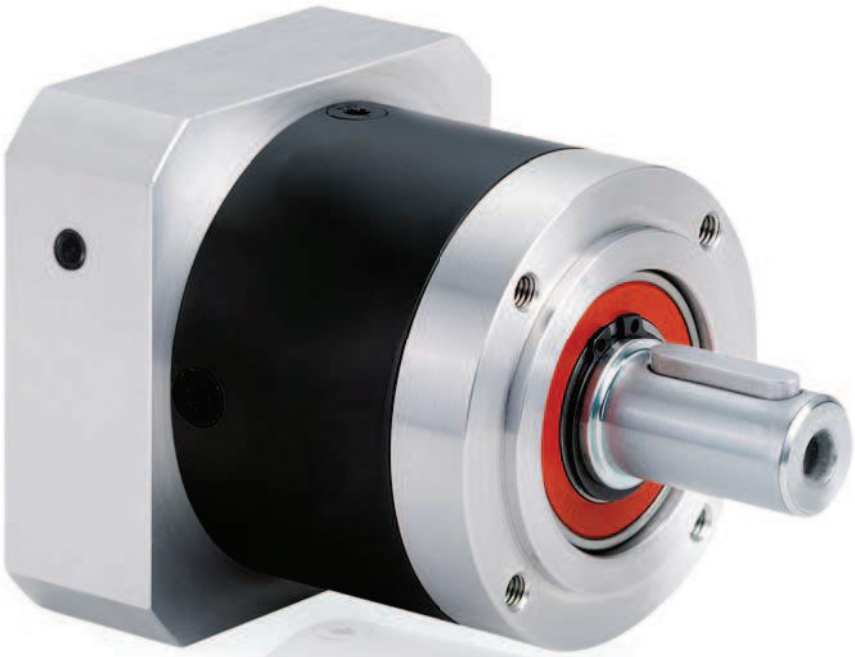
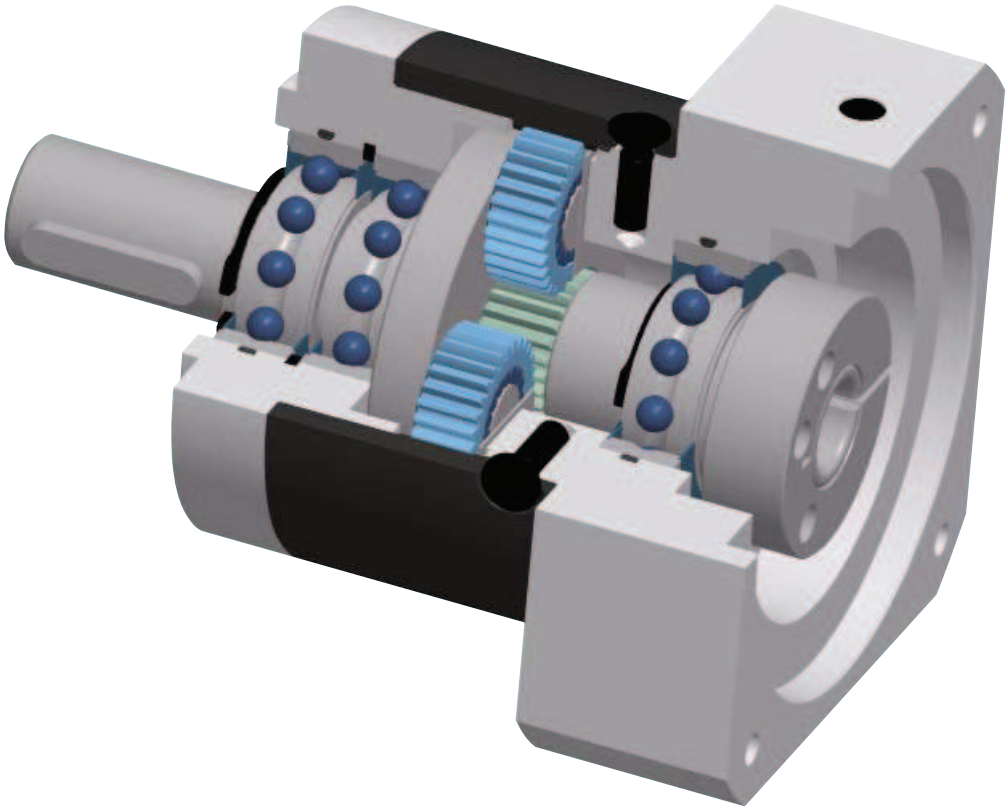


The base of the economy gearbox with round output flange

The PLE is the perfect economy alternative to our precision lines. We have specifically designed this planetary gearbox for all applications in which a particularly low backlash is not necessarily the main focus.

- Low backlash
- High output torque – the industry's highest torque density
- Balanced motor pinion
- High efficiency
- 24 ratios 3:1 to 512:1
- Low noise
- Consistent quality (ISO 9001 and 14001)
- Operable in any mounting position
- Lifetime lubrication
- Numerous options

PLE Economy Line



PLE Technical data

Gearbox characteristics				PLE040	PLE060	PLE080	PLE120	PLE160	Z(2)
Service life		t_L	h	30,000					
Efficiency at full load(3)		η	%	97					1
				95					2
				91					3
Min. operating temperature		T_{min}	°C	-25					
Max. operating temperature		T_{max}		90					
Protection class				IP 54					
Code	S	Standard lubrication		Grease – Klüberplex BEM 34-132					
OP 16	F	Food grade lubrication		Grease – Klübersynth UH1 14-222					
OP 17	L	Low temperature lubrication(8)		Grease – Klüber ISOFLEX TOPAS L 32 N					
Installation position				Any					
Code	S	Standard backlash	arcmin	< 15	< 10	< 7	< 7	< 6	1
				< 19	< 12	< 9	< 9	< 10	2
				< 22	< 15	< 11	< 11	-	3
Torsional stiffness(3)		c_g	Nm / arcmin	0.7 - 1	1.7 - 2.3	4.3 - 5.8	10.8 - 14.5	31 - 37.5	1
				0.8 - 1	1.9 - 2.3	4.7 - 5.7	11.7 - 14.5	30.5 - 37.5	2
				0.8 - 1	1.8 - 2.3	4.5 - 5.8	11.2 - 14.5	-	3
Gearbox weight		m_G	kg	0.35	0,9	2.1	6	18	1
				0.45	1.1	2.6	8	22	2
				0.55	1.3	3.1	10	-	3
Code	S	Standard housing surface		Citrox – Black					
Running noise(7)		Q_g	dB(A)	58	58	60	65	70	
Max. bending moment based on the gearbox input flange(1)		M_b	Nm	3	8	16	40	140	
Motor flange precision				DIN 42955-N					

