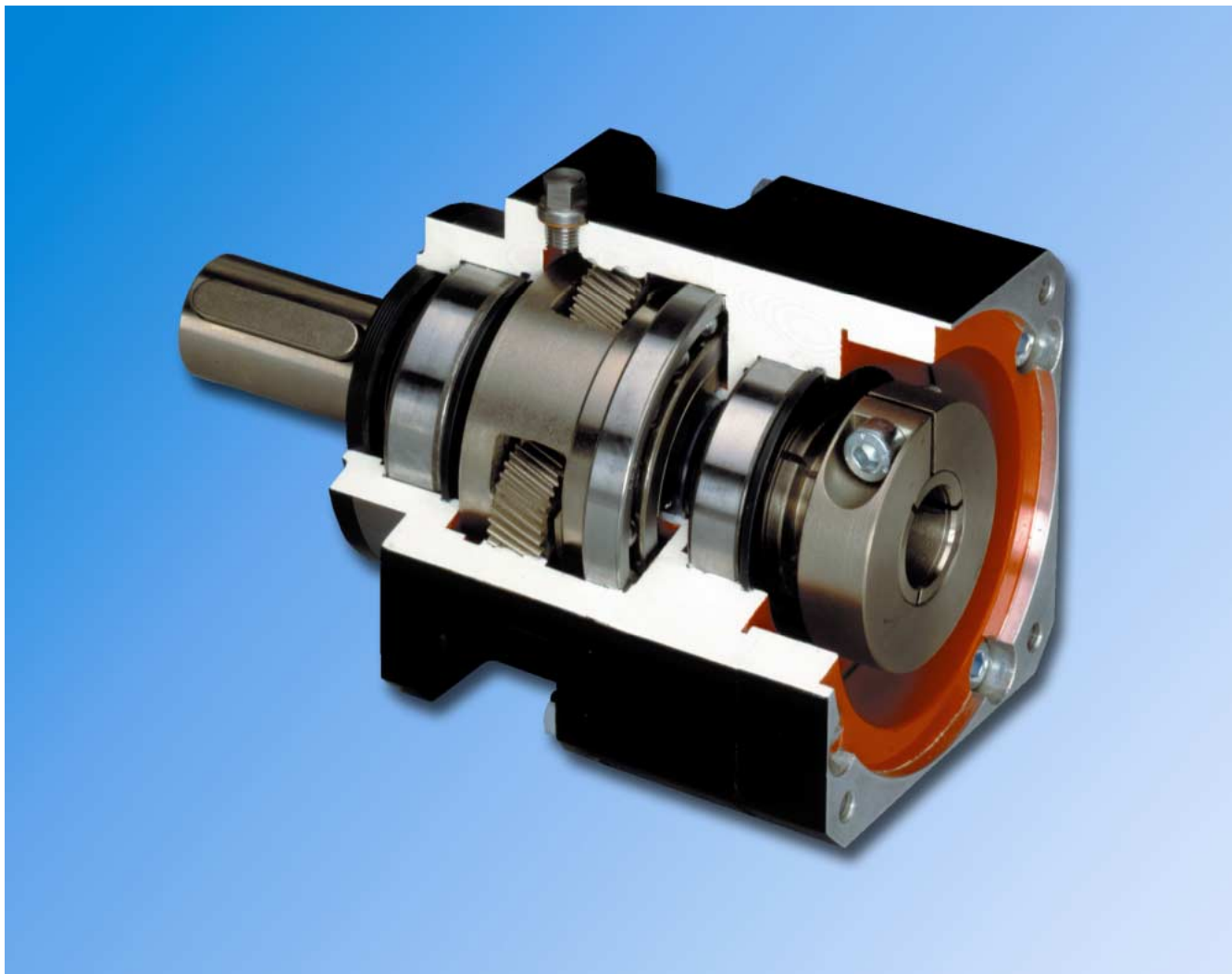




Planetary Gearbox

Stöber Series P

Catalogue 192-753011 N5/UK
Version 5 / October 2003



Stöber Gearbox, Series P

Construction of the planetary gearbox

Designed for the most demanding applications

Outstanding performance combined with extremely compact dimensions make STÖBER planetary gearboxes particularly suitable for use in applications where highly-dynamic servo motors are employed.

Sizes

The range is available in 5 sizes P3, P4, P5, P7 and P8 with maximum torque ratings from 50 to 1100Nm and ratios from 3:1 to 100:1.

Torsional backlash & stiffness

Precision-manufactured system components used in combination with matched sets of gears enables gearboxes to be produced with a torsional backlash better than 1 arc-minute. The standard backlash with single stage gearing is less than 4 arc-minutes and with 2 stage models less than 5 arc-minutes.

