34.6752	23.0606	18.4863	16.3939	15.2904	14.8851	14.6758	
B0	45.8411	28.2365	21.6470	17.4945	15.7845	15.3137	14.9457	
C0	45.8411	28.2365	21.6470	17.4945	15.7845	15.3137	14.9457	
D0	46.8232	28.6730	21.8926	17.6037	15.8459	15.3530	14.9729	
E0N	42.4047	26.7092	20.7879	17.1127	15.5697	15.1763	14.8502	
E0S	48.8060	29.5543	22.3883	17.8240	15.9698	15.4323	15.0280	
F0	46.4752	30.6161	22.2113	18.2717	16.4716	15.6611	15.2424	
G0	58.9746	34.2563	27.0398	22.4708	16.8069	16.3204	15.9517	
H0	58.9746	34.2563	27.0398	22.4708	16.8069	16.3204	15.9517	
J0	59.9567	34.6928	27.2854	22.5800	16.8683	16.3597	15.9789	
K0N	55.5382	32.7290	26.1807	22.0890	16.5921	16.1830	15.8562	
K0S	61.9395	35.5741	27.7811	22.8003	16.9922	16.4390	16.0340	

Mass [kg]
24.0
23.5
23.5
24.0
23.0
23.7
28.0
27.7
27.7
28.2
27.2
27.9

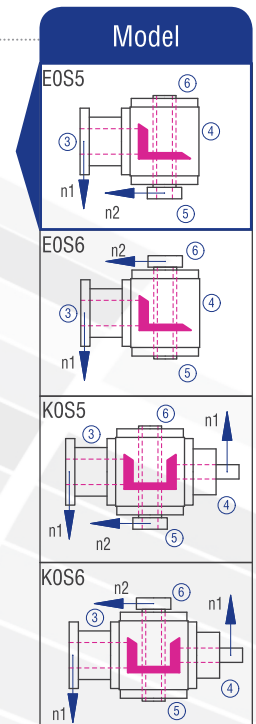
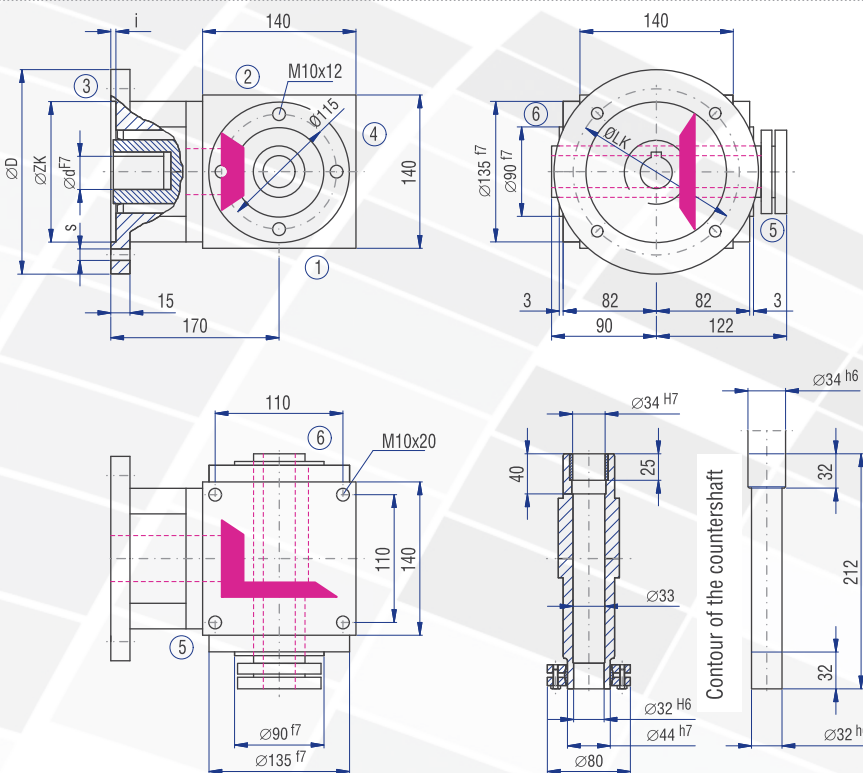
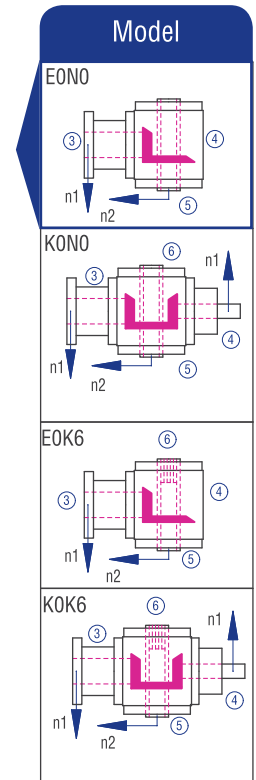
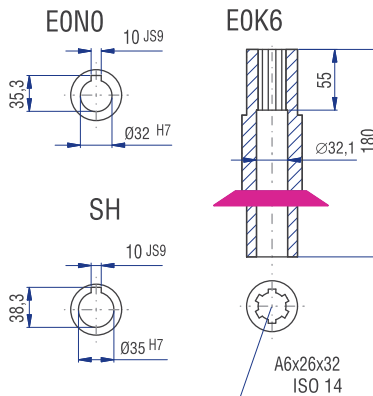






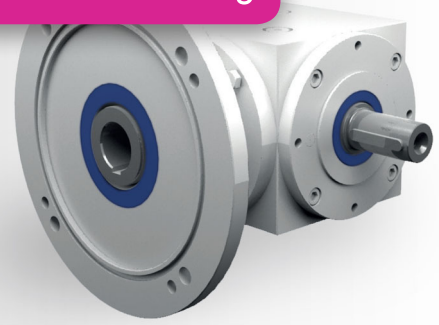


### Implementation



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.

## 6.5.10 Type VL 160 – Type V with flange for motor mounting



### Characteristics

Characteristic	Standard	Option
<b>Toothing</b>	Bevel gear set, spiral-toothed	See chapter 6.2.1
<b>Gear ratio</b>	1:1 to 6:1	
<b>Housing / Flanges</b>	Grey cast iron	
<b>Threaded mounting hole</b>	On all housing surfaces without flange and on all flanges.	See chapter 6.2.3
<b>Shaft</b>	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
<b>Hollow shaft</b>	Material 1 C45, shafts greased Fit with ISO 7 tolerance with parallel keyway: according to DIN 6885 Sheet 1	See chapter 4.6.3
<b>Radial shaft seal ring</b>	NBR, form A	See chapter 4.8
<b>Ambient temperature</b>	-10°C to +90°C. The values of the performance tables are valid for +20°C	See chapter 4.9.3
<b>Circumferential backlash</b>	< 30 arcmin	See chapter 6.2.10
<b>Protection class</b>	IP 54	See chapter 4.5
<b>Corrosion protection</b>	Prime coat; layer thickness > 40 µm	See chapter 4.4.1
<b>Bearing life L10h</b>	more than 15,000h	See chapter 4.9.1
<b>Oil change intervals</b>	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 6.2.8
<b>Lubricants</b>	Synthetic lubricants	See chapter 6.2.8
<b>Flange</b>	Suited for the mounting of IEC motors	
<b>Coupling</b>	Three-piece claw coupling	

## Performance data

$n_1$ [rpm]	1:1			1.5:1			2:1			3:1			4:1			5:1			6:1					
	$n_2$ [rpm]	$P_{1N}$ [kW]	$T_{2N}$ [Nm]	$n_2$ [rpm]	$P_{1N}$ [kW]	$T_{2N}$ [Nm]	$n_2$ [rpm]	$P_{1N}$ [kW]	$T_{2N}$ [Nm]	$n_2$ [rpm]	$P_{1N}$ [kW]	$T_{2N}$ [Nm]	$n_2$ [rpm]	$P_{1N}$ [kW]	$T_{2N}$ [Nm]	$n_2$ [rpm]	$P_{1N}$ [kW]	$T_{2N}$ [Nm]	$n_2$ [rpm]	$P_{1N}$ [kW]	$T_{2N}$ [Nm]			
3000				2000	40.78	185	1500	28.11	170	1000	20.94	190	750	14.88	180	600	11.90	180	500	7.09	129			
2400	2400	57.67	218	1600	36.15	205	1200	25.53	193	800	17.81	202	600	13.23	200	480	10.48	198	400	5.98	136			
1500	1500	42.99	260	1000	27.78	252	750	20.25	245	500	12.68	230	375	9.09	220	300	7.11	215	250	3.95	143			
1000	1000	31.96	290	667	20.59	280	500	14.88	270	333	8.99	245	250	6.61	240	200	4.96	225	167	3.01	164			
750	750	25.63	310	500	16.26	295	375	11.57	280	250	6.89	250	188	5.17	250	150	3.97	240	125	2.43	176			
500	500	18.19	330	333	11.56	315	250	8.27	300	167	4.79	260	125	3.58	260	100	2.76	250	83	1.72	187			
250	250	9.64	350	167	6.07	330	125	4.41	320	83	2.56	280	63	1.86	270	50	1.49	270	42	0.92	199			
50	50	2.09	380	33	1.29	355	25	0.88	320	17	0.57	305	13	0.39	280	10	0.32	290	8	0.18	197			
$P_{1Nt}$ [kW]	15.0			15.0			15.0			15.0			15.0			15.0			15.0					
$T_{2max}$ [Nm]	660			360			320			457			422			420			350					

