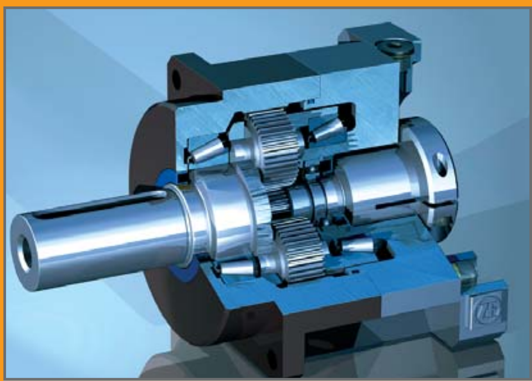
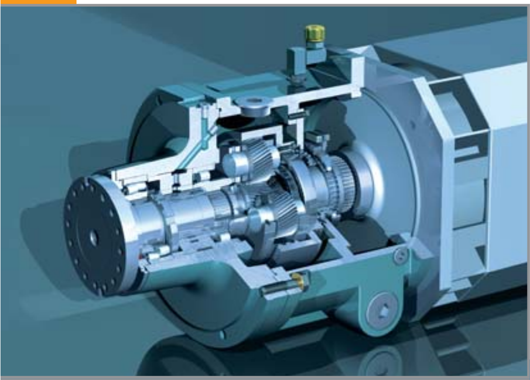
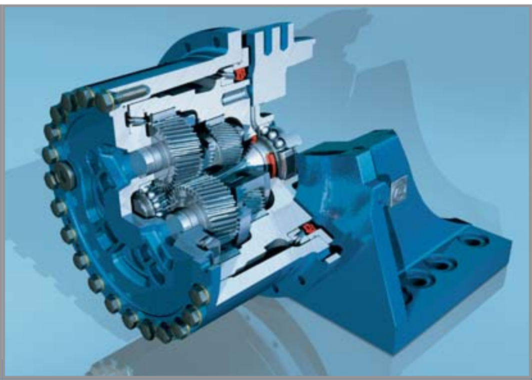
ZF Friedrichshafen AG
Special Driveline Technology

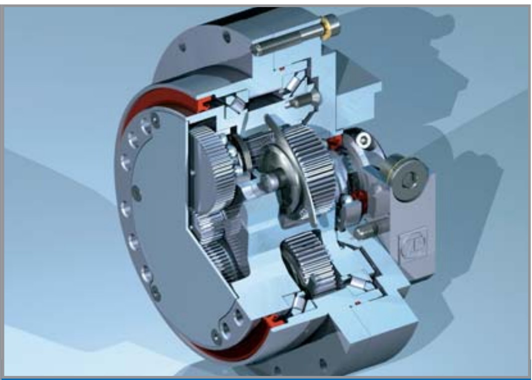


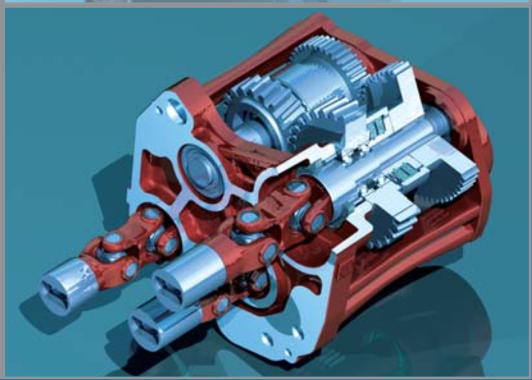
ZF-SERVOPLAN®

Planetary gearboxes
for servomotors









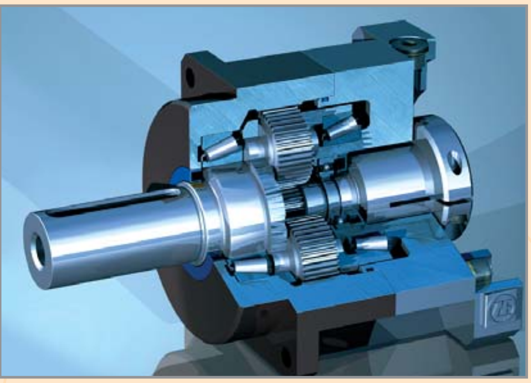
ZF-Servoplan CG
Compact Gearbox

ZF-Duoplan 2K
Two-speed Gearboxes

ZF-Ecolift
Elevator Gearboxes

ZF-Tiratron
Hysteresis Brakes

Customer specific
Gearboxes



ZF-Servoplan PG
Servogearboxes

Precision in movement

The ZF Friedrichshafen division Special Driveline Technology is able to offer you a wide range of machine drives, brakes and clutches for applications in engineering as well as customer specific drive solutions.

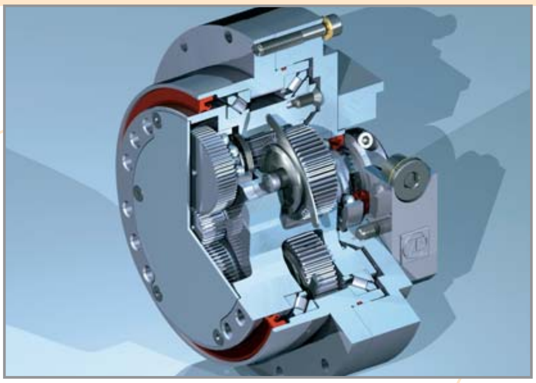
Our development and production activities are focused on servo-assisted drives for automation engineering, two-speed drive gearboxes for machine tools as well as customer-specific drives, such as for printing machines, robot applications and elevator gearboxes.

Our innovative standard products range from low backlash servogearboxes (ZF-Servoplan), and robust two-speed gearboxes (ZF-Duoplan) to hysteresis clutches and brakes for non-contact web control (ZF-Tiratron).

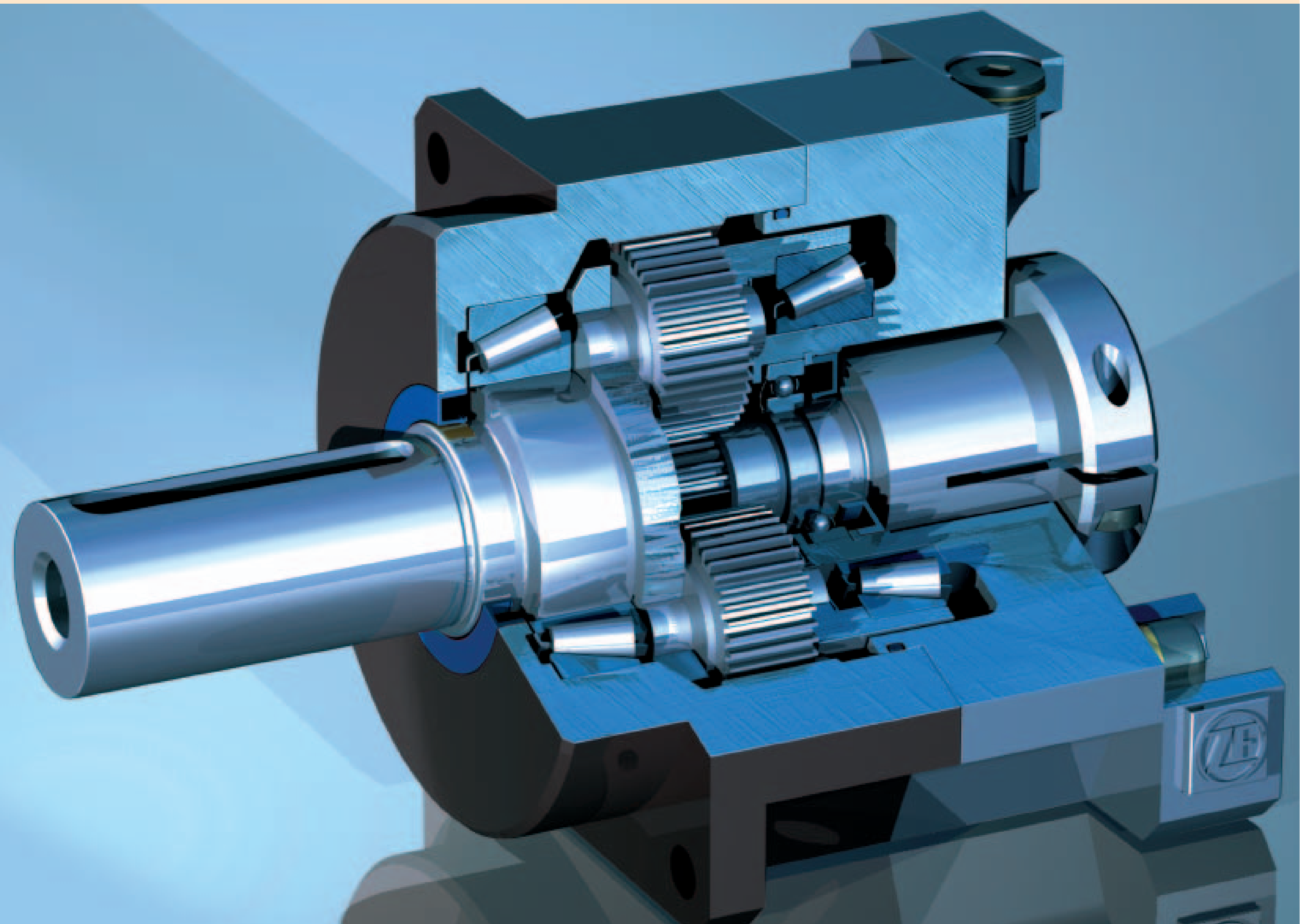
The ZF-Servoplan planetary gearbox series has been designed for direct mounting onto servomotors. The available wide range of sizes and the use of a modular system allows the application in almost any field of automation.

