S Version
Self-Contained Gear Reducer

TP-The Compact Precision

M Version
Motor-Mounted Gear Reducer

TP Low-Backlash Planetary Gear Reducer

K Version
Angle Gear Reducer

alpha

Contents

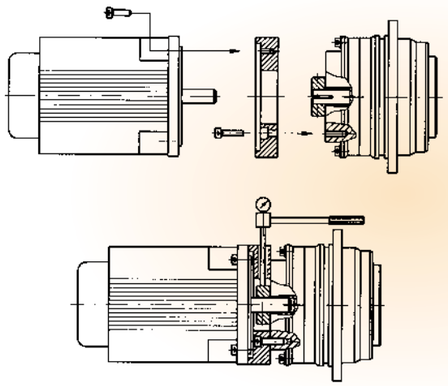
Compact precision

alpha's TP **Low-backlash Planetary gear reducers** are applied in increasing numbers in robots, automation applications, machine tools, packaging machines and printing presses for highly dynamic positioning operations as well as for continuous operations as a state-of-the-art component of servo systems.

The principles of design of the TP gear reducers renders them particularly applicable for drive systems with high standards for precision and reliability:

Excellent quality
- a long service life and extremely constant backlash achieved by optimized, ground gearing and high-duty material
- for highly dynamic cycle operations (S5) and high failsafety in continuous operations (S1) alpha gear reducers should be your first choice
- optimized quality assurance: a result of controlling 100% of the manufactured products

Unsurpassed concepts
- high efficiency and low mass moments of inertia of the planetary gear reducers enable highly dynamic drives with minimized energy loss
- as a consequence alpha gear reducers contribute noticeably to saving our resources and to the protection of our environment
- alpha offers forward-looking drive concepts to our customers



Innovative techniques
- **ingeniously simple, patented** system of **motor mounting** with integrated thermal length compensation
- creative solutions in design and in the production process ensure technical superiority
- forward-looking manufacturing technologies guarantee precision and premium quality standard

Modular planetary gear reducer program
- standardized modules are the basis of all alpha reducer series
- flexible, modular adapter parts enable simple, safe and fast mounting on practically any motor
- since alpha has standardized the geometry of the output parts, we guarantee the compatibility of our entire gear reducer range

Worldwide partnerships
- sales agencies and service worldwide guarantee competent support wherever you are
- the market requests minimized maintenance: alpha's gear reducers are maintenance-free and lubricated for life - a perfect service
- our customers can feel perfectly safe thanks to our excellent reliability, even if extreme demands are to be met

TP M-Version

Product characteristics

Extremely silent thanks to its unique reducer kinematics

High torsional rigidity thanks to the flange

Extremely compact as a result of integrated design

High dynamics thanks to a compact design and, consequently, low moments of inertia

Strongly recommended for highly dynamic cycle (S5) and a high failsafety for continuous operations (S1) thanks to our advanced design

Universal motor mounting with the help of modular adapter parts; Motor tolerance "N" to DIN 42955 can be used

Whatever mounting orientation the customer chooses thanks to lubrication with synthetic oil

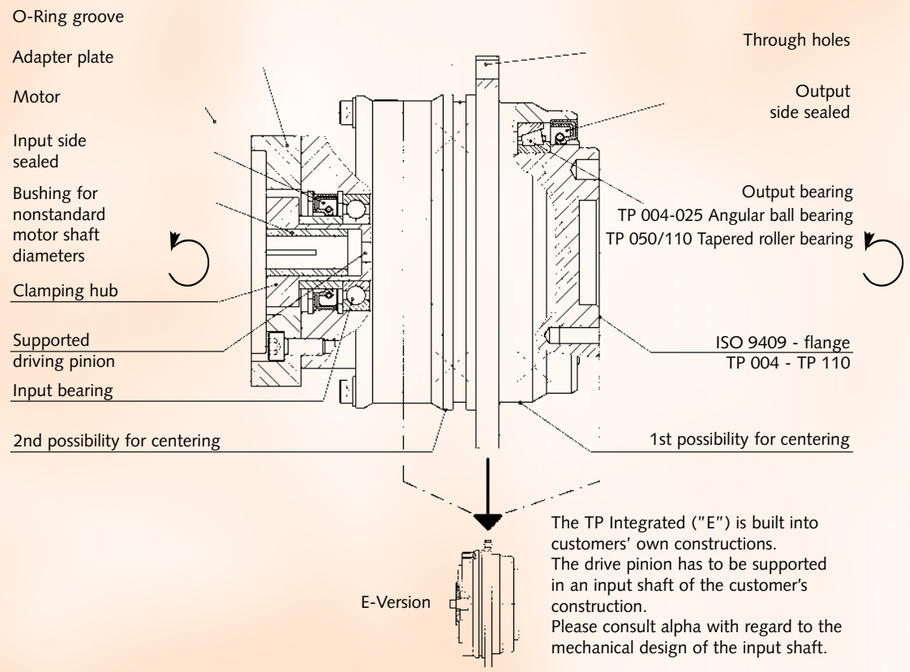
Unsurpassed positioning accuracy thanks to low backlash and high torsional rigidity

Ingeniously simple, patented motor mounting with integrated thermal length compensation

High efficiency, quiet running and high uniformity thanks to optimal gearing geometry and unsurpassed quality in the manufacturing processes

Minimum backlash ≤ 1arcmin because of compensation of tolerances without distortions

Product details



Conversion Table:
1 Nm = 8.85 in. lb.
1 kgcm² = 8.85 x 10^{-4} in. lb.s²
1 N = .225 lb_f
1 kg = 2.205 lb.

Technical data

Size				TP 004	TP 010	TP 025	TP 050	TP 110	TP 300	TP 500
max. Acceleration Torque [1]	T_{2B}	Nm	i = 5, 7, 31	40	100	300	650	-	-	-
			i = 10, 21, 61, 91	32	80	250	500	-	-	-
			i = 5, 7, 10, 21	-	-	-	-	1100	-	-
			i = 31	-	-	-	-	1600	3500	6000
			i = 61, 91	-	-	-	-	1300	2800	4800
Emergency Stop [2]	T_{2Not}	Nm		100	250	625	1250	2750	8750	15000
Nominal Output Torque	T_{2N}	Nm	i = 5, 7, 31	25	50	170	370	-	-	-
			i = 10, 21, 61, 91	15	35	100	220	-	-	-
			i = 5, 7, 10, 21	-	-	-	-	640	-	-
			i = 31	-	-	-	-	1230	2200	3700
			i = 61, 91	-	-	-	-	700	1600	2900
max. Input Speed	n_{1Max}	rpm	1-stage	6000	6000	4500	4000	3500	-	-
			2-stage			6000	5000	4500	3000	3000
Nominal Input Speed [3]	n_{1N}	rpm	i = 5, 7	3000	2500	2000	1600	1100	-	-
			i = 10	3500	3000	2500	2100	1600	-	-
			i = 21, 31	4500	3800	3100	2600	2100	1600	1300
			i = 61	6000	4700	3700	3300	2600	1900	1500
			i = 91	6000	5300	4500	4100	3300	2200	1800
Ratios [4]	i		1-stage	5 / 7 / 10					-	
			2-stage	21 / 31 / 61 / 91					31 / 61 / 91	
Torsional Backlash	j_t	arcmin	standard	≤ 5	≤ 3					
			reduced	≤ 3	≤ 1				-	
Torsional Rigidity	C_{t21}	Nm/arcmin	1-stage i = 5	9.5	31	85	171	438	-	-
			2-stage i = 31	6.8	21	56	118	300	560	736
max. Axial Load [5]	F_{2AMax}	N		1630	2150	4150	6130	10050	33000	50000
max. Tilting Mom.	M_{2KMax}	Nm		91	235	413	1295	3064	5900	8800
No-load Running Torque [6] (n_1=3000 rpm)	T_{012}	Nm	i = 5	0.30	1.01	2.23	5.6	13.0	-	-
			i = 31	0.15	0.25	0.59	1.3	2.80		
			i = 91	0.08	0.23	0.30	1.1	2.00		
Tilting Rigidity	C_{2K}	Nm/arcmin			225	550	560	1452	5560	9480
Efficiency with full load	η	%	1-stage	≥ 96					-	
			2-stage	≥ 93						
Weight	m	kg	1-stage	1.2	2.6	4.6	9.6	24.0	-	-
			2-stage	1.3	2.8	4.7	9.7	24.1	55	85
Lubrication			Synthetic oil viscosity ISO VG220							
Paint			Blue RAL 5002							
Mounting Position			advised with your order							
Permissible Gear Reducer Temp.		°C	- 10°C to + 90°C							
Direction of Rotation			Motor and gear reducer same direction							
Degree of Gearbox Protection			IP 64							
Noise level (n_1=3000 rpm)	L_{PA}	dB(A)	1-stage	≤ 68		≤ 70			-	-
			2-stage	≤ 64		≤ 65			≤ 67	≤ 69

[1] 1000 cycles per hour.
[2] 1000 times during the service life.
[3] at 20°C ambient temperature
(if you have higher ambient temperature, please reduce the n_{1N} speed).
[4] Further ratios see operations page 21.
[5] applied to the flange centre.
[6] at 20°C gear reducer temperature.

The dimensions of the two-stage gear reducers are different between variant 1 and 2. This difference is based on the choice of the motor shaft / clamping hub diameter (D10), which causes a change in dimensions (D11, L11, L14, L15, L18) within the size, shown in figure 1 and 2 on this page.
Because of this design difference we offer two variants of gear reducers, variant 1 (figure 1) with very low moment of inertia and variant 2 (figure 2) where a larger motor can be mounted.

