NEUGART

Precision gearbox catalog

Impress with power and precision.
Inspire with partnership.

“We are fascinated by the way in which a modest number of parts can be used to build a seemingly infinite number of gearbox variants, all the while making it appear like it’s quite simple.

We achieve this because we understand the application, exploit the intelligence of our modular gearbox system and develop custom solutions within just a short time.

Our gearboxes deliver the power you need:
Reliably. Lifelong. And that’s a promise.”

Thomas Herr
Managing Partner

Bernd Neugart
Managing Partner

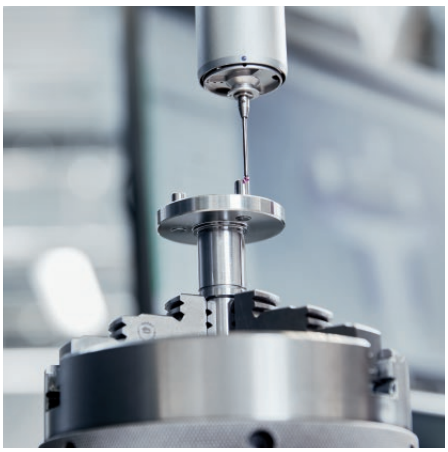
Editorial

Power, precision and partnership – these values characterize our business philosophy and our work, and have for over 85 years.

Our offered product range includes numerous innovative, technologically mature, and highly reliable gearbox solutions. The 18 standard planetary gearbox series we offer cover a wide range of applications – from the highest precision to the highest performance.

As a technology partner, we also provide customized solutions; specialized, custom designed gearboxes.

Please contact us with any questions about our products or services – we appreciate every opportunity to assist and meet your automation, precise motion and power transmission requirements.



Managementsystem ISO 9001 ISO 14001

BLUeCOMPETENCE Alliance Member
Partner der Nachhaltigkeitsinitiative des Maschinen- und Anlagenbaus

EHEDG EUROPEAN HYGIENIC ENGINEERING & DESIGN GROUP COMPANY MEMBER

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Innovative and individual:
Our custom made gearboxes.

Compact form and high performance, special construction requirements, food grade certification or individual design: We fulfill even your most complex requirements – in all sectors of machine building.

The qualified specialists of our engineering department design gearbox solutions and systems. According to your performance, price and quality needs.
Your benefit from innovation: We utilize our experience and at the same time take advantage of new developments, integrating them into our customer solutions.

Using modern design and development tools, applications from all areas of system design (for instance, printing presses, handling systems, die-cast machines and robot painting systems), medical engineering and model building are realized. For new perspectives.

Power at a high level: Our quality.

Your satisfaction is our measuring stick – that's why the quality of our products and services is always our top priority.
With our quality and environmental policies we secure and expand our economic success throughout international markets.

Our high standard in product quality, support and service is appreciated internationally: With over 70 representatives and branches, we are represented in all important industrial nations.

We manufacture our products exclusively in Germany.
In the USA and China, our assembly factories serve regional markets, guaranteeing a high level of flexibility for adaptations as well as the shortest delivery times.

Simply greater benefit: Neugart Calculation Program – NCP

The Neugart Calculation Program (NCP) lets you assemble the optimal motor and gearbox combination with just a few clicks – and thus save acquisition and operating costs.
The intuitive user interface guides the user through the application. The look and feel design can be learned in just a short time. You can start straight away.
NCP gives you access to virtually all of the conventional motors on the market and a large number of applications like pinions, spindles, belts, conveyors, rotary tables, slider cranks, and winders. Dynamics and load data are depicted as graphs in each stage. You can then see in real time whether the components you have selected are suitable or not.

Your benefits at a glance:

- User friendly – input and output values at a glance
- Free design tool available for download
- Offline mode – also without administrator rights
- Simple input options for complex, predefined applications
- Extensive database containing over 12,000 motors
- Plausibility check on the entered values
- Documentation of all calculation steps
- Information can be output in seven different languages
- Online access to dimension sheets and CAD files

Neugart offers free NCP training courses at regular intervals.
Please contact us at **training@neugart.com**

New online services, new options:
Tec Data Finder – TDF

With just a few clicks, the Tec Data Finder (TDF) generates all of the information relevant to your gearbox. This includes the specific technical and geometrical data in the form of a dimension sheet as well as the CAD models in all of the usual formats.

At the same time, the gearbox geometry can be adapted and tuned directly to your specific motor. This is based on a comprehensive motor database or on manual entries of individual connection measurements. In addition, the gearbox data can also be downloaded directly from the dimension sheet and CAD database without the advance selection of a specific motor.

Your benefits at a glance:

- User friendly – entries via dropdown fields
- Free online tool
- Comprehensive motor database (over 12,000 motors)
- Plausibility check on motor and gearbox flange geometries
- Power user access – for even faster access
- Output of the complete product code – for fast quote requests
- Information can be output in seven different languages

The NCP and TDF tools can be found on our website:
www.neugart.com

Perfection in every detail:
Our products and our service.

We accompany you with a wide range of services – from NCP, our free calculation tool, to the Neugart dimension sheet and product finders to our integrated, certified claims management.

We are represented in all important markets with local companies. Our internal information network and the business software we use ensure smooth internal communication and optimally coordinated business processes.

Powerful, efficient and innovative: We create forward-looking solutions in gearbox technology – high quality at reasonable prices.

Decidedly different:
Neugart – for good reason.

Neugart distinguishes itself with advanced, innovative technology, with high-precision production technology and has been doing so for decades. Worldwide, renowned customers put their trust in our vast experience.

Our precise planetary gearboxes and our experience in the construction of custom made gearboxes are highly sought after in national and international markets.

Put your trust in the highest level of performance – Made in Germany: In our well-balanced portfolio you will find the right product for your needs.

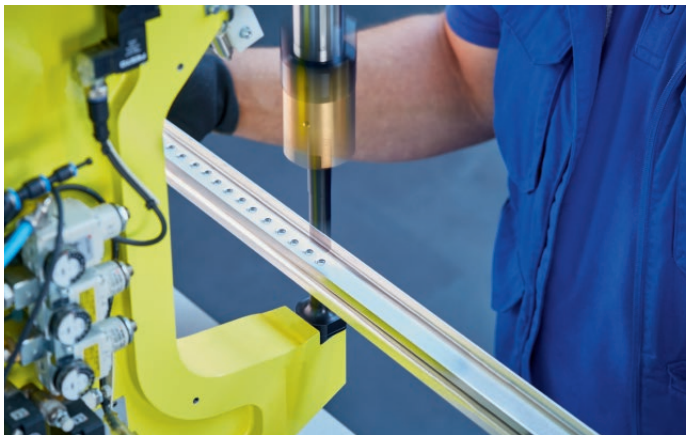
We can provide you with good reasons to make a decision for Neugart now.

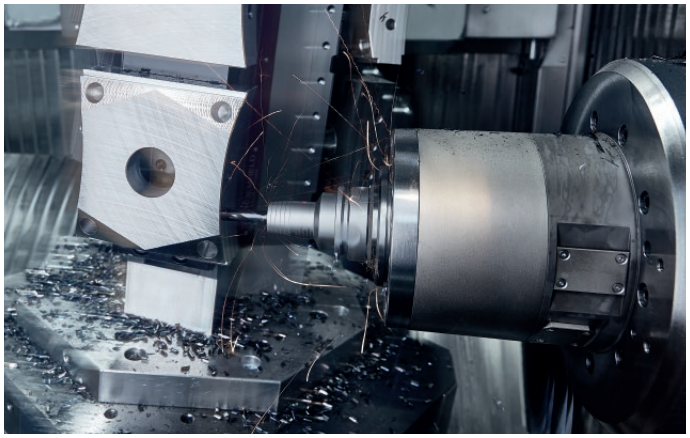
We are your specialist in planetary gearboxes.

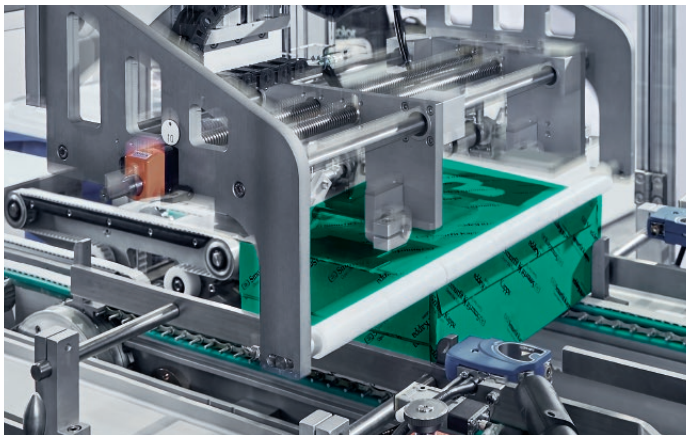
As a reliable, trusted and innovative planetary gearbox manufacturer, Neugart has been supporting all industrial sectors for over half a century. Our products get the job done, regardless of how complex our customers' needs may be. Over the years, we have become the foremost leaders in drive technology specialization. Our vast industry knowledge allows us to support customers with their most challenging projects and to offer the latest gear technologies and solutions.

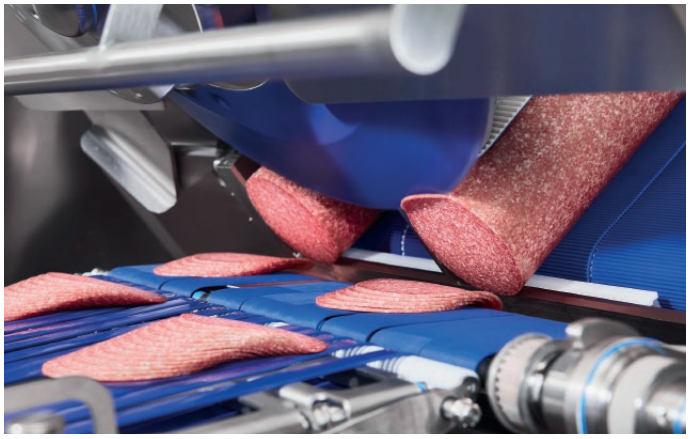
Our constantly expanding product inventory provides effective solutions for virtually every application of gearbox technology.

Our customers' challenges and concerns are always at the forefront of our thoughts. Listening to and reflecting upon problems helps us to expand our knowledge, in order to achieve the highest standard in design and innovation. Our mechanical and industrial expertise includes everything from automation and robotics to food and packaging to medical and pharmaceutical.









Neugart gearboxes are world-class products.

Unique possibilities are available for countless industries as we continuously optimize all technologies and services related to our products. We invite you to benefit from our competitive advantages.

Automation and robotics

- Cost-effective gearbox solutions
- Smart software for all product aspects

Packaging machines

- Dynamic and hardwearing gearboxes
- Cost-effective gearbox solutions

Machine tools

- Extensive application experience
- Reliable and long-lasting gearboxes

Food and beverage industry

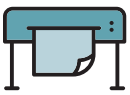
- Certified products
- Worldwide, comprehensive application knowledge

Medical engineering and pharmaceuticals

- Smart software for all product aspects
- Certified products

Printing industry

- Extensive application experience
- Higher quality end product



Agricultural machinery

- Reliable and long-lasting gearboxes
- Suitable for use in harsh conditions

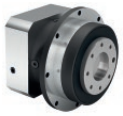
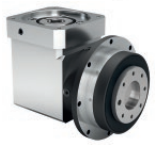
Neugart‘s fully developed product portfolio can handle virtually all applications with controlled motion. We are already precision gearbox partners in over 40 industries.

Powerful and efficient: Our precision planetary gearboxes.

Whether in machine tools or die-casting machines, in packaging, printing and textile machines, in automation technology or in robotic painting systems: Our precision planetary gearboxes are ideally suited for numerous applications.

We offer much more than just standard.

• **Standard** • • • • **Excellent**

Economy gearboxes	Nominal output torque	Backlash	Bearing load	Protection class	Running noise	Input speeds	Torsional stiffness	Wide range of ratios
 **PLE**	• •	• •	•	• •	• •	• • • •	• •	• • • •
 **PLQE**	• •	• •	• •	• •	• •	• • • •	• •	• • • •
 **PLPE**	• •	• •	• •	• •	• •	• • • •	• •	• • •
 **PLHE**	• •	• •	• • •	• • •	• •	• • •	• •	• • •
 **PLFE**	• •	• •	• •	• •	• •	• • • •	• • • •	• • •
 **WPLE**	•	•	•	• •	•	• • •	•	• • • •
 **WPLQE**	•	•	• •	• •	•	• • •	•	• • • •
 **WPLPE**	•	•	• •	• •	•	• • •	•	• • •
 **WPLFE**	•	•	• •	• •	•	• • •	• • • •	• • •

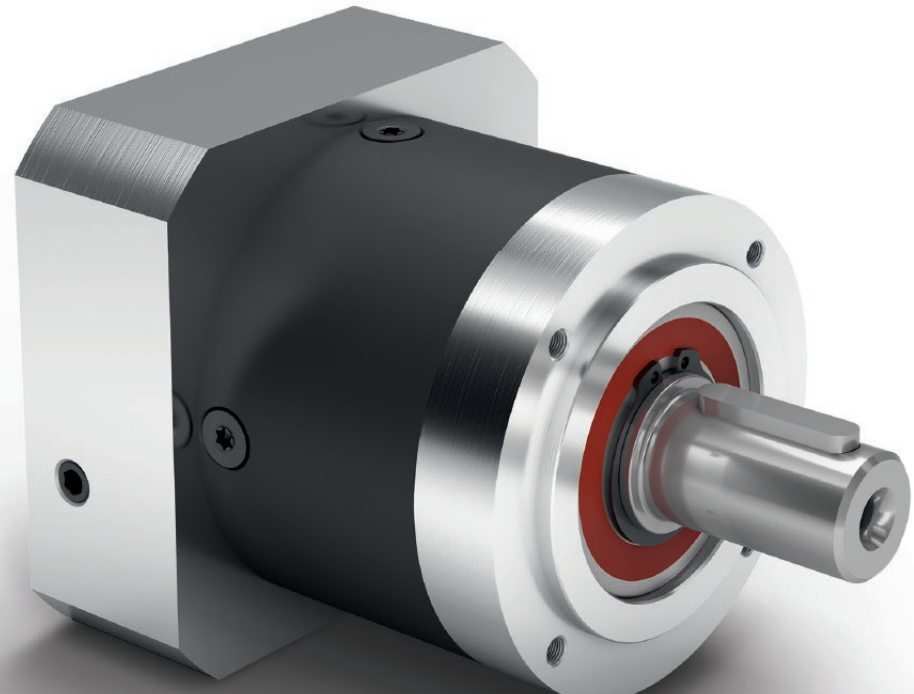
Our program at a glance.

In this overview you will find a direct comparison of the key features of our products.

• **Standard** • • • • **Excellent**

Precision gearboxes	Nominal output torque	Backlash	Bearing load	Protection class	Running noise	Input speeds	Torsional stiffness	Wide range of ratios
 PSBN	• • • •	• • • •	• •	• • •	• • • •	• • • •	• • •	• • •
 PSN	• • • •	• • • •	• • •	• • •	• • • •	• • •	• • •	• • •
 PLN	• • • •	• • • •	• • •	• • •	• •	• •	• • •	• • •
 PSFN	• • • •	• • • •	• • • •	• • •	• • • •	• • •	• • • •	• •
 PLFN	• • • •	• • • •	• • • •	• • •	• •	• •	• • • •	• •
 WPLN	• • •	• • •	• • •	• • •	• • •	•	• •	• •
 WPSFN	• • •	• • • •	• • •	• • •	• • •	•	• •	• •
 WGN	• • •	• • •	• • •	• • •	• • •	•	• •	•

Hygienic Design gearbox	Nominal output torque	Backlash	Bearing load	Protection class	Running noise	Input speeds	Torsional stiffness	Wide range of ratios
 HLAE	• •	• •	•	• • • •	• •	• • •	• •	• • •



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.

1 Light, but powerful

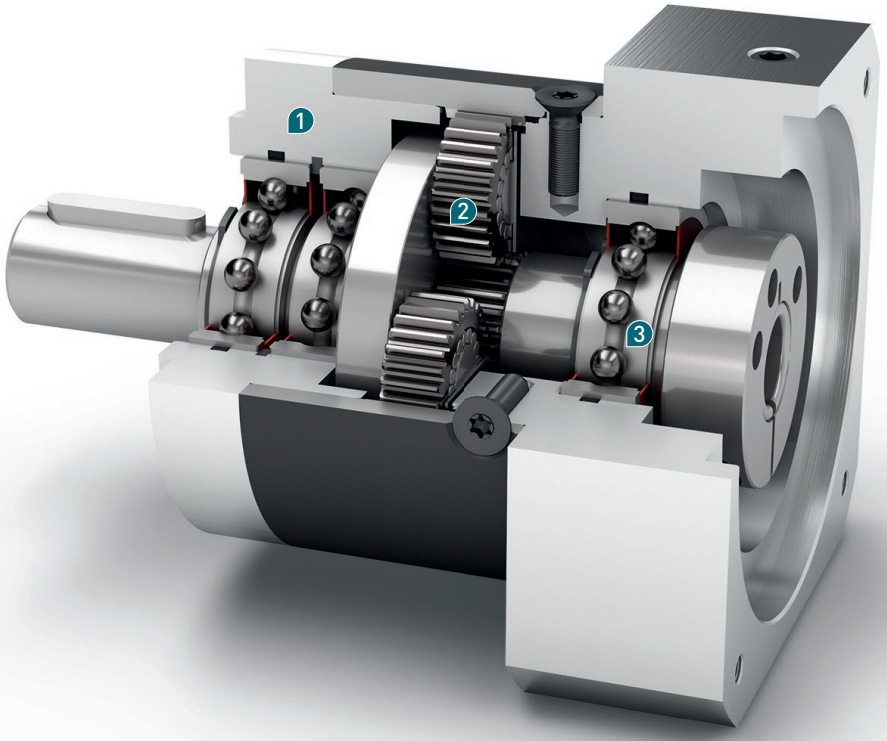
The **PLE** excels with its above-average weight to torque ratio, and it is 25% lighter than comparable conventional drives. You accordingly benefit from the highest dynamics needed for multiple axis systems.

2 Efficient and reliable

High performance at a fair price: This principle also applies to our **PLE** planetary gearbox. It is powerful, yet efficient, and delivers a high performance for attractive acquisition costs.

3 Low heat generation at the highest speeds

Even in extreme situations, the **PLE** will never let you down thanks to its low-friction bearing design and optimized lubrication. The low heat generation allows a continuous high speed without sacrifice to performance.



- For any mounting position
- Individual adaptation of the input flange to the motor
- Lifetime lubrication for maintenance-free operation
- Equidirectional rotation
- Wide range of output shaft designs
- Clamping systems with optimized mass moment of inertia
- Precise gearing

Code	Gearbox characteristics			PLE040	PLE060	PLE080	PLE120	PLE160	z(1)
	Service life	t_L	h	30,000					
	Efficiency at full load(2)	η	%	98					1
				97					2
				92					3
	Min. operating temperature	T_{min}	°C (°F)	-25 (-13)					
	Max. operating temperature	T_{max}		90 (194)					
	Protection class			IP 54					
S	Standard lubrication			Grease					
F	Food grade lubrication			Grease					
L	Low temperature lubrication(3)			Grease					
	Installation position			Any					
S	Standard backlash	j_t	arcmin	< 15	< 10	< 7	< 7	< 6	1
				< 19	< 12	< 9	< 9	< 10	2
				< 22	< 15	< 11	< 11	-	3
	Torsional stiffness(2)	c_g	Nm/arcmin (lb_f.in/arcmin)	0.7 - 1.0 (6 - 9)	1.7 - 2.3 (15 - 20)	4.3 - 5.8 (38 - 51)	10.8 - 14.5 (96 - 128)	31.0 - 37.5 (274 - 332)	1
				0.8 - 1.0 (7 - 9)	1.9 - 2.3 (17 - 20)	4.7 - 5.8 (42 - 51)	11.7 - 14.5 (104 - 128)	30.5 - 37.5 (270 - 332)	2
				0.8 - 1.0 (7 - 9)	1.8 - 2.3 (16 - 20)	4.5 - 5.8 (40 - 51)	11.2 - 14.5 (99 - 128)	-	3
	Gearbox weight	m_G	kg (lb_m)	0.35 (0.8)	0.9 (2.0)	2.1 (4.6)	6 (13.2)	18 (39.7)	1
				0.45 (1.0)	1.1 (2.4)	2.6 (5.7)	8 (17.6)	22 (48.5)	2
				0.55 (1.2)	1.3 (2.9)	3.1 (6.8)	10 (22.1)	-	3
S	Standard surface			Housing: Steel – nitrocarburized and post-oxidized (black)					
	Running noise(4)	Q_g	dB(A)	58	58	60	65	70	
	Max. bending moment based on the gearbox input flange(5)	M_b	Nm (lb_f.in)	3 (27)	8 (71)	16 (142)	40 (354)	140 (1239)	
	Motor flange precision			DIN 42955-N					

Output shaft loads			PLE040	PLE060	PLE080	PLE120	PLE160	z(1)
Radial force for 20,000 h(6)(7)	$F_{r\,20.000\,h}$	N (lb_f)	200 (45)	400 (90)	750 (169)	1750 (394)	5000 (1125)	
Axial force for 20,000 h(6)(7)	$F_{a\,20.000\,h}$		200 (45)	500 (113)	1000 (225)	2500 (563)	7000 (1575)	
Radial force for 30,000 h(6)(7)	$F_{r\,30.000\,h}$		160 (36)	340 (77)	650 (146)	1500 (338)	4200 (945)	
Axial force for 30,000 h(6)(7)	$F_{a\,30.000\,h}$		160 (36)	450 (101)	900 (203)	2100 (473)	6000 (1350)	
Static radial force(7)(8)	$F_{r\,Stat}$		200 (45)	700 (158)	1250 (281)	2000 (450)	5000 (1125)	
Static axial force(7)(8)	$F_{a\,Stat}$		240 (54)	800 (180)	1600 (360)	3800 (855)	11000 (2475)	
Tilting moment for 20,000 h(6)(8)	$M_{K\,20.000\,h}$	Nm (lb_f.in)	5 (44)	14 (124)	31 (274)	101 (894)	474 (4195)	
Tilting moment for 30,000 h(6)(8)	$M_{K\,30.000\,h}$		4 (35)	12 (106)	27 (239)	86 (761)	398 (3522)	

Moment of inertia			PLE040	PLE060	PLE080	PLE120	PLE160	z(1)
Mass moment of inertia(2)	J	kgcm² (lb_f.in.s²10⁻⁴)	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 (12.195 - 20.895)	3.726 - 11.999 (32.975 - 106.191)	1
			0.015 - 0.026 (0.133 - 0.230)	0.066 - 0.121 (0.584 - 1.071)	0.365 - 0.613 (3.230 - 5.425)	1.414 - 2.288 (12.514 - 20.249)	3.502 - 10.087 (30.993 - 89.270)	2
			0.015 - 0.025 (0.133 - 0.221)	0.066 - 0.076 (0.584 - 0.673)	0.365 - 0.590 (3.230 - 5.222)	1.413 - 2.196 (12.505 - 19.435)	-	3

(1) Number of stages

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

(3) T_{min} = -40°C (-40°F). Optimal operating temperature max. 50°C (122°F)

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

(5) Max. motor weight* in kg = 0.2 x M_b / motor length in m
* with symmetrically distributed motor weight
* with horizontal and stationary mounting

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

(7) Based on center of output shaft

(8) 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

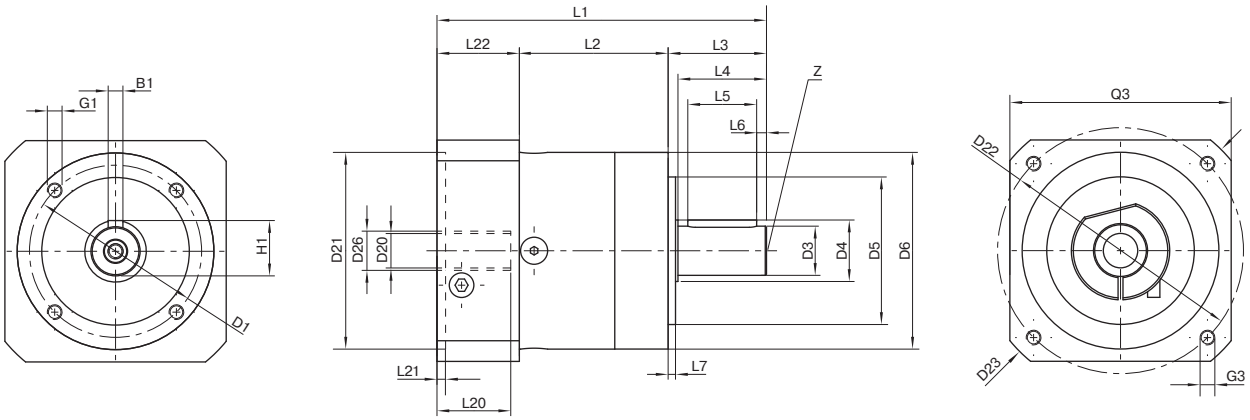
Output torques			PLE040	PLE060	PLE080	PLE120	PLE160	i(1)	z(2)
Nominal output torque(3)(4)	T_{2N}	Nm (lb_f.in)	11 (97)	28 (248)	85 (752)	115 (1018)	400 (3540)	3	1
			15 (133)	38 (336)	115 (1018)	155 (1372)	450 (3983)	4	
			14 (124)	40 (354)	110 (974)	195 (1726)	450 (3983)	5	
			8.5 (75)	25 (221)	65 (575)	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 (7080)	12	
			18 (159)	44 (389)	110 (974)	230 (2036)	700 (6195)	15	
			20 (177)	44 (389)	120 (1062)	260 (2301)	800 (7080)	16	
			20 (177)	44 (389)	120 (1062)	260 (2301)	800 (7080)	20	
			18 (159)	40 (354)	110 (974)	230 (2036)	700 (6195)	25	
			20 (177)	44 (389)	120 (1062)	260 (2301)	800 (7080)	32	
			18 (159)	40 (354)	110 (974)	230 (2036)	700 (6195)	40	
			7.5 (66)	18 (159)	50 (443)	120 (1062)	450 (3983)	64	
			20 (177)	44 (389)	110 (974)	260 (2301)	-	60	3
			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	
			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(4)(5)	T_{2max}	Nm (lb_f.in)	17.5 (155)	45 (398)	136 (1204)	184 (1628)	640 (5664)	3	1
			24 (212)	61 (540)	184 (1628)	248 (2195)	720 (6372)	4	
			22 (195)	64 (566)	176 (1558)	312 (2761)	720 (6372)	5	
			13.5 (119)	40 (354)	104 (920)	216 (1912)	-	7	
			10 (89)	29 (257)	80 (708)	192 (1699)	720 (6372)	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 (11328)	12	
			29 (257)	70 (620)	176 (1558)	368 (3257)	1120 (9912)	15	
			32 (283)	70 (620)	192 (1699)	416 (3682)	1280 (11328)	16	
			32 (283)	70 (620)	192 (1699)	416 (3682)	1280 (11328)	20	
			29 (257)	64 (566)	176 (1558)	368 (3257)	1120 (9912)	25	
			32 (283)	70 (620)	192 (1699)	416 (3682)	1280 (11328)	32	
			29 (257)	64 (566)	176 (1558)	368 (3257)	1120 (9912)	40	
			12 (106)	29 (257)	80 (708)	192 (1699)	720 (6372)	64	
			32 (283)	70 (620)	176 (1558)	416 (3682)	-	60	3
			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	

(1) Ratios ($i=n_1/n_2$)
(2) Number of stages
(3) Application specific configuration with NCP – www.neugart.com
(4) Values for feather key (code "A"): for repeated load
(5) 30,000 rotations of the output shaft permitted; see page 136

Output torques			PLE040	PLE060	PLE080	PLE120	PLE160	i[1]	z[2]
Emergency stop torque[3]	T_{2Stop}	Nm (lb_f.in)	22,5 (199)	66 (584)	180 (1593)	390 (3452)	800 (7080)	3	1
			30 (266)	88 (779)	240 (2124)	520 (4602)	900 (7965)	4	
			36 (319)	80 (708)	220 (1947)	500 (4425)	900 (7965)	5	
			26 (230)	80 (708)	178 (1575)	340 (3009)	-	7	
			27 (239)	80 (708)	190 (1682)	380 (3363)	900 (7965)	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 (14160)	12	
			36 (319)	88 (779)	220 (1947)	500 (4425)	1400 (12390)	15	
			40 (354)	88 (779)	240 (2124)	520 (4602)	1600 (14160)	16	
			40 (354)	88 (779)	240 (2124)	520 (4602)	1600 (14160)	20	
			36 (319)	80 (708)	220 (1947)	500 (4425)	1400 (12390)	25	
			40 (354)	88 (779)	240 (2124)	520 (4602)	1600 (14160)	32	
			36 (319)	80 (708)	220 (1947)	500 (4425)	1400 (12390)	40	
			27 (239)	80 (708)	190 (1682)	380 (3363)	900 (7965)	64	
			40 (354)	88 (779)	220 (1947)	520 (4602)	-	60	3
			40 (354)	88 (779)	240 (2124)	520 (4602)	-	80	
			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]	z[2]
Average thermal input speed at T_{2N} and S1[4][5]	n_{1N}	rpm	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}	rpm	18000	13000	7000	6500	6500		

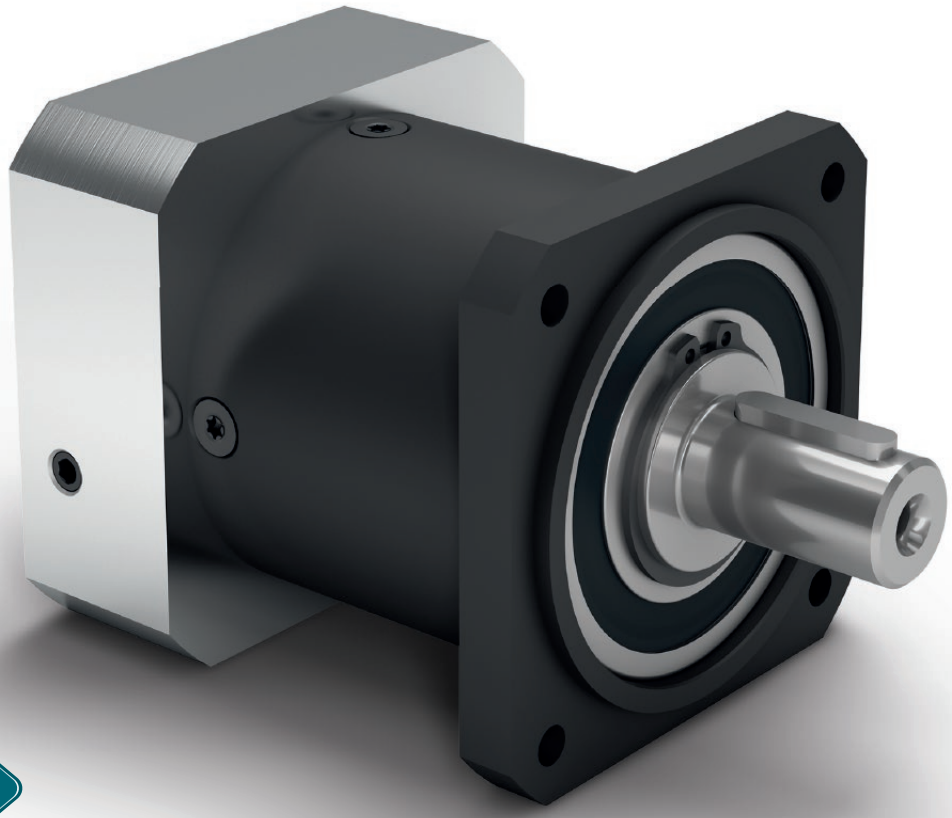
(1) Ratios ($i=n_1/n_2$)
(2) Number of stages
(3) Permitted 1000 times
(4) Application-specific speed configurations with NCP – www.neugart.com
(5) See page 136 for the definition
(6) Average thermal input speed at 50% T_{2N} and S1



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

Geometry[1]			PLE040	PLE060	PLE080	PLE120	PLE160	z[2]	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	
			101.5 (3.996)	118.5 (4.665)	150.5 (5.925)	204 (8.031)	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	
			52 (2.047)	59.5 (2.343)	77.5 (3.051)	101.5 (3.996)	153.5 (6.043)	2	
			64.5 (2.539)	72 (2.835)	95 (3.740)	129 (5.079)	-	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)		
Clamping system diameter input	D26		More information on page 125						
Motor shaft diameter j6/k6	D20		The dimensions vary with the motor/gearbox flange. The input flange geometries can be retrieved for each specific motor in Tec Data Finder at www.neugart.com						
Max. permis. motor shaft length	L20								
Min. permis. 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 6885-1)			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)	Z		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)		

[1] Dimensions in mm (in)
[2] Number of stages



PLQE

The easy to install planetary gearbox absorbs high forces with low heat generation

Our **PLQE** is uncomplicated and powerful. It can be connected directly to your installation without the need for an intermediate flange. The large deep groove ball bearings at the output can absorb large axial and radial forces. In the process, only little heat is generated, so reliable operations are assured even in complex production cycles.

❷ Easy installation

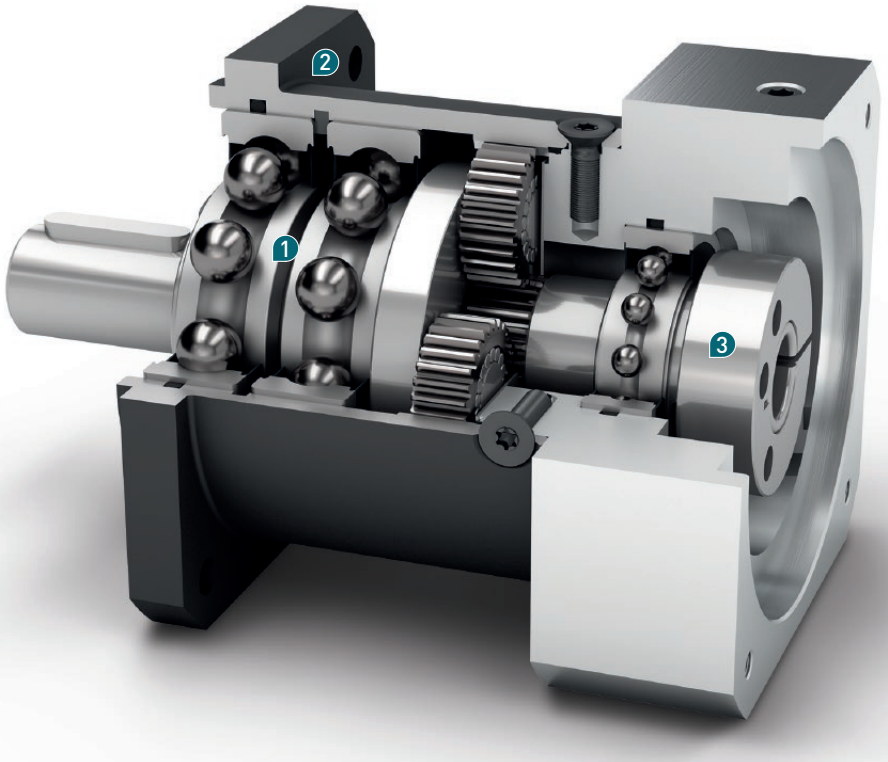
The square output flange on the **PLQE** with through hole can be mounted directly on the installation – saving time and money. These through holes facilitate full accessibility during installation. This makes your engineering much easier.

❶ Optimized output bearing

Large deep groove ball bearings make the **PLQE** especially powerful. It can even absorb high axial and radial forces with ease. Your drive elements can therefore be installed directly on the output shaft without the need for additional bearing components.

❸ Low heat generation at the highest speeds

A Neugart developed low-friction bearing design and optimized lubrication make it possible: The **PLQE** overcomes extreme challenges.



- For any mounting position
- Individual adaptation of the input flange to the motor
- Lifetime lubrication for maintenance-free operation
- Equidirectional rotation
- Wide range of output shaft designs
- Clamping systems with optimized mass moment of inertia
- Precise gearing

Code	Gearbox characteristics			PLQE060	PLQE080	PLQE120	z(1)
	Service life	t_L	h	30,000			
	Efficiency at full load(2)	η	%	98			1
				97			2
				92			3
	Min. operating temperature	T_{min}	°C (°F)	-25 (-13)			
	Max. operating temperature	T_{max}		90 (194)			
	Protection class			IP 54			
S	Standard lubrication			Grease			
F	Food grade lubrication			Grease			
L	Low temperature lubrication(3)			Grease			
	Installation position			Any			
S	Standard backlash	j_t	arcmin	< 10	< 7	< 7	1
				< 12	< 9	< 9	2
				< 15	< 11	< 11	3
	Torsional stiffness(2)	c_g	Nm/arcmin (lb$_f$.in/arcmin)	1.8 - 2.4 (16 - 21)	5.2 - 7.0 (46 - 62)	11.3 - 15.2 (100 - 135)	1
				1.9 - 2.4 (17 - 21)	5.7 - 7.0 (50 - 62)	12.3 - 15.2 (109 - 135)	2
				1.8 - 2.4 (16 - 21)	5.4 - 7.0 (48 - 62)	11.7 - 15.2 (104 - 135)	3
	Gearbox weight	m_G	kg (lb$_m$)	1.1 (2.4)	3.2 (7.1)	6.6 (14.6)	1
				1.3 (2.9)	3.7 (8.2)	8.6 (19.0)	2
				1.5 (3.3)	4.2 (9.3)	10.6 (23.4)	3
S	Standard surface			Housing: Steel – nitrocarburized and post-oxidized (black)			
	Running noise(4)	Q_g	dB(A)	58	60	65	
	Max. bending moment based on the gearbox input flange(5)	M_b	Nm (lb$_f$.in)	8 (71)	16 (142)	40 (354)	
	Motor flange precision			DIN 42955-N			

Output shaft loads			PLQE060	PLQE080	PLQE120	z(1)
Radial force for 20,000 h(6)(7)	$F_{r\,20.000\,h}$	N (lb$_f$)	900 (203)	2050 (461)	2950 (664)	
Axial force for 20,000 h(6)(7)	$F_{a\,20.000\,h}$		1000 (225)	2500 (563)	2500 (563)	
Radial force for 30,000 h(6)(7)	$F_{r\,30.000\,h}$		700 (158)	1700 (383)	2400 (540)	
Axial force for 30,000 h(6)(7)	$F_{a\,30.000\,h}$		800 (180)	2000 (450)	2100 (473)	
Static radial force(7)(8)	$F_{r\,Stat}$		1500 (338)	2500 (563)	4000 (900)	
Static axial force(7)(8)	$F_{a\,Stat}$		1950 (439)	3800 (855)	3800 (855)	
Tilting moment for 20,000 h(6)(8)	$M_{K\,20.000\,h}$	Nm (lb$_f$.in)	37 (327)	101 (894)	232 (2053)	
Tilting moment for 30,000 h(6)(8)	$M_{K\,30.000\,h}$		29 (257)	84 (743)	188 (1664)	

Moment of inertia			PLQE060	PLQE080	PLQE120	z(1)
Mass moment of inertia(2)	J	kgcm^2 (lb$_f$.in.s^{2}10^{-4})	0.066 - 0.142 (0.584 - 1.257)	0.371 - 0.783 (3.283 - 6.930)	1.381 - 2.393 (12.222 - 21.178)	1
			0.066 - 0.123 (0.584 - 1.089)	0.366 - 0.625 (3.239 - 5.531)	1.414 - 2.292 (12.514 - 20.284)	2
			0.066 - 0.076 (0.584 - 0.673)	0.365 - 0.590 (3.230 - 5.222)	1.413 - 2.196 (12.505 - 19.435)	3

(1) Number of stages
(2) The ratio-dependent values can be retrieved in Tec Data Finder – www.neugart.com
(3) T_{min} = -40°C (-40°F). Optimal operating temperature max. 50°C (122°F)
(4) Sound pressure level from 1 m, measured on input running at n_1=3000 rpm no load; i=5
(5) Max. motor weight* in kg = 0.2 x M_b / motor length in m
* with symmetrically distributed motor weight
* with horizontal and stationary mounting
(6) These values are based on an output shaft speed of n_2=100 rpm
(7) Based on center of output shaft
(8) 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

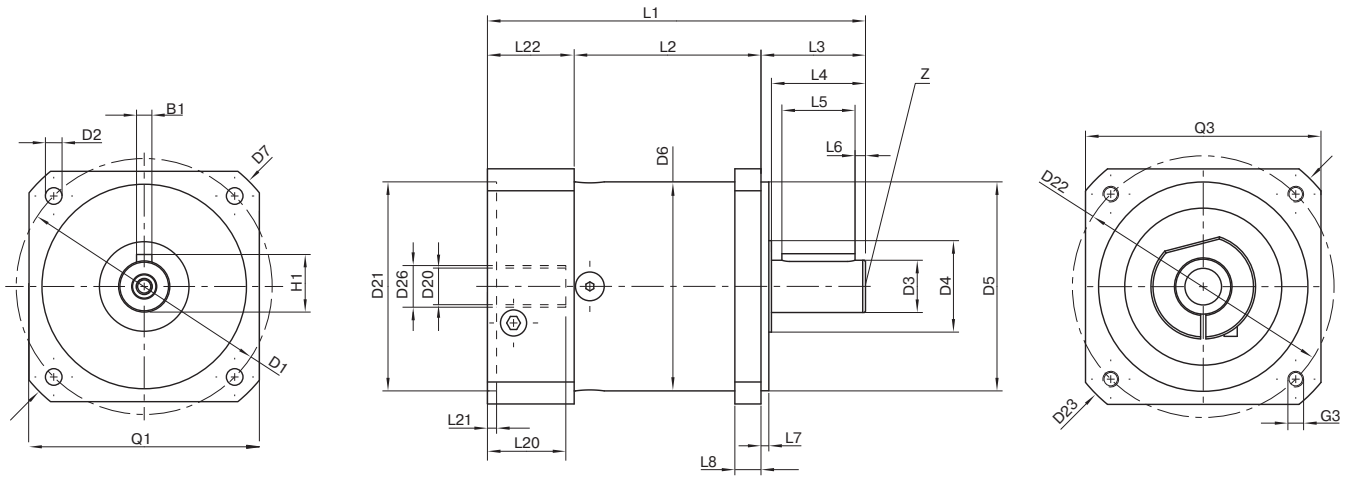
Output torques			PLQE060	PLQE080	PLQE120	i[1]	z[2]
Nominal output torque[3][4]	T_{2N}	Nm (lb_f.in)	28 (248)	85 (752)	115 (1018)	3	1
			38 (336)	115 (1018)	155 (1372)	4	
			40 (354)	110 (974)	195 (1726)	5	
			25 (221)	65 (575)	135 (1195)	7	
			18 (159)	50 (443)	120 (1062)	8	
			15 (133)	38 (336)	95 (841)	10	
			44 (389)	130 (1151)	210 (1859)	9	2
			44 (389)	120 (1062)	260 (2301)	12	
			44 (389)	110 (974)	230 (2036)	15	
			44 (389)	120 (1062)	260 (2301)	16	
			44 (389)	120 (1062)	260 (2301)	20	
			40 (354)	110 (974)	230 (2036)	25	
			44 (389)	120 (1062)	260 (2301)	32	
			40 (354)	110 (974)	230 (2036)	40	
			18 (159)	50 (443)	120 (1062)	64	
			44 (389)	110 (974)	260 (2301)	60	3
			44 (389)	120 (1062)	260 (2301)	80	
			44 (389)	120 (1062)	260 (2301)	100	
			44 (389)	110 (974)	230 (2036)	120	
			44 (389)	120 (1062)	260 (2301)	160	
			40 (354)	110 (974)	230 (2036)	200	
			44 (389)	120 (1062)	260 (2301)	256	
			40 (354)	110 (974)	230 (2036)	320	
			18 (159)	50 (443)	120 (1062)	512	
Max. output torque[4][5]	T_{2max}	Nm (lb_f.in)	45 (398)	136 (1204)	184 (1628)	3	1
			61 (540)	184 (1628)	248 (2195)	4	
			64 (566)	176 (1558)	312 (2761)	5	
			40 (354)	104 (920)	216 (1912)	7	
			29 (257)	80 (708)	192 (1699)	8	
			24 (212)	61 (540)	152 (1345)	10	
			70 (620)	208 (1841)	336 (2974)	9	2
			70 (620)	192 (1699)	416 (3682)	12	
			70 (620)	176 (1558)	368 (3257)	15	
			70 (620)	192 (1699)	416 (3682)	16	
			70 (620)	192 (1699)	416 (3682)	20	
			64 (566)	176 (1558)	368 (3257)	25	
			70 (620)	192 (1699)	416 (3682)	32	
			64 (566)	176 (1558)	368 (3257)	40	
			29 (257)	80 (708)	192 (1699)	64	
			70 (620)	176 (1558)	416 (3682)	60	3
			70 (620)	192 (1699)	416 (3682)	80	
			70 (620)	192 (1699)	416 (3682)	100	
			70 (620)	176 (1558)	368 (3257)	120	
			70 (620)	192 (1699)	416 (3682)	160	
			64 (566)	176 (1558)	368 (3257)	200	
			70 (620)	192 (1699)	416 (3682)	256	
			64 (566)	176 (1558)	368 (3257)	320	
			29 (257)	80 (708)	192 (1699)	512	

[1] Ratios ($i=n_1/n_2$)
[2] Number of stages
[3] Application specific configuration with NCP – www.neugart.com
[4] Values for feather key (code "A"): for repeated load
[5] 30,000 rotations of the output shaft permitted; see page 136

Output torques			PLQE060	PLQE080	PLQE120	i[1]	z[2]
Emergency stop torque[3]	T_{2Stop}	Nm (lb_f.in)	66 (584)	180 (1593)	390 (3452)	3	1
			88 (779)	240 (2124)	520 (4602)	4	
			80 (708)	220 (1947)	500 (4425)	5	
			80 (708)	178 (1575)	340 (3009)	7	
			80 (708)	190 (1682)	380 (3363)	8	
			80 (708)	200 (1770)	480 (4248)	10	
			88 (779)	260 (2301)	500 (4425)	9	2
			88 (779)	240 (2124)	520 (4602)	12	
			88 (779)	220 (1947)	500 (4425)	15	
			88 (779)	240 (2124)	520 (4602)	16	
			88 (779)	240 (2124)	520 (4602)	20	
			80 (708)	220 (1947)	500 (4425)	25	
			88 (779)	240 (2124)	520 (4602)	32	
			80 (708)	220 (1947)	500 (4425)	40	
			80 (708)	190 (1682)	380 (3363)	64	
			88 (779)	220 (1947)	520 (4602)	60	3
			88 (779)	240 (2124)	520 (4602)	80	
			88 (779)	240 (2124)	520 (4602)	100	
			88 (779)	220 (1947)	500 (4425)	120	
			88 (779)	240 (2124)	520 (4602)	160	
			80 (708)	220 (1947)	500 (4425)	200	
			88 (779)	240 (2124)	520 (4602)	256	
			80 (708)	220 (1947)	500 (4425)	320	
			80 (708)	190 (1682)	380 (3363)	512	

Input speeds			PLQE060	PLQE080	PLQE120	i[1]	z[2]
Average thermal input speed at T_{2N} and S1[4][5]	n_{1N}	rpm	4500[6]	3400[6]	3400[6]	3	1
			4500[6]	3450[6]	3500[6]	4	
			4500	4000[6]	3500[6]	5	
			4500	4000	3500	7	
			4500	4000	3500	8	
			4500	4000	3500	10	
			4500	4000[6]	3500[6]	9	2
			4500	4000[6]	3500[6]	12	
			4500	4000	3500[6]	15	
			4500	4000	3500[6]	16	
			4500	4000	3500	20	
			4500	4000	3500	25	
			4500	4000	3500	32	
			4500	4000	3500	40	
			4500	4000	3500	64	
			4500	4000	3500	60	3
			4500	4000	3500	80	
			4500	4000	3500	100	
			4500	4000	3500	120	
			4500	4000	3500	160	
			4500	4000	3500	200	
			4500	4000	3500	256	
			4500	4000	3500	320	
			4500	4000	3500	512	
Max. mechanical input speed[4]	n_{1Limit}	rpm	13000	7000	6500		

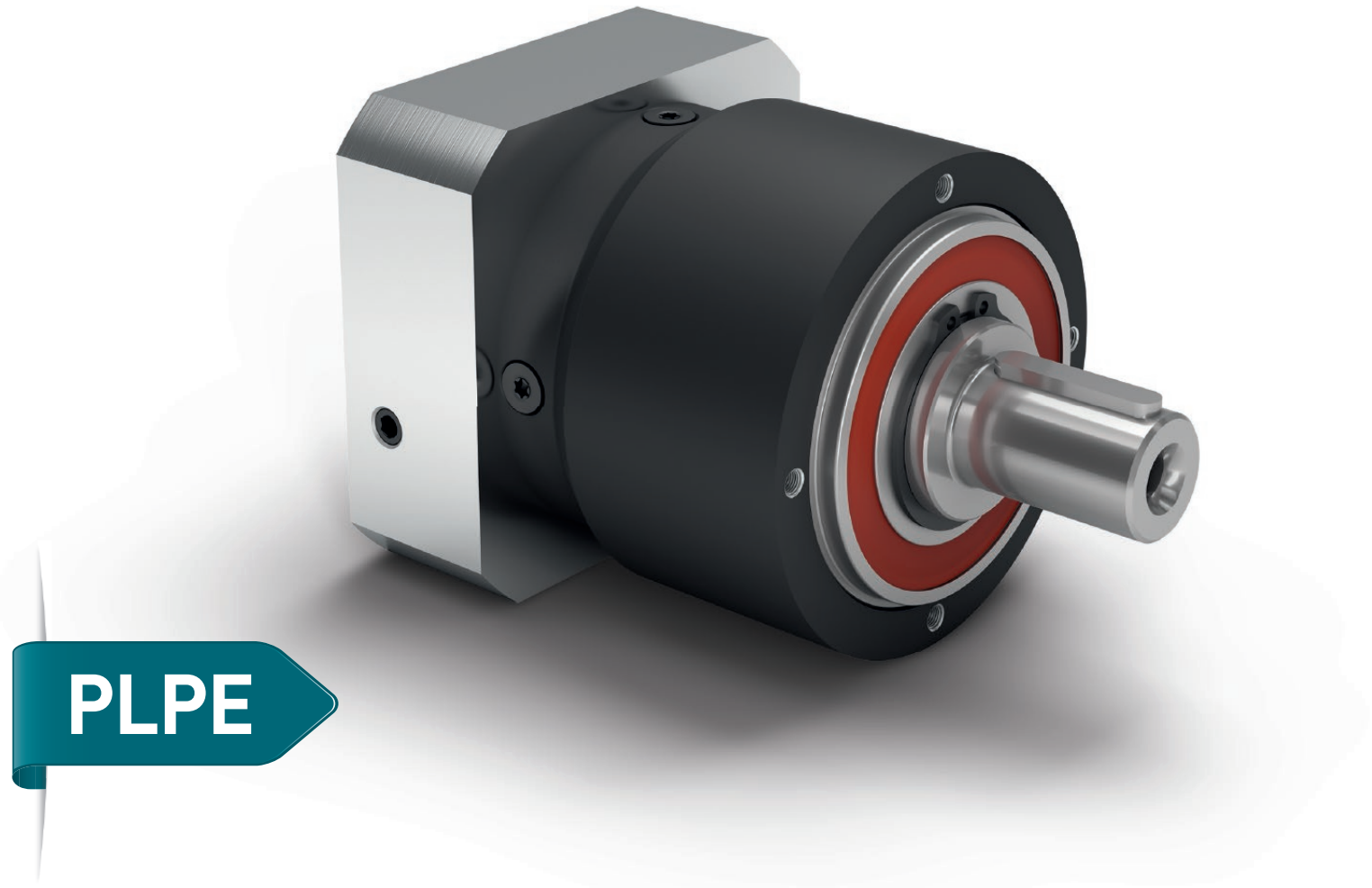
[1] Ratios ($i=n_1/n_2$)
[2] Number of stages
[3] Permitted 1000 times
[4] Application-specific speed configurations with NCP – www.neugart.com
[5] See page 136 for the definition
[6] Average thermal input speed at 50% T_{2N} and S1



Drawing corresponds to a PLQE080 / 1-stage / output shaft with feather key / 19 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[1]			PLQE060	PLQE080	PLQE120	z[2]	Code
Pitch circle diameter output	D1		75 (2.953)	100 (3.937)	130 (5.118)		
Mounting bore output	D2	4x	5.5 (0.217)	6.5 (0.256)	8.5 (0.335)		
Shaft diameter output	D3	h7	16 (0.630)	20 (0.787)	25 (0.984)		
Shaft collar output	D4		20 (0.787)	35 (1.378)	35 (1.378)		
Centering diameter output	D5	h7	60 (2.362)	80 (3.150)	110 (4.331)		
Housing diameter	D6		60 (2.362)	80 (3.150)	115 (4.528)		
Diagonal dimension output	D7		92 (3.622)	116 (4.567)	145 (5.709)		
Flange cross section output	Q1	■	70 (2.756)	90 (3.543)	115 (4.528)		
Min. total length	L1		111 (4.370)	145 (5.709)	201.5 (7.933)	1	
			123.5 (4.862)	162.5 (6.398)	229.5 (9.035)	2	
			136 (5.354)	180 (7.087)	257 (10.118)	3	
Housing length	L2		55 (2.165)	71.5 (2.815)	99 (3.898)	1	
			67.5 (2.657)	89 (3.504)	127 (5.000)	2	
			80 (3.150)	106.5 (4.193)	154.5 (6.083)	3	
Shaft length output	L3		32 (1.260)	40 (1.575)	55 (2.165)		
Centering depth output	L7		3 (0.118)	3 (0.118)	4 (0.157)		
Flange thickness output	L8		10 (0.394)	10 (0.394)	15 (0.591)		
Clamping system diameter input	D26		More information on page 125				
Motor shaft diameter j6/k6	D20		The dimensions vary with the motor/gearbox flange. The input flange geometries can be retrieved for each specific motor in Tec Data Finder at www.neugart.com				
Max. permis. motor shaft length	L20						
Min. permis. 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 6885-1)			A 5x5x20	A 6x6x28	A 8x7x40		A
Feather key width (DIN 6885-1)	B1		5 (0.197)	6 (0.236)	8 (0.315)		
Shaft height including feather key (DIN 6885-1)	H1		18 (0.709)	22.5 (0.886)	28 (1.102)		
Shaft length from shoulder	L4		28 (1.102)	36 (1.417)	50 (1.969)		
Feather key length	L5		20 (0.787)	28 (1.102)	40 (1.575)		
Distance from shaft end	L6		4 (0.157)	4 (0.157)	5 (0.197)		
Center hole (DIN 332, type DR)	Z		M5x12.5	M6x16	M10x22		
Smooth output shaft							B
Shaft length from shoulder	L4		28 (1.102)	36 (1.417)	50 (1.969)		

[1] Dimensions in mm (in)
[2] Number of stages



PLPE

The cost effective planetary gearbox with the best torque-low heat performance

Our **PLPE** unites the best properties of the Economy Line with a performance advantage. It is cost effective, yet powerful, and generates minimal heat. The optimized output bearing has been designed for high radial and axial forces.

