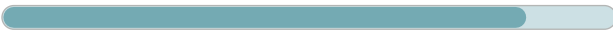


# PLE

**Unparalleled: This planetary gearbox maintains its maximum efficiency even at the highest speeds**

The **PLE** is perhaps the basis of our success. It is notably light, extremely powerful, yet suitable for complex production cycles due to its low-friction bearing design and optimized lubrication. A genuine powerhouse at an attractive, fair price.

Nominal output torque **5 - 800 Nm**



Radial force **200 - 5000 N**



Axial force **200 - 7000 N**



Torsional backlash **6 - 22 arcmin**

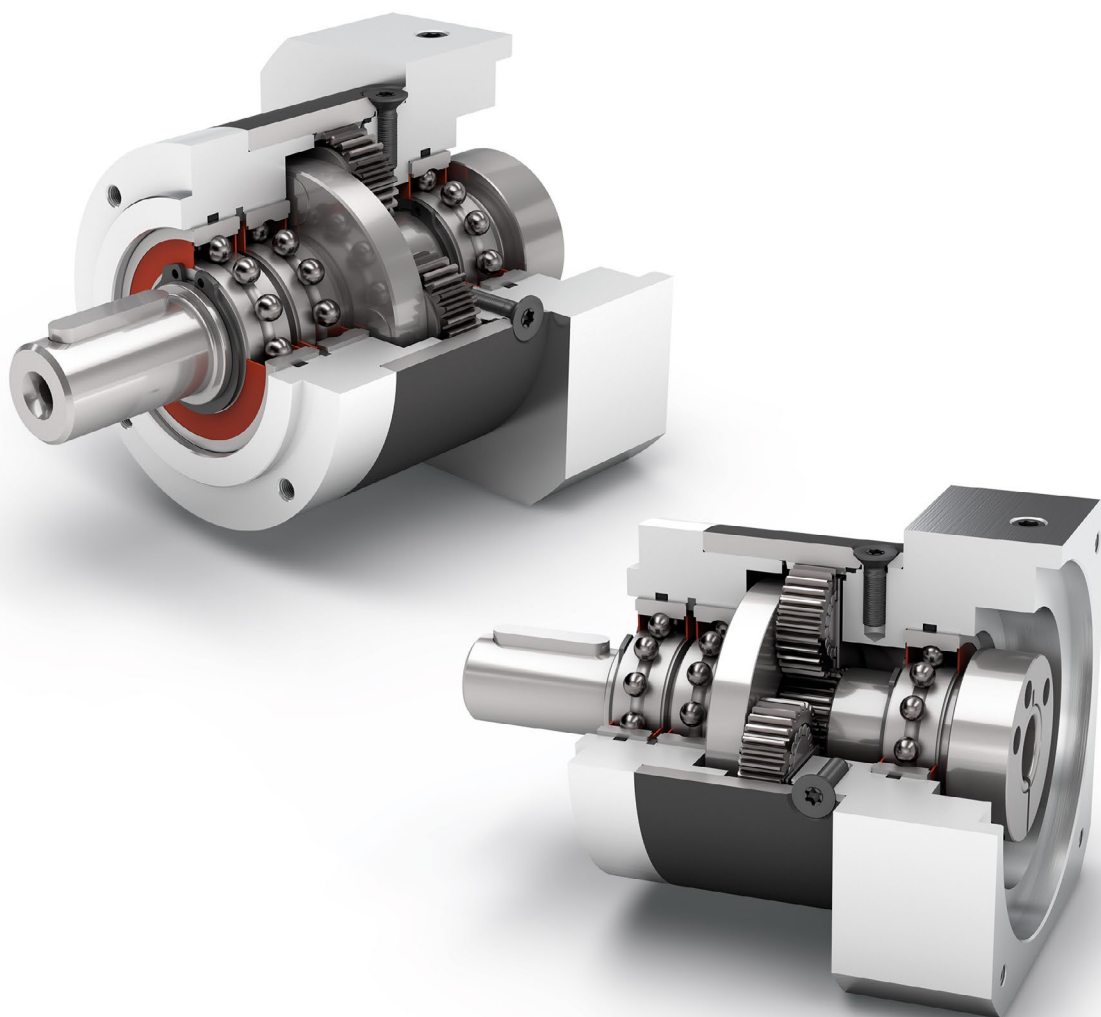


Protection class **IP54**



Frame sizes

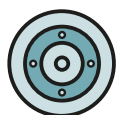
- 40
- 60
- 80
- 120
- 160



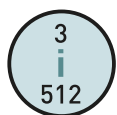
Economy Line



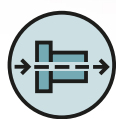
Equidirectional rotation



Round type output flange



High ratio variety  $i=3$  up to  $i=512$



Coaxial gearbox



Spur gear



Low-friction deep groove ball bearings



Planet carrier in disc design

Detailed explanations of the technical features starting on page 169.

