WPSFN

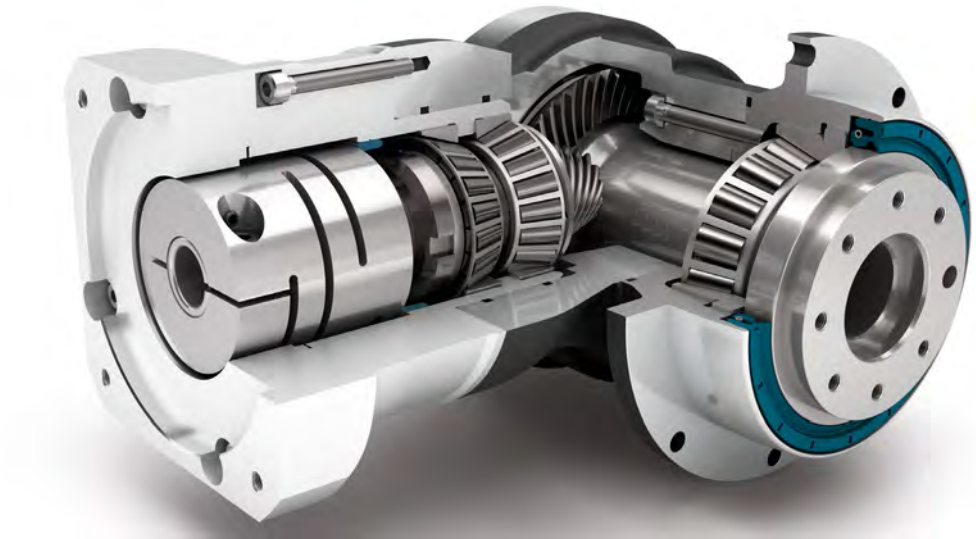
The shortest hypoid-toothed right angle gearbox with flange output shaft and hollow shaft

Our **WPSFN** is particularly easy and quick to integrate thanks to its standardized flange interface and offers high torsional rigidity. With its hypoid gearing, as well as the helical-toothed planetary stage, it achieves optimal synchronization for best surface qualities. The shortest right-angle precision gearbox, in a single-stage design with integrated hollow shaft, offers you new design solutions.

Cyclic torque	**22 - 620 Nm**
Radial force	**2150 - 12000 N**
Axial force	**4200 - 9500 N**
Torsional backlash	**3 - 5 arcmin**
Protection class	**IP65**

Frame sizes

64 **90** **110** **140**



- Precision Line
- Counterdirectional rotation
- Extra large round type output flange
- Rotary shaft seal
- Hollow shaft (1-stage)
- Option: Rack and pinion
  Planetary gearbox (Details on page 158)
- Right angle gearbox
- Hypoid gear right angle stage
- Preloaded angular contact roller bearings
- Flange output shaft (ISO 9409-1)
- Option: Reduced backlash (2-stage)
- Option: Painted surface
  – RAL 9005 Jet black

Detailed explanations of the technical features starting on page 201.

Code	Gearbox characteristics			WPSFN064	WPSFN090	WPSFN110	WPSFN140	p(1)
	Service life(2)	L_h	h	20,000				
	Efficiency(3)	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 (lifetime lubrication)				
F	Food grade lubrication			Oil (lifetime lubrication)				
	Installation position			Any				
S	Standard backlash	φ	arcmin	< 5				
R	Reduced backlash			-				1
				< 3				2
	Torsional stiffness(3)	C_{2t}	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(3)	m	kg (lb_m)	3.4 - 3.5 (7.6 - 7.7)	6.5 - 6.9 (14.3 - 15.3)	11.4 - 11.5 (25.1 - 25.3)	24.8 - 25.3 (54.7 - 55.9)	1
				3.8 - 3.9 (8.5 - 8.7)	5.4 - 5.6 (12.0 - 12.3)	8.7 - 9.0 (19.1 - 19.8)	18.3 - 18.8 (40.3 - 41.4)	2
S	Standard surface			Right angle housing: Aluminum – anodized (black)				
B	Painted surface(4)			RAL 9005 Jet black				
	Running noise(3)	L_{pA}	dB(A)	66	67	68	70	