1 High axial and radial forces

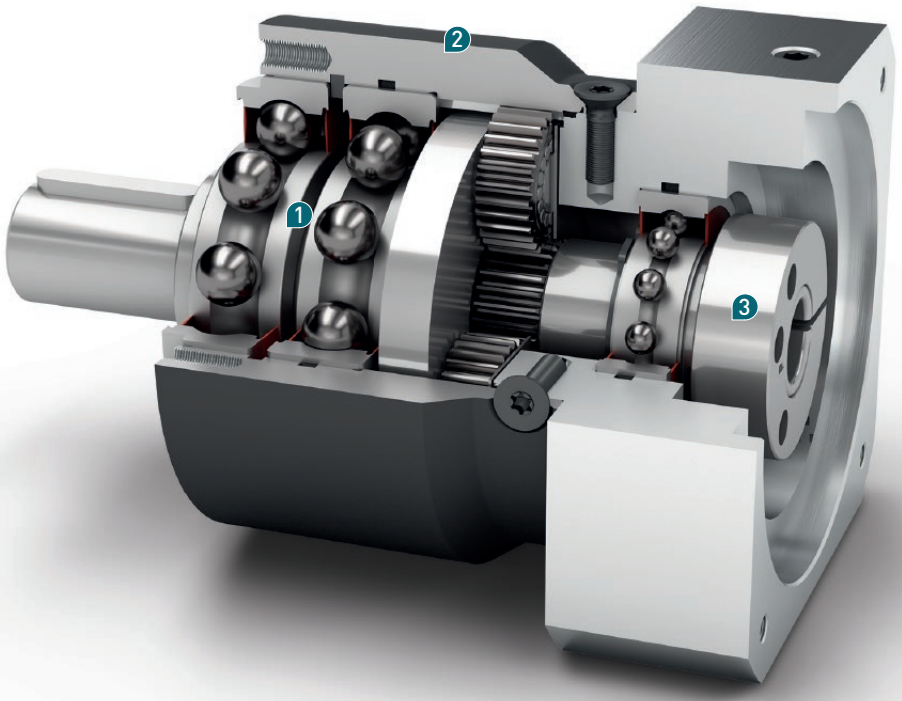
The large deep groove ball bearings in the **PLPE** can absorb large radial and axial forces. Your drive elements can therefore be installed directly on the output shaft without the need for additional bearing components. This makes it easy to use and flexible.

2 Best price

The **PLPE** is one of the pillars of our Economy Line. You are given a powerful planetary gearbox with very high energy efficiency – and that at a particularly fair price.

3 Low heat generation at the highest speeds

Its low-friction bearing design and optimized lubrication make the **PLPE** extremely resistant. And thanks to its low heat generation, it also passes the most demanding tests.



- For any mounting position
- Individual adaptation of the input flange to the motor
- Lifetime lubrication for maintenance-free operation
- Equidirectional rotation
- Wide range of output shaft designs
- Clamping systems with optimized mass moment of inertia
- Precise gearing

Code	Gearbox characteristics			PLPE050	PLPE070	PLPE090	PLPE120	PLPE155	z(1)
	Service life	t_L	h	30000					
	Efficiency at full load(2)	η	%	98					1
				97					2
	Min. operating temperature	T_{min}	°C (°F)	-25 (-13)					
	Max. operating temperature	T_{max}		90 (194)					
	Protection class			IP 54					
S	Standard lubrication			Grease					
F	Food grade lubrication			Grease					
L	Low temperature lubrication(3)			Grease					
	Installation position			Any					
S	Standard backlash	j_t	arcmin	< 15	< 10	< 7	< 7	< 8	1
				< 19	< 12	< 9	< 9	< 10	2
	Torsional stiffness(2)	c_g	Nm/arcmin (lb_f.in/arcmin)	0.8 - 1.1 (7 - 10)	2.6 - 3.5 (23 - 31)	7.3 - 9.8 (65 - 87)	20.0 - 27.0 (177 - 239)	38.5 - 52.0 (341 - 460)	1
				0.8 - 1.1 (7 - 10)	2.7 - 3.5 (24 - 31)	7,4 - 9,8 (65 - 87)	20.5 - 27.0 (181 - 239)	39.5 - 52.0 (350 - 460)	2
	Gearbox weight	m_G	kg (lb_m)	0.7 (1.5)	1.5 (3.3)	3 (6.6)	7.5 (16.5)	16.5 (36.4)	1
				0.9 (2.0)	1.8 (4.0)	3.7 (8.2)	9.7 (21.4)	20.5 (45.2)	2
S	Standard surface			Housing: Steel – nitrocarburized and post-oxidized (black)					
	Running noise(4)	Q_g	dB(A)	58	58	60	65	70	
	Max. bending moment based on the gearbox input flange(5)	M_b	Nm (lb_f.in)	3 (27)	8 (71)	16 (142)	40 (354)	180 (1593)	
	Motor flange precision			DIN 42955-N					

Output shaft loads			PLPE050	PLPE070	PLPE090	PLPE120	PLPE155	z(1)
Radial force for 20,000 h(6)(7)	$F_{r\,20.000\,h}$	N (lb_f)	800 (180)	1050 (236)	1900 (428)	2500 (563)	5200 (1170)	
Axial force for 20,000 h(6)(7)	$F_{a\,20.000\,h}$		1000 (225)	1350 (304)	2000 (450)	4000 (900)	7000 (1575)	
Radial force for 30,000 h(6)(7)	$F_{r\,30.000\,h}$		700 (158)	900 (203)	1700 (383)	2150 (484)	4600 (1035)	
Axial force for 30,000 h(6)(7)	$F_{a\,30.000\,h}$		800 (180)	1000 (225)	1500 (338)	3000 (675)	6000 (1350)	
Static radial force(7)(8)	$F_{r\,Stat}$		1300 (293)	1650 (371)	3100 (698)	4000 (900)	8400 (1890)	
Static axial force(7)(8)	$F_{a\,Stat}$		1000 (225)	2100 (473)	3800 (855)	5900 (1328)	11000 (2475)	
Tilting moment for 20,000 h(6)(8)	$M_{K\,20.000\,h}$	Nm (lb_f.in)	26 (230)	42 (372)	99 (876)	168 (1487)	497 (4398)	
Tilting moment for 30,000 h(6)(8)	$M_{K\,30.000\,h}$		22 (195)	36 (319)	89 (788)	144 (1274)	440 (3894)	

Moment of inertia			PLPE050	PLPE070	PLPE090	PLPE120	PLPE155	z(1)
Mass moment of inertia(2)	J	kgcm² (lb_f.in.s²10⁻⁴)	0.015 - 0.030 (0.133 - 0.266)	0.069 - 0.174 (0.611 - 1.540)	0.374 - 0.789 (3.310 - 6.983)	1.419 - 2.764 (12.558 - 24.461)	4.932 - 7.611 (43.648 - 67.357)	1
			0.014 - 0.026 (0.124 - 0.230)	0.064 - 0.126 (0.566 - 1.115)	0.356 - 0.625 (3.151 - 5.531)	1.376 - 2.334 (12.178 - 20.656)	4.759 - 7.108 (42.117 - 62.906)	2

(1) Number of stages
(2) The ratio-dependent values can be retrieved in Tec Data Finder – www.neugart.com
(3) T_{min} = -40°C (-40°F). Optimal operating temperature max. 50°C (122°F)
(4) Sound pressure level from 1 m, measured on input running at n_1=3000 rpm no load; i=5
(5) Max. motor weight* in kg = 0.2 x M_b / motor length in m
* with symmetrically distributed motor weight
* with horizontal and stationary mounting
(6) These values are based on an output shaft speed of n_2=100 rpm
(7) Based on center of output shaft
(8) 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

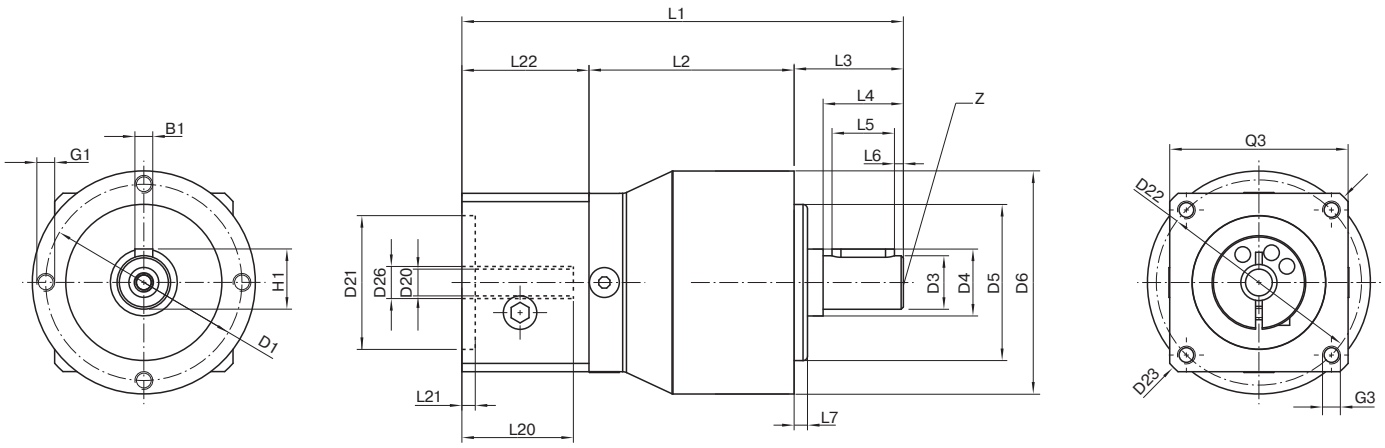
Output torques			PLPE050	PLPE070	PLPE090	PLPE120	PLPE155	i(1)	z(2)
Nominal output torque(3)(4)	T_{2N}	Nm (lb_f.in)	11 (97)	28 (248)	85 (752)	115 (1018)	-	3	1
			15 (133)	33 (292)	90 (797)	155 (1372)	460 (4071)	4	
			13 (115)	30 (266)	82 (726)	172 (1522)	445 (3938)	5	
			8.5 (75)	25 (221)	65 (575)	135 (1195)	-	7	
			6 (53)	18 (159)	50 (443)	120 (1062)	-	8	
			5 (44)	15 (133)	38 (336)	95 (841)	210 (1859)	10	
			12 (106)	33 (292)	97 (858)	157 (1389)	-	9	2
			15 (133)	33 (292)	90 (797)	195 (1726)	-	12	
			13 (115)	33 (292)	82 (726)	172 (1522)	-	15	
			15 (133)	33 (292)	90 (797)	195 (1726)	460 (4071)	16	
			15 (133)	33 (292)	90 (797)	195 (1726)	460 (4071)	20	
			13 (115)	30 (266)	82 (726)	172 (1522)	445 (3938)	25	
			15 (133)	33 (292)	90 (797)	195 (1726)	-	32	
			13 (115)	30 (266)	82 (726)	172 (1522)	460 (4071)	40	
			-	-	-	-	445 (3938)	50	
			7.5 (66)	18 (159)	50 (443)	120 (1062)	-	64	
			5 (44)	15 (133)	38 (336)	95 (841)	210 (1859)	100	
Max. output torque(4)(5)	T_{2max}	Nm (lb_f.in)	17.5 (155)	45 (398)	136 (1204)	184 (1628)	-	3	1
			24 (212)	53 (469)	144 (1274)	248 (2195)	736 (6514)	4	
			21 (186)	48 (425)	131 (1159)	275 (2434)	712 (6301)	5	
			13.5 (119)	40 (354)	104 (920)	216 (1912)	-	7	
			9.5 (84)	29 (257)	80 (708)	192 (1699)	-	8	
			8 (71)	24 (212)	61 (540)	152 (1345)	336 (2974)	10	
			19 (168)	53 (469)	155 (1372)	251 (2221)	-	9	2
			24 (212)	53 (469)	144 (1274)	312 (2761)	-	12	
			21 (186)	53 (469)	131 (1159)	275 (2434)	-	15	
			24 (212)	53 (469)	144 (1274)	312 (2761)	736 (6514)	16	
			24 (212)	53 (469)	144 (1274)	312 (2761)	736 (6514)	20	
			21 (186)	48 (425)	131 (1159)	275 (2434)	712 (6301)	25	
			24 (212)	53 (469)	144 (1274)	312 (2761)	-	32	
			21 (186)	48 (425)	131 (1159)	275 (2434)	736 (6514)	40	
			-	-	-	-	712 (6301)	50	
			12 (106)	29 (257)	80 (708)	192 (1699)	-	64	
			8 (71)	24 (212)	61 (540)	152 (1345)	336 (2974)	100	

(1) Ratios ($i=n_1/n_2$)
(2) Number of stages
(3) Application specific configuration with NCP – www.neugart.com
(4) Values for feather key (code "A"): for repeated load
(5) 30,000 rotations of the output shaft permitted; see page 136

Output torques			PLPE050	PLPE070	PLPE090	PLPE120	PLPE155	i[1]	z[2]
Emergency stop torque[3]	T_{2Stop}	Nm ($lb_f.in$)	22,5 (199)	66 (584)	180 (1593)	390 (3452)	-	3	1
			30 (266)	88 (779)	240 (2124)	520 (4602)	920 (8142)	4	
			36 (319)	80 (708)	220 (1947)	500 (4425)	890 (7877)	5	
			26 (230)	80 (708)	178 (1575)	340 (3009)	-	7	
			27 (239)	80 (708)	190 (1682)	380 (3363)	-	8	
			27 (239)	80 (708)	200 (1770)	480 (4248)	420 (3717)	10	
			33 (292)	88 (779)	260 (2301)	500 (4425)	-	9	2
			40 (354)	88 (779)	240 (2124)	520 (4602)	-	12	
			36 (319)	88 (779)	220 (1947)	500 (4425)	-	15	
			40 (354)	88 (779)	240 (2124)	520 (4602)	920 (8142)	16	
			40 (354)	88 (779)	240 (2124)	520 (4602)	920 (8142)	20	
			36 (319)	80 (708)	220 (1947)	500 (4425)	890 (7877)	25	
			40 (354)	88 (779)	240 (2124)	520 (4602)	-	32	
			36 (319)	80 (708)	220 (1947)	500 (4425)	920 (8142)	40	
			-	-	-	-	890 (7877)	50	
			27 (239)	80 (708)	190 (1682)	380 (3363)	-	64	
			27 (239)	80 (708)	200 (1770)	480 (4248)	420 (3717)	100	

Input speeds			PLPE050	PLPE070	PLPE090	PLPE120	PLPE155	i[1]	z[2]
Average thermal input speed at T_{2N} and S1[4][5]	n_{1N}	rpm	5000	4500[6]	3250[6]	2650[6]	-	3	1
			5000	4500[6]	3750[6]	2800[6]	1800[6]	4	
			5000	4500	4000[6]	3100[6]	2150[6]	5	
			5000	4500	4000	3500[6]	-	7	
			5000	4500	4000	3500	-	8	
			5000	4500	4000	3500	3000	10	
			5000	4500	4000[6]	3500[6]	-	9	2
			5000	4500	4000	3500[6]	-	12	
			5000	4500	4000	3500[6]	-	15	
			5000	4500	4000	3500[6]	2900[6]	16	
			5000	4500	4000	3500	3000[6]	20	
			5000	4500	4000	3500	3000[6]	25	
			5000	4500	4000	3500	-	32	
			5000	4500	4000	3500	3000	40	
			-	-	-	-	3000	50	
			5000	4500	4000	3500	-	64	
			5000	4500	4000	3500	3000	100	
Max. mechanical input speed[4]	n_{1Limit}		18000	13000	7000	6500	5500		

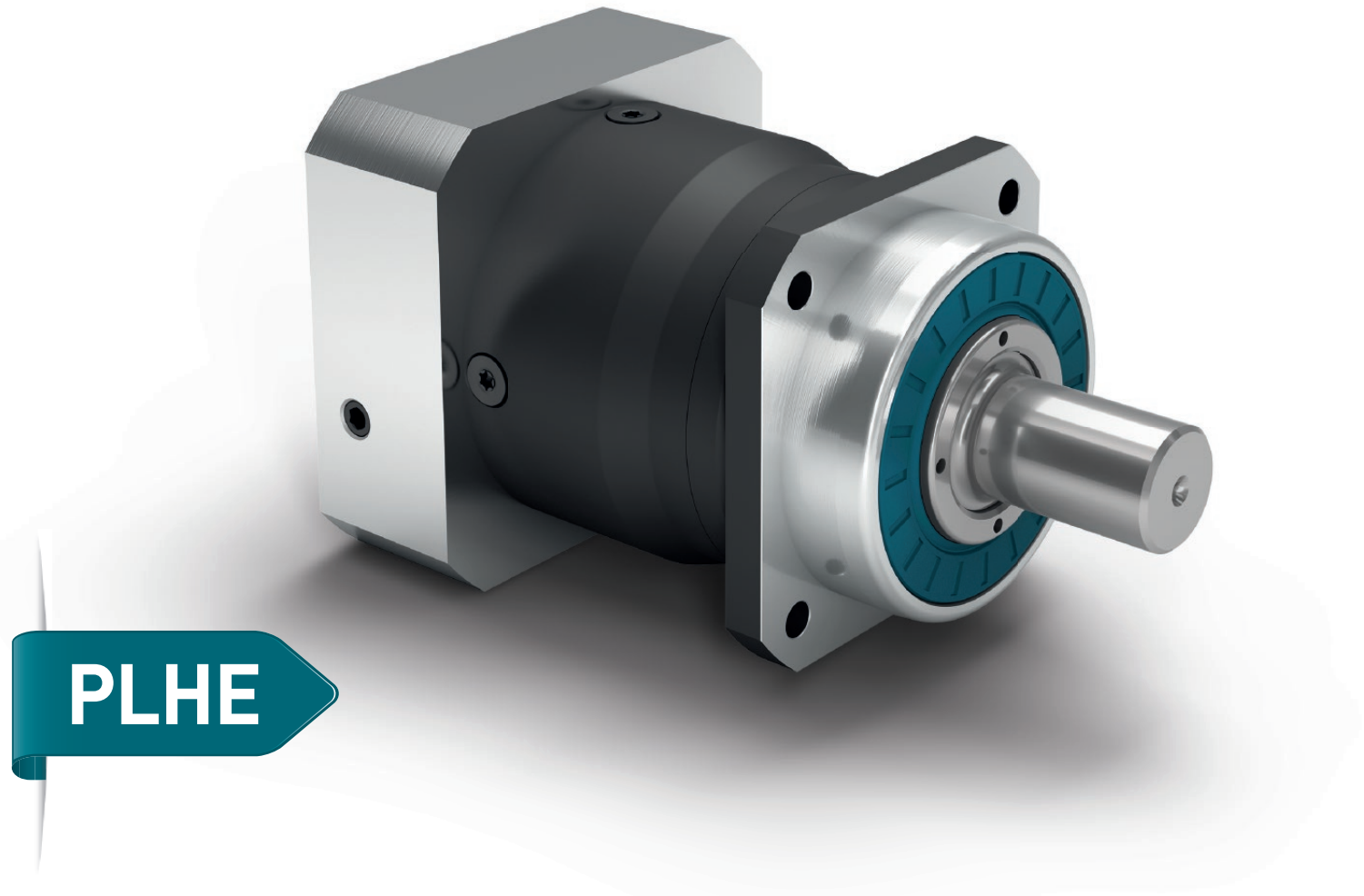
(1) Ratios ($i=n_1/n_2$)
(2) Number of stages
(3) Permitted 1000 times
(4) Application-specific speed configurations with NCP – www.neugart.com
(5) See page 136 for the definition
(6) Average thermal input speed at 50% T_{2N} and S1



Drawing corresponds to a PLPE050 / 1-stage / output shaft with feather key / 8 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[1]			PLPE050	PLPE070	PLPE090	PLPE120	PLPE155	z[2]	Code
Pitch circle diameter output	D1		44 (1.732)	62 (2.441)	80 (3.150)	108 (4.252)	140 (5.512)		
Shaft diameter output	D3	k7	12 (0.472)	16 (0.630)	22 (0.866)	32 (1.260)	40 (1.575)		
Shaft collar output	D4		15 (0.591)	30 (1.181)	35 (1.378)	50 (1.969)	55 (2.165)		
Centering diameter output	D5	h7	35 (1.378)	52 (2.047)	68 (2.677)	90 (3.543)	120 (4.724)		
Housing diameter	D6		50 (1.969)	70 (2.756)	90 (3.543)	120 (4.724)	155 (6.102)		
Mounting thread x depth	G1	4x	M4x8	M5x8	M6x9	M8x20	M10x20		
Min. total length	L1		94 (3.701)	111 (4.370)	147 (5.787)	192 (7.559)	275.5 (10.846)	1	
			106.5 (4.193)	124 (4.882)	165 (6.496)	219.5 (8.642)	320 (12.598)	2	
Housing length	L2		46 (1.811)	51 (2.008)	67.5 (2.657)	76.5 (3.012)	100 (3.937)	1	
			58.5 (2.303)	64 (2.520)	85.5 (3.366)	104 (4.094)	144.5 (5.689)	2	
Shaft length output	L3		24.5 (0.965)	36 (1.417)	46 (1.811)	68 (2.677)	97 (3.819)		
Centering depth output	L7		3 (0.118)	3 (0.118)	4 (0.157)	5 (0.197)	8 (0.315)		
Clamping system diameter input	D26		More information on page 125						
Motor shaft diameter j6/k6	D20		The dimensions vary with the motor/gearbox flange. The input flange geometries can be retrieved for each specific motor in Tec Data Finder at www.neugart.com						
Max. permis. motor shaft length	L20								
Min. permis. 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 6885-1)			A 4x4x14	A 5x5x25	A 6x6x32	A 10x8x50	A 12x8x70		A
Feather key width (DIN 6885-1)	B1		4 (0.157)	5 (0.197)	6 (0.236)	10 (0.394)	12 (0.472)		
Shaft height including feather key (DIN 6885-1)	H1		13.5 (0.531)	18 (0.709)	24.5 (0.965)	35 (1.378)	43 (1.693)		
Shaft length from shoulder	L4		18 (0.709)	28 (1.102)	36 (1.417)	58 (2.283)	82 (3.228)		
Feather key length	L5		14 (0.551)	25 (0.984)	32 (1.260)	50 (1.969)	70 (2.756)		
Distance from shaft end	L6		2 (0.079)	2 (0.079)	2 (0.079)	4 (0.157)	6 (0.236)		
Center hole (DIN 332, type DR)	Z		M4x10	M5x12.5	M8x19	M12x28	M16x36		
Smooth output shaft									B
Shaft length from shoulder	L4		18 (0.709)	28 (1.102)	36 (1.417)	58 (2.283)	82 (3.228)		

[1] Dimensions in mm (in)
[2] Number of stages



PLHE

This is progress:
In this planetary gearbox, precision and cost effectiveness meet

The **PLHE** is the world's first combination of economy and precision planetary gearboxes. The prestressed tapered roller bearings of our planetary gearboxes safeguard great stiffness even under the highest loads. The seal we have developed provides the perfect protection against dust and water jets.

1 Perfectly sealed

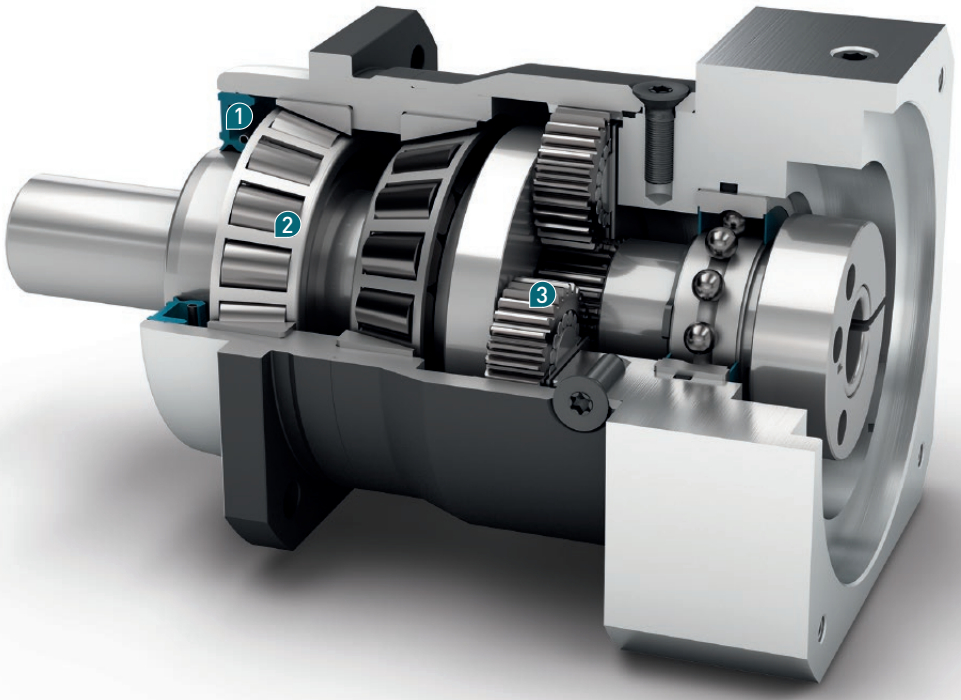
The **PLHE** endures in the most grueling conditions. The prestressed radial shaft seal assembly we have designed even withstands dust and water jets.
Perfect IP 65 protection class, thanks to its smart design.

2 Output bearing for heavy duty applications

The prestressed tapered roller bearings in the **PLHE** safeguard a high stiffness. Even under changing equidirectional rotations, the output bearings remain free of backlash. This gearbox perseveres under continuous loads.

3 The best of both worlds

The **PLHE** is the world's first combination of economy and precision planetary gearbox. It combines high performance with optimal acquisition costs – the perfect symbiosis.



- For any mounting position
- Individual adaptation of the input flange to the motor
- Lifetime lubrication for maintenance-free operation
- Equidirectional rotation
- Wide range of output shaft designs
- Clamping systems with optimized mass moment of inertia
- Precise gearing

Code	Gearbox characteristics			PLHE060	PLHE080	PLHE120	z(1)
	Service life	t_L	h	30,000			
	Efficiency at full load(2)	η	%	97			1
				96			2
	Min. operating temperature	T_{min}	°C (°F)	-25 (-13)			
	Max. operating temperature	T_{max}		90 (194)			
	Protection class			IP 65			
S	Standard lubrication			Grease			
F	Food grade lubrication			Grease			
L	Low temperature lubrication(3)			Grease			
	Installation position			Any			
S	Standard backlash	j_t	arcmin	< 10	< 7	< 7	1
				< 12	< 9	< 9	2
	Torsional stiffness(2)	c_g	Nm/arcmin (lb_f.in/arcmin)	2,2 - 3,0 (19 - 27)	6,0 - 8,0 (53 - 71)	13,4 - 18,0 (119 - 159)	1
				2,3 - 3,0 (20 - 27)	6,1 - 8,0 (54 - 71)	13,7 - 18,0 (121 - 159)	2
	Gearbox weight	m_G	kg (lb_m)	1,4 (3.1)	2,7 (6.0)	6,8 (15.0)	1
				1,6 (3.5)	3,4 (7.5)	8,8 (19.4)	2
S	Standard surface			Housing: Steel – nitrocarburized and post-oxidized (black)			
	Running noise(4)	Q_g	dB(A)	58	60	65	
	Max. bending moment based on the gearbox input flange(5)	M_b	Nm (lb_f.in)	8 (71)	16 (142)	40 (354)	
	Motor flange precision			DIN 42955-N			

Output shaft loads			PLHE060	PLHE080	PLHE120	z(1)
Radial force for 20,000 h(6)(7)	$F_{r\,20.000\,h}$	N (lb_f)	3200 (720)	5500 (1238)	6000 (1350)	
Axial force for 20,000 h(6)(7)	$F_{a\,20.000\,h}$		4400 (990)	6400 (1440)	8000 (1800)	
Radial force for 30,000 h(6)(7)	$F_{r\,30.000\,h}$		3200 (720)	4800 (1080)	5400 (1215)	
Axial force for 30,000 h(6)(7)	$F_{a\,30.000\,h}$		3900 (878)	5700 (1283)	7000 (1575)	
Static radial force(7)(8)	$F_{r\,Stat}$		3200 (720)	5500 (1238)	6000 (1350)	
Static axial force(7)(8)	$F_{a\,Stat}$		4400 (990)	6400 (1440)	8000 (1800)	
Tilting moment for 20,000 h(6)(8)	$M_{K\,20.000\,h}$	Nm (lb_f.in)	191 (1690)	383 (3390)	488 (4319)	
Tilting moment for 30,000 h(6)(8)	$M_{K\,30.000\,h}$		191 (1690)	335 (2965)	439 (3885)	

Moment of inertia			PLHE060	PLHE080	PLHE120	z(1)
Mass moment of inertia(2)	J	kgcm² (lb_f.in.s²10⁻⁴)	0,069 - 0,178 (0.611 - 1.575)	0,370 - 0,775 (3.275 - 6.859)	1,390 - 2,486 (12.302 - 22.001)	1
			0,064 - 0,135 (0.566 - 1.195)	0,357 - 0,638 (3.159 - 5.646)	1,378 - 2,326 (12.195 - 20.585)	2

(1) Number of stages
(2) The ratio-dependent values can be retrieved in Tec Data Finder – www.neugart.com
(3) T_{min} = -40°C (-40°F). Optimal operating temperature max. 50°C (122°F)
(4) Sound pressure level from 1 m, measured on input running at n_1=3000 rpm no load; i=5
(5) Max. motor weight* in kg = 0.2 x M_b / motor length in m
* with symmetrically distributed motor weight
* with horizontal and stationary mounting
(6) These values are based on an output shaft speed of n_2=100 rpm
(7) Based on center of output shaft
(8) 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

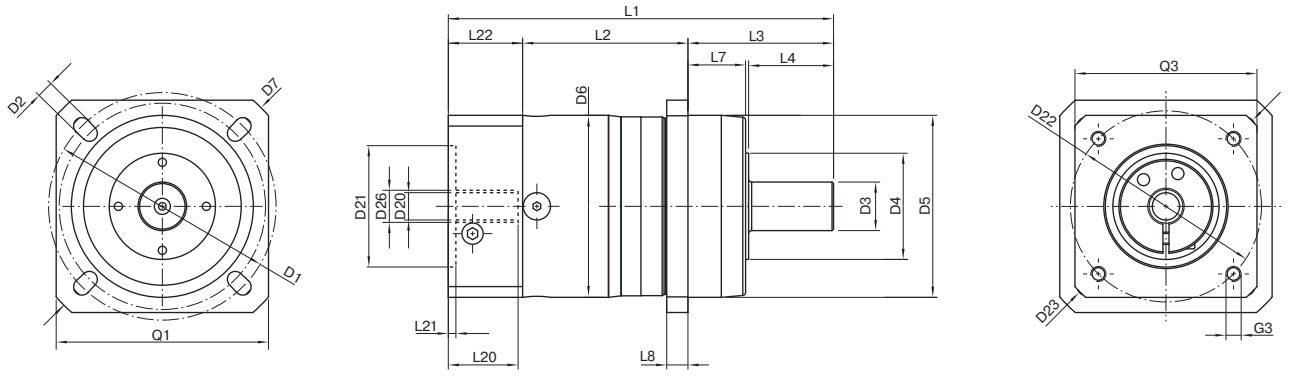
Output torques			PLHE060	PLHE080	PLHE120	i(1)	z(2)
Nominal output torque(3)(4)	T_{2N}	Nm (lb_f.in)	28 (248)	85 (752)	115 (1018)	3	1
			38 (336)	115 (1018)	155 (1372)	4	
			40 (354)	110 (974)	195 (1726)	5	
			25 (221)	65 (575)	135 (1195)	7	
			18 (159)	50 (443)	120 (1062)	8	
			15 (133)	38 (336)	95 (841)	10	
			44 (389)	130 (1151)	210 (1859)	9	2
			44 (389)	120 (1062)	260 (2301)	12	
			44 (389)	110 (974)	230 (2036)	15	
			44 (389)	120 (1062)	260 (2301)	16	
			44 (389)	120 (1062)	260 (2301)	20	
			40 (354)	110 (974)	230 (2036)	25	
			44 (389)	120 (1062)	260 (2301)	32	
			40 (354)	110 (974)	230 (2036)	40	
			18 (159)	50 (443)	120 (1062)	64	
			15 (133)	38 (336)	95 (841)	100	
Max. output torque(4)(5)	T_{2max}	Nm (lb_f.in)	45 (398)	136 (1204)	184 (1628)	3	1
			61 (540)	184 (1628)	248 (2195)	4	
			64 (566)	176 (1558)	312 (2761)	5	
			40 (354)	104 (920)	216 (1912)	7	
			29 (257)	80 (708)	192 (1699)	8	
			24 (212)	61 (540)	152 (1345)	10	
			70 (620)	208 (1841)	336 (2974)	9	2
			70 (620)	192 (1699)	416 (3682)	12	
			70 (620)	176 (1558)	368 (3257)	15	
			70 (620)	192 (1699)	416 (3682)	16	
			70 (620)	192 (1699)	416 (3682)	20	
			64 (566)	176 (1558)	368 (3257)	25	
			70 (620)	192 (1699)	416 (3682)	32	
			64 (566)	176 (1558)	368 (3257)	40	
			29 (257)	80 (708)	192 (1699)	64	
			24 (212)	61 (540)	152 (1345)	100	

(1) Ratios ($i=n_1/n_2$)
(2) Number of stages
(3) Application specific configuration with NCP – www.neugart.com
(4) Values for feather key (code "A"): for repeated load
(5) 30,000 rotations of the output shaft permitted; see page 136

Output torques			PLHE060	PLHE080	PLHE120	i[1]	z[2]
Emergency stop torque[3]	T_{2Stop}	Nm (lb_f.in)	66 (584)	180 (1593)	390 (3452)	3	1
			88 (779)	240 (2124)	520 (4602)	4	
			80 (708)	220 (1947)	500 (4425)	5	
			80 (708)	178 (1575)	340 (3009)	7	
			80 (708)	190 (1682)	380 (3363)	8	
			80 (708)	200 (1770)	480 (4248)	10	
			88 (779)	260 (2301)	500 (4425)	9	2
			88 (779)	240 (2124)	520 (4602)	12	
			88 (779)	220 (1947)	500 (4425)	15	
			88 (779)	240 (2124)	520 (4602)	16	
			88 (779)	240 (2124)	520 (4602)	20	
			80 (708)	220 (1947)	500 (4425)	25	
			88 (779)	240 (2124)	520 (4602)	32	
			80 (708)	220 (1947)	500 (4425)	40	
			80 (708)	190 (1682)	380 (3363)	64	
			80 (708)	200 (1770)	480 (4248)	100	

Input speeds			PLHE060	PLHE080	PLHE120	i[1]	z[2]
Average thermal input speed at T_{2N} and S1[4][5]	n_{1N}	rpm	2950[6]	2450[6]	2150[6]	3	1
			3500[6]	2700[6]	2400[6]	4	
			4200[6]	3250[6]	2600[6]	5	
			4500	4000	3500[6]	7	
			4500	4000	3500[6]	8	
			4500	4000	3500	10	
			4500[6]	4000[6]	3050[6]	9	2
			4500	4000[6]	3200[6]	12	
			4500	4000	3500[6]	15	
			4500	4000	3500[6]	16	
			4500	4000	3500[6]	20	
			4500	4000	3500	25	
			4500	4000	3500	32	
			4500	4000	3500	40	
			4500	4000	3500	64	
			4500	4000	3500	100	
Max. mechanical input speed[4]	n_{1Limit}	rpm	13000	7000	6500		

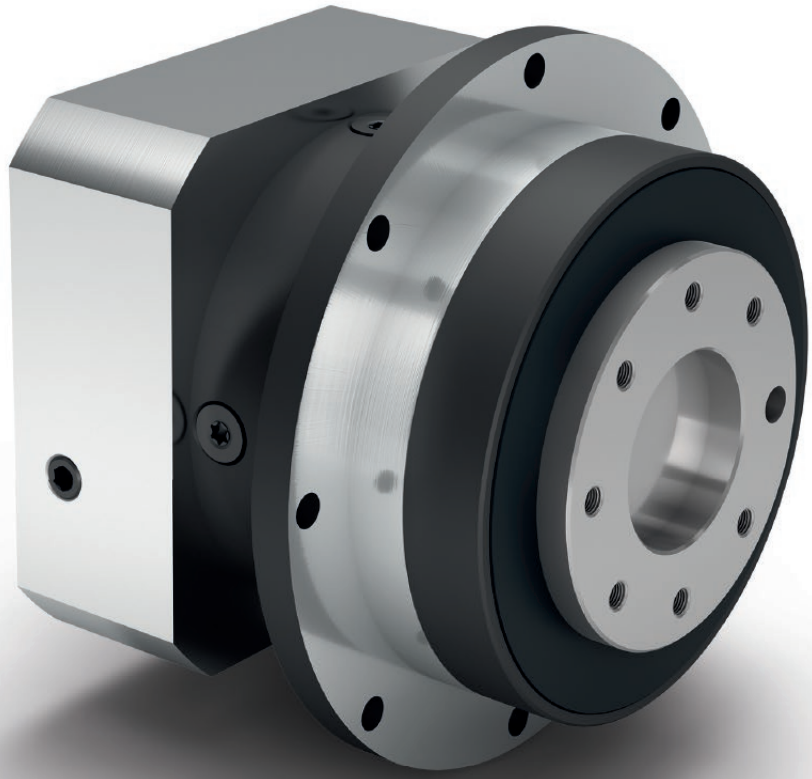
(1) Ratios ($i=n_1/n_2$)
(2) Number of stages
(3) Permitted 1000 times
(4) Application-specific speed configurations with NCP – www.neugart.com
(5) See page 136 for the definition
(6) Average thermal input speed at 50% T_{2N} and S1



Drawing corresponds to a PLHE060 / 1-stage / smooth output shaft / 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[1]			PLHE060	PLHE080	PLHE120	z[2]	Code
Pitch circle diameter output	D1		68 - 75 (2.677 - 2.953)	85 (3.346)	120 (4.724)		
Mounting bore output	D2	4x	5.5 (0.217)	6.5 (0.256)	9.0 (0.354)		
Shaft diameter output	D3	k6	16 (0.630)	22 (0.866)	32 (1.260)		
Shaft collar output	D4		35 (1.378)	40 (1.575)	45 (1.772)		
Centering diameter output	D5	g7	60 (2.362)	70 (2.756)	90 (3.543)		
Housing diameter	D6		60 (2.362)	80 (3.150)	115 (4.528)		
Diagonal dimension output	D7		92 (3.622)	100 (3.937)	140 (5.512)		
Flange cross section output	Q1	■	70 (2.756)	80 (3.150)	110 (4.331)		
Min. total length	L1		127 (5.000)	159.5 (6.280)	199.5 (7.854)	1	
			140 (5.512)	177 (6.968)	227 (8.937)	2	
Housing length	L2		55 (2.165)	69.5 (2.736)	64 (2.520)	1	
			67.5 (2.657)	87.5 (3.445)	91.5 (3.602)	2	
Shaft length output	L3		48 (1.890)	56 (2.205)	88 (3.465)		
Centering depth output	L7		19 (0.748)	17.5 (0.689)	28 (1.102)		
Flange thickness output	L8		7 (0.276)	8 (0.315)	10 (0.394)		
Clamping system diameter input	D26		More information on page 125				
Motor shaft diameter j6/k6	D20		The dimensions vary with the motor/gearbox flange. The input flange geometries can be retrieved for each specific motor in Tec Data Finder at www.neugart.com				
Max. permis. motor shaft length	L20						
Min. permis. 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 6885-1)			A 5x5x25	A 6x6x28	A 10x8x50		A
Feather key width (DIN 6885-1)	B1		5 (0.197)	6 (0.236)	10 (0.394)		
Shaft height including feather key (DIN 6885-1)	H1		18 (0.709)	24.5 (0.965)	35 (1.378)		
Shaft length from shoulder	L4		28 (1.102)	36 (1.417)	58 (2.283)		
Feather key length	L5		25 (0.984)	28 (1.102)	50 (1.969)		
Distance from shaft end	L6		2 (0.079)	4 (0.157)	4 (0.157)		
Center hole (DIN 332, type DR)	Z		M5x12.5	M8x19	M12x28		
Smooth output shaft							B
Shaft length from shoulder	L4		28 (1.102)	36 (1.417)	58 (2.283)		

[1] Dimensions in mm (in)
[2] Number of stages



PLFE

The shortest planetary gearbox with the highest torsional stiffness and flange output shaft

There's no such thing as too short: The **PLFE** is our planetary gearbox with compact flange output shaft. You save more than a third of the space and benefit from a torsional stiffness that is five times higher than conventional products. Due to its standardized flange interface, it is especially easy to install. The integrated dowel hole provides additional secureness during fitting.

1 Easy, reliable and fast installation

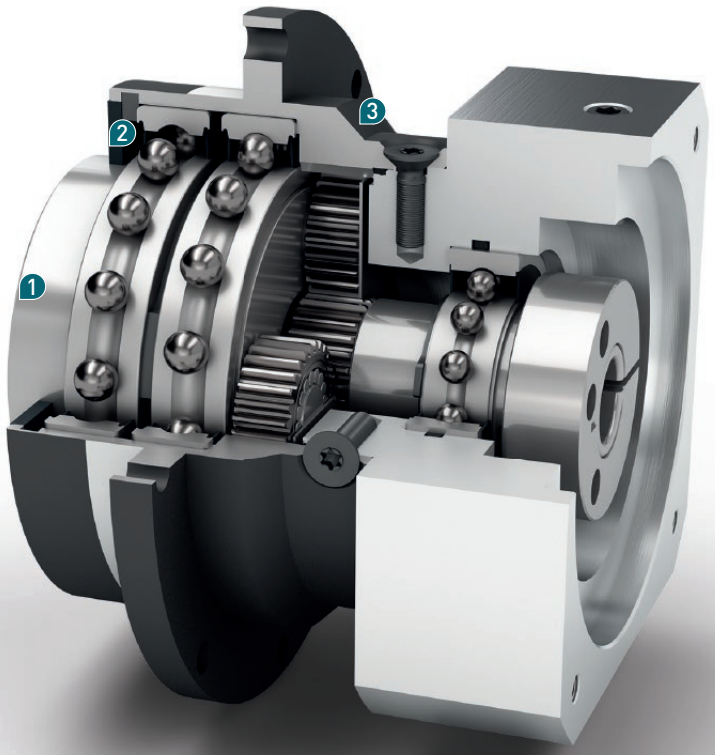
The standardized flange interface of the **PLFE** (EN ISO 9409-1) guarantees quick and easy mounting of the drive components, such as pulley, linear unit, or turntable. The integrated dowel hole provides additional secureness during fitting.

2 Five times higher torsional stiffness

The large diameter of the flange output shaft gives the **PLFE** a considerably greater torsional stiffness than an output shaft with feather key. You therefore get the most out of your drive solution.

3 The compact miracle

The **PLFE** is considerably shorter than comparable planetary gearboxes. Depending on the frame size, the installed length is up to 35% less than comparable conventional products.