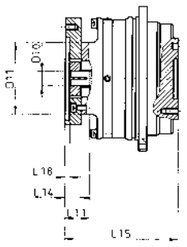


Figure 1 (Variant I)
very low mass moments of inertia

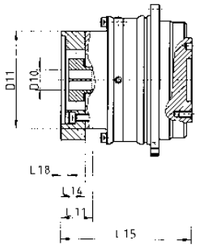
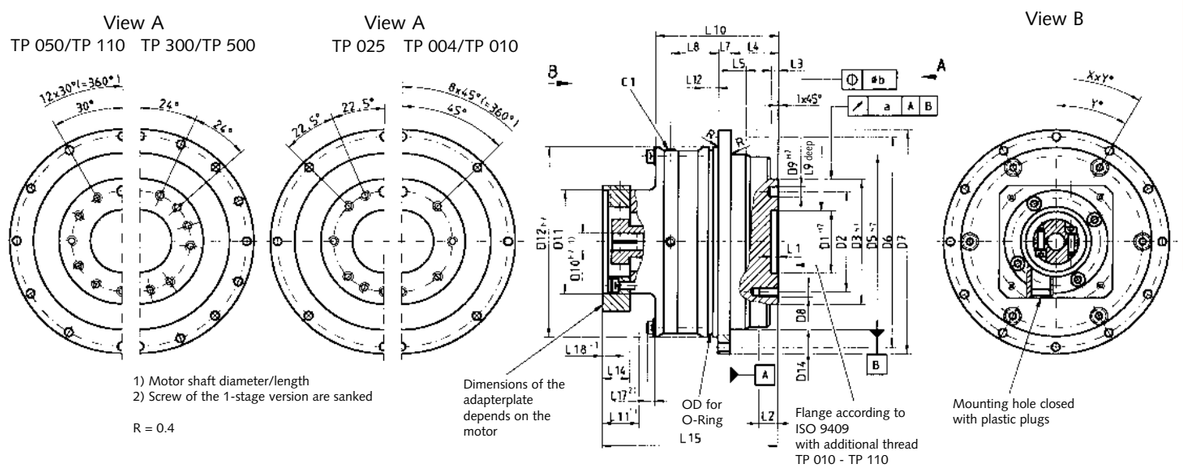


Figure 2 (Variant II)
larger motor can be mounted

Variant I
Variant II

Dimensions [mm]

1 mm = 0.03937 in.



Size		TP 004		TP 010		TP 025		TP 050		TP 110		TP 300	TP 500
Gear Stages		1	2	1	2	1	2	1	2	1	2	2	2
a		0.03		0.03		0.03		0.03		0.04		0.05	0.05
b		0.02		0.02		0.02		0.02		0.02		-	-
C1		-[3]		3xM8x1		3xM8x1		3xM8x1		3xM12x1.5		4xM12x1.5	4xM14x1.5
D1	H7	20		31.5		40		50		80		0	0
D2		31.5		50		63		80		125		140	160
D3	h7	40		63		80		100		160		180	200
D5	h7	64		90		110		140		200		255	285
D6		79		109		135		168		233		280	310
D7		86		118		145		179		247		300	330
D8		7xM5		7xM6		11xM6		11xM8		11xM10		12xM16	12xM20
D9	H7	5		6		6		8		10		0	0
D10[4]	F7	Variant I	max. 14	max. 11	max. 19	max. 11	max. 32	max. 14	max. 38	max. 19	max. 48	max. 28	max. 35	max. 48
		Variant II	-	-	-	max. 14	-	max. 19	-	max. 32	-	max. 38	-	-
D11[4]		Variant I	69.5	69.5	94	70	119	70	151	83	211	120	□140	□190
(comp. D10)		Variant II	-	-	-	70	-	90	-	110	-	152	-	-
D12	h7	70		95		120		152		212		255	285
D14		8x4.5		8x5.5		8x5.5		12x6.6		12x9		16x13.5	16x13.5
L1		4		6		6		6		8		0	0
L2		7		10		12		15		20		25	30
L3		3		6		6		6		8		12	15
L4		19.5		30		29		38		50		66	75
L5		7		10		10		14.6		15		20	20
L7		4		7		8		10		12		18	20
L8		-		27		33		38		47		63.4	70
L9		6		7		7		7		10		0	0
L10		54	65	73		83	79	106	98	136.5	124.5	158	175
L11[4] min.	Variant I	14	12.5	23	15	30	15	32	23	45	30	32	45
(comp. D10)	Variant II	-	-	-	15	-	23	-	30	-	32	-	-
L11[4] max.	Variant I	30	23	40	30	50	30	60	40	82	50	60	120
(comp. D10)	Variant II	-	-	-	30	-	40	-	50	-	60	-	-
L12		7.7		10		10		12		15		20	20
L14[4]	Variant I	15	12	22	15	28	15	30.5	22	37.5	28	30.5	37.5
(comp. D10)	Variant II	-	-	-	15	-	22	-	28	-	30.5	-	-
L15[4]	Variant I	69	77	95	100	111	109.5	136.5	140	174	173.5	277	327
(comp. D10)	Variant II	-	-	-	104.5	-	121.5	-	152	-	188	-	-
L17		0	0	0	5	0	6.2	0	7.5	0	10	6	3
L18[4] +1	Variant I	4	3.5	7.5	3.8	7	3.8	9	6.4	8.5	6.4	7	10
(comp. D10)	Variant II	-	-	-	4.0	-	6.1	-	6.9	-	5.0	-	-
OD		66x2		90x3		110x3		145x3		200x5		238x5	270x6
X		8		8		8		12		12		16	16
Y		45		45		45		30		30		22.5	22.5

[3] without drain plug
[4] dimensions depend on the motor

1 kgcm² = 8.85 x 10⁻⁴ in. lb.s²
1 mm = 0.03937 in.
1 Nm = 8.85 in.lb.

Mass moments of inertia J_1 [kgcm²] applies to the input

Gear reducer size	Shaft-Ø [mm]	Ratio i single-stage 5	7	10	Ratio i two-stage 21	31	61	91
TP 004	≤ 11	0.136	0.110	0.096	0.058	0.056	0.053	0.052
	> 11 ≤ 14	0.166	0.140	0.126	-	-	-	-
TP 010	≤ 10	-	-	-	0.13	0.12	0.09	0.09
	> 10 ≤ 11	0.56	0.45	0.39	0.12	0.11	0.09	0.09
	> 11 ≤ 14	0.61	0.49	0.43	0.17	0.16	0.14	0.14
	> 14 ≤ 19	0.65	0.54	0.48	-	-	-	-
TP 025	≤ 11	-	-	-	0.20	0.17	0.12	0.12
	> 11 ≤ 14	1.90	1.51	1.30	0.23	0.20	0.15	0.15
	> 14 ≤ 19	2.00	1.62	1.41	0.52	0.49	0.44	0.44
	> 19 ≤ 24	2.66	2.27	2.06	-	-	-	-
	> 24 ≤ 28	3.39	3.00	2.79	-	-	-	-
	> 28 ≤ 32	4.40	4.02	3.60	-	-	-	-
TP 050	≤ 11	-	-	-	0.71	0.60	0.40	0.39
	> 11 ≤ 14	-	-	-	0.75	0.65	0.45	0.44
	> 14 ≤ 19	5.22	3.66	2.99	0.80	0.69	0.49	0.48
	> 19 ≤ 24	5.79	4.24	3.56	2.28	2.17	1.97	1.96
	> 24 ≤ 32	8.63	7.08	6.41	3.95	3.84	3.64	3.63
	> 32 ≤ 35	8.47	6.92	6.25	-	-	-	-
	> 35 ≤ 38	11.56	10.00	9.33	-	-	-	-
TP 110	≤ 14	-	-	-	2.89	2.33	1.45	1.38
	> 14 ≤ 19	-	-	-	2.99	2.43	1.56	1.49
	> 19 ≤ 24	-	-	-	3.63	3.07	2.20	2.14
	> 24 ≤ 28	-	-	-	4.09	3.53	2.78	2.72
	> 28 ≤ 32	32.04	23.43	19.0	-	-	-	-
	> 32 ≤ 35	-	-	-	7.18	6.61	5.73	5.67
	> 35 ≤ 38	32.93	24.32	19.89	10.25	9.69	8.79	8.73
	> 38 ≤ 48	36.61	28.00	23.57	-	-	-	-
TP 300	≤ 35	-	-	-	-	15.0	12.2	12.0
TP 500	≤ 48	-	-	-	-	43.6	37.1	36.7

Quick Selection

Exact gear reducer selection can be found on page 16 to 20

Cycle Operation S5
(for number of cycles ≤ 1000)

Duty cycle < 60 %

1. Determination of the max. motor acceleration torque
   T_{1BMot} [Nm]
2. Determination of the actual max. acceleration torque on the reducer output T_{2b} [Nm]
   $T_{2b} = T_{1BMot} \times i$
3. Comparison of the actual max. acceleration torque T_{2b} [Nm] with the max. permissible acceleration torque T_{2B} [Nm] on the reducer output.
   $T_{2b} \leq T_{2B}$
4. Comparison of the motor shaft diameter D_{Mot} [mm] with the dimension D10 [mm]
   $D_{Mot} \leq D10$
5. Comparison of the motor shaft length L_{Mot} [mm] with the dimension L11 [mm]
   $L11_{min} \leq L_{Mot} \leq L11_{max}$

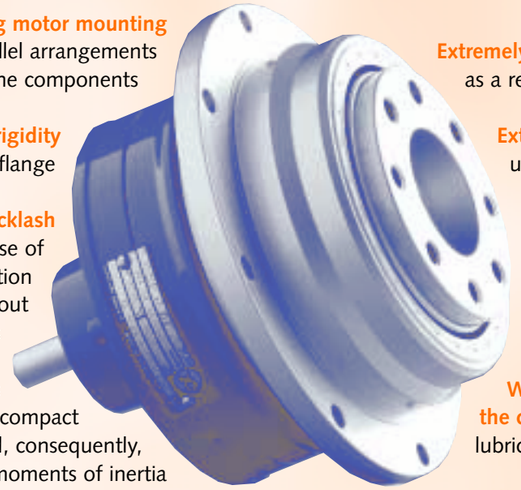
Continuous Operation S1
(use FPM-sealings, indicate this in your order)

Duty cycle ≥ 60%

1. Determination of the motor nominal torque
   T_{1NMot} [Nm]
2. Determination of the actual nominal torque on the reducer output T_{2n} [Nm]
   $T_{2n} = T_{1NMot} \times i$
3. Comparison of the actual nominal torque T_{2n} [Nm] with the permissible nominal torque T_{2N} [Nm] on the reducer output
   $T_{2n} \leq T_{2N}$
4. Determination of the actual input speed
   n_{1n} [rpm]
5. Comparison of the actual input speed n_{1n} [rpm] with the permissible nominal speed n_{1N} [rpm]
   $n_{1n} \leq n_{1N}$
6. Comparison of the motor shaft diameter D_{Mot} [mm] with the dimension D10 [mm]
   $D_{Mot} \leq D10$
7. Comparison of the motor shaft length L_{Mot} [mm] with the dimension of L11 [mm]
   $L11_{min} \leq L_{Mot} \leq L11_{max}$