Output shaft loads			WPSFN064	WPSFN090	WPSFN110	WPSFN140	p(1)
Maximum radial force	$F_{r\,max}$	N (lb_f)	2400 (540)	4400 (989)	5500 (1236)	12000 (2698)	1
			2150 (483)	3950 (888)	4900 (1102)	12000 (2698)	2
Maximum axial force	$F_{a\,max}$		2850 (641)	5450 (1225)	6450 (1450)	7500 (1686)	
Maximum tilting moment	$M_{K\,max}$	Nm (lb_f.in)	200 (1767)	484 (4283)	689 (6096)	1989 (17602)	1
			132 (1170)	326 (2888)	475 (4207)	1030 (9113)	2

Input characteristics			WPSFN064	WPSFN090	WPSFN110	WPSFN140	p(1)
Clamping system diameter input (Code)	D26	mm	14 (D)(5)	19 (E)(5)	24 (F)(5)	35 (G)(5)	1
			19 (E)	24 (F)	35 (G)	42 (H)	2
			14 (D)(5)	14 (D)(5)	19 (E)(5)	24 (F)(5)	
			19 (E)	19 (E)	24 (F)	35 (G)	
Mass moment of inertia input(3)(5)	J_1	kgcm² (lb_f. in.s²10⁻⁴)	0.502 - 0.672 (4.443 - 5.948)	1,046 - 1.591 (9.258 - 14.082)	4.857 - 6,.435 (42.988 - 56.955)	15.220 - 21.693 (134.708 - 191.999)	1
			0.497 - 0.642 (4.399 - 5.682)	0.497 - 0.659 (4.399 - 5.833)	1.015 - 1.452 (8.984 - 12.851)	4,810 - 6,449 (42.572 - 57.078)	2
Average idle torque(3)(5)	T_0	Nm (lb_f.in)	1.25 - 1.55 (11 - 14)	1.90 - 2.60 (17 - 23)	6,20 - 7.40 (55 - 65)	14,00 - 16,00 (124 - 142)	1
			0.80 - 1.10 (7 - 10)	0.80 - 1.65 (7 - 15)	1.20 - 2,90 (11 - 26)	4.00 - 8,30 (35 - 73)	2
Max. bending moment based on the gearbox input flange	M_{b1}		12 (106)	25,5 (226)	53 (469)	120 (1062)	1
			12 (106)	12 (106)	25,5 (226)	53 (469)	2

(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			WPSFN064	WPSFN090	WPSFN110	WPSFN140	i[1]	p[2]
Cyclic torque[3][4]	T_{2Z}	Nm (lb_f.in)	45 (398)	90 (797)	160 (1416)	320 (2832)	4	1
			42 (372)	75 (664)	140 (1239)	280 (2478)	5	
			28 (248)	51 (451)	91 (805)	189 (1673)	7	
			27 (239)	50 (443)	90 (797)	180 (1593)	8	
			22 (195)	40 (354)	75 (664)	160 (1416)	10	
			62 (549)	130 (1151)	310 (2744)	620 (5487)	16	2
			62 (549)	130 (1151)	300 (2655)	560 (4956)	20	
			60 (531)	123 (1089)	255 (2257)	540 (4779)	25	
			62 (549)	112 (991)	200 (1770)	360 (3186)	28	
			62 (549)	108 (956)	200 (1770)	360 (3186)	32	
			60 (531)	123 (1089)	255 (2257)	455 (4027)	35	
			60 (531)	123 (1089)	250 (2213)	450 (3983)	40	
			60 (531)	110 (974)	200 (1770)	375 (3319)	50	
			37 (327)	78 (690)	164 (1452)	355 (3142)	70	
			27 (239)	57 (504)	140 (1239)	305 (2699)	100	
Maximum torque[3][4]	T_{2max}	Nm (lb_f.in)	60 (531)	140 (1239)	255 (2257)	510 (4514)	4	1
			67 (593)	120 (1062)	220 (1947)	445 (3939)	5	
			44 (389)	81 (717)	145 (1283)	300 (2655)	7	
			43 (381)	80 (708)	144 (1275)	285 (2522)	8	
			35 (310)	64 (566)	120 (1062)	255 (2257)	10	
			83 (735)	205 (1814)	495 (4381)	1000 (8851)	16	2
			83 (735)	205 (1814)	480 (4248)	890 (7877)	20	
			79 (699)	184 (1629)	405 (3585)	860 (7612)	25	
			83 (735)	179 (1584)	325 (2876)	580 (5133)	28	
			83 (735)	172 (1522)	320 (2832)	570 (5045)	32	
			79 (699)	184 (1629)	405 (3585)	720 (6373)	35	
			79 (699)	184 (1629)	400 (3540)	720 (6373)	40	
			79 (699)	176 (1558)	320 (2832)	600 (5310)	50	
			59 (522)	124 (1097)	255 (2257)	560 (4956)	70	
			43 (381)	91 (805)	220 (1947)	485 (4293)	100	