Motor coupling

The quality of the motor coupling determines the forces created by shaft misalignment. If the error is large, torque variations will occur in the drive train and periodic speed

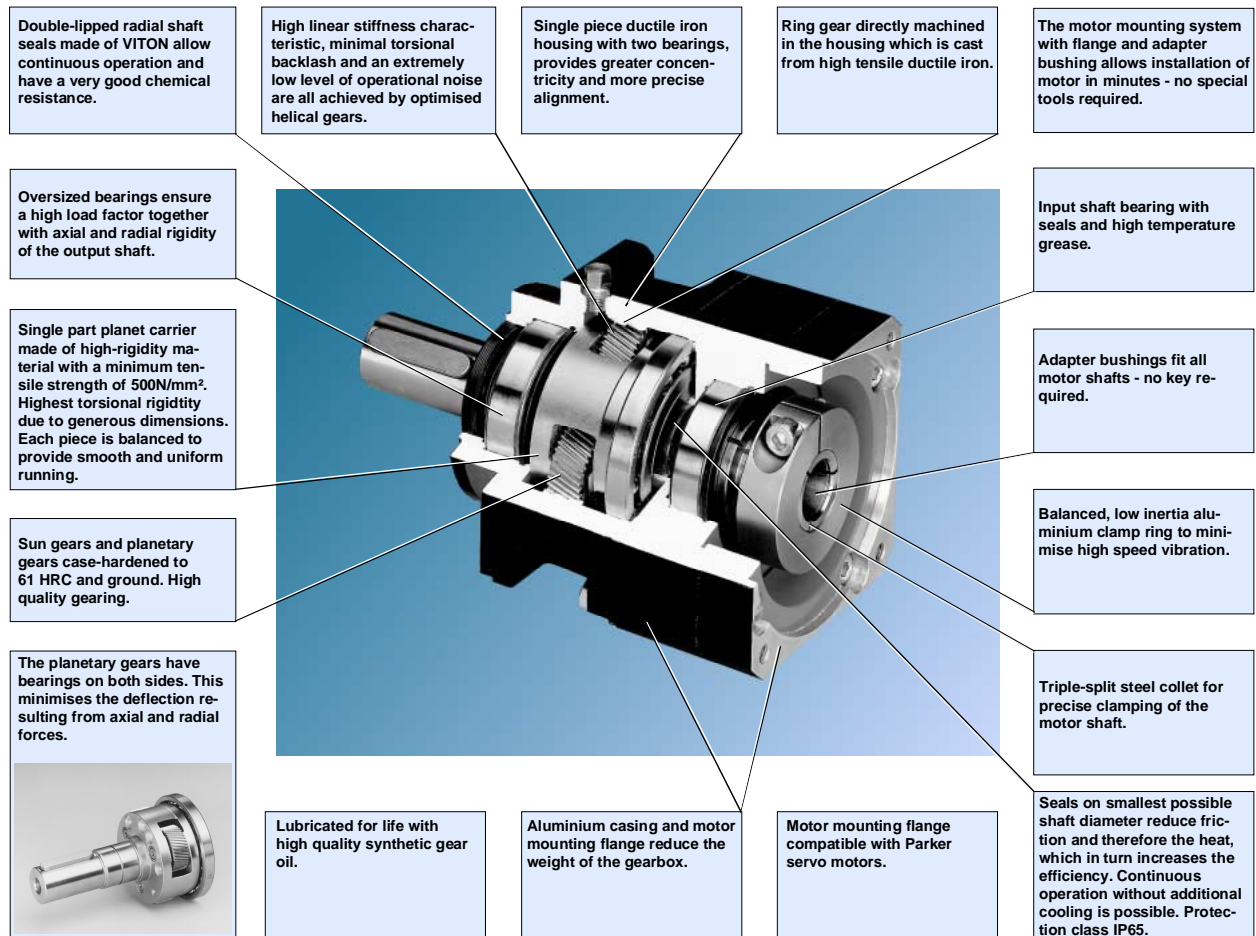
fluctuation will result. The torsionally-rigid couplings of this gearbox range are optimised in relation to these requirements and produce the highest running precision.

Noise

Gear noise resulting from mechanical errors is kept to an absolute minimum by:

- high manufacturing precision combined with the block construction principle (all critical features are machined within a one-piece housing).
- Optimised helical gears using cambered tooth profiles.

With noise figures of less than 60 dB(A), these gearboxes are among the quietest on the market.