Code	Gearbox characteristics			PLE040	PLE060	PLE080	PLE120	PLE160	p <sup>(1)</sup>
	Service life (L <sub>10h</sub> )	t <sub>L</sub>	h	30,000					
	Efficiency at full load <sup>(2)</sup>	η	%	98					1
97					2				
92					3				
	Min. operating temperature	T <sub>min</sub>	°C (°F)	-25 (-13)					
	Max. operating temperature	T <sub>max</sub>		90 (194)					
	Protection class	IP54							
<b>S</b>	Standard lubrication	Grease (lifetime lubrication)							
<b>F</b>	Food grade lubrication	Grease (lifetime lubrication)							
<b>L</b>	Low temperature lubrication <sup>(3)</sup>	Grease (lifetime lubrication)							
	Installation position	Any							
<b>S</b>	Standard backlash	j <sub>t</sub>	arcmin	< 15	< 10	< 7	< 7	< 6	1
				< 19	< 12	< 9	< 9	< 9	2
				< 22	< 15	< 11	< 11	-	3
	Torsional stiffness <sup>(2)</sup>	c <sub>g</sub>	Nm /arcmin (lb <sub>f</sub> .in/ arcmin)	0.7 - 1.0 (6 - 8)	2.1 - 2.8 (19 - 25)	7.2 - 10.0 (64 - 89)	15.5 - 21.0 (137 - 186)	57.5 - 69.0 (509 - 611)	1
				0.8 - 1.0 (7 - 9)	2.3 - 2.8 (20 - 25)	7.9 - 10.4 (70 - 92)	17.5 - 22.0 (155 - 195)	61.0 - 75.0 (540 - 664)	2
				0.8 - 1.0 (7 - 9)	2.3 - 2.8 (20 - 25)	7.9 - 10.5 (70 - 93)	17.5 - 22.0 (155 - 195)	-	3
	Gearbox weight <sup>(2)</sup>	m <sub>G</sub>	kg (lb <sub>m</sub> )	0.3 - 0.4 (0.7 - 0.8)	0.9 (1.9)	2.1 (4.6)	5.6 - 5.7 (12.3 - 12.6)	17.4 - 17.6 (38.4 - 38.8)	1
				0.4 - 0.5 (1.0 - 1.2)	1.1 (2.3)	2.6 (5.7)	7.3 - 7.5 (16.1 - 16.6)	23.5 - 23.7 (51.8 - 52.3)	2
				0.5 (1.2)	1.3 (2.8)	3.1 (6.7)	9.2 - 9.4 (20.2 - 20.6)	-	3
<b>S</b>	Standard surface	Housing: Steel – heat-treated and post-oxidized (black)							
	Running noise <sup>(4)</sup>	Q <sub>g</sub>	dB(A)	58	58	60	65	70	
	Max. bending moment based on the gearbox input flange <sup>(5)</sup>	M <sub>b</sub>	Nm (lb <sub>f</sub> .in)	3 (27)	8 (71)	16 (142)	40 (354)	140 (1239)	

Output shaft loads			PLE040	PLE060	PLE080	PLE120	PLE160	p <sup>(1)</sup>
Radial force for 20,000 h <sup>(6)(7)</sup>	F <sub>r,20.000h</sub>	N (lb <sub>f</sub> )	200 (45)	400 (90)	750 (169)	1750 (393)	5000 (1124)	
Axial force for 20,000 h <sup>(6)(7)</sup>	F <sub>a,20.000h</sub>		200 (45)	500 (112)	1000 (225)	2500 (562)	7000 (1574)	
Radial force for 30,000 h <sup>(6)(7)</sup>	F <sub>r,30.000h</sub>		160 (36)	340 (76)	650 (146)	1500 (337)	4200 (944)	
Axial force for 30,000 h <sup>(6)(7)</sup>	F <sub>a,30.000h</sub>		160 (36)	450 (101)	900 (202)	2100 (472)	6000 (1349)	
Maximum radial force <sup>(7)(8)</sup>	F <sub>r,Stat</sub>		200 (45)	700 (157)	1250 (281)	2000 (450)	5000 (1124)	
Maximum axial force <sup>(7)(8)</sup>	F <sub>a,Stat</sub>		240 (54)	800 (180)	1600 (360)	3800 (854)	11000 (2473)	
Tilting moment for 20,000 h <sup>(6)(8)</sup>	M <sub>K,20.000h</sub>	Nm (lb <sub>f</sub> .in)	5 (44)	14 (124)	31 (274)	101 (894)	474 (4195)	
Tilting moment for 30,000 h <sup>(6)(8)</sup>	M <sub>K,30.000h</sub>		4 (35)	12 (106)	27 (239)	86 (761)	398 (3523)	