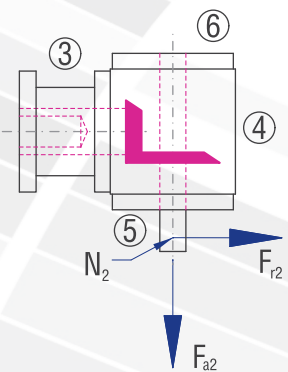
## Permissible radial force $F_{r2}$ and axial force $F_{a2}$ on shaft $N_2$

$n_2$ [rpm]	3000		1000		500		250		100		50	
$T_{2N}$ [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

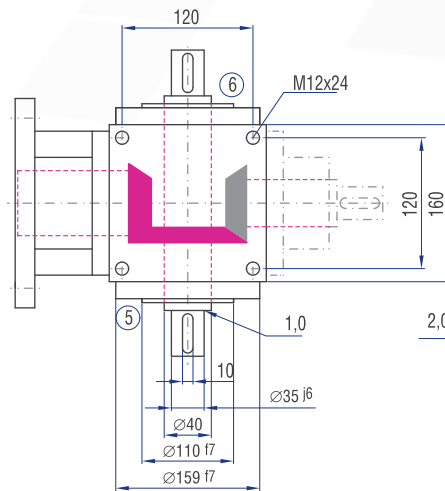
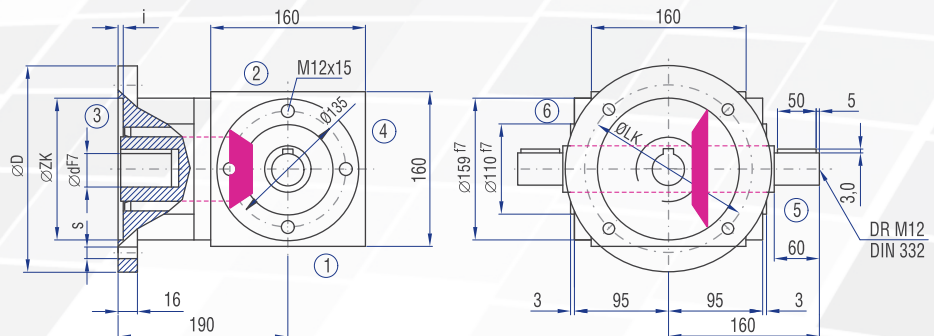
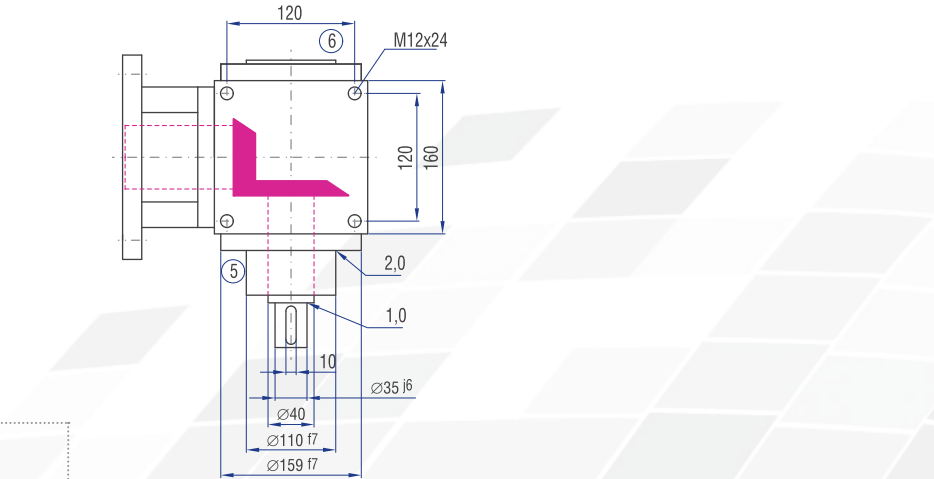
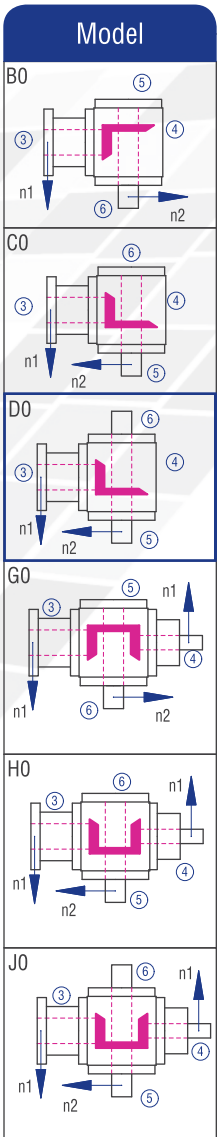
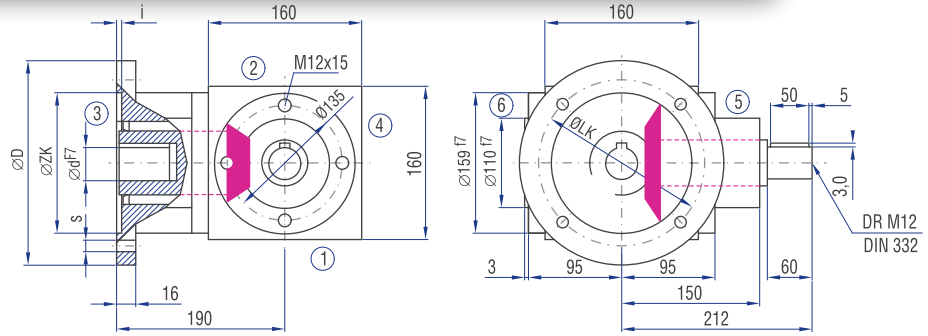
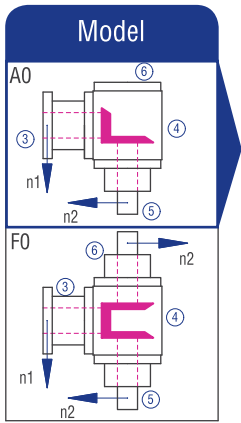
## Inertia moments/mass

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

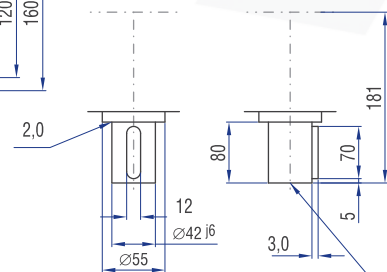
Model	Inertia moment [kgcm <sup>2</sup> ]							Mass [kg]
	1:1	1.5:1	2:1	3:1	4:1	5:1	6:1	
A0	42.4880	32.2050	25.0090	22.8169	21.8333	21.4119	21.2266	36.5
B0	44.3697	44.5919	32.7507	25.9456	23.8183	22.8273	22.0772	36.0
C0	44.3697	44.5919	32.7507	25.9456	23.8183	22.8273	22.0772	36.0
D0	45.3990	45.0494	33.0080	26.0600	23.8826	22.8685	22.1058	36.5
E0N	47.2021	45.7092	33.3159	26.1968	23.9596	22.9177	22.1413	35.0
E0S	53.4920	48.5047	34.8883	26.8957	24.3527	23.1693	22.3160	35.6
F0	57.3235	38.7985	28.7179	24.4653	22.7605	22.0053	21.6387	43.0
G0	59.2052	57.6357	41.4007	33.2488	29.3259	24.5072	23.7552	42.5
H0	59.2052	57.6357	41.4007	33.2488	29.3259	24.5072	23.7552	42.5
J0	60.2345	58.0932	41.6580	33.3632	29.3902	24.5484	23.7838	43.0
K0N	62.0376	58.7530	41.9659	33.5000	29.4672	24.5976	23.8193	41.5
K0S	68.3275	61.5485	43.5383	34.1989	29.8603	24.8492	23.9940	42.1



# 6.5.10 Type VL 160 – Type V with flange for motor mounting



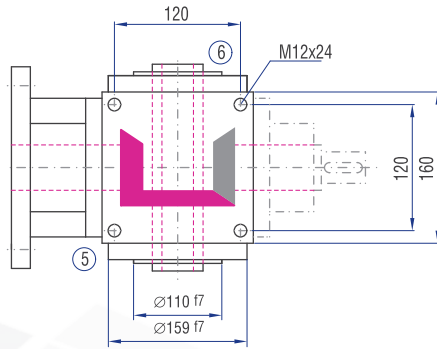
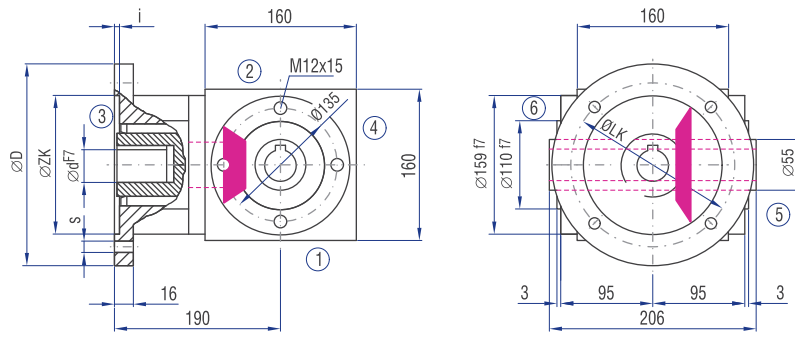
## Implementation VV