- For any mounting position
- Individual adaptation of the input flange to the motor
- Lifetime lubrication for maintenance-free operation
- Equidirectional rotation
- Clamping systems with optimized mass moment of inertia
- Precise gearing

Code	Gearbox characteristics			PLFE064	PLFE090	PLFE110	z(1)
	Service life	t_L	h	30,000			
	Efficiency at full load(2)	η	%	98			1
				97			2
	Min. operating temperature	T_{min}	°C (°F)	-25 (-13)			
	Max. operating temperature	T_{max}		90 (194)			
	Protection class			IP 54			
S	Standard lubrication			Grease			
F	Food grade lubrication			Grease			
L	Low temperature lubrication(3)			Grease			
	Installation position			Any			
S	Standard backlash	j_t	arcmin	< 10	< 7	< 7	1
				< 12	< 9	< 9	2
	Torsional stiffness(2)	c_g	Nm/arcmin (lb_f.in/arcmin)	9.1 - 12.2 (81 - 108)	21.5 - 28.5 (190 - 252)	54.0 - 73.0 (478 - 646)	1
				9.3 - 12.2 (82 - 108)	22.0 - 28.5 (195 - 252)	55.0 - 72.0 (487 - 637)	2
	Gearbox weight	m_G	kg (lb_m)	1.1 (2.4)	2.9 (6.4)	7 (15.4)	1
				1.5 (3.3)	3.3 (7.3)	9 (19.8)	2
S	Standard surface			Housing: Steel – nitrocarburized and post-oxidized (black)			
	Running noise(4)	Q_g	dB(A)	58	60	65	
	Max. bending moment based on the gearbox input flange(5)	M_b	Nm (lb_f.in)	8 (71)	16 (142)	40 (354)	
	Motor flange precision			DIN 42955-N			

Output shaft loads			PLFE064	PLFE090	PLFE110	z(1)
Radial force for 20,000 h(6)(7)	$F_{r\,20.000\,h}$	N (lb_f)	550 (124)	1400 (315)	2400 (540)	
Axial force for 20,000 h(6)(7)	$F_{a\,20.000\,h}$		1200 (270)	3000 (675)	3300 (743)	
Radial force for 30,000 h(6)(7)	$F_{r\,30.000\,h}$		500 (113)	1200 (270)	2100 (473)	
Axial force for 30,000 h(6)(7)	$F_{a\,30.000\,h}$		1200 (270)	3000 (675)	3300 (743)	
Static radial force(7)(8)	$F_{r\,Stat}$		900 (203)	2200 (495)	3800 (855)	
Static axial force(7)(8)	$F_{a\,Stat}$		1200 (270)	3300 (743)	5200 (1170)	
Tilting moment for 20,000 h(6)(8)	$M_{K\,20.000\,h}$	Nm (lb_f.in)	12 (106)	46 (407)	109 (965)	
Tilting moment for 30,000 h(6)(8)	$M_{K\,30.000\,h}$		11 (97)	40 (354)	96 (850)	

Moment of inertia			PLFE064	PLFE090	PLFE110	z(1)
Mass moment of inertia(2)	J	kgcm² (lb_f.in.s²10⁻⁴)	0.072 - 0.210 (0.637 - 1.859)	0.406 - 1.164 (3.593 - 10.301)	1.484 - 3.430 (13.133 - 30.356)	1
			0.064 - 0.130 (0.566 - 1.151)	0.356 - 0.666 (3.151 - 5.894)	1.377 - 2.407 (12.186 - 21.302)	2

(1) Number of stages
(2) The ratio-dependent values can be retrieved in Tec Data Finder – www.neugart.com
(3) T_{min} = -40°C (-40°F). Optimal operating temperature max. 50°C (122°F)
(4) Sound pressure level from 1 m, measured on input running at n_1=3000 rpm no load; i=5
(5) Max. motor weight* in kg = 0.2 x M_b / motor length in m
* with symmetrically distributed motor weight
* with horizontal and stationary mounting
(6) These values are based on an output shaft speed of n_2=100 rpm
(7) Based on the end of the output shaft
(8) 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

Output torques			PLFE064	PLFE090	PLFE110	i[1]	z[2]
Nominal output torque[3]	T_{2N}	Nm (lb_f.in)	28 (248)	85 (752)	115 (1018)	3	1
			38 (336)	115 (1018)	155 (1372)	4	
			40 (354)	110 (974)	195 (1726)	5	
			25 (221)	65 (575)	135 (1195)	7	
			18 (159)	50 (443)	120 (1062)	8	
			15 (133)	38 (336)	95 (841)	10	
			44 (389)	130 (1151)	240 (2124)	9	2
			44 (389)	120 (1062)	260 (2301)	12	
			44 (389)	110 (974)	230 (2036)	15	
			44 (389)	120 (1062)	260 (2301)	16	
			44 (389)	120 (1062)	260 (2301)	20	
			40 (354)	110 (974)	230 (2036)	25	
			44 (389)	120 (1062)	260 (2301)	32	
			40 (354)	110 (974)	230 (2036)	40	
			18 (159)	50 (443)	120 (1062)	64	
			15 (133)	38 (336)	95 (841)	100	
Max. output torque[4]	T_{2max}	Nm (lb_f.in)	45 (398)	136 (1204)	184 (1628)	3	1
			61 (540)	184 (1628)	248 (2195)	4	
			64 (566)	176 (1558)	312 (2761)	5	
			40 (354)	104 (920)	216 (1912)	7	
			29 (257)	80 (708)	192 (1699)	8	
			24 (212)	61 (540)	152 (1345)	10	
			70 (620)	208 (1841)	384 (3398)	9	2
			70 (620)	192 (1699)	416 (3682)	12	
			70 (620)	176 (1558)	368 (3257)	15	
			70 (620)	192 (1699)	416 (3682)	16	
			70 (620)	192 (1699)	416 (3682)	20	
			64 (566)	176 (1558)	368 (3257)	25	
			70 (620)	192 (1699)	416 (3682)	32	
			64 (566)	176 (1558)	368 (3257)	40	
			29 (257)	80 (708)	192 (1699)	64	
			24 (212)	61 (540)	152 (1345)	100	

(1) Ratios ($i=n_1/n_2$)
(2) Number of stages
(3) Application specific configuration with NCP – www.neugart.com
(4) 30,000 rotations of the output shaft permitted; see page 136

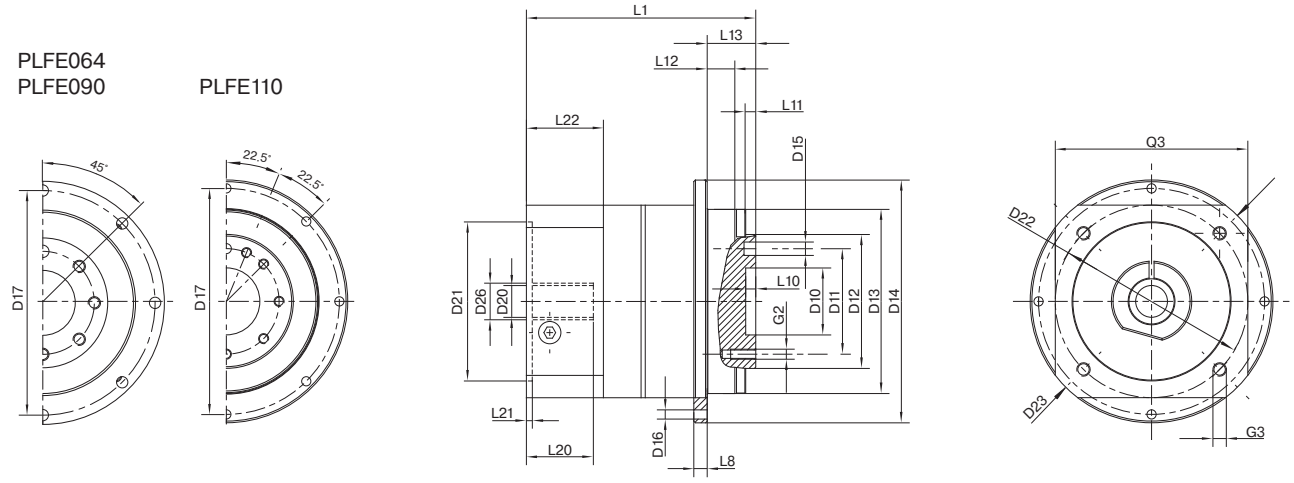
Output torques			PLFE064	PLFE090	PLFE110	i[1]	z[2]
Emergency stop torque[3]	T_{2Stop}	Nm (lb_f.in)	66 (584)	180 (1593)	390 (3452)	3	1
			88 (779)	240 (2124)	520 (4602)	4	
			80 (708)	220 (1947)	500 (4425)	5	
			80 (708)	178 (1575)	340 (3009)	7	
			80 (708)	190 (1682)	380 (3363)	8	
			80 (708)	200 (1770)	480 (4248)	10	
			88 (779)	260 (2301)	500 (4425)	9	2
			88 (779)	240 (2124)	520 (4602)	12	
			88 (779)	220 (1947)	500 (4425)	15	
			88 (779)	240 (2124)	520 (4602)	16	
			88 (779)	240 (2124)	520 (4602)	20	
			80 (708)	220 (1947)	500 (4425)	25	
			88 (779)	240 (2124)	520 (4602)	32	
			80 (708)	220 (1947)	500 (4425)	40	
			80 (708)	190 (1682)	380 (3363)	64	
			80 (708)	200 (1770)	480 (4248)	100	

Input speeds			PLFE064	PLFE090	PLFE110	i[1]	z[2]
Average thermal input speed at T_{2N} and S1[4][5]	n_{1N}	rpm	3950[6]	2800[6]	2350[6]	3	1
			4500[6]	3000[6]	2550[6]	4	
			4500[6]	3550[6]	2700[6]	5	
			4500	4000	3500[6]	7	
			4500	4000	3500[6]	8	
			4500	4000	3500	10	
			4500[6]	4000[6]	2850[6]	9	2
			4500	4000[6]	3100[6]	12	
			4500	4000	3500[6]	15	
			4500	4000	3500[6]	16	
			4500	4000	3500[6]	20	
			4500	4000	3500	25	
			4500	4000	3500	32	
			4500	4000	3500	40	
			4500	4000	3500	64	
			4500	4000	3500	100	
Max. mechanical input speed[4]	n_{1Limit}	rpm	13000	7000	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 136 for the definition
(6) Average thermal input speed at 50% T_{2N} and S1

PLFE064
PLFE090

PLFE110

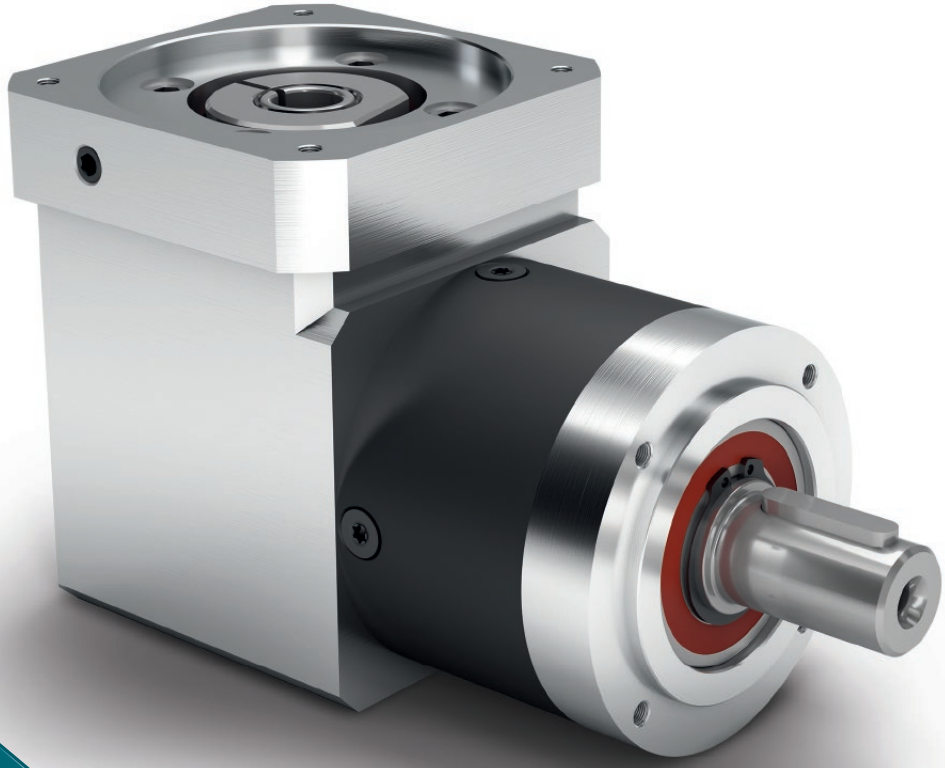


Drawing corresponds to a PLFE110 / 1-stage / flange output shaft with dowel hole / 24 mm clamping system / motor adaptation – one part / B5 flange type motor

All other variants can be retrieved in the Tec Data Finder at www.neugart.com

Geometry[1]			PLFE064	PLFE090	PLFE110	z[2]	Code
Centering diameter output shaft	D10	H7	20 (0.787)	31.5 (1.240)	40 (1.575)		
Pitch circle diameter output shaft	D11		31.5 (1.240)	50 (1.969)	63 (2.480)		
Centering diameter output shaft	D12	h7	40 (1.575)	63 (2.480)	80 (3.150)		
Centering diameter output flange	D13		64 (2.520)	90 (3.543)	110 (4.331)		
Flange diameter output	D14		86 (3.386)	118 (4.646)	145 (5.709)		
Mounting bore output	D16		4.5 8x45°	5.5 8x45°	5.5 8x45°		
Pitch circle diameter output flange	D17		79 (3.110)	109 (4.291)	135 (5.315)		
Min. total length	L1		69 (2.717)	98.5 (3.878)	125.5 (4.941)	1	
			81.5 (3.209)	116 (4.567)	152.5 (6.004)	2	
Flange thickness output	L8		4 (0.157)	7 (0.276)	8 (0.315)		
Centering depth output shaft	L10		4 (0.157)	6 (0.236)	6 (0.236)		
Centering depth output shaft	L11		3 (0.118)	6 (0.236)	6 (0.236)		
Centering depth output flange	L12		7.5 (0.295)	10.5 (0.413)	10.5 (0.413)		
Output flange length	L13		19.5 (0.768)	30 (1.181)	29 (1.142)		
Clamping system diameter input	D26		More information on page 125				
Motor shaft diameter j6/k6	D20		The dimensions vary with the motor/gearbox flange. The input flange geometries can be retrieved for each specific motor in Tec Data Finder at www.neugart.com				
Max. permis. motor shaft length	L20						
Min. permis. 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	■					
Flange output shaft with dowel hole (EN ISO 9409-1)							E
Dowel hole x depth	D15	H7	5x6	6x7	6x7		
Number x thread x depth	G2		7 x M5x7	7 x M6x10	11 x M6x12		

[1] Dimensions in mm (in)
[2] Number of stages



WPLE

The versatile right angle planetary gearbox with lower weight and appealing cost effectiveness

The **WPLE** is a consistent continuation of the benefits offered by the Economy Line. With its compact, but powerful design, it is ideal for dynamic multiple axis systems. Our right angle gearbox features lifetime lubrication, is easy to install, all this at an unrivalled price-performance ratio.

❷ Efficient and effective

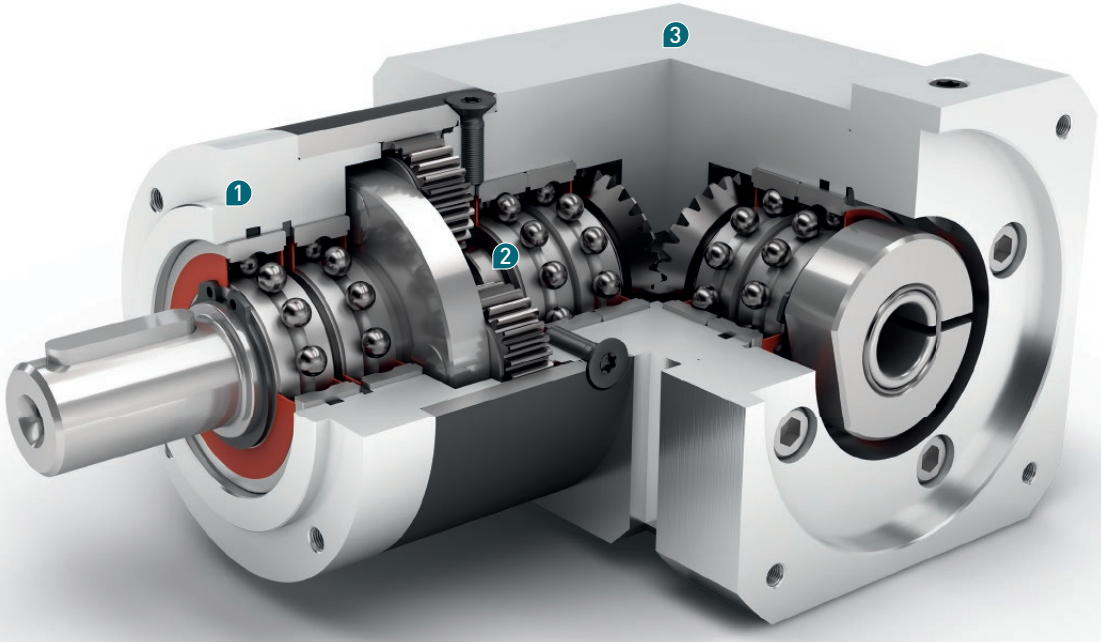
As a genuine multi-talent of right angle planetary gearboxes, the **WPLE** is the specialist among the generalists – and that at an unbeatable price-performance ratio.

❶ The highest dynamics in multiple axis systems

The **WPLE** right angle gearbox delivers more than just above average performance: With 25% less weight, it outputs a particularly high torque.

❸ Flexible installation options and reliability

Fitted with lifetime lubrication, our **WPLE** right angle planetary gearbox lets you exploit restricted space to the optimal extent. It can be installed in any direction, making it the ideal choice for many applications.



- Individual adaptation of the input flange to the motor
- Lifetime lubrication for maintenance-free operation
- Equidirectional rotation
- Wide range of output shaft designs
- Precise gearing
- Wide range of ratios i = 3 to i = 512

Code	Gearbox characteristics			WPLE040	WPLE060	WPLE080	WPLE120	z[1]
	Service life	t_L	h	20,000				
	Service life at T_{2N} x 0.88			30,000				
	Efficiency at full load[2]	η	%	95				1
				94				2
				88				3
	Min. operating temperature	T_{min}	°C (°F)	-25 (-13)				
	Max. operating temperature	T_{max}		90 (194)				
	Protection class			IP 54				
S	Standard lubrication			Grease				
F	Food grade lubrication			Grease				
L	Low temperature lubrication[3]			Grease				
	Installation position			Any				
S	Standard backlash	j_t	arcmin	< 21	< 16	< 13	< 11	1
				< 25	< 18	< 15	< 13	2
				< 28	< 21	< 17	< 15	3
	Torsional stiffness[2]	c_g	Nm/arcmin (lb_f.in/arcmin)	0.6 - 0.8 (5 - 7)	1.5 - 2.0 (13 - 18)	3.8 - 5.1 (34 - 45)	9.6 - 12.9 (85 - 114)	1
				0.6 - 0.8 (5 - 7)	1.6 - 2.0 (14 - 18)	4.1 - 5.1 (36 - 45)	10.4 - 12.9 (92 - 114)	2
				0.6 - 0.8 (5 - 7)	1.5 - 2.0 (13 - 18)	3.9 - 5.1 (35 - 45)	9.9 - 12.9 (88 - 114)	3
	Gearbox weight	m_G	kg (lb_m)	0.5 (1.1)	1.7 (3.7)	4.4 (9.7)	12 (26.5)	1
				0.6 (1.3)	1.9 (4.2)	5 (11.0)	14 (30.9)	2
				0.7 (1.5)	2.1 (4.6)	5.5 (12.1)	16 (35.3)	3
S	Standard surface			Housing: Steel – nitrocarburized and post-oxidized (black)				
	Running noise[4]	Q_g	dB(A)	68	70	73	75	
	Max. bending moment based on the gearbox input flange[5]	M_b	Nm (lb_f.in)	2 (18)	5 (44)	10.5 (93)	26 (230)	
	Motor flange precision			DIN 42955-N				

Output shaft loads			WPLE040	WPLE060	WPLE080	WPLE120	z[1]
Radial force for 20,000 h[6][7]	$F_{r\,20.000\,h}$	N (lb_f)	200 (45)	400 (90)	750 (169)	1750 (394)	
Axial force for 20,000 h[6][7]	$F_{a\,20.000\,h}$		200 (45)	500 (113)	1000 (225)	2500 (563)	
Radial force for 30,000 h[6][7]	$F_{r\,30.000\,h}$		160 (36)	340 (77)	650 (146)	1500 (338)	
Axial force for 30,000 h[6][7]	$F_{a\,30.000\,h}$		160 (36)	450 (101)	900 (203)	2100 (473)	
Static radial force[7][8]	$F_{r\,Stat}$		200 (45)	700 (158)	1250 (281)	2000 (450)	
Static axial force[7][8]	$F_{a\,Stat}$		240 (54)	800 (180)	1600 (360)	3800 (855)	
Tilting moment for 20,000 h[6][8]	$M_{K\,20.000\,h}$	Nm (lb_f.in)	5 (44)	14 (124)	31 (274)	101 (894)	
Tilting moment for 30,000 h[6][8]	$M_{K\,30.000\,h}$		4 (35)	12 (106)	27 (239)	86 (761)	

Moment of inertia			WPLE040	WPLE060	WPLE080	WPLE120	z[1]
Mass moment of inertia[2]	J	$kgcm^2$ ($lb_f.in.s^2 10^{-4}$)	0.032 - 0.049 (0.283 - 0.434)	0.221 - 0.376 (1.956 - 3.328)	0.917 - 1.409 (8.115 - 12.470)	1.849 - 3.204 (16.364 - 28.355)	1
			0.032 - 0.049 (0.283 - 0.434)	0.223 - 0.378 (1.974 - 3.345)	0.931 - 1.424 (8.239 - 12.602)	1.919 - 3.397 (16.983 - 30.063)	2
			0.032 - 0.048 (0.283 - 0.425)	0.223 - 0.240 (1.974 - 2.124)	0.931 - 1.368 (8.239 - 12.107)	1.919 - 3.175 (16.983 - 28.099)	3

(1) Number of stages
(2) The ratio-dependent values can be retrieved in Tec Data Finder – www.neugart.com
(3) T_{min} = -40°C (-40°F). Optimal operating temperature max. 50°C (122°F)
(4) Sound pressure level from 1 m, measured on input running at n_1=3000 rpm no load; i=5
(5) Max. motor weight* in kg = 0.2 x M_b / motor length in m
* with symmetrically distributed motor weight
* with horizontal and stationary mounting
(6) These values are based on an output shaft speed of n_2=100 rpm
(7) Based on center of output shaft
(8) 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

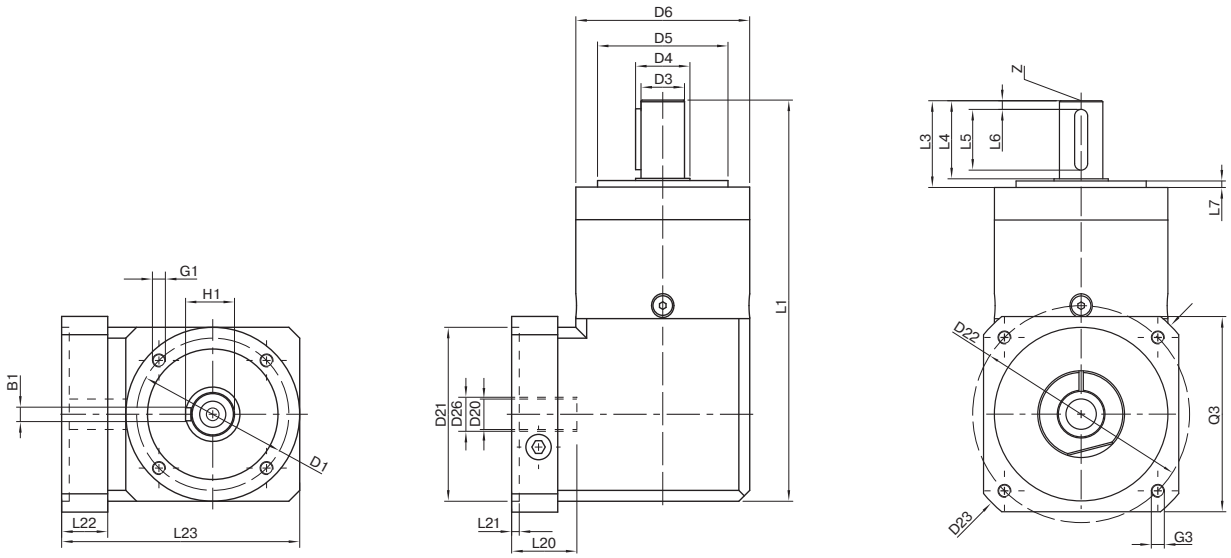
Output torques			WPLE040	WPLE060	WPLE080	WPLE120	i[1]	z[2]
Nominal output torque[3][4]	T_{2N}	Nm (lb_f.in)	4.5 (40)	14 (124)	40 (354)[5]	80 (708)[5]	3	1
			6 (53)	19 (168)	53 (469)[5]	105 (929)[5]	4	
			7.5 (66)	24 (212)	67 (593)[5]	130 (1151)[5]	5	
			8.5 (75)	25 (221)	65 (575)	135 (1195)	7	
			6 (53)	18 (159)	50 (443)	120 (1062)	8	
			5 (44)	15 (133)	38 (336)	95 (841)	10	
			16.5 (146)[5]	44 (389)[5]	130 (1151)[5]	210 (1859)[5]	9	2
			20 (177)[5]	44 (389)	120 (1062)[5]	260 (2301)[5]	12	
			18 (159)[5]	44 (389)	110 (974)	230 (2036)	15	
			20 (177)[5]	44 (389)	120 (1062)	260 (2301)	16	
			20 (177)[5]	44 (389)	120 (1062)	260 (2301)	20	
			18 (159)	40 (354)	110 (974)	230 (2036)	25	
			20 (177)	44 (389)	120 (1062)	260 (2301)	32	
			18 (159)	40 (354)	110 (974)	230 (2036)	40	
			7.5 (66)	18 (159)	50 (443)	120 (1062)	64	
			20 (177)	44 (389)	110 (974)	260 (2301)	60	3
			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	
			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[4][6]	T_{2max}	Nm (lb_f.in)	7 (62)	22 (195)	64 (566)	128 (1133)	3	1
			10 (89)	30 (266)	85 (752)	168 (1487)	4	
			12 (106)	38 (336)	107 (947)	208 (1841)	5	
			13.5 (119)	40 (354)	104 (920)	216 (1912)	7	
			10 (89)	29 (257)	80 (708)	192 (1699)	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)	12	
			29 (257)	70 (620)	176 (1558)	368 (3257)	15	
			32 (283)	70 (620)	192 (1699)	416 (3682)	16	
			32 (283)	70 (620)	192 (1699)	416 (3682)	20	
			29 (257)	64 (566)	176 (1558)	368 (3257)	25	
			32 (283)	70 (620)	192 (1699)	416 (3682)	32	
			29 (257)	64 (566)	176 (1558)	368 (3257)	40	
			12 (106)	29 (257)	80 (708)	192 (1699)	64	
			32 (283)	70 (620)	176 (1558)	416 (3682)	60	3
			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	

(1) Ratios ($i=n_1/n_2$)
(2) Number of stages
(3) Application specific configuration with NCP – www.neugart.com
(4) Values for feather key (code "A"): for repeated load
(5) Different service life: 10,000 h at T_{2N}
(6) 30,000 rotations of the output shaft permitted; see page 136

Output torques			WPLE040	WPLE060	WPLE080	WPLE120	i[1]	z[2]
Emergency stop torque[3]	T_{2Stop}	Nm (lb_f.in)	22.5 (199)	66 (584)	180 (1593)	360 (3186)	3	1
			28 (248)	86 (761)	240 (2124)	474 (4195)	4	
			35 (310)	80 (708)	220 (1947)	500 (4425)	5	
			26 (230)	80 (708)	178 (1575)	340 (3009)	7	
			27 (239)	80 (708)	190 (1682)	380 (3363)	8	
			25 (221)	70 (620)	170 (1505)	430 (3806)	10	
			33 (292)	88 (779)	260 (2301)	500 (4425)	9	2
			40 (354)	88 (779)	240 (2124)	520 (4602)	12	
			36 (319)	88 (779)	220 (1947)	500 (4425)	15	
			40 (354)	88 (779)	240 (2124)	520 (4602)	16	
			40 (354)	88 (779)	240 (2124)	520 (4602)	20	
			36 (319)	80 (708)	220 (1947)	500 (4425)	25	
			40 (354)	88 (779)	240 (2124)	520 (4602)	32	
			36 (319)	80 (708)	220 (1947)	500 (4425)	40	
			27 (239)	80 (708)	190 (1682)	380 (3363)	64	
			40 (354)	88 (779)	220 (1947)	520 (4602)	60	3
			40 (354)	88 (779)	240 (2124)	520 (4602)	80	
			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			WPLE040	WPLE060	WPLE080	WPLE120	i[1]	z[2]
Average thermal input speed at T_{2N} and S1[4][5]	n_{1N}	rpm	5000	4500[6]	3500[6]	2850[6]	3	1
			5000	4500[6]	3550[6]	2950[6]	4	
			5000	4500[6]	3600[6]	3050[6]	5	
			5000	4500	4000[6]	3500[6]	7	
			5000	4500	4000[6]	3500[6]	8	
			5000	4500	4000	3500	10	
			5000	4500[6]	3250[6]	2950[6]	9	2
			5000	4500[6]	3850[6]	3050[6]	12	
			5000	4500	4000[6]	3500[6]	15	
			5000	4500	4000[6]	3450[6]	16	
			5000	4500	4000[6]	3500[6]	20	
			5000	4500	4000	3500[6]	25	
			5000	4500	4000	3500	32	
			5000	4500	4000	3500	40	
			5000	4500	4000	3500	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}	rpm	18000	13000	7000	6500		

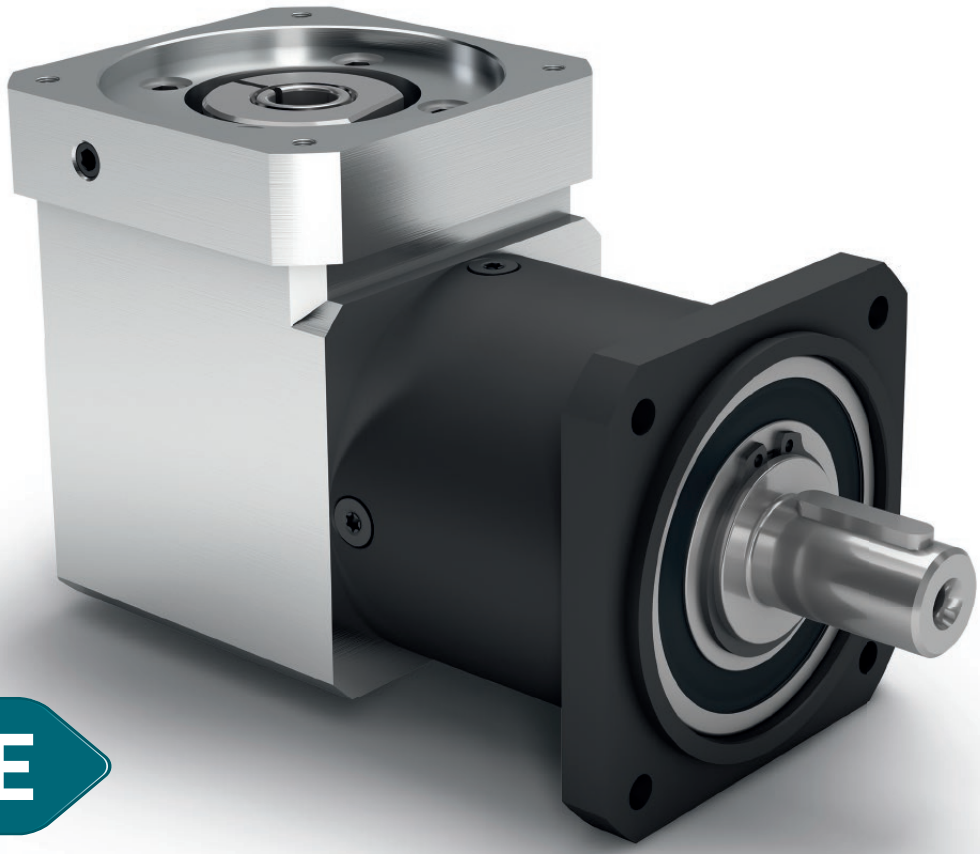
(1) Ratios ($i=n_1/n_2$)
(2) Number of stages
(3) Permitted 1000 times
(4) Application-specific speed configurations with NCP – www.neugart.com
(5) See page 136 for the definition
(6) Average thermal input speed at 50% T_{2N} and S1



Drawing corresponds to a WPLE080 / 1-stage / output shaft with feather key / 19 mm clamping system / motor adaptation – 2-part – square universal flange / B5 flange type motor
All other variants can be retrieved in the Tec Data Finder at www.neugart.com

Geometry[1]			WPLE040	WPLE060	WPLE080	WPLE120	z[2]	Code
Pitch circle diameter output	D1		34 (1.339)	52 (2.047)	70 (2.756)	100 (3.937)		
Shaft diameter output	D3	h7	10 (0.394)	14 (0.551)	20 (0.787)	25 (0.984)		
Shaft collar output	D4		12 (0.472)	17 (0.669)	25 (0.984)	35 (1.378)		
Centering diameter output	D5	h7	26 (1.024)	40 (1.575)	60 (2.362)	80 (3.150)		
Housing diameter	D6		40 (1.575)	60 (2.362)	80 (3.150)	115 (4.528)		
Mounting thread x depth	G1	4x	M4x6	M5x8	M6x10	M10x16		
Total length	L1		110 (4.331)	147 (5.787)	184 (7.244)	249.5 (9.823)	1	
			123 (4.843)	159.5 (6.280)	201.5 (7.933)	277 (10.905)	2	
			135.5 (5.335)	172 (6.772)	219 (8.622)	304.5 (11.988)	3	
Shaft length output	L3		26 (1.024)	35 (1.378)	40 (1.575)	55 (2.165)		
Centering depth output	L7		2 (0.079)	3 (0.118)	3 (0.118)	4 (0.157)		
Min. overall height	L23		62 (2.441)	86 (3.366)	110 (4.331)	146 (5.728)		
Clamping system diameter input	D26		More information on page 125					
Motor shaft diameter j6/k6	D20		The dimensions vary with the motor/gearbox flange. The input flange geometries can be retrieved for each specific motor in Tec Data Finder at www.neugart.com					
Max. permis. motor shaft length	L20							
Min. permis. 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 6885-1)			A 3x3x18	A 5x5x25	A 6x6x28	A 8x7x40		A
Feather key width (DIN 6885-1)	B1		3 (0.118)	5 (0.197)	6 (0.236)	8 (0.315)		
Shaft height including feather key (DIN 6885-1)	H1		11.2 (0.441)	16 (0.630)	22.5 (0.886)	28 (1.102)		
Shaft length from shoulder	L4		23 (0.906)	30 (1.181)	36 (1.417)	50 (1.969)		
Feather key length	L5		18 (0.709)	25 (0.984)	28 (1.102)	40 (1.575)		
Distance from shaft end	L6		2.5 (0.098)	2.5 (0.098)	4 (0.157)	5 (0.197)		
Center hole (DIN 332, type DR)	Z		M3x9	M5x12.5	M6x16	M10x22		
Smooth output shaft								B
Shaft length from shoulder	L4		23 (0.906)	30 (1.181)	36 (1.417)	50 (1.969)		

[1] Dimensions in mm (in)
[2] Number of stages



WPLQE

The right angle planetary gearbox with universal output flange – flexible installation options and for high forces

The **WPLQE** is our right angle gearbox with the square output flange. This makes it particularly easy to install for a wide range of applications, and its large deep groove ball bearings also make it ideal for high radial and axial forces.

❶ Square output flange

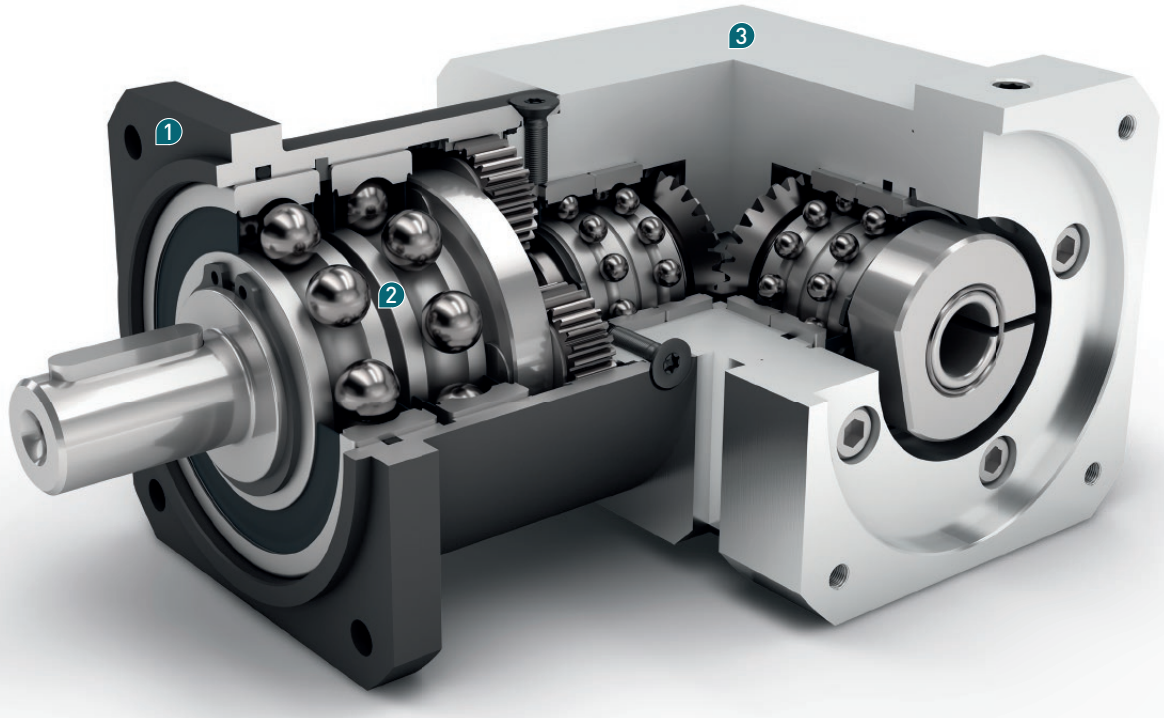
The **WPLQE** can be bolted directly to the machine without the need for additional intermediate flanges.
The output flange with through holes safeguard the ease, reliability, and full accessibility of the installation.

❷ Optimized ball bearings

Install your drive elements directly on the output shaft at the **WPLQE** – this saves time and money without compromising performance. Thanks to its large tapered roller bearings at the output, this right angle gearbox can also absorb large radial and axial forces.

❸ Highest installation flexibility

You will get the most out of your gearbox: The **WPLQE** has lifetime lubrication and can be installed virtually anywhere for maximum flexibility.



- Individual adaptation of the input flange to the motor
- Lifetime lubrication for maintenance-free operation
- Equidirectional rotation
- Wide range of output shaft designs
- Precise gearing
- Wide range of ratios i = 3 to i = 512

Code	Gearbox characteristics			WPLQE060	WPLQE080	WPLQE120	z[1]
	Service life	t_L	h	20,000			
	Service life at T_{2N} x 0.88			30,000			
	Efficiency at full load[2]	η	%	95			1
				94			2
				88			3
	Min. operating temperature	T_{min}	°C (°F)	-25 (-13)			
	Max. operating temperature	T_{max}		90 (194)			
	Protection class			IP 54			
S	Standard lubrication			Grease			
F	Food grade lubrication			Grease			
L	Low temperature lubrication[3]			Grease			
	Installation position			Any			
S	Standard backlash	j_t	arcmin	< 16	< 13	< 11	1
				< 18	< 15	< 13	2
				< 21	< 17	< 15	3
	Torsional stiffness[2]	c_g	Nm/arcmin (lb_f.in/arcmin)	1.6 - 2.1 (14 - 19)	4.7 - 6.3 (42 - 56)	10.1 - 13.6 (89 - 120)	1
				1.7 - 2.1 (15 - 19)	5.1 - 6.3 (45 - 56)	11.0 - 13.6 (97 - 120)	2
				1.6 - 2.1 (14 - 19)	4.9 - 6.3 (43 - 56)	10.5 - 13.6 (93 - 120)	3
	Gearbox weight	m_G	kg (lb_m)	1.9 (4.2)	5.5 (12.1)	12.6 (27.8)	1
				2.1 (4.6)	6.1 (13.5)	14.6 (32.2)	2
				2.3 (5.1)	6.6 (14.6)	16.6 (36.6)	3
S	Standard surface			Housing: Steel – nitrocarburized and post-oxidized (black)			
	Running noise[4]	Q_g	dB(A)	70	73	75	
	Max. bending moment based on the gearbox input flange[5]	M_b	Nm (lb_f.in)	5 (44)	10.5 (93)	26 (230)	
	Motor flange precision			DIN 42955-N			

Output shaft loads			WPLQE060	WPLQE080	WPLQE120	z[1]
Radial force for 20,000 h[6][7]	$F_{r\,20.000\,h}$	N (lb_f)	900 (203)	2050 (461)	2950 (664)	
Axial force for 20,000 h[6][7]	$F_{a\,20.000\,h}$		1000 (225)	2500 (563)	2500 (563)	
Radial force for 30,000 h[6][7]	$F_{r\,30.000\,h}$		700 (158)	1700 (383)	2400 (540)	
Axial force for 30,000 h[6][7]	$F_{a\,30.000\,h}$		800 (180)	2000 (450)	2100 (473)	
Static radial force[7][8]	$F_{r\,Stat}$		1500 (338)	2500 (563)	4000 (900)	
Static axial force[7][8]	$F_{a\,Stat}$		1950 (439)	3800 (855)	3800 (855)	
Tilting moment for 20,000 h[6][8]	$M_{K\,20.000\,h}$	Nm (lb_f.in)	37 (327)	101 (894)	232 (2053)	
Tilting moment for 30,000 h[6][8]	$M_{K\,30.000\,h}$		29 (257)	84 (743)	188 (1664)	

Moment of inertia			WPLQE060	WPLQE080	WPLQE120	z[1]
Mass moment of inertia[2]	J	kgcm² (lb_f.in.s²10⁻⁴)	0.223 - 0.390 (1.974 - 3.452)	0.928 - 1.538 (8.213 - 13.611)	1.852 - 3.235 (16.390 - 28.630)	1
			0.223 - 0.379 (1.974 - 3.354)	0.932 - 1.438 (8.248 - 12.726)	1.919 - 3.400 (16.983 - 30.090)	2
			0.223 - 0.240 (1.974 - 2.124)	0.931 - 1.368 (8.239 - 12.107)	1.919 - 3.175 (16.983 - 28.099)	3

[1] Number of stages
[2] The ratio-dependent values can be retrieved in Tec Data Finder – www.neugart.com
[3] T_{min} = -40°C (-40°F). Optimal operating temperature max. 50°C (122°F)
[4] Sound pressure level from 1 m, measured on input running at n_1=3000 rpm no load; i=5
[5] Max. motor weight* in kg = 0.2 x M_b / motor length in m
* with symmetrically distributed motor weight
* with horizontal and stationary mounting
[6] These values are based on an output shaft speed of n_2=100 rpm
[7] Based on center of output shaft
[8] 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

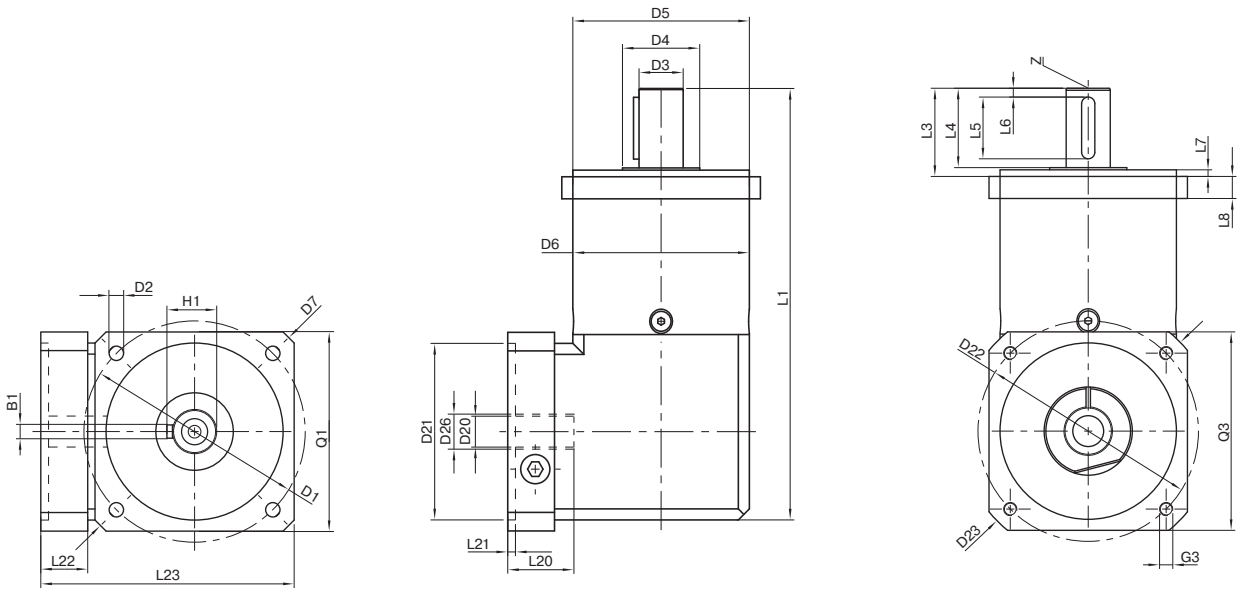
Output torques			WPLQE060	WPLQE080	WPLQE120	i[1]	z[2]
Nominal output torque[3][4]	T_{2N}	Nm (lb_f.in)	14 (124)	40 (354)[5]	80 (708)[5]	3	1
			19 (168)	53 (469)[5]	105 (929)[5]	4	
			24 (212)	67 (593)[5]	130 (1151)[5]	5	
			25 (221)	65 (575)	135 (1195)	7	
			18 (159)	50 (443)	120 (1062)	8	
			15 (133)	38 (336)	95 (841)	10	
			44 (389)[5]	130 (1151)[5]	210 (1859)[5]	9	2
			44 (389)	120 (1062)[5]	260 (2301)[5]	12	
			44 (389)	110 (974)	230 (2036)	15	
			44 (389)	120 (1062)	260 (2301)	16	
			44 (389)	120 (1062)	260 (2301)	20	
			40 (354)	110 (974)	230 (2036)	25	
			44 (389)	120 (1062)	260 (2301)	32	
			40 (354)	110 (974)	230 (2036)	40	
			18 (159)	50 (443)	120 (1062)	64	
			44 (389)	110 (974)	260 (2301)	60	3
			44 (389)	120 (1062)	260 (2301)	80	
			44 (389)	120 (1062)	260 (2301)	100	
			44 (389)	110 (974)	230 (2036)	120	
			44 (389)	120 (1062)	260 (2301)	160	
			40 (354)	110 (974)	230 (2036)	200	
			44 (389)	120 (1062)	260 (2301)	256	
			40 (354)	110 (974)	230 (2036)	320	
			18 (159)	50 (443)	120 (1062)	512	
Max. output torque[4][6]	T_{2max}	Nm (lb_f.in)	22 (195)	64 (566)	128 (1133)	3	1
			30 (266)	85 (752)	168 (1487)	4	
			38 (336)	107 (947)	208 (1841)	5	
			40 (354)	104 (920)	216 (1912)	7	
			29 (257)	80 (708)	192 (1699)	8	
			24 (212)	61 (540)	152 (1345)	10	
			70 (620)	208 (1841)	336 (2974)	9	2
			70 (620)	192 (1699)	416 (3682)	12	
			70 (620)	176 (1558)	368 (3257)	15	
			70 (620)	192 (1699)	416 (3682)	16	
			70 (620)	192 (1699)	416 (3682)	20	
			64 (566)	176 (1558)	368 (3257)	25	
			70 (620)	192 (1699)	416 (3682)	32	
			64 (566)	176 (1558)	368 (3257)	40	
			29 (257)	80 (708)	192 (1699)	64	
			70 (620)	176 (1558)	416 (3682)	60	3
			70 (620)	192 (1699)	416 (3682)	80	
			70 (620)	192 (1699)	416 (3682)	100	
			70 (620)	176 (1558)	368 (3257)	120	
			70 (620)	192 (1699)	416 (3682)	160	
			64 (566)	176 (1558)	368 (3257)	200	
			70 (620)	192 (1699)	416 (3682)	256	
			64 (566)	176 (1558)	368 (3257)	320	
			29 (257)	80 (708)	192 (1699)	512	

(1) Ratios ($i=n_1/n_2$)
(2) Number of stages
(3) Application specific configuration with NCP – www.neugart.com
(4) Values for feather key (code "A"): for repeated load
(5) Different service life: 10,000 h at T_{2N}
(6) 30,000 rotations of the output shaft permitted; see page 136

Output torques			WPLQE060	WPLQE080	WPLQE120	i[1]	z[2]
Emergency stop torque[3]	T_{2Stop}	Nm ($lb_f.in$)	66 (584)	180 (1593)	360 (3186)	3	1
			86 (761)	240 (2124)	474 (4195)	4	
			80 (708)	220 (1947)	500 (4425)	5	
			80 (708)	178 (1575)	340 (3009)	7	
			80 (708)	190 (1682)	380 (3363)	8	
			70 (620)	170 (1505)	430 (3806)	10	
			88 (779)	260 (2301)	500 (4425)	9	2
			88 (779)	240 (2124)	520 (4602)	12	
			88 (779)	220 (1947)	500 (4425)	15	
			88 (779)	240 (2124)	520 (4602)	16	
			88 (779)	240 (2124)	520 (4602)	20	
			80 (708)	220 (1947)	500 (4425)	25	
			88 (779)	240 (2124)	520 (4602)	32	
			80 (708)	220 (1947)	500 (4425)	40	
			80 (708)	190 (1682)	380 (3363)	64	
			88 (779)	220 (1947)	520 (4602)	60	3
			88 (779)	240 (2124)	520 (4602)	80	
			88 (779)	240 (2124)	520 (4602)	100	
			88 (779)	220 (1947)	500 (4425)	120	
			88 (779)	240 (2124)	520 (4602)	160	
			80 (708)	220 (1947)	500 (4425)	200	
			88 (779)	240 (2124)	520 (4602)	256	
			80 (708)	220 (1947)	500 (4425)	320	
			80 (708)	190 (1682)	380 (3363)	512	

Input speeds			WPLQE060	WPLQE080	WPLQE120	i[1]	z[2]
Average thermal input speed at T_{2N} and S1[4][5]	n_{1N}	rpm	4500[6]	3100[6]	2850[6]	3	1
			4500[6]	3250[6]	2950[6]	4	
			4500[6]	3350[6]	3050[6]	5	
			4500	4000[6]	3500[6]	7	
			4500	4000[6]	3500[6]	8	
			4500	4000	3500	10	
			4500[6]	3150[6]	2950[6]	9	2
			4500[6]	3750[6]	3050[6]	12	
			4500	4000[6]	3500[6]	15	
			4500	4000[6]	3450[6]	16	
			4500	4000[6]	3500[6]	20	
			4500	4000	3500[6]	25	
			4500	4000	3500	32	
			4500	4000	3500	40	
			4500	4000	3500	64	
			4500	4000	3500	60	3
			4500	4000	3500	80	
			4500	4000	3500	100	
			4500	4000	3500	120	
			4500	4000	3500	160	
			4500	4000	3500	200	
			4500	4000	3500	256	
			4500	4000	3500	320	
			4500	4000	3500	512	
Max. mechanical input speed[4]	n_{1Limit}	rpm	13000	7000	6500		

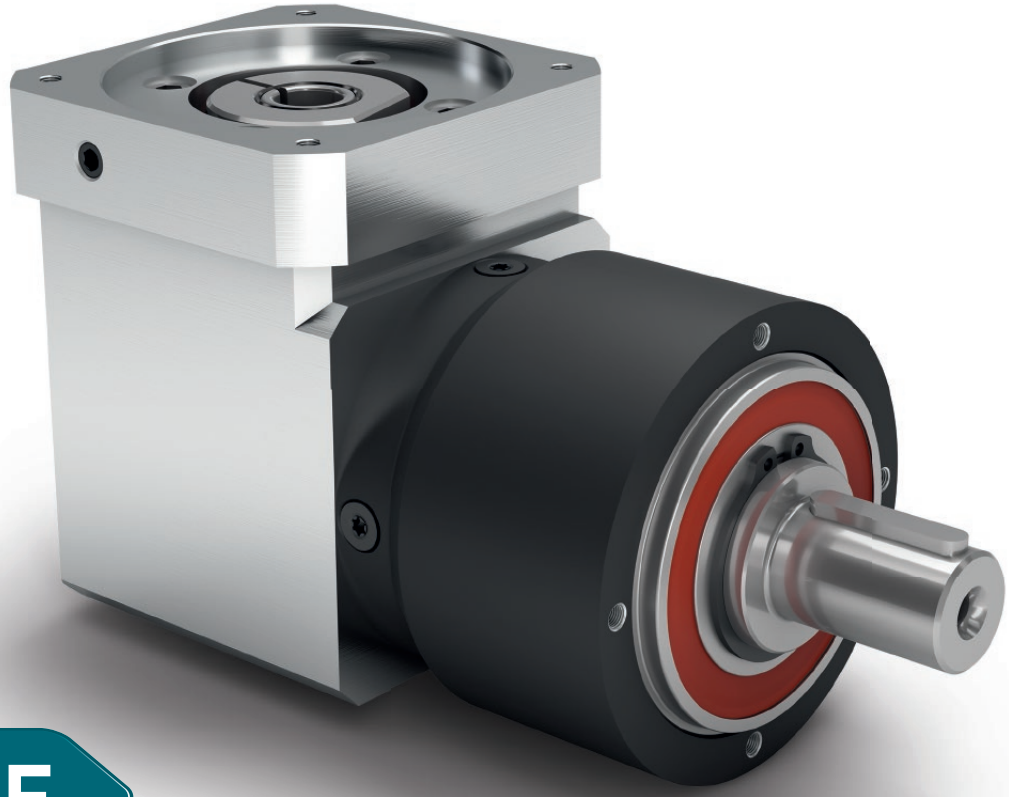
[1] Ratios ($i=n_1/n_2$)
[2] Number of stages
[3] Permitted 1000 times
[4] Application-specific speed configurations with NCP – www.neugart.com
[5] See page 136 for the definition
[6] Average thermal input speed at 50% T_{2N} and S1



Drawing corresponds to a WPLQE080 / 1-stage / output shaft with feather key / 19 mm clamping system / motor adaptation – 2-part – square universal flange / B5 flange type motor
All other variants can be retrieved in Tec Data Finder at www.neugart.com

Geometry[1]			WPLQE060	WPLQE080	WPLQE120	z[2]	Code
Pitch circle diameter output	D1		75 (2.953)	100 (3.937)	130 (5.118)		
Mounting bore output	D2	4x	5.5 (0.217)	6.5 (0.256)	8.5 (0.335)		
Shaft diameter output	D3	h7	16 (0.630)	20 (0.787)	25 (0.984)		
Shaft collar output	D4		20 (0.787)	35 (1.378)	35 (1.378)		
Centering diameter output	D5	h7	60 (2.362)	80 (3.150)	110 (4.331)		
Housing diameter	D6		60 (2.362)	80 (3.150)	115 (4.528)		
Diagonal dimension output	D7		92 (3.622)	116 (4.567)	145 (5.709)		
Flange cross section output	Q1	■	70 (2.756)	90 (3.543)	115 (4.528)		
Total length	L1		152 (5.984)	195.5 (7.697)	274.5 (10.807)	1	
			164.5 (6.476)	213 (8.386)	302.5 (11.909)	2	
			177 (6.968)	230.5 (9.075)	330 (12.992)	3	
Shaft length output	L3		32 (1.260)	40 (1.575)	55 (2.165)		
Centering depth output	L7		3 (0.118)	3 (0.118)	4 (0.157)		
Flange thickness output	L8		10 (0.394)	10 (0.394)	15 (0.591)		
Min. overall height	L23		91 (3.563)	115 (4.528)	146 (5.728)		
Clamping system diameter input	D26		More information on page 125				
Motor shaft diameter j6/k6	D20		The dimensions vary with the motor/gearbox flange. The input flange geometries can be retrieved for each specific motor in Tec Data Finder at www.neugart.com				
Max. permis. motor shaft length	L20						
Min. permis. 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 6885-1)			A 5x5x20	A 6x6x28	A 8x7x40		A
Feather key width (DIN 6885-1)	B1		5 (0.197)	6 (0.236)	8 (0.315)		
Shaft height including feather key (DIN 6885-1)	H1		18 (0.709)	22.5 (0.886)	28 (1.102)		
Shaft length from shoulder	L4		28 (1.102)	36 (1.417)	50 (1.969)		
Feather key length	L5		20 (0.787)	28 (1.102)	40 (1.575)		
Distance from shaft end	L6		4 (0.157)	4 (0.157)	5 (0.197)		
Center hole (DIN 332, type DR)	Z		M5x12.5	M6x16	M10x22		
Smooth output shaft							B
Shaft length from shoulder	L4		28 (1.102)	36 (1.417)	50 (1.969)		

[1] Dimensions in mm (in)
[2] Number of stages



WPLPE

The economical right angle planetary gearbox for particularly high forces – flexible installation options and lifetime lubrication

The **WPLPE** is the smart right angle solution from our Economy Line: Space-saving, and yet powerful at an attractive price. You install your drive elements directly on the output shaft and extract the maximum flexibility from your application.