Output shaft loads			PLE040	PLE060	PLE080	PLE120	PLE160	Z(2)
Radial force for 20,000 h(4)(5)	$F_{r\ 20,000\ h}$	N	200	400	750	1750	5000	
Axial force for 20,000 h(4)(5)	$F_{a\ 20,000\ h}$		200	500	1000	2500	7000	
Radial force for 30,000 h(4)(5)	$F_{r\ 30,000\ h}$		160	340	650	1500	4200	
Axial force for 30,000 h(4)(5)	$F_{a\ 30,000\ h}$		160	450	900	2100	6000	
Static radial force(5)(6)	$F_{r\ Stat}$		200	700	1250	2000	5000	
Static axial force(5)(6)	$F_{a\ Stat}$		240	800	1600	3800	11000	

Moment of inertia			PLE040	PLE060	PLE080	PLE120	PLE160	Z(2)
Mass moment of inertia(3)	J	kgcm²	0.014 - 0.027	0.065 - 0.128	0.359 - 0.654	1.378 - 2.361	3.726 - 11.999	1
			0.015 - 0.026	0.066 - 0.121	0.366 - 0.613	1.414 - 2.288	3.502 - 10.087	2
			0.015 - 0.025	0.066 - 0.076	0.366 - 0.584	1.413 - 2.196	-	3

(1) Max. motor weight* in kg = $\frac{0.2 \times M_b}{\text{Motor length in m}}$

* with symmetrically distributed motor weight
* with horizontal and stationary mounting

(2) Number of stages

(3) The ratio-dependent values can be retrieved in the Tec Data Finder – www.neugart.com

(4) These values are based on an output shaft speed of n_2=100 rpm

(5) Based on center of output shaft

(6) Other (sometimes higher) values following changes to T_{2N}, F_r, F_a, cycle, and service life of bearing.
Application specific configuration with NCP – www.neugart.com

(7) Sound pressure level from 1 m, measured on input running at n_1=3000 rpm no load; i=5

(8) Optimal operating temperature max. 50°C

PLE Technical data

Output torques			PLE040	PLE060	PLE080	PLE120	PLE160	i(1)	Z(2)
Nominal output torque(3)(4)	T_{2N}	Nm	11	28	85	115	400	3	1
			15	38	115	155	450	4	
			14	40	110	195	450	5	
			8.5	25	65	135	-	7	
			6	18	50	120	450	8	
			5	15	38	95	-	10	
			16.5	44	130	210	-	9	2
			20	44	120	260	800	12	
			18	44	110	230	700	15	
			20	44	120	260	800	16	
			20	44	120	260	800	20	
			18	40	110	230	700	25	
			20	44	120	260	800	32	
			18	40	110	230	700	40	
			7.5	18	50	120	450	64	
			20	44	110	260	-	60	3
			20	44	120	260	-	80	
			20	44	120	260	-	100	
			18	44	110	230	-	120	
			20	44	120	260	-	160	
			18	40	110	230	-	200	
			20	44	120	260	-	256	
			18	40	110	230	-	320	
			7.5	18	50	120	-	512	
Max. output torque(4)(5)	T_{2max}	Nm	17.5	45	136	184	640	3	1
			24	61	184	248	720	4	
			22	64	176	312	720	5	
			13.5	40	104	216	-	7	
			10	29	80	192	720	8	
			8	24	61	152	-	10	
			26	70	208	336	-	9	2
			32	70	192	416	1280	12	
			29	70	176	368	1120	15	
			32	70	192	416	1280	16	
			32	70	192	416	1280	20	
			29	64	176	368	1120	25	
			32	70	192	416	1280	32	
			29	64	176	368	1120	40	
			12	29	80	192	720	64	
			32	70	176	416	-	60	3
			32	70	192	416	-	80	
			32	70	192	416	-	100	
			29	70	176	368	-	120	
			32	70	192	416	-	160	
			29	64	176	368	-	200	
			32	70	192	416	-	256	
			29	64	176	368	-	320	
			12	29	80	192	-	512	

(1) Ratios ($i=n_1/n_2$)
(2) Number of stages
(3) For n_{1N}
(4) Values for feather key (code "A"): for repeated load
(5) 30,000 rotations of the output shaft permitted;
see page 109