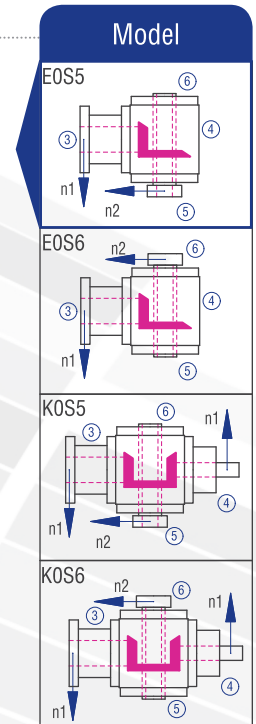
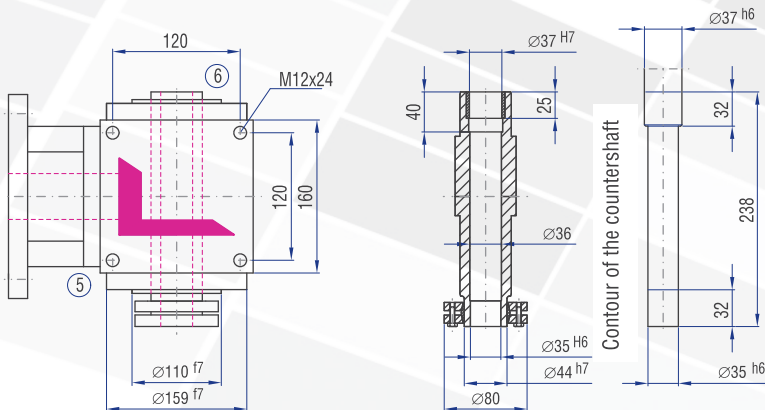
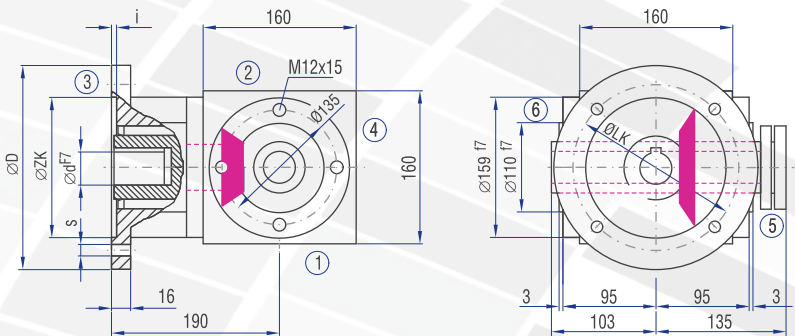
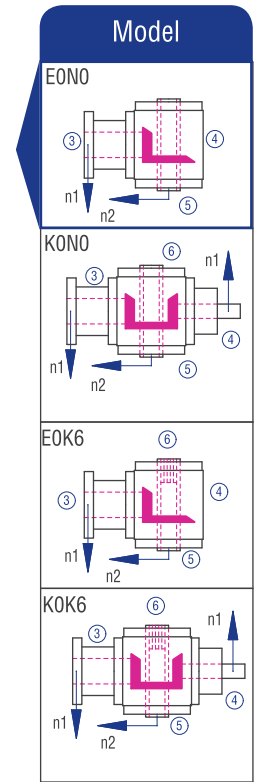
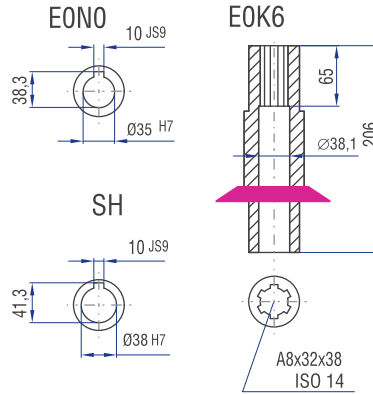
DR M16  
DIN 332

IEC motor	Model	Shaft (dxl)	D [mm]	LK [mm]	ZK [mm]	s [mm]	i [mm]
100	B14	28x60	200	165	130	11	4
	B5	28x60	250	215	180	14	5
112	B5	28x60	200	165	130	11	4
	B5	28x60	250	215	180	14	5
132	B14	38x80	200	165	130	11	4
	B5	38x80	300	265	230	14	5

Gear ratios 3:1 through 6:1 only with intermediate flange or shortened motor shaft.

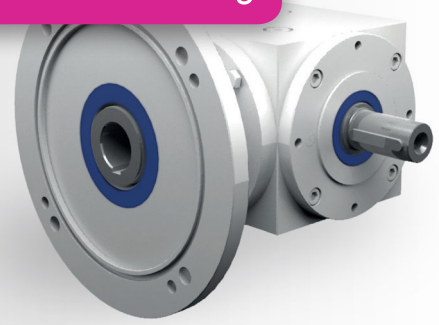


### Implementation



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.

## 6.5.11 Type VL 200 – Type V with flange for motor mounting



### Characteristics

Characteristic	Standard	Option
<b>Toothing</b>	Bevel gear set, spiral-toothed	See chapter 6.2.1
<b>Gear ratio</b>	1:1 to 6:1	
<b>Housing / Flanges</b>	Grey cast iron	
<b>Threaded mounting hole</b>	On all housing surfaces without flange and on all flanges.	See chapter 6.2.3
<b>Shaft</b>	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
<b>Hollow shaft</b>	Material 1 C45, shafts greased Fit with ISO 7 tolerance with parallel keyway: according to DIN 6885 Sheet 1	See chapter 4.6.3
<b>Radial shaft seal ring</b>	NBR, form A	See chapter 4.8
<b>Ambient temperature</b>	-10°C to +90°C. The values of the performance tables are valid for +20°C	See chapter 4.9.3
<b>Circumferential backlash</b>	< 30 arcmin	See chapter 6.2.10
<b>Protection class</b>	IP 54	See chapter 4.5
<b>Corrosion protection</b>	Prime coat; layer thickness > 40 µm	See chapter 4.4.1
<b>Bearing life L10h</b>	more than 15,000h	See chapter 4.9.1
<b>Oil change intervals</b>	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 6.2.8
<b>Lubricants</b>	Synthetic lubricants	See chapter 6.2.8
<b>Flange</b>	Suited for the mounting of IEC motors	
<b>Coupling</b>	Three-piece claw coupling	

## Performance data

$n_1$ [rpm]	1:1		1.5:1			2:1			3:1			4:1			5:1			6:1			
	$n_2$ [rpm]	$P_{1N}$ [kW]	$T_{2N}$ [Nm]	$n_2$ [rpm]	$P_{1N}$ [kW]	$T_{2N}$ [Nm]	$n_2$ [rpm]	$P_{1N}$ [kW]	$T_{2N}$ [Nm]	$n_2$ [rpm]	$P_{1N}$ [kW]	$T_{2N}$ [Nm]	$n_2$ [rpm]	$P_{1N}$ [kW]	$T_{2N}$ [Nm]	$n_2$ [rpm]	$P_{1N}$ [kW]	$T_{2N}$ [Nm]	$n_2$ [rpm]	$P_{1N}$ [kW]	$T_{2N}$ [Nm]
3000				2000	72.75	330	1500	51.25	310	1000	46.29	420	750	28.93	350	600	19.84	300	500	11.45	208
2400				1600	63.49	360	1200	45.24	342	800	39.24	445	600	26.45	400	480	17.99	340	400	9.60	218
1500	1500	74.40	450	1000	48.17	437	750	35.13	425	500	28.38	515	375	18.81	455	300	12.57	380	250	6.54	237
1000	1000	56.21	510	667	37.13	505	500	27.56	500	333	20.37	555	250	13.36	485	200	9.26	420	167	4.74	258
750	750	45.88	555	500	30.31	550	375	21.90	530	250	15.98	580	188	10.54	510	150	7.27	440	125	3.98	289
500	500	34.17	620	333	22.02	600	250	14.60	530	167	11.04	600	125	7.23	525	100	5.18	470	83	2.79	304
250	250	19.56	710	167	11.04	600	125	7.30	530	83	5.76	630	63	3.79	550	50	2.78	505	42	1.44	311
50	50	4.13	750	33	2.18	600	25	1.46	530	17	1.29	690	13	0.80	580	10	0.58	525	8	0.28	306
$P_{1Nt}$ [kW]	26.0			26.0			26.0			26.0			26.0			26.0			26.0		
$T_{2max}$ [Nm]	1090			600			530			910			860			860			625		

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

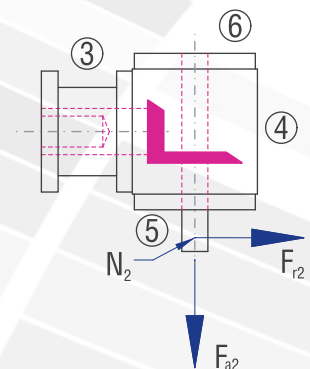
$n_2$ [rpm]	3000		1000		500		250		100		50	
$T_{2N}$ [Nm]	$F_r$ [N]	$F_a$ [N]	$F_r$ [N]	$F_a$ [N]	$F_r$ [N]	$F_a$ [N]	$F_r$ [N]	$F_a$ [N]	$F_r$ [N]	$F_a$ [N]	$F_r$ [N]	$F_a$ [N]
< 500	3200	1600	4300	2150	5000	2500	6500	3250	8000	4000	10000	5000
> 500	2670	1335	3580	1790	4170	2085	5420	2710	6670	3335	8330	4165