1 Suitable for high radial and axial forces

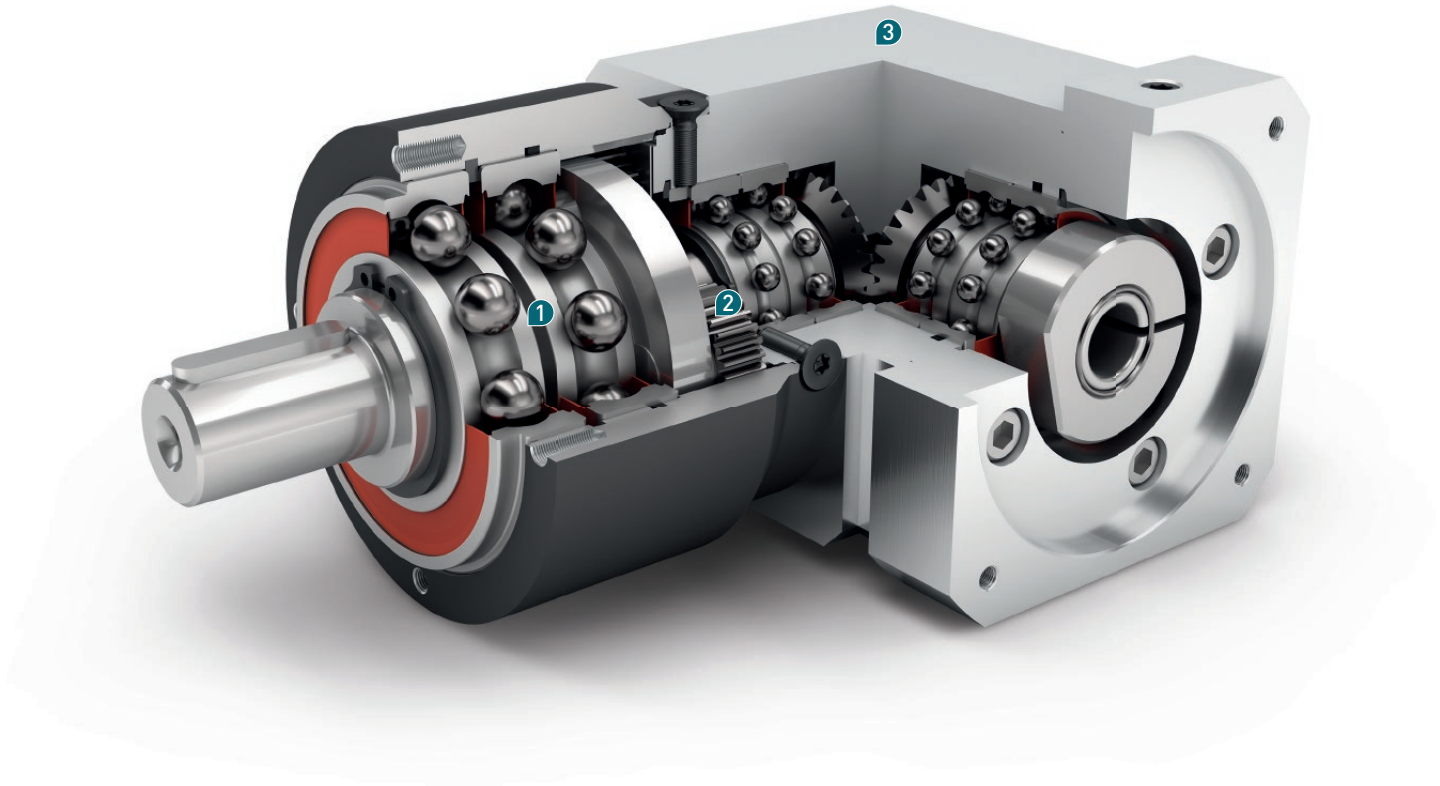
Thanks to its large deep groove ball bearings, the **WPLPE** can absorb even high radial and axial forces. Your drive elements can therefore be installed directly on the output shaft without the need for additional bearing components.

2 Unbeatable price-performance ratio

The **WPLPE** delivers the full performance at an attractive price. You benefit from a powerful right angle planetary gearbox for the most diverse range of applications.

3 Flexible installation options and reliability

Great performance, even in restricted spaces. Especially because of its compact design, the **WPLPE** can be installed virtually anywhere. It has lifetime lubrication and is therefore destined for optimal performance.



- Individual adaptation of the input flange to the motor
- Lifetime lubrication for maintenance-free operation
- Equidirectional rotation
- Wide range of output shaft designs
- Precise gearing
- Compact, space saving right angle stage

Code	Gearbox characteristics			WPLPE050	WPLPE070	WPLPE090	WPLPE120	z[1]
	Service life	t_L	h	20,000				
	Service life at T_{2N} x 0.88			30,000				
	Efficiency at full load[2]	η	%	95				1
				94				2
	Min. operating temperature	T_{min}	°C (°F)	-25 (-13)				
	Max. operating temperature	T_{max}		90 (194)				
	Protection class			IP 54				
S	Standard lubrication			Grease				
F	Food grade lubrication			Grease				
L	Low temperature lubrication[3]			Grease				
	Installation position			Any				
S	Standard backlash	j_t	arcmin	< 21	< 16	< 13	< 11	1
				< 25	< 18	< 15	< 13	2
	Torsional stiffness[2]	c_g	Nm/arcmin (lb$_f$.in/arcmin)	0.7 - 0.9 (6 - 8)	2.4 - 3.2 (21 - 28)	6.8 - 9.1 (60 - 81)	19.0 - 25.5 (168 - 226)	1
				0.7 - 0.9 (6 - 8)	2.4 - 3.2 (21 - 28)	6.9 - 9.1 (61 - 81)	19.5 - 25.5 (173 - 226)	2
	Gearbox weight	m_G	kg (lb$_m$)	0.85 (1.9)	2.3 (5.1)	5.3 (11.7)	13.5 (29.8)	1
				1.05 (2.3)	2.6 (5.7)	6.1 (13.5)	15.7 (34.6)	2
S	Standard surface			Housing: Steel – nitrocarburized and post-oxidized (black)				
	Running noise[4]	Q_g	dB(A)	68	70	73	75	
	Max. bending moment based on the gearbox input flange[5]	M_b	Nm (lb$_f$.in)	2 (18)	5 (44)	10.5 (93)	26 (230)	
	Motor flange precision			DIN 42955-N				

Output shaft loads			WPLPE050	WPLPE070	WPLPE090	WPLPE120	z[1]
Radial force for 20,000 h[6][7]	$F_{r\ 20.000\ h}$	N (lb$_f$)	800 (180)	1050 (236)	1900 (428)	2500 (563)	
Axial force for 20,000 h[6][7]	$F_{a\ 20.000\ h}$		1000 (225)	1350 (304)	2000 (450)	4000 (900)	
Radial force for 30,000 h[6][7]	$F_{r\ 30.000\ h}$		700 (158)	900 (203)	1700 (383)	2150 (484)	
Axial force for 30,000 h[6][7]	$F_{a\ 30.000\ h}$		800 (180)	1000 (225)	1500 (338)	3000 (675)	
Static radial force[7][8]	$F_{r\ Stat}$		1300 (293)	1650 (371)	3100 (698)	4000 (900)	
Static axial force[7][8]	$F_{a\ Stat}$		1000 (225)	2100 (473)	3800 (855)	5900 (1328)	
Tilting moment for 20,000 h[6][8]	$M_{K\ 20.000\ h}$	Nm (lb$_f$.in)	26 (230)	42 (372)	99 (876)	168 (1487)	
Tilting moment for 30,000 h[6][8]	$M_{K\ 30.000\ h}$		22 (195)	36 (319)	89 (788)	144 (1274)	

Moment of inertia			WPLPE050	WPLPE070	WPLPE090	WPLPE120	z[1]
Mass moment of inertia[2]	J	kgcm^2 (lb$_f$.in.s^{2}10^{-4})	0.032 - 0.052 (0.283 - 0.460)	0.218 - 0.335 (1.929 - 2.965)	0.932 - 1.545 (8.248 - 13.673)	1.890 - 3.612 (16.727 - 31.966)	1
			0.032 - 0.050 (0.283 - 0.443)	0.218 - 0.335 (1.929 - 2.965)	0.914 - 1.448 (8.089 - 12.815)	1.850 - 3.446 (16.373 - 30.497)	2

(1) Number of stages
(2) The ratio-dependent values can be retrieved in Tec Data Finder – www.neugart.com
(3) T_{min} = -40°C (-40°F). Optimal operating temperature max. 50°C (122°F)
(4) Sound pressure level from 1 m, measured on input running at n_1=3000 rpm no load; i=5
(5) Max. motor weight* in kg = 0.2 x M_b / motor length in m
* with symmetrically distributed motor weight
* with horizontal and stationary mounting
(6) These values are based on an output shaft speed of n_2=100 rpm
(7) Based on center of output shaft
(8) 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

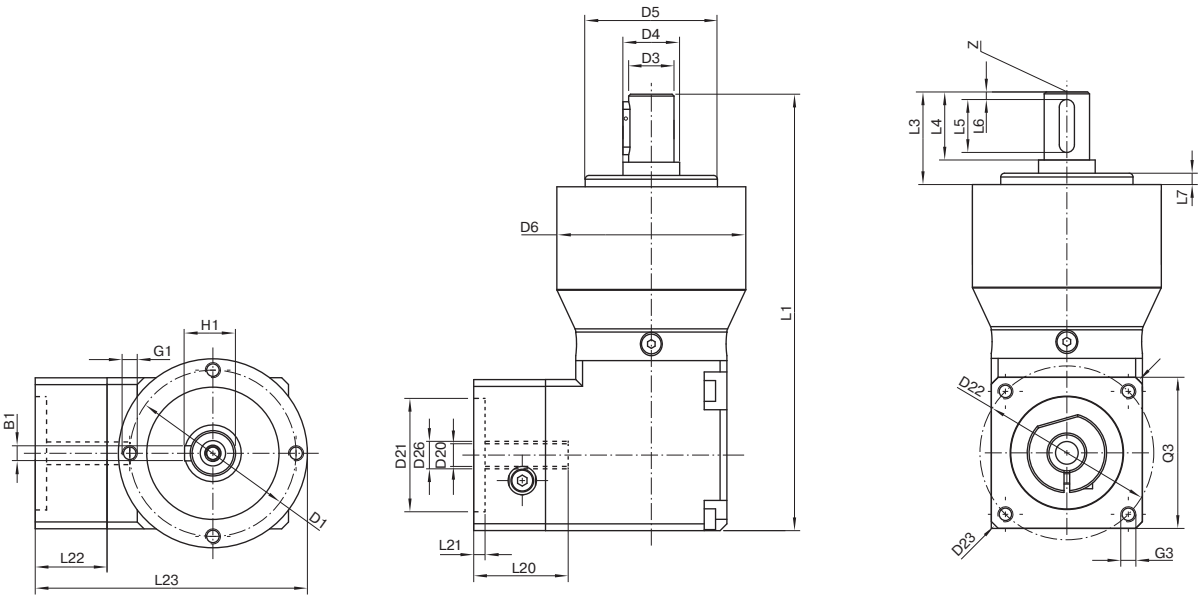
Output torques			WPLPE050	WPLPE070	WPLPE090	WPLPE120	i[1]	z[2]
Nominal output torque[3][4]	T_{2N}	Nm (lb_f.in)	4.5 (40)	14 (124)	40 (354)[5]	80 (708)[5]	3	1
			6 (53)	19 (168)	53 (469)[5]	105 (929)[5]	4	
			7.5 (66)	24 (212)	67 (593)[5]	130 (1151)[5]	5	
			8.5 (75)	25 (221)	65 (575)	135 (1195)	7	
			6 (53)	18 (159)	50 (443)	120 (1062)	8	
			5 (44)	15 (133)	38 (336)	95 (841)	10	
			12 (106)	33 (292)	97 (858)	157 (1389)	9	2
			15 (133)	33 (292)	90 (797)	195 (1726)	12	
			13 (115)	33 (292)	82 (726)	172 (1522)	15	
			15 (133)	33 (292)	90 (797)	195 (1726)	16	
			15 (133)	33 (292)	90 (797)	195 (1726)	20	
			13 (115)	30 (266)	82 (726)	172 (1522)	25	
			15 (133)	33 (292)	90 (797)	195 (1726)	32	
			13 (115)	30 (266)	82 (726)	172 (1522)	40	
			7.5 (66)	18 (159)	50 (443)	120 (1062)	64	
			5 (44)	15 (133)	38 (336)	95 (841)	100	
Max. output torque[4][6]	T_{2max}	Nm (lb_f.in)	7 (62)	22 (195)	64 (566)	128 (1133)	3	1
			10 (89)	30 (266)	85 (752)	168 (1487)	4	
			12 (106)	38 (336)	107 (947)	208 (1841)	5	
			13.5 (119)	40 (354)	104 (920)	216 (1912)	7	
			10 (89)	29 (257)	80 (708)	192 (1699)	8	
			8 (71)	24 (212)	61 (540)	152 (1345)	10	
			19 (168)	53 (469)	155 (1372)	251 (2221)	9	2
			24 (212)	53 (469)	144 (1274)	312 (2761)	12	
			21 (186)	53 (469)	131 (1159)	275 (2434)	15	
			24 (212)	53 (469)	144 (1274)	312 (2761)	16	
			24 (212)	53 (469)	144 (1274)	312 (2761)	20	
			21 (186)	48 (425)	131 (1159)	275 (2434)	25	
			24 (212)	53 (469)	144 (1274)	312 (2761)	32	
			21 (186)	48 (425)	131 (1159)	275 (2434)	40	
			12 (106)	29 (257)	80 (708)	192 (1699)	64	
			8 (71)	24 (212)	61 (540)	152 (1345)	100	

(1) Ratios ($i=n_1/n_2$)
(2) Number of stages
(3) Application specific configuration with NCP – www.neugart.com
(4) Values for feather key (code "A"): for repeated load
(5) Different service life: 10,000 h at T_{2N}
(6) 30,000 rotations of the output shaft permitted; see page 136

Output torques			WPLPE050	WPLPE070	WPLPE090	WPLPE120	i[1]	z[2]
Emergency stop torque[3]	T_{2Stop}	Nm (lb_f.in)	22.5 (199)	66 (584)	180 (1593)	360 (3186)	3	1
			28 (248)	86 (761)	240 (2124)	474 (4195)	4	
			35 (310)	80 (708)	220 (1947)	500 (4425)	5	
			26 (230)	80 (708)	178 (1575)	340 (3009)	7	
			27 (239)	80 (708)	190 (1682)	380 (3363)	8	
			25 (221)	70 (620)	170 (1505)	430 (3806)	10	
			33 (292)	88 (779)	260 (2301)	500 (4425)	9	2
			40 (354)	88 (779)	240 (2124)	520 (4602)	12	
			36 (319)	88 (779)	220 (1947)	500 (4425)	15	
			40 (354)	88 (779)	240 (2124)	520 (4602)	16	
			40 (354)	88 (779)	240 (2124)	520 (4602)	20	
			36 (319)	80 (708)	220 (1947)	500 (4425)	25	
			40 (354)	88 (779)	240 (2124)	520 (4602)	32	
			36 (319)	80 (708)	220 (1947)	500 (4425)	40	
			27 (239)	80 (708)	190 (1682)	380 (3363)	64	
			27 (239)	80 (708)	170 (1505)	430 (3806)	100	

Input speeds			WPLPE050	WPLPE070	WPLPE090	WPLPE120	i[1]	z[2]
Average thermal input speed at T_{2N} and S1[4][5]	n_{1N}	rpm	5000	4200[6]	3000[6]	2350[6]	3	1
			5000	4500[6]	3150[6]	2450[6]	4	
			5000	4500[6]	3250[6]	2600[6]	5	
			5000	4500[6]	3950[6]	3100[6]	7	
			5000	4500	4000[6]	3450[6]	8	
			5000	4500	4000	3500[6]	10	
			5000	4500[6]	3500[6]	2950[6]	9	2
			5000	4500	4000[6]	3050[6]	12	
			5000	4500	4000[6]	3450[6]	15	
			5000	4500	4000[6]	3450[6]	16	
			5000	4500	4000[6]	3500[6]	20	
			5000	4500	4000	3500[6]	25	
			5000	4500	4000	3500	32	
			5000	4500	4000	3500	40	
			5000	4500	4000	3500	64	
			5000	4500	4000	3500	100	
Max. mechanical input speed[4]	n_{1Limit}	rpm	18000	13000	7000	6500		

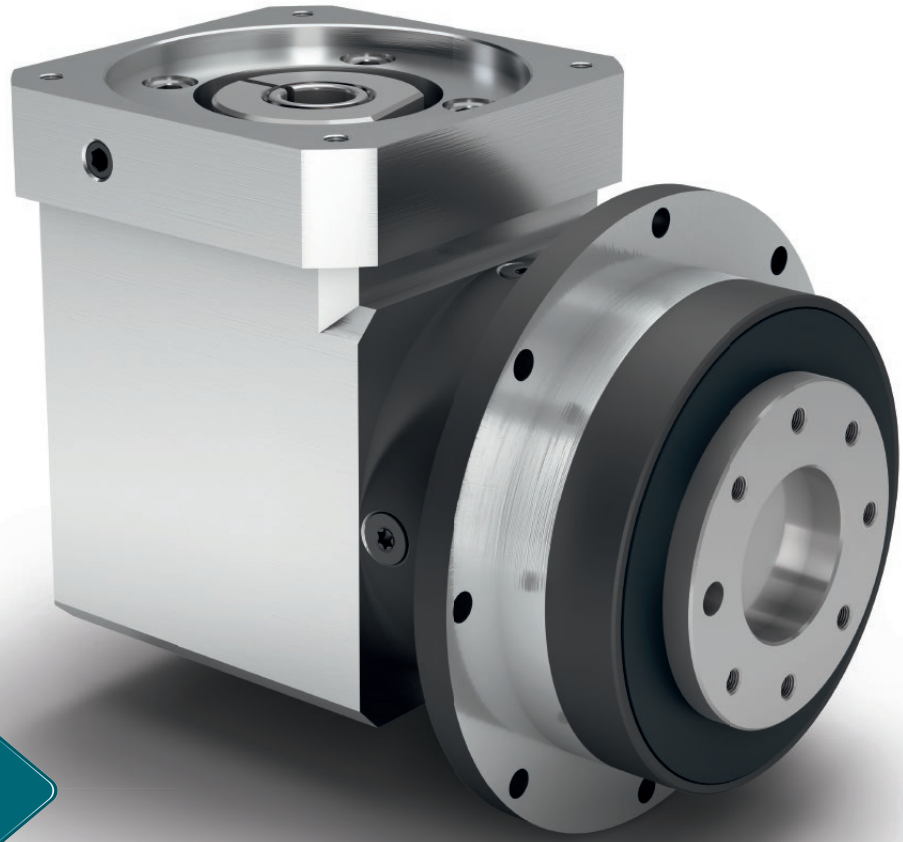
[1] Ratios ($i=n_1/n_2$)
[2] Number of stages
[3] Permitted 1000 times
[4] Application-specific speed configurations with NCP – www.neugart.com
[5] See page 136 for the definition
[6] Average thermal input speed at 50% T_{2N} and S1



Drawing corresponds to a WPLPE090 / 1-stage / output shaft with feather key / 19 mm clamping system / motor adaptation – 2-part – square universal flange / B5 flange type motor
All other variants can be retrieved in the Tec Data Finder at www.neugart.com

Geometry[1]			WPLPE050	WPLPE070	WPLPE090	WPLPE120	z[2]	Code
Pitch circle diameter output	D1		44 (1.732)	62 (2.441)	80 (3.150)	108 (4.252)		
Shaft diameter output	D3	k7	12 (0.472)	16 (0.630)	22 (0.866)	32 (1.260)		
Shaft collar output	D4		15 (0.591)	30 (1.181)	35 (1.378)	50 (1.969)		
Centering diameter output	D5	h7	35 (1.378)	52 (2.047)	68 (2.677)	90 (3.543)		
Housing diameter	D6		50 (1.969)	70 (2.756)	90 (3.543)	120 (4.724)		
Mounting thread x depth	G1	4x	M4x8	M5x8	M6x9	M8x20		
Total length	L1		115.5 (4.547)	152.5 (6.004)	197.5 (7.776)	265 (10.433)	1	
			128 (5.039)	165.5 (6.516)	215.5 (8.484)	292.5 (11.516)	2	
Shaft length output	L3		24.5 (0.965)	36 (1.417)	46 (1.811)	68 (2.677)		
Centering depth output	L7		3 (0.118)	3 (0.118)	4 (0.157)	5 (0.197)		
Min. overall height	L23		67 (2.638)	91 (3.563)	115 (4.528)	148 (5.827)		
Clamping system diameter input	D26		More information on page 125					
Motor shaft diameter j6/k6	D20		The dimensions vary with the motor/gearbox flange. The input flange geometries can be retrieved for each specific motor in Tec Data Finder at www.neugart.com					
Max. permis. motor shaft length	L20							
Min. permis. 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 6885-1)			A 4x4x14	A 5x5x25	A 6x6x32	A 10x8x50		A
Feather key width (DIN 6885-1)	B1		4 (0.157)	5 (0.197)	6 (0.236)	10 (0.394)		
Shaft height including feather key (DIN 6885-1)	H1		13.5 (0.531)	18 (0.709)	24.5 (0.965)	35 (1.378)		
Shaft length from shoulder	L4		18 (0.709)	28 (1.102)	36 (1.417)	58 (2.283)		
Feather key length	L5		14 (0.551)	25 (0.984)	32 (1.260)	50 (1.969)		
Distance from shaft end	L6		2 (0.079)	2 (0.079)	2 (0.079)	4 (0.157)		
Center hole (DIN 332, type DR)	Z		M4x10	M5x12.5	M8x19	M12x28		
Smooth output shaft								B
Shaft length from shoulder	L4		18 (0.709)	28 (1.102)	36 (1.417)	58 (2.283)		

[1] Dimensions in mm (in)
[2] Number of stages



WPLFE

The shortest right angle planetary gearbox with flange output shaft and maximum torsional stiffness

Thinking around corners even in tight spaces. The **WPLFE** is our right angle planetary gearbox with compact flange output shaft. You save up to a third of the space and benefit from a torsional stiffness that is five times higher than conventional products. Thanks to its standardized flange interface, it is especially easy to install. The integrated dowel hole provides additional secureness during fitting.

1 Easy, reliable, and fast installation

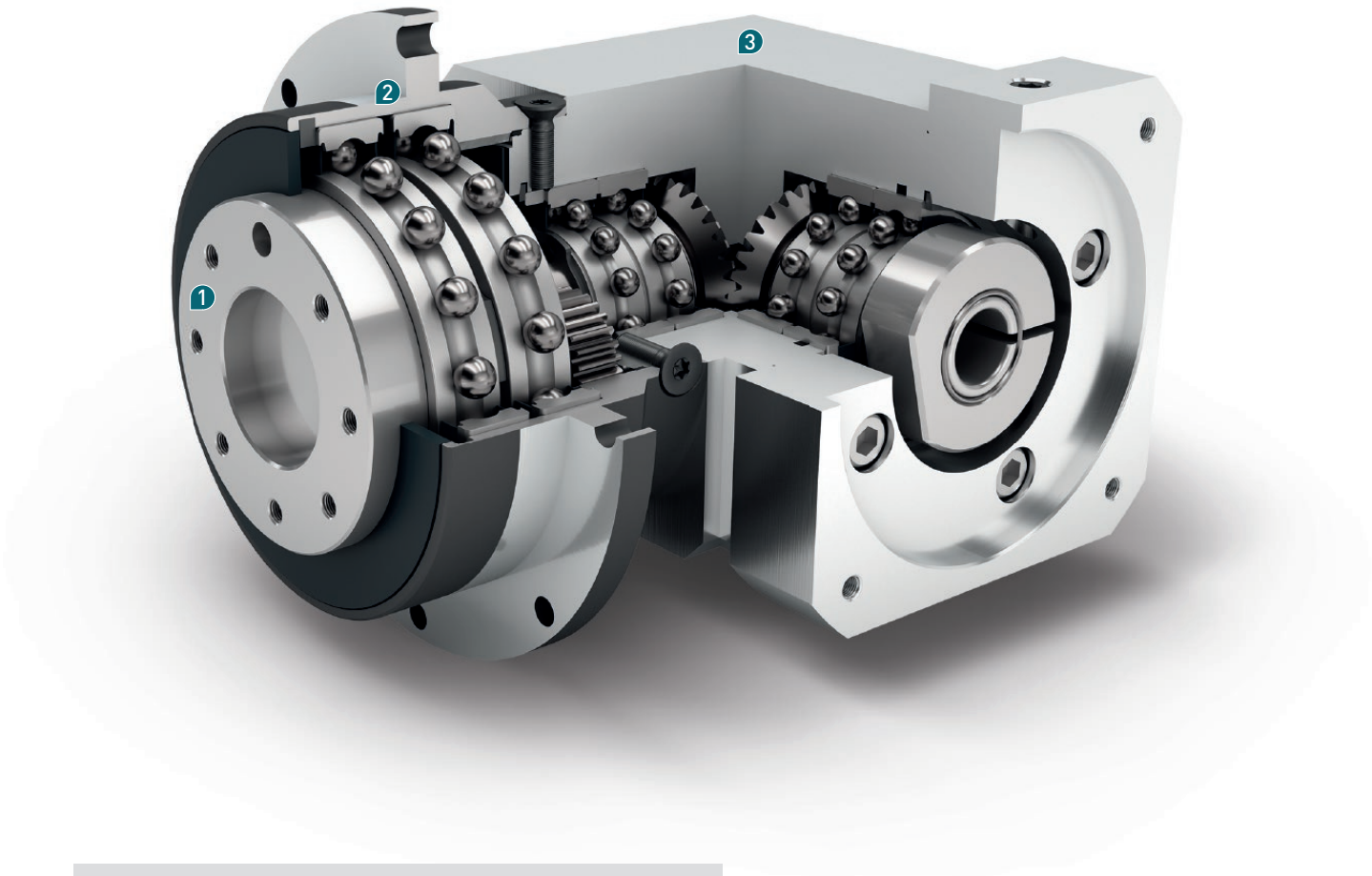
The standardized flange interface of the **WPLFE** (EN ISO 9409-1) guarantees quick and easy mounting of the drive components, such as pulley, linear unit, or turntable. The integrated dowel hole provides additional secureness during fitting.

2 Maximum torsional stiffness for precise drive solutions

The large diameter of the flange output shaft gives the **WPLFE** a torsional stiffness that is five times higher than an output shaft with feather key. You can therefore make the most of your drive solution for intermittent and continuous operation.

3 Space-saving thanks to minimal installation height

The **WPLFE** is the shortest right angle planetary gearbox on the Economy Line. Depending on the frame size, the installation space is up to 30% smaller than comparable right angle gearboxes.



- For any mounting position
- Individual adaptation of the input flange to the motor
- Lifetime lubrication for maintenance-free operation
- Equidirectional rotation
- Optimized bearing concept for high performance
- Precise gearing

Code	Gearbox characteristics			WPLFE064	WPLFE090	WPLFE110	z(1)
	Service life	t_L	h	20,000			
	Service life at T_{2N} x 0.88			30,000			
	Efficiency at full load(2)	η	%	94			1
				93			2
	Min. operating temperature	T_{min}	°C (°F)	-25 (-13)			
	Max. operating temperature	T_{max}		90 (194)			
	Protection class			IP 54			
S	Standard lubrication			Grease			
F	Food grade lubrication			Grease			
L	Low temperature lubrication(3)			Grease			
	Installation position			Any			
S	Standard backlash	j_t	arcmin	< 16	< 13	< 11	1
				< 18	< 15	< 13	2
	Torsional stiffness(2)	c_g	Nm/arcmin (lb$_f$.in/arcmin)	8.9 - 11.9 (79 - 105)	21.0 - 27.8 (186 - 246)	52.8 - 71.4 (467 - 632)	1
				9.1 - 11.9 (81 - 105)	21.5 - 27.8 (190 - 246)	53.8 - 70.4 (476 - 623)	2
	Gearbox weight	m_G	kg (lb$_m$)	1.9 (4.2)	5.2 (11.5)	13 (28.7)	1
				2.3 (5.1)	5.7 (12.6)	15 (33.1)	2
S	Standard surface			Housing: Steel – nitrocarburized and post-oxidized (black)			
	Running noise(4)	Q_g	dB(A)	70	73	75	
	Max. bending moment based on the gearbox input flange(5)	M_b	Nm (lb$_f$.in)	5 (44)	10.5 (93)	26 (230)	
	Motor flange precision			DIN 42955-N			

Output shaft loads			WPLFE064	WPLFE090	WPLFE110	z(1)
Radial force for 20,000 h(6)(7)	$F_{r\,20.000\,h}$	N (lb$_f$)	550 (124)	1400 (315)	2400 (540)	
Axial force for 20,000 h(6)(7)	$F_{a\,20.000\,h}$		1200 (270)	3000 (675)	3300 (743)	
Radial force for 30,000 h(6)(7)	$F_{r\,30.000\,h}$		500 (113)	1200 (270)	2100 (473)	
Axial force for 30,000 h(6)(7)	$F_{a\,30.000\,h}$		1200 (270)	3000 (675)	3300 (743)	
Static radial force(7)(8)	$F_{r\,Stat}$		900 (203)	2200 (495)	3800 (855)	
Static axial force(7)(8)	$F_{a\,Stat}$		1200 (270)	3300 (743)	5200 (1170)	
Tilting moment for 20,000 h(6)(8)	$M_{K\,20.000\,h}$	Nm (lb$_f$.in)	12 (106)	46 (407)	109 (965)	
Tilting moment for 30,000 h(6)(8)	$M_{K\,30.000\,h}$		11 (97)	40 (354)	96 (850)	

Moment of inertia			WPLFE064	WPLFE090	WPLFE110	z(1)
Mass moment of inertia(2)	J	kgcm^2 (lb$_f$.in.s^{2}10^{-4})	0.229 - 0.458 (2.024 - 4.055)	0.964 - 1.913 (8.528 - 16.934)	1.955 - 4.272 (17.306 - 37.806)	1
			0.221 - 0.387 (1.953 - 3.425)	0.917 - 1.477 (8.120 - 13.076)	1.850 - 3.515 (16.376 - 31.111)	2

(1) Number of stages
(2) The ratio-dependent values can be retrieved in Tec Data Finder – www.neugart.com
(3) T_{min} = -40°C (-40°F). Optimal operating temperature max. 50°C (122°F)
(4) Sound pressure level from 1 m, measured on input running at n_1=3000 rpm no load; i=5
(5) Max. motor weight* in kg = 0.2 x M_b / motor length in m
* with symmetrically distributed motor weight
* with horizontal and stationary mounting
(6) These values are based on an output shaft speed of n_2=100 rpm
(7) Based on the end of the output shaft
(8) 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

Output torques			WPLFE064	WPLFE090	WPLFE110	i[1]	z[2]
Nominal output torque[3]	T_{2N}	Nm (lb_f.in)	14 (124)	40 (354)[4]	80 (708)[4]	3	1
			19 (168)	53 (469)[4]	105 (929)[4]	4	
			24 (212)	67 (593)[4]	130 (1151)[4]	5	
			25 (221)	65 (575)	135 (1195)	7	
			18 (159)	50 (443)	120 (1062)	8	
			15 (133)	38 (336)	95 (841)	10	
			44 (389)[4]	130 (1151)[4]	210 (1859)[4]	9	2
			44 (389)	120 (1062)[4]	260 (2301)[4]	12	
			44 (389)	110 (974)	230 (2036)	15	
			44 (389)	120 (1062)	260 (2301)	16	
			44 (389)	120 (1062)	260 (2301)	20	
			40 (354)	110 (974)	230 (2036)	25	
			44 (389)	120 (1062)	260 (2301)	32	
			40 (354)	110 (974)	230 (2036)	40	
			18 (159)	50 (443)	120 (1062)	64	
			15 (133)	38 (336)	95 (841)	100	
Max. output torque[5]	T_{2max}	Nm (lb_f.in)	22 (195)	64 (566)	128 (1133)	3	1
			30 (266)	85 (752)	168 (1487)	4	
			38 (336)	107 (947)	208 (1841)	5	
			40 (354)	104 (920)	216 (1912)	7	
			29 (257)	80 (708)	192 (1699)	8	
			24 (212)	61 (540)	152 (1345)	10	
			70 (620)	208 (1841)	336 (2974)	9	2
			70 (620)	192 (1699)	416 (3682)	12	
			70 (620)	176 (1558)	368 (3257)	15	
			70 (620)	192 (1699)	416 (3682)	16	
			70 (620)	192 (1699)	416 (3682)	20	
			64 (566)	176 (1558)	368 (3257)	25	
			70 (620)	192 (1699)	416 (3682)	32	
			64 (566)	176 (1558)	368 (3257)	40	
			29 (257)	80 (708)	192 (1699)	64	
			24 (212)	61 (540)	152 (1345)	100	

(1) Ratios ($i=n_1/n_2$)
(2) Number of stages
(3) Application specific configuration with NCP – www.neugart.com
(4) Different service life: 10,000 h at T_{2N}
(5) 30,000 rotations of the output shaft permitted; see page 136

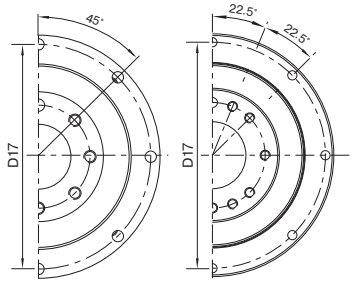
Output torques			WPLFE064	WPLFE090	WPLFE110	i[1]	z[2]
Emergency stop torque[3]	T_{2Stop}	Nm (lb_f.in)	66 (584)	180 (1593)	360 (3186)	3	1
			86 (761)	240 (2124)	474 (4195)	4	
			80 (708)	220 (1947)	500 (4425)	5	
			80 (708)	178 (1575)	340 (3009)	7	
			80 (708)	190 (1682)	380 (3363)	8	
			70 (620)	170 (1505)	430 (3806)	10	
			88 (779)	260 (2301)	500 (4425)	9	2
			88 (779)	240 (2124)	520 (4602)	12	
			88 (779)	220 (1947)	500 (4425)	15	
			88 (779)	240 (2124)	520 (4602)	16	
			88 (779)	240 (2124)	520 (4602)	20	
			80 (708)	220 (1947)	500 (4425)	25	
			88 (779)	240 (2124)	520 (4602)	32	
			80 (708)	220 (1947)	500 (4425)	40	
			80 (708)	190 (1682)	380 (3363)	64	
			80 (708)	200 (1770)	430 (3806)	100	

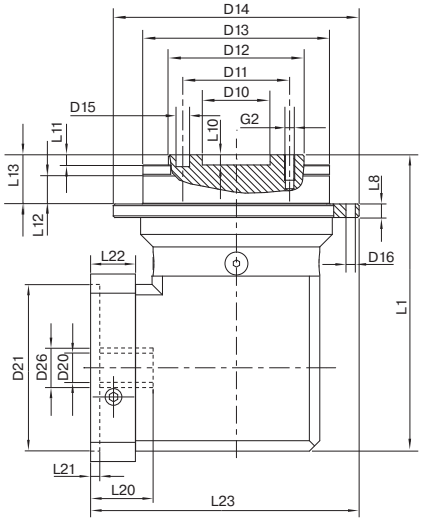
Input speeds			WPLFE064	WPLFE090	WPLFE110	i[1]	z[2]
Average thermal input speed at T_{2N} and S1[4][5]	n_{1N}	rpm	4000[6]	2800[6]	2200[6]	3	1
			4400[6]	3000[6]	2400[6]	4	
			4500[6]	3200[6]	2600[6]	5	
			4500[6]	4000[6]	3000[6]	7	
			4500	4000[6]	3300[6]	8	
			4500	4000	3500[6]	10	
			4300[6]	2900[6]	2400[6]	9	2
			4500[6]	3400[6]	2600[6]	12	
			4500[6]	3800[6]	3100[6]	15	
			4500[6]	3800[6]	3000[6]	16	
			4500	4000[6]	3400[6]	20	
			4500	4000[6]	3500[6]	25	
			4500	4000	3500[6]	32	
			4500	4000	3500	40	
			4500	4000	3500	64	
			4500	4000	3500	100	
Max. mechanical input speed[4]	n_{1Limit}	rpm	13000	7000	6500		

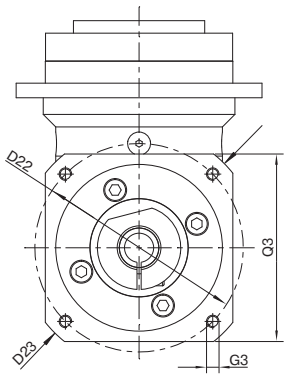
[1] Ratios ($i=n_1/n_2$)
[2] Number of stages
[3] Permitted 1000 times
[4] Application-specific speed configurations with NCP – www.neugart.com
[5] See page 136 for the definition
[6] Average thermal input speed at 50% T_{2N} and S1

WPLFE064
WPLFE090

WPLFE110



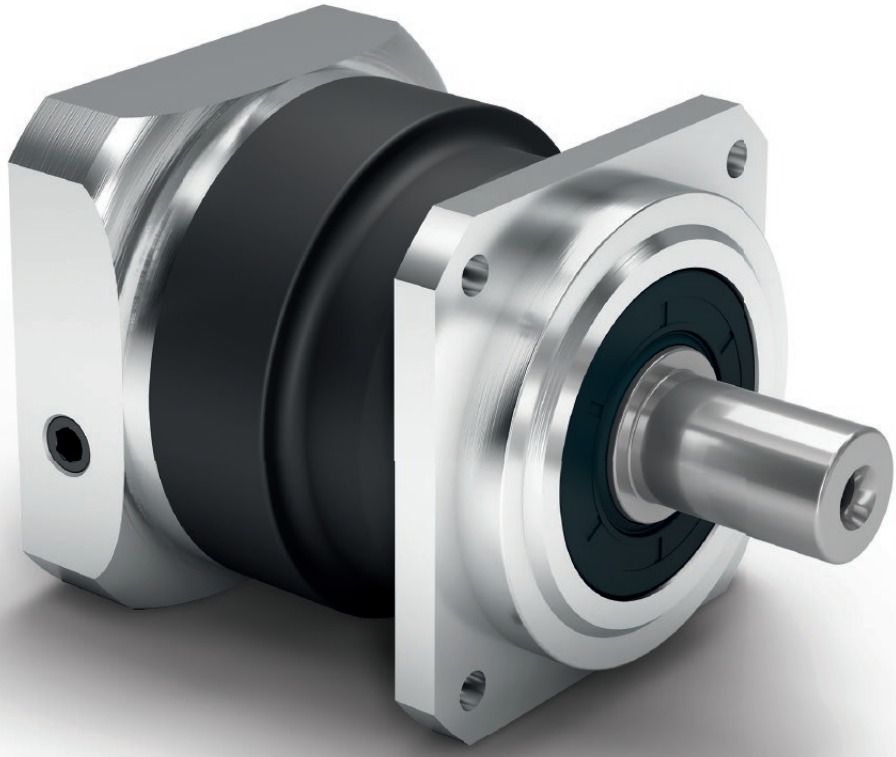




Drawing corresponds to a WPLFE090 / 1-stage / flange output shaft with dowel hole / 19 mm clamping system / motor adaptation – 2-part – square universal flange / B5 flange type motor
All other variants can be retrieved in the Tec Data Finder at www.neugart.com

Geometry[1]			**WPLFE064**	**WPLFE090**	**WPLFE110**	**z**[1]	**Code**
Centering diameter output shaft	D10	H7	20 (0.787)	31.5 (1.240)	40 (1.575)		
Pitch circle diameter output shaft	D11		31.5 (1.240)	50 (1.969)	63 (2.480)		
Centering diameter output shaft	D12	h7	40 (1.575)	63 (2.480)	80 (3.150)		
Centering diameter output flange	D13		64 (2.520)	90 (3.543)	110 (4.331)		
Flange diameter output	D14		86 (3.386)	118 (4.646)	145 (5.709)		
Mounting bore output	D16		4.5 8x45°	5.5 8x45°	5.5 8x45°		
Pitch circle diameter output flange	D17		79 (3.110)	109 (4.291)	135 (5.315)		
Total length	L1		110 (4.331)	149 (5.866)	198.5 (7.815)	1	
			122.5 (4.823)	165.5 (6.516)	225.5 (8.878)	2	
Flange thickness output	L8		4 (0.157)	7 (0.276)	8 (0.315)		
Centering depth output shaft	L10		4 (0.157)	6 (0.236)	6 (0.236)		
Centering depth output shaft	L11		3 (0.118)	6 (0.236)	6 (0.236)		
Centering depth output flange	L12		7.5 (0.295)	10.5 (0.413)	10.5 (0.413)		
Output flange length	L13		19.5 (0.768)	30.0 (1.181)	29.0 (1.142)		
Min. overall height	L23		99 (3.878)	129 (5.079)	161 (6.319)		
Clamping system diameter input	D26		More information on page 125				
Motor shaft diameter j6/k6	D20		The dimensions vary with the motor/gearbox flange. The input flange geometries can be retrieved for each specific motor in Tec Data Finder at www.neugart.com				
Max. permis. motor shaft length	L20						
Min. permis. 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	■					
Flange output shaft with dowel hole (EN ISO 9409-1)							**E**
Dowel hole x depth	D15	H7	5x6	6x7	6x7		
Number x thread x depth	G2		7 x M5x7	7 x M6x10	11 x M6x12		

[1] Dimensions in mm (in)
[2] Number of stages



PSBN

The high-performance precision planetary gearbox with helical teeth for a particularly quiet drive

Our **PSBN** is the ideal combination of precision planetary gearbox and efficient bearing technology. It has been developed specifically for delivering the maximum performance at high speeds. Its helical teeth provide homogeneous synchronism and quiet running noise.

1 Helical teeth for enhanced quality

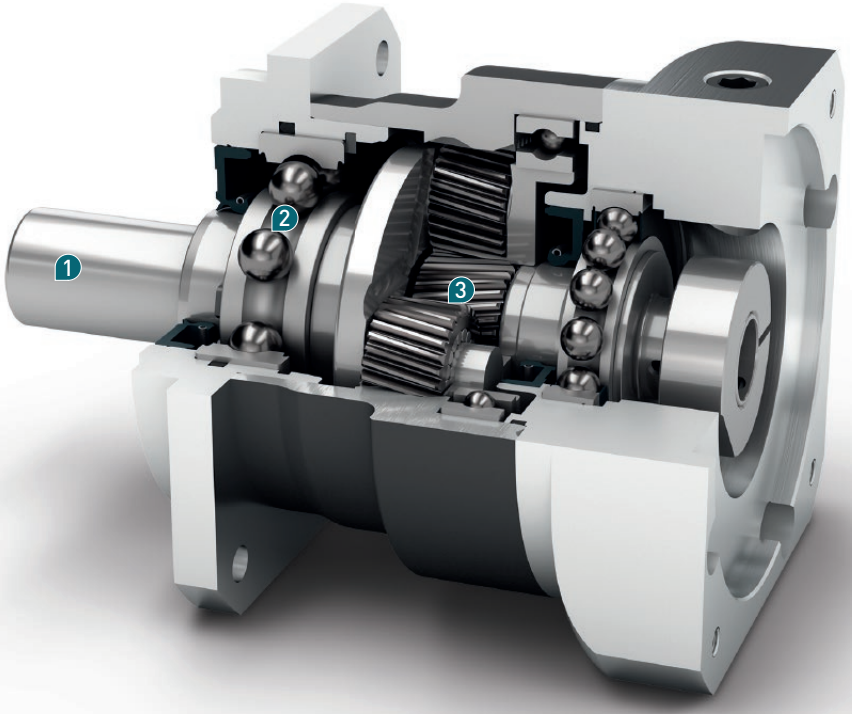
This is progress: The innovative helical teeth of the **PSBN** safeguard the optimal, homogeneous synchronism. Vibrations are minimized for greater workpiece surface and printed quality.

2 The highest speed for the best performance

Thanks to its low-friction bearing design and optimized lubrication, the **PSBN** operates with particular reliability and low heat generation – even in complex production cycles.

3 Particularly quiet drive

Our Neugart-developed helical teeth save you money. The **PSBN** does not need expensive sound absorption measures on your machine. The value of the whole system increases as a result.