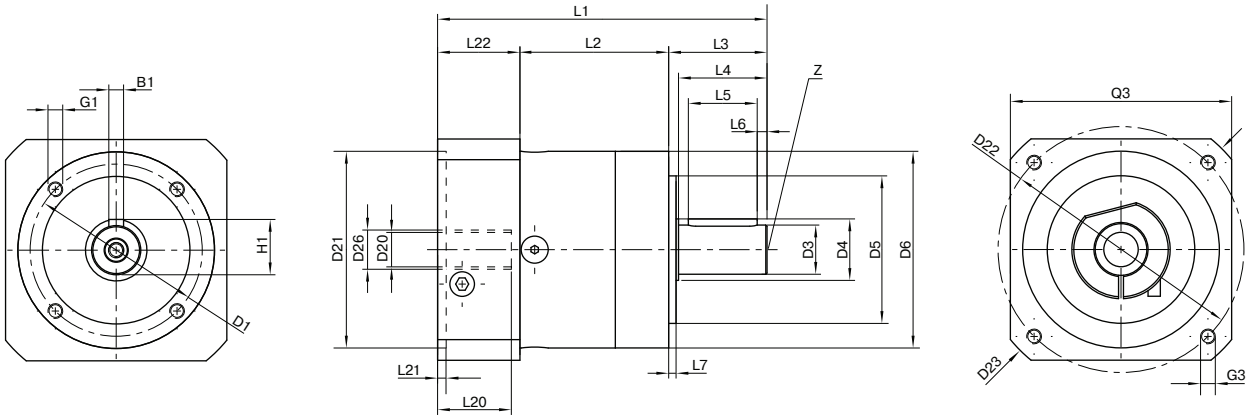
PLE Technical data

Output torques			PLE040	PLE060	PLE080	PLE120	PLE160	i[1]	Z[2]
Emergency stop torque[3]	T_{2Stop}	Nm	22.5	66	180	390	800	3	1
			30	88	240	520	900	4	
			36	80	220	500	900	5	
			26	80	178	340	-	7	
			27	80	190	380	900	8	
			27	80	200	480	-	10	
			33	88	260	500	-	9	2
			40	88	240	520	1600	12	
			36	88	220	500	1400	15	
			40	88	240	520	1600	16	
			40	88	240	520	1600	20	
			36	80	220	500	1400	25	
			40	88	240	520	1600	32	
			36	80	220	500	1400	40	
			27	80	190	380	900	64	
			40	88	220	520	-	60	3
			40	88	240	520	-	80	
			40	88	240	520	-	100	
			36	88	220	500	-	120	
			40	88	240	520	-	160	
			36	80	220	500	-	200	
			40	88	240	520	-	256	
			36	80	220	500	-	320	
			27	80	190	380	-	512	

Input speeds			PLE040	PLE060	PLE080	PLE120	PLE160	i[1]	Z[2]
Average thermal input speed at T_{2N} and S1[4][5]	n_{1N}	min^{-1}	5000	4500	4000[6]	3400[6]	1350[6]	3	1
			5000	4500	3900[6]	3500[6]	1450[6]	4	
			5000	4500	4000[6]	3500[6]	1700[6]	5	
			5000	4500	4000	3500	-	7	
			5000	4500	4000	3500	2200[6]	8	
			5000	4500	4000	3500	-	10	
			5000	4500	4000[6]	3500[6]	-	9	2
			5000	4500	4000[6]	3500[6]	1600[6]	12	
			5000	4500	4000	3500[6]	1900[6]	15	
			5000	4500	4000	3500[6]	1800[6]	16	
			5000	4500	4000	3500	2100[6]	20	
			5000	4500	4000	3500	2400[6]	25	
			5000	4500	4000	3500	2700[6]	32	
			5000	4500	4000	3500	3000[6]	40	
			5000	4500	4000	3500	3000	64	
			5000	4500	4000	3500	-	60	3
			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[4]	n_{1Limit}	min^{-1}	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 109 for the definition
(6) Average thermal input speed at 50% T_{2N} and S1

PLE Dimensions



Drawing corresponds to a PLE060 / 1-stage / output shaft with feather key / 11 mm clamping system / motor adaptation – one part / B5 flange type motor
All other variants can be retrieved in the Tec Data Finder at www.neugart.com

Geometry*			PLE040	PLE060	PLE080	PLE120	PLE160	Z(1)
Pitch circle diameter output	D1		34	52	70	100	145	
Shaft diameter output	D3	h7	10	14	20	25	40	
Shaft collar output	D4		12	17	25	35	55	
Centering diameter output	D5	h7	26	40	60	80	130	
Housing diameter	D6		40	60	80	115	160	
mounting thread x depth	G1	4x	M4x6	M5x8	M6x10	M10x16	M12x20	
Housing length	L2		39	47	60	74	104	1
			52	59.5	77.5	101.5	153.5	2
			64.5	72	95	129	-	3
Shaft length output	L3		26	35	40	55	87	
Centering depth output	L7		2	3	3	4	5	
Clamping system diameter input	D26		More information on page 99					
Total length	L1		The dimensions vary with the motor/gearbox flange. The input flange geometries can be retrieved for each specific motor in the Tec Data Finder at www.neugart.com					
Motor shaft diameter j6/k6	D20							
Max. permissible motor shaft length	L20							
Min. permissible motor shaft length								
Centering diameter input	D21							
Centering depth input	L21							
Pitch circle diameter input	D22							
Motor flange length	L22							
Diagonal dimension input	D23							
Mounting thread x depth	G3	4x						
Flange cross section input	Q3	□						
Output shaft with feather key (DIN 6885 T1)			A 3 x 3 x 18	A 5 x 5 x 25	A 6 x 6 x 28	A 8 x 7 x 40	A 12 x 8 x 65	
Feather key width (DIN 6885 T1)	B1		3	5	6	8	12	
Shaft height including feather key (DIN 6885 T1)	H1		11.2	16	22.5	28	43	
Shaft length from shoulder	L4		23	30	36	50	80	
Feather key length	L5		18	25	28	40	65	
Distance from shaft end	L6		2.5	2.5	4	5	8	
Center hole (DIN 332, type DR)	Z		M3 x 9	M5 x 12.5	M6 x 16	M10 x 22	M16 x 36	
Smooth output shaft								
Shaft length from shoulder	L4		23	30	36	50	80	

A Code OP 7

B Code OP 6

(1) Number of stages

* Dimensions in mm

Product code

PLE 060 - 008 - S S S B

Series

	**PLE**	**PLE Economy planetary gearbox**
	**PLQE**	**PLQE Economy planetary gearbox** Formerly **PLE□**
	**PLPE**	**PLPE Economy planetary gearbox**
	**PLHE**	**PLHE Economy planetary gearbox**
	**PLFE**	**PLFE Economy planetary gearbox**
	**WPLE**	**WPLE Economy planetary gearbox**
	**WPLQE**	**WPLQE Economy planetary gearbox** Formerly **WPLE□**
	**WPLPE**	**WPLPE Economy planetary gearbox**
	**PSN**	**PSN Precision planetary gearbox**
	**PLN**	**PLN Precision planetary gearbox**
	**PSFN**	**PSFN Precision planetary gearbox**
	**PLFN**	**PLFN Precision planetary gearbox**
	**WPLN**	**WPLN Precision hypoid (planetary) gearbox**
	**WGN**	**WGN Precision hypoid gearbox**

Over the course of the years 2015/2016, Neugart will be introducing a new product code. It will supersede the option values (OP) used previously. In the transitional phase, the catalog will list both the product code and the OP value. The step by step conversion will be announced separately for each of the series.