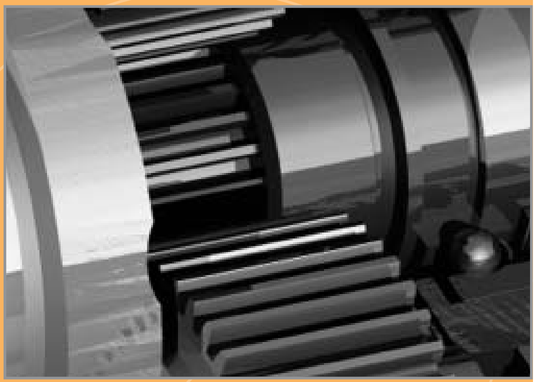
The combination of servomotors with ZF-Servoplan planetary gearboxes constitutes a coaxial drive unit. The servomotor output shaft is connected to the sun gear of the gearbox by using a clamping coupling. The sun gear drives three planetary gears inside the planetary carrier, which rotate inside the internal ring gear.

Since the power is distributed to three planetary gears, thereby distributing the forces evenly, this allows a very compact design with high power density.

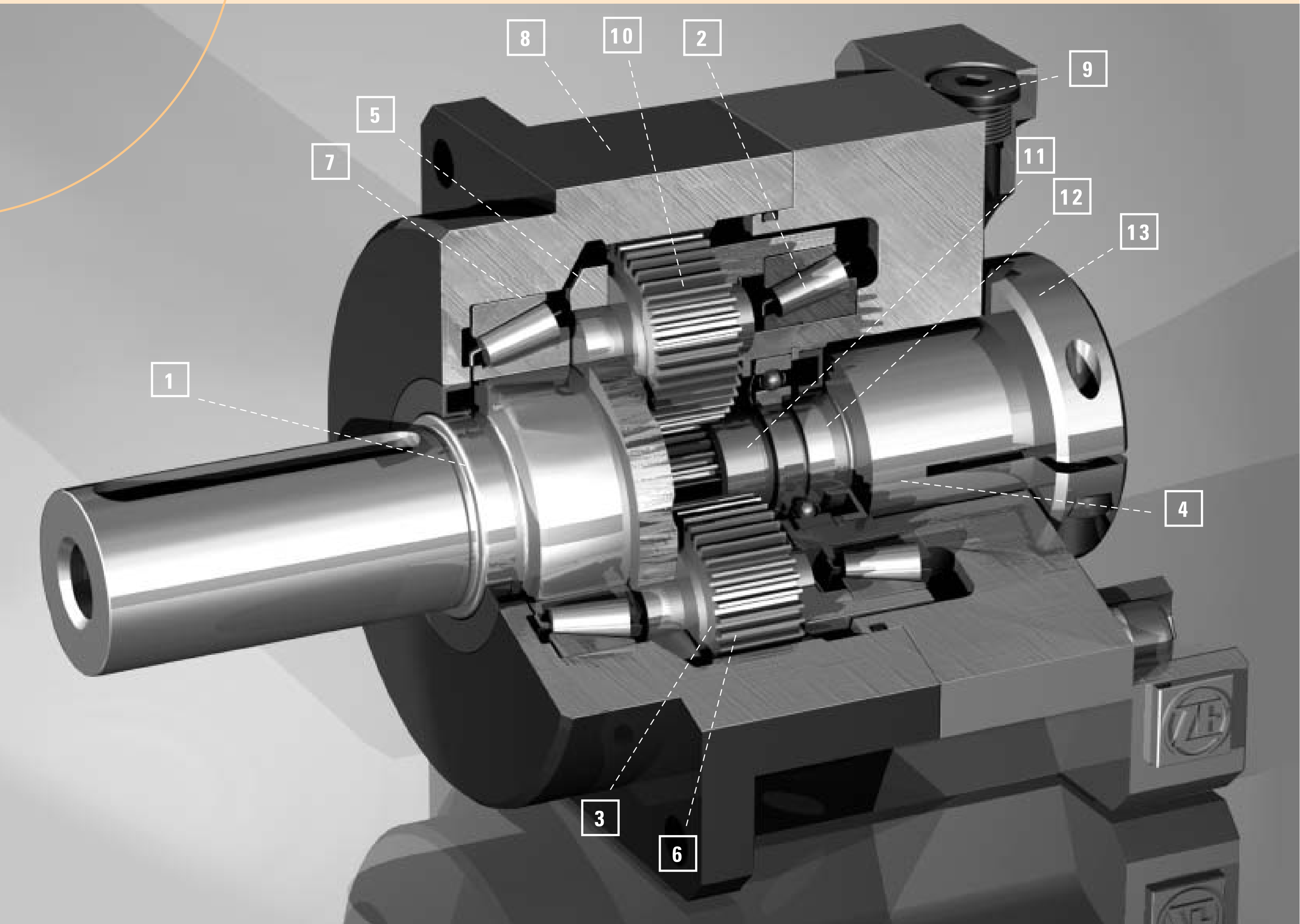


Also available from ZF: Compact gearboxes for automation and robot applications.