- Minimized backlash for maximized precision (< 1 arcmin)
- For any mounting position
- Individual adaptation of the input flange to the motor
- Lifetime lubrication for maintenance-free operation
- Equidirectional rotation
- Wide range of output shaft designs
- Clamping systems with optimized mass moment of inertia

Code	Gearbox characteristics			PSBN070	PSBN090	PSBN115	PSBN142	z[1]
	Service life	t_L	h	20,000				
	Service life at T_{2N} x 0.88			30,000				
	Efficiency at full load[2]	η	%	98				1
				96				2
	Min. operating temperature	T_{min}	°C (°F)	-25 (-13)				
	Max. operating temperature	T_{max}		90 (194)				
	Protection class			IP 65				
S	Standard lubrication			Oil				
F	Food grade lubrication			Oil				
L	Low temperature lubrication[3]			Oil				
	Installation position			Any				
S	Standard backlash	j_t	arcmin	< 3				1
				< 5				2
R	Reduced backlash			< 2	< 1	< 1	< 1	
	Torsional stiffness[2]	c_g	Nm/arcmin (lb$_f$.in/arcmin)	3.7 - 5.0 (33 - 44)	7.8 - 10.5 (69 - 93)	21.5 - 29.0 (190 - 257)	38,0 - 51,0 (336 - 451)	1
				3.8 - 5.0 (34 - 44)	7.7 - 10.1 (68 - 89)	21.0 - 28.0 (186 - 248)	37.0 - 49.0 (327 - 434)	2
	Gearbox weight	m_G	kg (lb$_m$)	1.4 (3.1)	2.7 (6.0)	5.6 (12.3)	13 (28.7)	1
				2.2 (4.9)	3.7 (8.2)	7.1 (15.7)	14.3 (31.5)	2
S	Standard surface			Housing: Steel – nitrocarburized and post-oxidized (black)				
	Running noise[4]	Q_g	dB(A)	57	58	63	66	
	Max. bending moment based on the gearbox input flange[5]	M_b	Nm (lb$_f$.in)	18 (159)	38 (336)	80 (708)	180 (1593)	1
				18 (159)	18 (159)	38 (336)	80 (708)	2
	Motor flange precision			DIN 42955-R				

Output shaft loads			PSBN070	PSBN090	PSBN115	PSBN142	z[1]
Radial force for 20,000 h[6][7]	$F_{r\,20.000\,h}$	N (lb$_f$)	1000 (225)	1900 (428)	2300 (518)	4200 - 5800[2] (945 - 1305)[2]	
Axial force for 20,000 h[6][7]	$F_{a\,20.000\,h}$		1500 (338)	3000 (675)	4400 (990)	9400 (2115)	
Radial force for 30,000 h[6][7]	$F_{r\,30.000\,h}$		850 (191)	1700 (383)	2000 (450)	3700 - 5100[2] (833 - 1148)[2]	
Axial force for 30,000 h[6][7]	$F_{a\,30.000\,h}$		1300 (293)	2500 (563)	3700 (833)	7700 (1733)	
Static radial force[7][8]	$F_{r\,Stat}$		1600 (360)	3100 (698)	4500 (1013)	9500 (2138)	
Static axial force[7][8]	$F_{a\,Stat}$		1500 (338)	2800 (630)	4500 (1013)	9600 (2160)	
Tilting moment for 20,000 h[6][8]	$M_{K\,20.000\,h}$	Nm (lb$_f$.in)	68 (602)	154 (1363)	226 (2000)	565 - 794[2] (5000 - 7027)[2]	
Tilting moment for 30,000 h[6][8]	$M_{K\,30.000\,h}$		58 (513)	138 (1221)	197 (1743)	495 - 697[2] (4381 - 6168)[2]	

Moment of inertia			PSBN070	PSBN090	PSBN115	PSBN142	z[1]
Mass moment of inertia[2]	J	kgcm^2 (lb$_f$.in.s^{2}10^{-4})	0.126 - 0.250 (1.112 - 2.216)	0.324 - 0.760 (2.870 - 6.727)	0.862 - 2.520 (7.628 - 22.306)	6.539 - 14.440 (57.870 - 127.794)	1
			0.123 - 0.175 (1.091 - 1.551)	0.124 - 0.200 (1.096 - 1.768)	0.321 - 0.600 (2.838 - 5.306)	0.841 - 2.003 (7.443 - 17.727)	2

(1) Number of stages
(2) The ratio-dependent values can be retrieved in Tec Data Finder – www.neugart.com
(3) T_{min} = -40°C (-40°F). Optimal operating temperature max. 50°C (122°F)
(4) Sound pressure level from 1 m, measured on input running at n_1=3000 rpm no load; i=5
(5) Max. motor weight* in kg = 0.2 x M_b / motor length in m
* with symmetrically distributed motor weight
* with horizontal and stationary mounting
(6) These values are based on an output shaft speed of n_2=100 rpm
(7) Based on center of output shaft
(8) 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

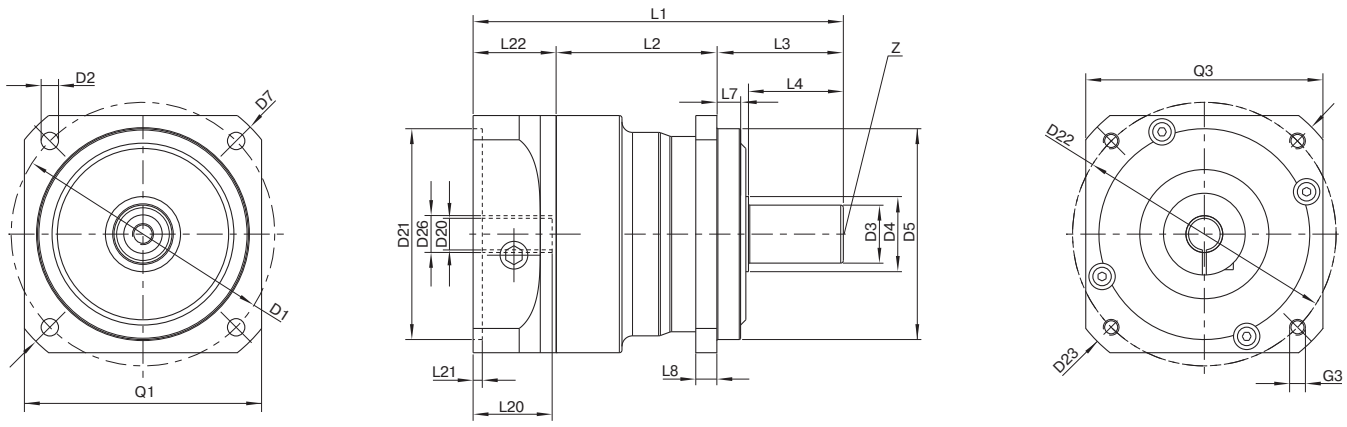
Output torques			PSBN070	PSBN090	PSBN115	PSBN142	i(1)	z(2)
Nominal output torque(3)(4)	T_{2N}	Nm (lb_f.in)	29 (257)	54 (478)	135 (1195)	380 (3363)	3	1
			39 (345)	80 (708)	180 (1593)	470 (4160)	4	
			40 (354)	80 (708)	175 (1549)	405 (3584)	5	
			37 (327)	78 (690)	175 (1549)	355 (3142)	7	
			39 (345)	75 (664)	155 (1372)	350 (3098)	8	
			28 (248)	59 (522)	140 (1239)	305 (2699)	10	
			29 (257)	54 (478)	135 (1195)	380 (3363)	12	2
			29 (257)	54 (478)	135 (1195)	380 (3363)	15	
			39 (345)	80 (708)	180 (1593)	450 (3983)	16	
			39 (345)	80 (708)	180 (1593)	450 (3983)	20	
			40 (354)	80 (708)	175 (1549)	405 (3584)	25	
			40 (354)	80 (708)	175 (1549)	405 (3584)	35	
			39 (345)	80 (708)	180 (1593)	470 (4160)	40	
			40 (354)	80 (708)	175 (1549)	405 (3584)	50	
			37 (327)	78 (690)	175 (1549)	355 (3142)	70	
			28 (248)	59 (522)	140 (1239)	305 (2699)	100	
Max. output torque(4)(5)	T_{2max}	Nm (lb_f.in)	46 (407)	86 (761)	216 (1912)	608 (5381)	3	1
			62 (549)	128 (1133)	288 (2549)	752 (6655)	4	
			64 (566)	128 (1133)	280 (2478)	648 (5735)	5	
			59 (522)	125 (1106)	280 (2478)	568 (5027)	7	
			62 (549)	120 (1062)	248 (2195)	560 (4956)	8	
			45 (398)	94 (832)	224 (1982)	488 (4319)	10	
			46 (407)	86 (761)	216 (1912)	608 (5381)	12	2
			46 (407)	86 (761)	216 (1912)	608 (5381)	15	
			62 (549)	128 (1133)	288 (2549)	720 (6372)	16	
			62 (549)	128 (1133)	288 (2549)	720 (6372)	20	
			64 (566)	128 (1133)	280 (2478)	648 (5735)	25	
			64 (566)	128 (1133)	280 (2478)	648 (5735)	35	
			62 (549)	128 (1133)	288 (2549)	752 (6655)	40	
			64 (566)	128 (1133)	280 (2478)	648 (5735)	50	
			59 (522)	125 (1106)	280 (2478)	568 (5027)	70	
			45 (398)	94 (832)	224 (1982)	488 (4319)	100	

(1) Ratios ($i=n_1/n_2$)
(2) Number of stages
(3) Application specific configuration with NCP – www.neugart.com
(4) Values for feather key (code "A"): for repeated load
(5) 30,000 rotations of the output shaft permitted; see page 136

Output torques			PSBN070	PSBN090	PSBN115	PSBN142	i[1]	z[2]
Emergency stop torque[3]	T_{2Stop}	Nm (lb_f.in)	90 (797)	210 (1859)	490 (4337)	1250 (11063)	3	1
			120 (1062)	280 (2478)	650 (5753)	1650 (14603)	4	
			130 (1151)	280 (2478)	650 (5753)	1650 (14603)	5	
			80 (708)	175 (1549)	340 (3009)	1300 (11505)	7	
			90 (797)	200 (1770)	380 (3363)	1100 (9735)	8	
			90 (797)	200 (1770)	480 (4248)	600 (5310)	10	
			135 (1195)	220 (1947)	500 (4425)	1250 (11063)	12	2
			135 (1195)	220 (1947)	500 (4425)	1250 (11063)	15	
			150 (1328)	300 (2655)	650 (5753)	1650 (14603)	16	
			150 (1328)	300 (2655)	650 (5753)	1650 (14603)	20	
			150 (1328)	300 (2655)	650 (5753)	1650 (14603)	25	
			150 (1328)	300 (2655)	650 (5753)	1650 (14603)	35	
			150 (1328)	300 (2655)	650 (5753)	1650 (14603)	40	
			150 (1328)	300 (2655)	650 (5753)	1650 (14603)	50	
			80 (708)	175 (1549)	340 (3009)	1300 (11505)	70	
			80 (708)	200 (1770)	480 (4248)	600 (5310)	100	

Input speeds			PSBN070	PSBN090	PSBN115	PSBN142	i[1]	z[2]
Average thermal input speed at T_{2N} and S1[4][5]	n_{1N}	rpm	3800[6]	3400[6]	2900[6]	1600[6]	3	1
			4400[6]	3700[6]	3000[6]	1950[6]	4	
			4600[6]	3900[6]	3500[6]	2350[6]	5	
			5000	4500	4000[6]	3150[6]	7	
			5000	4500	4000	3450[6]	8	
			5000	4500	4000	3500	10	
			5000	5000	4500	3150[6]	12	2
			5000	5000	4500	3950[6]	15	
			5000	5000	4500	3400[6]	16	
			5000	5000	4500	4000[6]	20	
			5000	5000	4500	4000	25	
			5000	5000	4500	4000	35	
			5000	5000	4500	4000	40	
			5000	5000	4500	4000	50	
			5000	5000	4500	4000	70	
			5000	5000	4500	4000	100	
Max. mechanical input speed[4]	n_{1Limit}	rpm	14000	10000	8500	6500		1
			14000	14000	10000	8500		2

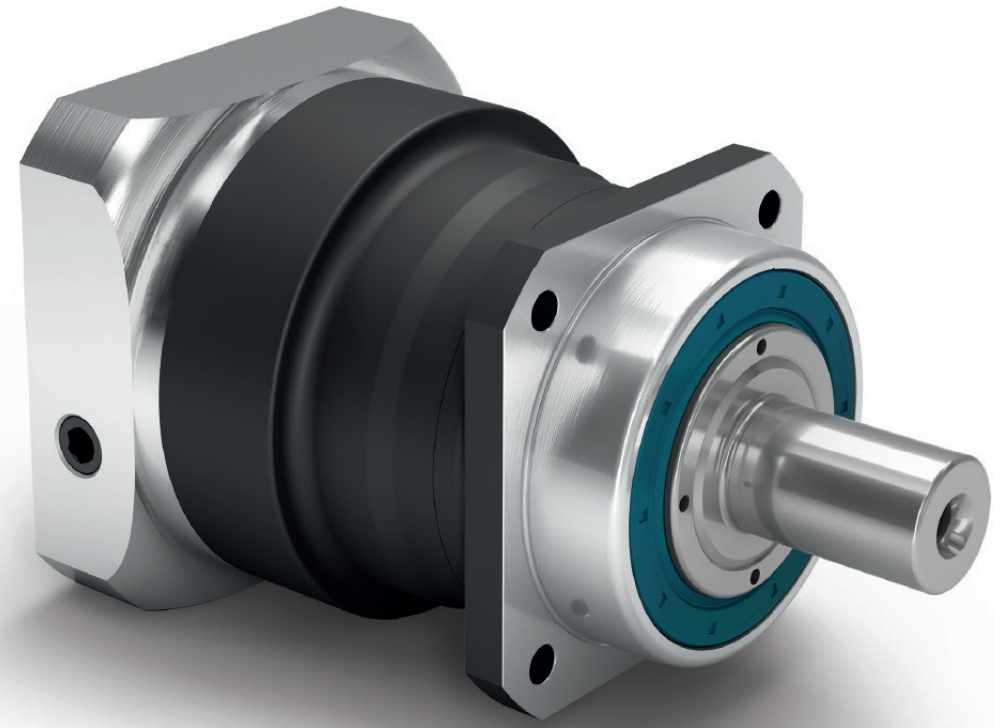
[1] Ratios ($i=n_1/n_2$)
[2] Number of stages
[3] Permitted 1000 times
[4] Application-specific speed configurations with NCP – www.neugart.com
[5] See page 136 for the definition
[6] Average thermal input speed at 50% T_{2N} and S1



Drawing corresponds to a PSBN090 / 1-stage / smooth output shaft / 14 mm clamping system / motor adaptation – 2-part – round universal flange / B5 flange type motor
All other variants can be retrieved in the Tec Data Finder at www.neugart.com

Geometry[1]			PSBN070	PSBN090	PSBN115	PSBN142	z[2]	Code
Pitch circle diameter output	D1		70 (2.756)	100 (3.937)	130 (5.118)	165 (6.496)		
Mounting bore output	D2	4x	5.5 (0.217)	6.6 (0.260)	9.0 (0.354)	11.0 (0.433)		
Shaft diameter output	D3	j6	16 (0.630)	22 (0.866)	32 (1.260)	40 (1.575)		
Shaft collar output	D4		23.5 (0.925)	28.5 (1.122)	38.5 (1.516)	48.5 (1.909)		
Centering diameter output	D5	g6	50 (1.969)	80 (3.150)	110 (4.331)	130 (5.118)		
Diagonal dimension output	D7		80 (3.150)	115 (4.528)	148 (5.827)	185 (7.283)		
Flange cross section output	Q1	■	60 (2.362)	90 (3.543)	115 (4.528)	140 (5.512)		
Min. total length	L1		116.5 (4.587)	140.5 (5.531)	182.5 (7.185)	247.5 (9.744)	1	
			145 (5.709)	162.5 (6.398)	204.5 (8.051)	278.5 (10.965)	2	
Housing length	L2		54 (2.126)	61 (2.402)	74 (2.913)	100.5 (3.957)	1	
			82.5 (3.248)	89 (3.504)	107.5 (4.232)	138 (5.433)	2	
Shaft length output	L3		37 (1.457)	48 (1.890)	65 (2.559)	97 (3.819)		
Centering depth output	L7		6 (0.236)	9 (0.354)	4 (0.157)	12 (0.472)		
Flange thickness output	L8		6 (0.236)	8 (0.315)	10 (0.394)	12 (0.472)		
Center hole (DIN 332. type DR)	Z		M5x12.5	M8x19	M12x28	M16x36		
Clamping system diameter input	D26		More information on page 125					
Motor shaft diameter j6/k6	D20		The dimensions vary with the motor/gearbox flange. The input flange geometries can be retrieved for each specific motor in Tec Data Finder at www.neugart.com					
Max. permis. motor shaft length	L20							
Min. permis. 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 6885-1)			A 5x5x25	A 6x6x28	A 10x8x50	A 12x8x65		A
Feather key width (DIN 6885-1)	B1		5 (0.197)	6 (0.236)	10 (0.394)	12 (0.472)		
Shaft height including feather key (DIN 6885-1)	H1		18 (0.709)	24.5 (0.984)	35 (1.378)	43 (1.693)		
Shaft length from shoulder	L4		28 (1.102)	36 (1.417)	58 (2.283)	82 (3.228)		
Feather key length	L5		25 (0.984)	28 (1.102)	50 (1.969)	65 (2.559)		
Distance from shaft end	L6		2 (0.079)	4 (0.157)	4 (0.157)	8 (0.315)		
Smooth output shaft								B
Shaft length from shoulder	L4		28 (1.102)	36 (1.417)	58 (2.283)	82 (3.228)		

[1] Dimensions in mm (in)
[2] Number of stages



PSN

The helical-toothed precision planetary gearbox for low-noise operation and high bearing loads

Our **PSN** embodies pure progress: Its innovative helical teeth safeguard low-noise operations. This precision planetary gearbox minimizes vibrations, and therefore increases the quality of your workpiece surfaces even under the highest bearing loads.

1 Helical teeth for better quality

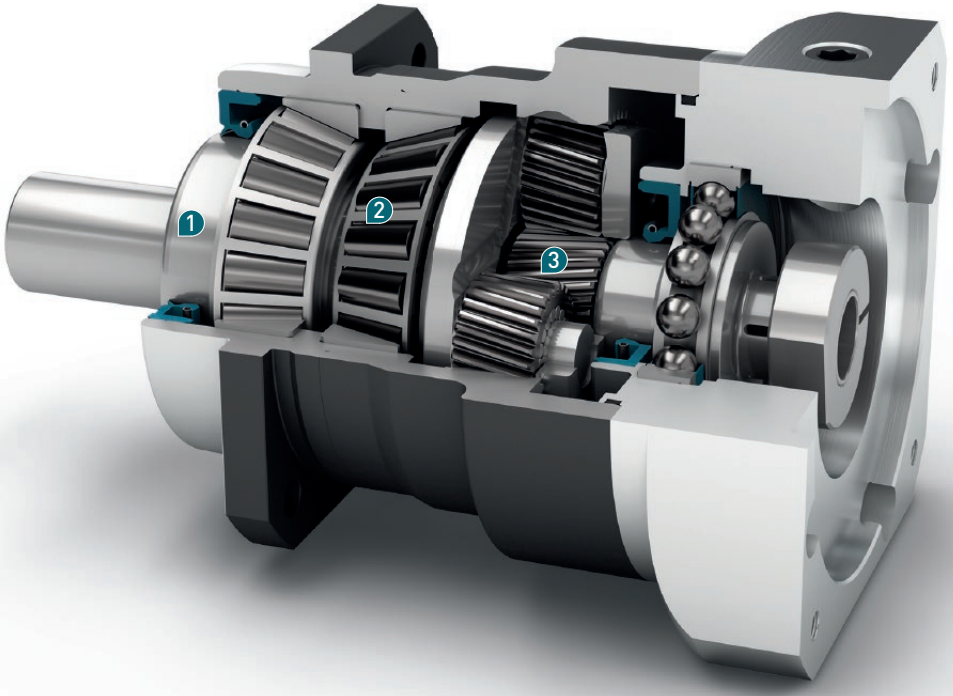
This is progress: The innovative helical teeth of the **PSN** safeguard the optimal, homogeneous synchronism. Vibrations are minimized for greater workpiece surface and printed quality.

2 Perfect stiffness even under the highest loads

The prestressed tapered roller bearings in the **PSN** can withstand extremely high loads. Even under changing equidirectional rotations, this gearbox never loses the required stiffness. It is therefore the ideal solution for the highest loads.

3 Particularly quiet drive

The value of your system increases as a result. Thanks to the helical teeth in the **PSN**, your machine does not need any additional sound absorbent measures.



- Minimized backlash for maximized precision (< 1 arcmin)
- For any mounting position
- Individual adaptation of the input flange to the motor
- Lifetime lubrication for maintenance-free operation
- Equidirectional rotation
- Wide range of output shaft designs
- Clamping systems with optimized mass moment of inertia

Code	Gearbox characteristics			PSN070	PSN090	PSN115	PSN142	PSN190	z[1]
	Service life	t_L	h	20,000					
	Service life at T_{2N} x 0.88			30,000					
	Efficiency at full load[2]	η	%	98					1
				97					2
	Min. operating temperature	T_{min}	°C (°F)	-25 (-13)					
	Max. operating temperature	T_{max}		90 (194)					
	Protection class			IP 65					
S	Standard lubrication			Oil					
F	Food grade lubrication			Oil					
L	Low temperature lubrication[3]			Oil					
	Installation position			Any					
S	Standard backlash	j_t	arcmin	< 3					1
				< 5					2
R	Reduced backlash			< 2	< 1	< 1	< 1	< 1	
	Torsional stiffness[2]	c_g	Nm/arcmin (lb_f.in/arcmin)	3.5 - 5.0 (31 - 44)	7.3 - 10.5 (65 - 93)	20.0 - 29.0 (177 - 257)	35.0 - 51.0 (310 - 451)	122.0 - 175.0 (1080 - 1549)	1
				3.6 - 5.0 (32 - 44)	7.2 - 10.1 (64 - 89)	19.5 - 28.0 (173 - 248)	34.0 - 49.0 (301 - 434)	120.0 - 168.0 (1062 - 1487)	2
	Gearbox weight	m_G	kg (lb_m)	1.9 (4.2)	3.3 (7.3)	6.9 (15.2)	15.7 (34.6)	36 (79.4)	1
				2.7 (6.0)	4.3 (9.5)	8.4 (18.5)	17 (37.5)	39.7 (87.5)	2
S	Standard surface			Housing: Steel – nitrocarburized and post-oxidized (black)					
	Running noise[4]	Q_g	dB(A)	57	58	63	66	68	
	Max. bending moment based on the gearbox input flange[5]	M_b	Nm (lb_f.in)	18 (159)	38 (336)	80 (708)	180 (1593)	300 (2655)	1
				18 (159)	18 (159)	38 (336)	80 (708)	180 (1593)	2
	Motor flange precision			DIN 42955-R					

Output shaft loads			PSN070	PSN090	PSN115	PSN142	PSN190	z[1]
Radial force for 20,000 h[6][7]	$F_{r\ 20.000\ h}$	N (lb_f)	3200 (720)	5500 (1238)	6000 (1350)	13000 (2925)	20000 (4500)	
Axial force for 20,000 h[6][7]	$F_{a\ 20.000\ h}$		4400 (990)	6400 (1440)	8000 (1800)	15000 (3375)	19000 (4275)	
Radial force for 30,000 h[6][7]	$F_{r\ 30.000\ h}$		3200 (720)	4800 (1080)	5400 (1215)	11500 (2588)	17500 (3938)	
Axial force for 30,000 h[6][7]	$F_{a\ 30.000\ h}$		3900 (878)	5700 (1283)	7000 (1575)	13500 (3038)	18500 (4163)	
Static radial force[7][8]	$F_{r\ Stat}$		3200 (720)	5500 (1238)	6000 (1350)	13000 (2925)	20000 (4500)	
Static axial force[7][8]	$F_{a\ Stat}$		4400 (990)	6400 (1440)	8000 (1800)	15000 (3375)	19000 (4275)	
Tilting moment for 20,000 h[6][8]	$M_{K\ 20.000\ h}$	Nm (lb_f.in)	203 (1797)	419 (3708)	562 (4974)	1566 (13859)	2887 (25550)	
Tilting moment for 30,000 h[6][8]	$M_{K\ 30.000\ h}$		203 (1797)	366 (3239)	506 (4478)	1385 (12257)	2526 (22355)	

Moment of inertia			PSN070	PSN090	PSN115	PSN142	PSN190	z[1]
Mass moment of inertia[2]	J	kgcm² (lb_f.in.s²10⁻⁴)	0.128 - 0.272 (1.133 - 2.407)	0.330 - 0.811 (2.921 - 7.177)	0.857 - 2.484 (7.584 - 21.983)	6.475 - 13.112 (57.304 - 116.041)	21.695 - 53.182 (192.001 - 470.661)	1
			0.123 - 0.177 (1.089 - 1.566)	0.124 - 0.227 (1.097 - 2.009)	0.321 - 0.600 (2.841 - 5.310)	0.840 - 1.962 (7.434 - 17.364)	6.360 - 10.654 (56.286 - 94.288)	2

(1) Number of stages
(2) The ratio-dependent values can be retrieved in Tec Data Finder – www.neugart.com
(3) T_{min} = -40°C (-40°F). Optimal operating temperature max. 50°C (122°F)
(4) Sound pressure level from 1 m, measured on input running at n_1=3000 rpm no load; i=5
(5) Max. motor weight* in kg = 0.2 x M_b / motor length in m
* with symmetrically distributed motor weight
* with horizontal and stationary mounting
(6) These values are based on an output shaft speed of n_2=100 rpm
(7) Based on center of output shaft
(8) 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

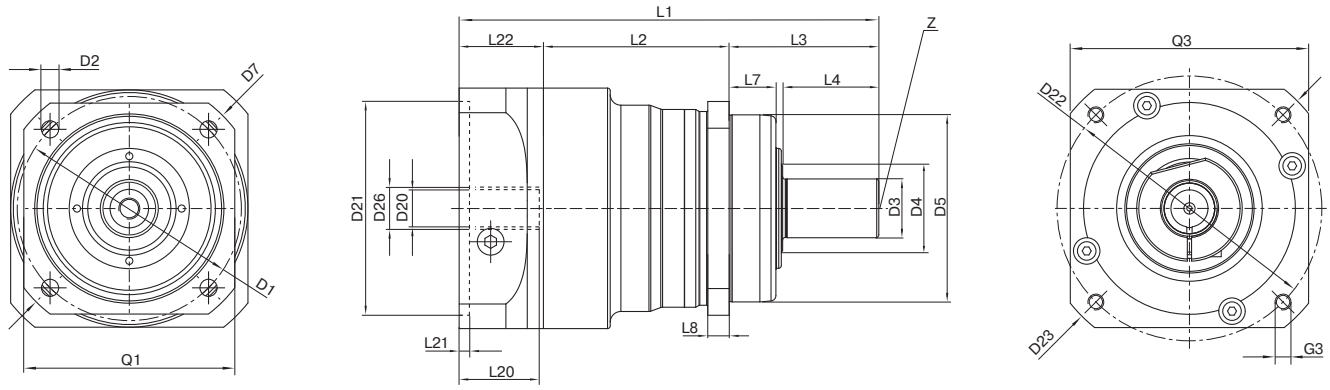
Output torques			PSN070	PSN090	PSN115	PSN142	PSN190	i(1)	z(2)
Nominal output torque(3)(4)	T_{2N}	Nm (lb_f.in)	29 (257)	54 (478)	135 (1195)	380 (3363)	845 (7478)	3	1
			39 (345)	80 (708)	180 (1593)	470 (4160)	950 (8408)	4	
			40 (354)	80 (708)	175 (1549)	405 (3584)	950 (8408)	5	
			37 (327)	78 (690)	175 (1549)	355 (3142)	900 (7965)	7	
			28 (248)	59 (522)	140 (1239)	305 (2699)	750 (6638)	10	
			29 (257)	54 (478)	135 (1195)	380 (3363)	845 (7478)	12	2
			29 (257)	54 (478)	135 (1195)	380 (3363)	845 (7478)	15	
			39 (345)	80 (708)	180 (1593)	450 (3983)	950 (8408)	16	
			39 (345)	80 (708)	180 (1593)	450 (3983)	950 (8408)	20	
			40 (354)	80 (708)	175 (1549)	405 (3584)	950 (8408)	25	
			40 (354)	80 (708)	175 (1549)	405 (3584)	950 (8408)	35	
			39 (345)	80 (708)	180 (1593)	470 (4160)	950 (8408)	40	
			40 (354)	80 (708)	175 (1549)	405 (3584)	950 (8408)	50	
			37 (327)	78 (690)	175 (1549)	355 (3142)	900 (7965)	70	
			28 (248)	59 (522)	140 (1239)	305 (2699)	750 (6638)	100	
Max. output torque(4)(5)	T_{2max}	Nm (lb_f.in)	46 (407)	86 (761)	216 (1912)	608 (5381)	1352 (11965)	3	1
			62 (549)	128 (1133)	288 (2549)	752 (6655)	1520 (13452)	4	
			64 (566)	128 (1133)	280 (2478)	648 (5735)	1520 (13452)	5	
			59 (522)	125 (1106)	280 (2478)	568 (5027)	1440 (12744)	7	
			45 (398)	94 (832)	224 (1982)	488 (4319)	1200 (10620)	10	
			46 (407)	86 (761)	216 (1912)	608 (5381)	1352 (11965)	12	2
			46 (407)	86 (761)	216 (1912)	608 (5381)	1352 (11965)	15	
			62 (549)	128 (1133)	288 (2549)	720 (6372)	1520 (13452)	16	
			62 (549)	128 (1133)	288 (2549)	720 (6372)	1520 (13452)	20	
			64 (566)	128 (1133)	280 (2478)	648 (5735)	1520 (13452)	25	
			64 (566)	128 (1133)	280 (2478)	648 (5735)	1520 (13452)	35	
			62 (549)	128 (1133)	288 (2549)	752 (6655)	1520 (13452)	40	
			64 (566)	128 (1133)	280 (2478)	648 (5735)	1520 (13452)	50	
			59 (522)	125 (1106)	280 (2478)	568 (5027)	1440 (12744)	70	
			45 (398)	94 (832)	224 (1982)	488 (4319)	1200 (10620)	100	

(1) Ratios ($i=n_1/n_2$)
(2) Number of stages
(3) Application specific configuration with NCP – www.neugart.com
(4) Values for feather key (code "A"): for repeated load
(5) 30,000 rotations of the output shaft permitted; see page 136

Output torques			PSN070	PSN090	PSN115	PSN142	PSN190	i[1]	z[2]
Emergency stop torque[3]	T_{2Stop}	Nm (lb_f.in)	90 (797)	210 (1859)	490 (4337)	1250 (11063)	2400 (21240)	3	1
			120 (1062)	280 (2478)	650 (5753)	1650 (14603)	3200 (28320)	4	
			130 (1151)	280 (2478)	650 (5753)	1650 (14603)	3200 (28320)	5	
			80 (708)	175 (1549)	340 (3009)	1300 (11505)	3200 (28320)	7	
			90 (797)	200 (1770)	480 (4248)	600 (5310)	1700 (15045)	10	
			135 (1195)	220 (1947)	500 (4425)	1250 (11063)	2400 (21240)	12	2
			135 (1195)	220 (1947)	500 (4425)	1250 (11063)	2400 (21240)	15	
			150 (1328)	300 (2655)	650 (5753)	1650 (14603)	3200 (28320)	16	
			150 (1328)	300 (2655)	650 (5753)	1650 (14603)	3200 (28320)	20	
			150 (1328)	300 (2655)	650 (5753)	1650 (14603)	3200 (28320)	25	
			150 (1328)	300 (2655)	650 (5753)	1650 (14603)	3200 (28320)	35	
			150 (1328)	300 (2655)	650 (5753)	1650 (14603)	3200 (28320)	40	
			150 (1328)	300 (2655)	650 (5753)	1650 (14603)	3200 (28320)	50	
			80 (708)	175 (1549)	340 (3009)	1300 (11505)	3200 (28320)	70	
			80 (708)	200 (1770)	480 (4248)	600 (5310)	1700 (15045)	100	

Input speeds			PSN070	PSN090	PSN115	PSN142	PSN190	i[1]	z[2]
Average thermal input speed at T_{2N} and S1[4][5]	n_{1N}	rpm	3000[6]	2700[6]	2000[6]	1000[6]	750[6]	3	1
			3700[6]	3050[6]	2250[6]	1250[6]	900[6]	4	
			4400[6]	3700[6]	2750[6]	1550[6]	1100[6]	5	
			4500	4000	3500[6]	2000[6]	1450[6]	7	
			4500	4000	3500	2500[6]	1900[6]	10	
			4500	4500	4000[6]	2400[6]	1550[6]	12	2
			4500	4500	4000	3000[6]	1900[6]	15	
			4500	4500	4000[6]	2600[6]	1650[6]	16	
			4500	4500	4000	3250[6]	2050[6]	20	
			4500	4500	4000	3500[6]	2200[6]	25	
			4500	4500	4000	3500	2800[6]	35	
			4500	4500	4000	3500	3000[6]	40	
			4500	4500	4000	3500	3000	50	
			4500	4500	4000	3500	3000	70	
			4500	4500	4000	3500	3000	100	
Max. mechanical input speed[4]	n_{1Limit}	rpm	14000	10000	8500	6500	6000		1
			14000	14000	10000	8500	6500		2

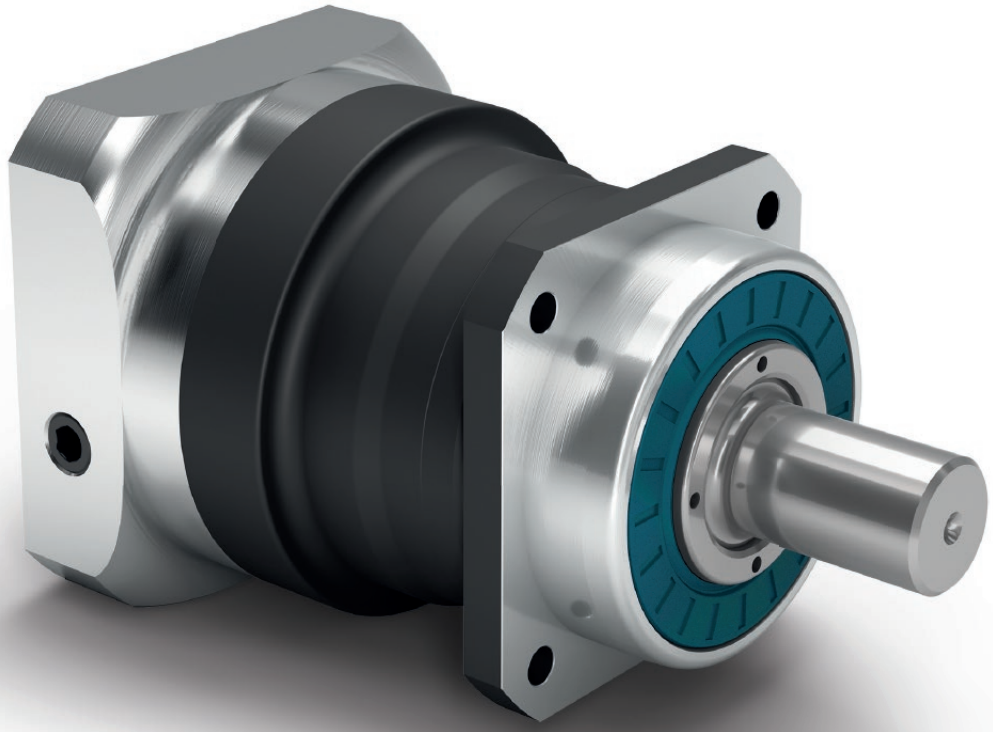
[1] Ratios ($i=n_1/n_2$)
[2] Number of stages
[3] Permitted 1000 times
[4] Application-specific speed configurations with NCP – www.neugart.com
[5] See page 136 for the definition
[6] Average thermal input speed at 50% T_{2N} and S1



Drawing corresponds to a PSN090 / 1-stage / smooth output shaft / 14 mm clamping system / motor adaptation – 2-part – round universal flange / B5 flange type motor
All other variants can be retrieved in the Tec Data Finder at www.neugart.com

Geometry[1]			PSN070	PSN090	PSN115	PSN142	PSN190	z[2]	Code
Pitch circle diameter output	D1		68 - 75 (2.677 - 2.953)	85 (3.346)	120 (4.724)	165 (6.496)	215 (8.465)		
Mounting bore output	D2	4x	5.5 (0.217)	6.5 (0.256)	9.0 (0.354)	11.0 (0.433)	13.5 (0.531)		
Shaft diameter output	D3	k6	16 (0.630)	22 (0.866)	32 (1.260)	40 (1.575)	55 (2.165)		
Shaft collar output	D4		21.5 (0.846)	31.5 (1.240)	41.5 (1.634)	57.5 (2.264)	76.5 (3.012)		
Centering diameter output	D5	g7	60 (2.362)	70 (2.756)	90 (3.543)	130 (5.118)	160 (6.299)		
Diagonal dimension output	D7		92 (3.622)	100 (3.937)	140 (5.512)	185 (7.283)	240 (9.449)		
Flange cross section output	Q1	■	70 (2.756)	80 (3.150)	110 (4.331)	142 (5.591)	190 (7.480)		
Min. total length	L1		134 (5.276)	157 (6.181)	202.5 (7.972)	261.5 (10.295)	310.5 (12.224)	1	
			162.5 (6.398)	179 (7.047)	224.5 (8.839)	292.5 (11.516)	355.5 (13.996)	2	
Housing length	L2		60.5 (2.382)	69.5 (2.736)	71 (2.795)	101.5 (3.996)	130.5 (5.138)	1	
			89 (3.504)	97.5 (3.839)	104.5 (4.114)	139 (5.472)	193.5 (7.618)	2	
Centering depth output	L7		19 (0.748)	17.5 (0.689)	28 (1.102)	28 (1.102)	28 (1.102)		
Flange thickness output	L8		7 (0.276)	8 (0.315)	10 (0.394)	12 (0.472)	15 (0.591)		
Center hole (DIN 332, type DR)	Z		M5x12.5	M8x19	M12x28	M16x36	M20x42		
Clamping system diameter input	D26		More information on page 125						
Motor shaft diameter j6/k6	D20		The dimensions vary with the motor/gearbox flange. The input flange geometries can be retrieved for each specific motor in Tec Data Finder at www.neugart.com						
Max. permis. motor shaft length	L20								
Min. permis. 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 6885-1)			A 5x5x25	A 6x6x28	A 10x8x50	A 12x8x65	A 16x10x70		A
Feather key width (DIN 6885-1)	B1		5 (0.197)	6 (0.236)	10 (0.394)	12 (0.472)	16 (0.630)		
Shaft height including feather key (DIN 6885-1)	H1		18 (0.709)	24.5 (0.965)	35 (1.378)	43 (1.693)	59 (2.323)		
Shaft length output	L3		48 (1.890)	56 (2.205)	88 (3.465)	110 (4.331)	112 (4.409)		
Shaft length from shoulder	L4		28 (1.102)	36 (1.417)	58 (2.283)	80 (3.150)	82 (3.228)		
Feather key length	L5		25 (0.984)	28 (1.102)	50 (1.969)	65 (2.559)	70 (2.756)		
Distance from shaft end	L6		2 (0.079)	4 (0.157)	4 (0.157)	8 (0.315)	6 (0.236)		
Smooth output shaft									B
Shaft length output	L3		48 (1.890)	56 (2.205)	88 (3.465)	110 (4.331)	112 (4.409)		
Shaft length from shoulder	L4		28 (1.102)	36 (1.417)	58 (2.283)	80 (3.150)	82 (3.228)		
Toothed output shaft (DIN 5480)			W16x0.8 x18x6m	W22x1.25 x16x6m	W32x1.25x 24x6m	W40x2.0x 18x6m	W55x2.0x 26x6m		C
Width of gearing	L_v		15 (0.591)	15 (0.591)	15 (0.591)	20 (0.787)	22 (0.866)		
Shaft length output	L3		46 (1.811)	46 (1.811)	56 (2.205)	70 (2.756)	71.5 (2.815)		
Shaft length from shoulder	L4		26 (1.024)	26 (1.024)	26 (1.024)	40 (1.575)	41.5 (1.634)		

[1] Dimensions in mm (in)
[2] Number of stages



PLN

The perfectly sealed straight-toothed planetary gearbox delivers the maximum performance without ever losing the required stiffness

Our straight-toothed precision planetary gearbox has been designed for the highest performance and torque. The prestressed tapered roller bearings in the **PLN** and the seal we have developed safeguard the optimal performance even against dust and water jets.

1 Perfectly sealed

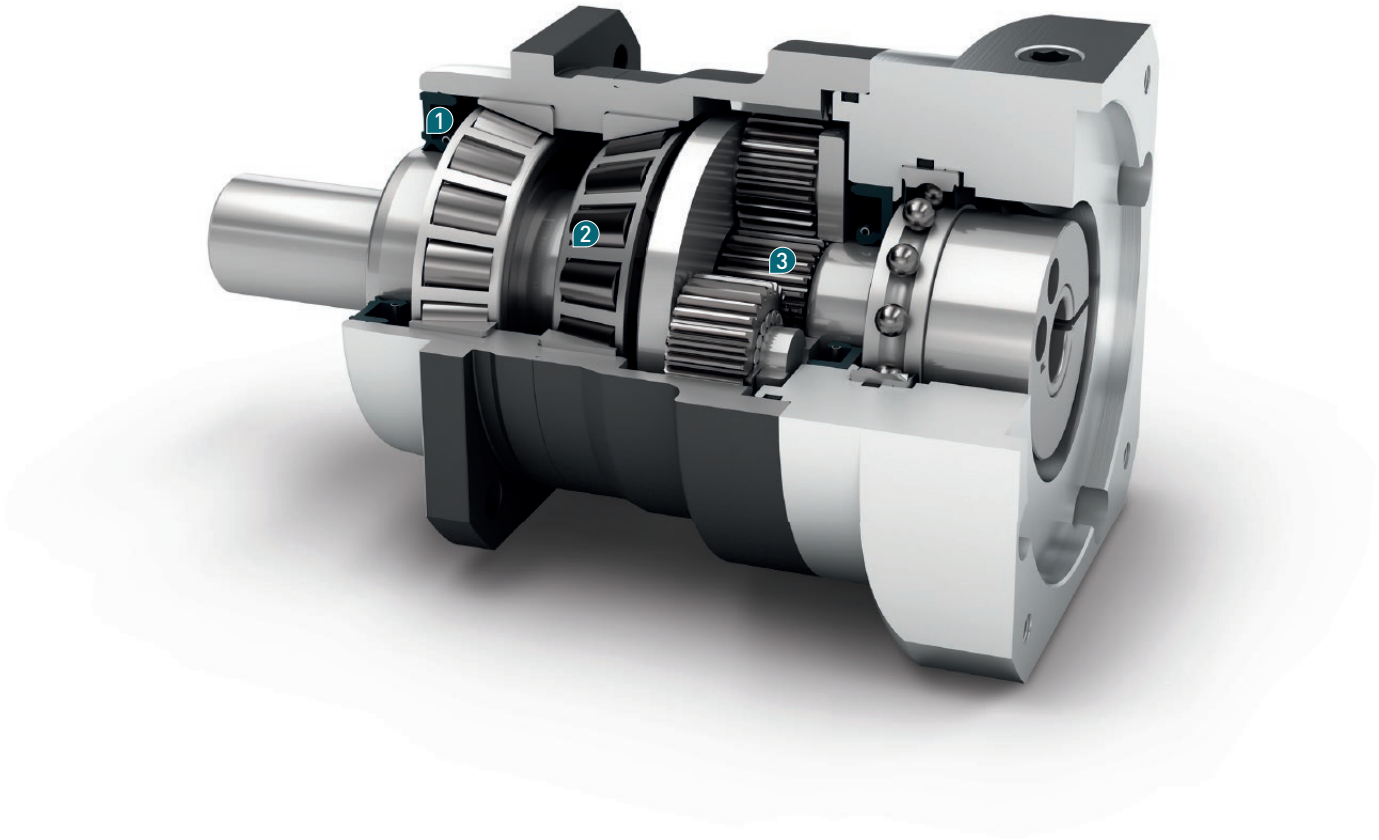
This gearbox resists dust and water jets. Thanks to its radial shaft seal, the **PLN** is also ideal in the most grueling conditions. Perfect IP 65 protection class, by means of its smart design.

2 Perfect stiffness even under the highest loads

Thanks to its prestressed tapered roller bearings, the **PLN** always maintains the optimal stiffness and is therefore a solution that never lets you down.

3 Straight teeth for the highest torques

Due to its straight teeth, the **PLN** is ideal for the highest performance. Its intelligent design delivers greater power than conventional planetary gearboxes.



- Minimized backlash for maximized precision (< 1 arcmin)
- For any mounting position
- Individual adaptation of the input flange to the motor
- Lifetime lubrication for maintenance-free operation
- Equidirectional rotation
- Wide range of output shaft designs
- Clamping systems with optimized mass moment of inertia

Code	Gearbox characteristics			PLN070	PLN090	PLN115	PLN142	PLN190	z[1]
	Service life	t_L	h	20,000					
	Service life at T_{2N} x 0.88			30,000					
	Efficiency at full load[2]	η	%	98					1
				95					2
	Min. operating temperature	T_{min}	°C (°F)	-25 (-13)					
	Max. operating temperature	T_{max}		90 (194)					
	Protection class			IP 65					
S	Standard lubrication			Oil					
F	Food grade lubrication			Oil					
L	Low temperature lubrication[3]			Oil					
	Installation position			Any					
S	Standard backlash	j_t	arcmin	< 3					1
				< 5					2
R	Reduced backlash			< 2	< 1	< 1	< 1	< 1	
	Torsional stiffness[2]	C_g	Nm/arcmin (lb_f.in/arcmin)	4.2 - 6.0 (37 - 53)	8.0 - 11.5 (71 - 102)	18.0 - 26.5 (159 - 235)	42.0 - 61.0 (372 - 540)	115.0 - 165.0 (1018 - 1460)	1
				4.3 - 6.0 (38 - 53)	8.1 - 11.5 (72 - 102)	18.5 - 26.5 (164 - 235)	43.0 - 61.0 (381 - 540)	117.0 - 165.0 (1035 - 1460)	2
	Gearbox weight	m_G	kg (lb_m)	1.9 (4.2)	3.3 (7.3)	6.9 (15.2)	16 (35.3)	30.5 (67.3)	1
				2.4 (5.3)	4.2 (9.3)	9.5 (20.9)	20.5 (45.2)	45 (99.2)	2
S	Standard surface			Housing: Steel – nitrocarburized and post-oxidized (black)					
	Running noise[4]	Q_g	dB(A)	60	62	65	70	74	
	Max. bending moment based on the gearbox input flange[5]	M_b	Nm (lb_f.in)	18 (159)	38 (336)	80 (708)	180 (1593)	300 (2655)	
	Motor flange precision			DIN 42955-R					

Output shaft loads			PLN070	PLN090	PLN115	PLN142	PLN190	z[1]
Radial force for 20,000 h[6][7]	$F_{r\ 20.000\ h}$	N (lb_f)	3200 (720)	5500 (1238)	6000 (1350)	12500 (2813)	21000 (4725)	
Axial force for 20,000 h[6][7]	$F_{a\ 20.000\ h}$		4400 (990)	6400 (1440)	8000 (1800)	15000 (3375)	21000 (4725)	
Radial force for 30,000 h[6][7]	$F_{r\ 30.000\ h}$		3200 (720)	4800 (1080)	5400 (1215)	11400 (2565)	18000 (4050)	
Axial force for 30,000 h[6][7]	$F_{a\ 30.000\ h}$		3900 (878)	5700 (1283)	7000 (1575)	13200 (2970)	18500 (4163)	
Static radial force[7][8]	$F_{r\ Stat}$		3200 (720)	5500 (1238)	6000 (1350)	12500 (2813)	21000 (4725)	
Static axial force[7][8]	$F_{a\ Stat}$		4400 (990)	6400 (1440)	8000 (1800)	15000 (3375)	21000 (4725)	
Tilting moment for 20,000 h[6][8]	$M_{K\ 20.000\ h}$	Nm (lb_f.in)	191 (1690)	383 (3390)	488 (4319)	1420 (12567)	2535 (22435)	
Tilting moment for 30,000 h[6][8]	$M_{K\ 30.000\ h}$		191 (1690)	335 (2965)	439 (3885)	1295 (11461)	2173 (19231)	

Moment of inertia			PLN070	PLN090	PLN115	PLN142	PLN190	z[1]
Mass moment of inertia[2]	J	kgcm² (lb_f.in.s²10⁻⁴)	0.216 - 0.365 (1.912 - 3.230)	0.560 - 1.028 (4.956 - 9.098)	1.942 - 3.256 (17.187 - 28.816)	7.008 - 15.270 (62.021 - 135.140)	22.882 - 63.821 (202.506 - 564.816)	1
			0.209 - 0.249 (1.850 - 2.204)	0.544 - 0.699 (4.814 - 6.186)	1.933 - 2.373 (17.107 - 21.001)	6.811 - 9.813 (60.277 - 86.845)	22.430 - 36.003 (198.506 - 318.627)	2

(1) Number of stages
(2) The ratio-dependent values can be retrieved in Tec Data Finder – www.neugart.com
(3) T_{min} = -40°C (-40°F). Optimal operating temperature max. 50°C (122°F)
(4) Sound pressure level from 1 m, measured on input running at n_1=3000 rpm no load; i=5
(5) Max. motor weight* in kg = 0.2 x M_b / motor length in m
* with symmetrically distributed motor weight
* with horizontal and stationary mounting
(6) These values are based on an output shaft speed of n_2=100 rpm
(7) Based on center of output shaft
(8) 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

Output torques			PLN070	PLN090	PLN115	PLN142	PLN190	i(1)	z(2)
Nominal output torque(3)(4)	T_{2N}	Nm (lb_f.in)	45 (398)	100 (885)	230 (2036)	450 (3983)	1000 (8850)	3	1
			60 (531)	140 (1239)	300 (2655)	600 (5310)	1300 (11505)	4	
			65 (575)	140 (1239)	260 (2301)	750 (6638)	1600 (14160)	5	
			45 (398)	90 (797)	180 (1593)	530 (4691)	1300 (11505)	7	
			40 (354)	80 (708)	150 (1328)	450 (3983)	1000 (8850)	8	
			27 (239)	60 (531)	125 (1106)	305 (2699)	630 (5576)	10	
			68 (602)	110 (974)	250 (2213)	780 (6903)	1500 (13275)	12	2
			68 (602)	110 (974)	250 (2213)	780 (6903)	1500 (13275)	15	
			77 (681)	150 (1328)	300 (2655)	1000 (8850)	1800 (15930)	16	
			77 (681)	150 (1328)	300 (2655)	1000 (8850)	1800 (15930)	20	
			65 (575)	140 (1239)	260 (2301)	900 (7965)	1800 (15930)	25	
			77 (681)	150 (1328)	300 (2655)	1000 (8850)	1800 (15930)	32	
			65 (575)	140 (1239)	260 (2301)	900 (7965)	1800 (15930)	40	
			40 (354)	80 (708)	150 (1328)	450 (3983)	1000 (8850)	64	
			27 (239)	60 (531)	125 (1106)	305 (2699)	630 (5576)	100	
Max. output torque(4)(5)	T_{2max}	Nm (lb_f.in)	72 (637)	160 (1416)	368 (3257)	720 (6372)	1600 (14160)	3	1
			96 (850)	224 (1982)	480 (4248)	960 (8496)	2080 (18408)	4	
			104 (920)	224 (1982)	416 (3682)	1200 (10620)	2560 (22656)	5	
			72 (637)	144 (1274)	288 (2549)	848 (7505)	2080 (18408)	7	
			64 (566)	128 (1133)	240 (2124)	720 (6372)	1600 (14160)	8	
			43 (381)	96 (850)	200 (1770)	488 (4319)	1008 (8921)	10	
			109 (965)	176 (1558)	400 (3540)	1248 (11045)	2400 (21240)	12	2
			109 (965)	176 (1558)	400 (3540)	1248 (11045)	2400 (21240)	15	
			123 (1089)	240 (2124)	480 (4248)	1600 (14160)	2880 (25488)	16	
			123 (1089)	240 (2124)	480 (4248)	1600 (14160)	2880 (25488)	20	
			104 (920)	224 (1982)	416 (3682)	1440 (12744)	2880 (25488)	25	
			123 (1089)	240 (2124)	480 (4248)	1600 (14160)	2880 (25488)	32	
			104 (920)	224 (1982)	416 (3682)	1440 (12744)	2880 (25488)	40	
			64 (566)	128 (1133)	240 (2124)	720 (6372)	1600 (14160)	64	
			43 (381)	96 (850)	200 (1770)	488 (4319)	1008 (8921)	100	

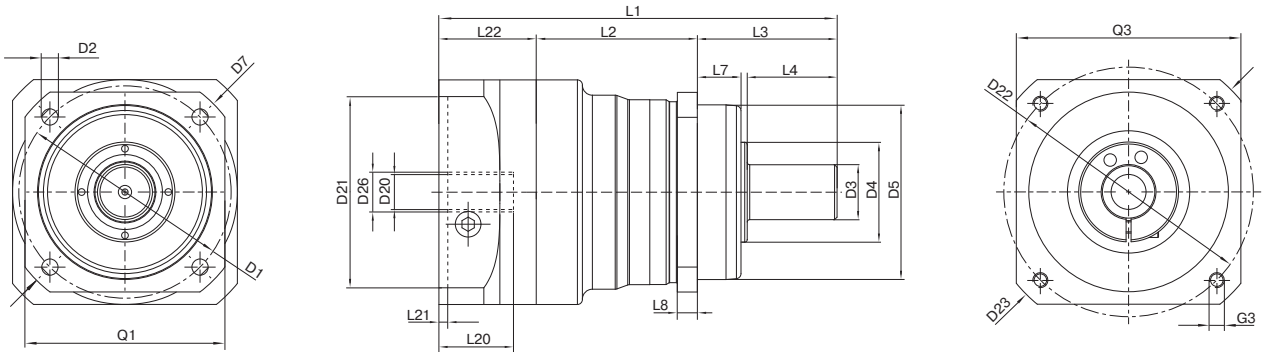
(1) Ratios ($i=n_1/n_2$)
(2) Number of stages
(3) Application specific configuration with NCP – www.neugart.com
(4) Values for feather key (code "A"): for repeated load
(5) 30,000 rotations of the output shaft permitted; see page 136

Output torques			PLN070	PLN090	PLN115	PLN142	PLN190	i[1]	z[2]
Emergency stop torque[3]	T_{2Stop}	Nm (lb_f.in)	90 (797)	210 (1859)	490 (4337)	975 (8629)	2000 (17700)	3	1
			120 (1062)	280 (2478)	650 (5753)	1300 (11505)	2700 (23895)	4	
			130 (1151)	280 (2478)	650 (5753)	1500 (13275)	3200 (28320)	5	
			80 (708)	175 (1549)	340 (3009)	1300 (11505)	2600 (23010)	7	
			90 (797)	200 (1770)	380 (3363)	1000 (8850)	2600 (23010)	8	
			90 (797)	200 (1770)	480 (4248)	750 (6638)	1350 (11948)	10	
			135 (1195)	220 (1947)	500 (4425)	1500 (13275)	3000 (26550)	12	2
			135 (1195)	220 (1947)	500 (4425)	1500 (13275)	3000 (26550)	15	
			150 (1328)	300 (2655)	650 (5753)	2000 (17700)	3600 (31860)	16	
			150 (1328)	300 (2655)	650 (5753)	2000 (17700)	3600 (31860)	20	
			150 (1328)	300 (2655)	650 (5753)	1800 (15930)	3600 (31860)	25	
			150 (1328)	300 (2655)	650 (5753)	2000 (17700)	3600 (31860)	32	
			150 (1328)	300 (2655)	650 (5753)	1800 (15930)	3600 (31860)	40	
			80 (708)	200 (1770)	380 (3363)	1000 (8850)	2600 (23010)	64	
			80 (708)	200 (1770)	480 (4248)	750 (6638)	1350 (11948)	100	