TP S-Version

Product characteristics



Space-saving motor mounting thanks to parallel arrangements of the components

High torsional rigidity thanks to the flange

Minimum backlash ≤ 1arcmin because of compensation of tolerances without distortions

High dynamics thanks to a compact design and, consequently, low moments of inertia

Extremely compact as a result of integrated design

Extremely silent thanks to its unique reducer kinematics

Strongly recommended for highly dynamic cycle (S5) and a high failsafety for continuous operations (S1) thanks to our advanced design

Whatever mounting orientation the customer chooses thanks to lubrication with synthetic oil

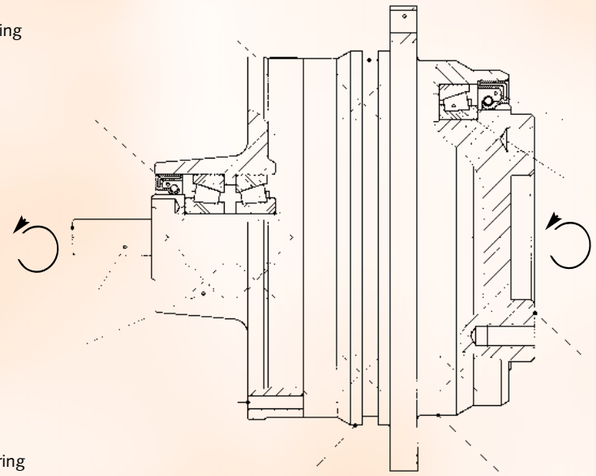
Unsurpassed positioning accuracy thanks to low backlash and high torsional rigidity

High security in case of an emergency stop thanks to high-duty gearings tough bearings

High efficiency, quiet running and high uniformity thanks to optimal gearing geometry and unsurpassed quality in the manufacturing processes

Very easy to install owing to input fastening thread for coupling flanges

Product details



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1 kg = 2.205 lb.

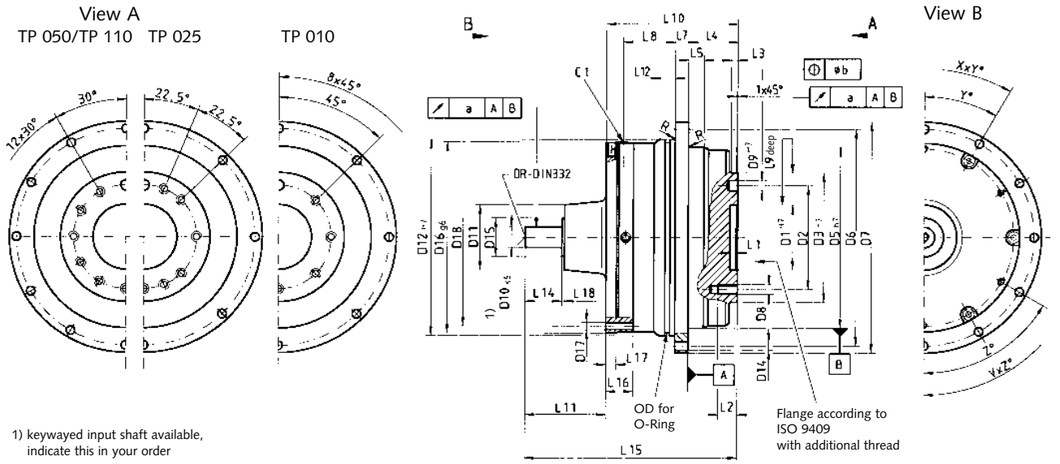
Technical data

Size				TP 010	TP 025	TP 050	TP 110
max. Acceleration Torque [1]	T_{2B}	Nm	i = 5, 7, 31	100	300	650	-
			i = 10, 21, 61, 91	80	250	500	-
			i = 5, 7, 10, 21	-	-	-	1100
			i = 31	-	-	-	1600
			i = 61, 91	-	-	-	1300
Emergency Stop [2]	T_{2Not}	Nm		250	625	1250	2750
Nominal Output Torque	T_{2N}	Nm	i = 5, 7, 31	50	170	370	-
			i = 10, 21, 61, 91	35	100	220	-
			i = 5, 7, 10, 21	-	-	-	640
			i = 31	-	-	-	1230
			i = 61, 91	-	-	-	700
max. Input Speed	n_{1Max}	rpm	1-stage	6000	4500	4000	3500
			2-stage		6000	5000	4500
Nominal Input Speed [3]	n_{1N}	rpm	i = 5, 7	1300	1000	800	600
			i = 10	1500	1300	1100	800
			i = 21, 31	1900	1600	1300	1100
			i = 61	2400	1900	1700	1300
			i = 91	2700	2300	2100	1700
Ratios [4]	i		1-stage	5 / 7 / 10			
			2-stage	21 / 31 / 61 / 91			
Torsional Backlash	j_t	arcmin	standard	≤ 3			
			reduced	≤ 1			
Torsional Rigidity	C_{t21}	Nm/arcmin	1-stage i = 5	31	85	171	438
			2-stage i = 91	17	43	88	280
max. Axial Load (Output) [5]	F_{2AMax}	N		2150	4150	6130	10050
max. Tilting Moment	Output M_{2KMax}	Nm		235	413	1295	3064
	Input M_{1KMax}	Nm	1-stage	66	113	232	454
			2-stage	23	26	66	113
max. Axial Load (Input) [5]	F_{1AMax}	N	1-stage	1150	1600	2700	4700
			2-stage	900	950	1150	1600
max. Radial Load (Input) [5]	F_{1RMax}	N	1-stage	1300	1900	3000	4500
			2-stage	500	550	1300	1900
No-load Running Torque [6] (n_1=3000 rpm)	T_{012}	Nm	i = 10			5	
			i = 31	0.4		1.8	
			i = 91		0.5		
Tilting Rigidity	C_{2K}	Nm/arcmin		225	550	560	1452
Efficiency with full load	η	%	1-stage	≥ 95			
			2-stage	≥ 92			
Weight	m	kg		3.2	5.2	10.3	25.4
Lubrication				Synthetic oil viscosity ISO VG220			
Paint				Blue RAL 5002			
Mounting Position				advised with your order			
Permissible Gear Reducer Temp.		°C		- 10°C to + 90°C			
Direction of Rotation				Motor and gear reducer same direction			
Degree of Gearbox Protection				IP 64			
Noise level (n_1=3000 rpm)	L_{PA}	dB(A)	1-stage	≤ 68		≤ 70	
			2-stage	≤ 64		≤ 65	

[1] 1000 cycles per hour.
[2] 1000 times during the service life.
[3] at 20°C ambient temperature (if you have higher ambient temperature, please reduce the n_{1N} speed).
[4] Further ratios see operations.
[5] applied to the flange/shaft centre.
[6] at 20°C gear reducer temperature.

Dimensions [mm]

1 mm = 0.03937 in.



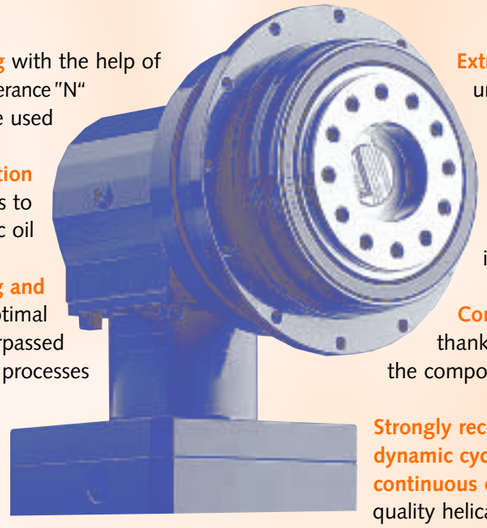
1) keywayed input shaft available, indicate this in your order

Size		TP 010	TP 025	TP 050	TP 110
Gear Stages		1 / 2	1 / 2	1 / 2	1 / 2
a		0.03	0.03	0.03	0.04
b		0.02	0.02	0.02	0.02
C1		3xM8x1	3xM8x1	3xM8x1	3xM12x1.5
DR		M5 / M3	M8 / M4	M12 / M5	M16 / M8
D1	H7	31.5	40	50	80
D2		50	63	80	125
D3	h7	63	80	100	160
D5	h7	90	110	140	200
D6		109	135	168	233
D7		118	145	179	247
D8		7xM6	11xM6	11xM8	11xM10
D9	H7	6	6	8	10
D10	k6	16 / 9	22 / 12	32 / 16	40 / 22
D11		48 / 38	60 / 40	78 / 50	98 / 62
D12	h7	95	120	152	212
D14		8x5.5	8x5.5	12x6.6	12x9
D15		30 / 22	38 / 25	55 / 30	70 / 38
D16	g6	92	118	148	208
D17		4xM4	4xM5	6xM6	6xM8
D18		84	107	137	193
L1		6	6	6	8
L2		10	12	15	20
L3		6	6	6	8
L4		30	29	38	50
L5		10	10	14.6	15
L7		7	8	10	12
L8		27	33	40	46.5
L9		7	7	7	10
L10		73.5	80.5	98	124.5
L11		44	54.5 / 42.5	78 / 65	105.5 / 73.5
L12		10	10	12	15
L14		28 / 20	36 / 18	58 / 28	82 / 36
L15		118 / 117.5	135 / 123	176 / 163	230 / 198
L16		14.5	15.5	18	23
L17		5	6	8	10
L18		2 / 1	2 / 1	2	3 / 2
OD		90x3	110x3	145x3	200x5
R		0.4	0.4	0.4	0.4
V		4	4	6	6
X		8	8	12	12
Y		45	45	30	30
Z		90	90	60	60

S-Version

TP K-Version

Product characteristics



Universal motor mounting with the help of modular adapter parts; Motor tolerance "N" to DIN 42955 can be used

Whatever mounting orientation the customer chooses thanks to lubrication with synthetic oil

High efficiency, quiet running and high uniformity thanks to optimal gearing geometry and unsurpassed quality in the manufacturing processes

High dynamics thanks to a compact design and, consequently, low moments of inertia

Extremely silent thanks to its unique reducer kinematics

High torsional rigidity thanks to the flange

Extremely compact as a result of integrated design

Compact and space-saving design thanks to right-angled arrangement of the components

Strongly recommended for highly dynamic cycle (S5) and a high failsafety for continuous operations (S1) thanks to high quality helical gear