Moment of inertia			PLE040	PLE060	PLE080	PLE120	PLE160	p <sup>(1)</sup>
Mass moment of inertia <sup>(2)</sup>	J	kgcm <sup>2</sup> (lb <sub>f</sub> .in.s <sup>2</sup> 10 <sup>-4</sup> )	0.014 - 0.027 (0.124 - 0.239)	0.065 - 0.128 (0.575 - 1.133)	0.359 - 0.654 (3.177 - 5.788)	1.378 - 2.361 (12.196 - 20.897)	3.726 - 11.999 (32.978 - 106.200)	1
			0.015 - 0.026 (0.133 - 0.230)	0.066 - 0.121 (0.584 - 1.071)	0.365 - 0.613 (3.231 - 5.426)	1.414 - 2.288 (12.515 - 20.251)	3.502 - 10.087 (30.995 - 89.277)	2
			0.015 - 0.025 (0.133 - 0.221)	0.066 - 0.076 (0.584 - 0.673)	0.365 - 0.590 (3.231 - 5.222)	1.413 - 2.196 (12.506 - 19.436)	-	3

<sup>(1)</sup> Number of stages

<sup>(2)</sup> The ratio-dependent values can be retrieved in Tec Data Finder – www.neugart.com

<sup>(3)</sup> T<sub>min</sub> = -40°C. Optimal operating temperature max. 50°C

<sup>(4)</sup> Sound pressure level from 1 m, measured on input running at n<sub>1</sub>=3000 rpm no load; i=5

<sup>(5)</sup> Max. motor weight\* in kg = 0.2 x M<sub>s</sub> / motor length in m  
\* with symmetrically distributed motor weight  
\* with horizontal and stationary mounting

<sup>(6)</sup> These values are based on an output shaft speed of n<sub>2</sub>=100 rpm

<sup>(7)</sup> Based on center of output shaft

<sup>(8)</sup> Other (sometimes higher) values following changes to T<sub>2n1</sub>, F<sub>r</sub>, F<sub>a</sub>, cycle, and service life of bearing. Application specific configuration with NCP – www.neugart.com