1. The robust output shaft shoulder allows the highest possible axial loads
2. High radial forces and an extreme tilt resistance through large-dimensioned taper roller bearings
3. A high positional accuracy is achieved by using ground and highly accurate gears
4. High quality Viton shaft seals ensure a permanent and save sealing
5. High torsional rigidity thanks to an optimized sungear with a stable two-sided support for the planetary gears
6. Low running noise thanks to an optimized gear tooth shape
7. Compact design by using separated output bearings
8. A special galvanic surface treatment makes the housing environmentally resistant, even under the most adverse conditions
9. Hermetically sealed housing by using robust sealed screws
10. Special surface treatment of the ring gear in order to optimize the lubrication supply of the teething
11. High acceleration torques permissible by using gearbox internal interlocking power transmission
12. Low gearbox temperatures and minimum power loss by using smallest possible seal diameters
13. Backlash-free power transmission by using clamping coupling for motor shaft connection


8
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Planetary Gearbox, one-stage

Technical Data:		Reduction Ratio i:	Size: PG 25/1	PG 100/1	PG 200/1	PG 500/1	PG 1200/1	PG 3000/1
Nominal output torque Also applicable for S1 operation	T_{2N} [Nm]	3	-	-	120	280	720	1 800
		4	25	85	170	420	1 020	2 500
		5	25	100	200	500	1 200	3 000
		7	25	85	170	420	1 020	2 500
		10	20	60	120	280	720	1 800
Emergency stop torque [1]	T_{2Not} [Nm]	3	-	-	400	840	2 160	5 400
		4	100	280	560	1 260	3 060	7 500
		5	100	330	660	1 500	3 600	9 000
		7	80	280	560	1 260	3 060	7 500
		10	80	200	400	840	2 160	5 400
Max. acceleration torque [2]	T_{2B} [Nm]	3	-	-	220	560	1 440	3 000
		4	50	170	340	840	2 040	5 000
		5	50	200	400	1 000	2 400	6 000
		7	50	170	340	840	2 040	5 000
		10	40	110	220	560	1 440	3 000
Max. input speed [5]	n_{1Max} [rpm]	3	-	-	4 000	3 200	2 500	2 000
		4	5 000	5 000	4 000	3 200	2 500	2 000
		5	6 300	6 300	5 000	4 000	3 200	2 500
		7	8 000	8 000	6 300	5 000	4 000	3 000
		10	10 000	10 000	8 000	6 300	5 000	3 500
Nominal input speed	n_{1N} [rpm]	3	-	-	2 300	1 800	1 300	800
		4	3 000	3 000	2 500	2 000	1 500	1 000
		5	4 000	4 000	3 000	2 500	2 000	1 200
		7	5 000	5 000	4 000	3 000	2 500	1 500
		10	6 000	6 000	5 000	4 000	3 000	2 000
Backlash standard	[arcmin]		≤ 6	≤ 6	≤ 4	≤ 4	≤ 4	≤ 4
reduced [3]			≤ 3	≤ 3	≤ 2	≤ 2	≤ 2	≤ 2
Torsional rigidity	C_t [Nm/arcmin]		3.5	8.2	24	48	149	340
Moments of inertia	I_1 [kg cm²]	3	-	-	2.8	8.2	36	128
		4	0.16	0.55	2.0	6.75	24.5	97.6
		5	0.16	0.47	1.64	5.54	18.8	76.4
		7	0.15	0.41	1.36	4.59	14.5	59.9
		10	0.14	0.38	1.22	4.1	12.3	51.1
Max. axial force	F_A [N]		3 200	4 500	7 000	10 000	15 000	22 000
Max. radial force [4]	F_R [N]		2 700	3 700	6 700	9 200	14 000	21 000
Lifetime	L_h [h]		> 20 000	> 20 000	> 20 000	> 20 000	> 20 000	> 20 000
Efficiency	η		≥ 97 %	≥ 97 %	≥ 97 %	≥ 97 %	≥ 97 %	≥ 97 %
Weight	m [kg]		1.6	2.9	5.7	11.5	27	62
Operating noise at (n_{an} = 3000 rpm) [6]	L_p [dB(A)]		≤ 63	≤ 68	≤ 68	≤ 72	≤ 72	≤ 72

Lubrication	Lifetime lubrication, closed system
Surface protection	Aluminium respectively steel, galvanically treated
Installation position	Any, variable
Operating temperature	- 10 °C to + 90 °C
Direction of rotation	same as input
Degree of protection	IP 65

1) Max. 1000 times during gearbox lifetime.

2) At a maximum of 1000 cycles per hour, with the dynamic factor K1 page 16 to be taken into consideration in any other case.

Percentage of the overall running time less than 5 % and duration of the impulse under 0.3 sec.

3) Optional.

4) Resultant force center of output shaft at output speed 300 rpm.

5) For cyclic duty only

6) At i=3: + 4 db(A)

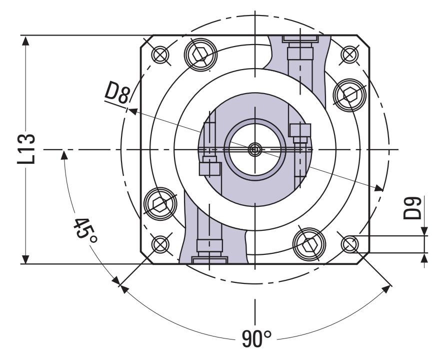
Dimensions [mm]:

Size:		PG 25/1	PG 100/1	PG 200/1	PG 500/1	PG 1200/1	PG 3000/1
DR		M5	M8	M12	M16	M20	M20
D_1 (g6)		60	70	90	130	160	200
D_2		20	28	40	45	60	95
D_3 (k6)		16	22	32	40	55	85
D_4		5.5	6.6	9	11	13	17
D_5		68	85	120	165	215	290
D_6*(F7)	min.	6	14	19	24	32	42
	max.	14	24	32	38	48	60
L_1*		129.5	155.7	193.1	245.6	290	399.5
L_2 (+0.5)		28	36	58	82	82	130
L_3		20	20	30	30	30	40
L_4		7.7	8	10	12.5	22	30
L_6*	min.	15	23	30	32	45	55
	max.	30	40	50	60	82	110
L_7*		3.5	4.5	5.5	5.3	8	8
L11		62	76	101	141	182	242
L12		2	2	2	3	3	3
L13*	min.	62	80	106	141	182	242
L14		22	28	50	70	70	110
L15		3	4	4	5	5	7.5
L16		5	6	10	12	16	22
L17		18	24.5	35	43	59	90
L22*		4.5	7.5	8.5	7.5	9	10
D7/ D8/ D9		Adaptations available for all common servomotors, dimensions are variable. Please request specific installation drawing.					

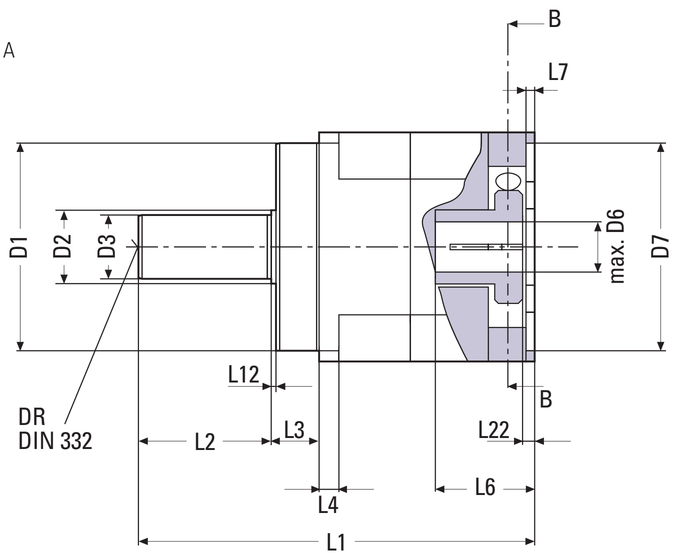
*Dimensions depending on motor.

Please use page 19 for inquiries and orders.