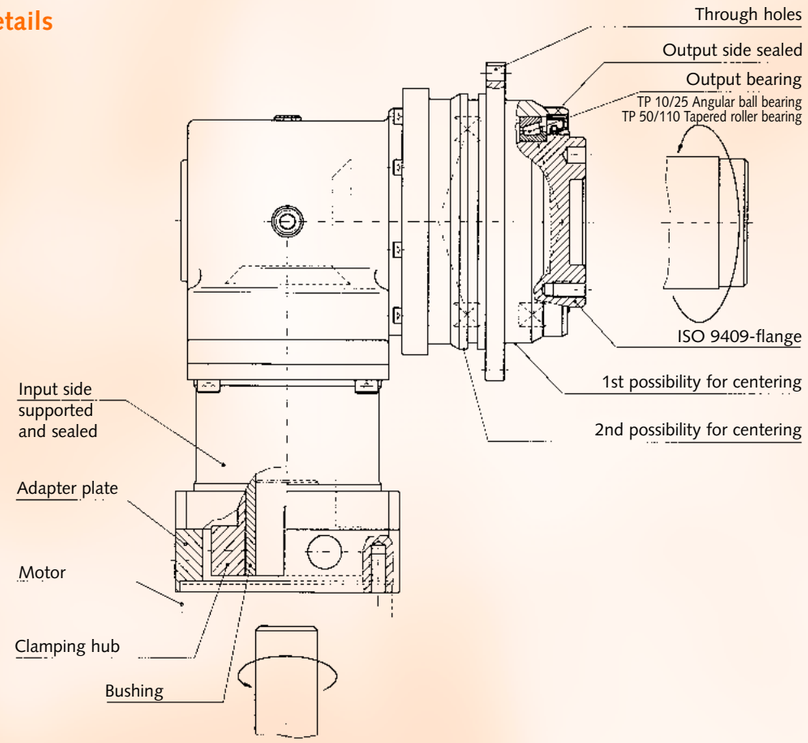
High security in case of an emergency stop thanks to high-duty gearings and tough bearings

Unsurpassed positioning accuracy thanks to low backlash and high torsional rigidity

Ingeniously simple, patented motor mounting with integrated thermal length compensation

Low backlash because of compensation of tolerances without distortions

Product details



1 kgcm² = 8.85 x 10⁻⁴ in. lb.s²
1 Nm = 8.85 in.lb.

Mass moments of inertia J_1 [kgcm²] applies to the input

Gear reducer	Ratio i single-stage			Ratio i two-stage			
size	5	7	10	21	31	61	91
TP 010	0.53	0.42	0.36	0.09	0.08	0.06	0.06
TP 025	1.61	1.23	1.02	0.20	0.16	0.12	0.11
TP 050	5.84	4.28	3.60	0.67	0.56	0.36	0.35
TP 110	28.34	19.60	15.17	2.48	1.92	1.04	0.97

Quick Selection

Exact gear reducer selection can be found on page 16 to 20

Cycle Operation S5
(for number of cycles ≤ 1000)

Duty cycle < 60%

1. Determination of the max. motor acceleration torque
   T_{1BMot} [Nm]
2. Determination of the actual max. acceleration torque on the reducer output T_{2b} [Nm]
   $T_{2b} = T_{1BMot} \times i$
3. Comparison of the actual max. acceleration torque T_{2b} [Nm] with the max. permissible acceleration torque T_{2B} [Nm] on the reducer output
   $T_{2b} \leq T_{2B}$

Continuous Operation S1
(use FPM-sealings, indicate this in your order)

Duty cycle ≥ 60%

1. Determination of the motor nominal torque
   T_{1NMot} [Nm]
2. Determination of the actual nominal torque on the reducer output T_{2n} [Nm]
   $T_{2n} = T_{1NMot} \times i$
3. Comparison of the actual nominal torque T_{2n} [Nm] with the permissible nominal torque T_{2N} [Nm] on the reducer output
   $T_{2n} \leq T_{2N}$
4. Determination of the actual input speed
   n_{1n} [rpm]
5. Comparison of the actual input speed n_{1n} [rpm] with the permissible nominal speed n_{1N} [rpm]
   $n_{1n} \leq n_{1N}$

Technical data

Size				TPK 010	TPK 025	TPK 050	TPK 110	TPK 300 [6]
max.	T_{2B}	Nm	i = 5, 7, 10, 14, 62	100	300	650	-	-
Acceleration			i = 20, 42, 122, 182	80	250	500	-	-
Torque [1]			i = 5, 7, 10, 14, 20, 42	-	-	-	1100	-
			i = 62	-	-	-	1600	3500
			i = 122, 182	-	-	-	1300	2800
Emergency Stop [2]	T_{2Not}	Nm		250	625	1250	2750	8750
Nominal Output	T_{2N}	Nm	i = 5, 7, 10, 14, 62	50	170	370	-	-
Torque			i = 20, 42, 122, 182	35	100	220	-	-
			i = 5, 7, 10, 14, 20, 42	-	-	-	640	-
			i = 62	-	-	-	1230	2200
			i = 122, 182	-	-	-	700	1600
max. Input	n_{1Max}	rpm	2-stage	6000	4500	4000	3500	-
Speed			3-stage		6000	4500	4000	3000
Nominal Input	n_{1N}	rpm	i = 5, 7	1600	1400	1000	700	-
Speed [3]			i = 10, 14, 20	2300	1900	1500	1000	-
			i ≥ 42	3300	3300	3300	2900	2400
Ratios [6]	i		2-stage	5 / 7 / 10 / 14 / 20				
			3-stage	42 / 62 / 122 / 182				
Torsional Backlash	j_t	arcmin	standard	≤ 4				
			reduced	≤ 2				
Torsional Rigidity	C_{t21}	Nm/arcmin	2-stage i = 5	15.5	43		290	
			3-stage i = 182	17	43	105	280	500
max. Axial Load [4]	F_{2AMax}	N		2150	4150	6130	10050	33000
max. Tilting Moment	M_{2KMax}	Nm		235	413	1295	3064	5900
No-load Running	T_{012}	Nm	i = 5		3.2			
Torque [5]			i = 42			2	7	
(n_1=3000 rpm)			i = 62	0.75				
			i = 182				3	4.5
Tilting Rigidity	C_{2K}	Nm/arcmin		225	550	560	1452	5560
Efficiency with	η	%	2-stage	≥ 93				
full load			3-stage	≥ 90				
Weight	m	kg	2-stage	7.0	11.5	23.0	48.0	-
			3-stage	4.9	7.0	13.8	29.3	65
Lubrication				Synthetic oil viscosity ISO VG220				
Paint				Blue RAL 5002				
Mounting Position				advised with your order				
Permissible Gear Reducer Temp.		°C		- 10°C to + 90°C				
Direction of Rotation				Motor and gear reducer same direction				
Degree of Gearbox Protection				IP 64				
Noise level	L_{PA}	dB(A)		≤ 68	≤ 70	≤ 71	≤ 72	≤ 75
(n_1=3000 rpm)								

[1] 1000 cycles per hour.

[2] 1000 times during the service life.

[3] If you require higher n_{1N} speed, please contact alpha.
At 20°C ambient temperature (if you have higher ambient temperature, please reduce the n_{1N} speed).

[4] applied to the flange centre.

[5] at 20°C gear reducer temperature.

[6] i = 42 not available for TPK 300

Conversion Table:

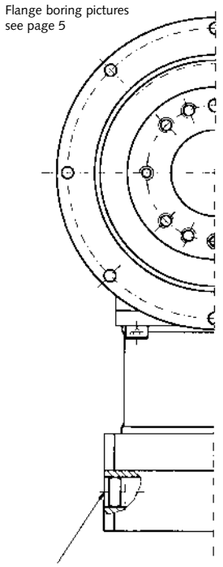
1 Nm = 8.85 in. lb.
1 kgcm² = 8.85 x 10^{-4} in. lb.s²
1 N = .225 lb_f
1 kg = 2.205 lb.

Dimensions [mm]

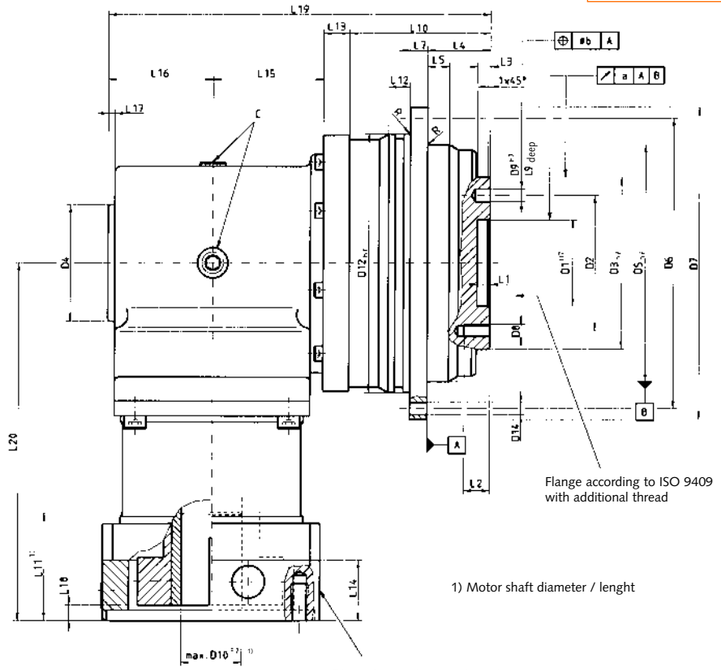
1 mm = 0.03937 in.