Output torques			PLE040	PLE060	PLE080	PLE120	PLE160	i <sup>(1)</sup>	p <sup>(2)</sup>
Nominal output torque <sup>(3)(4)</sup>	T <sub>2N</sub>	Nm (lb.in)	11 (97)	28 (248)	85 (752)	115 (1018)	400 (3540)	3	1
			15 (133)	38 (336)	115 (1018)	155 (1372)	450 (3983)	4	
			14 (124)	40 (354)	110 (974)	195 (1726)	450 (3983)	5	
			8,5 (75)	25 (221)	65 (575)	135 (1195)	-	7	
			6 (53)	18 (159)	50 (443)	120 (1062)	450 (3983)	8	
			5 (44)	15 (133)	38 (336)	95 (841)	-	10	
			16,5 (146)	44 (389)	130 (1151)	210 (1859)	-	9	2
			20 (177)	44 (389)	120 (1062)	260 (2301)	800 (7081)	12	
			18 (159)	44 (389)	110 (974)	230 (2036)	700 (6196)	15	
			20 (177)	44 (389)	120 (1062)	260 (2301)	800 (7081)	16	
			20 (177)	44 (389)	120 (1062)	260 (2301)	800 (7081)	20	
			18 (159)	40 (354)	110 (974)	230 (2036)	700 (6196)	25	
			20 (177)	44 (389)	120 (1062)	260 (2301)	800 (7081)	32	
			18 (159)	40 (354)	110 (974)	230 (2036)	700 (6196)	40	
			7,5 (66)	18 (159)	50 (443)	120 (1062)	450 (3983)	64	
			20 (177)	44 (389)	110 (974)	260 (2301)	-	60	
			20 (177)	44 (389)	120 (1062)	260 (2301)	-	80	
			20 (177)	44 (389)	120 (1062)	260 (2301)	-	100	
			18 (159)	44 (389)	110 (974)	230 (2036)	-	120	3
			20 (177)	44 (389)	120 (1062)	260 (2301)	-	160	
			18 (159)	40 (354)	110 (974)	230 (2036)	-	200	
			20 (177)	44 (389)	120 (1062)	260 (2301)	-	256	
			18 (159)	40 (354)	110 (974)	230 (2036)	-	320	
			7,5 (66)	18 (159)	50 (443)	120 (1062)	-	512	
Max. output torque <sup>(4)(5)</sup>	T <sub>2max</sub>	Nm (lb.in)	17,5 (155)	45 (398)	136 (1204)	184 (1629)	640 (5664)	3	1
			24 (212)	61 (540)	184 (1629)	248 (2195)	720 (6373)	4	
			22 (195)	64 (566)	176 (1558)	312 (2761)	720 (6373)	5	
			13,5 (119)	40 (354)	104 (920)	216 (1912)	-	7	
			10 (89)	29 (257)	80 (708)	192 (1699)	720 (6373)	8	
			8 (71)	24 (212)	61 (540)	152 (1345)	-	10	
			26 (230)	70 (620)	208 (1841)	336 (2974)	-	9	2
			32 (283)	70 (620)	192 (1699)	416 (3682)	1280 (11329)	12	
			29 (257)	70 (620)	176 (1558)	368 (3257)	1120 (9913)	15	
			32 (283)	70 (620)	192 (1699)	416 (3682)	1280 (11329)	16	
			32 (283)	70 (620)	192 (1699)	416 (3682)	1280 (11329)	20	
			29 (257)	64 (566)	176 (1558)	368 (3257)	1120 (9913)	25	
			32 (283)	70 (620)	192 (1699)	416 (3682)	1280 (11329)	32	
			29 (257)	64 (566)	176 (1558)	368 (3257)	1120 (9913)	40	
			12 (106)	29 (257)	80 (708)	192 (1699)	720 (6373)	64	
			32 (283)	70 (620)	176 (1558)	416 (3682)	-	60	
			32 (283)	70 (620)	192 (1699)	416 (3682)	-	80	
			32 (283)	70 (620)	192 (1699)	416 (3682)	-	100	
			29 (257)	70 (620)	176 (1558)	368 (3257)	-	120	
			32 (283)	70 (620)	192 (1699)	416 (3682)	-	160	
			29 (257)	64 (566)	176 (1558)	368 (3257)	-	200	
			32 (283)	70 (620)	192 (1699)	416 (3682)	-	256	
			29 (257)	64 (566)	176 (1558)	368 (3257)	-	320	
			12 (106)	29 (257)	80 (708)	192 (1699)	-	512	

<sup>(1)</sup> Ratios (i=n<sub>1</sub>/n<sub>2</sub>)

<sup>(2)</sup> Number of stages

<sup>(3)</sup> Application specific configuration with NCP – www.neugart.com

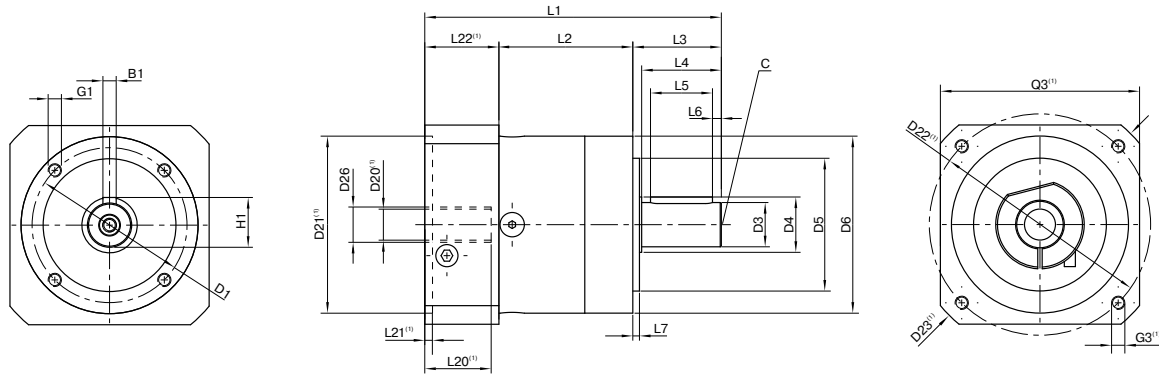
<sup>(4)</sup> Values for feather key (code "A"): for repeated load