Input speeds			PLN070	PLN090	PLN115	PLN142	PLN190	i[1]	z[2]
Average thermal input speed at T_{2N} and S1[4][5]	n_{1N}	rpm	2050[6]	1950[6]	1500[6]	850[6]	700[6]	3	1
			2300[6]	2100[6]	1600[6]	950[6]	750[6]	4	
			2650[6]	2500[6]	2000[6]	1050[6]	850[6]	5	
			3450[6]	3550[6]	2800[6]	1550[6]	1200[6]	7	
			3800[6]	3950[6]	3200[6]	1800[6]	1450[6]	8	
			4400[6]	4000	3500[6]	2250[6]	1900[6]	10	
			3550[6]	3400[6]	2450[6]	1300[6]	1000[6]	12	2
			4000[6]	4000[6]	3000[6]	1600[6]	1250[6]	15	
			3800[6]	3550[6]	2550[6]	1350[6]	1050[6]	16	
			4300[6]	4000[6]	3050[6]	1600[6]	1300[6]	20	
			4500[6]	4000[6]	3400[6]	1850[6]	1400[6]	25	
			4500	4000	3500[6]	2300[6]	1900[6]	32	
			4500	4000	3500	2550[6]	2100[6]	40	
			4500	4000	3500	3000[6]	2500[6]	64	
			4500	4000	3500	3000	2500	100	
Max. mechanical input speed[4]	n_{1Limit}	rpm	14000	10000	8500	6500	6000		

PLN

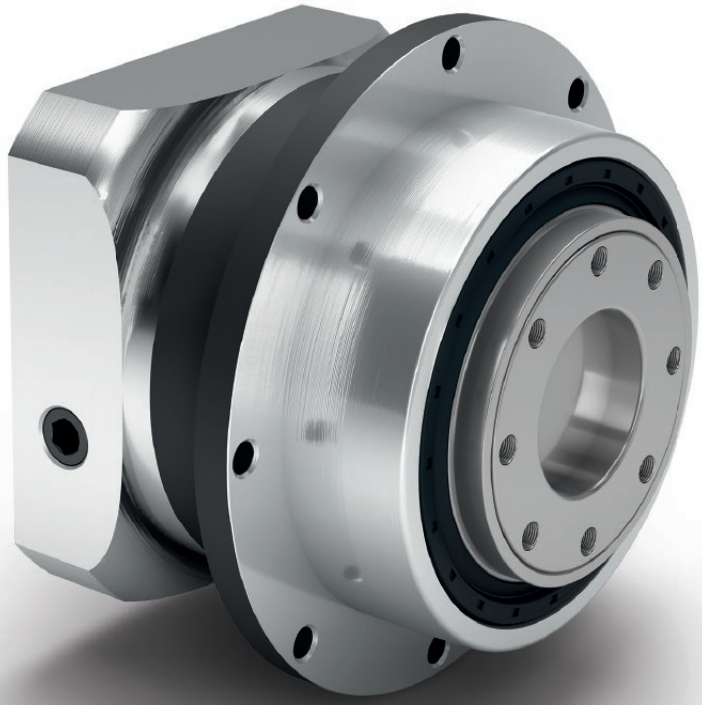
[1] Ratios ($i=n_1/n_2$)
[2] Number of stages
[3] Permitted 1000 times
[4] Application-specific speed configurations with NCP – www.neugart.com
[5] See page 136 for the definition
[6] Average thermal input speed at 50% T_{2N} and S1



Drawing corresponds to a PLN090 / 1-stage / smooth output shaft / 19 mm clamping system / motor adaptation – 2-part – round universal flange / B5 flange type motor
All other variants can be retrieved in the Tec Data Finder at www.neugart.com

Geometry[1]			**PLN070**	**PLN090**	**PLN115**	**PLN142**	**PLN190**	**z**[2]	**Code**
Pitch circle diameter output	D1		68 - 75 (2.677 - 2.953)	85 (3.346)	120 (4.724)	165 (6.496)	215 (8.465)		
Mounting bore output	D2	4x	5.5 (0.217)	6.5 (0.256)	9.0 (0.354)	11.0 (0.433)	13.5 (0.531)		
Shaft diameter output	D3	k6	16 (0.630)	22 (0.866)	32 (1.260)	40 (1.575)	55 (2.165)		
Shaft collar output	D4		35 (1.378)	40 (1.575)	45 (1.772)	70 (2.756)	80 (3.150)		
Centering diameter output	D5	g7	60 (2.362)	70 (2.756)	90 (3.543)	130 (5.118)	160 (6.299)		
Diagonal dimension output	D7		92 (3.622)	100 (3.937)	140 (5.512)	185 (7.283)	240 (9.449)		
Flange cross section output	Q1	■	70 (2.756)	80 (3.150)	110 (4.331)	142 (5.591)	190 (7.480)		
Min. total length	L1		137.5 (5.413)	159.5 (6.280)	201 (7.913)	276 (10.866)	310.5 (12.224)	1	
			166.5 (6.555)	191.5 (7.539)	241 (9.488)	335 (13.189)	382.5 (15.059)	2	
Housing length	L2		59 (2.323)	64.5 (2.539)	61.5 (2.421)	91.5 (3.602)	116 (4.567)	1	
			88 (3.465)	96.5 (3.799)	101.5 (3.996)	150.5 (5.925)	188 (7.402)	2	
Centering depth output	L7		19 (0.748)	17.5 (0.689)	28 (1.102)	28 (1.102)	28 (1.102)		
Flange thickness output	L8		7 (0.276)	8 (0.315)	10 (0.394)	12 (0.472)	15 (0.591)		
Clamping system diameter input	D26		More information on page 125						
Motor shaft diameter j6/k6	D20		The dimensions vary with the motor/gearbox flange. The input flange geometries can be retrieved for each specific motor in Tec Data Finder at www.neugart.com						
Max. permis. motor shaft length	L20								
Min. permis. 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 6885-1)			A 5x5x25	A 6x6x28	A 10x8x50	A 12x8x65	A 16x10x70		
Feather key width (DIN 6885-1)	B1		5 (0.197)	6 (0.236)	10 (0.394)	12 (0.472)	16 (0.630)		
Shaft height including feather key (DIN 6885-1)	H1		18 (0.709)	24.5 (0.965)	35 (1.378)	43 (1.693)	59 (2.323)		
Shaft length output	L3		48 (1.890)	56 (2.205)	88 (3.465)	110 (4.331)	112 (4.409)		A
Shaft length from shoulder	L4		28 (1.102)	36 (1.417)	58 (2.283)	80 (3.150)	82 (3.228)		
Feather key length	L5		25 (0.984)	28 (1.102)	50 (1.969)	65 (2.559)	70 (2.756)		
Distance from shaft end	L6		2 (0.079)	4 (0.157)	4 (0.157)	8 (0.315)	6 (0.236)		
Center hole (DIN 332, type DR)	Z		M5x12.5	M8x19	M12x28	M16x36	M20x42		
Smooth output shaft									B
Shaft length output	L3		48 (1.890)	56 (2.205)	88 (3.465)	110 (4.331)	112 (4.409)		
Shaft length from shoulder	L4		28 (1.102)	36 (1.417)	58 (2.283)	80 (3.150)	82 (3.228)		
Toothed output shaft (DIN 5480)			W16x0.8x 18x6m	W22x1.25x 16x6m	W32x1.25x 24x6m	W40x2.0x 18x6m	W55x2.0x 26x6m		C
Width of gearing	L_v		15 (0.591)	15 (0.591)	15 (0.591)	20 (0.787)	22 (0.866)		
Shaft length output	L3		46 (1.811)	46 (1.811)	56 (2.205)	70 (2.756)	71.5 (2.815)		
Shaft length from shoulder	L4		26 (1.024)	26 (1.024)	26 (1.024)	40 (1.575)	41.5 (1.634)		
Center hole (DIN 332. type DR)	Z		M5x12.5	M8x19	M12x28	M16x36	M20x42		

[1] Dimensions in mm (in)
[2] Number of stages



PSFN

The precision planetary gearbox for maximum loads with particularly quiet drive and flange output shaft

Thanks to its standardized flange interface, our **PSFN** can be installed easily and reliably. Our Neugart-designed helical teeth makes additional noise absorption measures absolute. Thanks to its high tilting moment, you may demand the utmost from this precision planetary gearbox.

❷ Particularly quiet drive

The **PSFN** runs particularly quiet. Thanks to the helical teeth we have developed, you need not think about noise absorption measures for your machine. This saves you money.

❶ Easy, reliable, fast

Fitted with an EN ISO 9409-1 flange interface, the **PSFN** lets you install drive components quickly and easily like flange pinion, pulley, or turntable. The optional dowel hole provides additional secureness during fitting.

❸ Maximized loads

Thanks to its high tilting moment, you can subject the **PSFN** to the highest radial and axial forces. This has genuine benefits for the design of turntables or rack and pinion assemblies – and all this, of course, with the best performance.

- Minimized backlash for maximized precision (< 1 arcmin)
- For any mounting position
- Individual adaptation of the input flange to the motor
- Lifetime lubrication for maintenance-free operation
- Equidirectional rotation
- Clamping systems with optimized mass moment of inertia

Code	Gearbox characteristics			PSFN064	PSFN090	PSFN110	PSFN140	PSFN200	z[1]
	Service life	t_L	h	20,000					
	Service life at T_{2N} x 0.88			30,000					
	Efficiency at full load[2]	η	%	97					1
				96					2
	Min. operating temperature	T_{min}	°C (°F)	-25 (-13)					
	Max. operating temperature	T_{max}		90 (194)					
	Protection class			IP 65					
S	Standard lubrication			Oil					
F	Food grade lubrication			Oil					
L	Low temperature lubrication[3]			Oil					
	Installation position			Any					
S	Standard backlash	j_t	arcmin	< 3					1
				< 5					2
R	Reduced backlash			< 2	< 1	< 1	< 1	< 1	
	Torsional stiffness[2]	c_g	Nm/arcmin (lb_f.in/arcmin)	8.9 - 12.0 (79 - 106)	24.5 - 33.0 (217 - 292)	61.0 - 82.0 (540 - 726)	142.0 - 190.0 (1257 - 1682)	455.0 - 610.0 (4027 - 5399)	1
				9.1 - 12.0 (81 - 106)	24.0 - 31.5 (212 - 279)	60.0 - 79.0 (531 - 699)	139.0 - 182.0 (1230 - 1611)	445.0 - 585.0 (3938 - 5177)	2
	Gearbox weight	m_G	kg (lb_m)	1.5 (3.3)	3 (6.6)	6.5 (14.3)	12 (26.5)	28.3 (62.4)	1
				2.2 (4.9)	4 (8.8)	8 (17.6)	13.5 (29.8)	32 (70.6)	2
S	Standard surface			Housing: Steel – nitrocarburized and post-oxidized (black)					
	Running noise[4]	Q_g	dB(A)	57	58	63	66	68	
	Max. bending moment based on the gearbox input flange[5]	M_b	Nm (lb_f.in)	18 (159)	38 (336)	80 (708)	180 (1593)	300 (2655)	1
				18 (159)	18 (159)	38 (336)	80 (708)	180 (1593)	2
	Motor flange precision			DIN 42955-R					

Output shaft loads			PSFN064	PSFN090	PSFN110	PSFN140	PSFN200	z[1]
Radial force for 20,000 h[6][7]	$F_{r\ 20.000\ h}$	N (lb_f)	2400 (540)	4400 (990)	5500 (1238)	12000 (2700)	23000 (5175)	
Axial force for 20,000 h[6][7]	$F_{a\ 20.000\ h}$		4300 (968)	8200 (1845)	9500 (2138)	8500 (1913)	16000 (3600)	
Radial force for 30,000 h[6][7]	$F_{r\ 30.000\ h}$		2100 (473)	3900 (878)	4800 (1080)	11000 (2475)	21000 (4725)	
Axial force for 30,000 h[6][7]	$F_{a\ 30.000\ h}$		3800 (855)	7200 (1620)	8400 (1890)	7500 (1688)	14000 (3150)	
Static radial force[7][8]	$F_{r\ Stat}$		2400 (540)	4400 (990)	5500 (1238)	12000 (2700)	23000 (5175)	
Static axial force[7][8]	$F_{a\ Stat}$		4300 (968)	8200 (1845)	9500 (2138)	8500 (1913)	16000 (3600)	
Tilting moment for 20,000 h[6][8]	$M_{K\ 20.000\ h}$	Nm (lb_f.in)	147 (1301)	361 (3195)	534 (4726)	1030 (9116)	2445 (21638)	
Tilting moment for 30,000 h[6][8]	$M_{K\ 30.000\ h}$		129 (1142)	320 (2832)	466 (4124)	944 (8354)	2232 (19753)	

Moment of inertia			PSFN064	PSFN090	PSFN110	PSFN140	PSFN200	z[1]
Mass moment of inertia[2]	J	kgcm² (lb_f.in.s²10⁻⁴)	0.128 - 0.188 (1.133 - 1.664)	0.342 - 0.611 (3.027 - 5.407)	0.892 - 1.741 (7.894 - 15.408)	6.526 - 9.670 (57.755 - 85.580)	22.520 - 40.642 (199.302 - 359.682)	1
			0.124 - 0.180 (1.097 - 1.593)	0.125 - 0.197 (1.106 - 1.743)	0.325 - 0.587 (2.876 - 5.195)	0.853 - 1.836 (7.549 - 16.249)	6.434 - 10.410 (56.941 - 92.129)	2

[1] Number of stages
[2] The ratio-dependent values can be retrieved in Tec Data Finder – www.neugart.com
[3] T_{min} = -40°C (-40°F). Optimal operating temperature max. 50°C (122°F)
[4] Sound pressure level from 1 m, measured on input running at n_1=3000 rpm no load; i=5
[5] Max. motor weight* in kg = 0.2 x M_b / motor length in m
* with symmetrically distributed motor weight
* with horizontal and stationary mounting
[6] These values are based on an output shaft speed of n_2=100 rpm
[7] Based on the end of the output shaft
[8] 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

Output torques			PSFN064	PSFN090	PSFN110	PSFN140	PSFN200	i(1)	z(2)
Nominal output torque(3)	T_{2N}	Nm (lb_f.in)	39 (345)	80 (708)	180 (1593)	470 (4160)	950 (8408)	4	1
			40 (354)	80 (708)	175 (1549)	405 (3584)	950 (8408)	5	
			37 (327)	78 (690)	175 (1549)	355 (3142)	900 (7965)	7	
			28 (248)	59 (522)	140 (1239)	305 (2699)	750 (6638)	10	
			39 (345)	80 (708)	180 (1593)	450 (3983)	950 (8408)	16	2
			39 (345)	80 (708)	180 (1593)	450 (3983)	950 (8408)	20	
			40 (354)	80 (708)	175 (1549)	405 (3584)	950 (8408)	25	
			40 (354)	80 (708)	175 (1549)	405 (3584)	950 (8408)	35	
			39 (345)	80 (708)	180 (1593)	470 (4160)	950 (8408)	40	
			40 (354)	80 (708)	175 (1549)	405 (3584)	950 (8408)	50	
			37 (327)	78 (690)	175 (1549)	355 (3142)	900 (7965)	70	
			28 (248)	59 (522)	140 (1239)	305 (2699)	750 (6638)	100	
Max. output torque(4)	T_{2max}	Nm (lb_f.in)	62 (549)	128 (1133)	288 (2549)	752 (6655)	1520 (13452)	4	1
			64 (566)	128 (1133)	280 (2478)	648 (5735)	1520 (13452)	5	
			59 (522)	125 (1106)	280 (2478)	568 (5027)	1440 (12744)	7	
			45 (398)	94 (832)	224 (1982)	488 (4319)	1200 (10620)	10	
			62 (549)	128 (1133)	288 (2549)	720 (6372)	1520 (13452)	16	2
			62 (549)	128 (1133)	288 (2549)	720 (6372)	1520 (13452)	20	
			64 (566)	128 (1133)	280 (2478)	648 (5735)	1520 (13452)	25	
			64 (566)	128 (1133)	280 (2478)	648 (5735)	1520 (13452)	35	
			62 (549)	128 (1133)	288 (2549)	752 (6655)	1520 (13452)	40	
			64 (566)	128 (1133)	280 (2478)	648 (5735)	1520 (13452)	50	
			59 (522)	125 (1106)	280 (2478)	568 (5027)	1440 (12744)	70	
			45 (398)	94 (832)	224 (1982)	488 (4319)	1200 (10620)	100	

(1) Ratios ($i=n_1/n_2$)
(2) Number of stages
(3) Application specific configuration with NCP – www.neugart.com
(4) 30,000 rotations of the output shaft permitted; see page 136

Output torques			PSFN064	PSFN090	PSFN110	PSFN140	PSFN200	i[1]	z[2]
Emergency stop torque[3]	T_{2Stop}	Nm (lb_f.in)	120 (1062)	280 (2478)	650 (5753)	1650 (14603)	3200 (28320)	4	1
			130 (1151)	280 (2478)	650 (5753)	1650 (14603)	3200 (28320)	5	
			80 (708)	175 (1549)	340 (3009)	1300 (11505)	3200 (28320)	7	
			90 (797)	200 (1770)	480 (4248)	600 (5310)	1700 (15045)	10	
			150 (1328)	300 (2655)	650 (5753)	1650 (14603)	3200 (28320)	16	2
			150 (1328)	300 (2655)	650 (5753)	1650 (14603)	3200 (28320)	20	
			150 (1328)	300 (2655)	650 (5753)	1650 (14603)	3200 (28320)	25	
			150 (1328)	300 (2655)	650 (5753)	1650 (14603)	3200 (28320)	35	
			150 (1328)	300 (2655)	650 (5753)	1650 (14603)	3200 (28320)	40	
			150 (1328)	300 (2655)	650 (5753)	1650 (14603)	3200 (28320)	50	
			80 (708)	175 (1549)	340 (3009)	1300 (11505)	3200 (28320)	70	
			90 (797)	200 (1770)	480 (4248)	600 (5310)	1700 (15045)	100	

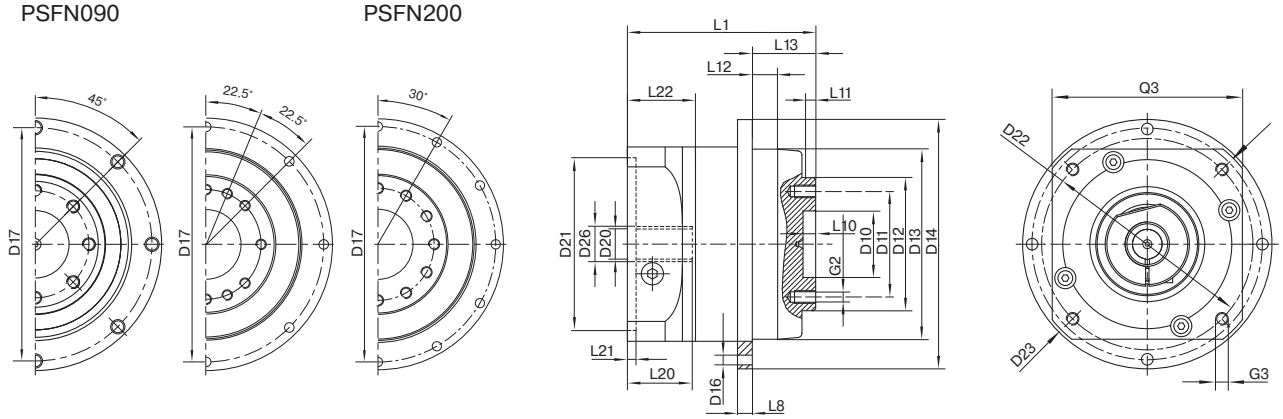
Input speeds			PSFN064	PSFN090	PSFN110	PSFN140	PSFN200	i[1]	z[2]
Average thermal input speed at T_{2N} and S1[4][5]	n_{1N}	rpm	3200[6]	2400[6]	1800[6]	1100[6]	750[6]	4	1
			3800[6]	2950[6]	2250[6]	1350[6]	950[6]	5	
			4500	3800[6]	2950[6]	1800[6]	1250[6]	7	
			4500	4000	3500	2300[6]	1700[6]	10	
			4500	4500	3800[6]	2450[6]	1550[6]	16	2
			4500	4500	4000	3050[6]	1900[6]	20	
			4500	4500	4000	3350[6]	2050[6]	25	
			4500	4500	4000	3500	2650[6]	35	
			4500	4500	4000	3500	3000[6]	40	
			4500	4500	4000	3500	3000	50	
			4500	4500	4000	3500	3000	70	
			4500	4500	4000	3500	3000	100	
Max. mechanical input speed[4]	n_{1Limit}	rpm	14000	10000	8500	6500	6000		1
			14000	14000	10000	8500	6500		2

[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 136 for the definition
[6] Average thermal input speed at 50% T_{2N} and S1

PSFN064
PSFN090

PSFN110

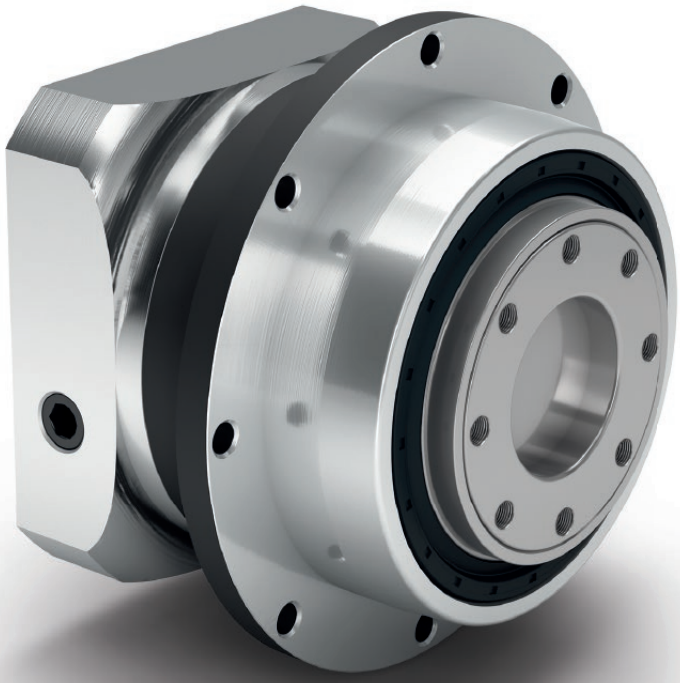
PSFN140
PSFN200



Drawing corresponds to a PSFN090 / 1-stage / flange output shaft / 14 mm clamping system / motor adaptation – 2-part – round universal flange / B5 flange type motor
All other variants can be retrieved in the Tec Data Finder at www.neugart.com

Geometry[1]			PSFN064	PSFN090	PSFN110	PSFN140	PSFN200	z[2]	Code
Centering diameter output shaft	D10	H7	20 (0.787)	31.5 (1.240)	40 (1.575)	50 (1.969)	80 (3.150)		
Pitch circle diameter output shaft	D11		31.5 (1.240)	50 (1.969)	63 (2.480)	80 (3.150)	125 (4.921)		
Centering diameter output shaft	D12	h7	40 (1.575)	63 (2.480)	80 (3.150)	100 (3.937)	160 (6.299)		
Centering diameter output flange	D13		64 (2.520)	90 (3.543)	110 (4.331)	140 (5.512)	200 (7.874)		
Flange diameter output	D14		86 (3.386)	118 (4.646)	145 (5.709)	179 (7.047)	247 (9.724)		
Mounting bore output	D16		4.5 8x45°	5.5 8x45°	5.5 8x45°	6.6 12x30°	9 12x30°		
Pitch circle diameter output flange	D17		79 (3.110)	109 (4.291)	135 (5.315)	168 (6.614)	233 (9.173)		
Min. total length	L1		71 (2.795)	89.5 (3.524)	108 (4.252)	142 (5.591)	172 (6.772)	1	
			99.5 (3.917)	111.5 (4.390)	130 (5.118)	173 (6.811)	217 (8.543)	2	
Flange thickness output	L8		4 (0.157)	7 (0.276)	8 (0.315)	10 (0.394)	12 (0.472)		
Centering depth output shaft	L10		4.5 (0.177)	6.5 (0.256)	6.5 (0.256)	6.5 (0.256)	10 (0.394)		
Centering depth output shaft	L11		3 (0.118)	6 (0.236)	6 (0.236)	6 (0.236)	7 (0.276)		
Centering depth output flange	L12		10 (0.394)	12 (0.472)	12 (0.472)	14 (0.551)	17.5 (0.689)		
Output flange length	L13		19.5	30.0	29.0	38.0	50.0		
Clamping system diameter input	D26		More information on page 125						
Motor shaft diameter j6/k6	D20		The dimensions vary with the motor/gearbox flange. The input flange geometries can be retrieved for each specific motor in Tec Data Finder at www.neugart.com						
Max. permis. motor shaft length	L20								
Min. permis. 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	■							
Flange output shaft (similar EN ISO 9409-1)									D
Number x thread x depth	G2		8 x M5x7	8 x M6x10	12 x M6x12	12 x M8x15	12 x M10x20		
Flange output shaft with dowel hole (EN ISO 9409-1)									E
Dowel hole x depth	D15	H7	5x5	6x6	6x6	8x8	10x10		
Number x thread x depth	G2		7 x M5x7	7 x M6x10	11 x M6x12	11 x M8x15	11 x M10x20		

(1) Dimensions in mm (in)
(2) Number of stages



PLFN

The precision planetary gearbox for maximum loads and the highest performance – fast and easy to install

Our **PLFN** features a standardized flange interface for ease of installation. The straight-teeth precision planetary gearbox has been designed for the highest performance and torque. Its high tilting moment delivers the best performance even under the highest radial and axial forces.

1 Standardized flange interface

Fitted with an EN ISO 9409-1 interface, the **PLFN** precision planetary gearbox promises you fast and easy installation of the drive components like flange pinion, pulley, or turntable. The optional dowel hole provides additional secureness during fitting.

2 Maximized loads

Thanks to its high tilting moment, the **PLFN** is particularly robust and withstands even the highest axial and radial forces. This advanced technology is intended for your complex applications, e.g. turntable or rack and pinion.

3 Maximized torque

Thanks to its straight teeth, the **PLFN** is ideal for the highest performance. Its intelligent design delivers greater power than conventional planetary gearboxes.

- Minimized backlash for maximized precision (< 1 arcmin)
- For any mounting position
- Individual adaptation of the input flange to the motor
- Lifetime lubrication for maintenance-free operation
- Equidirectional rotation
- Clamping systems with optimized mass moment of inertia

Code	Gearbox characteristics			PLFN064	PLFN090	PLFN110	PLFN140	PLFN200	z[1]
	Service life	t_L	h	20,000					
	Service life at T_{2N} x 0.88			30,000					
	Efficiency at full load[2]	η	%	97					1
				96					2
	Min. operating temperature	T_{min}	°C (°F)	-25 (-13)					
	Max. operating temperature	T_{max}		90 (194)					
	Protection class			IP 65					
S	Standard lubrication			Oil					
F	Food grade lubrication			Oil					
L	Low temperature lubrication[3]			Oil					
	Installation position			Any					
S	Standard backlash	j_t	arcmin	< 3					1
				< 5					2
R	Reduced backlash			< 2	< 1	< 1	< 1	< 1	
	Torsional stiffness[2]	c_g	Nm/arcmin (lb_f.in/arcmin)	10.8 - 14.5 (96 - 128)	25.5 - 34.0 (226 - 301)	64.0 - 86.0 (566 - 761)	145.0 - 195.0 (1283 - 1726)	470.0 - 630.0 (4160 - 5576)	1
				11.0 - 14.5 (97 - 128)	25.0 - 32.5 (221 - 288)	63.0 - 83.0 (558 - 735)	142.0 - 187.0 (1257 - 1655)	460.0 - 605.0 (4071 - 5354)	2
	Gearbox weight	m_G	kg (lb_m)	1.5 (3.3)	3 (6.6)	6.5 (14.3)	13.8 (30.4)	35.5 (78.3)	1
				2.2 (4.9)	4 (8.8)	8 (17.6)	16 (35.3)	42.5 (93.7)	2
S	Standard surface			Housing: Steel – nitrocarburized and post-oxidized (black)					
	Running noise[4]	Q_g	dB(A)	60	62	65	70	74	
	Max. bending moment based on the gearbox input flange[5]	M_b	Nm (lb_f.in)	18 (159)	38 (336)	80 (708)	180 (1593)	300 (2655)	1
				18 (159)	18 (159)	38 (336)	80 (708)	180 (1593)	2
	Motor flange precision			DIN 42955-R					

Output shaft loads			PLFN064	PLFN090	PLFN110	PLFN140	PLFN200	z[1]
Radial force for 20,000 h[6][7]	$F_{r\ 20.000\ h}$	N (lb_f)	2400 (540)	4400 (990)	5500 (1238)	12000 (2700)	33000 (7425)	
Axial force for 20,000 h[6][7]	$F_{a\ 20.000\ h}$		4300 (968)	8200 (1845)	9500 (2138)	8500 (1913)	15000 (3375)[8]	
Radial force for 30,000 h[6][7]	$F_{r\ 30.000\ h}$		2100 (473)	3900 (878)	4800 (1080)	11000 (2475)	29500 (6638)	
Axial force for 30,000 h[6][7]	$F_{a\ 30.000\ h}$		3800 (855)	7200 (1620)	8400 (1890)	7500 (1688)	13500 (3038)[8]	
Static radial force[7][8]	$F_{r\ Stat}$		2400 (540)	4400 (990)	5500 (1238)	12000 (2700)	33000 (7425)	
Static axial force[7][8]	$F_{a\ Stat}$		4300 (968)	8200 (1845)	9500 (2138)	8500 (1913)	15000 (3375)[8]	
Tilting moment for 20,000 h[6][8]	$M_{K\ 20.000\ h}$	Nm (lb_f.in)	148 (1310)	363 (3213)	534 (4726)	1219 (10788)	4957 (43869)	
Tilting moment for 30,000 h[6][8]	$M_{K\ 30.000\ h}$		129 (1142)	322 (2850)	466 (4124)	1117 (9885)	4431 (39214)	

Moment of inertia			PLFN064	PLFN090	PLFN110	PLFN140	PLFN200	z[1]
Mass moment of inertia[2]	J	kgcm² (lb_f.in.s²10⁻⁴)	0.217 - 0.288 (1.920 - 2.549)	0.580 - 0.920 (5.133 - 8.142)	2.036 - 2.942 (18.019 - 26.037)	7.313 - 12.365 (64.720 - 109.430)	26.880 - 61.170 (237.888 - 541.355)	1
			0.209 - 0.243 (1.850 - 2.151)	0.211 - 0.269 (1.867 - 2.381)	0.546 - 0.737 (4.832 - 6.522)	1.951 - 2.784 (17.266 - 24.638)	6.911 - 11.813 (61.162 - 104.545)	2

(1) Number of stages
(2) The ratio-dependent values can be retrieved in Tec Data Finder – www.neugart.com
(3) T_{min} = -40°C (-40°F). Optimal operating temperature max. 50°C (122°F)
(4) Sound pressure level from 1 m, measured on input running at n_1=3000 rpm no load; i=5
(5) Max. motor weight* in kg = 0.2 x M_b / motor length in m
* with symmetrically distributed motor weight
* with horizontal and stationary mounting
(6) These values are based on an output shaft speed of n_2=100 rpm
(7) Based on the end of the output shaft
(8) 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

Output torques			PLFN064	PLFN090	PLFN110	PLFN140	PLFN200	i(1)	z(2)
Nominal output torque(3)	T_{2N}	Nm (lb_f.in)	60 (531)	140 (1239)	300 (2655)	600 (5310)	1300 (11505)	4	1
			65 (575)	140 (1239)	260 (2301)	750 (6638)	1600 (14160)	5	
			45 (398)	90 (797)	180 (1593)	530 (4691)	1300 (11505)	7	
			40 (354)	80 (708)	150 (1328)	450 (3983)	1000 (8850)	8	
			27 (239)	60 (531)	125 (1106)	305 (2699)	630 (5576)	10	
			77 (681)	150 (1328)	300 (2655)	1000 (8850)	1800 (15930)	16	2
			77 (681)	150 (1328)	300 (2655)	1000 (8850)	1800 (15930)	20	
			65 (575)	140 (1239)	260 (2301)	900 (7965)	1800 (15930)	25	
			77 (681)	150 (1328)	300 (2655)	600 (5310)	1800 (15930)	32	
			65 (575)	140 (1239)	260 (2301)	750 (6638)	1800 (15930)	40	
			65 (575)	130 (1151)	260 (2301)	620 (5487)	1525 (13496)	50	
			40 (354)	80 (708)	150 (1328)	450 (3983)	1000 (8850)	64	
			27 (239)	60 (531)	125 (1106)	305 (2699)	630 (5576)	100	
Max. output torque(4)	T_{2max}	Nm (lb_f.in)	96 (850)	224 (1982)	480 (4248)	960 (8496)	2080 (18408)	4	1
			104 (920)	224 (1982)	416 (3682)	1200 (10620)	2560 (22656)	5	
			72 (637)	144 (1274)	288 (2549)	848 (7505)	2080 (18408)	7	
			64 (566)	128 (1133)	240 (2124)	720 (6372)	1600 (14160)	8	
			43 (381)	96 (850)	200 (1770)	488 (4319)	1008 (8921)	10	
			123 (1089)	240 (2124)	480 (4248)	1600 (14160)	2880 (25488)	16	2
			123 (1089)	240 (2124)	480 (4248)	1600 (14160)	2880 (25488)	20	
			104 (920)	224 (1982)	416 (3682)	1440 (12744)	2880 (25488)	25	
			123 (1089)	240 (2124)	480 (4248)	960 (8496)	2880 (25488)	32	
			104 (920)	224 (1982)	416 (3682)	1200 (10620)	2880 (25488)	40	
			104 (920)	208 (1841)	416 (3682)	992 (8779)	2440 (21594)	50	
			64 (566)	128 (1133)	240 (2124)	720 (6372)	1600 (14160)	64	
			43 (381)	96 (850)	200 (1770)	488 (4319)	1008 (8921)	100	

(1) Ratios ($i=n_1/n_2$)
(2) Number of stages
(3) Application specific configuration with NCP – www.neugart.com
(4) 30,000 rotations of the output shaft permitted; see page 136

Output torques			PLFN064	PLFN090	PLFN110	PLFN140	PLFN200	i[1]	z[2]
Emergency stop torque[3]	T_{2Stop}	Nm (lb_f.in)	120 (1062)	280 (2478)	650 (5753)	1300 (11505)	2700 (23895)	4	1
			130 (1151)	280 (2478)	650 (5753)	1500 (13275)	3200 (28320)	5	
			90 (797)	175 (1549)	340 (3009)	1300 (11505)	2600 (23010)	7	
			90 (797)	200 (1770)	380 (3363)	1000 (8850)	2600 (23010)	8	
			90 (797)	200 (1770)	480 (4248)	750 (6638)	1350 (11948)	10	
			150 (1328)	300 (2655)	650 (5753)	2000 (17700)	3600 (31860)	16	2
			150 (1328)	300 (2655)	650 (5753)	2000 (17700)	3600 (31860)	20	
			150 (1328)	300 (2655)	650 (5753)	1800 (15930)	3600 (31860)	25	
			150 (1328)	300 (2655)	650 (5753)	1500 (13275)	3600 (31860)	32	
			150 (1328)	300 (2655)	650 (5753)	1500 (13275)	3600 (31860)	40	
			150 (1328)	300 (2655)	650 (5753)	1500 (13275)	3600 (31860)	50	
			80 (708)	200 (1770)	380 (3363)	1000 (8850)	2600 (23010)	64	
			80 (708)	200 (1770)	480 (4248)	750 (6638)	1350 (11948)	100	

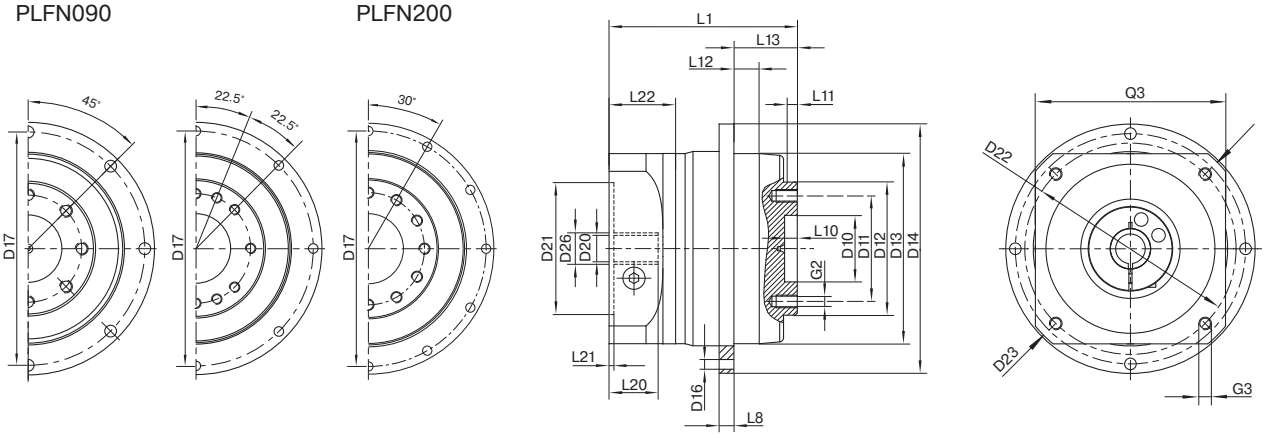
Input speeds			PLFN064	PLFN090	PLFN110	PLFN140	PLFN200	i[1]	z[2]
Average thermal input speed at T_{2N} and S1[4][5]	n_{1N}	rpm	2100[6]	1750[6]	1300[6]	850[6]	500[6]	4	1
			2450[6]	2100[6]	1650[6]	950[6]	600[6]	5	
			3200[6]	3000[6]	2350[6]	1400[6]	850[6]	7	
			3550[6]	3350[6]	2650[6]	1650[6]	1000[6]	8	
			4100[6]	4000[6]	3150[6]	2050[6]	1300[6]	10	
			3700[6]	3850[6]	3150[6]	1700[6]	1100[6]	16	2
			4200[6]	4450[6]	3750[6]	2100[6]	1350[6]	20	
			4500[6]	4500[6]	4000[6]	2500[6]	1550[6]	25	
			4500[6]	4500	4000	3500[6]	2000[6]	32	
			4500	4500	4000	3500[6]	2250[6]	40	
			4500	4500	4000	3500	2750[6]	50	
			4500	4500	4000	3500	3000[6]	64	
			4500	4500	4000	3500	3000	100	
Max. mechanical input speed[4]	n_{1Limit}	rpm	14000	10000	8500	6500	6000		1
			14000	14000	10000	8500	6500		2

[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 136 for the definition
[6] Average thermal input speed at 50% T_{2N} and S1

PLFN064
PLFN090

PLFN110

PLFN140
PLFN200



Drawing corresponds to a PLFN090 / 1-stage / flange output shaft / 19 mm clamping system / motor adaptation – 2-part – round universal flange / B5 flange type motor
All other variants can be retrieved in the Tec Data Finder at www.neugart.com

Geometry[1]			PLFN064	PLFN090	PLFN110	PLFN140	PLFN200	z[2]	Code
Centering diameter output shaft	D10	H7	20 (0.787)	31.5 (1.240)	40 (1.575)	50 (1.969)	80 (3.150)		
Pitch circle diameter output shaft	D11		31.5 (1.240)	50 (1.969)	63 (2.480)	80 (3.150)	125 (4.921)		
Centering diameter output shaft	D12	h7	40 (1.575)	63 (2.480)	80 (3.150)	100 (3.937)	160 (6.299)		
Centering diameter output flange	D13		64 (2.520)	90 (3.543)	110 (4.331)	140 (5.512)	200 (7.874)		
Flange diameter output	D14		86 (3.386)	118 (4.646)	145 (5.709)	179 (7.047)	247 (9.724)		
Mounting bore output	D16		4.5 8x45°	5.5 8x45°	5.5 8x45°	6.6 12x30°	9 12x30°		
Pitch circle diameter output flange	D17		79 (3.110)	109 (4.291)	135 (5.315)	168 (6.614)	233 (9.173)		
Min. total length	L1		71 (2.795)	89 (3.504)	108 (4.252)	157 (6.181)	212.5 (8.366)	1	
			99.5 (3.917)	111 (4.370)	130 (5.118)	187.5 (7.382)	264 (10.394)	2	
Flange thickness output	L8		4 (0.157)	7 (0.276)	8 (0.315)	10 (0.394)	12 (0.472)		
Centering depth output shaft	L10		4.5 (0.177)	6.5 (0.256)	6.5 (0.256)	6.5 (0.256)	10 (0.394)		
Centering depth output shaft	L11		3 (0.118)	6 (0.236)	6 (0.236)	6 (0.236)	8 (0.315)		
Centering depth output flange	L12		10 (0.394)	12 (0.472)	12 (0.472)	14 (0.551)	17.5 (0.689)		
Output flange length	L13		19.5	30.0	29.0	38.0	50.0		
Clamping system diameter input	D26		More information on page 125						
Motor shaft diameter j6/k6	D20		The dimensions vary with the motor/gearbox flange. The input flange geometries can be retrieved for each specific motor in Tec Data Finder at www.neugart.com						
Max. permis. motor shaft length	L20								
Min. permis. 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	■							
Flange output shaft (similar EN ISO 9409-1)									D
Number x thread x depth	G2		8xM5x7	8xM6x10	12xM6x12	12xM8x15	12xM10x20		
Flange output shaft with dowel hole (EN ISO 9409-1)									E
Dowel hole x depth	D15	H7	5x5	6x6	6x6	8x8	10x10		
Number x thread x depth	G2	-	7xM5x7	7xM6x10	11xM6x12	11xM8x15	11xM10x20		

[1] Dimensions in mm (in)
[2] Number of stages

WPLN

The versatile right angle gearbox with spiral teeth for a quiet drive

Thanks to its spiral teeth, our **WPLN** achieves the optimal synchronism for the best surface qualities. By minimizing vibrations, it runs uniformly and quietly. The precision right angle planetary gearbox features lifetime lubrication and can be mounted virtually anywhere.

❶ Highest installation flexibility

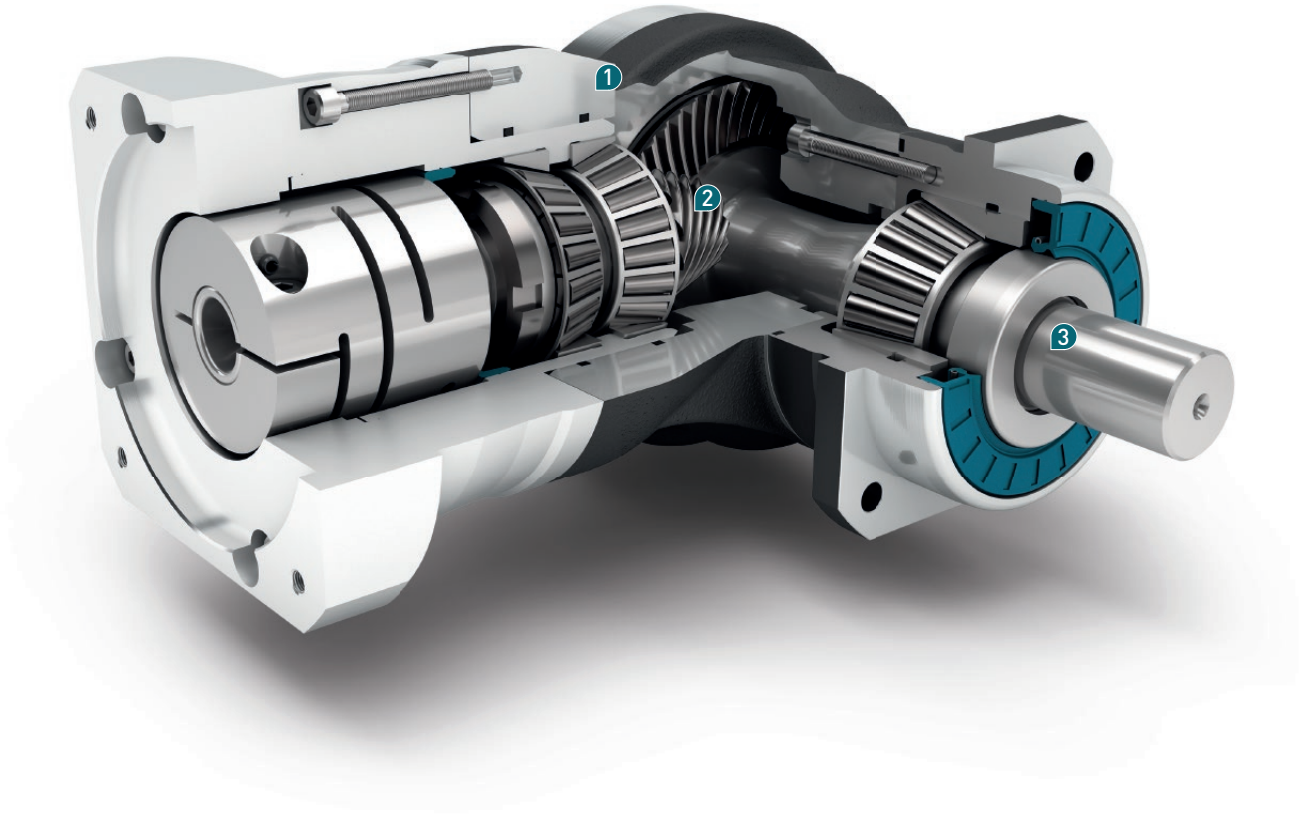
Our lifetime lubricated right angle planetary gearbox extracts the most out of little space. The **WPLN** can be installed virtually anywhere, giving you greater freedom.

❷ Particularly quiet drive

The high-quality spiral teeth makes the **WPLN** a particularly low-noise solution. Additional sound absorption measures are not needed on your machine. The value of the whole system increases as a result.

❸ Best surface quality

Thanks to its spiral teeth, the **WPLN** delivers a particularly uniform and low-vibration performance. Your machine therefore produces the highest surface quality and the best prints.