View A

Flange boring pictures
see page 5



Mounting hole closed
with plastic plugs for 010-110



Size		TPK 010	TPK 025	TPK 050	TPK 110	TPK 300
Gear Stages		2 / 3	2 / 3	2 / 3	2 / 3	3
a		0.03	0.03	0.03	0.04	0.05
b		0.02	0.02	0.02	0.02	
C		3xM8x1	3xM12x1.5 / 3xM8x1	3xM12x1.5 / 3xM8x1	3xM12x1.5	4xM12x1.5
D1	H7	31.5	40	50	80	0
D2		50	63	80	125	140
D3	h7	63	80	100	160	180
D4		42/40	54/40	70/42	100/54	70
D5	h7	90	110	140	200	255
D6		109	135	168	233	280
D7		118	145	179	247	300
D8		7xM6	11xM6	11xM8	11xM10	12xM16
D9	H7	6	6	8	10	0
D10 [2]	F7	19 / 14	28 / 14	35 / 19	48 / 28	35
D12	h7	95	120	152	212	255
D14		8x5.5	8x5.5	12x6.6	12x9	16x13.5
L1		6	6	6	8	0
L2		10	12	15	20	25
L3		6	6	6	8	12
L4		30	29	38	50	66
L5		10	10	14.6	15	20
L7		7	8	10	12	18
L9		7	7	7	10	0
L10		59	65	80	101.5	140
L11 [2]	min.	23 / 15	30 / 15	32 / 23	45 / 30	32
	max.	40 / 30	50 / 30	60 / 40	82 / 50	60
L12		10	10	12	15	20
L13		12 / 16.5	12 / 18	17.5 / 20	33.5 / 25.7	23.5
L14 [2]		22 / 15	28 / 15	30.5 / 22	37.5 / 28	30.5
L15		49.5 / 32	51 / 32	72.5 / 49.5	87 / 51	72.5
L16		43 / 37.5	48 / 37.5	58 / 43	83 / 48	58
L17		10.5 / 7.5	3 / 7.5	5.5 / 10.5	8 / 3	5.5
L18 [2]		6.2 / 3.7	6.7 / 3.7	5.2 / 6.2	9.3 / 6.7	5.2
L19		163.5 / 145	176 / 152.5	228 / 192.5	305 / 226.2	294
L20 [2]		144 / 123.5	166 / 123.5	189.5 / 144	253 / 166	189.5
R		0.4	0.4	0.4	0.4	0.4

[2] dimensions depend on the motor

1 kgcm² = 8.85 x 10⁻⁴ in. lb.s²
1 mm = 0.03937 in.
1 Nm = 8.85 in. lb.

Mass moments of inertia J_1 [kgcm²] applies to the input

Gear reducer	Ratio i 2-stage					Ratio i 3-stage			
Size	5	7	10	14	20	42	62	122	182
TPK 010	3.54	3.42	2.39	2.36	2.35	0.673	0.671	0.666	0.666
TPK 025	12.4	12.0	8.18	8.09	8.03	0.688	0.678	0.666	0.666
TPK 050	28.8	27.2	18.5	18.1	18.0	2.42	2.40	2.35	2.34
TPK 110	200	192	95.9	93.9	92.8	8.41	8.27	8.05	8.03
TPK 300							18.9	18.2	18.1

J_1 isn't dependent on the motor shaft diameter

Quick selection

Exact gear reducer selection can be found on page 16 to 20

Cycle Operation S5
(for number of cycles ≤ 1000)

Duty cycle < 60%

1. Determination of the max. motor acceleration torque
   T_{1BMot} [Nm]
2. Determination of the actual max. acceleration torque on the reducer output T_{2b} [Nm]
   $T_{2b} = T_{1BMot} \times i$
3. Comparison of the actual max. acceleration torque T_{2b} [Nm] with the max. permissible acceleration torque T_{2B} [Nm] on the reducer output
   $T_{2b} \leq T_{2B}$
4. Comparison of the motor shaft diameter D_{Mot} [mm] with the dimension D10 [mm]
   $D_{Mot} \leq D10$
5. Comparison of the motor shaft length L_{Mot} [mm] with the dimension L11 [mm]
   $L11_{min} \leq L_{Mot} \leq L11_{max}$

Continuous Operation S1
(use FPM-sealings, indicate this in your order)

Duty cycle ≥ 60%

1. Determination of the motor nominal torque
   T_{1NMot} [Nm]
2. Determination of the actual nominal torque on the reducer output T_{2n} [Nm]
   $T_{2n} = T_{1NMot} \times i$
3. Comparison of the actual nominal torque T_{2n} [Nm] with the permissible nominal torque T_{2N} [Nm] of the reducer output
   $T_{2n} \leq T_{2N}$
4. Determination of the actual input speed
   n_{1n} [rpm]
5. Comparison of the actual input speed n_{1n} [rpm] with the permissible nominal speed n_{1N} [rpm]
   $n_{1n} \leq n_{1N}$
6. Comparison of the motor shaft diameter D_{Mot} [mm] with the dimension D10 [mm]
   $D_{Mot} \leq D10$
7. Comparison of the motor shaft length L_{Mot} [mm] with the dimension of L11 [mm]
   $L11_{min} \leq L_{Mot} \leq L11_{max}$

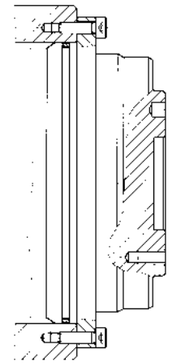
Mounting versions

Mounting versions of the housing

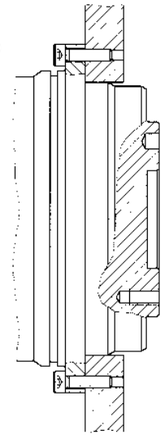
The centering features of the gearbox housing yield two possibilities for mounting (see Fig. beside).

An O-ring can be fitted to seal the gearbox housing if version a) is chosen.

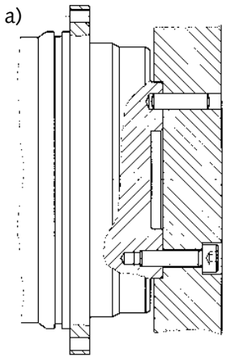
a)



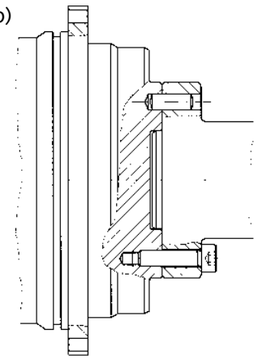
b)



a)



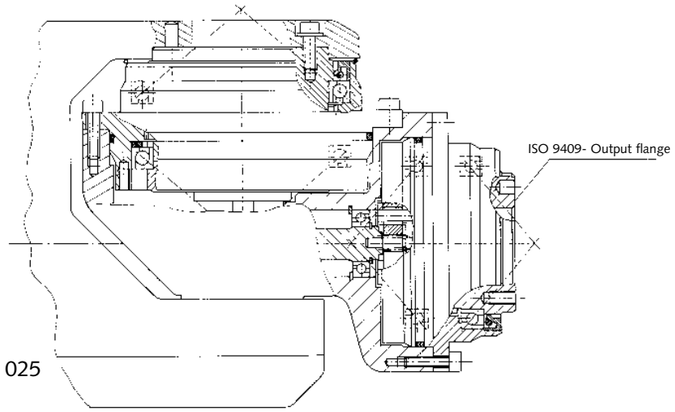
b)



Mounting versions of the output flange

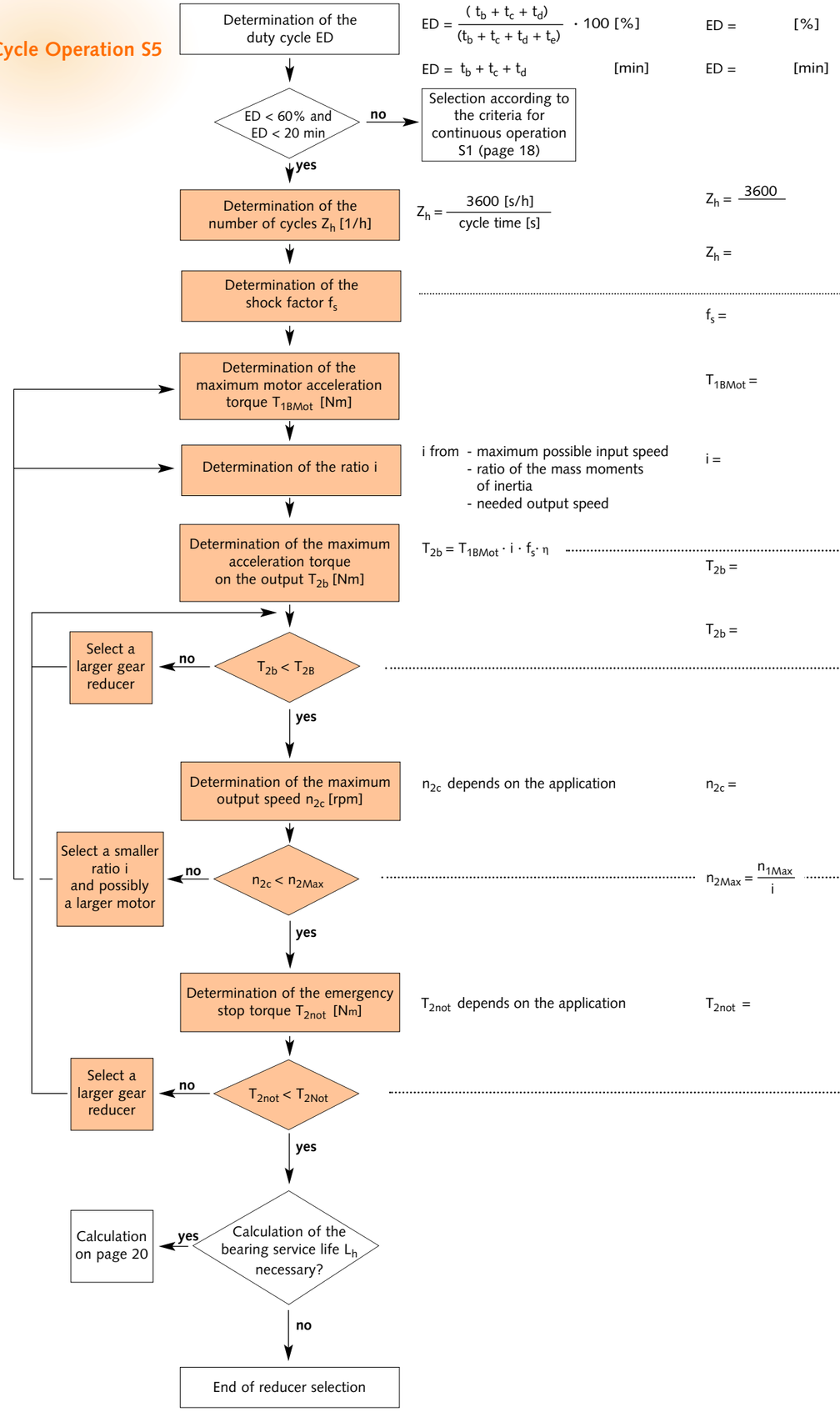
The ISO-output flange has two possibilities for centering as well as an Index bore.

a) External centering
b) Internal centering

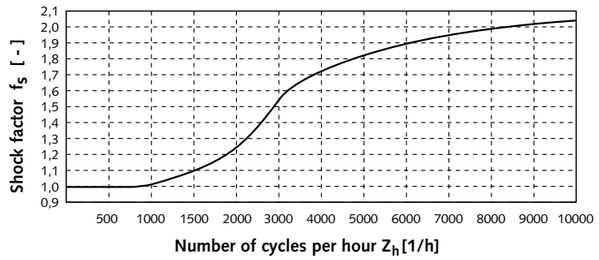


Installation example: TP 010 and TP 025
Integrated in an robot hand

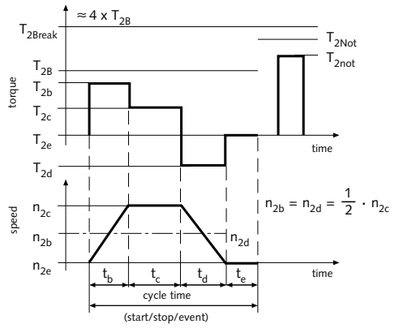
Cycle Operation S5



Rapid reversals in combination with short acceleration times may cause vibration within the drive assembly. The resulting overloads should be calculated using the shock factor f_s.