Stöber Gearbox, Series P

Technical Data

	Unit	Size									
		P3		P4		P5		P7		P8	
		1 stage	2 stage	1 stage	2 stage	1 stage	2 stage	1 stage	2 stage	1 stage	2 stage
Maximum permissible acceleration torque	Nm	50		100		250		500		1100	
Nominal output torque ^{*)} T _{2N}	Nm	40		80		200		400		800	
Maximum permissible input speed n ₁ (at ambient temperature 20°)											
Intermittent operation	min ⁻¹	6000		6000		6000		6000		4500	
Continuous operation i ≥ 5	min ⁻¹	4000		4000		3500		3000		2500	
Continuous operation i < 5	min ⁻¹	3000		3000		2800		2500		2000	
Torsional backlash											
Standard	arcmin	≤ 4.0	≤ 5.0	≤ 4.0	≤ 5.0	≤ 4.0	≤ 5.0	≤ 3.0	≤ 4.0	≤ 3.0	≤ 4.0
Reduced	arcmin	≤ 2.5	≤ 3.0	≤ 2.0	≤ 2.5	≤ 1.5	≤ 2.5	≤ 1.0	≤ 2.0	≤ 1.0	≤ 2.0
Torsional rigidity (related to the output shaft at T _{2N})	Nm/arcmin	4		10		25		50		145	
Maximum permissible axial load F _a	N	1000		1500		2000		3000		4000	
Maximum permissible radial load F _r											
Normal bearing	N	3000		4500		7000		9000		15000	
Heavy duty bearing	N	4000		6000		9000		12000		18000	
Efficiency at nominal torque	%	97	95	97	95	97	95	97	95	97	95
Weight	kg	2.6	4.0	4.0	5.3	6.5	8.5	12	15	26	32
Noise emission at n ₁ = 2000 rpm ¹	dB(A)	< 58		< 59		< 60		< 61		< 62	
Available ratios - standard gearboxes											
One stage	i=	3, 5, 7, 10									
Two stage	i=	25									
Other available ratios (on request)											
One stage	i=	4									
Two stage	i=	15, 20, 35, 49, 70, 100									
Lubrication		synthetic gear oil CLP HC ISO VG 150									
External paint finish		Black RAL 9005									
Fitting position		any									
Protection class		IP 65									
Ambient temperature range	°C	0°C bis 40°C									

*) Values refer to input speeds n₁ ≤ 2000 rpm.
For higher speeds use the following formula:

$$T_{2N} = \frac{T_{2N(2000\text{min}^{-1})}}{\sqrt[3]{\frac{n_1}{2000}}}$$

¹ Measured in accordance with DIN 45635 (Accuracy class 2).

Stöber Gearbox, Series P

Peak (emergency stop) torque ratings

Size	Peak torque ratings [Nm] (permissible for max 10 ³ operations)								
	One stage*				Two stages*				
	i = 3	i = 4	i = 5 i = 10	i = 7	i = 15	i = 20	i = 25 i = 70 i = 100	i = 35	i = 49
P3	73	97	100	85	73	97	100	100	85
P4	175	200	200	170	175	200	200	170	170
P5	364	485	500	407	364	485	500	407	407
P7	728	970	970	849	728	970	1000	849	849
P8	1455	1940	2000	1698	1455	1940	2000	1698	1698

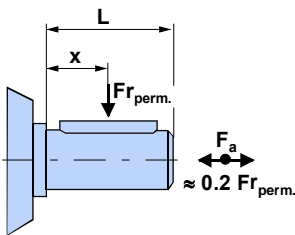
* The bold-printed transmission numbers refer to standard gearboxes.

Moment of inertia

Size	Moment of inertia [kgmm ²]											
	One stage*					Two stages*						
	i = 3	i = 4	i = 5	i = 7	i = 10	i = 15	i = 20	i = 25	i = 35	i = 49	i = 70	i = 100
P3	81	68	64	59	57	65	64	64	59	59	59	57
P4	182	102	92	85	77	66	65	65	64	59	59	57
P5	403	295	258	227	212	149	145	143	142	131	131	127
P7	1150	786	658	555	504	434	420	415	411	378	377	361
P8	4850	2950	2280	1700	1430	996	920	893	872	761	756	702

* The bold-printed transmission numbers refer to standard gearboxes.