Our tried and tested Tec Data Finder has been optimized for intuitive use and now generates the CAD data and dimension sheets for you. It also automatically forms the corresponding product code.

Details can be found at: www.neugart.com

Frame size

			PLE	PLQE	PLPE	PLHE	PLFE	WPLE	WPLQE	WPLPE	PSN	PLN	PSFN	PLFN	WPLN	WGN
040	**Frame size**	40	•					•								
050	**Frame size**	50			•					•						
060	**Frame size**	60	•	•		•		•	•							
064	**Frame size**	64					•						•	•		
070	**Frame size**	70			•					•	•	•			•	•
080	**Frame size**	80	•	•		•		•	•							
090	**Frame size**	90			•		•			•	•	•	•	•	•	•
110	**Frame size**	110					•						•	•		
115	**Frame size**	115									•	•			•	•
120	**Frame size**	120	•	•	•	•		•	•	•						
140	**Frame size**	140											•	•		
142	**Frame size**	142									•	•			•	•
155	**Frame size**	155			•											
160	**Frame size**	160	•													
190	**Frame size**	190									•	•				
200	**Frame size**	200											•	•		

Separator

-

Ratio

			PLE	PLQE	PLPE	PLHE	PLFE	WPLE	WPLQE	WPLPE	PSN	PLN	PSFN	PLFN	WPLN	WGN	Z[3]
003	**Ratio**	i = 3	•[1]	•	•[1]	•	•	•	•	•	•	•					1
004	**Ratio**	i = 4	•	•	•	•	•	•	•	•	•	•	•	•	•	•	
005	**Ratio**	i = 5	•	•	•	•	•	•	•	•	•	•	•	•	•	•	
007	**Ratio**	i = 7	•[1]	•	•[1]	•	•	•	•	•	•	•	•	•			
008	**Ratio**	i = 8	•	•	•[1]	•	•	•	•	•		•		•	•	•	
010	**Ratio**	i = 10	•[1]	•	•	•	•	•	•	•	•	•	•	•	•	•	
009	**Ratio**	i = 9	•[1]	•	•[1]	•	•	•	•	•							2
012	**Ratio**	i = 12	•	•	•[1]	•	•	•	•	•	•	•					
015	**Ratio**	i = 15	•	•	•[1]	•	•	•	•	•	•	•					
016	**Ratio**	i = 16	•	•	•	•	•	•	•	•	•	•	•	•	•		
020	**Ratio**	i = 20	•	•	•	•	•	•	•	•	•	•	•	•	•		
025	**Ratio**	i = 25	•	•	•	•	•	•	•	•	•	•	•	•	•		
032	**Ratio**	i = 32	•	•	•[1]	•	•	•	•	•		•		•	•		
035	**Ratio**	i = 35									•		•				
040	**Ratio**	i = 40	•	•	•	•	•	•	•	•	•	•	•	•	•		
050	**Ratio**	i = 50			•[2]						•		•	•	•		
064	**Ratio**	i = 64	•	•	•[1]	•	•	•	•	•		•		•	•		
070	**Ratio**	i = 70									•		•				
060	**Ratio**	i = 60	•[1]	•				•	•								3
080	**Ratio**	i = 80	•[1]	•				•	•								
100	**Ratio**	i = 100	•[1]	•	•	•	•	•	•	•	•	•	•	•	•		
120	**Ratio**	i = 120	•[1]	•				•	•								
160	**Ratio**	i = 160	•[1]	•				•	•								
200	**Ratio**	i = 200	•[1]	•				•	•								
256	**Ratio**	i = 256	•[1]	•				•	•								
320	**Ratio**	i = 320	•[1]	•				•	•								
512	**Ratio**	i = 512	•[1]	•				•	•								

[1] Not for frame size 155 or 160

[2] Not for frame sizes 50, 70, 90, 120

[3] Number of stages

3 A C - E9 / 20 / 40 / 63 / B5 / M5

See next page

Separator

-

Clamping system diameter input

Frame size

PLE	PLQE	PLPE	PLHE	PLFE	WPLE	WPLQE	WPLPE	PSN	PLN	PSFN	PLFN	WPLN	WGN	Z [3]		
40		50			40		50							1/2/3	8 mm	Clamping system diameter A
40		50			40		50							1/2/3	9 mm	Clamping system diameter B
40 60	60	50 70	60	64	60	60	70	70		64				1	11 mm	Clamping system diameter C
								70 90		64 90				2/3		
60	60	70	60	64	60	60	70	70 90	70	64 90	64	70	70	1	14 mm	Clamping system diameter D
								70 90 115		64 90 110	64 90	70 90		2/3		
60 80	60 80	70 90	60 80	64 90	80	80	90	70 90 115	70 90	64 90 110	64 90	70 90	70 90	1	19 mm	Clamping system diameter E
								70 90 115 142		64 90 110 140	64 90 110	70 90 115		2/3		
80 120	80 120	90 120	80 120	90 110	120	120	120	90 115	90 115	90 110	90 110	90 115	90 115	1	24 mm	Clamping system diameter F
								115 142		110 140	110 140	115 142		2/3		
120 160	120	120 155	120	110				115 142	115 142	110 140	110 140	115 142	115 142	1	35 mm	Clamping system diameter G
								142 190		140 200	140 200	142		2/3		
		155						142	142	140	140	142	142	1	42 mm	Clamping system diameter H
								190		200	200			2		
								190	190	200	200			1	48 mm	Clamping system diameter K
														2		
•	•	•	•	•												No clamping system N

Input system

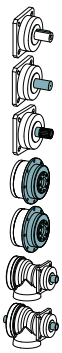
PLE	PLQE	PLPE	PLHE	PLFE	WPLE	WPLQE	WPLPE	PSN	PLN	PSFN	PLFN	WPLN	WGN		
•	•	•	•	•	•	•	•	•	•	•	•	•	•		Standard input system A
												•	•	OP 25	Input system with metal bellow-type coupling F