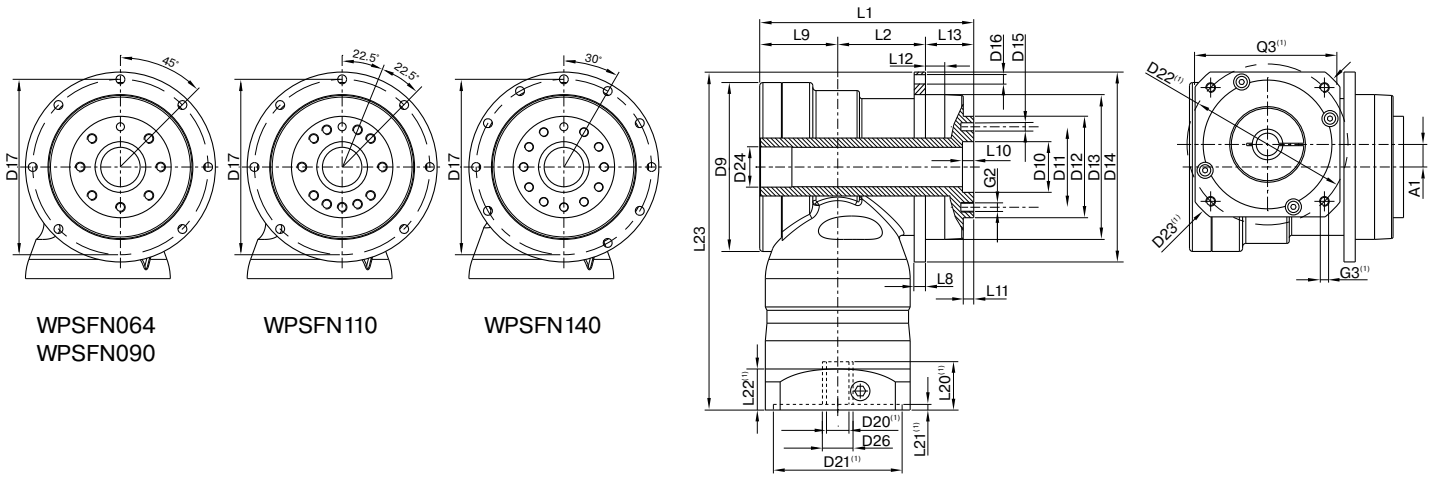
[1] Ratios ($i=n_1/n_2$)
[2] Number of stages
[3] Application specific configuration with NCP – www.neugart.com
[4] Based on reference clamping system diameter

Output torques			WPSFN064	WPSFN090	WPSFN110	WPSFN140	i[1]	p[2]
Continuous torque[3]	T_{2D}	Nm (lb_f.in)	29 (257)	41 (363)	105 (929)	230 (2036)	4	1
			31 (274)	39 (345)	102 (903)	225 (1991)	5	
			23 (204)	40 (354)	77 (682)	160 (1416)	7	
			22 (195)	37 (327)	76 (673)	153 (1354)	8	
			18.5 (164)	34 (301)	63 (558)	136 (1204)	10	
			52 (460)	110 (974)	165 (1460)	405 (3585)	16	2
			52 (460)	110 (974)	200 (1770)	475 (4204)	20	
			51 (451)	104 (920)	193 (1708)	455 (4027)	25	
			52 (460)	95 (841)	160 (1416)	305 (2699)	28	
			52 (460)	91 (805)	151 (1336)	305 (2699)	32	
			51 (451)	104 (920)	198 (1752)	385 (3408)	35	
			51 (451)	104 (920)	210 (1859)	380 (3363)	40	
			51 (451)	93 (823)	170 (1505)	315 (2788)	50	
			31 (274)	66 (584)	148 (1310)	300 (2655)	70	
			23 (204)	50 (443)	119 (1053)	255 (2257)	100	