Permissible radial and axial loads ²



$$P3 \quad Fr_x = Fr_{perm.} \times \frac{81}{67 + x}$$

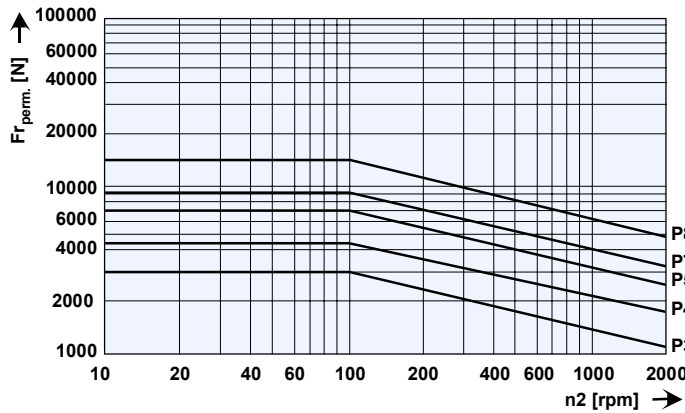
$$P4 \quad Fr_x = Fr_{perm.} \times \frac{92}{74 + x}$$

$$P5 \quad Fr_x = Fr_{perm.} \times \frac{115}{86 + x}$$

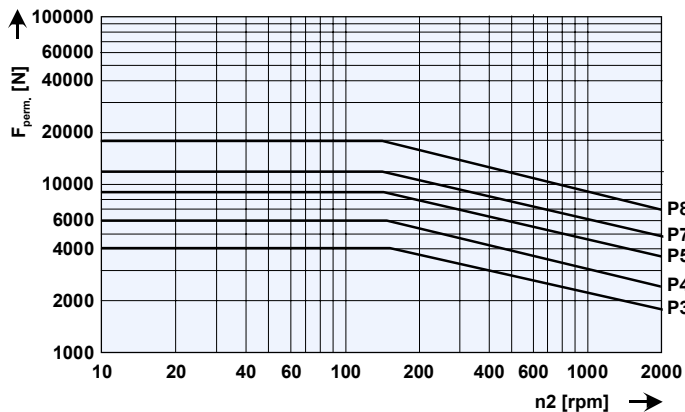
$$P7 \quad Fr_x = Fr_{perm.} \times \frac{140}{99 + x}$$

$$P8 \quad Fr_x = Fr_{perm.} \times \frac{163}{122 + x}$$

The diagrams show the permissible load for a bearing life of 20000 hours.



Normal output shaft bearing.
Diagram valid for x = L/2.