B-B

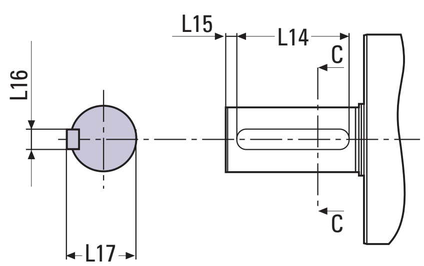


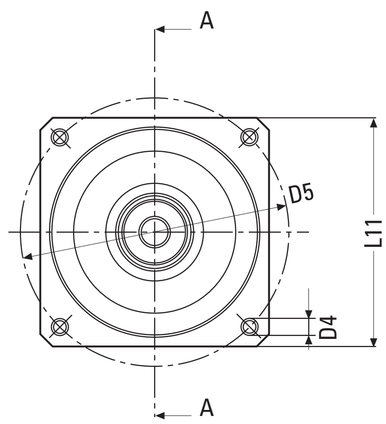
A-A



Centering DIN 332 (G)
Optional with key as per DIN 6885 sheet 1

C-C





Planetary Gearbox, two-stage

Technical Data:		Reduction Ratio i:	Size: PG 25/2	PG 100/2	PG 200/2	PG 500/2	PG 1200/2
Nominal output torque Also applicable for S1 operation	T_{2N} [Nm]	20, 35, 40, 70 25, 50 100	25 25 20	85 100 60	170 200 120	420 500 280	1 020 1 200 720
Emergency stop torque 1)	T_{2Not} [Nm]	20, 35, 40, 70 25, 50 100	100 100 80	280 330 200	560 660 400	1 260 1 500 840	3 060 3 600 2 160
Max. acceleration torque 2)	T_{2B} [Nm]	20, 35, 40, 70 25, 50 100	50 50 40	170 200 110	340 400 220	840 1 000 560	2 040 2 400 1 440
Max. input speed 5)	n_{1Max} [rpm]	20, 25, 35, 40, 50, 70, 100	6 300 10 000	6 300 10 000	5 000 8 000	4 000 6 300	3 200 5 000
Nominal input speed	n_{1N} [rpm]	20, 25, 35, 40, 50, 70, 100	4 000 6 000	4 000 6 000	3 000 5 000	2 500 4 000	2 000 3 000
Backlash standard reduced 3)	[arcmin]		≤ 8 ≤ 6	≤ 8 ≤ 6	≤ 6 ≤ 4	≤ 6 ≤ 4	≤ 6 ≤ 4
Torsional rigidity	C_t [Nm/arcmin]		3.5	8.2	24	48	149
Moments of inertia	I_1 [kg cm²]	20 25 35 40 50 70 100	0.12 0.12 0.12 0.10 0.10 0.10 0.10	0.47 0.47 0.47 0.47 0.47 0.46 0.46	1.56 1.54 1.53 1.44 1.44 1.44 1.44	5.29 5.25 5.21 4.96 4.96 4.94 4.94	6.95 6.70 6.53 5.51 5.45 5.42 5.39
Max. axial force	F_A [N]		3 200	4 500	7 000	10 000	15 000
Max. radial force 4)	F_R [N]		2 700	3 700	6 700	9 200	14 000
Lifetime	L_h [h]		> 20 000	> 20 000	> 20 000	> 20 000	> 20 000
Efficiency	μ [%]		≥ 94 %	≥ 94 %	≥ 94 %	≥ 94 %	≥ 94 %
Weight	m [kg]		2.2	3.8	7.5	15	35
Operating noise at (n_{an} = 3000 rpm)	L_P [dB(A)]		≤ 63	≤ 68	≤ 68	≤ 72	≤ 72
Lubrication		Lifetime lubrication, closed system					
Surface protection		Aluminium respectively steel, galvanically treated					
Installation position		Any, variable					
Operating temperature		- 10 °C to + 90 °C					
Direction of rotation		same as input					
Degree of protection		IP 65					

1) Max. 1000 times during gearbox lifetime.

2) At a maximum of 1000 cycles per hour, with the dynamic factor K2 page 16 to be taken into consideration in any other case.

Percentage of the overall running time less than 5 % and duration of the impulse under 0.3 sec.

3) Optional.

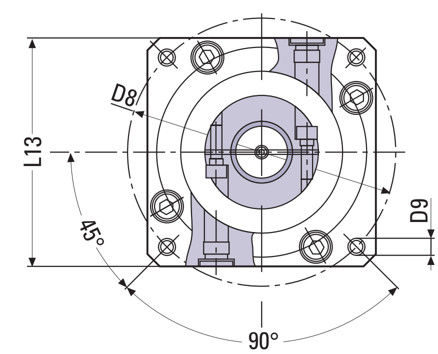
4) Resultant force. center of output shaft at output speed 300 rpm.

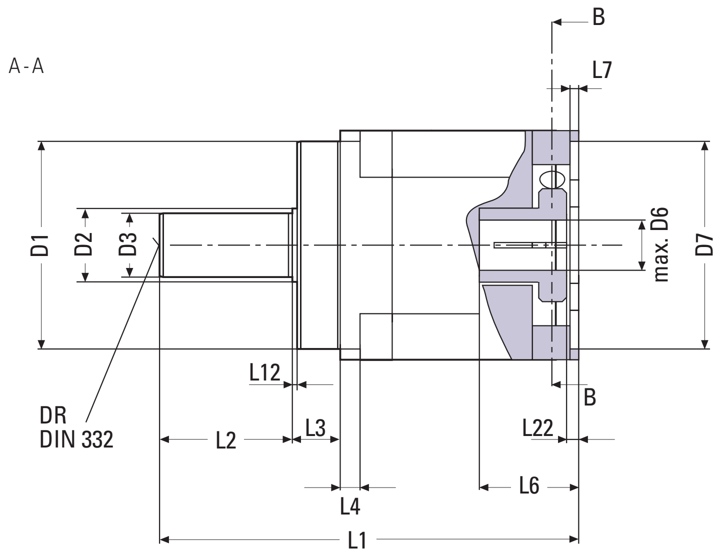
5) For cyclic duty only

Dimensions [mm]:		PG 25/2	PG 100/2	PG 200/2	PG 500/2	PG 1200/2
DR		M5	M8	M12	M16	M20
D_1(g6)		60	70	90	130	160
D_2		20	28	40	45	60
D_{3}(k6)		16	22	32	40	55
D_4		5.5	6.6	9	11	13
D_5		68	85	120	165	215
D_6*(F7)	min.	6	11	14	19	19
	max.	14	24	32	38	38
L_1*		153.0	182.2	236.0	296.0	335.2
L_2 (+0.5)		28	36	58	82	82
L_3		20	20	30	30	30
L_4		7.7	8	10	12.5	22
L_6*	min.	15	23	30	32	32
	max.	30	40	50	60	60
L_7*		3.5	4.5	5.5	5.3	8
L11		62	76	101	141	182
L12		2	2	2	3	3
L13*	min.	62	80	106	141	182
L14		22	28	50	70	70
L15		3	4	4	5	5
L16		5	6	10	12	16
L17		18	24.5	35	43	59
L22*		4.5	7.5	8.5	7.5	9
D7/ D8/ D9		Adaptations available for all common servomotors, dimensions are variable. Please request specific installation drawing.				

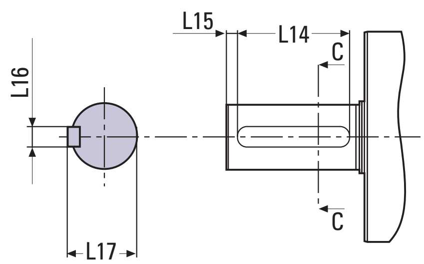
*Dimensions depending on motor.

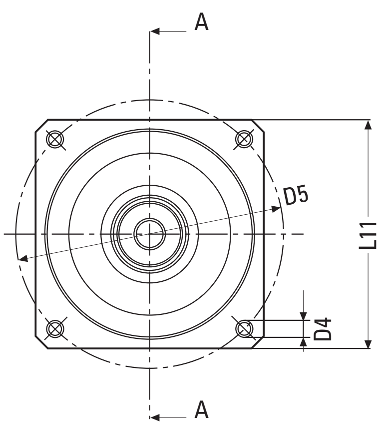
Please use page 19 for inquiries and orders.