Output flange design

PLE	PLQE	PLPE	PLHE	PLFE	WPLE	WPLQE	WPLPE	PSN	PLN	PSFN	PLFN	WPLN	WGN		
•	•	•	•	•	•	•	•	•	•	•	•	•	•		Standard output flange 3
									•			•		OP 14	Output flange (W)PLS-compatible 4

Output shaft design

PLE	PLQE	PLPE	PLHE	PLFE	WPLE	WPLQE	WPLPE	PSN	PLN	PSFN	PLFN	WPLN	WGN		
•	•	•	•		•	•	•	•	•			•		OP 7	Output shaft with feather key (DIN 6885 T1) A
•	•	•	•		•	•	•	•	•			•		OP 6	Smooth output shaft B
								•	• [A)]					OP 26	Toothed output shaft (DIN 5480) C
										•	•				Flange output shaft D
				•						•	•			OP 27	Flange output shaft with dowel hole E
													•	OP 24	Hollow output shaft on one side F
													•		Hollow output shaft on both sides G



[A)] Possible only for “output flange design – code 3”

Surface

PLE	PLQE	PLPE	PLHE	PLFE	WPLE	WPLQE	WPLPE	PSN	PLN	PSFN	PLFN	WPLN	WGN	
•	•	•	•	•	•	•	•	•	•	•	•	•	•	Standard surface S

Lubrication

PLE	PLQE	PLPE	PLHE	PLFE	WPLE	WPLQE	WPLPE	PSN	PLN	PSFN	PLFN	WPLN	WGN		
•	•	•	•	•	•	•	•	•	•	•	•	•	•		Standard lubrication S
•	•	•	•	•	•	•	•	•	•	•	•	•	•	OP 16	Food grade lubrication F
•	•	•	•	•	•	•	•	•	•	•	•			OP 17	Low temperature lubrication L

Torsional backlash

PLE	PLQE	PLPE	PLHE	PLFE	WPLE	WPLQE	WPLPE	PSN	PLN	PSFN	PLFN	WPLN	WGN		
•	•	•	•	•	•	•	•	•	•	•	•	•	•		Standard backlash S
								•	•	•	•			OP 18	Reduced backlash R

Separator

-

Product code

PLE060-008-SSSB3AC- **E** **9** / **20** / **40** / **63** / **B5** / **M5**

See previous page

Input design

		PLE	PLQE	PLPE	PLHE	PLFE	WPLE	WPLQE	WPLPE	PSN	PLN	PSFN	PLFN	WPLN	WGN	
 **Z**	**Motor adaptation – 2-part – round universal flange**	•	•	•	•	•				•	•	•	•	•	•	
 **Y**	**Motor adaptation – 2-part – square universal flange**	•	•	•	•	•	•	•	•		•		•	•	•	
 **E**	**Motor adaptation – one part**	•	•	•	•	•										
 **R**	**No motor adaptation – round universal flange**[2]	•	•	•	•	•					•		•	•	•	OP 29
 **T**	**No motor adaptation – square universal flange**[2]	•	•	•	•	•	•	•			•		•	•	•	OP 30
 **W**	**No motor adaptation – input shaft**[1]	•	•													OP 1

See page 101 for the definition

[1] The product code ends after this option

[2] The product code ends after "motor shaft diameter" has been entered

Motor shaft diameter

			For "clamping system diameter"							
			8	9	11	14	19	24	35	42	48
4	4 mm	**Motor shaft diameter**	•								
5	5 mm	**Motor shaft diameter**	•		•						
6	6 mm	**Motor shaft diameter**	•		•						
6.35	6,35 mm	**Motor shaft diameter**	•		•	•					
7	7 mm	**Motor shaft diameter**		•	•						
8	8 mm	**Motor shaft diameter**	•		•	•	•				
9	9 mm	**Motor shaft diameter**		•	•	•	•				
9.5	9,5 mm	**Motor shaft diameter**			•	•	•				
9.525	9,525 mm	**Motor shaft diameter**			•	•	•				
10	10 mm	**Motor shaft diameter**				•	•				
11	11 mm	**Motor shaft diameter**			•	•	•	•			
12	12 mm	**Motor shaft diameter**				•	•	•			
12.7	12,7 mm	**Motor shaft diameter**				•	•	•			
14	14 mm	**Motor shaft diameter**				•	•	•			
15.875	15,875 mm	**Motor shaft diameter**					•	•			
16	16 mm	**Motor shaft diameter**					•	•			
19	19 mm	**Motor shaft diameter**					•	•	•		
19.05	19,05 mm	**Motor shaft diameter**						•			
20	20 mm	**Motor shaft diameter**						•			
22	22 mm	**Motor shaft diameter**						•	•		
24	24 mm	**Motor shaft diameter**						•	•		•
28	28 mm	**Motor shaft diameter**							•		•
32	32 mm	**Motor shaft diameter**							•		•
35	35 mm	**Motor shaft diameter**							•		•
38	38 mm	**Motor shaft diameter**								•	•
42	42 mm	**Motor shaft diameter**								•	•
48	48 mm	**Motor shaft diameter**									•

Max. motor shaft length [mm]

	Max. permissible motor shaft length	**Free text – length without decimal places**

Centering diameter [mm]

	Centering diameter	**Free text – length to two decimal places**

Pitch circle diameter [mm]

	Pitch circle diameter	**Free text – length to one decimal place**

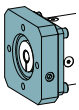
Flange type motor

		PLE	PLQE	PLPE	PLHE	PLFE	WPLE	WPLQE	WPLPE	PSN	PLN	PSFN	PLFN	WPLN	WGN
 **B5**	**B5 Flange type motor**	•	•	•	•	•	•	•	•	•	•	•	•	•	•
 **B14**	**B14 Flange type motor**	**Available on inquiry**													

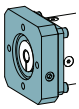
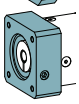
Mounting thread

M2	M2	**Mounting thread**
M3	M3	**Mounting thread**
M4	M4	**Mounting thread**
M5	M5	**Mounting thread**
M6	M6	**Mounting thread**
M8	M8	**Mounting thread**
M10	M10	**Mounting thread**
M12	M12	**Mounting thread**
M16	M16	**Mounting thread**