## Inertia moments/mass

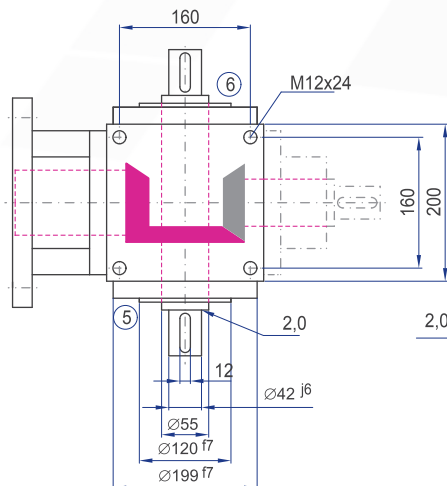
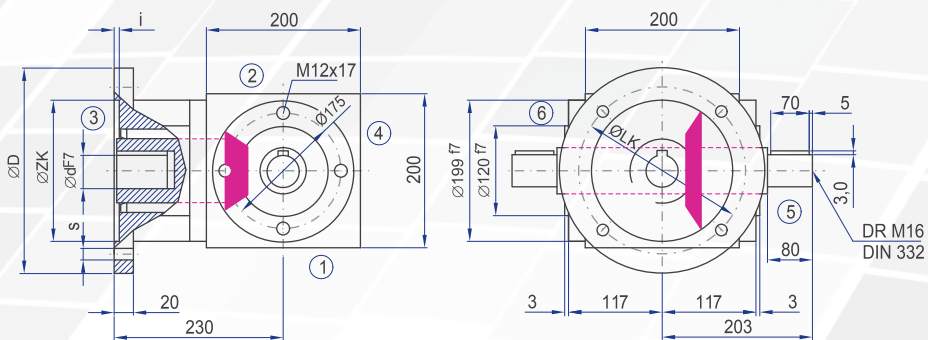
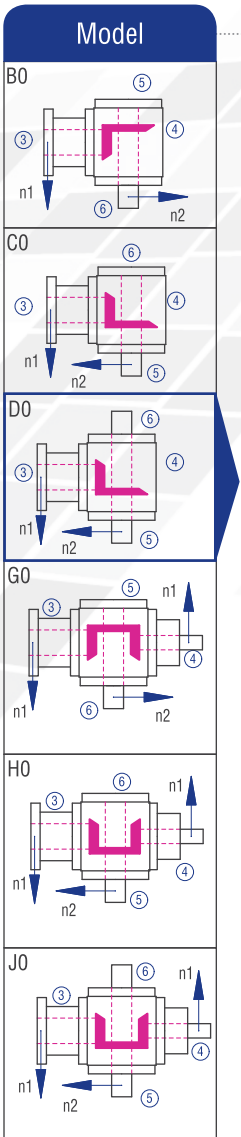
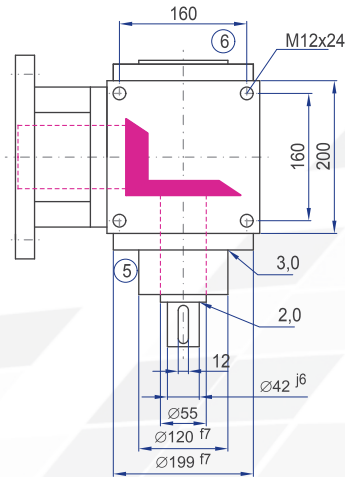
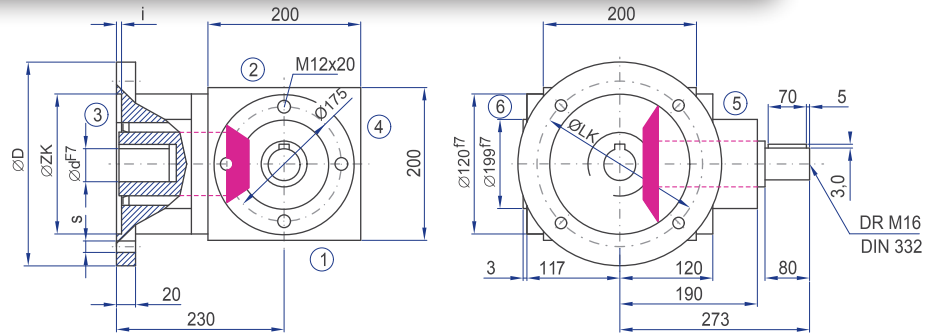
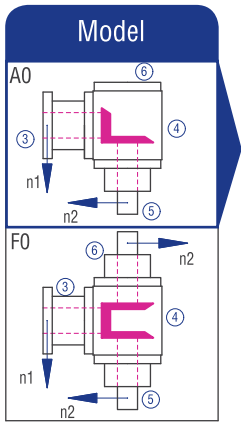
Inertia moment  $J_1$  related to the fast-rotating shaft ( $N_1$ )

Model	Inertia moment [kgcm <sup>2</sup> ]						
	1:1	1.5:1	2:1	3:1	4:1	5:1	6:1
A0	160.794	103.333	79.4024	66.6041	62.5170	60.9854	60.2444
B0	214.242	149.221	114.714	81.9650	70.9700	67.7153	64.9180
C0	214.242	149.221	114.714	81.9650	70.9700	67.7153	64.9180
D0	217.359	150.606	115.494	82.3114	71.1649	67.8400	65.0046
E0N	240.932	154.665	119.527	82.9928	71.6107	68.6453	65.5638
E0S	261.954	164.009	124.783	85.3286	72.9245	69.4862	66.1478
F0	221.420	130.278	94.5590	73.3404	66.3062	63.4105	61.9285
G0	274.868	179.971	135.867	94.0610	81.4460	71.4373	68.6220
H0	274.868	179.971	135.867	94.0610	81.4460	71.4373	68.6220
J0	277.985	181.356	136.647	94.4074	81.6409	71.5620	68.7086
K0N	301.558	185.416	140.680	95.0888	82.0867	72.3673	69.2678
K0S	322.580	194.759	145.936	97.4246	83.4005	73.2082	69.8518

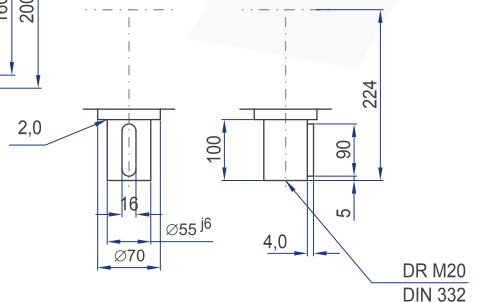
Mass [kg]
64.0
60.0
60.0
60.0
62.0
60.0
61.3
72.0
70.0
70.0
72.0
70.0
70.0
71.3



# 6.5.11 Type VL 200 – Type V with flange for motor mounting



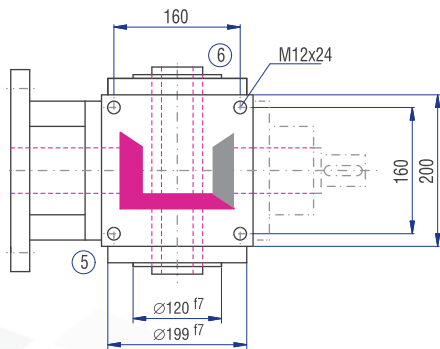
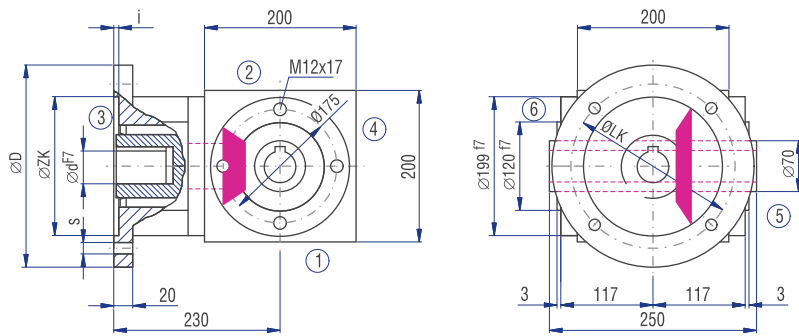
## Implementation VV



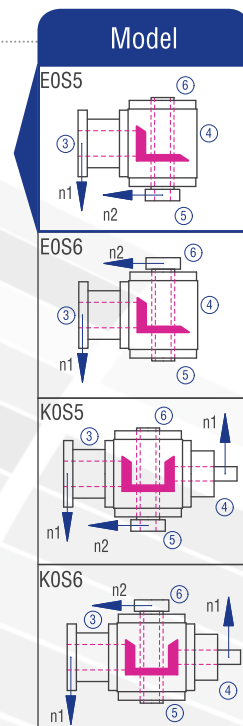
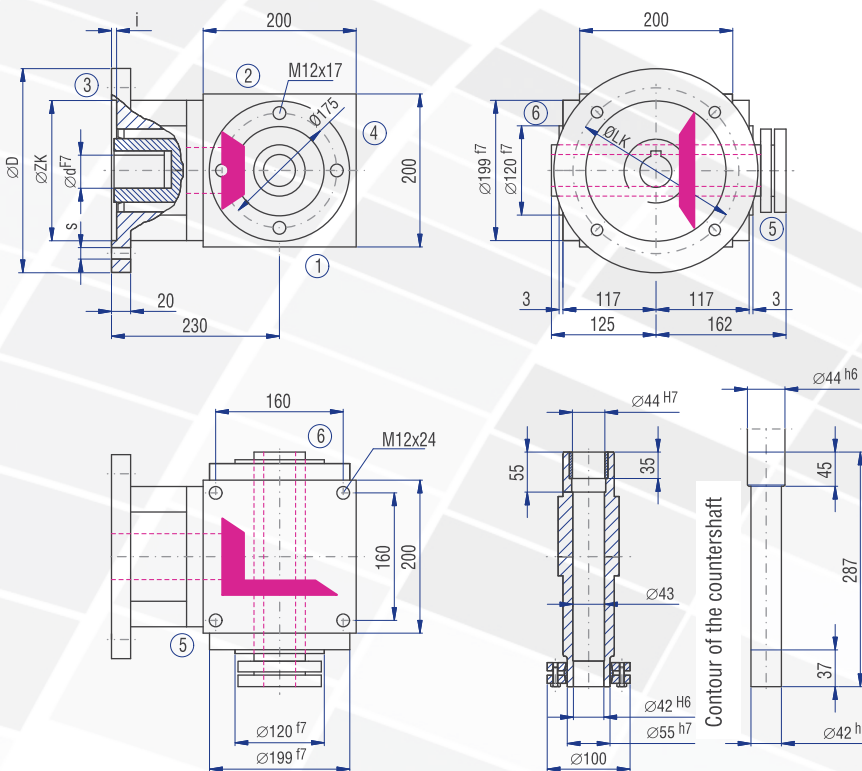
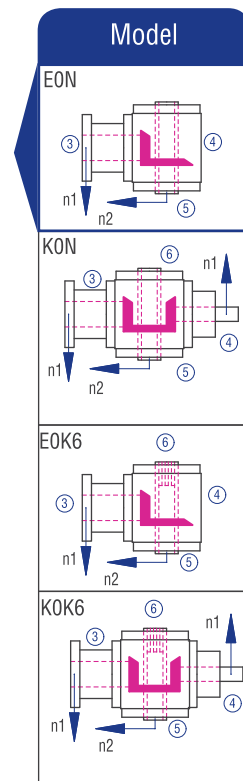
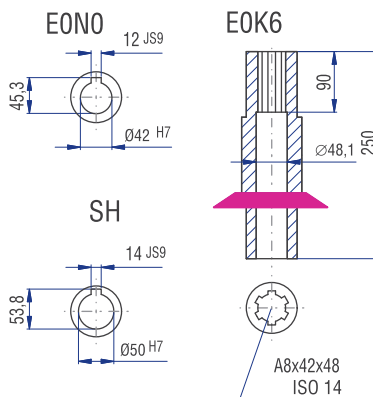
IEC motor	Model	Shaft (dxl)	D [mm]	LK [mm]	ZK [mm]	s [mm]	i [mm]
100	B14	28x60	200	165	130	11	4
	B5	28x60	250	215	180	14	5
112	B5	28x60	200	165	130	11	4
	B5	28x60	250	215	180	14	5
132	B14	38x80	200	165	130	11	4
	B5	38x80	300	265	230	14	5
160	B5	42x110	350	300	250	18	6
180	B5	48x110	350	300	250	18	6