All usual loads at the output



Version		η [%]
M	1-stage	≥96
	2-stage	≥93
S	1-stage	≥95
	2-stage	≥92
K	2-stage	≥93
	3-stage	≥90

1 Nm = 8.85 in. lb.

	Version		TP004[1]	TP010	TP025	TP050	TP110	TP300[1]	TP500[1]
T_{2B} [Nm]	M/S	i=5/7/31	40	100	300	650	-	-	-
		i=10/21/61/91	32	80	250	500	-	-	-
		i=5/7/10/21	-	-	-	-	1100	-	-
		i=31	-	-	-	-	1600	3500	6000
		i=61/91	-	-	-	-	1300	2800	4800
	K	i=5/7/10/14/62	-	100	300	650	-	-	-
		i=20/42/122/182	-	80	250	500	-	-	-
		i=5/7/10/14/20/42	-	-	-	-	1100	-	-
		i=62	-	-	-	-	1600	3500[2]	-
		i=122/182	-	-	-	-	1300	2800[2]	-

[1] only available as M-Version.
[2] K-Version only 3-stage

	Version		TP004[1]	TP010	TP025	TP050	TP110	TP300[1]	TP500[1]
n_{1Max} [rpm]	M/S	1-stage	6000	6000	4500	4000	3500	-	-
		2-stage			6000	5000	4500	3000	3000
	K	2-stage	-	6000	4500	4000	3500	-	-
		3-stage	-		6000	4500	4000	3000	-

[1] only available as M-Version.

	Version		TP004[1]	TP010	TP025	TP050	TP110	TP300[1]	TP500[1]
T_{2Not} [Nm]	M/S/K		100	250	625	1250	2750	8750	15000

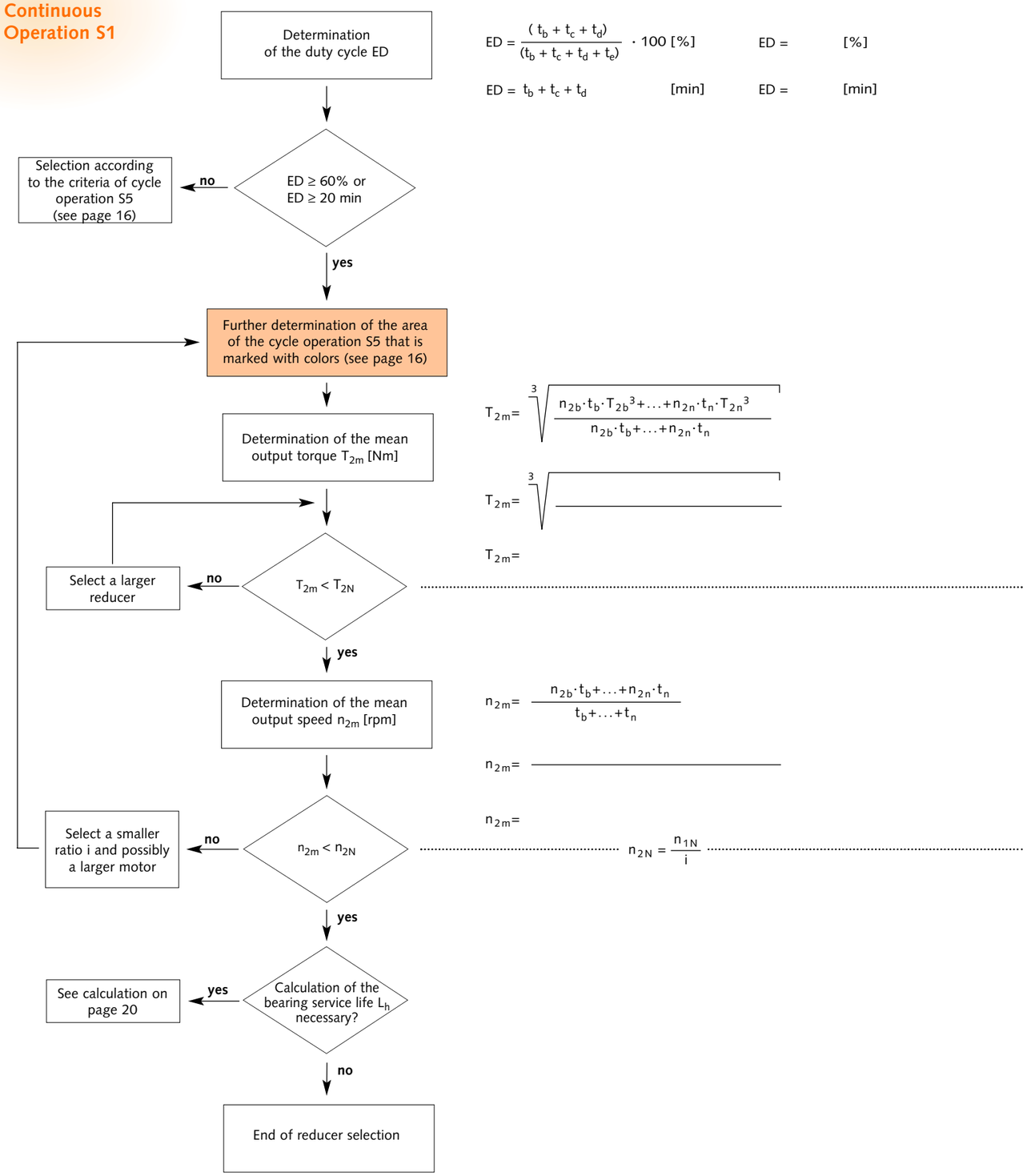
[1] only available as M-Version.

On request we carry out calculations at our company for you to select a gear reducer.

Designation and index see page 19

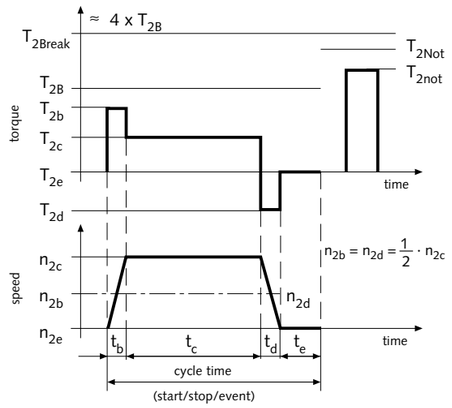
Accurate Selection of Reducer for Cycle Operation S5

Continuous Operation S1



On request we carry out calculations at our company for you to select a gear reducer.

All usual loads at the output



If in continuous operations S1 the gear reducer is loaded below or equal the nominal torque T_{2N}, the gearing's fatigue strength will be sufficient. If the input speeds are lower than or equal to the nominal speed n_{1N} and the ambient conditions are normal, the gear reducer temperature will not exceed 90°C.

1 Nm = 8.85 in. lb.

	Version		TP004[1]	TP010	TP025	TP050	TP110	TP300[1]	TP500[1]
T_{2N} [Nm]	M/S	i=5/7/31	25	50	170	370	-	-	-
		i=10/21/61/91	15	35	100	220	-	-	-
		i=5/7/10/21	-	-	-	-	640	-	-
		i=31	-	-	-	-	1230	2200	3700
		i=61/91	-	-	-	-	700	1600	2900
	K	i=5/7/10/14/62	-	50	170	370	-	-	-
		i=20/42/122/182	-	35	100	220	-	-	-
		i=5/7/10/14/20/42	-	-	-	-	640	-	-
		i=62	-	-	-	-	1230	2200[2]	-
		i=122/182	-	-	-	-	700	1600[2]	-

[1] only available as M-Version.
[2] K-Version inly 3-stage.

	Version		TP004[1]	TP010	TP025	TP050	TP110	TP300[1]	TP500[1]
n_{1N} [rpm]	M	i=5/7	3000	2500	2000	1600	1100	-	-
		i=10	3500	3000	2500	2100	1600	-	-
		i=21/31	4500	3800	3100	2600	2100	1600	1300
		i=61	6000	4700	3700	3300	2600	1900	1500
		i=91	6000	5300	4500	4100	3300	2200	1800
	S	i=5/7	-	1300	1000	800	600	-	-
		i=10	-	1500	1300	1100	800	-	-
		i=21/31	-	1900	1600	1300	1100	-	-
		i=61	-	2400	1900	1700	1300	-	-
		i=91	-	2700	2300	2100	1700	-	-
	K	i=5/7	-	1600	1400	1000	700	-	-
		i=10/14/20	-	2300	1900	1500	1000	-	-
		i≥42	-	3300	3300	3300	2900	2400	-

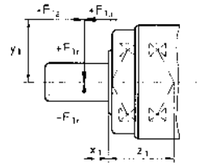
[1] only available as M-Version.