- Individual adaptation of the input flange to the motor
- Lifetime lubrication for maintenance-free operation
- Counterdirectional rotation
- Wide range of output shaft designs
- Clamping systems with optimized mass moment of inertia

Code	Gearbox characteristics			WPLN070	WPLN090	WPLN115	WPLN142	z(1)
	Service life	t_L	h	20,000				
	Service life at T_{2N} x 0,88			30,000				
	Efficiency at full load(2)	η	%	95				1
				94				2
	Min. operating temperature	T_{min}	°C (°F)	-25 (-13)				
	Max. operating temperature	T_{max}		90 (194)				
	Protection class			IP 65				
S	Standard lubrication			Oil				
F	Food grade lubrication			Oil				
	Installation position			Any				
S	Standard backlash	j_t	arcmin	< 5				
	Torsional stiffness(2)	c_g	Nm/arcmin (lb_f.in/arcmin)	1,8 - 2,4 (16 - 21)	4,6 - 6,2 (41 - 55)	10,1 - 13,5 (89 - 119)	25,5 - 34,0 (226 - 301)	1
				2,3 - 3,0 (20 - 27)	5,9 - 7,8 (52 - 69)	12,8 - 16,9 (113 - 150)	32,5 - 42,5 (288 - 376)	2
	Gearbox weight	m_G	kg (lb_m)	3 (6.6)	5 (11.0)	10,5 (23.2)	25 (55.1)	1
				3,9 (8.6)	5,3 (11.7)	9,2 (20.3)	21,5 (47.4)	2
S	Standard surface			Right angle housing: Aluminum – anodized (black)				
	Running noise(3)	Q_g	dB(A)	66	67	68	70	
	Max. bending moment based on the gearbox input flange(4)	M_b	Nm (lb_f.in)	12 (106)	25,5 (226)	53 (469)	120 (1062)	1
				12 (106)	12 (106)	25,5 (226)	53 (469)	2
	Motor flange precision			DIN 42955-R				

Output shaft loads			WPLN070	WPLN090	WPLN115	WPLN142	z(1)
Radial force for 20,000 h(5)(6)	$F_{r\,20.000\,h}$	N (lb_f)	3200 (720)	5200 (1170)	6000 (1350)	12500 (2813)	1
			3200 (720)	5500 (1238)	6000 (1350)	12500 (2813)	2
Axial force for 20,000 h(5)(6)	$F_{a\,20.000\,h}$		4300 (968)	5900 (1328)	7000 (1575)	14500 (3263)	1
			4400 (990)	6400 (1440)	8000 (1800)	15000 (3375)	2
Radial force for 30,000 h(5)(6)	$F_{r\,30.000\,h}$		3200 (720)	5200 (1170)	6000 (1350)	10900 (2453)	1
			3200 (720)	4800 (1080)	5400 (1215)	11400 (2565)	2
Axial force for 30,000 h(5)(6)	$F_{a\,30.000\,h}$		3700 (833)	5200 (1170)	6100 (1373)	12000 (2700)	1
			3900 (878)	5700 (1283)	7000 (1575)	13200 (2970)	2
Static radial force(6)(7)	$F_{r\,Stat}$		3200 (720)	5200 (1170)	6000 (1350)	12500 (2813)	1
			3200 (720)	5500 (1238)	6000 (1350)	12500 (2813)	2
Static axial force(6)(7)	$F_{a\,Stat}$		4300 (968)	5900 (1328)	7000 (1575)	14500 (3263)	1
			4400 (990)	6400 (1440)	8000 (1800)	15000 (3375)	2
Tilting moment for 20,000 h(5)(7)	$M_{K\,20.000\,h}$	Nm (lb_f.in)	322 (2850)	624 (5522)	1010 (8939)	2225 (19691)	1
			322 (2850)	660 (5841)	1010 (8939)	2225 (19691)	2
Tilting moment for 30,000 h(5)(7)	$M_{K\,30.000\,h}$		322 (2850)	624 (5522)	1010 (8939)	1940 (17169)	1
			322 (2850)	576 (5098)	909 (8045)	2029 (17957)	2

Moment of inertia			WPLN070	WPLN090	WPLN115	WPLN142	z(1)
Mass moment of inertia(2)	J	kgcm² (lb_f.in.s²10⁻⁴)	0.500 - 0.822 (4.425 - 7.275)	1.013 - 1.387 (8.965 - 12.275)	4.767 - 5.875 (42.188 - 51.994)	15.090 - 18.307 (133.547 - 162.017)	1
			0.498 - 0.642 (4.407 - 5.682)	0.497 - 0.649 (4.398 - 5.744)	1.014 - 1.419 (8.974 - 12.558)	4.807 - 6.387 (42.542 - 56.525)	2

(1) Number of stages
(2) The ratio-dependent values can be retrieved in Tec Data Finder – www.neugart.com
(3) Sound pressure level from 1 m, measured on input running at n_1=3000 rpm no load; i=5
(4) Max. motor weight* in kg = 0.2 x M_b / motor length in m
* with symmetrically distributed motor weight
* with horizontal and stationary mounting
(5) These values are based on an output shaft speed of n_2=100 rpm
(6) Based on center of output shaft
(7) 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

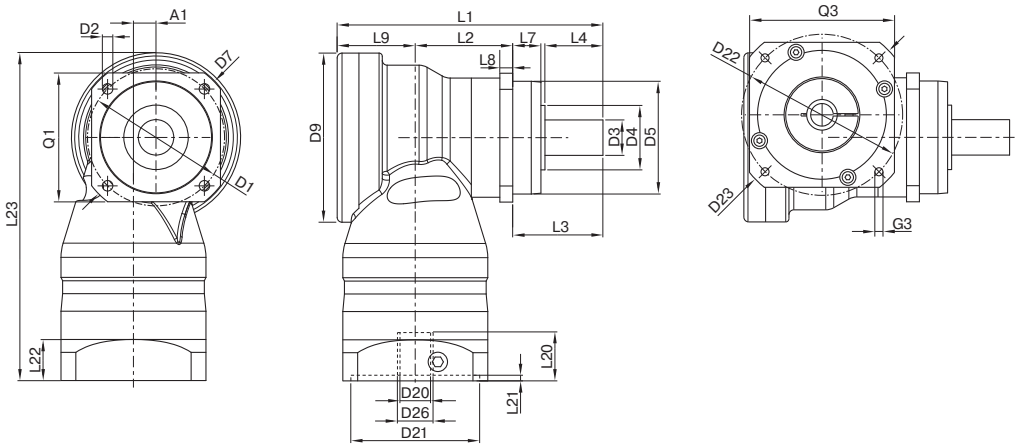
Output torques			WPLN070	WPLN090	WPLN115	WPLN142	i(1)	z(2)
Nominal output torque(3)(4)	T_{2N}	Nm (lb_f.in)	45 (398)	90 (797)	160 (1416)	320 (2832)	4	1
			42 (372)	75 (664)	140 (1239)	280 (2478)	5	
			27 (239)	50 (443)	90 (797)	180 (1593)	8	
			22 (195)	40 (354)	75 (664)	160 (1416)	10	
			77 (681)	150 (1328)	300 (2655)	640 (5664)	16	2
			77 (681)	150 (1328)	300 (2655)	800 (7080)	20	
			65 (575)	140 (1239)	260 (2301)	700 (6195)	25	
			77 (681)	108 (956)	200 (1770)	360 (3186)	32	
			65 (575)	135 (1195)	250 (2213)	450 (3983)	40	
			65 (575)	110 (974)	200 (1770)	375 (3319)	50	
			40 (354)	80 (708)	150 (1328)	450 (3983)	64	
			27 (239)	60 (531)	125 (1106)	305 (2699)	100	
Max. output torque(4)(5)	T_{2max}	Nm (lb_f.in)	72 (637)	144 (1274)	256 (2266)	512 (4531)	4	1
			67 (593)	120 (1062)	224 (1982)	448 (3965)	5	
			43 (381)	80 (708)	144 (1274)	288 (2549)	8	
			35 (310)	64 (566)	120 (1062)	256 (2266)	10	
			123 (1089)	240 (2124)	480 (4248)	1024 (9062)	16	2
			123 (1089)	240 (2124)	480 (4248)	1280 (11328)	20	
			104 (920)	224 (1982)	416 (3682)	1120 (9912)	25	
			123 (1089)	172 (1522)	320 (2832)	576 (5098)	32	
			104 (920)	216 (1912)	400 (3540)	720 (6372)	40	
			104 (920)	176 (1558)	320 (2832)	600 (5310)	50	
			64 (566)	128 (1133)	240 (2124)	720 (6372)	64	
			43 (381)	96 (850)	200 (1770)	488 (4319)	100	

(1) Ratios ($i=n_1/n_2$)
(2) Number of stages
(3) Application specific configuration with NCP – www.neugart.com
(4) Values for feather key (code "A"): for repeated load
(5) 30,000 rotations of the output shaft permitted; see page 136

Output torques			WPLN070	WPLN090	WPLN115	WPLN142	i[1]	z[2]
Emergency stop torque[3]	T_{2Stop}	Nm (lb_f.in)	100 (885)	200 (1770)	400 (3540)	800 (7080)	4	1
			100 (885)	200 (1770)	400 (3540)	800 (7080)	5	
			75 (664)	150 (1328)	300 (2655)	700 (6195)	8	
			75 (664)	150 (1328)	300 (2655)	700 (6195)	10	
			150 (1328)	300 (2655)	650 (5753)	1600 (14160)	16	2
			150 (1328)	300 (2655)	650 (5753)	1600 (14160)	20	
			150 (1328)	300 (2655)	650 (5753)	1600 (14160)	25	
			150 (1328)	300 (2655)	600 (5310)	1200 (10620)	32	
			150 (1328)	300 (2655)	650 (5753)	1500 (13275)	40	
			150 (1328)	300 (2655)	600 (5310)	1200 (10620)	50	
			80 (708)	200 (1770)	380 (3363)	1000 (8850)	64	
			80 (708)	200 (1770)	480 (4248)	750 (6638)	100	

Input speeds			WPLN070	WPLN090	WPLN115	WPLN142	i[1]	z[2]
Average thermal input speed at T_{2N} and S1[4][5]	n_{1N}	rpm	1800[6]	1650[6]	1150[6]	950[6]	4	1
			2000[6]	1900[6]	1250[6]	1000[6]	5	
			2350[6]	2250[6]	1450[6]	1100[6]	8	
			2500[6]	2400[6]	1500[6]	1100[6]	10	
			1850[6]	1800[6]	1650[6]	1000[6]	16	2
			2000[6]	2100[6]	1950[6]	1050[6]	20	
			2150[6]	2250[6]	2150[6]	1150[6]	25	
			2300[6]	2300[6]	2200[6]	1400[6]	32	
			2400[6]	2300[6]	2250[6]	1450[6]	40	
			2500[6]	2450[6]	2400[6]	1550[6]	50	
			2600[6]	2950[6]	2850[6]	1750[6]	64	
			2700[6]	3100[6]	3050[6]	1900[6]	100	
Max. mechanical input speed[4]	n_{1Limit}	rpm	16000	14000	9500	8000		1
			16000	16000	14000	9500		2

[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 136 for the definition
[6] Average thermal input speed at 50% T_{2N} and S1



Drawing corresponds to a WPLN090 / 1-stage / smooth output shaft / 19 mm clamping system / motor adaptation – 2-part – round universal flange / B5 flange type motor

All other variants can be retrieved in the Tec Data Finder at www.neugart.com

Geometry[1]			WPLN070	WPLN090	WPLN115	WPLN142	z[2]	Code
Axis offset	A1		10 (0.394)	14 (0.551)	20 (0.787)	26 (1.024)	1	
			10 (0.394)	10 (0.394)	14 (0.551)	20 (0.787)	2	
Pitch circle diameter output	D1		68 - 75 (2.677 - 2.953)	85 (3.346)	120 (4.724)	165 (6.496)		
Mounting bore output	D2	4x	5.5 (0.217)	6.5 (0.256)	9.0 (0.354)	11.0 (0.433)		
Shaft diameter output	D3	k6	16 (0.630)	22 (0.866)	32 (1.260)	40 (1.575)		
Shaft collar output	D4		30 (1.181)	40 (1.575)	45 (1.772)	70 (2.756)	1	
			35 (1.378)	40 (1.575)	45 (1.772)	70 (2.756)	2	
Centering diameter output	D5	g7	60 (2.362)	70 (2.756)	90 (3.543)	130 (5.118)		
Diagonal dimension output	D7		92 (3.622)	100 (3.937)	140 (5.512)	185 (7.283)		
Max. diameter	D9		86 (3.386)	105 (4.134)	120 (4.724)	170 (6.693)	1	
			86 (3.386)	86 (3.386)	105 (4.134)	120 (4.724)	2	
Flange cross section output	Q1	■	70 (2.756)	80 (3.150)	110 (4.331)	142 (5.591)		
Total length	L1		137.5 (5.413)	165 (6.496)	218 (8.583)	273 (10.748)	1	
			185 (7.283)	207 (8.150)	248.5 (9.783)	342.5 (13.484)	2	
Housing length	L2		46.5 (1.831)	60.5 (2.382)	73.5 (2.894)	76 (2.992)	1	
			94 (3.701)	108 (4.252)	112 (4.409)	176 (6.929)	2	
Shaft length output	L3		48 (1.890)	56 (2.205)	88 (3.465)	110 (4.331)		
Centering depth output	L7		18 (0.709)	17.5 (0.689)	28 (1.102)	28 (1.102)		
Flange thickness output	L8		7 (0.276)	8 (0.315)	10 (0.394)	12 (0.472)		
Offset length	L9		43 (1.693)	48.5 (1.909)	56.5 (2.224)	87 (3.425)	1	
			43 (1.693)	43 (1.693)	48.5 (1.909)	56.5 (2.224)	2	
Min. overall height	L23		179.0 (7.047)	203.5 (8.012)	247.5 (9.744)	318.0 (12.520)	1	
			179.0 (7.047)	182.5 (7.185)	210.0 (8.268)	258.5 (10.177)	2	
Clamping system diameter input	D26		More information on page 125					
Motor shaft diameter j6/k6	D20		The dimensions vary with the motor/gearbox flange. The input flange geometries can be retrieved for each specific motor in Tec Data Finder at www.neugart.com					
Max. permis. motor shaft length	L20							
Min. permis. 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 6885-1)			A 5x5x25	A 6x6x28	A 10x8x50	A 12x8x65		A
Feather key width (DIN 6885-1)	B1		5 (0.197)	6 (0.236)	10 (0.394)	12 (0.472)		
Shaft height including feather key (DIN 6885-1)	H1		18 (0.709)	24.5 (0.965)	35 (1.378)	43 (1.693)		
Shaft length from shoulder	L4		28 (1.102)	36 (1.417)	58 (2.283)	80 (3.150)		
Feather key length	L5		25 (0.984)	28 (1.102)	50 (1.969)	65 (2.559)		
Distance from shaft end	L6		2 (0.079)	4 (0.157)	4 (0.157)	8 (0.315)		
Center hole (DIN 332, type DR)	Z		M5x12.5	M8x19	M12x28	M16x36		
Smooth output shaft								B
Shaft length from shoulder	L4		28 (1.102)	36 (1.417)	58 (2.283)	80 (3.150)		

[1] Dimensions in mm (in)

[2] Number of stages

WPSFN

The shortest spiral-toothed right angle gearbox with flange output shaft and hollow shaft

Our **WPSFN** is extremely light and easy to integrate thanks to its standardized flange interface. It achieves optimized synchronization with the spiral gearing and the helical-toothed planetary stage for the best surface qualities. The shortest right angle precision gearbox with integrated hollow shaft provides you with new structural solutions.

1 Space-saving thanks to minimal installation height

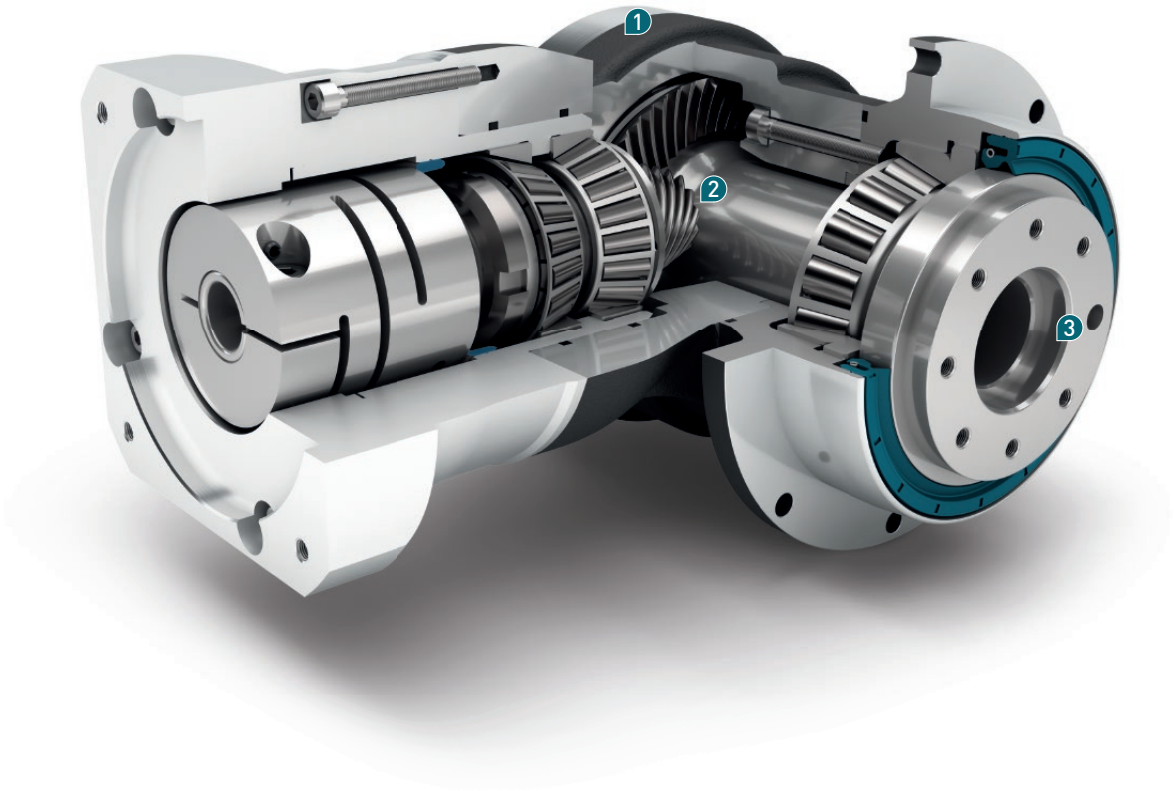
The **WPSFN** is the shortest right angle precision gearbox. Depending on the frame size, you may use up to 25% less installation space than with comparable right angle gearboxes with spiral gearing.

2 Greater quality due to high-class gearing

Thanks to its spiral gearing, the **WPSFN** achieves optimal, homogeneous synchronism. The two-stage right angle precision gearbox operates with extremely low vibration with the helical-toothed planetary stage. As a result, your machine produces the highest surface quality and the best prints.

3 Standard flange interface with hollow shaft

The **WPSFN** right angle precision gearbox with its EN ISO 9409-1 standard flange interface allows you to quickly integrate drive components such as a flanged pinion or turntable. Discover new design solutions for flexible line routing with the hollow shaft integrated in the single-stage **WPSFN**.



- Minimized backlash for maximum precision (< 3 arcmin)
- For any mounting position
- Individual adaptation of the input flange to the motor
- Lifetime lubrication for maintenance-free operation
- Counterdirectional rotation
- Clamping systems with optimized mass moment of inertia

Code	Gearbox characteristics			WPSFN064	WPSFN090	WPSFN110	WPSFN140	z(1)
	Service life	t_L	h	20,000				
	Service life at T_{2N} x 0.88			30,000				
	Efficiency at full load(2)	η	%	94				1
				93				2
	Min. operating temperature	T_{min}	°C (°F)	-25 (-13)				
	Max. operating temperature	T_{max}		90 (194)				
	Protection class			IP65				
S	Standard lubrication			Oil				
F	Food grade lubrication			Oil				
	Installation position			Any				
S	Standard backlash	j_t	arcmin	< 5				
R	Reduced backlash			< 3				2
	Torsional stiffness(2)	c_g	Nm/arcmin (lb_f.in/arcmin)	1.9 - 2.6 (17 - 23)	4.0 - 5.5 (35 - 49)	10.1 - 13.5 (89 - 119)	26.0 - 34.5 (230 - 305)	1
				5.3 - 6.9 (47 - 61)	15.3 - 20.5 (135 - 181)	33.5 - 44.0 (296 - 389)	85.0 - 111.0 (752 - 982)	2
	Gearbox weight	m_G	kg (lb_m)	3.3 (7.3)	6.1 (13.5)	10.9 (24.0)	24 (52.9)	1
				3.7 (8.2)	5.3 (11.7)	8.4 (18.5)	17.8 (39.2)	2
S	Standard surface			Right angle housing: Aluminum – anodized (black)				
	Running noise(3)	Q_g	dB(A)	66	67	68	70	
	Max. bending moment based on the gearbox input flange(4)	M_b	Nm (lb_f.in)	12 (106)	25.5 (226)	53 (469)	120 (1062)	1
				12 (106)	12 (106)	25.5 (226)	53 (469)	2
	Motor flange precision			DIN 42955-R				

Output shaft loads			WPSFN064	WPSFN090	WPSFN110	WPSFN140	z(1)
Radial force for 20,000 h(5)(6)	$F_{r\,20.000\,h}$	N (lb_f)	2400 (540)	4400 (990)	5500 (1238)	12,000 (2700)	
Axial force for 20,000 h(5)(6)	$F_{a\,20.000\,h}$		4200 (945)	7200 (1620)	9500 (2138)	8500 (1913)	1
			4300 (968)	8200 (1845)	9500 (2138)	8500 (1913)	2
Radial force for 30,000 h(5)(6)	$F_{r\,30.000\,h}$		2100 (473)	3900 (878)	4800 (1080)	11,000 (2475)	
Axial force for 30,000 h(5)(6)	$F_{a\,30.000\,h}$		3700 (833)	6300 (1418)	8400 (1890)	7500 (1688)	1
			3800 (855)	7200 (1620)	8400 (1890)	7500 (1688)	2
Static radial force(7)(6)	$F_{r\,Stat}$		2400 (540)	4400 (990)	5500 (1238)	12,000 (2700)	
Static axial force(7)(6)	$F_{a\,Stat}$		4200 (945)	7200 (1620)	9500 (2138)	8500 (1913)	1
			4300 (968)	8200 (1845)	9500 (2138)	8500 (1913)	2
Tilting moment for 20,000 h(5)(7)	$M_{K\,20.000\,h}$	Nm (lb_f.in)	200 (1770)	484 (4283)	689 (6098)	1989 (17,603)	1
			147 (1301)	361 (3195)	534 (4726)	1030 (9116)	2
Tilting moment for 30,000 h(5)(7)	$M_{K\,30.000\,h}$		175 (1549)	429 (3797)	601 (5319)	1823 (16,134)	1
			129 (1142)	320 (2832)	466 (4124)	944 (8354)	2

Moment of inertia			WPSFN064	WPSFN090	WPSFN110	WPSFN140	z(1)
Mass moment of inertia(2)	J	$kgcm^2$ ($lb_f.in.s^2 10^{-4}$)	0.500 - 0.822 (4.425 - 7.275)	1.046 - 1.591 (9.257 - 14.080)	4.857 - 6.435 (42.984 - 56.950)	15.220 - 18.825 (134.697 - 166.601)	1
			0.497 - 0.642 (4.398 - 5.682)	0.497 - 0.659 (4.398 - 5.832)	1.015 - 1.452 (8.983 - 12.850)	4.810 - 6.449 (42.569 - 57.074)	2

(1) Number of stages
(2) The ratio-dependent values can be retrieved in Tec Data Finder – www.neugart.com
(3) Sound pressure level from 1 m, measured on input running at n_1=3000 rpm no load; i=5
(4) Max. motor weight* in kg = 0.2 x M_b / motor length in m
* with symmetrically distributed motor weight
* with horizontal and stationary mounting
(5) These values are based on an output shaft speed of n_2=100 rpm
(6) Based on the end of the output shaft
(7) 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

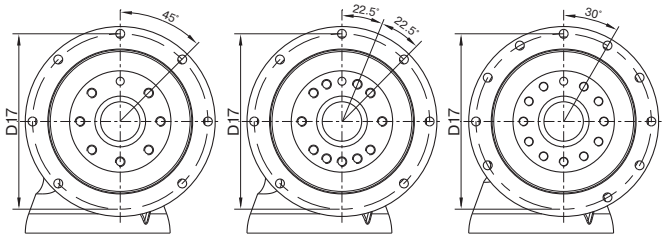
Output torques			WPSFN064	WPSFN090	WPSFN110	WPSFN140	i(1)	z(2)
Nominal output torque(3)	T_{2N}	Nm (lb_f.in)	45 (398)	90 (797)	160 (1416)	320 (2832)	4	1
			42 (372)	75 (664)	140 (1239)	280 (2478)	5	
			27 (239)	50 (443)	90 (797)	180 (1593)	8	
			22 (195)	40 (354)	75 (664)	160 (1416)	10	
			62 (549)	130 (1151)	310 (2744)	625 (5531)	16	2
			62 (549)	130 (1151)	300 (2655)	560 (4956)	20	
			60 (531)	120 (1062)	255 (2257)	540 (4779)	25	
			62 (549)	108 (956)	200 (1770)	360 (3186)	32	
			60 (531)	123 (1089)	250 (2213)	450 (3983)	40	
			60 (531)	110 (974)	200 (1770)	375 (3319)	50	
			37 (327)	78 (690)	175 (1549)	355 (3142)	70	
			28 (248)	59 (522)	140 (1239)	305 (2699)	100	
Max. output torque(4)	T_{2max}	Nm (lb_f.in)	72 (637)	144 (1274)	256 (2266)	512 (4531)	4	1
			67 (593)	120 (1062)	224 (1982)	448 (3965)	5	
			43 (381)	80 (708)	144 (1274)	288 (2549)	8	
			35 (310)	64 (566)	120 (1062)	256 (2266)	10	
			99 (876)	210 (1859)	502 (4443)	1003 (8877)	16	2
			99 (876)	210 (1859)	480 (4248)	896 (7930)	20	
			96 (850)	197 (1743)	408 (3611)	864 (7646)	25	
			99 (876)	172 (1522)	320 (2832)	576 (5098)	32	
			96 (850)	197 (1743)	400 (3540)	720 (6372)	40	
			96 (850)	175 (1549)	320 (2832)	600 (5310)	50	
			59 (522)	125 (1106)	280 (2478)	568 (5027)	70	
			45 (398)	94 (832)	224 (1982)	488 (4319)	100	

(1) Ratios ($i=n_1/n_2$)
(2) Number of stages
(3) Application specific configuration with NCP – www.neugart.com
(4) 30,000 rotations of the output shaft permitted; see page 136

Output torques			WPSFN064	WPSFN090	WPSFN110	WPSFN140	i[1]	z[2]
Emergency stop torque[3]	T_{2Stop}	Nm (lb_f.in)	100 (885)	200 (1770)	400 (3540)	800 (7080)	4	1
			100 (885)	200 (1770)	400 (3540)	800 (7080)	5	
			75 (664)	150 (1328)	300 (2655)	700 (6195)	8	
			75 (664)	150 (1328)	300 (2655)	700 (6195)	10	
			150 (1328)	300 (2655)	650 (5753)	1600 (14160)	16	2
			150 (1328)	300 (2655)	650 (5753)	1600 (14160)	20	
			150 (1328)	300 (2655)	650 (5753)	1650 (14603)	25	
			150 (1328)	300 (2655)	600 (5310)	1200 (10620)	32	
			150 (1328)	300 (2655)	650 (5753)	1500 (13275)	40	
			150 (1328)	300 (2655)	650 (5753)	1500 (13275)	50	
			80 (708)	175 (1549)	340 (3009)	1300 (11505)	70	
			90 (797)	200 (1770)	480 (4248)	600 (5310)	100	

Input speeds			WPSFN064	WPSFN090	WPSFN110	WPSFN140	i[1]	z[2]
Average thermal input speed at T_{2N} and S1[4][5]	n_{1N}	rpm	1850[6]	1650[6]	1100[6]	1050[6]	4	1
			2050[6]	1900[6]	1200[6]	1150[6]	5	
			2500[6]	2400[6]	1450[6]	1350[6]	8	
			2650[6]	2550[6]	1500[6]	1400[6]	10	
			2250[6]	2250[6]	1750[6]	1400[6]	16	2
			2400[6]	2500[6]	2000[6]	1600[6]	20	
			2500[6]	2800[6]	2300[6]	1650[6]	25	
			2550[6]	2900[6]	2450[6]	1900[6]	32	
			2800[6]	2950[6]	2500[6]	1900[6]	40	
			2750[6]	3100[6]	2650[6]	2000[6]	50	
			3000[6]	3700[6]	3000[6]	2200[6]	70	
			3050[6]	3850[6]	3300[6]	2400[6]	100	
Max. mechanical input speed[4]	n_{1Limit}	rpm	16000	14000	9500	8000		1
			16000	16000	14000	9500		2

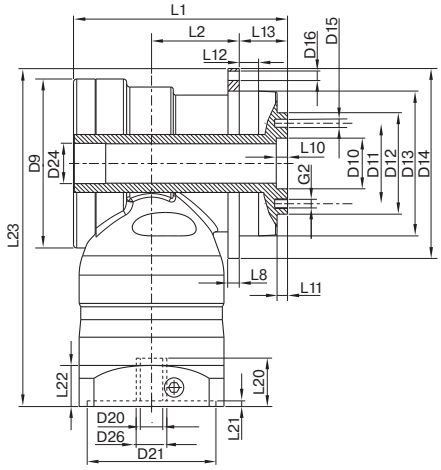
[1] Ratios ($i=n_1/n_2$)
[2] Number of stages
[3] Permitted 1000 times
[4] Application-specific speed configurations with NCP – www.neugart.com
[5] See page 136 for the definition
[6] Average thermal input speed at 50% T_{2N} and S1

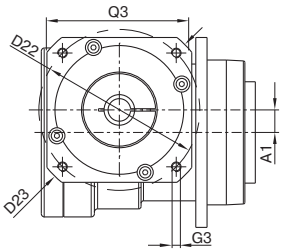


WPSFN064
WPSFN090

WPSFN110

WPSFN140





Drawing corresponds to a WPSFN090 / 1-stage / flange output hollow shaft with dowel hole / 19 mm clamping system / motor adaptation – 2-part – round universal flange / B5 flange type motor
All other variants can be retrieved in the Tec Data Finder at www.neugart.com

Geometry[1]			WPSFN064	WPSFN090	WPSFN110	WPSFN140	z[2]	Code
Axis offset	A1		10 (0.394)	14 (0.551)	20 (0.787)	26 (1.024)	1	
			10 (0.394)	10 (0.394)	14 (0.551)	20 (0.787)	2	
Max. diameter	D9		86 (3.386)	105 (4.134)	120 (4.724)	170 (6.693)	1	
			86 (3.386)	86 (3.386)	105 (4.134)	120 (4.724)	2	
Centering diameter output shaft	D10	H7	20 (0.787)	31.5 (1.240)	40 (1.575)	50 (1.969)		
Pitch circle diameter output shaft	D11		31.5 (1.240)	50 (1.969)	63 (2.480)	80 (3.150)		
Centering diameter output shaft	D12	h7	40 (1.575)	63 (2.480)	80 (3.150)	100 (3.937)		
Centering diameter output flange	D13		64 (2.520)	90 (3.543)	110 (4.331)	140 (5.512)		
Flange diameter output	D14		86 (3.386)	118 (4.646)	145 (5.709)	179 (7.047)		
Mounting bore output	D16		4.5 7x45°	5.5 7x45°	5.5 7x45°	6.6 10x30°	1	
			4.5 8x45°	5.5 8x45°	5.5 8x45°	6.6 12x30°	2	
Pitch circle diameter output flange	D17		79 (3.110)	109 (4.291)	135 (5.315)	168 (6.614)		
Total length	L1		104.5 (4.114)	132 (5.197)	153,5 (6.043)	201.5 (7.933)	1	
			122 (4.803)	139.5 (5.492)	154 (6.063)	224 (8.819)	2	
Housing length	L2		42	53.5	68	76.5	1	
			60	66.5	76,5	129.5	2	
Flange thickness output	L8		4 (0.157)	7 (0.276)	8 (0.315)	10 (0.394)		
Centering depth output shaft	L10		4.5 (0.177)	6.5 (0.256)	6.5 (0.256)	6.5 (0.256)		
	L11		3 (0.118)	6 (0.236)	6 (0.236)	6 (0.236)		
Centering depth output flange	L12		10 (0.394)	12 (0.472)	12 (0.472)	14 (0.551)		
Output flange length	L13		19.5	30.0	29.0	38.0		
Min. overall height	L23		179	210	260	323	1	
			179	195	223.5	277	2	
Clamping system diameter input	D26		More information on page 125					
Motor shaft diameter j6/k6	D20		The dimensions vary with the motor/gearbox flange. The input flange geometries can be retrieved for each specific motor in Tec Data Finder at www.neugart.com					
Max./min. permis. motor shaft length	L20							
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	■						
Flange hollow output shaft with dowel hole (EN ISO 9409-1)							1	H
Dowel hole x depth	D15	H7	5x5	6x6	6x6	8x8		
Hollow shaft diameter	D24	M7	17 (0.669)	25 (0.984)	35 (1.378)	50 (1.969)		
Number x thread x depth	G2		7 x M5x7	7 x M6x10	11 x M6x12	11 x M8x15		
Flange output shaft (similar EN ISO 9409-1)							2	D
Number x thread x depth	G2		8 x M5x7	8 x M6x10	12 x M6x12	12 x M8x15		
Flange output shaft with dowel hole (EN ISO 9409-1)							2	E
Dowel hole x depth	D15	H7	5x5	6x6	6x6	8x8		
Number x thread x depth	G2		7 x M5x7	7 x M6x10	11 x M6x12	11 x M8x15		

[1] Dimensions in mm
[2] Number of stages

WGN

The spiral-toothed right angle gearbox with hollow shaft – low noise levels and force-fit installation

Our **WGN** is a hollow-shaft right angle gearbox that operates with particularly low noise levels. At the same time, the spiral teeth increase the quality of your workpiece surfaces. It can be connected directly to the application via a shrink disc, a simple and reliable solution that offers you new design possibilities.

❷ Best surface quality

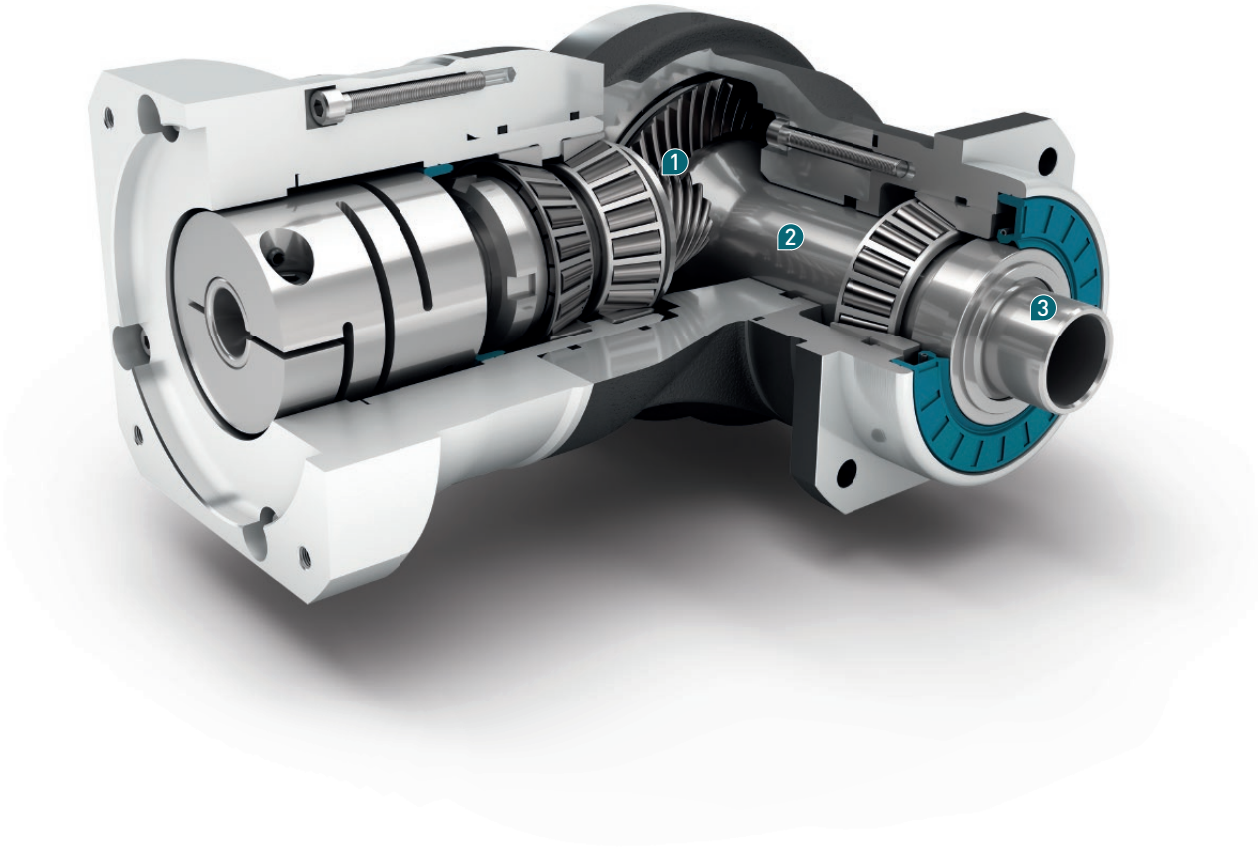
Thanks to its spiral teeth, the **WGN** achieves the optimal synchronism. You therefore benefit from the highest quality for your workpiece surfaces and prints.

❶ Particularly quiet drive

Thanks to the Neugart-developed spiral teeth, the **WGN** delivers particularly quiet and low-vibration performance.
The machine does not need any additional noise absorption measures.

❸ Easy, reliable, force-fit

The hollow shaft in the **WGN** right angle gearbox can be force-fit to your machine shaft via shrink disc. This is reliable, simple, and saves space.



- Individual adaptation of the input flange to the motor
- Lifetime lubrication for maintenance-free operation
- Counterdirectional rotation
- Wide range of output shaft designs
- Clamping systems with optimized mass moment of inertia
- Line routing possible through hollow shaft

Code	Gearbox characteristics			WGN070	WGN090	WGN115	WGN142	z(1)
	Service life	t_L	h	20,000				
	Service life at T_{2N} x 0,88			30,000				
	Efficiency at full load(2)	η	%	95				
	Min. operating temperature	T_{min}	°C (°F)	-25 (-13)				
	Max. operating temperature	T_{max}		90 (194)				
	Protection class			IP 65				
S	Standard lubrication			Oil				
F	Food grade lubrication			Oil				
	Installation position			Any				
S	Standard backlash	j_t	arcmin	< 5				1
	Torsional stiffness(2)	c_g	Nm/arcmin (lb_f.in/arcmin)	1,6 - 2,2 (14 - 19)	4,2 - 5,7 (37 - 50)	9,2 - 12,4 (81 - 110)	23,5 - 31,5 (208 - 279)	
	Gearbox weight	m_G	kg (lb_m)	3 (6.6)	5 (11.0)	9,2 (20.3)	25 (55.1)	
S	Standard surface			Right angle housing: Aluminum – anodized (black)				
	Running noise(3)	Q_g	dB(A)	66	67	68	70	
	Max. bending moment based on the gearbox input flange(4)	M_b	Nm (lb_f.in)	12 (106)	25,5 (226)	53 (469)	120 (1062)	
	Motor flange precision			DIN 42955-R				

Output shaft loads			WGN070	WGN090	WGN115	WGN142	z(1)
Radial force for 20,000 h(5)(6)	$F_{r\ 20.000\ h}$	N (lb_f)	2700 (608)	4000 (900)	6500 (1463)	10000 (2250)	1
Axial force for 20,000 h(5)(6)	$F_{a\ 20.000\ h}$		4300 (968)	5900 (1328)	7000 (1575)	14500 (3263)	
Radial force for 30,000 h(5)(6)	$F_{r\ 30.000\ h}$		2700 (608)	4000 (900)	6500 (1463)	10000 (2250)	
Axial force for 30,000 h(5)(6)	$F_{a\ 30.000\ h}$		3700 (833)	5200 (1170)	6100 (1373)	12000 (2700)	
Static radial force(6)(7)	$F_{r\ Stat}$		2700 (608)	4000 (900)	6500 (1463)	10000 (2250)	
Static axial force(6)(7)	$F_{a\ Stat}$		4300 (968)	5900 (1328)	7000 (1575)	14500 (3263)	
Tilting moment for 20,000 h(5)(7)	$M_{K\ 20.000\ h}$	Nm (lb_f.in)	252 (2230)	442 (3912)	970 (8585)	1505 (13319)	
Tilting moment for 30,000 h(5)(7)	$M_{K\ 30.000\ h}$		252 (2230)	442 (3912)	970 (8585)	1505 (13319)	

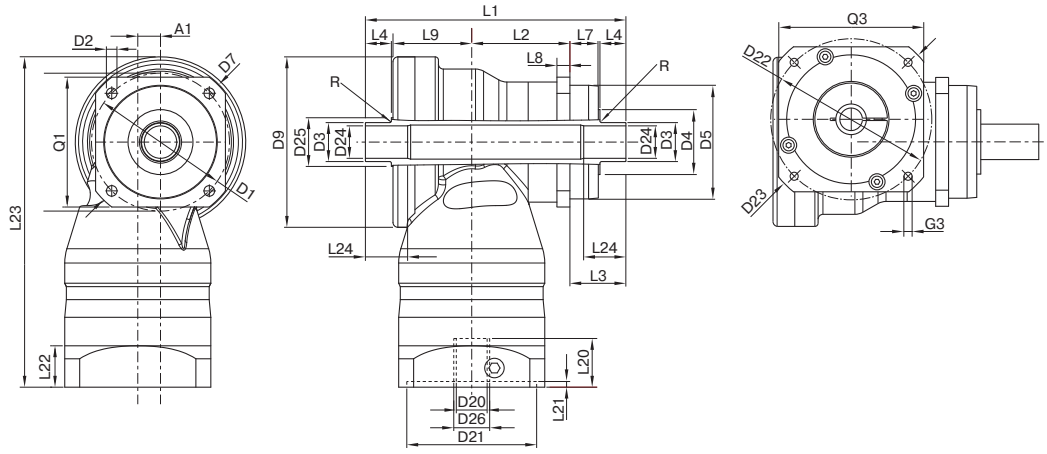
Moment of inertia			WGN070	WGN090	WGN115	WGN142	z(1)
Mass moment of inertia(2)	J	kgcm² (lb_f.in.s²10⁻⁴)	0,502 - 0,834 (4.443 - 7.381)	0,908 - 1,417 (8.036 - 12.540)	4,805 - 6,111 (42.524 - 54.082)	12,885 - 16,204 (114.032 - 143.405)	1

(1) Number of stages
(2) The ratio-dependent values can be retrieved in Tec Data Finder – www.neugart.com
(3) Sound pressure level from 1 m, measured on input running at n_1=3000 rpm no load; i=5
(4) Max. motor weight* in kg = 0.2 x M_b / motor length in m
* with symmetrically distributed motor weight
* with horizontal and stationary mounting
(5) These values are based on an output shaft speed of n_2=100 rpm
(6) Based on center of output shaft
(7) 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

Output torques			WGN070	WGN090	WGN115	WGN142	i[1]	z[2]
Nominal output torque[3]	T_{2N}	Nm (lb_f.in)	45 (398)	70 (620)	140 (1239)	320 (2832)	4	1
			42 (372)	70 (620)	140 (1239)	280 (2478)	5	
			27 (239)	50 (443)	90 (797)	180 (1593)	8	
			22 (195)	40 (354)	75 (664)	160 (1416)	10	
Max. output torque[4]	T_{2max}	Nm (lb_f.in)	72 (637)	112 (991)	224 (1982)	512 (4531)	4	
			67 (593)	112 (991)	224 (1982)	448 (3965)	5	
			43 (381)	80 (708)	144 (1274)	288 (2549)	8	
			35 (310)	64 (566)	120 (1062)	256 (2266)	10	
Emergency stop torque[5]	T_{2Stop}	Nm (lb_f.in)	100 (885)	200 (1770)	400 (3540)	800 (7080)	4	
			100 (885)	200 (1770)	400 (3540)	800 (7080)	5	
			75 (664)	150 (1328)	300 (2655)	700 (6195)	8	
			75 (664)	150 (1328)	300 (2655)	700 (6195)	10	

Input speeds			WGN070	WGN090	WGN115	WGN142	i[1]	z[2]
Average thermal input speed at T_{2N} and S1[6][7]	n_{1N}	rpm	1750[8]	1700[8]	1150[8]	950[8]	4	1
			1900[8]	1850[8]	1200[8]	950[8]	5	
			2300[8]	2200[8]	1400[8]	1050[8]	8	
			2400[8]	2350[8]	1500[8]	1050[8]	10	
Max. mechanical input speed[6]	n_{1Limit}	rpm	16000	14000	9500	8000		

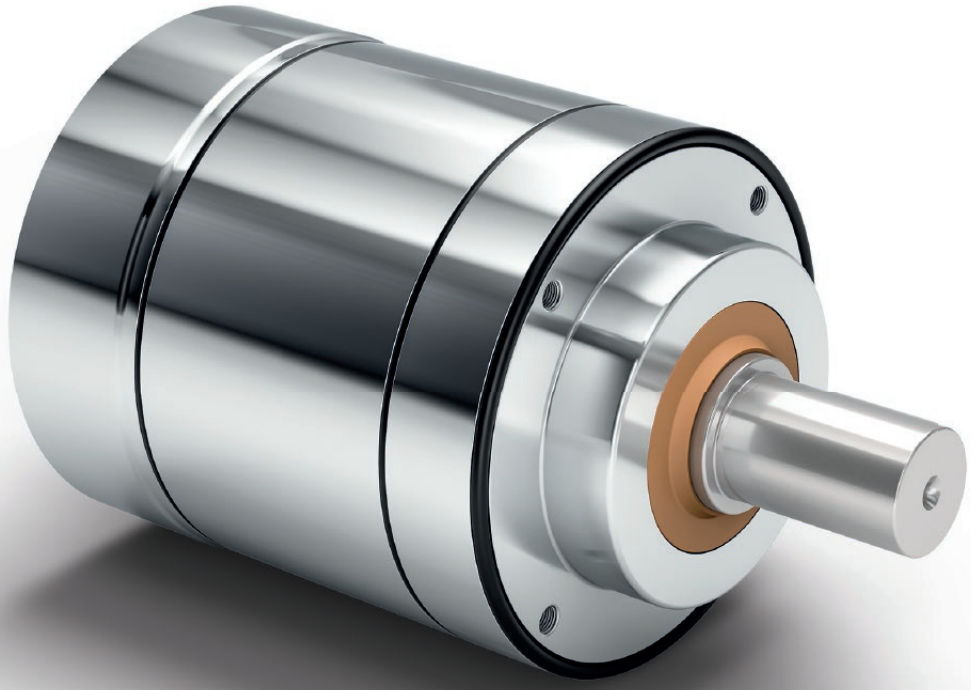
(1) Ratios ($i=n_1/n_2$)
(2) Number of stages
(3) Application specific configuration with NCP – www.neugart.com
(4) 30,000 rotations of the output shaft permitted; see page 136
(5) Permitted 1000 times
(6) Application-specific speed configurations with NCP – www.neugart.com
(7) See page 136 for the definition
(8) Average thermal input speed at 50% T_{2N} and S1



Drawing corresponds to a WGN090 / 1-stage / hollow output shaft on both sides / 19 mm clamping system / motor adaptation – 2-part – round universal flange / B5 flange type motor
All other variants can be retrieved in the Tec Data Finder at www.neugart.com

Geometry[1]			WGN070	WGN090	WGN115	WGN142	z[2]	Code
Axis offset	A1		10 (0.394)	14 (0.551)	20 (0.787)	26 (1.024)		
Pitch circle diameter output	D1		68 - 75 (2.677 - 2.953)	85 (3.346)	120 (4.724)	165 (6.496)		
Mounting bore output	D2	4x	5.5 (0.217)	6.5 (0.256)	9.0 (0.354)	11.0 (0.433)		
Shaft diameter output	D3	h8	18 (0.709)	24 (0.945)	36 (1.417)	50 (1.969)		
Shaft collar output	D4		24 (0.945)	34 (1.339)	45 (1.772)	70 (2.756)		
Centering diameter output	D5	g7	60 (2.362)	70 (2.756)	90 (3.543)	130 (5.118)		
Diagonal dimension output	D7		92 (3.622)	100 (3.937)	140 (5.512)	185 (7.283)		
Max. diameter	D9		86 (3.386)	105 (4.134)	120 (4.724)	170 (6.693)		
Flange cross section output	Q1	■	70 (2.756)	80 (3.150)	110 (4.331)	142 (5.591)		
Housing length	L2		46.5 (1.831)	60.5 (2.382)	73.5 (2.894)	76 (2.992)		
Shaft length output	L3		33 (1.299)	34.5 (1.358)	48 (1.890)	54 (2.126)		
Centering depth output	L7		18 (0.709)	17.5 (0.689)	27 (1.063)	28 (1.102)		
Flange thickness output	L8		7 (0.276)	8 (0.315)	10 (0.394)	12 (0.472)		
Offset length	L9		43 (1.693)	48.5 (1.909)	56.5 (2.224)	87 (3.425)	1	
Min. overall height	L23		179 (7.047)	204 (8.012)	248 (9.744)	318 (12.520)		
Max. radius	R		1.5 (0.059)	1.5 (0.059)	1.5 (0.059)	1.5 (0.059)		
Clamping system diameter input	D26		More information on page 125					
Motor shaft diameter j6/k6	D20		The dimensions vary with the motor/gearbox flange. The input flange geometries can be retrieved for each specific motor in Tec Data Finder at www.neugart.com					
Max. permis. motor shaft length	L20							
Min. permis. 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	■						
Hollow output shaft on one side								F
Hollow shaft diameter	D24	H6	15 (0.591)	20 (0.787)	30 (1.181)	40 (1.575)		
Total length	L1		122.5 (4.823)	143.5 (5.650)	179 (7.047)	217 (8.543)		
Shaft length from shoulder	L4		14 (0.551)	16 (0.630)	20 (0.787)	25 (0.984)		
Min. fit length	L24		20 (0.787)	25 (0.984)	30 (1.181)	35 (1.378)		
Hollow output shaft on both sides								G
Hollow shaft diameter	D24	H6	15 (0.591)	20 (0.787)	30 (1.181)	40 (1.575)		
Shaft collar	D25		25 (0.984)	30 (1.181)	42 (1.654)	58 (2.283)		
Total length	L1		137.5 (5.413)	160.5 (6.319)	200 (7.874)	243 (9.567)		
Shaft length from shoulder	L4		14 (0.551)	16 (0.630)	20 (0.787)	25 (0.984)		
Min. fit length	L24		20 (0.787)	25 (0.984)	30 (1.181)	35 (1.378)		

[1] Dimensions in mm (in)
[2] Number of stages



HLAE

The unique planetary gearbox with certified hygienic design – ideal for reliable cleaning processes

Our **HLAE** is unique: It is the world's first planetary gearbox with certified hygienic design – flexible without a radial screw, powerful, and yet ideal for fast and easy cleaning. It has been developed specifically for challenging applications such as in the pharmaceutical, cosmetics, and food industries.

2 Certified protection

Our **HLAE** is unique in the world. It is the first planetary gearbox to be awarded a 3-A RPSCQC certificate. It is thus ideal for the industrial production of food, pharmaceuticals, and cosmetics.

3 Fast and easy to clean

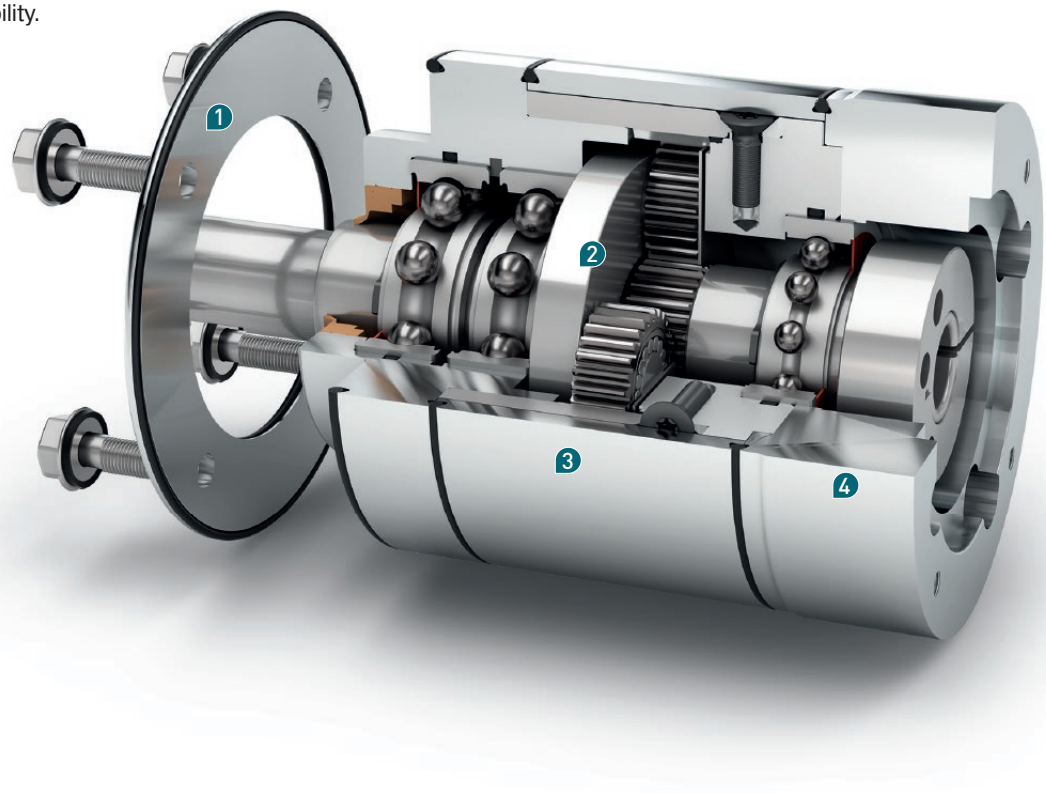
The electropolished surface is one of the main features of our **HLAE** planetary gearbox. It exceeds the usual hygiene standards and allows for fast aseptic cleaning, even under high pressure.

1 For particularly flexible installations

Designed for free positioning, the **HLAE** sealing kit provides the highest level of hygienic protection and is therefore the ideal universal solution for a wide range of machine wall thicknesses. It can therefore be connected to the machine with the maximum flexibility.

4 Uniquely, completely round

The **HLAE** does not need a radial screw. The hygienic design planetary gearbox can consequently be connected to your motor with maximum flexibility. The result is a surface completely and uncompromisingly free of dead space.