Gear ratios 3:1 through 6:1 only with intermediate flange or shortened motor shaft.



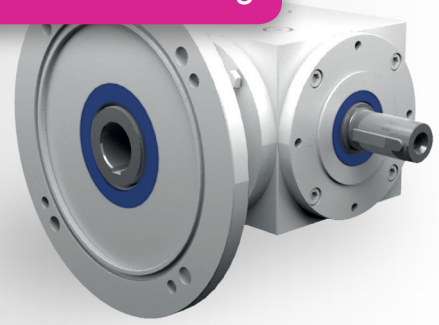


### Implementation



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.

## 6.5.12 Type VL 230 – Type V with flange for motor mounting



### Characteristics

Characteristic	Standard	Option
<b>Toothing</b>	Bevel gear set, spiral-toothed	See chapter 6.2.1
<b>Gear ratio</b>	1:1 to 6:1	
<b>Housing / Flanges</b>	Grey cast iron	
<b>Threaded mounting hole</b>	On all housing surfaces without flange and on all flanges.	See chapter 6.2.3
<b>Shaft</b>	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
<b>Hollow shaft</b>	Material 1 C45, shafts greased Fit with ISO 7 tolerance with parallel keyway: according to DIN 6885 Sheet 1	See chapter 4.6.3
<b>Radial shaft seal ring</b>	NBR, form A	See chapter 4.8
<b>Ambient temperature</b>	-10°C to +90°C. The values of the performance tables are valid for +20°C	See chapter 4.9.3
<b>Circumferential backlash</b>	< 30 arcmin	See chapter 6.2.10
<b>Protection class</b>	IP 54	See chapter 4.5
<b>Corrosion protection</b>	Prime coat; layer thickness > 40 µm	See chapter 4.4.1
<b>Bearing life L10h</b>	more than 15,000h	See chapter 4.9.1
<b>Oil change intervals</b>	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 6.2.8
<b>Lubricants</b>	Synthetic lubricants	See chapter 6.2.8
<b>Flange</b>	Suited for the mounting of IEC motors	
<b>Coupling</b>	Three-piece claw coupling	

## Performance data

n <sub>1</sub> [rpm]	1:1			1.5:1			2:1			3:1			4:1			5:1			6:1					
	n <sub>2</sub> [rpm]	P <sub>1N</sub> [kW]	T <sub>2N</sub> [Nm]	n <sub>2</sub> [rpm]	P <sub>1N</sub> [kW]	T <sub>2N</sub> [Nm]	n <sub>2</sub> [rpm]	P <sub>1N</sub> [kW]	T <sub>2N</sub> [Nm]	n <sub>2</sub> [rpm]	P <sub>1N</sub> [kW]	T <sub>2N</sub> [Nm]	n <sub>2</sub> [rpm]	P <sub>1N</sub> [kW]	T <sub>2N</sub> [Nm]	n <sub>2</sub> [rpm]	P <sub>1N</sub> [kW]	T <sub>2N</sub> [Nm]	n <sub>2</sub> [rpm]	P <sub>1N</sub> [kW]	T <sub>2N</sub> [Nm]			
3000				2000	99.20	450	1500	87.63	530	1000	44.09	400	750	36.37	440	600	33.73	510	500	20.17	366			
2400				1600	91.35	518	1200	80.02	605	800	39.68	450	600	32.74	495	480	29.10	550	400	18.08	410			
1500	1500	87.63	530	1000	72.20	655	750	59.11	715	500	29.76	540	375	24.80	600	300	21.00	635	250	13.50	490			
1000	1000	71.65	650	667	56.21	765	500	45.19	820	333	23.33	635	250	18.60	675	200	15.76	715	167	9.92	540			
750	750	60.76	735	500	45.47	825	375	36.79	890	250	19.29	700	188	15.19	735	150	12.73	770	125	7.78	565			
500	500	45.19	820	333	33.79	920	250	26.73	970	167	14.07	765	125	10.95	795	100	9.15	830	83	5.42	590			
250	250	26.73	970	167	20.57	1,120	125	16.88	1,225	83	7.58	825	63	5.99	870	50	5.07	920	42	2.82	610			
50	50	7.00	1,270	33	4.89	1,330	25	3.66	1,330	17	1.63	870	13	1.35	980	10	1.09	990	8	0.57	625			

P <sub>1Nt</sub> [kW]	34.0	34.0	34.0	34.0	34.0	34.0	34.0	34.0	34.0	34.0	34.0	34.0	34.0	34.0	34.0	34.0	34.0	34.0	34.0	34.0	34.0	34.0	
T <sub>2max</sub> [Nm]	1500	1400	1400	1400	1400	1400	1400	1400	1300	1300	1300	1300	1300	1300	1300	1200	1200	1200	1200	1000	1000	1000	1000

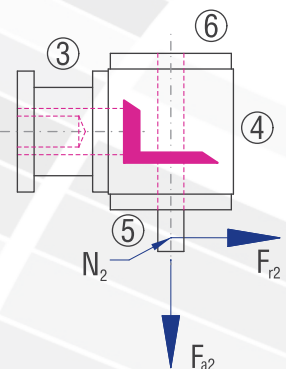
## Permissible radial force F<sub>r2</sub> and axial force F<sub>a2</sub> on shaft N<sub>2</sub>

n <sub>2</sub> [rpm]	3000		1000		500		250		100		50	
T <sub>2N</sub> [Nm]	F <sub>r</sub> [N]	F <sub>a</sub> [N]	F <sub>r</sub> [N]	F <sub>a</sub> [N]	F <sub>r</sub> [N]	F <sub>a</sub> [N]	F <sub>r</sub> [N]	F <sub>a</sub> [N]	F <sub>r</sub> [N]	F <sub>a</sub> [N]	F <sub>r</sub> [N]	F <sub>a</sub> [N]
< 750	5850	2925	8650	4325	10500	5250	12250	6125	15000	7500	19000	9500
> 750	4876	2438	7208	3604	8750	4375	10208	5104	12500	6250	15830	7915