Input design

		PLE	PLQE	PLPE	PLHE	PLFE	WPLE	WPLQE	WPLPE		
	Code Z	**60** (11/14) **80** (19) **120** (24)	**60** (11/14) **80** (19) **120** (24)	**70** (11/14) **90** (19) **120** (24)	**60** (11/14) **80** (19) **120** (24)	**64** (11/14) **90** (19) **110** (24)					Economy Line
	Code Y	**40** (8/9/11) **60** (19) **80** (24) **120** (35) **160** (35)	**60** (19) **80** (24) **120** (35)	**50** (8/9/11) **70** (19) **90** (24) **120** (35) **155** (35/42)	**60** (19) **80** (24) **120** (35)	**64** (19) **90** (24) **110** (35)	**40** (8/9) **60** (11/14) **80** (19) **120** (24)	**60** (11/14) **80** (19) **120** (24)	**50** (8/9) **70** (11/14) **90** (19) **120** (24)		
	Code E	**40** (8/9) **60** (11/14) **80** (19) **120** (24) **160** (35)	**60** (11/14) **80** (19) **120** (24)	**50** (8/9) **70** (11/14) **90** (19) **120** (24) **155** (35)	**60** (11/14) **80** (19) **120** (24)	**64** (11/14) **90** (19) **110** (24)					
	Code R	**60** (11/14) **80** (19) **120** (24)	**60** (11/14) **80** (19) **120** (24)	**70** (11/14) **90** (19) **120** (24)	**60** (11/14) **80** (19) **120** (24)	**64** (11/14) **90** (19) **110** (24)				OP 29	
	Code T	**40** (8/9/11) **60** (19) **80** (24) **120** (35) **160** (35)	**60** (19) **80** (24) **120** (35)	**50** (8/9/11) **70** (19) **90** (24) **120** (35) **155** (35/42)	**60** (19) **80** (24) **120** (35)	**64** (19) **90** (24) **110** (35)	**40** (8/9) **60** (11/14) **80** (19) **120** (24)	**60** (11/14) **80** (19) **120** (24)	**50** (8/9) **70** (11/14) **90** (19) **120** (24)	OP 30	
	Code W	**40** (N) **60** (N) **80** (N) **120** (N) **160** (N)	**60** (N) **80** (N) **120** (N)							OP 1	

Frame size (Clamping system diameter)

		PSN	PLN	PSFN	PLFN	WPLN	WGN		
	Code Z	**70** (11/14/19) **90** (11/14/19/24) **115** (14/19/24/35) **142** (19/24/35/42) **190** (35/42/48)	**70** (14/19) **90** (19/24) **115** (24)	**64** (11/14/19) **90** (11/14/19/24) **110** (14/19/24/35) **140** (19/24/35/42) **200** (35/42/48)	**64** (14/19) **90** (14/19/24) **110** (19/24) **140** (24) **200** (48)	**70** (14/19) **90** (14/19/24) **115** (19/24) **142** (24)	**70** (14/19) **90** (19/24) **115** (24)		Precision Line
	Code Y		**115** (35) **142** (35/42) **190** (48)		**110** (35) **140** (35/42) **200** (35/42)	**115** (35) **142** (35/42)	**115** (35) **142** (35/42)		
	Code E								
	Code R		**70** (14/19) **90** (19/24) **115** (24)		**64** (14/19) **90** (14/19/24) **110** (19/24) **140** (24) **200** (48)	**70** (14/19) **90** (14/19/24) **115** (19/24) **142** (24)	**70** (14/19) **90** (19/24) **115** (24)	OP 29	
	Code T		**115** (35) **142** (35/42) **190** (48)		**110** (35) **140** (35/42) **200** (35/42)	**115** (35) **142** (35/42)	**115** (35) **142** (35/42)	OP 30	
	Code W							OP 1	

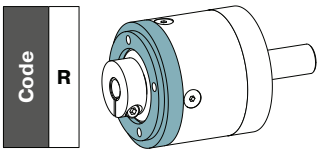
Frame size (Clamping system diameter)

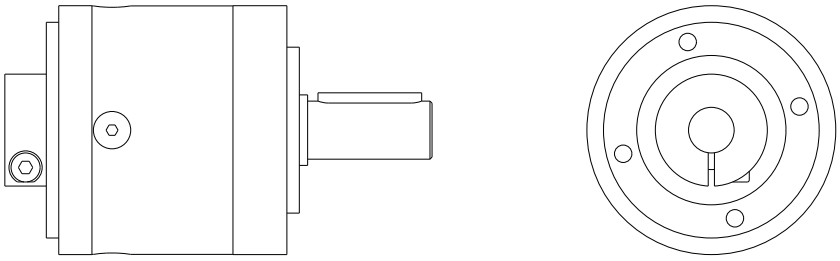
Project modifications
In addition to the widely diversified Neugart product portfolio and the standardized modification options it contains, our gearboxes can also be modified to specifications for our customers' projects.
Of course, we can also work together with you in elaborating the optimal solution. Simply contact us at: sales@neugart.com

Possible project modifications:
- Custom made lubrication
- Gearbox surface finishing
- Adaptation to the output shaft
- Adaptation to the output flange
- Direct motor attachment
- Adaptation of the input system
- Adaptation of the input flange
- ATEX certification for use in explosive environments

Custom made gearboxes
Individual design or performance data optimized to your application:
A development department specializing in custom made gearboxes has been a success at Neugart for years.
Our experienced engineers will be pleased to advise you on the complex challenges of gearbox engineering and to develop a gearbox tailored precisely to your performance and quality needs.
Also see page 8 for examples.

Input design





Drawing corresponds to a PLE060 / 1-stage / output shaft with feather key / 11 mm clamping system / no motor adaptation – round universal flange
All other variants can be retrieved in the Tec Data Finder at www.neugart.com

This input design applies to the following series, frame sizes, and associated clamping systems
The respective measurements can be taken from the dimension sheets in the Tec Data Finder at www.neugart.com.

