



PFHE

The planetary gearbox with flange output shaft for high-load applications

The **PFHE** represents an economically attractive alternative for high-load applications in which high radial loads occur. The combination of special pre-stressed inclined roller bearings and a flanged output shaft in accordance with ISO 9409-1 gives the **PFHE** a very high load capacity. Thanks to the radial shaft seal that is used, this gearbox achieves protection class IP65 at the output side and can therefore also withstand adverse usage conditions.

Nominal output torque **15 - 260 Nm**



Radial force **2300 - 5150 N**



Axial force **2850 - 6450 N**



Torsional backlash **7 - 12 arcmin**



Protection class **IP65**

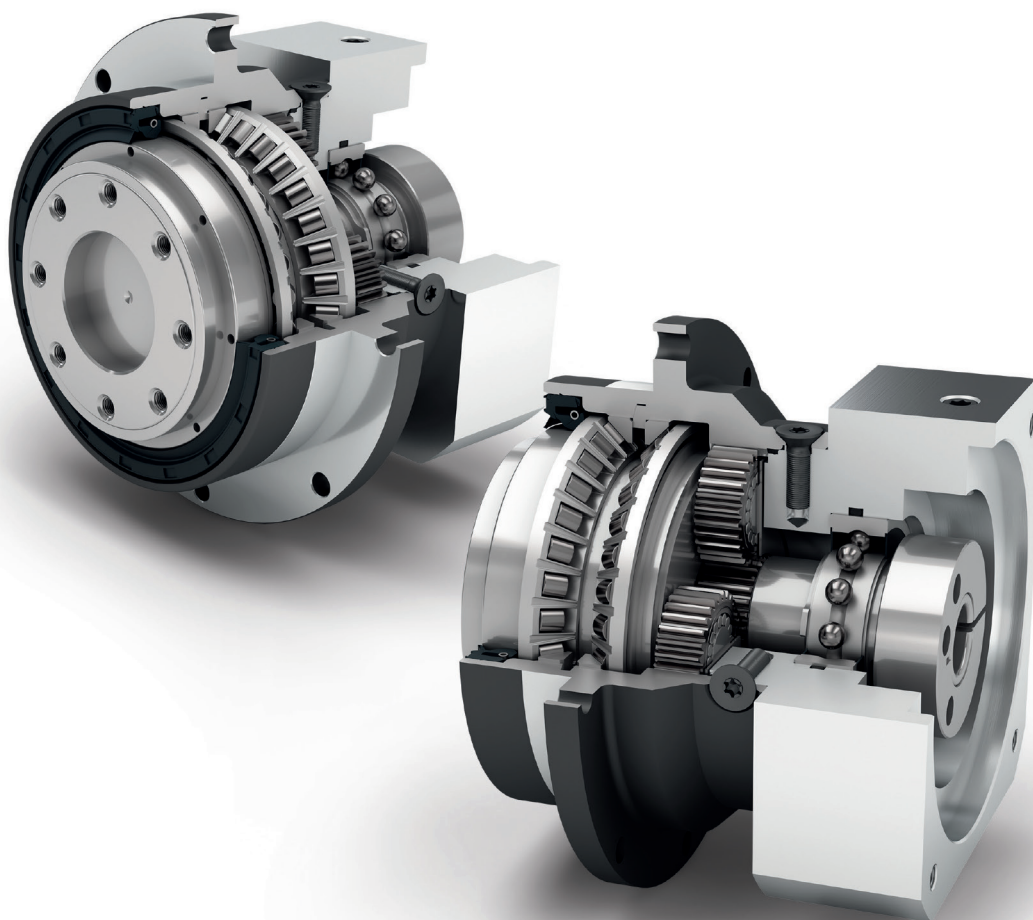


Frame sizes

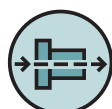
64

90

110



Economy Line



Coaxial gearbox



Spur gear



Preloaded angular contact roller bearings



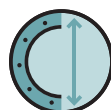
Flange output shaft (ISO 9409-1)



Option: Planetary gearbox with mounted pinion on page 132



Equidirectional rotation



Extra large round type output flange



Rotary shaft seal



Planet carrier in disc design



Option: Painted surface
– RAL 9005 Jet black

Detailed explanations of the technical features starting on page 173.