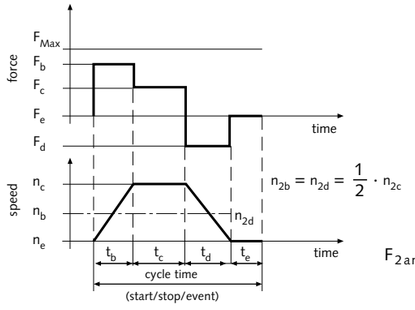
Symbol	Unit	Designation
C	Nm/arcmin	Rigidity
ED	%	Duty cycle
F	N	Force
f_s	-	Shock factor
i	-	Ratio
j	arcmin	Backlash
K1	Nm	Bearing calculation factor
L	h	Service Life
M	Nm	Moment
n	rpm	Speed
p	-	Bearing calculation exponent
η	%	Efficiency
t	s	Time
T	Nm	Torque
x	mm	Distance of the radial load to the shaft collar
y	mm	Distance of the axial load to the centre of the gear reducer
z	mm	Bearing calculation factor
Z	1/h	Number of cycles

Index	
Capital letters	Permissible values
Small letters	Actual values
1	Input
2	Output
A/a	Axial
B/b	Acceleration
Break	Break
c	Constant
d	Delay
e	Pause
h	Hours
K/k	Tilt
m	Mean
Max/max	Maximum
Mot	Motor
N	Nominal
Not/not	Emergency stop
0	No-load running
R/r	Radial
t	Torsional

Accurate Selection of Reducer for Continuous Operation S1

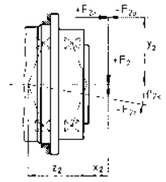
Input (S - Version)





$$n_{2b} = n_{2d} = \frac{1}{2} \cdot n_{2c}$$

Output (M/S/K - Version)



$$F_{1am} = \sqrt[3]{\frac{n_{1b} \cdot t_b \cdot F_{1ab}^3 + \ldots + n_{1n} \cdot t_n \cdot F_{1an}^3}{n_{1b} \cdot t_b + \ldots + n_{1n} \cdot t_n}}$$

$$F_{1rm} = \sqrt[3]{\frac{n_{1b} \cdot t_b \cdot F_{1rb}^3 + \ldots + n_{1n} \cdot t_n \cdot F_{1rn}^3}{n_{1b} \cdot t_b + \ldots + n_{1n} \cdot t_n}}$$

$$F_{2am} = \sqrt[3]{\frac{n_{2b} \cdot t_b \cdot F_{2ab}^3 + \ldots + n_{2n} \cdot t_n \cdot F_{2an}^3}{n_{2b} \cdot t_b + \ldots + n_{2n} \cdot t_n}}$$

$$F_{2rm} = \sqrt[3]{\frac{n_{2b} \cdot t_b \cdot F_{2rb}^3 + \ldots + n_{2n} \cdot t_n \cdot F_{2rn}^3}{n_{2b} \cdot t_b + \ldots + n_{2n} \cdot t_n}}$$

Determination of the mean axial and radial force F_{am}, F_{rm} [N]

$\frac{F_{1am}}{F_{1rm}} \leq 0.37$ TP10 TP25 2-stage $\frac{F_{1am}}{F_{1rm}} \leq 1.14$ $x_1>0$

no → Consult alpha! ← no

TP04 -TP25 $\frac{F_{2am}}{F_{2rm}} \leq 1.14$ TP50 -TP500 $\frac{F_{2am}}{F_{2rm}} \leq 0.37$ $x_2>0$

1 Nm = 8.85 in. lb.
1 N = .225 lb_f
1 mm = 0.03937 in.

yes

$$M_{1km} = \frac{F_{1am} \cdot y_1 + F_{1rm} \cdot (x_1+z_1)}{1000}$$

$$M_{2km} = \frac{F_{2am} \cdot y_2 + F_{2rm} \cdot (x_2+z_2)}{1000}$$

Determination of the mean tilting moment M_{km} [Nm]

S-Version		TP010	TP025	TP050	TP110
z_1[mm]	1-stage	37	41.25	48.25	59.75
	2-stage	35.8	38	37	41.25

	Version	TP004	TP010	TP025	TP050	TP110	TP300	TP500
z_2 [mm]	M/S/K	51,8	71,1	88,2	76,6	99,4	134,1	152,8

$$M_{1kmax} = \frac{F_{1amax} \cdot y_1 + F_{1rmax} \cdot (x_1+z_1)}{1000}$$

$$M_{2kmax} = \frac{F_{2amax} \cdot y_2 + F_{2rmax} \cdot (x_2+z_2)}{1000}$$

Determination of the maximum tilting moment M_{kmax} [Nm]

Select a larger reducer (Gear reducer selection) ← no

$M_{kmax} \leq M_{KMax}$
$F_{amax} \leq F_{AMax}$

yes

	Version	TP004	TP010	TP025	TP050	TP110	TP300	TP500
M_{2KMax} [Nm]	M/S/K	91	235	413	1295	3064	5900	8800
F_{2AMax} [N]	M/S/K	1630	2150	4150	6130	10050	33000	50000

S-Version		TP010	TP025	TP050	TP110
M_{1KMax} [Nm]	1-stage	66	113	232	454
	2-stage	23	26	66	113
F_{1AMax} [N]	1-stage	1150	1600	2700	4700
	2-stage	900	950	1150	1600

$$n_{1m} = \frac{n_{1b} \cdot t_b + \ldots + n_{1n} \cdot t_n}{t_b + \ldots + t_n}$$

$$n_{2m} = \frac{n_{2b} \cdot t_b + \ldots + n_{2n} \cdot t_n}{t_b + \ldots + t_n}$$

Determination of the mean speed n_m [rpm]

$$L_{h1} = \frac{16666}{n_{1m}} \cdot \left[\frac{K1_1}{M_{1km}}\right]^{p_1}$$

$$L_{h2} = \frac{16666}{n_{2m}} \cdot \left[\frac{K1_2}{M_{2km}}\right]^{p_2}$$

Determination of the service life L_h [h]

S-Version		TP010	TP025	TP050	TP110
p_1	1-stage	3.33	3.33	3.33	3.33
	2-stage	3	3	3.33	3.33
$K1_1$	1-stage	557	942.5	1890	3600
[Nm]	2-stage	219	272	557	942.5

	Version	TP004	TP010	TP025	TP050	TP110	TP300	TP500
p_2	M/S/K	3	3	3	3,33	3,33	3,33	3,33
$K1_2$ [Nm]	M/S/K	380	984	1732.5	3875	9167	11284	16414

Enough life time L_h? ← no

Select a larger reducer (Gear reducer selection)

yes

Calculation of the tilting angle necessary? → no: End of the calculation of the service life of the bearing L_h

yes

$$\varphi_{2kmax} = \frac{M_{2kmax}}{C_{2K}}$$

Determination of the tilting angle φ_{kmax}

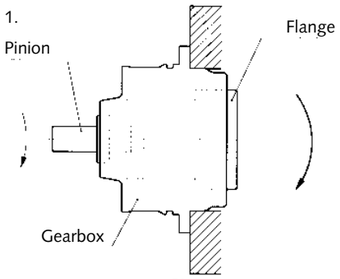
	Version	TP004	TP010	TP025	TP050	TP110	TP300	TP500
c_{2K} [Nm /arcmin]	M/S/K	-	225	550	560	1452	5560	9480

Designations and index see page 19

Possible Operation Modes:

The drive pinion, output flange or gear reducer housing can be used as the input or output or fixed in an TP-gear reducer.
The following diagram illustrates the resulting seven different modes of operation and the corresponding formulae for determining the transmission ratios.
Please observe that depending on the mounting version the permissible speeds and torques will change.
Please contact alpha!

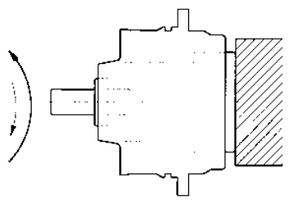
1.



Input: Pinion
Output: Flange
Fixed: Gearbox

$i_1 = i$

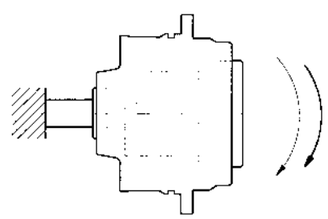
2.



Input: Pinion
Output: Gearbox
Fixed: Flange

$i_2 = -(i - 1)$

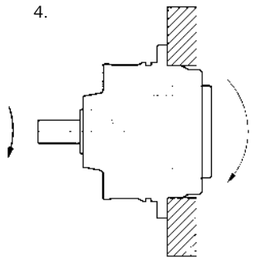
3.



Input: Gearbox
Output: Flange
Fixed: Pinion

$i_3 = \frac{i}{i - 1}$

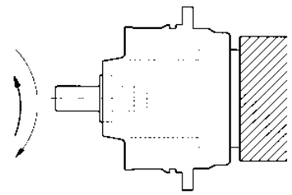
4.



Input: Flange
Output: Pinion
Fixed: Gearbox

$i_4 = \frac{1}{i}$

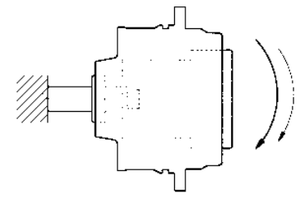
5.



Input: Gearbox
Output: Pinion
Fixed: Flange

$i_5 = -\frac{1}{i - 1}$

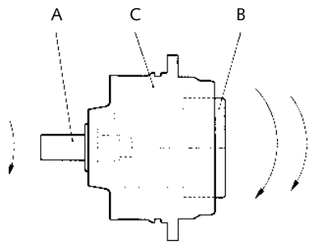
6.

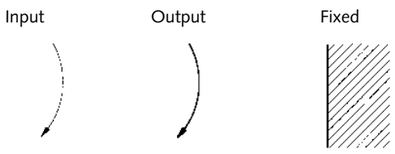


Input: Flange
Output: Gearbox
Fixed: Pinion

$i_6 = \frac{i - 1}{i}$

7. Differential and Variable- speed gear





All versions rotate
$n_A - i \cdot n_B - (1 - i) \cdot n_C = 0$

n_A : Pinion speed
n_B : Flange speed
n_C : Gearbox speed

i : Ratio
i_{1-6} : Ratio for the particular application

Ordering Code

TP 010 - MF2 - 61 - 021/Motor - V3

Gear Reducer type
TP 004 / 010 / 025 / 050 / 110 / 300 / 500

Reducer Design
M = Motor-mounted "M"
E = Integrated "E"
S = Self-contained "S"
TP 004 / TP 300 / TP 500 only "M"

Reducer Execution
F = Standard
FPM seals (Viton®)
X = Customized

Number of Stages
1 = 1-stage
2 = 2-stage

Ratio i
TP 004 - TP 110: 1-stage = 5 / 7 / 10
2-stage = 21 / 31 / 61 / 91
TP 300 + TP 500: 2-stage = 31 / 61 / 91

Mounting Position (see below)

Motor Designation
(manufacturer type)
isn't necessary E- and S-versions

Backlash
1 = Standard
0 = Reduced

Clamping hub bore Diameter
M-version: Code numbers - see table below
E-version: 0 = only input pinion
S-version: 0 = smooth input shaft
1 = keyed input shaft

Type of Output flange
0 = Standard
4 = Customized

Code Number - Clamping hub bore diameter (TP)

1 mm = 0.03937 in.