<sup>(5)</sup> 30,000 rotations of the output shaft permitted; see page 158

Output torques			PLE040	PLE060	PLE080	PLE120	PLE160	$i^{(1)}$	$p^{(2)}$
Emergency stop torque <sup>(3)</sup>	$T_{2Stop}$	Nm (lb <sub>r</sub> .in)	22,5 (199)	66 (584)	180 (1593)	390 (3452)	800 (7081)	3	1
			30 (266)	88 (779)	240 (2124)	520 (4602)	900 (7966)	4	
			36 (319)	80 (708)	220 (1947)	500 (4425)	900 (7966)	5	
			26 (230)	80 (708)	178 (1575)	340 (3009)	-	7	
			27 (239)	80 (708)	190 (1682)	380 (3363)	900 (7966)	8	
			27 (239)	80 (708)	200 (1770)	480 (4248)	-	10	
			33 (292)	88 (779)	260 (2301)	500 (4425)	-	9	2
			40 (354)	88 (779)	240 (2124)	520 (4602)	1600 (14161)	12	
			36 (319)	88 (779)	220 (1947)	500 (4425)	1400 (12391)	15	
			40 (354)	88 (779)	240 (2124)	520 (4602)	1600 (14161)	16	
			40 (354)	88 (779)	240 (2124)	520 (4602)	1600 (14161)	20	
			36 (319)	80 (708)	220 (1947)	500 (4425)	1400 (12391)	25	
			40 (354)	88 (779)	240 (2124)	520 (4602)	1600 (14161)	32	
			36 (319)	80 (708)	220 (1947)	500 (4425)	1400 (12391)	40	
			27 (239)	80 (708)	190 (1682)	380 (3363)	900 (7966)	64	
			40 (354)	88 (779)	220 (1947)	520 (4602)	-	60	
			40 (354)	88 (779)	240 (2124)	520 (4602)	-	80	3
			40 (354)	88 (779)	240 (2124)	520 (4602)	-	100	
			36 (319)	88 (779)	220 (1947)	500 (4425)	-	120	
			40 (354)	88 (779)	240 (2124)	520 (4602)	-	160	
36 (319)	80 (708)	220 (1947)	500 (4425)	-	200				
40 (354)	88 (779)	240 (2124)	520 (4602)	-	256				
36 (319)	80 (708)	220 (1947)	500 (4425)	-	320				
27 (239)	80 (708)	190 (1682)	380 (3363)	-	512				

Input speeds			PLE040	PLE060	PLE080	PLE120	PLE160	$i^{(1)}$	$p^{(2)}$
Average thermal input speed at $T_{2N}$ and $S1^{(4)(5)}$	$n_{1N}$	rpm	5000	4500	4000 <sup>(6)</sup>	3400 <sup>(6)</sup>	1350 <sup>(6)</sup>	3	1
			5000	4500	3900 <sup>(6)</sup>	3500 <sup>(6)</sup>	1450 <sup>(6)</sup>	4	
			5000	4500	4000 <sup>(6)</sup>	3500 <sup>(6)</sup>	1700 <sup>(6)</sup>	5	
			5000	4500	4000	3500	-	7	
			5000	4500	4000	3500	2200 <sup>(6)</sup>	8	
			5000	4500	4000	3500	-	10	2
			5000	4500	4000 <sup>(6)</sup>	3500 <sup>(6)</sup>	-	9	
			5000	4500	4000 <sup>(6)</sup>	3500 <sup>(6)</sup>	1600 <sup>(6)</sup>	12	
			5000	4500	4000	3500 <sup>(6)</sup>	1900 <sup>(6)</sup>	15	
			5000	4500	4000	3500 <sup>(6)</sup>	1800 <sup>(6)</sup>	16	
			5000	4500	4000	3500	2100 <sup>(6)</sup>	20	
			5000	4500	4000	3500	2400 <sup>(6)</sup>	25	
			5000	4500	4000	3500	2700 <sup>(6)</sup>	32	
			5000	4500	4000	3500	3000 <sup>(6)</sup>	40	
			5000	4500	4000	3500	3000	64	
			5000	4500	4000	3500	-	60	
			5000	4500	4000	3500	-	80	
			5000	4500	4000	3500	-	100	
			5000	4500	4000	3500	-	120	
			5000	4500	4000	3500	-	160	
5000	4500	4000	3500	-	200				
5000	4500	4000	3500	-	256				
5000	4500	4000	3500	-	320				
5000	4500	4000	3500	-	512				
Max. mechanical input speed <sup>(4)</sup>	$n_{1Limit}$	rpm	18000	13000	7000	6500	6500		