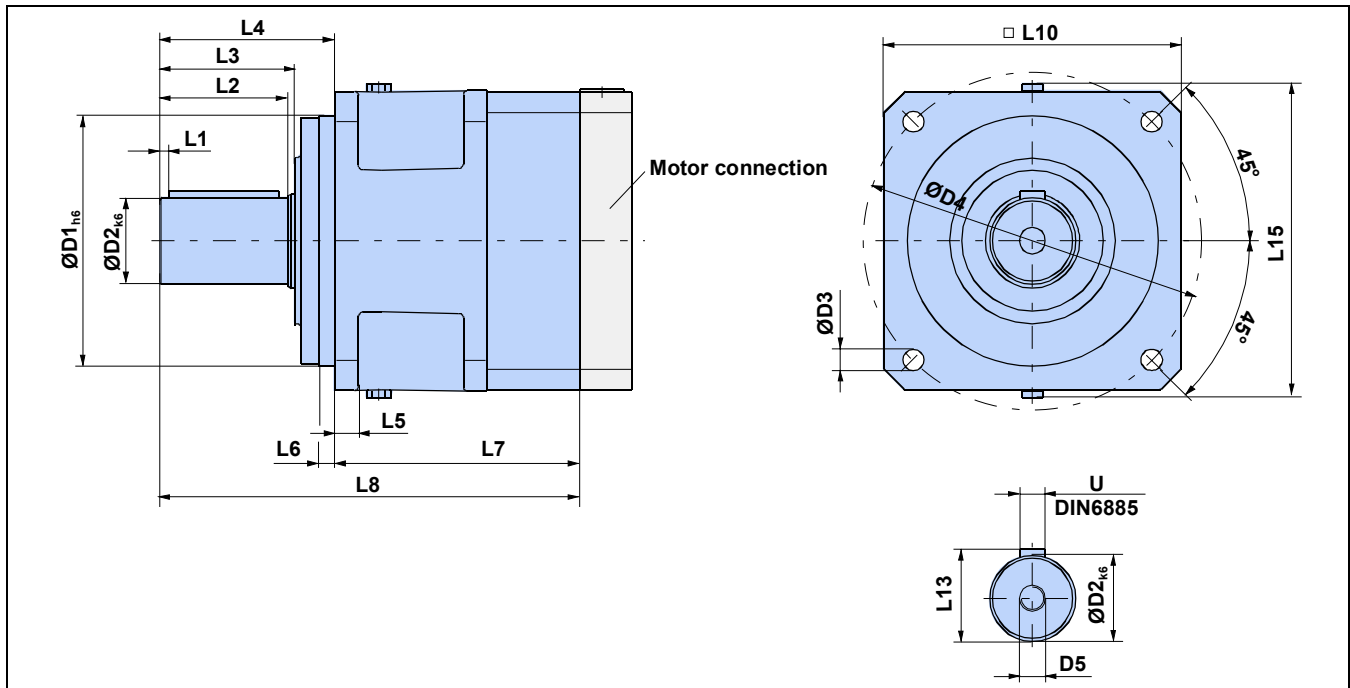


Heavy duty output shaft bearing.
Diagram valid for x = L/2.

² The diagrams are only valid if Fa works in the middle of the shaft

Stöber Gearbox, Series P

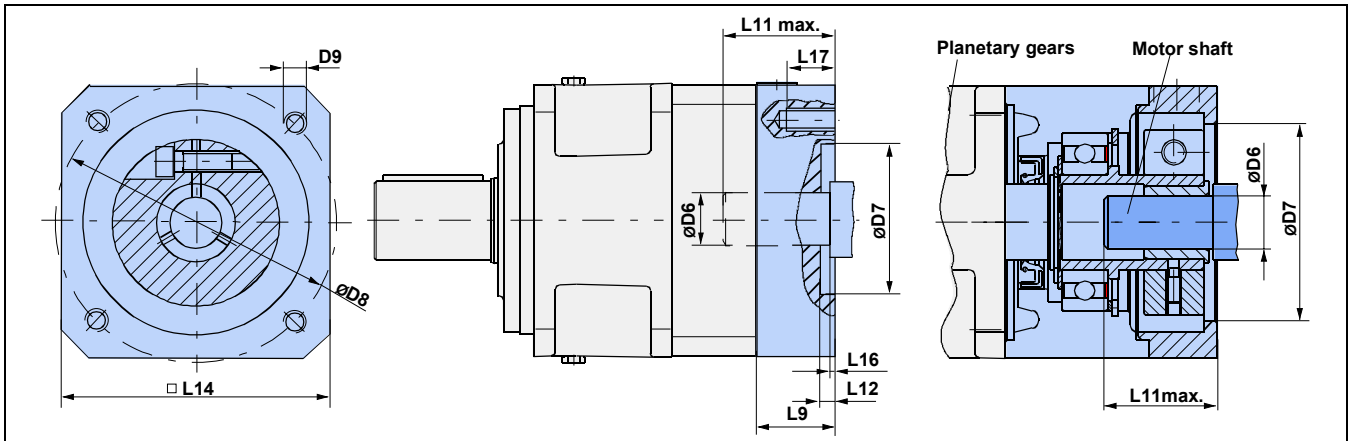
Dimensions



Dimension \ Size	P3		P4		P5		P7		P8	
	1 stage	2 stages	1 stage	2 stages	1 stage	2 stages	1 stage	2 stages	1 stage	2 stages
D1	60		70		90		130		160	
D2	16		22		32		40		55	
D3	5.5		6.6		9.0		11		14	
D4	75		85		120		165		215	
D5	M5		M8		M12		M16		M20	
L1	4		3		3		4		6	
L2	28		36		58		82		82	
L3	30.5		39.5		62.0		86.0		86.5	
L4	48		56		88		112		112	
L5	7		9		10		15		15	
L6	8		7.5		16		3.5		10	
L7	87.5	128.5	92	136	99	140	125	167	156	212
L8	135.5	176.5	148	192	187	228	237	279	268	324
L10	72		98		115		145		190	
L13	18		24.5		35		43		59	
L15	82		108		124		154		200	
U	A5x5x20		A6x6x28		A10x8x50		A12x8x70		A16x10x70	