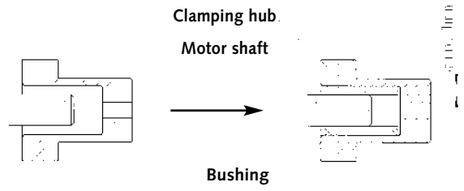
Gear stages	1	2	1	2	1	2	1	2	1	2	2	2
Motor shaft-Ø [mm]*	TP 004		TP 010		TP 025		TP 050		TP 110		TP 300	TP 500
10	x	x	x	1	x	x	x	x	x	x	x	x
11	1	1	2	2	x	2	x	1	x	x	x	x
14	2	-	3	3	3	3	x	2	x	1	x	x
19	-	-	4	-	4	4	3	3	x	2	x	x
24	-	-	-	-	5	-	4	4	x	3	x	x
28	-	-	-	-	6	-	x	-	x	4	x	x
32	-	-	-	-	7	-	5	5	5	x	x	x
35	-	-	-	-	-	-	6	-	x	6	1	x
38	-	-	-	-	-	-	7	-	7	7	-	x
48	-	-	-	-	-	-	-	-	8	-	-	1

* If your motor shaft diameter is not listed, add 2 mm to diameter and select next higher size.

- = choose next larger gear reducer
x = choose next larger code number

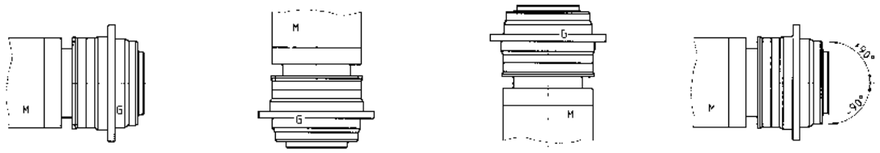
Bushing

If the motor shaft- and the clamping hub diameter do not fit together. . .



. . . a bushing is used.

Mounting Position



B5-horizontal

V1-vertical, with output flange facing downwards

V3-vertical, with output flange facing upwards

S-can be pivoted ± 90° from the horizontal

M = Motor
G = Gear reducer

Ordering Code

TPK 010 - MF2 - 20 - 021/Motor - V3/B5

Gear Reducer Type
TPK 010 / 025 / 050 / 110 / 300

Reducer Design
M = Motor-mounted "M"

Reducer Execution
F = Standard
FPM seals (Viton®)
X = Customized

Stages *
2 = 2-stage
3 = 3-stage
* TPK 300 only 3-stage

Ratio i
2-stage = 5 / 7 / 10 / 14 / 20
3-stage = 42* / 62 / 122 / 182
* not available for TPK 300

Mounting Position (see below)

Motor Designation
(Manufacturer-Type)

Backlash
1 = Standard ≤ 4 arcmin
0 = Reduced ≤ 2 arcmin

Clamping hub bore Diameter
Code numbers - see table below

Type of Output flange
0 = Standard
4 = Customized

Code Number - Clamping hub bore diameter (TPK)

1 mm = 0.03937 in.

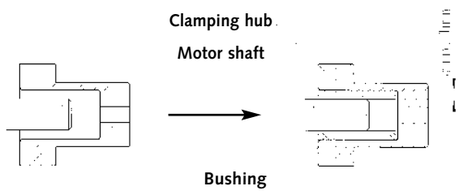
Gear stages	2	3	2	3	2	3	2	3	3
Motor shaft-Ø [mm]*	TPK 010		TPK 025		TPK 050		TPK 110		TPK 300
14	x	3	x	3	x	x	x	x	x
19	4	-	x	-	x	3	x	x	x
28	-	-	6	-	x	-	x	4	x
35	-	-	-	-	6	-	x	-	6
48	-	-	-	-	-	-	8	-	-

* If your motor shaft diameter is not listed, add 2 mm to diameter and select next higher size.

- = choose next larger gear reducer
x = choose next larger code number

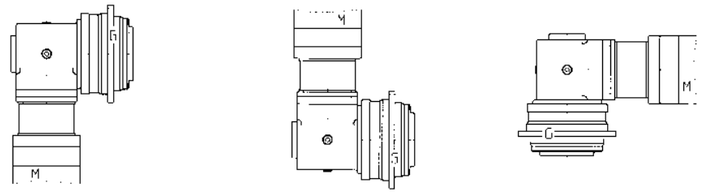
Bushing

If the motor shaft- and the clamping hub diameter do not fit together . . .



. . . a bushing is used.

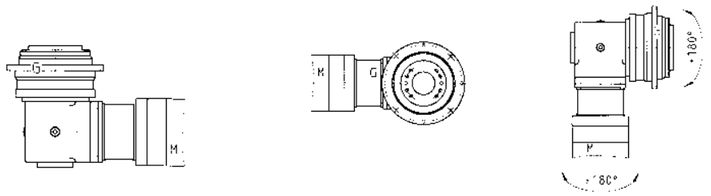
Mounting Position



B5/V3-Output flange horizontal, Motor shaft facing upwards

B5/V1-Output flange horizontal, Motor shaft facing downwards

V1/B5-Output flange vertical facing downwards, Motor shaft horizontal



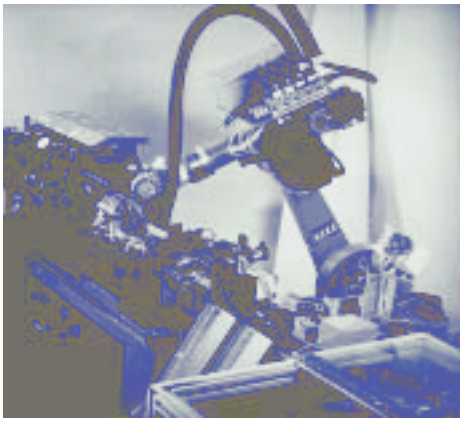
V3/B5-Output flange vertical facing upwards, Motor shaft horizontal

B5/B5-Output flange and motor shaft horizontal

S-can be pivoted 360°

M = Motor
G = Gear reducer

Installation- and Application Examples



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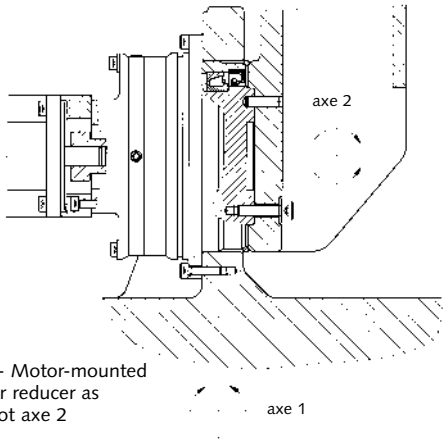
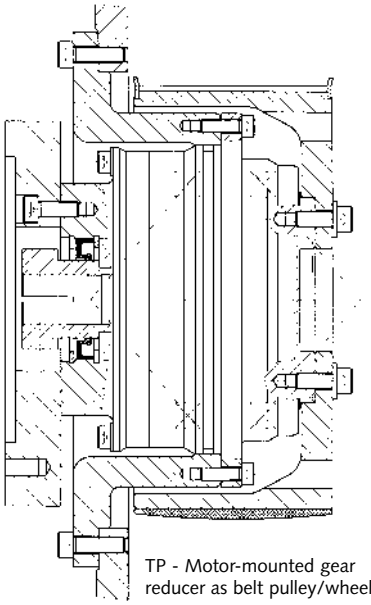
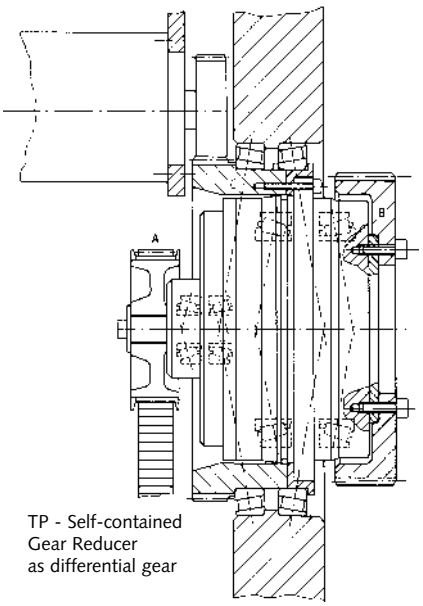


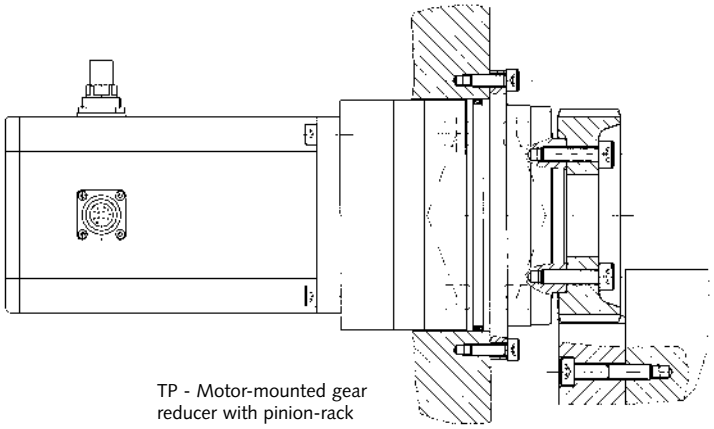
TP - Motor-mounted gear reducer as robot axe 2



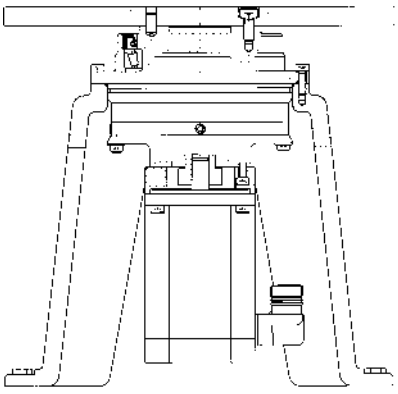
TP - Motor-mounted gear reducer as belt pulley/wheel drive



TP - Self-contained Gear Reducer as differential gear



TP - Motor-mounted gear reducer with pinion-rack



TP - Motor-mounted gear reducer as turnable