Input speeds			WPSFN064	WPSFN090	WPSFN110	WPSFN140	i[1]	p[2]
Continuous input speed[3][4]	n_{1D}	rpm	1700	1650	1000	930	4	1
			1900	1850	1100	1000	5	
			2200	2150	1250	1200	7	
			2250	2250	1300	1200	8	
			2450	2350	1400	1250	10	
			2150	1850	1700	1150	16	2
			2200	2050	1900	1250	20	
			2300	2300	2050	1300	25	
			2300	2350	2200	1450	28	
			2350	2400	2250	1500	32	
			2550	2550	2250	1500	35	
			2600	2500	2300	1500	40	
			2550	2650	2450	1650	50	
			2900	3100	2850	1850	70	
			3000	3500	3200	2050	100	
Max. mechanical input speed[3]	n_{1max}	rpm	16000	14000	9500	8000		1
			16000	16000	14000	9500		2

Output torques			WPSFN064	WPSFN090	WPSFN110	WPSFN140	i[1]	p[2]
Emergency stop torque[4][5]	T_{2Stop}	Nm (lb_f.in)	80 (708)	200 (1770)	400 (3540)	800 (7081)	4	1
			100 (885)	200 (1770)	400 (3540)	800 (7081)	5	
			75 (664)	150 (1328)	300 (2655)	700 (6196)	7	
			75 (664)	150 (1328)	300 (2655)	700 (6196)	8	
			75 (664)	150 (1328)	300 (2655)	700 (6196)	10	
			150 (1328)	300 (2655)	650 (5753)	1600 (14161)	16	2
			150 (1328)	300 (2655)	650 (5753)	1600 (14161)	20	
			150 (1328)	300 (2655)	650 (5753)	1650 (14604)	25	
			150 (1328)	300 (2655)	600 (5310)	1200 (10621)	28	
			150 (1328)	300 (2655)	600 (5310)	1200 (10621)	32	
			150 (1328)	300 (2655)	650 (5753)	1500 (13276)	35	
			150 (1328)	300 (2655)	650 (5753)	1500 (13276)	40	
			150 (1328)	300 (2655)	650 (5753)	1500 (13276)	50	
			80 (708)	175 (1549)	340 (3009)	930 (8231)	70	
			50 (443)	120 (1062)	240 (2124)	600 (5310)	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



WPSFN064
WPSFN090

WPSFN110

WPSFN140

Drawing corresponds to a WPSFN090 / 1-stage / flange hollow output shaft / 19 mm clamping system / motor adaptation – 2-part – round universal flange / 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)			WPSFN064	WPSFN090	WPSFN110	WPSFN140	p(3)	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)		
Min. total length	L1		104.5 (4.114)	132 (5.197)	153.5 (6.043)	201.5 (7.933)	1	
			122.5 (4.823)	139.5 (5.492)	154 (6.063)	224 (8.819)	2	
Housing length	L2		42	53.5	68	76.5	1	
			59.5	66.5	76.5	129.5	2	
Flange thickness output	L8		4 (0.157)	7 (0.276)	8 (0.315)	10 (0.394)		
Offset length	L9		43	48.5	56.5	87	1	
			43	43	48.5	56.5	2	
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	
Motor shaft diameter j6/k6	D20		More information on page 191/192					
Clamping system diameter input	D26		More information on page 148					
Flange output hollow shaft with dowel hole (EN ISO 9409-1)							1	H
Dowel hole x depth	D15	H7	5x5	6x6	6x6	8x8		
Hollow shaft diameter	D24		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 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 (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		

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