Centering DIN 332 (G)
Optional with key as per DIN 6885 sheet 1



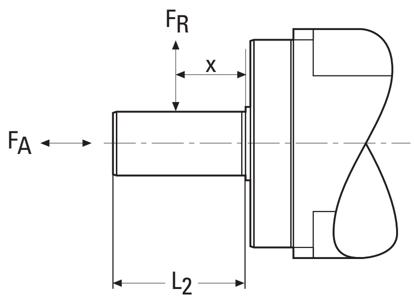


The permissible shaft loads in axial or radial direction (see table on page 8 and 10) correspond to a nominal bearing lifetime of 15000 operating hours at a constant output shaft speed of 300 rpm.

The load application point is located at the centre of the output shaft. The values for F_R do not take any axial loads into account.

For combined axial and radial forces the permissible force values are reduced.

If the radial force F_R acts on the output shaft outside its centre, the permissible force values are reduced ($x > \frac{L_2}{2}$) or increased ($x < \frac{L_2}{2}$), respectively.



Force (load) application points on gearbox output shaft
F_A = permitted axial force
F_R = permitted radial force
x = distance

Degree of protection
The degree of protection is defined by the designation IP (International Protection corresponding EN 60529) and two digits. For our gearboxes the designation is IP 65.

The first digit designates the degree of protection against contact (screen protection) and penetration of foreign bodies.

In this instance, the first digit 6 means:
- protection against dust infiltration (dust-tight)
- complete screen protection.

The second digit designates the degree of protection against water.

In this instance, the digit 5 means:
- protection against water jets which are emitted from a nozzle and sprayed against the housing from all directions (jet water).

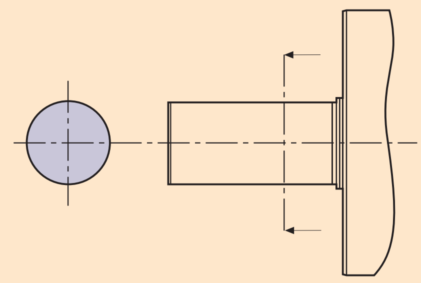
The gearbox output shaft is available in the following designs:

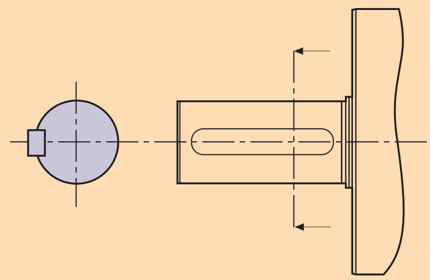
Plain output shaft (standard) for shrunk, backlash-free shaft-hub connections. This allows lower levels of running (operating) noise. We recommend the use of output shafts with shrunk shaft-hub connections.

Alternatively available:

Output shaft with key as per DIN 6885 sheet 1 (08.68 issue) for keyed shaft-hub connections. This type of connection is suitable for constant direction, where applications, requirements are not as stringent.

This connection type requires additional axial fixing of the hub. A centering bore with thread is provided on the face end of the gearbox output shaft for this purpose (as per DIN 332, sheet 2).

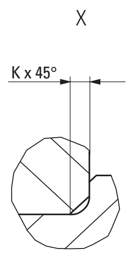


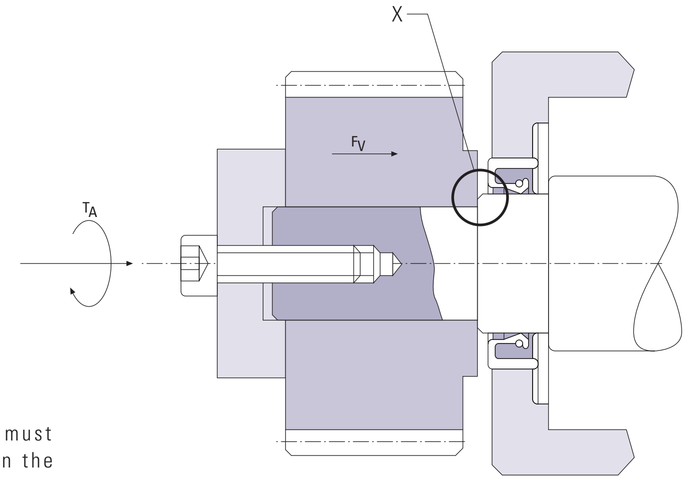


Size:

		PG 25/1 25/2	PG 100/1 100/2	PG 200/1 200/2	PG 500/1 500/2	PG 1200/1 1200/2	PG 3000/1 3000/2
Thread		M5	M8	M12	M16	M20	M20
T_A	[Nm]	5,5	23	79	130	260	260
F_V*	[kN]	6,5	17	40	50	80	80
K min.	[mm]	0,8	1,4	1,4	0,8	0,8	1,4
K max.	[mm]	1,0	1,6	1,6	1,0	1,0	1,6

*F_V = Pretensioning Force



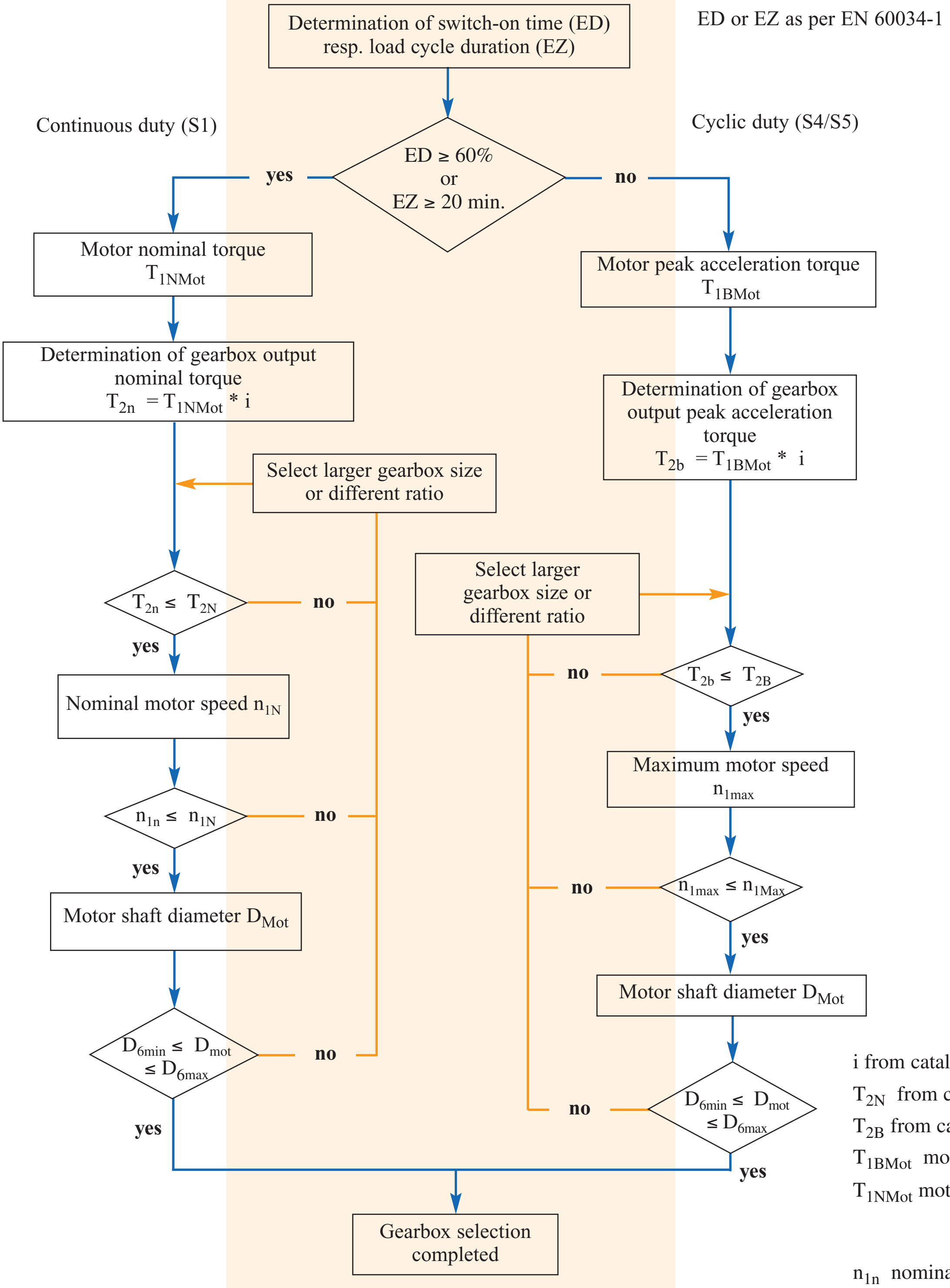


The connecting part on the gearbox output shaft must have a chamfer "K" (high of chamfer see table) on the contact pattern to the gearbox.