Stöber Gearbox, Series P

Motor mounting



Size / Version		P3N ShaftØ11		P3N ShaftØ19		P4N ShaftØ14		P4N ShaftØ19		P5N ShaftØ19		P5N ShaftØ24		P7N ShaftØ24		P7N ShaftØ32		P8N ShaftØ32		P8N ShaftØ38	
		P3V ShaftØ14		P3V ShaftØ19		P4V ShaftØ19		P4V ShaftØ24		P5V ShaftØ24		P5V ShaftØ32		--		--		--		--	
Dim.	Version	1 st.	2 st.	1 st.	2 st.	1 st.	2 st.	1 st.	2 st.	1 st.	2 st.	1 st.	2 st.	1 st.	2 st.	1 st.	2 st.	1 st.	2 st.	1 st.	2 st.
D6	N	11	11	19	19	14	14	19	19	19	19	24	24	24	24	32	32	32	32	38	38
	V	14	--	19	--	19	--	24	--	24	--	32	--	--	--	--	--	--	--	--	--
D7	N	60	60	80	80	80	80	80	80	95	95	110	110	130	130	130	130	180	180	180	180
	V	80	--	80	--	95	--	110	--	130	--	130	--	--	--	--	--	--	--	--	--
D8	N	75	75	100	100	100	100	100	100	115	115	130	130	165	165	165	165	215	215	215	215
	V	100	--	100	--	115	--	130	--	165	--	165	--	--	--	--	--	--	--	--	--
D9	N	M5	M5	M6	M6	M6	M6	M6	M6	M8	M8	M8	M8	M10	M10	M10	M10	M12	M12	M12	M12
	V	M6	--	M6	--	M8	--	M8	--	M10	--	M10	--	--	--	--	--	--	--	--	--
L9	N	18	18	18	18	21	18	21	18	24	21	24	30	25	32	25	32	33	45	33	45
	V	18	--	18	--	21	--	30	--	32	--	32	--	--	--	--	--	--	--	--	--
L11	N	40	40	40	40	40	40	40	40	50	40	50	50	60	58	60	58	80	80	80	80
	V	40	--	40	--	40	--	50	--	58	--	58	--	--	--	--	--	--	--	--	--
L12	N	3.5	3.5	3.5	3.5	4.0	3.5	4.0	3.5	4.0	4.0	4.0	4.0	5.0	4.0	5.0	4.0	5.0	5.0	5.0	5.0
	V	3.5	--	3.5	--	4.0	--	4.0	--	4.0	--	4.0	--	--	--	--	--	--	--	--	--
L14	N	72	72	90	90	98	90	98	90	114	98	114	116	145	150	145	150	190	192	190	192
	V	90	--	90	--	98	--	116	--	150	--	150	--	--	--	--	--	--	--	--	--
L16	N	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.5	3.0	3.5	12.0	3.5	11.5	3.5	11.5	3.5	23.5	3.5	23.5
	V	3.0	--	3.0	--	3.0	--	12.0	--	11.5	--	11.5	--	--	--	--	--	--	--	--	--
L17	N	11	11	13	13	11	13	13	13	16	16	16	16	25	20	25	20	33	25	33	25
	V	13	--	13	--	13	--	16	--	20	--	20	--	--	--	--	--	--	--	--	--

N: Normal bearing; V: Heavy duty bearing on the output shaft

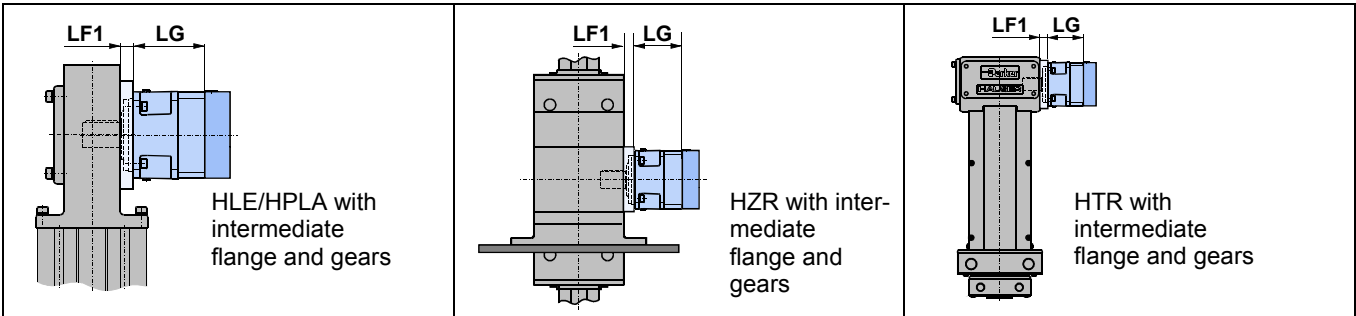


When specifying a custom motor, please state the following motor dimensions in the order code (page 11): Spigot Ø D7; circular hole Ø D8; shaft Ø D6; shaft length L11 to flange.