(1) Ratios ( $i=n_1/n_2$ )  
 (2) Number of stages  
 (3) Permitted 1000 times  
 (4) Application-specific speed configurations with NCP – www.neugart.com  
 (5) See page 158 for the definition  
 (6) Average thermal input speed at 50%  $T_{2N}$  and  $S1$



Drawing corresponds to a PLE060 / 1-stage / output shaft with feather key / 11 mm clamping system / motor adaptation – one part / B5 flange type motor

<sup>(1)</sup> The dimensions vary with the motor/gearbox flange. The input flange dimensions can be retrieved for each specific motor in Tec Data Finder at [www.neugart.com](http://www.neugart.com)

Geometry <sup>(2)</sup>			PLE040	PLE060	PLE080	PLE120	PLE160	p <sup>(3)</sup>	Code
Pitch circle diameter output	D1		34 (1.339)	52 (2.047)	70 (2.756)	100 (3.937)	145 (5.709)		
Shaft diameter output	D3	h7	10 (0.394)	14 (0.551)	20 (0.787)	25 (0.984)	40 (1.575)		
Shaft collar output	D4		12 (0.472)	17 (0.669)	25 (0.984)	35 (1.378)	55 (2.165)		
Centering diameter output	D5	h7	26 (1.024)	40 (1.575)	60 (2.362)	80 (3.150)	130 (5.118)		
Housing diameter	D6		40 (1.575)	60 (2.362)	80 (3.150)	115 (4.528)	160 (6.299)		
Mounting thread x depth	G1	4x	M4x6	M5x8	M6x10	M10x16	M12x20		
Min. total length	L1		88.5 (3.484)	106 (4.173)	133.5 (5.256)	176.5 (6.949)	255.5 (10.059)	1	
			106.5 (4.193)	118.5 (4.665)	150.5 (5.925)	204 (8.032)	305 (12.008)	2	
			114 (4.488)	131 (5.157)	168 (6.614)	231.5 (9.114)	-	3	
Housing length	L2		39 (1.535)	47 (1.850)	60 (2.362)	74 (2.913)	104 (4.094)	1	
			51,5 (2.028)	59.5 (2.343)	78 (3.071)	102 (4.016)	153.5 (6.043)	2	
			64.5 (2.539)	72 (2.835)	95,5 (3.760)	129,5 (5.098)	-	3	
Shaft length output	L3		26 (1.024)	35 (1.378)	40 (1.575)	55 (2.165)	87 (3.425)		
Centering depth output	L7		2 (0.079)	3 (0.118)	3 (0.118)	4 (0.157)	5 (0.197)		
Motor shaft diameter j6/k6	D20		More information on page 155/156						
Clamping system diameter input	D26		More information on page 155/156						
Output shaft with feather key (DIN 6885-1)			A 3x3x18	A 5x5x25	A 6x6x28	A 8x7x40	A 12x8x65		A
Feather key width (DIN 6885-1)	B1		3 (0.118)	5 (0.197)	6 (0.236)	8 (0.315)	12 (0.472)		
Shaft height including feather key (DIN 6885-1)	H1		11.2 (0.441)	16 (0.630)	22.5 (0.886)	28 (1.102)	43 (1.693)		
Shaft length from shoulder	L4		23 (0.906)	30 (1.181)	36 (1.417)	50 (1.969)	80 (3.150)		
Feather key length	L5		18 (0.709)	25 (0.984)	28 (1.102)	40 (1.575)	65 (2.559)		
Distance from shaft end	L6		2.5 (0.098)	2.5 (0.098)	4 (0.157)	5 (0.197)	8 (0.315)		
Center hole (DIN 332. type DR)	C		M3x9	M5x12.5	M6x16	M10x22	M16x36		
Smooth output shaft									B
Shaft length from shoulder	L4		23 (0.906)	30 (1.181)	36 (1.417)	50 (1.969)	80 (3.150)		

<sup>(2)</sup> Dimensions in mm

<sup>(3)</sup> Number of stages