Fast gearbox selection

The quickest and most reliable method, to determine the appropriate gearbox size for a specific application, is a comparison of motor peak torque with gearbox datas.

Applications are differentiated based on norm EN 60034-1 as to continuous duty (S1) or intermittent cyclic duty (S4/S5). For intermittent cyclic duties the maximum motor acceleration torque is relevant, whereas for continuous duties motor nominal torque is used. In case the motor peak torque exceeds the permitted gearbox values, a calculation based on the actual application specific torques is required. Detailed configuration according to pages 15 to 17.



1) For nos. of cycles ≤ 1000 cycles per hour, and percentage of total running time ≤ 5% and duration of impulse less than 0.3 sec.

i from catalogue
T_{2N} from catalogue
T_{2B} from catalogue 1)
T_{1BMot} motor data
T_{1NMot} motor data

n_{1n} nominal motor speed
n_{1N} gearbox nominal input speed from catalogue
n_{1max} maximum motor speed
n_{1Max} gearbox max. nominal input speed from catalogue

Detailed Gearbox Configuration

In the detailed configuration the application specific loads are compared to the permitted gearbox datas. Further emergency-stop loads, as well as dynamic and occurrence factors are taken into consideration.

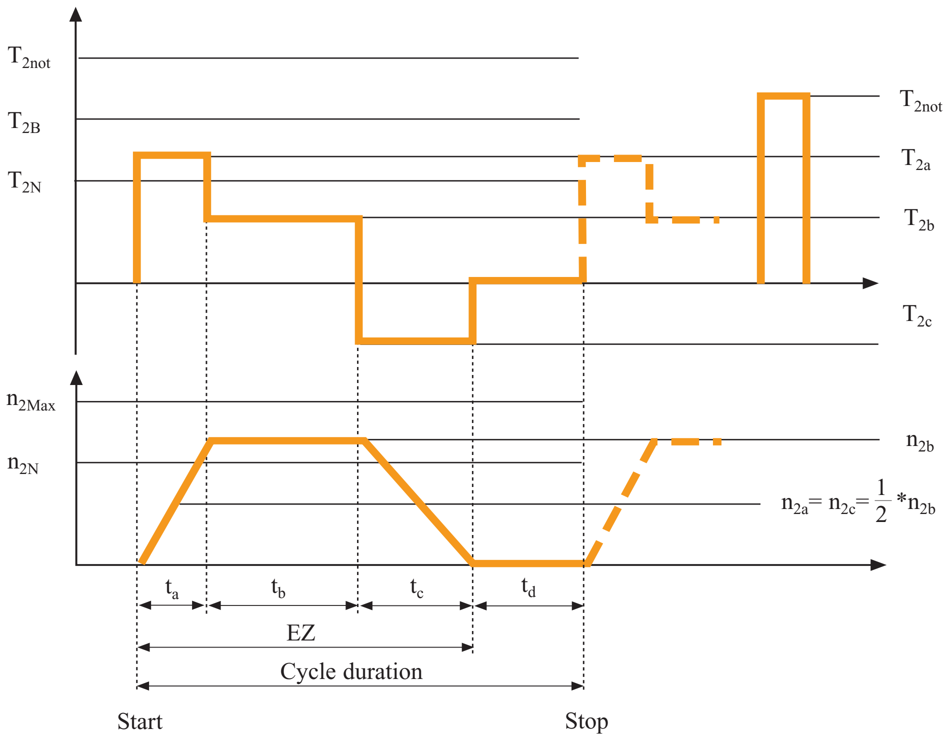
Application Loads

Each application has specific and unique loads. Torque T_2 and speed n_2 refer to the gearbox output shaft, which, for acceleration movements, is defined by the principle of angular momentum. The required acceleration torque is calculated from the rotating mass J_{app} which experiences a speed change in a given time period Δt.

Torque at gearbox output T_2 [Nm]: $T_2 = J_{app} * \frac{\Delta n}{\Delta t} + T_{Last}$

J_{app} [kgm^2]:	Mass moments of inertia of driven mass
T_{Last} [Nm]:	Load torque
$\frac{\Delta n}{\Delta t}$ [$1/s^2$] :	Acceleration

Typical load collective at gearbox output



T_{2max} = max. torque during load collective

t_{max} = duration of max. torque T_{2max}

For gearbox selection following performance datas are required:

Duration of single cycle [sec]:	Cycle duration = ta + tb + tc +td
Nos. of single cycles per hour [1/h]:	nos.of cycles = $\frac{3600}{\text{cycle duration}}$
Maximum input speed n_{1max} [rpm]:	$n_{1max} = i * \text{maximum} (n_{2a}, n_{2b},..., n_{2n})$
Maximum gearbox output torque T_{2max} [Nm]:	$T_{2max} = \text{maximum} (T_{2a}, T_{2b},..., T_{2n})$
Switch-on time ED [%]:	$ED = \frac{(ta + tb + tc)}{(ta + tb + tc + td)} * 100$
Load cycle duration EZ [min]:	EZ = ta + tb + tc
Duration of max. torque T_{2max} during the cycle [sec.]:	determination from application
Duration percentage of max. acceleration torque during total cycle [%]:	$E_{max} = \frac{t_{max}}{\text{cycle duration}} * 100$
Mean output speed n_{2m} [rpm]:	$n_{2m} = \sqrt[3]{\left(\frac{n_{2a}^3 * t_a + n_{2b}^3 * t_b + n_{2n}^3 * t_n}{t_a + t_b + ... + t_n}\right)}$
Mean input speed n_{1m} [rpm]:	$n_{1m} = i * n_{2m}$
Mean output torque T_{2m} [Nm]:	$T_{2m} = \sqrt[3]{\left(\frac{t_a * T_{2a}^3 + t_b * T_{2b}^3 + ... + t_n * T_{2n}^3}{\text{Zykluszeit}}\right)}$
Emergency-stop output torque T_{2not} [Nm]:	determination from application

Diagram 1:
Dynamic factor k1

For the peak torques caused by short acceleration times with high nos. of cycles, the dynamic factor needs to be considered. For nos. of cycles < 1000 cycles per hour and for continuous duties the dynamic factor k1 = 1.0.