Code	Gearbox characteristics			PFHE064	PFHE090	PFHE110	p ⁽¹⁾
	Service life (L _{10h})	t _L	h	30,000			
	Efficiency at full load ⁽²⁾	η	%	97			
	Min. operating temperature	T _{min}	°C	-25 (-13)			
	Max. operating temperature	T _{max}	(°F)	90 (194)			
	Protection class			IP65			
S	Standard lubrication			Grease (lifetime lubrication)			
F	Food grade lubrication			Grease (lifetime lubrication)			
L	Low temperature lubrication ⁽³⁾			Grease (lifetime lubrication)			
	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 _r .in/ arcmin)	5.4 - 10.6 (48 - 94)	16.1 - 32.5 (142 - 288)	37.0 - 77.0 (327 - 682)	1
				5.0 - 11.5 (44 - 102)	15.7 - 38.5 (139 - 341)	30.0 - 95.0 (266 - 841)	2
	Gearbox weight ⁽²⁾	m _G	kg (lb _m)	1.1 (2.4 - 2.5)	3.1 (6.7 - 6.9)	5.9 - 6.1 (12.9 - 13.5)	1
				1.3 - 1.4 (2.9 - 3.2)	3.5 - 3.8 (7.7 - 8.4)	7.6 - 8.1 (16.7 - 17.8)	2
S	Standard surface			Housing: Steel – heat-treated and post-oxidized (black)			
B	Painted surface			RAL 9005 Jet black			
	Running noise ⁽⁴⁾	Q _g	dB(A)	60	62	65	
	Max. bending moment based on the gearbox input flange ⁽⁵⁾	M _b	Nm (lb _r .in)	8 (71)	16 (142)	40 (354)	

Output shaft loads			PFHE064	PFHE090	PFHE110	p ⁽¹⁾
Radial force for 20,000 h ⁽⁶⁾⁽⁷⁾	F _{r 20.000 h}	N (lb _f)	2300 (517)	4100 (922)	5150 (1158)	
Axial force for 20,000 h ⁽⁶⁾⁽⁷⁾	F _{a 20.000 h}		2850 (641)	5450 (1225)	6450 (1450)	
Radial force for 30,000 h ⁽⁶⁾⁽⁷⁾	F _{r 30.000 h}		2000 (450)	3650 (821)	4550 (1023)	
Axial force for 30,000 h ⁽⁶⁾⁽⁷⁾	F _{a 30.000 h}		2500 (562)	4800 (1079)	5600 (1259)	
Maximum radial force ⁽⁷⁾⁽⁸⁾	F _{r Stat}		2300 (517)	4100 (922)	5150 (1158)	
Maximum axial force ⁽⁷⁾⁽⁸⁾	F _{a Stat}		2850 (641)	5450 (1225)	6450 (1450)	
Tilting moment for 20,000 h ⁽⁶⁾⁽⁸⁾	M _{K 20.000 h}	Nm (lb _i .in)	110 (972)	278 (2462)	407 (3603)	
Tilting moment for 30,000 h ⁽⁶⁾⁽⁸⁾	M _{K 30.000 h}		96 (845)	248 (2192)	360 (3184)	

Moment of inertia			PFHE064	PFHE090	PFHE110	p ⁽¹⁾
Mass moment of inertia ⁽²⁾	J	kgcm ² (lb _i .in.s ² 10 ⁻⁴)	0.073 - 0.224 (0.646 - 1.983)	0.407 - 1.170 (3.602 - 10.355)	1.505 - 3.658 (13.320 - 32.376)	1
			0.064 - 0.132 (0.566 - 1.168)	0.356 - 0.667 (3.151 - 5.903)	1.377 - 2.432 (12.187 - 21.525)	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. Optimal operating temperature max. 50°C

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

⁽⁵⁾ Max. motor weight* in kg = 0.2 x M_g / 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 n₂=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			PFHE064	PFHE090	PFHE110	i ⁽¹⁾	p ⁽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)	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⁾	T _{2max}	Nm (lb _f .in)	45 (398)	136 (1204)	184 (1629)	3	1
			61 (540)	184 (1629)	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=n₁/n₂)