Stöber Gearbox, Series P

Standard Combinations

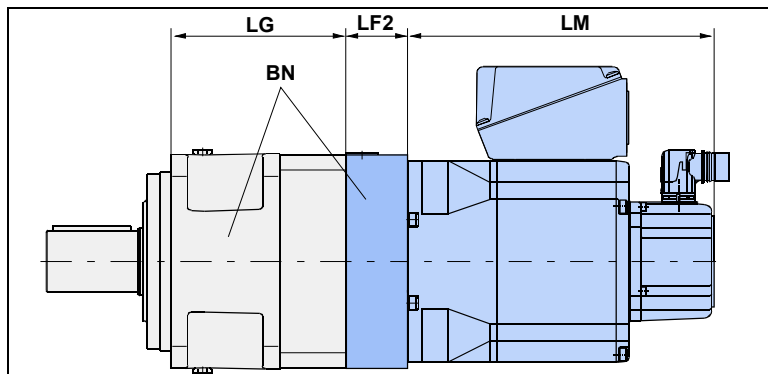
Gearbox/linear actuator combinations



		Linear actuator HPLA								
		HPLA80			HPLA120			HPLA180		
		Single axis		Dual axis	Single axis		Dual axis	Single axis	Dual axis	
		Hollow shaft bearing	Pulley on gearbox shaft	Hollow shaft bearing	Hollow shaft bearing	Pulley on gearbox shaft	Hollow shaft bearing	Hollow shaft bearing	Hollow shaft bearing	
P3	LF1	36	15	--	--			--		
	LG	1 st.	87.5							87.5
		2 st.	128.5	128.5						
P4	LF1	36	23	36	41	11	--			
	LG	1 st.	92	92	92	92				
		2 st.	136	136	136	136				
P5	LF1	--			51	30	51	54.5	--	
	LG				1 st.	99	99	99		
		2 st.	139	139	139	139	139			
P7	LF1	--			--			54.4	54.5	
	LG							1 st.	125	125
		2 st.	167	167						

		HLEc linear actuator				HZR vertical actuator			Telescopic actuator		
		HLE100c		HLE150c		HZR			HTR		
		Single axis	Dual axis	Single axis	Dual axis	HZR50	HZR80	HZR100	HTR50	HTR80	
P3	LF1	12	--	--		without flange	--		13	--	
	LG	1 st.				87.5			87.5		
		2 st.	128.5			128.5		128.5			
P4	LF1	on request	12	14	--		--	15	--		
	LG		1 st.	92				92			92
		2 st.	136	136		136		136			
P5	LF1	--		on request	30	--		25	--		
	LG			1 st.	99			99			
		2 st.	139	139		139					

Gearbox/motor combination



Stöber Gearbox, Series P

Gearbox data				Motor data				
Gear-box size	Ver-sion	Gearbox length		Motor/ Type	LM Body length, without/ with brake	LF2 Flange thick- ness 1/2 stage	BN	
		1 stage i = 3 i = 5 i = 7 i = 10	2 stages i = 25				Order code for gearbox complete with motor mounting flange	
P3	N	87.5	128.5	MH_070/___/B05/11 0.5 01 1.5 02	158/214 188/244 218/274 248/304	18/18	i = 3	P301PN0030M060/075/11/40
							i = 5	P301PN0050M060/075/11/40
							i = 7	P301PN0070M060/075/11/40
							i = 10	P301PN0100M060/075/11/40
				SMH060/___/B05/11 1.4	129.5/161	18/18	i = 25	P312PN0250M060/075/11/40
							i = 3	P301PN0030M080/100/19/40
							i = 5	P301PN0050M080/100/19/40
							i = 7	P301PN0070M080/100/19/40
	V	87.5	-	MH105/___/B09/19 02 04 06 08	186/250 229/293 273/337 317/381	18/18	i = 10	P301PN0100M080/100/19/40
							i = 25	P312PN0250M080/100/19/40
							i = 3	P301PV0030M080/100/14/40
							i = 5	P301PV0050M080/100/14/40
				SMH082/___/B08/14 03	163.5/206.5	18/-	i = 7	P301PV0070M080/100/14/40
							i = 10	P301PV0100M080/100/14/40
							i = 3	P301PV0030M080/100/19/40
							i = 5	P301PV0050M080/100/19/40
MH105/___/B09/19 02 04 06 08	186/250 229/293 273/337 317/381	18/-	i = 7	P301PV0070M080/100/19/40				
			i = 10	P301PV0100M080/100/19/40				
			i = 3	P401PN0030M080/100/14/40				
			i = 5	P401PN0050M080/100/14/40				
P4	N	92	136	SMH082/___/B08/14 03	163.5/206.5	21/18	i = 7	P401PN0070M080/100/14/40
							i = 10	P401PN0100M080/100/14/40
							i = 25	P412PN0250M080/100/14/40
							i = 3	P401PN0030M080/100/19/40
				MH105/___/B09/19 02 04 06 08	186/250 229/293 273/337 317/381	21/18	i = 5	P401PN0050M080/100/19/40
							i = 7	P401PN0070M080/100/19/40
							i = 10	P401PN0100M080/100/19/40
							i = 25	P412PN0250M080/100/19/40
	V	92	-	MH105/___/B05/19 02 04 06 08	186/250 229/293 273/337 317/381	21/-	i = 3	P401PV0030M095/115/19/40
							i = 5	P401PV0050M095/115/19/40
							i = 7	P401PV0070M095/115/19/40
							i = 10	P401PV0100M095/115/19/40
				SMH082/___/B05/19 03	163.5/206.5	30/-	i = 3	P401PV0030M110/130/24/50
							i = 5	P401PV0050M110/130/24/50
							i = 7	P401PV0070M110/130/24/50
							i = 10	P401PV0100M110/130/24/50
SMH100/___/B05/19 06	191.5/238.5	30/-	i = 3	P401PV0030M110/130/24/50				
			i = 5	P401PV0050M110/130/24/50				
			i = 7	P401PV0070M110/130/24/50				
			i = 10	P401PV0100M110/130/24/50				
MH105/___/B06/24 02 04 06 08	186/250 229/293 273/337 317/381	30/-	i = 3	P401PV0030M110/130/24/50				
			i = 5	P401PV0050M110/130/24/50				
			i = 7	P401PV0070M110/130/24/50				
			i = 10	P401PV0100M110/130/24/50				