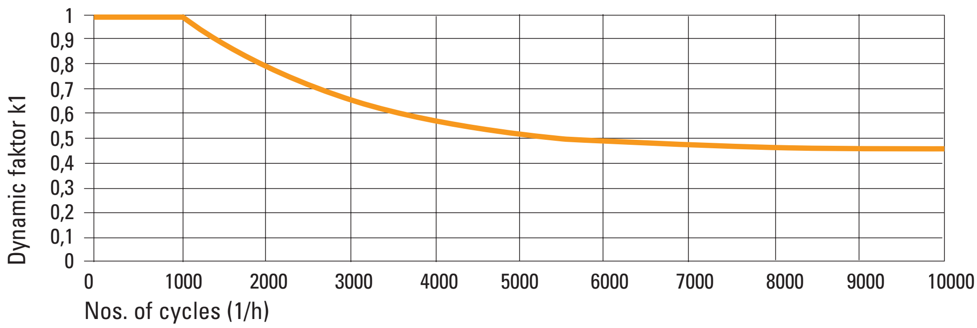
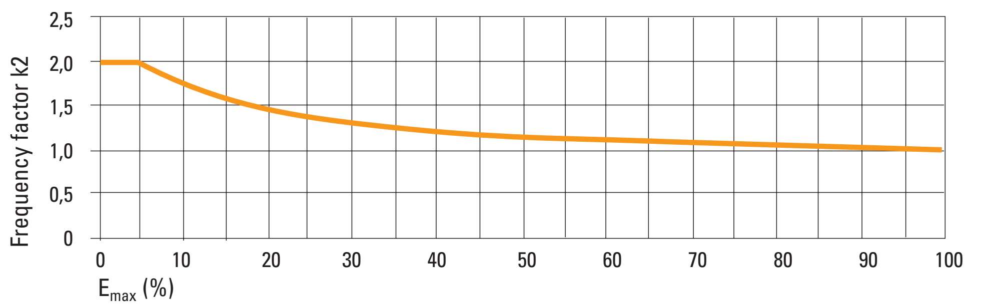
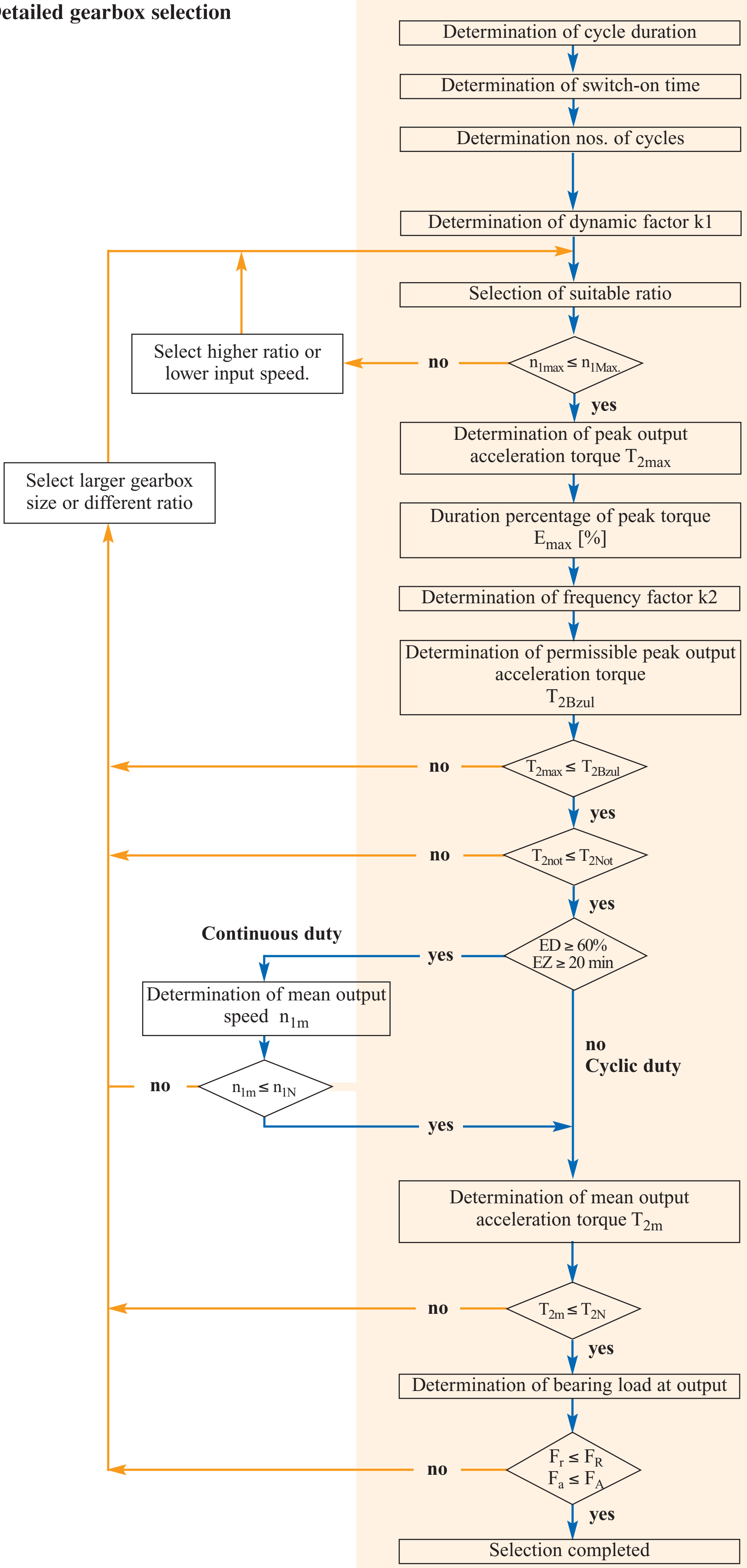


Diagram 2:
Frequency factor k2

There is a substantial influence of high output torques on the gearbox lifetime.
The frequency factor takes into account the duration percentage of maximum acceleration torque of total cycle. For continuous duties, the frequency factor
k2 = 1.0.



Detailed gearbox selection



EZ = ta + tb + tc [min]

$$ED = \frac{(ta + tb + tc)}{(ta + tb + tc + td)} * 100\ [\%]$$

Cycle duration = ta + tb + tc + td [s]

$$\text{Nos. of cycles} = \frac{3600}{\text{cycle duration}}\ [1/h]$$

k1 from diagramm 1

$$i = \frac{\text{possible input speed}}{\text{max. output speed}}$$

i from catalogue

n_{1Max} from catalogue

n_{1max} = i * maximum ($n_{2a}, n_{2b},..., n_{2n}$) [rpm]

T_{2max} = maximum ($T_{2a}, T_{2b},..., T_{2n}$) [Nm]

$$E_{max} = \frac{t_{max}}{\text{cycle duration}} * 100\ [\%]$$

k2 from diagram 2

T_{2N} from catalogue

$T_{2Bzul.} = T_{2N} * k1 * k2$ [Nm]

T_{2not} depending on application

T_{2Not} from catalogue

$$n_{2m} = \sqrt[3]{\left(\frac{n_{2a}^3 * t_a + n_{2b}^3 * t_b + n_{2n}^3 * t_n}{t_a + t_b + ... + t_n}\right)}\ [rpm]$$

$n_{1m} = i * n_{2m}$ [rpm]

$$T_{2m} = \sqrt[3]{\left(\frac{t_a * T_{2a}^3 + t_b * T_{2b}^3 + ... + t_n * T_{2n}^3}{\text{Zykluszeit}}\right)}\ [Nm]$$

Ordering Number

PG				-							-				
	1	2	3	-	4	5	6	7	8	9	-	10	11	12	13

Size	Size Code
PG 25/1, PG 25/2	002
PG 100/1, PG 100/2	010
PG 200/1, PG 200/2	020
PG 500/1, PG 500/2	050
PG 1200/1, PG 1200/2	120
PG 3000/1, PG 3000/2	300

Size	D6 [mm]	Motor Shaft Code
PG 25/1 PG 25/2	6.0	A
	7.0	B
	8.0	C
	9.0	D
	10.0	E
	11.0	F
	12.0	G
	12.7	H
	14.0	I
PG 100/1 PG 100/2	14.0	A
	15.0	B
	16.0	C
	19.0	D
	22.0	E
	24.0	F
	11.0	G
PG 200/1 PG 200/2	19.0	A
	22.0	B
	24.0	C
	28.0	D
	32.0	E
	14.0	F
PG 500/1 PG 500/2	22.0	A
	24.0	B
	28.0	C
	32.0	D
	35.0	E
	38.0	F
	19.0	G
PG 1200/1	32.0	A
	35.0	B
	38.0	C
	42.0	D
	48.0	E
PG 1200/2	22.0	F
	24.0	G
	28.0	H
	32.0	I
	35.0	J
	38.0	K
	19.0	L
PG 3000/1	42.0	A
	48.0	B
	55.0	C
	60.0	D