Economy Line

Series	PLE				PLQE				PLPE			
Frame size	60		80	120	60		80	120	70		90	120
Clamping system diameter input	C 11 mm	D 14 mm	E 19 mm	F 24 mm	C 11 mm	D 14 mm	E 19 mm	F 24 mm	C 11 mm	D 14 mm	E 19 mm	F 24 mm
Number of stages	1/2/3				1/2/3				1/2			

Series	PLHE				PLFE			
Frame size	60		80	120	64		90	110
Clamping system diameter input	C 11 mm	D 14 mm	E 19 mm	F 24 mm	C 11 mm	D 14 mm	E 19 mm	F 24 mm
Number of stages	1/2				1/2			

Precision Line

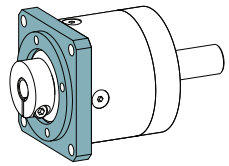
Series	PLN					WGN				
Frame size	70		90		115	70		90		115
Clamping system diameter input	D 14 mm	E 19 mm	E 19 mm	F 24 mm	F 24 mm	D 14 mm	E 19 mm	E 19 mm	F 24 mm	F 24 mm
Number of stages	1/2					1				

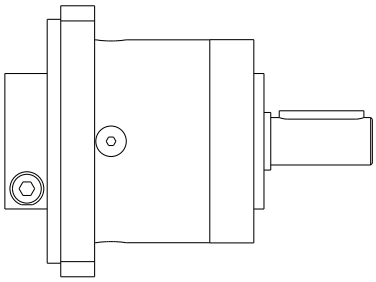
Series	PLFN								
Frame size	64		90			110		140	200
Clamping system diameter input	D 14 mm	E 19 mm	D 14 mm	E 19 mm	F 24 mm	E 19 mm	F 24 mm	F 24 mm	K 48 mm
Number of stages	1/2		2	1/2	1	2	1/2	2	1

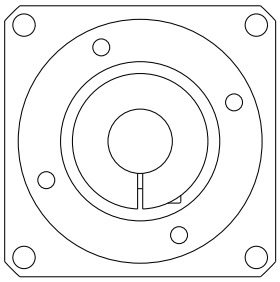
Series	WPLN							
Frame size	70		90			115		142
Clamping system diameter input	D 14 mm	E 19 mm	D 14 mm	E 19 mm	F 24 mm	E 19 mm	E 19 mm	F 24 mm
Number of stages	1/2		2	1/2	1	2	1/2	2

Input design

Code	T







Drawing corresponds to a PLE060 / 1-stage / output shaft with feather key / 19 mm clamping system / no motor adaptation – square universal flange
All other variants can be retrieved in the Tec Data Finder at www.neugart.com

This input design applies to the following series, frame sizes, and associated clamping systems
The respective measurements can be taken from the dimension sheets in the Tec Data Finder at www.neugart.com.

Series	PLE							PLQE		
Frame size	40			60	80	120	160	60	80	120
Clamping system diameter input	A 8 mm	B 9 mm	C 11 mm	E 19 mm	F 24 mm	G 35 mm	G 35 mm	E 19 mm	F 24 mm	G 35 mm
Number of stages	1/2/3							1/2/3		

Series	PLPE								PLHE		
Frame size	50			70	90	120	155		60	80	120
Clamping system diameter input	A 8 mm	B 9 mm	C 11 mm	E 19 mm	F 24 mm	G 35 mm	G 35 mm	H 42 mm	E 19 mm	F 24 mm	G 35 mm
Number of stages	1/2								1/2		

Series	PLFE		
Frame size	64	90	110
Clamping system diameter input	E 19 mm	F 24 mm	G 35 mm
Number of stages	1/2		

Economy Line

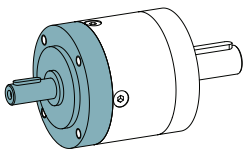
Series	PLN				PLFN				
Frame size	115	142		190	110	140		200	
Clamping system diameter input	G 35 mm	G 35 mm	H 42 mm	K 48 mm	G 35 mm	G 35 mm	H 42 mm	G 35 mm	H 42 mm
Number of stages	1/2				1	1/2	1	2	

Series	WPLN			WGN		
Frame size	115	142		115	142	
Clamping system diameter input	G 35 mm	G 35 mm	H 42 mm	G 35 mm	G 35 mm	H 42 mm
Number of stages	1	1/2	1	1		

Precision Line

Input design

Code W



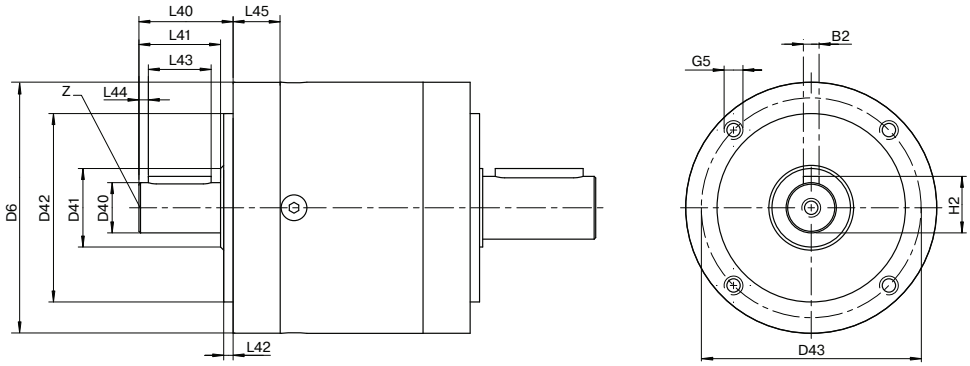
For PLE and PLQE (OP 1)

Gearbox characteristics not listed here correspond to the details on pages 16 to 25 - the gearboxes have to be flanged on input and output flange

Input shaft loads			PLE040	PLE060	PLE080	PLE120	PLE160	Z(1)
Radial force input 10,000 h(3)	$F_{r\ input}$	N	100	250	450	1000	1400	
Axial force input 10,000 h(3)	$F_{a\ input}$		120	300	500	1300	1600	

Moment of inertia			PLE040	PLE060	PLE080	PLE120	PLE160	Z(1)
Mass moment of inertia(2)	J	kgcm²	0.009 - 0.021	0.053 - 0.120	0.25 - 0.55	1.50 - 2.50	16.7 - 24.9	1
			0.009 - 0.020	0.054 - 0.110	0.26 - 0.51	1.54 - 2.40	16.4 - 23.0	2
			0,009 - 0.019	0.054 - 0.064	0.26 - 0.48	1.54 - 2.30	-	3