⁽²⁾ Number of stages

⁽³⁾ Application specific configuration with NCP – www.neugart.com

⁽⁴⁾ 30,000 rotations of the output shaft permitted; see page 166

Output torques			PFHE064	PFHE090	PFHE110	$i^{(1)}$	$p^{(2)}$
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			PFHE064	PFHE090	PFHE110	$i^{(1)}$	$p^{(2)}$
Average thermal input speed at T_{2N} and S1 ⁽⁴⁾⁽⁵⁾	n_{1N}	rpm	2350 ⁽⁶⁾	1900 ⁽⁶⁾	1600 ⁽⁶⁾	3	1
			2950 ⁽⁶⁾	2200 ⁽⁶⁾	1900 ⁽⁶⁾	4	
			3550 ⁽⁶⁾	2750 ⁽⁶⁾	2200 ⁽⁶⁾	5	
			4500	4000 ⁽⁶⁾	3350 ⁽⁶⁾	7	
			4500	4000	3500 ⁽⁶⁾	8	
			4500	4000	3500	10	
			4500	4000 ⁽⁶⁾	3300 ⁽⁶⁾	9	2
			4500	4000	3500 ⁽⁶⁾	12	
			4500	4000	3500	15	
			4500	4000	3500	16	
			4500	4000	3500	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	7500	7000	6500		

⁽¹⁾ Ratios ($i=n_1/n_2$)

⁽²⁾ Number of stages

⁽³⁾ Permitted 1000 times

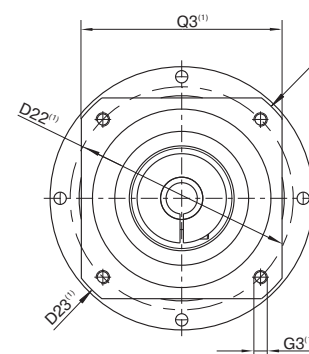
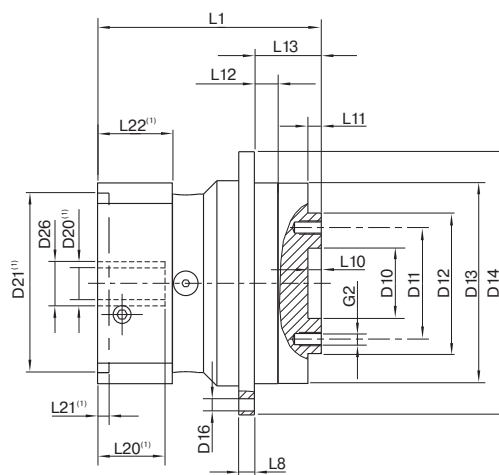
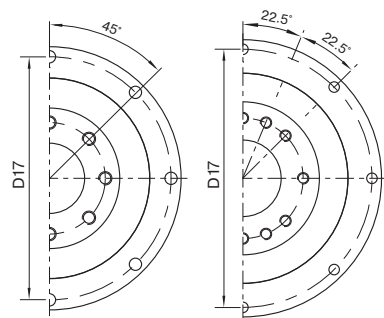
⁽⁴⁾ Application-specific speed configurations with NCP – www.neugart.com

⁽⁵⁾ See page 166 for the definition

⁽⁶⁾ Average thermal input speed at 50% T_{2N} and S1

PFHE064
PFHE090

PFHE110



Drawing corresponds to a PFHE090 / 1-stage / flange output shaft / 19 mm clamping system / motor adaptation – one part / B5 flange type motor

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

Geometry ⁽²⁾			PFHE064	PFHE090	PFHE110	p ⁽³⁾	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)		
Flange output shaft diameter	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		72 (2.835)	100.5 (3.957)	117 (4.606)	1	
			84.5 (3.327)	118 (4.646)	144 (5.669)	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)		
	L11		3 (0.118)	6 (0.236)	7 (0.256)		
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)		
Motor shaft diameter j6/k6	D20		More information on page 163/164				
Clamping system diameter input	D26						
Flange output shaft (similar ISO 9409-1)							D
Number x thread x depth	G2		8 x M5x7	8 x M6x10	12 x M6x12		

⁽²⁾ Dimensions in mm

⁽³⁾ Number of stages