Size	D7 [mm]	D8 [mm]	D9 [mm]	L6 min [mm]	L6 max [mm]	L7 [mm]	L22	Flange Code
PG 25/1 PG 25/2	30.0	45.0	M3	15	30	4	4.5	AA
	30.0	46.0	M4	15	30	4	4.5	AB
	36.0	70.7	M4	15	30	4	4.5	AC
	40.0	63.0	M4	15	30	3.5	4.5	AD
	40.0	63.0	M5	15	30	3.5	4.5	AE
	40.0	70.0	M4	15	30	3.5	4.5	AF
	50.0	60.0	M4	15	30	3.5	4.5	AG
	50.0	65.0	D5.5	15	30	3.5	4.5	AH
	50.0	70.0	M4	15	30	3.5	4.5	AI
	50.0	70.0	M5	15	30	3.5	4.5	AJ
	50.0	80.0	M5	15	30	4	4.5	AK
	50.0	95.0	M6	15	30	4	4.5	AL
	50.0	100.0	M6	15	30	3.5	4.5	AM
	60.0	75.0	M5	15	30	3.5	4.5	AN
	60.0	90.0	M5	15	30	4	4.5	AO
	70.0	90.0	M5	17	32	4	6.5	AP
	70.0	90.0	M5	19	34	5.5	8.5	AQ
	70.0	90.0	M6	15	30	3.5	4.5	AR
	73.05	98.5	M5	15	30	3	4.5	AS
	80.0	100.0	M6	15	30	3.5	4.5	AT
PG 100/1 PG 100/2	50.0	95.0	M6	23	40	5.5	7.5	AA
	50.0	100.0	M6	23	40	5.5	7.5	AB
	60.0	75.0	M5	23	40	4.3	7.5	AC
	60.0	99.0	M6	23	40	4.3	7.5	AD
	70.0	90.0	M5	23	40	4.3	7.5	AE
	70.0	90.0	M6	23	40	4.3	7.5	AF
	80.0	100.0	M6	23	40	4.3	7.5	AG
	95.0	115.0	M8	23	40	4.3	7.5	AH
	95.0	130.0	M8	23	40	4.3	7.5	AI
	110.0	130.0	M8	23	40	4.3	7.5	AJ
	110.0	130.0	M8	34	51	4.3	18.5	AK
	110.0	145.0	M8	23	40	4.3	7.5	AL
	110.0	145.0	M8	34	51	6.5	18.5	AM
	110.0	145.0	M8	41	58	6.5	25.5	AN
	110.0	165.0	M10	34	51	4.3	18.5	AO
	80.0	100.0	M6	41	58	4.3	25.5	AP
	95	115.0	M8	41	58	4.3	25.5	AQ
	95	115.0	M8	27	44	6.3	11.5	AR
PG 200/1 PG 200/2	95.0	115.0	M8	30	50	5.5	8.5	AA
	95.0	130.0	M8	30	50	5.5	8.5	AB
	110.0	130.0	M8	30	50	5.5	8.5	AC
	110.0	145.0	M8	30	50	6.5	8.5	AD
	110.0	145.0	M8	40	60	6.5	18.5	AE
	110.0	145.0	M8	45	65	6.5	23.5	AG
	110.0	165.0	M10	30	50	6.5	8.5	AH
	130.0	165.0	M10	40	60	6.5	18.5	AI
	80.0	100.0	M6	30	50	5.5	8.5	AJ
PG 500/1 PG 500/2	110.0	145.0	M8	32	60	6.5	7.5	AA
	110.0	145.0	M8	38	66	6.3	13.5	AB
	110.0	165.0	M10	32	60	5.3	7.5	AC
	114.3	200.0	M12	32	60	5.3	7.5	AD
	114.3	200.0	M12	52	80	7.5	27.5	AE
	130.0	165.0	M10	32	60	5.3	7.5	AF
	130.0	165.0	M10	38	66	5.3	13.5	AG
	130.0	215.0	M12	32	60	5.3	7.5	AH
	180.0	215.0	M12	32	60	5.3	7.5	AI
	180.0	215.0	M12	52	80	5.3	27.5	AJ
PG 1200/1	114.3	200.0	M12	45	82	8	9	AA
	114.3	200.0	M12	76	113	8	40	AB
	130.0	215.0	M12	45	82	8	9	AC
	180.0	215.0	M12	45	82	8	9	AD
	200.0	235.0	M12	45	82	8	9	AE
	200.0	235.0	M12	79	116	8	43	AF
	230.0	265.0	M12	45	82	8	9	AG
	250.0	300.0	M16	45	82	8	9	AH
	250.0	300.0	M16	73	110	8	37	AI
PG 1200/2	110.0	145.0	M8	32	60	6.5	7.5	AJ
	110.0	145.0	M8	38	66	6.3	13.5	AK
	110.0	165.0	M10	32	60	5.3	7.5	AL
	114.3	200.0	M12	32	60	5.3	7.5	AM
	114.3	200.0	M12	52	80	7.5	27.5	AN
	130.0	165.0	M10	32	60	5.3	7.5	AO
	130.0	165.0	M10	38	66	6.3	13.5	AP
	130.0	215.0	M12	32	60	5.3	7.5	AQ
	180.0	215.0	M12	32	60	5.3	7.5	AR
	180.0	215.0	M12	52	80	5.3	27.5	AS
PG 3000/1	200.0	235.0	M12	61	116	8	15	AA
	242.0	300.0	M16	61	116	8	15	AB
	250.0	300.0	M16	55	110	8	9	AC
	300.0	350.0	M16	55	110	8	9	AD
	300.0	350.0	M16	85	140	8	39	AE

Version
0

Output Flange	Type Code
Standard	A
Substitute	B

Backlash	Backlash Code
Standard	A
Reduced	B

Output shaft	Form Code
Plain	0
Keyed	1

i	Ratio Code
3	003*
4	004
5	005
7	007
10	010
20	020
25	025
35	035
40	040
50	050
70	070
100	100

*Available for gearbox size PG 200/1; PG 500/1; PG 1200/1; PG 3000/1

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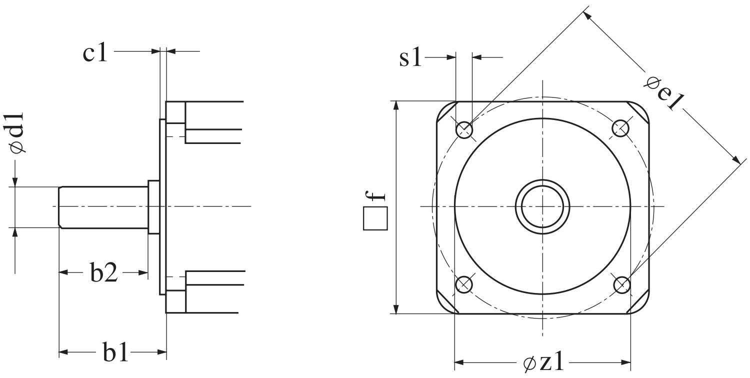

Motor data:

Motor manufacturer:	
Type:	
Motor shaft diameter d1 [mm]:	
Flange face distance b1 [mm]:	
Motor shaft length b2 [mm]:	
Centering diameter z1 [mm]:	
Fixing hole circle diameter e1 [mm]:	
Fixing hole diameter s1 [mm]:	
Flange square ☐ f [mm]:	
Motor nominal torque [Nm]:	
Motor maximum torque [Nm]:	

Gearbox data:

ZF-Servoplan size:	PG-
ZF-Servoplan ratio [i]:	
Keyed output shaft (yes/no):	
Reduced backlash (yes/no):	
Ordering number (see page 18):	
Basis of quotation (batch size):	
Projected annual volume:	

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please request installation drawings; only the data contained therein is binding.
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