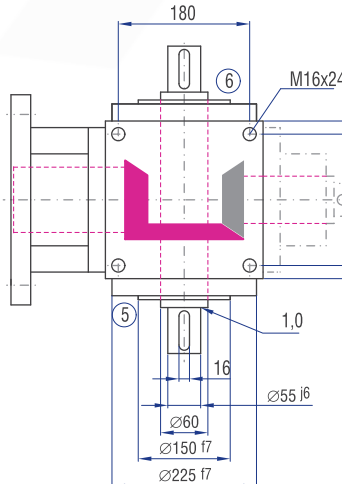
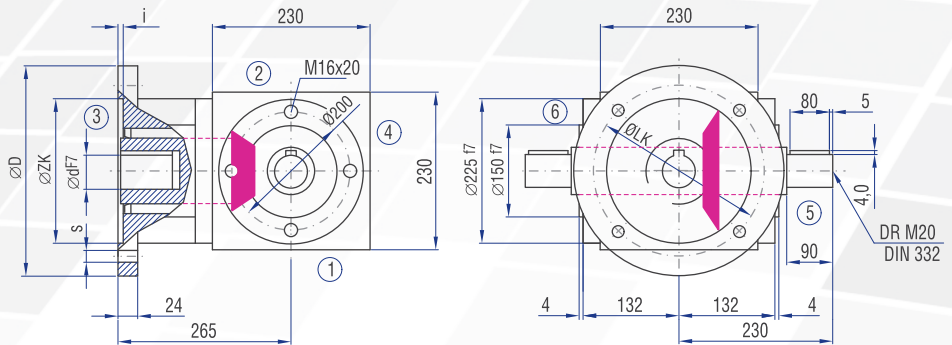
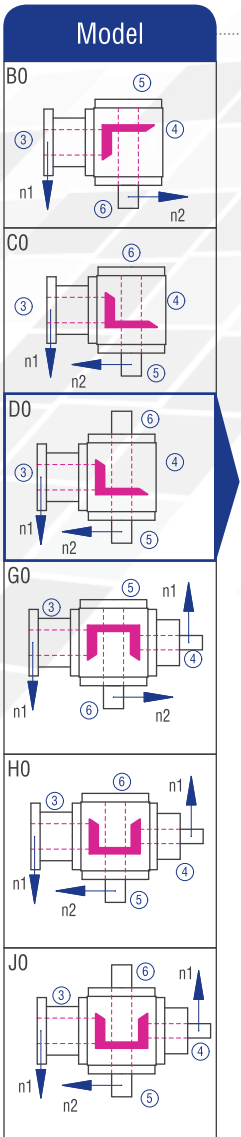
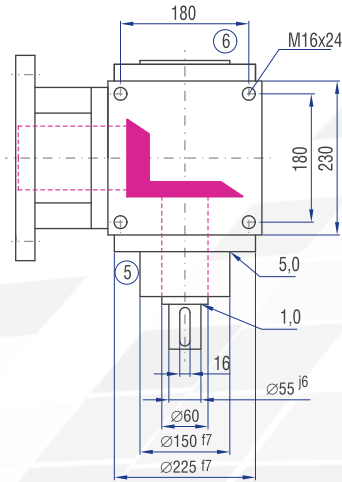
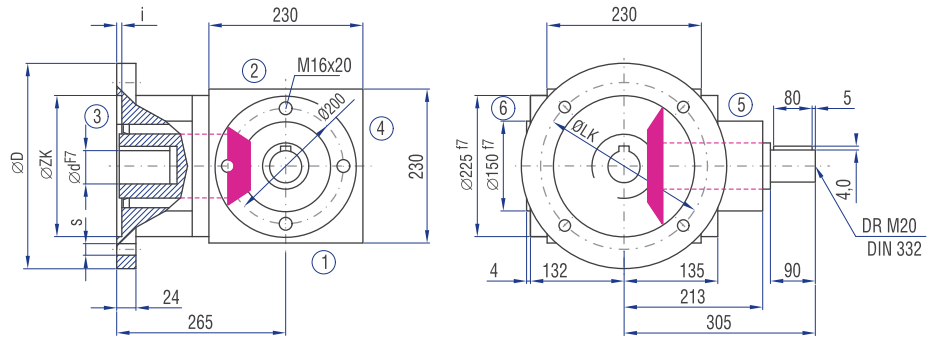
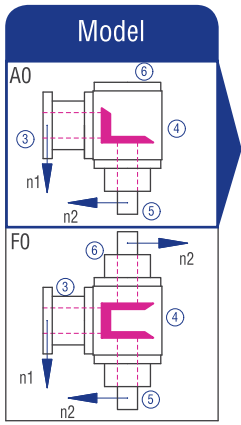
## Inertia moments/mass

Inertia moment J<sub>1</sub> related to the fast-rotating shaft (N<sub>1</sub>)

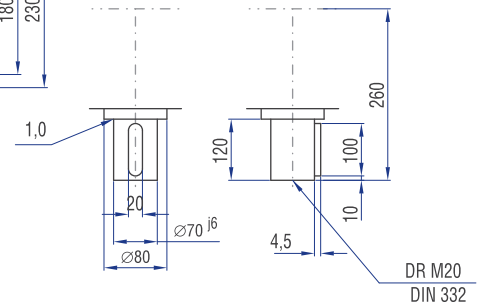
Model	Inertia moment [kgcm <sup>2</sup> ]							Mass [kg]
	1:1	1.5:1	2:1	3:1	4:1	5:1	6:1	
A0	577.000	287.000	203.000	141.000	134.000	131.000	126.000	94.0
B0	573.000	292.000	207.000	143.000	135.000	131.000	127.000	112.0
C0	573.000	292.000	207.000	143.000	135.000	131.000	127.000	112.0
D0	583.000	296.000	209.000	144.000	135.000	132.000	127.000	91.0
E0N	583.000	301.000	213.000	146.000	136.000	132.000	127.000	86.0
E0S	644.000	328.000	228.000	153.000	140.000	135.000	129.000	87.0
F0	830.000	404.000	272.000	163.000	149.000	142.000	134.000	112.0
G0	826.000	390.000	271.000	177.000	168.000	161.000	157.000	115.0
H0	826.000	390.000	271.000	177.000	168.000	161.000	157.000	115.0
J0	836.000	394.000	273.000	178.000	168.000	162.000	157.000	117.0
K0N	836.000	399.000	277.000	180.000	169.000	162.000	157.000	110.0
K0S	897.000	426.000	292.000	187.000	173.000	165.000	159.000	111.0



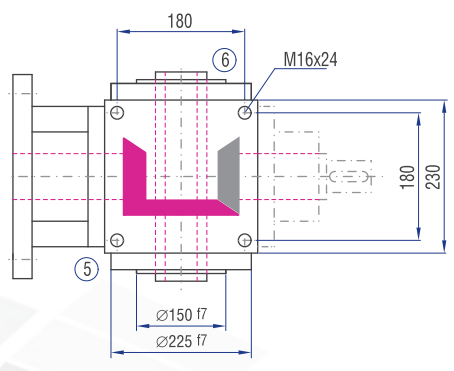
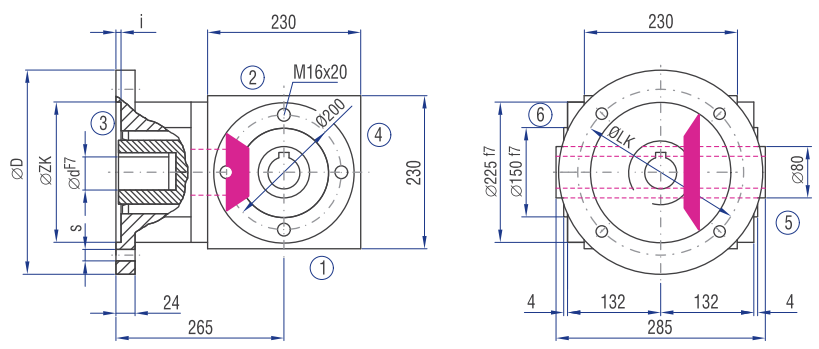
# 6.5.12 Type VL 230 – Type V with flange for motor mounting



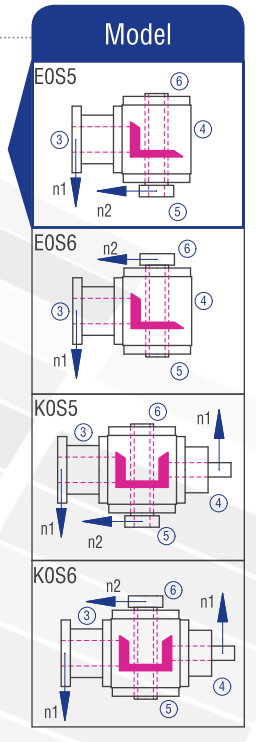
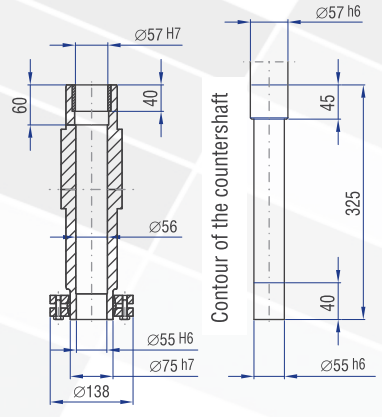
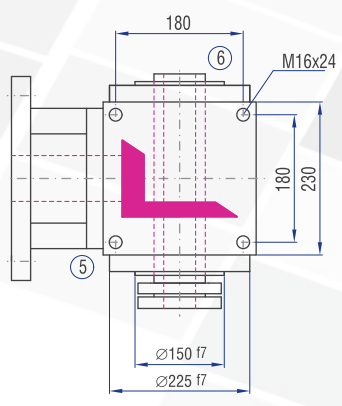
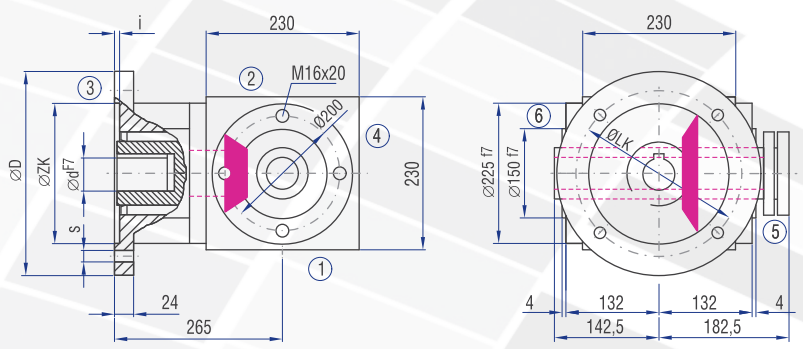
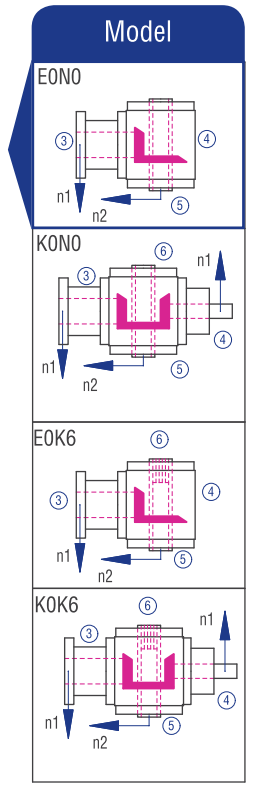
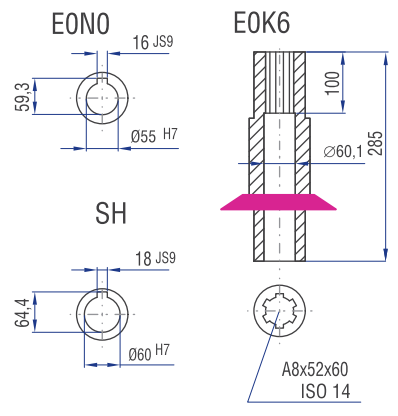
Implementation VV