N: Normal bearing; V: Heavy duty bearing on the output shaft

Sizes P5, P7 and P8 → next page.

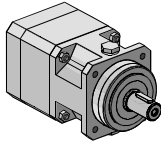
Stöber Gearbox, Series P

Gearbox data				Motor data					
Gear-box size	Ver-sion	Gearbox length		Motor/ Type	LM Body length, without/ with brake	LF2 Flange thick- ness 1/2 stage	BN		
		1 stage i = 3 i = 5 i = 7 i = 10	2 stages i = 25				Order code for gearbox complete with motor mounting flange		
P5	N	99	139	MH105/___/B05/19	186/250	24/21	i = 3	P501PN0030M095/115/19/40	
				02	229/293				
				04	273/337				
				06	317/381				
				08					
				SMH082/___/B05/19	163.5/206.5				
				03					
	SMH100/___/B05/19	191.5/238.5							
				MH105/___/B06/24	186/250	24/30	i = 3	P501PN0030M110/130/24/50	
				02	229/293				
				04	273/337				
				06	317/381				
				08					
	V	99	-	MH145/___/B05/24	200/274	32/-	i = 3	P501PV0030M130/165/24/58	
				04	231/305				
				08	292/366				
				15	354/428				
				22	416/490				
				28					
P7	N	125	167	MH145/___/B05/24	200/274	25/32	i = 3	P701PN0030M130/165/24/60	
					04				231/305
					08				292/366
					15				354/428
					22				416/490
					28				
P8	N	157	212	MH_205/___/B05/38	273/372	33/45	i = 3	P801PN0030M180/215/38/80	
					28				342/441
					50				411/510
					70				480/579
					90				

N: Normal bearing; V: Heavy duty bearing on the output shaft

Stöber Gearbox, Series P

Order Codes



Gearbox type

Planetary gear P

Gearbox size

3	3
4	4
5	5
7	7
8	8

Number of stages

1 stage	0	1
2 stages	1	2

Output shaft style

Plain shaft	G
Shaft with key (standard)	P

Output shaft bearing

Normal	N
Heavy duty	V

Transmission ratio

i = 3 (Standard gearbox)	0	0	3	0
i = 4	0	0	4	0
i = 5 (Standard gearbox)	0	0	5	0
i = 7 (Standard gearbox)	0	0	7	0
i = 10 (Standard gearbox)	0	1	0	0
i = 15	0	1	5	0
i = 20	0	2	0	0
i = 25 (Standard gearbox)	0	2	5	0
i = 35	0	3	5	0
i = 49	0	4	9	0
i = 70	0	7	0	0
i = 100	1	0	0	0

Motor mounting dimensions [mm] (see table on page 9 and 10)

Spigot - Ø (Ø D7)	
Circular hole - Ø (Ø D8)	
Shaft - Ø (Ø D6)	
Length of shaft to flange (L11)	

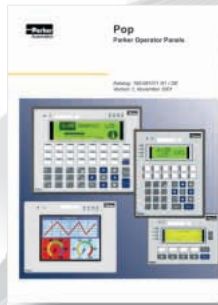
You can use the special order code in the table on page 9 and 10 for a gearbox complete with mounting flange for a standard motor.



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Screw Driven / Linear Motor Driven



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