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.

Cyclic 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: Rack and pinion Planetary gearbox (Details on page 158)
- 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 201.

Code	Gearbox characteristics			PFHE064	PFHE090	PFHE110	p[1]
	Service life[2]	L_h	h	20,000			
	Efficiency[3]	η	%	97			
	Min. operating temperature	T_{min}	°C (°F)	-25 (-13)			
	Max. operating temperature	T_{max}		90 (194)			
	Protection class			IP65			
S	Standard lubrication			Grease (lifetime lubrication)			
F	Food grade lubrication			Grease (lifetime lubrication)			
	Installation position			Any			
S	Standard backlash	φ	arcmin	< 10	< 7	< 7	1
				< 12	< 9	< 9	2
	Torsional stiffness[3]	C_{2t}	Nm / arcmin (lb_f.in/ arcmin)	5.4 - 10.3 (48 - 91)	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[3]	m	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[4]			RAL 9005 Jet black			
	Running noise[3]	L_{pA}	dB(A)	60	62	65	

Output shaft loads			PFHE064	PFHE090	PFHE110	p[1]
Maximum radial force	$F_{r\,max}$	N (lb_f)	2300 (517)	4100 (922)	5150 (1158)	
Maximum axial force	$F_{a\,max}$		2850 (641)	5450 (1225)	6450 (1450)	
Maximum tilting moment	$M_{K\,max}$	Nm (lb_f.in)	110 (972)	278 (2462)	407 (3603)	

Input characteristics			PFHE064	PFHE090	PFHE110	p[1]
Clamping system diameter input (Code)	D26	mm	11 (C)	19 (E)[5]	24 (F)[5]	
			14 (D)[5]	24 (F)	35 (G)	
			19 (E)	-	-	
Mass moment of inertia input[3][5]	J_1	kgcm² (lb_f. in.s²$10^{-4}$)	0.094 - 0.245 (0.832 - 2.168)	0.407 - 1.170 (3.602 - 10.355)	1.505 - 3.658 (13.320 - 32.376)	1
			0.084 - 0.152 (0.743 - 1.345)	0.356 - 0.667 (3.151 - 5.903)	1.377 - 2.432 (12.187 - 21.525)	2
Average idle torque[3][5]	T_0	Nm (lb_f.in)	0.25 - 0.85 (2 - 8)	0.45 - 1.75 (4 - 15)	0.80 - 3.65 (7 - 32)	1
			0.15 - 0.30 (1 - 3)	0.20 - 0.55 (2 - 5)	0.30 - 1.15 (3 - 10)	2
Maximum bending moment input	M_{b1}		8 (71)	16 (142)	40 (354)	

(1) Number of stages
(2) Application specific configuration with NCP – www.neugart.com
(3) The ratio-dependent values can be retrieved in Tec Data Finder – www.neugart.com
(4) More information on page 183
(5) Reference clamping system diameter

Output torques			PFHE064	PFHE090	PFHE110	i(1)	p(2)
Cyclic torque(3)(4)	T_{2Z}	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	
Maximum torque(3)(4)	T_{2max}	Nm (lb_f.in)	44 (389)	105 (929)	184 (1629)	3	1
			60 (531)	140 (1239)	245 (2168)	4	
			61 (540)	175 (1549)	310 (2744)	5	
			40 (354)	104 (920)	215 (1903)	7	
			28 (248)	80 (708)	192 (1699)	8	
			24 (212)	60 (531)	152 (1345)	10	
			70 (620)	182 (1611)	335 (2965)	9	2
			65 (575)	192 (1699)	415 (3673)	12	
			70 (620)	176 (1558)	365 (3231)	15	
			65 (575)	192 (1699)	415 (3673)	16	
			65 (575)	192 (1699)	415 (3673)	20	
			61 (540)	176 (1558)	365 (3231)	25	
			65 (575)	192 (1699)	415 (3673)	32	
			61 (540)	176 (1558)	365 (3231)	40	
			28 (248)	80 (708)	192 (1699)	64	
			24 (212)	60 (531)	152 (1345)	100	

(1) Ratios ($i=n_1/n_2$)
(2) Number of stages
(3) Application specific configuration with NCP – www.neugart.com
(4) Based on reference clamping system diameter