IEC motor	Model	Shaft (dxl)	D [mm]	LK [mm]	ZK [mm]	s [mm]	i [mm]
132	B5	38x80	300	265	230	14	5
160	B5	42x110	350	300	250	18	6
180	B5	48x110	350	300	250	18	6
200	B5	55x110	400	350	300	18	6

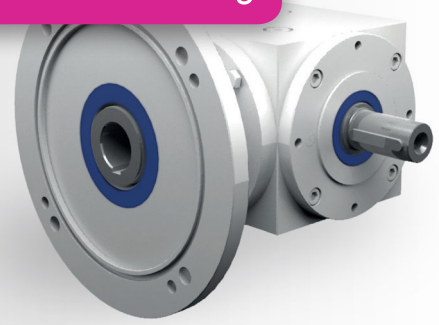


### Implementation



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.

## 6.5.13 Type VL 260 – Type V with flange for motor mounting



### Characteristics

Characteristic	Standard	Option
<b>Toothing</b>	Bevel gear set, spiral-toothed	See chapter 6.2.1
<b>Gear ratio</b>	1:1 to 6:1	
<b>Housing / Flanges</b>	Grey cast iron	
<b>Threaded mounting hole</b>	On all housing surfaces without flange and on all flanges.	See chapter 6.2.3
<b>Shaft</b>	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
<b>Hollow shaft</b>	Material 1 C45, shafts greased Fit with ISO 7 tolerance with parallel keyway: according to DIN 6885 Sheet 1	See chapter 4.6.3
<b>Radial shaft seal ring</b>	NBR, form A	See chapter 4.8
<b>Ambient temperature</b>	-10°C to +90°C. The values of the performance tables are valid for +20°C	See chapter 4.9.3
<b>Circumferential backlash</b>	< 30 arcmin	See chapter 6.2.10
<b>Protection class</b>	IP 54	See chapter 4.5
<b>Corrosion protection</b>	Prime coat; layer thickness > 40 µm	See chapter 4.4.1
<b>Bearing life L10h</b>	more than 15,000h	See chapter 4.9.1
<b>Oil change intervals</b>	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 6.2.8
<b>Lubricants</b>	Synthetic lubricants	See chapter 6.2.8
<b>Flange</b>	Suited for the mounting of IEC motors	
<b>Coupling</b>	Three-piece claw coupling	

## Performance data

n <sub>1</sub> [rpm]	1:1			1.5:1			2:1			3:1			4:1			5:1			6:1					
	n <sub>2</sub> [rpm]	P <sub>1N</sub> [kW]	T <sub>2N</sub> [Nm]	n <sub>2</sub> [rpm]	P <sub>1N</sub> [kW]	T <sub>2N</sub> [Nm]	n <sub>2</sub> [rpm]	P <sub>1N</sub> [kW]	T <sub>2N</sub> [Nm]	n <sub>2</sub> [rpm]	P <sub>1N</sub> [kW]	T <sub>2N</sub> [Nm]	n <sub>2</sub> [rpm]	P <sub>1N</sub> [kW]	T <sub>2N</sub> [Nm]	n <sub>2</sub> [rpm]	P <sub>1N</sub> [kW]	T <sub>2N</sub> [Nm]	n <sub>2</sub> [rpm]	P <sub>1N</sub> [kW]	T <sub>2N</sub> [Nm]			
3000				2000	189.58	860	1500	133.92	810	1000	85.97	780	750	57.87	700	600	46.29	700	500	27.27	495			
2400				1600	158.72	900	1200	112.43	850	800	72.39	821	600	51.58	780	480	40.21	760	400	23.12	524			
1500	1500	157.07	950	1000	104.71	950	750	78.53	950	500	49.60	900	375	37.20	900	300	29.10	880	250	16.36	594			
1000	1000	115.73	1,050	667	73.50	1,000	500	57.87	1,050	333	36.34	990	250	28.93	1,050	200	21.82	990	167	12.93	702			
750	750	96.72	1,170	500	55.11	1,000	375	48.36	1,170	250	28.93	1,050	188	22.73	1,100	150	18.19	1,100	125	10.91	792			
500	500	72.75	1,320	333	36.70	1,000	250	33.07	1,200	167	20.43	1,110	125	16.26	1,180	100	13.23	1,200	83	8.06	878			
250	250	42.44	1,540	167	18.40	1,000	125	16.53	1,200	83	11.16	1,220	63	8.61	1,250	50	7.11	1,290	42	4.35	940			
50	50	9.64	1,750	33	3.64	1,000	25	3.31	1,200	17	2.55	1,360	13	1.82	1,320	10	1.47	1,330	8	0.87	951			
P <sub>1Nt</sub> [kW]		42.0			42.0			42.0			42.0			42.0			42.0			42.0				
T <sub>2max</sub> [Nm]		2310			1000			1200			1940			1940			1910			1730				

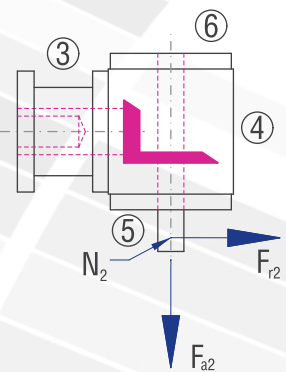
## Permissible radial force F<sub>r2</sub> and axial force F<sub>a2</sub> on shaft N<sub>2</sub>

n <sub>2</sub> [rpm]	3000		1000		500		250		100		50	
T <sub>2N</sub> [Nm]	F <sub>r</sub> [N]	F <sub>a</sub> [N]	F <sub>r</sub> [N]	F <sub>a</sub> [N]	F <sub>r</sub> [N]	F <sub>a</sub> [N]	F <sub>r</sub> [N]	F <sub>a</sub> [N]	F <sub>r</sub> [N]	F <sub>a</sub> [N]	F <sub>r</sub> [N]	F <sub>a</sub> [N]
< 950	8500	4250	13000	6500	16000	8000	18000	9000	22000	11000	28000	14000
> 950	7080	3540	10830	5415	13330	6665	15000	7500	18330	9165	23330	11665

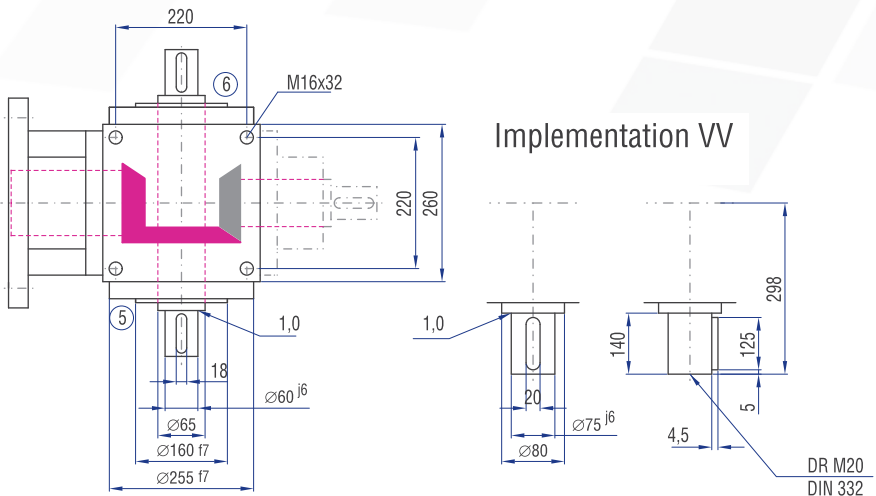
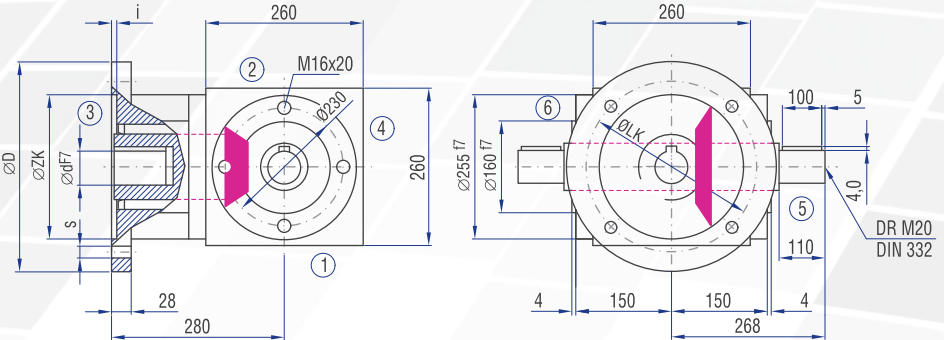
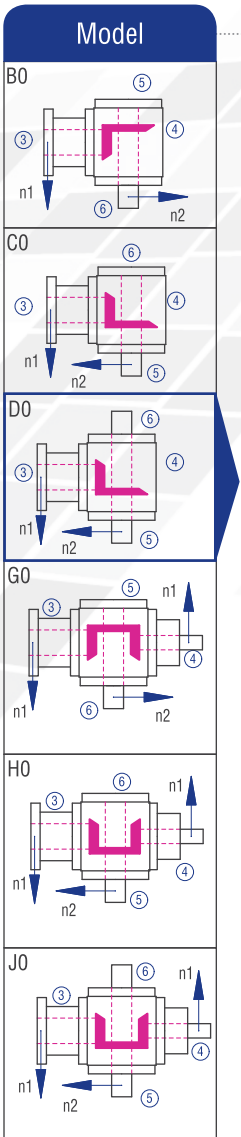
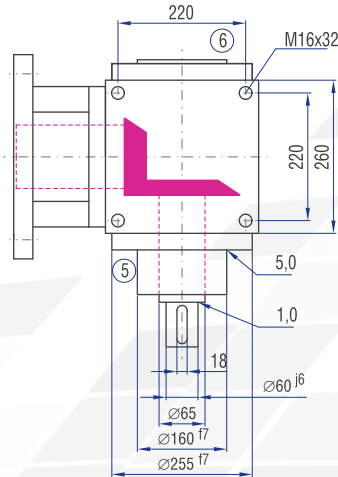
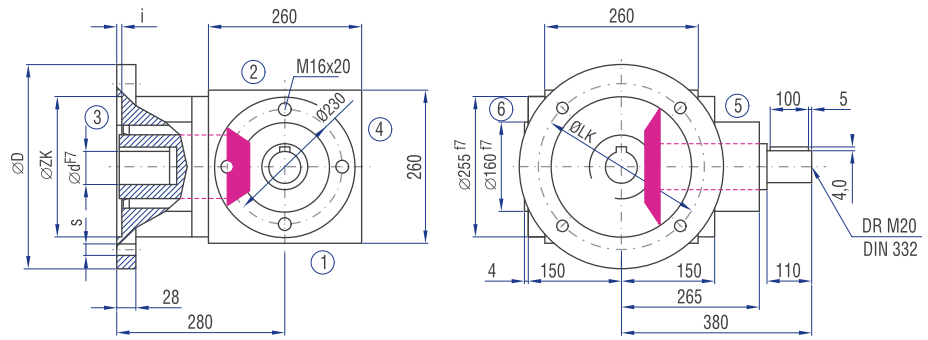
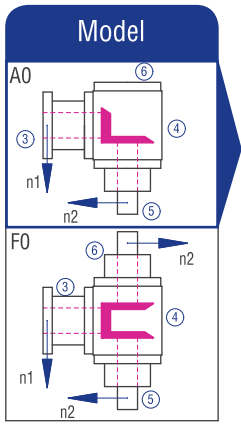
## Inertia moments/mass