- For any mounting position
- Individual adaptation of the input flange to the motor
- Lifetime lubrication for maintenance-free operation
- Equidirectional rotation
- Wide range of output shaft designs
- Precise gearing
- Optional FFPM seals for greater chemical and heat resistance

Code	Gearbox characteristics			HLAE070	HLAE090	HLAE110	z[1]
	Service life	t_L	h	30,000			
	Efficiency at full load[2]	η	%	98			1
				97			2
	Min. operating temperature	T_{min}	°C (°F)	-25 (-13)			
	Max. operating temperature	T_{max}		90 (194)			
	Protection class			IP69K			
F	Food grade lubrication			Grease			
	Installation position			Any			
S	Standard backlash	j_t	arcmin	< 10	< 7	< 7	1
				< 12	< 9	< 9	2
	Torsional stiffness[2]	c_g	Nm/arcmin (lb_f.in/ arcmin)	1.5 - 2.1 (13 - 19)	3.9 - 5.2 (35 - 46)	9.7 - 13.1 (86 - 116)	1
				1.5 - 2.1 (13 - 19)	4.0 - 5.2 (35 - 46)	9.9 - 13.1 (88 - 116)	2
	Gearbox weight	m_G	kg (lb_m)	2.1 (4.6)	3 (6.6)	8.7 (19.2)	1
				2.4 (5.3)	3.7 (8.2)	11 (24.3)	2
S	Standard surface			Housing: Stainless steel 1.4404 – electropolished (R_a < 0,8 µm)			
	Running noise[3]	Q_g	dB(A)	58	60	65	
	Max. bending moment based on the gearbox input flange[4]	M_b	Nm (lb_f.in)	8 (71)	16 (142)	40 (354)	
	Motor flange precision			DIN 42922-N			

Output shaft loads			HLAE070	HLAE090	HLAE110	z[1]
Radial force for 20,000 h[5][6]	$F_{r\,20.000\,h}$	N (lb_f)	450 (101)	900 (203)	1450 (326)	
Axial force for 20,000 h[5][6]	$F_{a\,20.000\,h}$		550 (124)	1500 (338)	2500 (563)	
Radial force for 30,000 h[5][6]	$F_{r\,30.000\,h}$		400 (90)	600 (135)	1250 (281)	
Axial force for 30,000 h[5][6]	$F_{a\,30.000\,h}$		500 (113)	1000 (225)	2000 (450)	
Static radial force[6][7]	$F_{r\,Stat}$		1000 (225)	1250 (281)	5000 (1125)	
Static axial force[6][7]	$F_{a\,Stat}$		1200 (270)	1600 (360)	3800 (855)	
Tilting moment for 20,000 h[5][7]	$M_{K\,20.000\,h}$	Nm (lb_f.in)	22 (195)	49 (434)	109 (965)	
Tilting moment for 30,000 h[5][7]	$M_{K\,30.000\,h}$		19 (168)	33 (292)	94 (832)	

Moment of inertia			HLAE070	HLAE090	HLAE110	z[1]
Mass moment of inertia[2]	J	kgcm² (lb_f.in.s²10⁻⁴)	0.064 - 0.135 (0.566 - 1.195)	0.390 - 0.770 (3.452 - 6.815)	1.300 - 2.630 (11.505 - 23.276)	1
			0.064 - 0.131 (0.566 - 1.159)	0.390 - 0.740 (3.452 - 6.549)	1.300 - 2.620 (11.505 - 23.187)	2

(1) Number of stages
(2) The ratio-dependent values can be retrieved in Tec Data Finder – www.neugart.com
(3) Sound pressure level from 1 m, measured on input running at n_1=3000 rpm no load; i=5
(4) Max. motor weight* in kg = 0.2 x M_b / motor length in m
* with symmetrically distributed motor weight
* with horizontal and stationary mounting
(5) These values are based on an output shaft speed of n_2=100 rpm
(6) Based on the center of the output shaft
(7) 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

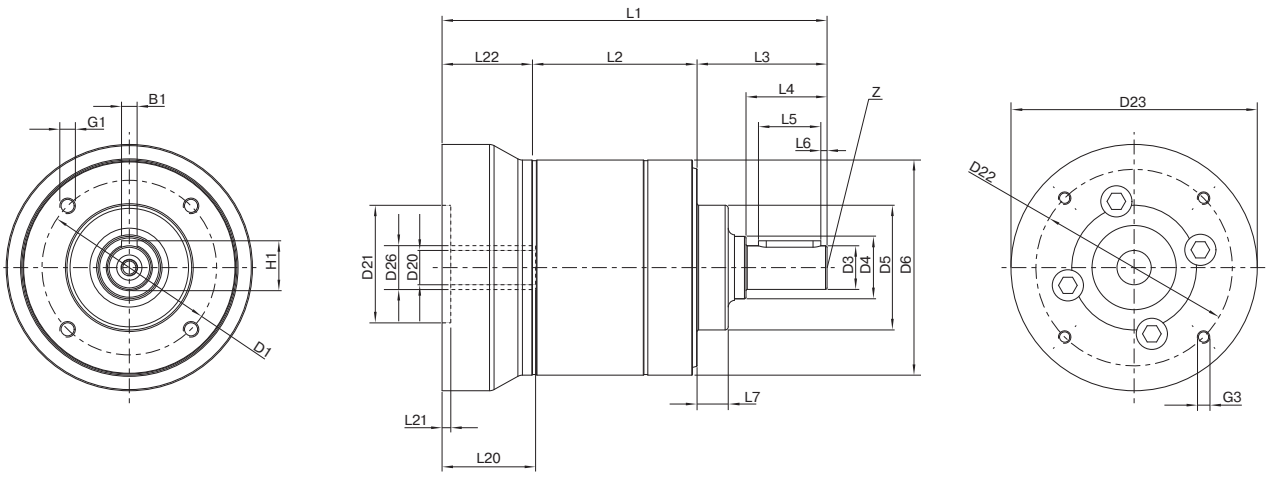
Output torques			HLAE070	HLAE090	HLAE110	i(1)	z(2)
Nominal output torque(3)(4)	T_{2N}	Nm (lb_f.in)	28 (248)	85 (752)	115 (1018)	3	1
			33 (292)	87 (770)	155 (1372)	4	
			30 (266)	82 (726)	171 (1513)	5	
			25 (221)	65 (575)	135 (1195)	7	
			18 (159)	50 (443)	120 (1062)	8	
			15 (133)	38 (336)	95 (841)	10	
			33 (292)	87 (770)	157 (1389)	9	2
			33 (292)	80 (708)	171 (1513)	12	
			33 (292)	82 (726)	171 (1513)	15	
			33 (292)	87 (770)	171 (1513)	16	
			33 (292)	87 (770)	171 (1513)	20	
			30 (266)	82 (726)	171 (1513)	25	
			33 (292)	87 (770)	171 (1513)	32	
			30 (266)	82 (726)	171 (1513)	40	
			18 (159)	50 (443)	120 (1062)	64	
			15 (133)	38 (336)	95 (841)	100	
Max. output torque(4)(5)	T_{2max}	Nm (lb_f.in)	45 (398)	136 (1204)	184 (1628)	3	1
			53 (469)	140 (1239)	248 (2195)	4	
			48 (425)	131 (1159)	274 (2425)	5	
			40 (354)	104 (920)	216 (1912)	7	
			29 (257)	80 (708)	192 (1699)	8	
			24 (212)	61 (540)	152 (1345)	10	
			53 (469)	140 (1239)	251 (2221)	9	2
			53 (469)	140 (1239)	274 (2425)	12	
			53 (469)	131 (1159)	274 (2425)	15	
			53 (469)	140 (1239)	274 (2425)	16	
			53 (469)	140 (1239)	274 (2425)	20	
			48 (425)	131 (1159)	274 (2425)	25	
			53 (469)	140 (1239)	274 (2425)	32	
			48 (425)	131 (1159)	274 (2425)	40	
			29 (257)	80 (708)	192 (1699)	64	
			24 (212)	61 (540)	152 (1345)	100	

(1) Ratios ($i=n_1/n_2$)
(2) Number of stages
(3) Application specific configuration with NCP – www.neugart.com
(4) Values for feather key (code "A"): for repeated load
(5) 30,000 rotations of the output shaft permitted; see page 136

Output torques			HLAE070	HLAE090	HLAE110	i[1]	z[2]
Emergency stop torque[3]	T_{2Stop}	Nm (lb_f.in)	56 (496)	170 (1505)	230 (2036)	3	1
			66 (584)	174 (1540)	310 (2744)	4	
			60 (531)	164 (1451)	342 (3027)	5	
			50 (443)	130 (1151)	270 (2390)	7	
			36 (319)	100 (885)	240 (2124)	8	
			30 (266)	76 (673)	190 (1682)	10	
			66 (584)	174 (1540)	314 (2779)	9	2
			66 (584)	174 (1540)	342 (3027)	12	
			66 (584)	164 (1451)	342 (3027)	15	
			66 (584)	174 (1540)	342 (3027)	16	
			66 (584)	174 (1540)	342 (3027)	20	
			60 (531)	164 (1451)	342 (3027)	25	
			66 (584)	174 (1540)	342 (3027)	32	
			60 (531)	164 (1451)	342 (3027)	40	
			36 (319)	100 (885)	240 (2124)	64	
			30 (266)	76 (673)	190 (1682)	100	

Input speeds			HLAE070	HLAE090	HLAE110	i[1]	z[2]
Average thermal input speed at T_{2N} and S1[4][5]	n_{1N}	rpm	3000	2500	2000	3	1
			3000	2500	2000	4	
			3000	2500	2000	5	
			3000	2500	2000	7	
			3000	2500	2000	8	
			3000	2500	2000	10	
			3500	3000	2500	9	2
			3500	3000	2500	12	
			3500	3000	2500	15	
			3500	3000	2500	16	
			3500	3000	2500	20	
			3500	3000	2500	25	
			3500	3000	2500	32	
			3500	3000	2500	40	
			3500	3000	2500	64	
			3500	3000	2500	100	
Max. mechanical input speed[4]	n_{1Limit}	rpm	13000	7000	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 136 for the definition



Drawing corresponds to a HLAE070 / 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[1]			HLAE070	HLAE090	HLAE110	z[2]	Code
Pitch circle diameter output	D1		56 (2.205)	75 (2.953)	90 (3.543)		
Shaft diameter output	D3	h7	14 (0.551)	20 (0.787)	25 (0.984)		
Shaft collar output	D4		20 (0.787)	25 (0.984)	35 (1.378)		
Centering diameter output	D5	h7	40 (1.575)	58 (2.283)	65 (2.559)		
Housing diameter	D6		69 (2.717)	88 (3.465)	109 (4.291)		
Mounting thread x depth	G1	4x	M5x11	M6x12	M8x20		
Min. total length	L1		123.5 (4.862)	146 (5.748)	191 (7.520)	1	
			135.5 (5.335)	166 (6.535)	219 (8.622)	2	
Housing length	L2		52.8 (2.079)	68.0 (2.677)	89.0 (3.504)	1	
			64.8 (2.551)	88.0 (3.465)	117.0 (4.606)	2	
Shaft length output	L3		41.7 (1.642)	50 (1.969)	66.5 (2.618)		
Centering depth output	L7		10 (0.394)	13 (0.512)	14 (0.551)		
Clamping system diameter input	D26		More information on page 125				
Motor shaft diameter j6/k6	D20		The dimensions vary with the motor/gearbox flange. The input flange geometries can be retrieved for each specific motor in Tec Data Finder at www.neugart.com				
Max. permis. motor shaft length	L20						
Min. permis. 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					
Output shaft with feather key (DIN 6885-1)			A 5x5x20	A 6x6x25	A 8x7x35		A
Feather key width (DIN 6885-1)	B1		5 (0.197)	6 (0.236)	8 (0.315)		
Shaft height including feather key (DIN 6885-1)	H1		16 (0.630)	22.5 (0.886)	28 (1.102)		
Shaft length from shoulder	L4		26 (1.024)	32 (1.260)	45 (1.772)		
Feather key length	L5		20 (0.787)	25 (0.984)	35 (1.378)		
Distance from shaft end	L6		2 (0.079)	2.5 (0.098)	5 (0.197)		
Center hole (DIN 332, type DR)	Z		M5x12.5	M6x16	M10x22		
Smooth output shaft							B
Shaft length from shoulder	L4		26 (1.024)	32 (1.260)	45 (1.772)		

[1] Dimensions in mm (in)
[2] Number of stages

Product code

PLE 060 - 008 - S S S B

Series

PLE	**PLE Economy planetary gearbox**
PLQE	**PLQE Economy planetary gearbox**
PLPE	**PLPE Economy planetary gearbox**
PLHE	**PLHE Economy planetary gearbox**
PLFE	**PLFE Economy planetary gearbox**
WPLE	**WPLE Economy right angle gearbox**
WPLQE	**WPLQE Economy right angle gearbox**
WPLPE	**WPLPE Economy right angle gearbox**
WPLFE	**WPLFE Economy right angle gearbox**
PSBN	**PSBN Precision 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 right angle gearbox**
WPSFN	**WPSFN Precision right angle gearbox**
WGN	**WGN Precision right angle gearbox**
HLAE	**HLAE Economy Hygienic Design planetary gearbox**

Frame size

			PLE	PLQE	PLPE	PLHE	PLFE	WPLE	WPLQE	WPLPE	WPLFE	PSBN	PSN	PLN	PSFN	PLFN	WPLN	WPSFN	WGN	HLAE
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													•	•				

Ratio

			PLE	PLQE	PLPE	PLHE	PLFE	WPLE	WPLQE	WPLPE	WPLFE	PSBN	PSN	PLN	PSFN	PLFN	WPLN	WPSFN	WGN	HLAE	z [3]	
003	**Ratio**	i = 3	•	•	•[1]	•	•	•	•	•	•	•	•	•						•		
004	**Ratio**	i = 4	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•		
005	**Ratio**	i = 5	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•		
007	**Ratio**	i = 7	•[1]	•	•[1]	•	•	•	•	•	•	•	•	•	•	•				•		1
008	**Ratio**	i = 8	•	•	•[1]	•	•	•	•	•	•	•		•		•	•	•	•	•		
010	**Ratio**	i = 10	•[1]	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•		
009	**Ratio**	i = 9	•[1]	•	•[1]	•	•	•	•	•	•									•		
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										•	•		•							2
040	**Ratio**	i = 40	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•		•		
050	**Ratio**	i = 50			•[2]							•	•		•	•	•	•				
064	**Ratio**	i = 64	•	•	•[1]	•	•	•	•	•	•			•		•	•			•		
070	**Ratio**	i = 70										•	•		•			•				
060	**Ratio**	i = 60	•[1]	•				•	•													
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]	•				•	•													3
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

Clamping system diameter input

Frame size

PLE	PLQE	PLPE	PLHE	PLFE	WPLE	WPLQE	WPLPE	WPLFE	PSBN	PSN	PLN	PSFN	PLFN	WPLN	WPSFN	WGN	HLAE	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	64	70	70		64					70	1	11 mm	Clamping system diameter C
									70 90	70 90		64 90						2/3		
60	60	70	60	64	60	60	70	64	70 90	70 90	70	64 90	64	70	64	70	70	1	14 mm	Clamping system diameter D
									70 90 115	70 90 115		64 90 110	64 90	70 90	64 90			2/3		
60 80	60 80	70 90	60 80	64 90	80	80	90	90	70 90 115	70 90 115	70 90	64 90 110	64 90	70 90	64 90	70 90	90	1	19 mm	Clamping system diameter E
									70 90 115	70 90 115 142		64 90 110 140	64 90 110	70 90 115	64 90 110			2/3		
80 120	80 120	90 120	80 120	90 110	120	120	120	110	90 115	90 115	90 115	90 110	90 110	90 115	90 110	90 115	110	1	24 mm	Clamping system diameter F
									115 142	115 142		110 140	110 140	115 142	110 140			2/3		
120 160	120	120 155	120	110					115 142	115 142	115 142	110 140	110 140	115 142	110 140	115 142		1	35 mm	Clamping system diameter G
									142	142 190		140 200	140 200	142	140			2/3		
		155							142	142	142	140	140	142	140	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	WPLFE	PSBN	PSN	PLN	PSFN	PLFN	WPLN	WPSFN	WGN	HLAE	
•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•		Standard input system A
																	•	Mountable input system S
														•	•	•		Input system with metal bellow-type coupling F

Output flange design

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

Output shaft design

PLE	PLQE	PLPE	PLHE	PLFE	WPLE	WPLQE	WPLPE	WPLFE	PSBN	PSN	PLN	PSFN	PLFN	WPLN	WPSFN	WGN	HLAE	Z [3]	
•	•	•	•		•	•	•		•	•	•			•			•	1/2/3	Output shaft with feather key (DIN 6885-1) A
•	•	•	•		•	•	•		•	•	•			•			•	1/2/3	Smooth output shaft B
										•	•							1/2	Toothed output shaft (DIN 5480) C
												•	•					1	Flange output shaft D
															•			2	
				•				•				•	•					1	Flange output shaft with dowel hole E
															•			2	
																•		1	Hollow output shaft on one side F
																•		1	Hollow output shaft on both sides G
															•			1	Flange output hollow shaft with dowel hole H

Surface

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

Lubrication

PLE	PLQE	PLPE	PLHE	PLFE	WPLE	WPLQE	WPLPE	WPLFE	PSBN	PSN	PLN	PSFN	PLFN	WPLN	WPSFN	WGN	HLAE	
•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•		Standard lubrication S
•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	Food grade lubrication F
•	•	•	•	•	•	•	•	•	•	•	•	•	•					Low temperature lubrication L

Torsional backlash

PLE	PLQE	PLPE	PLHE	PLFE	WPLE	WPLQE	WPLPE	WPLFE	PSBN	PSN	PLN	PSFN	PLFN	WPLN	WPSFN	WGN	HLAE	Z [3]	
•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	1/2/3	Standard backlash S
									•	•	•	•	•		•			1 2	Reduced backlash R

Product code

Input design

		PLE	PLQE	PLPE	PLHE	PLFE	WPLE	WPLQE	WPLPE	WPLFE
	**Z** Motor adaptation – 2-part – round universal flange	**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)				
	**Y** Motor adaptation – 2-part – square universal flange	**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)	**64** (11/14) **90** (19) **110** (24)
	**E** Motor adaptation – one part	**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)				
	**R** No motor adaptation – round universal flange[1]	**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)				
	**T** No motor adaptation – square universal flange[1]	**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)[3] **60** (11/14)[4] **80** (19)[4] **120** (24)[4]	**60** (11/14)[4] **80** (19)[4] **120** (24)[4]	**50** (8/9)[3] **70** (11/14)[4] **90** (19)[4] **120** (24)[4]	**64** (11/14)[4] **90** (19)[4] **110** (24)[4]
	**W** No motor adaptation – input shaft[2]	**40** (N) **60** (N) **80** (N) **120** (N) **160** (N)	**60** (N) **80** (N) **120** (N)							

Frame size (clamping system diameter)

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

[2] The product code ends after this option

[3] Angle only with through hole

[4] Angle only with thread

Motor shaft 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**									•

For "clamping system 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	WPLFE	PSBN	PSN	PLN	PSFN	PLFN	WPLN	WPSFN	WGN	HLAE
B5	**B5 Flange type motor**	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
B14	**B14 Flange type motor**	**Available upon 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**

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See previous page

	PSBN	PSN	PLN	PSFN	PLFN	WPLN	WPSFN	WGN	HLAE
	70 (11/14/19) **90** (11/14/19/24) **115** (14/19/24/35) **142** (19/24/35/42)	**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)	**64** (14/19) **90** (14/19/24) **110**(19/24) **140** (24)	**70** (14/19) **90** (19/24) **115** (24)	**70** (11/14) **90** (19) **110** (24)
			115 (35) **142** (35/42) **190** (48)		**110** (35) **140** (35/42) **200** (35/42)	**115** (35) **142** (35/42)	**110** (35) **140** (35/42)	**115** (35) **142** (35/42)	
									70 (11/14) **90** (19) **110** (24)
			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)	**64** (14/19) **90** (14/19/24) **110** (19/24) **140** (24)	**70** (14/19) **90** (19/24) **115** (24)	
			115 (35) **142** (35/42) **190** (48)		**110** (35) **140** (35/42) **200** (35/42)	**115** (35) **142** (35/42)	**110** (35) **140** (35/42)	**115** (35) **142** (35/42)	

Input design

Motor shaft diameter

Max. motor shaft length [mm]

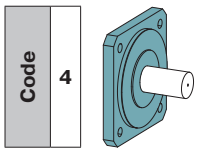
Centering diameter [mm]

Pitch circle diameter [mm]

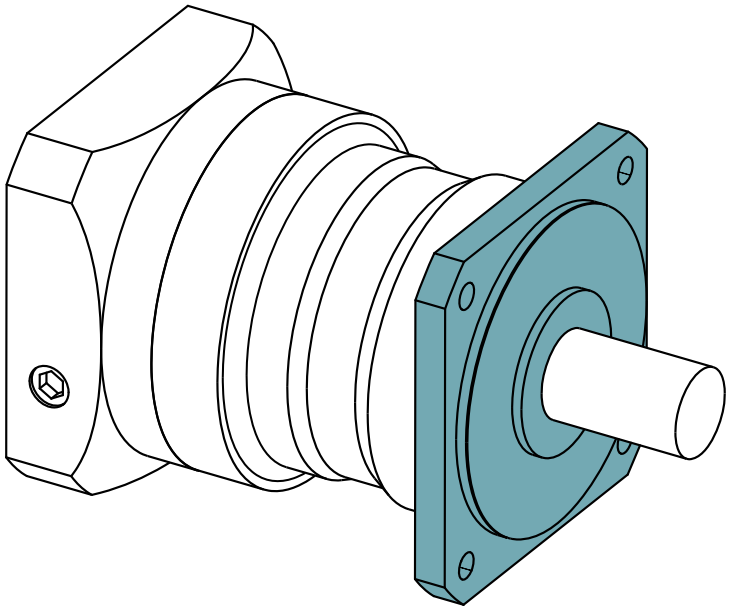
Flange type motor

Mounting thread

Output flange design



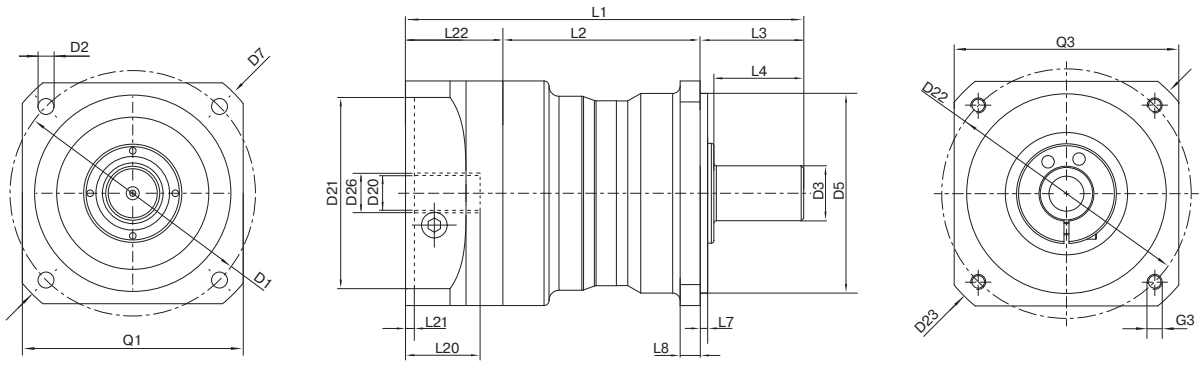
For PLN



Other specifications for gearbox characteristics, output shaft loads, output torques, input speeds and dimensions not listed here correspond to the details on pages 84 to 87.

Input speeds			PLN070	PLN090	PLN115	PLN142	PLN190	i[1]	z[2]
Average thermal input speed at T_{2N} and S1[3][4]	n_{1N}	rpm	1850[5]	1800[5]	1400[5]	800[5]	650[5]	3	1
			2150[5]	1950[5]	1450[5]	850[5]	700[5]	4	
			2450[5]	2350[5]	1850[5]	950[5]	750[5]	5	
			3200[5]	3300[5]	2600[5]	1400[5]	1100[5]	7	
			3500[5]	3700[5]	2950[5]	1650[5]	1350[5]	8	
			4050[5]	4000[5]	3500[5]	2100[5]	1750[5]	10	
			3300[5]	3150[5]	2300[5]	1200[5]	950[5]	12	2
			3700[5]	3750[5]	2750[5]	1450[5]	1150[5]	15	
			3500[5]	3300[5]	2400[5]	1200[5]	1000[5]	16	
			4000[5]	3900[5]	2850[5]	1500[5]	1200[5]	20	
			4350[5]	4000[5]	3150[5]	1700[5]	1300[5]	25	
			4500[5]	4000	3500[5]	2100[5]	1750[5]	32	
			4500	4000	3500	2350[5]	1900[5]	40	
			4500	4000	3500	2950[5]	2400[5]	64	
			4500	4000	3500	3000	2500	100	

(1) Ratios ($i=n_1/n_2$)
(2) Number of stages
(3) Application-specific speed configurations with NCP – www.neugart.com
(4) See page 136 for the definition
(5) Average thermal input speed at 50% T_{2N} and S1

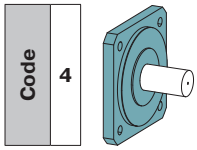


Drawing corresponds to a PLN090 / 1-stage / smooth output shaft / output flange PLS-compatible /19 mm clamping system / motor adaptation – 2-part – round universal flange / B5 flange type motor
All other variants can be retrieved in the Tec Data Finder at www.neugart.com

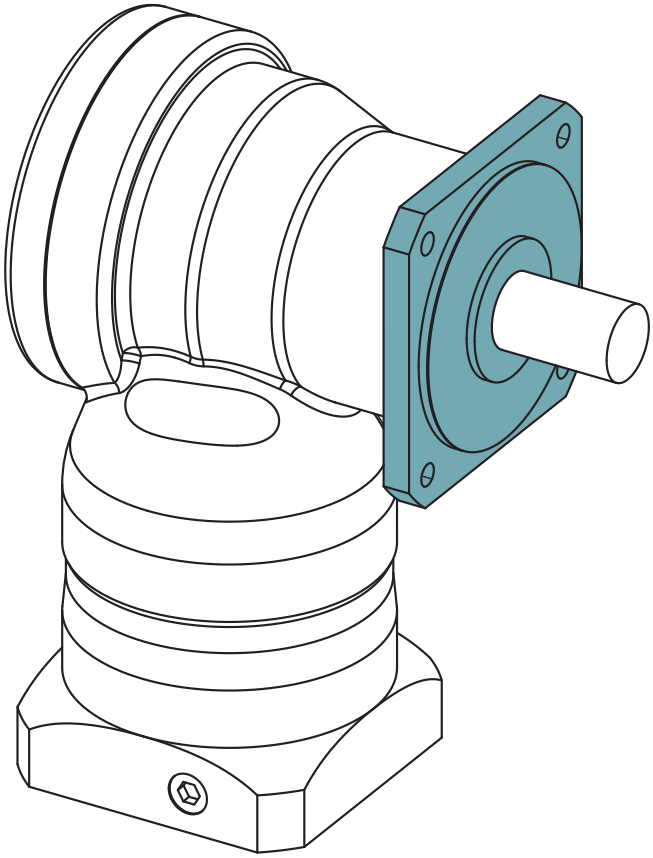
Geometry[1]			**PLN070**	**PLN090**	**PLN115**	**PLN142**	**PLN190**	**z**[2]	**Code**
Pitch circle diameter output	D1		75 (2.953)	100 (3.937)	130 (5.118)	165 (6.496)	215 (8.465)		
Mounting bore output	D2	4x	5.5 (0.217)	6.5 (0.256)	8.5 (0.335)	11.0 (0.433)	13.5 (0.531)		
Shaft diameter output	D3	k6	19 (0.748)	22 (0.866)	32 (1.260)	40 (1.575)	55 (2.165)		
Centering diameter output	D5	h7	60 (2.362)	80 (3.150)	110 (4.331)	130 (5.118)	160 (6.299)		
Diagonal dimension output	D7		92 (3.622)	116 (4.567)	145 (5.709)	185 (7.283)	240 (9.449)		
Flange cross section output	Q1	■	70 (2.756)	90 (3.543)	115 (4.528)	142 (5.591)	190 (7.480)		
Min. total length	L1		138 (5.413)	160 (6.280)	201 (7.913)	276 (10.866)	311 (12.224)	1	
			167 (6.555)	192 (7.539)	241 (9.488)	335 (13.189)	383 (15.059)	2	
Housing length	L2		75 (2.953)	79 (3.110)	85 (3.346)	114.5 (4.508)	138 (5.433)	1	
			104 (4.094)	111 (4.370)	125 (4.921)	173.5 (6.831)	210 (8.268)	2	
Shaft length output	L3		32 (1.260)	41.5 (1.634)	64.5 (2.539)	87 (3.425)	90 (3.543)		
Centering depth output	L7		3 (0.118)	3 (0.118)	4.5 (0.177)	5 (0.197)	6 (0.236)		
Flange thickness output	L8		7 (0.276)	8 (0.315)	10 (0.394)	20 (0.787)	20 (0.787)		
Clamping system diameter input	D26		More information on page 125						
Motor shaft diameter j6/k6	D20		The dimensions vary with the motor/gearbox flange. The input flange geometries can be retrieved for each specific motor in Tec Data Finder at www.neugart.com						
Max. permis. motor shaft length	L20								
Min. permis. 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 6885-1)			A 6x6x20	A 6x6x28	A 10x8x50	A 12x8x65	A 16x10x70		A
Feather key width (DIN 6885-1)	B1		6 (0.236)	6 (0.236)	10 (0.394)	12 (0.472)	16 (0.630)		
Shaft height including feather key (DIN 6885-1)	H1		21.5 (0.846)	24.5 (0.965)	35 (1.378)	43 (1.693)	59 (2.323)		
Shaft length from shoulder	L4		28 (1.102)	36 (1.417)	58 (2.283)	80 (3.150)	82 (3.228)		
Feather key length	L5		20 (0.787)	28 (1.102)	50 (1.969)	65 (2.559)	70 (2.756)		
Distance from shaft end	L6		4 (0.157)	4 (0.157)	4 (0.157)	8 (0.315)	6 (0.236)		
Center hole (DIN 332, type DR)	Z		M6x16	M8x19	M12x28	M16x36	M20x42		
Smooth output shaft									B
Shaft length from shoulder	L4		28 (1.102)	36 (1.417)	58 (2.283)	80 (3.150)	82 (3.228)		

[1] Dimensions in mm (in)
[2] Number of stages

Output flange design



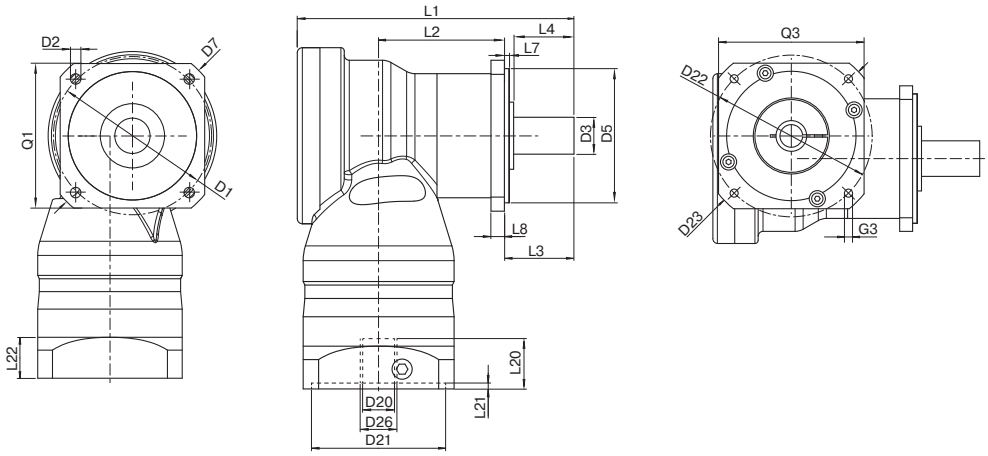
For WPLN



Other specifications for gearbox characteristics, output shaft loads, output torques, input speeds and dimensions not listed here correspond to the details on pages 102 to 105.

Input speeds			WPLN070	WPLN090	WPLN115	WPLN142	i[1]	z[2]
Average thermal input speed at T_{2N} and S1[3][4]	n_{1N}	rpm	1700[5]	1550[5]	1050[5]	900[5]	4	1
			1850[5]	1750[5]	1150[5]	950[5]	5	
			2200[5]	2100[5]	1350[5]	1000[5]	8	
			2300[5]	2200[5]	1400[5]	1050[5]	10	
			1700[5]	1650[5]	1550[5]	900[5]	16	2
			1850[5]	1900[5]	1800[5]	950[5]	20	
			2000[5]	2100[5]	2000[5]	1050[5]	25	
			2100[5]	2100[5]	2050[5]	1350[5]	32	
			2200[5]	2150[5]	2050[5]	1350[5]	40	
			2300[5]	2300[5]	2250[5]	1450[5]	50	
			2400[5]	2750[5]	2700[5]	1650[5]	64	
			2500[5]	2900[5]	2850[5]	1800[5]	100	

(1) Ratios ($i=n_1/n_2$)
(2) Number of stages
(3) Application-specific speed configurations with NCP – www.neugart.com
(4) See page 136 for the definition
(5) Average thermal input speed at 50% T_{2N} and S1



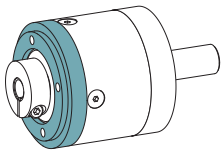
Drawing corresponds to a WPLN090 / 1-stage / smooth output shaft / output flange WPLS-compatible / 14 mm clamping system / motor adaptation – 2-part – round universal flange / B5 flange type motor
All other variants can be retrieved in the Tec Data Finder at www.neugart.com

Geometry[1]			WPLN070	WPLN090	WPLN115	WPLN142	z[2]	Code
Pitch circle diameter output	D1		75 (2.953)	100 (3.937)	130 (5.118)	165 (6.496)		
Mounting bore output	D2	4x	5.5 (0.217)	6.5 (0.256)	8.5 (0.335)	11.0 (0.433)		
Shaft diameter output	D3	k6	19 (0.748)	22 (0.866)	32 (1.260)	40 (1.575)		
Centering diameter output	D5	h7	60 (2.362)	80 (3.150)	110 (4.331)	130 (5.118)		
Diagonal dimension output	D7		92 (3.622)	116 (4.567)	145 (5.709)	185 (7.283)		
Flange cross section output	Q1	■	70 (2.756)	90 (3.543)	115 (4.528)	142 (5.591)		
Total length	L1		137.5 (5.413)	165 (6.496)	218 (8.583)	273 (10.748)	1	
			185 (7.283)	207 (8.150)	248.5 (9.783)	342.5 (13.484)	2	
Housing length	L2		62.5	75	97	99	1	
			110	122.5	135.5	199	2	
Shaft length output	L3		32 (1.260)	41.5 (1.634)	64.5 (2.539)	87 (3.425)		
Centering depth output	L7		3 (0.118)	3 (0.118)	4.5 (0.177)	5 (0.197)		
Flange thickness output	L8		7 (0.276)	8 (0.315)	10 (0.394)	20 (0.787)		
Min. overall height	L23		179 (7.047)	204 (8.012)	248 (9.744)	318 (12.520)	1	
			179 (7.047)	183 (7.185)	210 (8.268)	259 (10.177)	2	
Clamping system diameter input	D26		More information on page 125					
Motor shaft diameter j6/k6	D20		The dimensions vary with the motor/gearbox flange. The input flange geometries can be retrieved for each specific motor in Tec Data Finder at www.neugart.com					
Max. permis. motor shaft length	L20							
Min. permis. 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 6885-1)			A 6x6x20	A 6x6x28	A 10x8x50	A 12x8x65		A
Feather key width (DIN 6885-1)	B1		6 (0.236)	6 (0.236)	10 (0.394)	12 (0.472)		
Shaft height including feather key (DIN 6885-1)	H1		21.5 (0.846)	24.5 (0.965)	35 (1.378)	43 (1.693)		
Shaft length from shoulder	L4		28 (1.102)	36 (1.417)	58 (2.283)	80 (3.150)		
Feather key length	L5		20 (0.787)	28 (1.102)	50 (1.969)	65 (2.559)		
Distance from shaft end	L6		4 (0.157)	4 (0.157)	4 (0.157)	8 (0.315)		
Center hole (DIN 332, type DR)	Z		M6x16	M8x19	M12x28	M16x36		
Smooth output shaft								B
Shaft length from shoulder	L4		28 (1.102)	36 (1.417)	58 (2.283)	80 (3.150)		

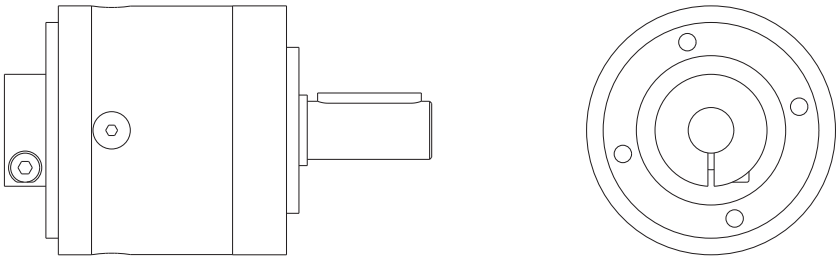
[1] Dimensions in mm (in)
[2] Number of stages

Input design

Code R



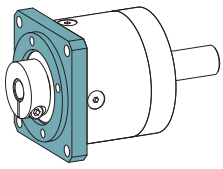
No motor adaptation – round universal flange



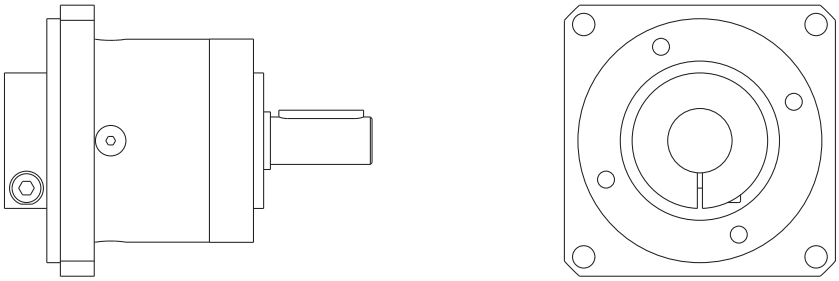
Drawing corresponds to a PLE060 / 1-stage / output shaft with feather key / 11 mm clamping system / no motor adaptation – round universal flange
All other variants can be retrieved in Tec Data Finder at www.neugart.com

This input design applies to the series, frame sizes, and associated clamping systems shown in the product code on pages 125-127.
The respective measurements can be taken from the dimension sheets in Tec Data Finder at www.neugart.com

Code T



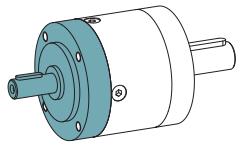
No motor adaptation – square universal flange



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 Tec Data Finder at www.neugart.com

This input design applies to the series, frame sizes, and associated clamping systems shown in the product code on pages 125-127.
The respective measurements can be taken from the dimension sheets in Tec Data Finder at www.neugart.com

Code	W



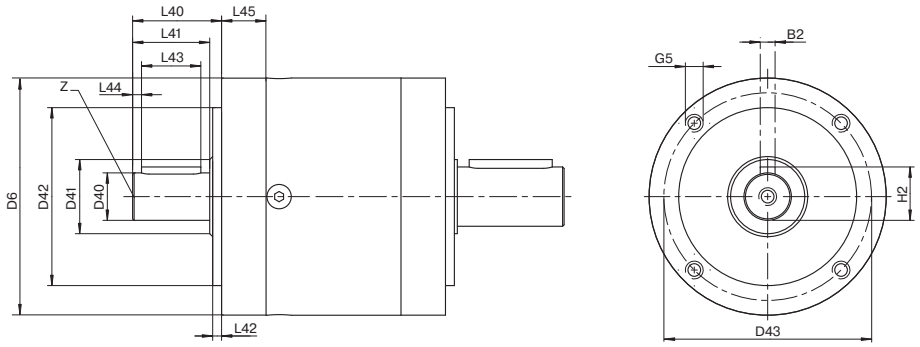
For PLE and PLQE

Gearbox characteristics not listed here correspond to the details on pages 18 to 27 - The gearboxes have to be flanged on input and output flange

Output shaft loads			**PLE040**	**PLE060** / **PLQE060**	**PLE080** / **PLQE080**	**PLE120** / **PLQE120**	**PLE160**	**z(1)**	**Code**
Radial force input 10,000 h(2)	$F_{r\,input}$	N (lb_f)	100 (22)	250 (56)	450 (101)	1000 (225)	1400 (315)		W
Axial force input 10,000 h(2)	$F_{a\,input}$		120 (27)	300 (67)	500 (112)	1300 (292)	1600 (360)		

Moment of inertia			**PLE040**	**PLE060** / **PLQE060**	**PLE080** / **PLQE080**	**PLE120** / **PLQE120**	**PLE160**	**z(1)**	**Code**
Mass moment of inertia(3)	J	kgcm² ($lb_f.in.s^2 10^{-4}$)	0.011 - 0.020 (0.097 - 0.177)	0.049 - 0.107 (0.433 - 0.946)	0.269 - 0.587 (2.380 - 5.194)	1.034 - 1.795 (9.150 - 15.885)	2.795 - 8.999 (24.735 - 79.641)	1	W
			0.011 - 0.020 (0.097 - 0.177)	0.050 - 0.092 (0.442 - 0.814)	0.274 - 0.469 (2.424 - 4.150)	1.061 - 1.719 (9.389 - 15.213)	2.627 - 7.565 (23.248 - 66.950)	2	
			0.011 - 0.019 (0.097 - 0.168)	0.048 - 0.057 (0.424 - 0.504)	0.267 - 0.443 (2.362 - 3.920)	1.032 - 1.647 (9.133 - 14.575)	-	3	

Input speeds			**PLE040**	**PLE060** / **PLQE060**	**PLE080** / **PLQE080**	**PLE120** / **PLQE120**	**PLE160**	**z(1)**	**Code**
Max. mechanical input speed(4)	$n_{1\,Limit}$	rpm	18000	13000	7000	6500	4500		W

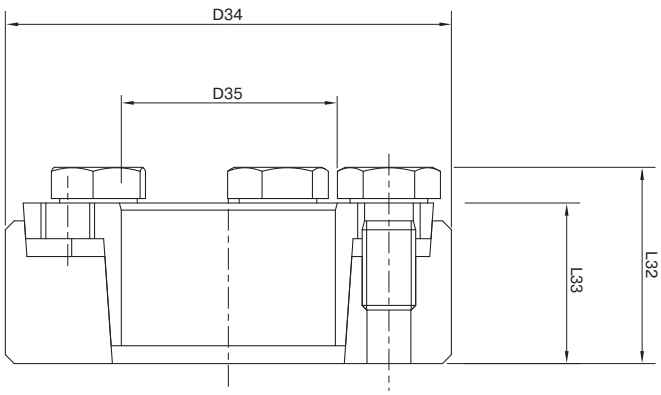


Drawing corresponds to a PLE080 / 1-stage / output shaft with feather key / input shaft – All other variants can be retrieved in Tec Data Finder at www.neugart.com

Geometry(5)			**PLE040**	**PLE060** / **PLQE060**	**PLE080** / **PLQE080**	**PLE120** / **PLQE120**	**PLE160**	**z(1)**	**Code**
Feather key width (DIN 6885-1)	B2		2 (0.079)	3 (0.118)	5 (0.197)	6 (0.236)	10 (0.394)		W
Housing diameter	D6		40 (1.575)	60 (2.362)	80 (3.150)	115 (4.528)	160 (6.299)		
Shaft diameter input	D40	j6	8 (0.315)	10 (0.394)	16 (0.630)	20 (0.787)	35 (1.378)		
Shaft collar input	D41		12 (0.472)	17 (0.669)	25 (0.984)	35 (1.378)	55 (2.165)		
Centering diameter input	D42	h7	26 (1.024)	40 (1.575)	60 (2.362)	80 (3.150)	110 (4.331)		
Pitch circle diameter input	D43		34 (1.339)	52 (2.047)	70 (2.756)	100 (3.937)	130 (5.118)		
Mounting thread x depth	G5	4x	M4x6	M5x8	M6x10	M10x16	M10x25		
Shaft height including feather key (DIN 6885-1)	H2		8.8 (0.346)	11.2 (0.441)	18.0 (0.709)	22.5 (0.886)	38.0 (1.496)		
Shaft length input	L40		20 (0.787)	28 (1.102)	30 (1.181)	45 (1.772)	65 (2.559)		
Shaft length from shoulder	L41		17 (0.669)	23 (0.906)	26 (1.024)	40 (1.575)	58 (2.283)		
Centering depth input	L42		2 (0.079)	3 (0.118)	3 (0.118)	4 (0.157)	5 (0.197)		
Feather key length input	L43		12 (0.472)	18 (0.709)	20 (0.787)	32 (1.260)	45 (1.772)		
Distance from shaft end input	L44		2.5 (0.098)	2.5 (0.098)	3.0 (0.118)	4.0 (0.157)	7.0 (0.276)		
Flange thickness input	L45		10.2 (0.402)	12.7 (0.500)	15.0 (0.591)	31.0 (1.220)	58.0 (2.283)		
Center hole (DIN 332, type DR)	Z		M3x9	M3x9	M5x12	M6x16	M12x28		

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

WGN Shrink disc



This shrink disc can be used to make a force-fit connection between your machine shaft and the right angle hollow shaft gearbox WGN.

			WGN070	WGN090	WGN115	WGN142
Art. No.			**58365**	**58366**	**58367**	**58368**
Outside diameter	D34	mm (in)	44 (1.732)	50 (1.968)	72 (2.835)	90 (3.543)
Inner diameter	D35		18 (0.709)	24 (0.945)	36 (1.417)	50 (1.968)
Overall length[1]	L32		19 (0.748)	22 (0.866)	27.3 (1.075)	31.3 (1.232)
Clamp length[1]	L33		15 (0.591)	18 (0.709)	22 (0.866)	26 (1.024)
Width across flats	SW30		10 (0.394)	10 (0.394)	13 (0.512)	13 (0.512)
Number of clamp screws	N30		4 (0.157)	5 (0.197)	5 (0.197)	8 (0.315)
Mass moment of inertia	J	$kgcm^2$ ($lb_f.in.s^2 10^{-4}$)	0.4251 (3.672)	0.7831 (6.930)	4.212 (37.276)	11.55 (102.218)

For the load shaft, we recommend a tolerance of h6 and a surface roughness of Ra < 3.2 µm. CAD data can be accessed at www.neugart.com

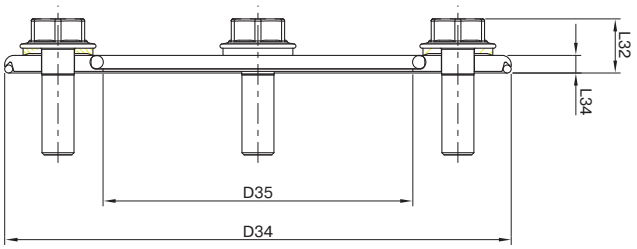
For correct installation of the shrink disc, please refer to the corresponding mounting instructions (www.neugart.com)

Scope of delivery

1 x Shrink disc (incl. screws)

[1] Dimensions in unclamped state

HLAE Sealing kit



The freely positionable sealing kit for the HLAE provides maximum hygienic protection, making it universally suitable for different wall thicknesses.
It therefore gives you maximum flexibility for connecting to the machine while satisfying the strictest hygienic requirements.

			HLAE070	HLAE090	HLAE110
Art. No.			**63911**	**63858**	**64130**
Outside diameter	D34	mm (in)	75 (2.953)	95 (3.740)	120 (4.724)
Inner diameter	D35		40 (1.575)	58 (2.283)	65 (2.559)
Overall length	L32		8.5 (0.335)	9.5 (0.374)	11.5 (0.453)
Disc length	L34		3 (0.118)	3 (0.118)	3 (0.118)
Width across flats	SW30		8 (0.315)	10 (0.394)	13 (0.512)
Quantity x screw x length	G30		4 x M5x16	4 x M6x20	4 x M8x25

For correct installation of the sealing kit, please refer to the corresponding mounting instructions (www.neugart.com)

Scope of delivery

1 x electropolished stainless steel disc
1 x EPDM sealing ring (seal to application)
1 x EPDM sealing ring (seal to gearbox)
4 x USIT-VA with EPDM coated sealing washer, EHEDG-compliant
4 x Hygienic Design stainless steel screw (electropolished), EHEDG-compliant

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 $T_{2application}$

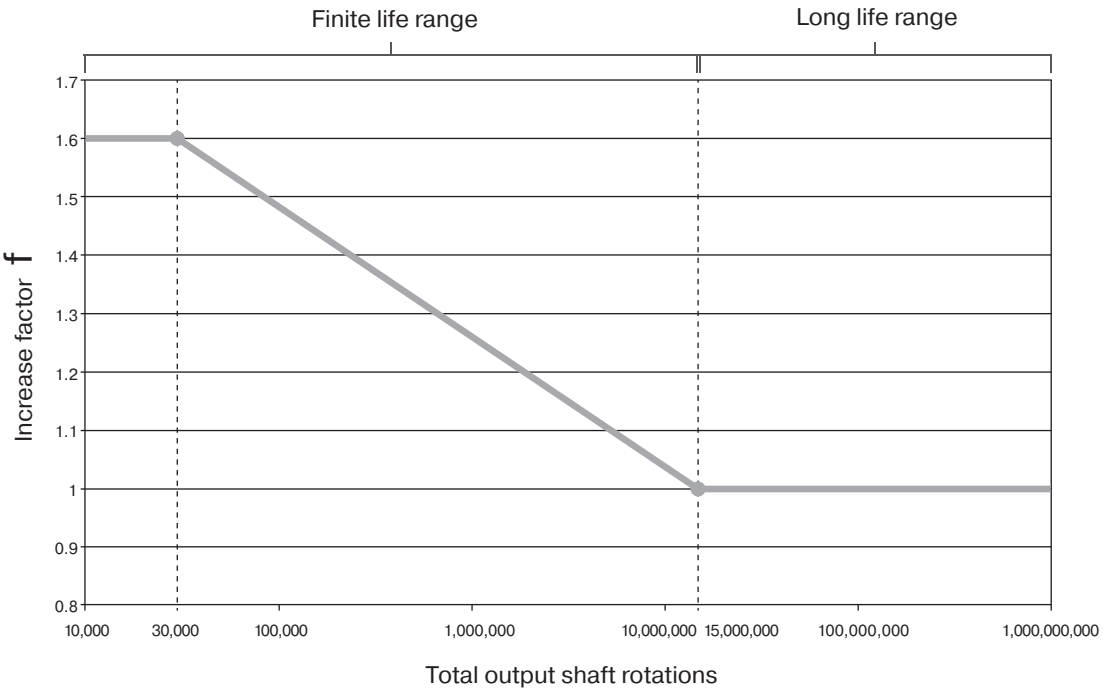
* The total output shaft rotations under the increased application torques are determined.
* The resulting max increase factor f can be determined from the diagram.
* The max transferable application torque $T_{2max\_application}$ is calculated:

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

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

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

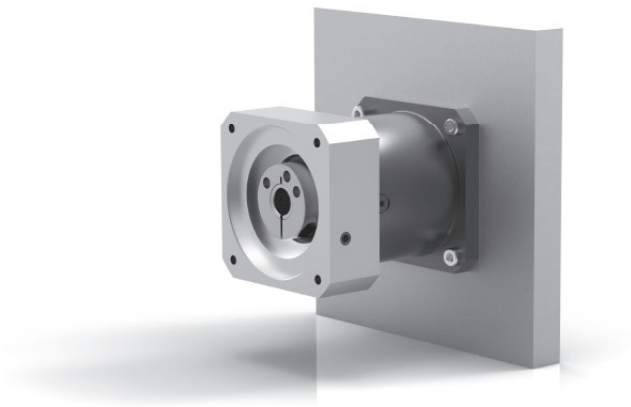
Increase factor f as a function of the total "output shaft rotations"



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°C



Application specific configuration with NCP – www.neugart.com

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