Output torques			PFHE064	PFHE090	PFHE110	i[1]	p[2]
Continuous torque[3]	T_{2D}	Nm (lb_f.in)	23 (204)	38 (336)	97 (859)	3	1
			23 (204)	88 (779)	131 (1159)	4	
			24 (212)	87 (770)	165 (1460)	5	
			19.5 (173)	55 (487)	114 (1009)	7	
			15 (133)	42 (372)	102 (903)	8	
			12.5 (111)	32 (283)	80 (708)	10	
			30 (266)	87 (770)	178 (1575)	9	2
			32 (283)	102 (903)	220 (1947)	12	
			35 (310)	93 (823)	195 (1726)	15	
			35 (310)	102 (903)	220 (1947)	16	
			37 (327)	102 (903)	220 (1947)	20	
			34 (301)	93 (823)	195 (1726)	25	
			37 (327)	102 (903)	220 (1947)	32	
			34 (301)	93 (823)	195 (1726)	40	
			15 (133)	42 (372)	102 (903)	64	
			12.5 (111)	32 (283)	80 (708)	100	

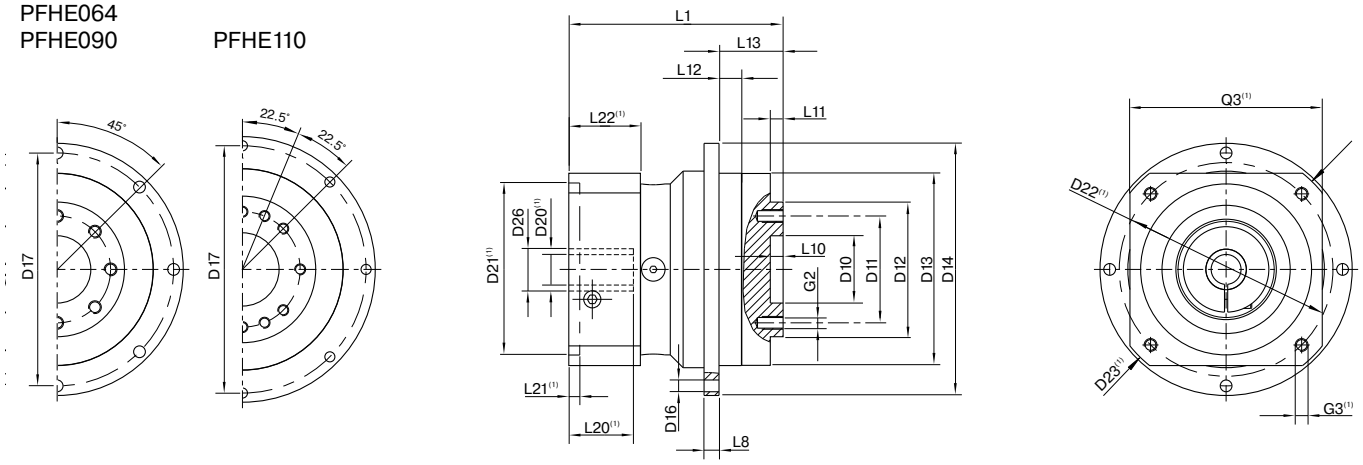
Input speeds			PFHE064	PFHE090	PFHE110	i[1]	p[2]
Continuous input speed[3][4]	n_{1D}	rpm	3800	3750	1550	3	1
			4500	2950	1750	4	
			4500	3550	1950	5	
			4500	4000	2750	7	
			4500	4000	3450	8	
			4500	4000	3500	10	
			4500	4000	1700	9	2
			4500	4000	2000	12	
			4500	4000	2450	15	
			4500	4000	2400	16	
			4500	4000	2750	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[3]	n_{1max}	rpm	7500	7000	6500		

Output torques			PFHE064	PFHE090	PFHE110	i[1]	p[2]
Emergency stop torque[4][5]	T_{2Stop}	Nm (lb_f.in)	60 (531)	150 (1328)	375 (3319)	3	1
			80 (708)	200 (1770)	500 (4425)	4	
			80 (708)	220 (1947)	500 (4425)	5	
			80 (708)	178 (1575)	340 (3009)	7	
			80 (708)	190 (1682)	380 (3363)	8	
			75 (664)	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	
			75 (664)	200 (1770)	480 (4248)	100	

(1) Ratios ($i=n_1/n_2$)
(2) Number of stages
(3) Application specific configuration with NCP – www.neugart.com
(4) Based on reference clamping system diameter
(5) Permitted 1000 times

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)		
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		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 191/192				
Clamping system diameter input	D26		More information on page 54				
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