Inertia moment J<sub>1</sub> related to the fast-rotating shaft (N<sub>1</sub>)

Model	Inertia moment [kgcm <sup>2</sup> ]							Mass [kg]
	1:1	1.5:1	2:1	3:1	4:1	5:1	6:1	
A0	826.100	347.183	202.675	136.373	115.804	105.534	100.558	100.0
B0	839.340	209.512	289.735	168.511	135.694	118.264	109.454	100.0
C0	839.340	209.512	289.735	168.511	135.694	118.264	109.454	100.0
D0	853.750	424.806	293.338	103.557	136.594	118.840	109.854	103.0
E0N	840.590	454.512	296.298	171.400	137.319	119.304	110.176	97.0
E0S	904.240	482.801	312.210	178.470	141.296	121.849	111.944	99.9
F0	1233.20	528.117	304.450	181.607	141.248	121.818	111.867	120.0
G0	1246.44	334.512	382.235	208.361	157.024	139.264	129.954	124.0
H0	1246.44	334.512	382.235	208.361	157.024	139.264	129.954	124.0
J0	1260.85	549.806	385.838	143.407	157.924	139.840	130.354	127.0
K0N	1247.69	579.512	388.798	211.250	158.649	140.304	130.676	121.0
K0S	1311.34	607.801	404.710	218.320	162.626	142.849	132.444	123.9

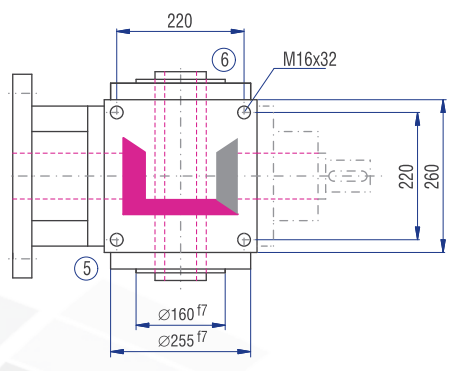
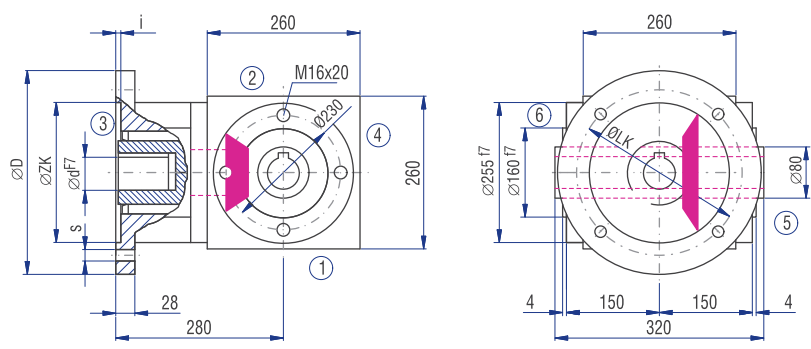


# 6.5.13 Type VL 260 – Type V with flange for motor mounting

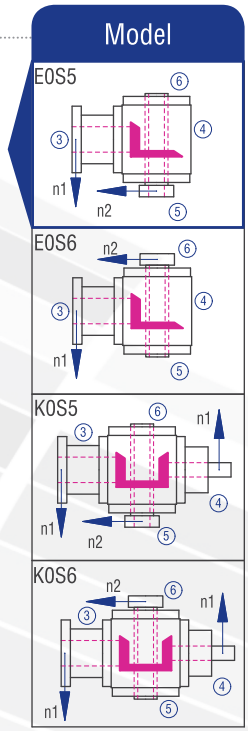
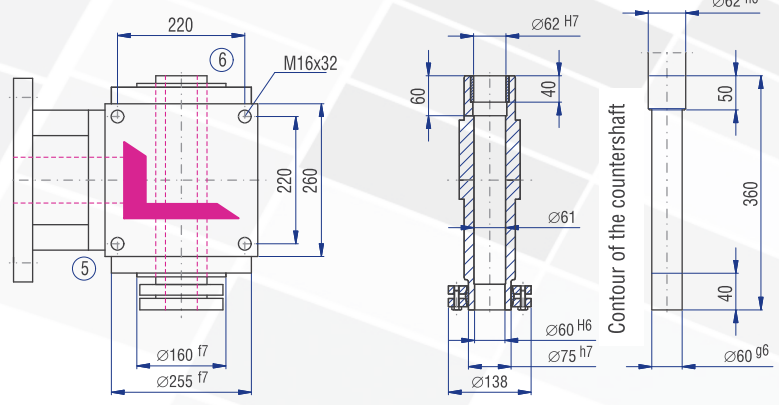
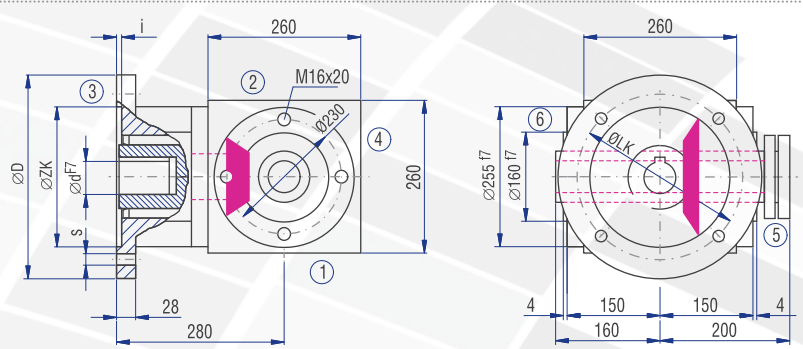
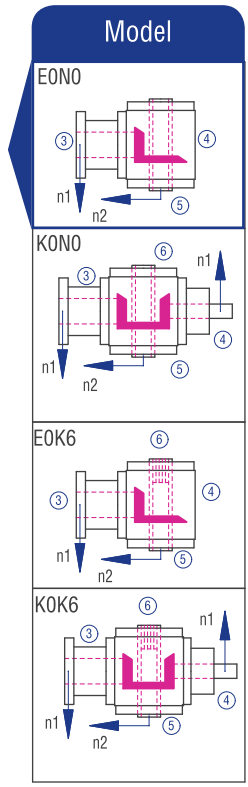
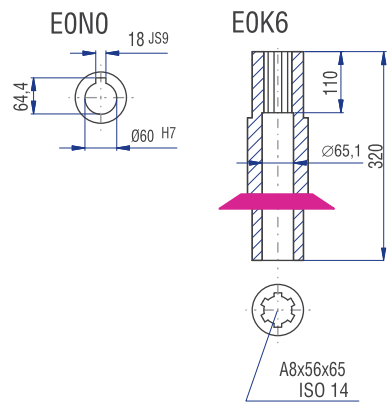


IEC motor	Model	Shaft (dxl)	D [mm]	LK [mm]	ZK [mm]	s [mm]	i [mm]
132	B5	38x80	300	265	230	14	5
160	B5	42x110	350	300	250	18	6
180	B5	48x110	350	300	250	18	6
200	B5	55x110	400	350	300	18	6





### Implementation



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.