Input speeds			PLE040	PLE060	PLE080	PLE120	PLE160	Z(1)
Max. mechanical input speed(4)	n_{1Limit}	min^{-1}	18000	13000	7000	6500	4500	



Drawing corresponds to a PLE080 / 1-stage / output shaft with feather key / input shaft – All other variants can be retrieved in the Tec Data Finder at www.neugart.com

Geometry*			PLE040	PLE060	PLE080	PLE120	PLE160	Z(1)
Feather key width (DIN 6885 T1)	B2		2	3	5	6	10	
Shaft height including feather key input (DIN 6885 T1)	H2		8.8	11.2	18	22.5	38	
Housing diameter	D6		40	60	80	115	160	
Shaft diameter input	D40	j6	8	10	16	20	35	
Shaft length input	L40		20	28	30	45	65	
Shaft collar input	D41		12	17	25	35	55	
Shaft length from shoulder	L41		17	23	26	40	58	
Centering diameter input	D42	h7	26	40	60	80	110	
Centering depth input	L42		2	3	3	4	5	
Pitch circle diameter input	D43		34	52	70	100	130	
Feather key length input	L43		12	18	20	32	45	
Distance from shaft end input	L44		2.5	2.5	3	4	7	
Flange thickness input	L45		10.2	12.7	15	31	58	
Mounting thread x depth	G5	4x	M4x6	M5x8	M6x10	M10x16	M10x25	
Center hole (DIN 332, Sheet 2, type DR)	Z	4x	M3x9	M3x9	M5x12	M6x16	M12x28	

(1) Number of stages
(2) The ratio-dependent values can be retrieved in the Tec Data Finder – www.neugart.com
(3) Based on center of shaft at n_1=1000 rpm
(4) Allowed operating temperature must be kept; other input speeds available on inquiry

* Dimensions in mm

Max. transferable output torque

Max. transferable output torque
Calculations of gear teeth service lives differentiate between long life and finite life. See diagram.

Long life
All Neugart planetary gearboxes are designed for the long life range within the specified nominal torques T_{2N}.
The load specifications can be reached any number of times without the gear teeth failing.

Finite life
Intermittent duty may transfer brief torque peaks or increased application factors that exceed the specified nominal torque T_{2N}.

Calculating the max application torque $T_{2application}$

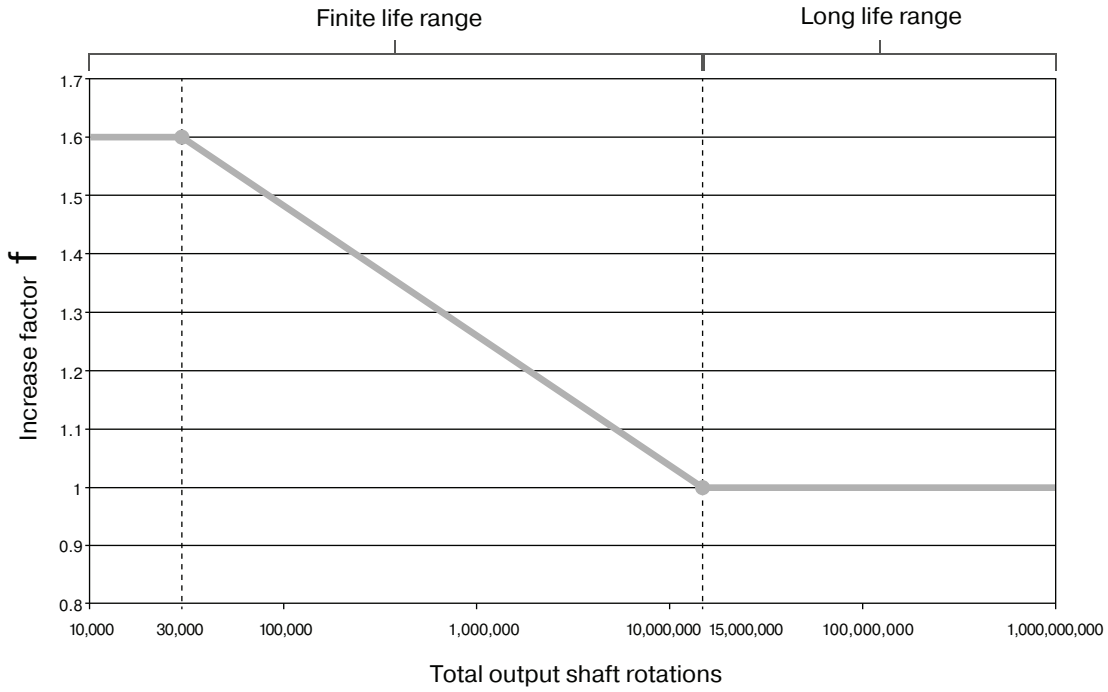
* The total output shaft rotations under the increased application torques are determined.
* The resulting max increase factor f is determined from the diagram.
* The max transferable application torque $T_{2max\_application}$ is calculated:

$$T_{2max\_application} = f \times T_{2N}$$

* The application torque $T_{2application}$ may not exceed the gearbox's calculated max application torque $T_{2max\_application}$

$$T_{2max\_application} \geq T_{2application}$$

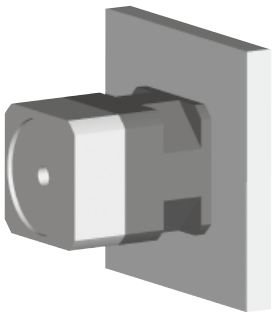
Increase factor f as a function of the total "output shaft rotations"



Ambient conditions

The following ambient conditions for the thermal design serve as the basis for the catalog values:

* The motor does not heat up the gearbox
* Flange mounted plate (application side):
  - Square plate = 2 x gearbox output flange size
  - Material: steel
* Plate connected via machine bed: 20°C on one side
* No hindrance to gearbox convection
* Ambient temperature: 20°



Application specific configuration with NCP – www.neugart.com