



Compact, powerful, yet quiet

The WPLN series gearhead is the enhanced right angle high precision planetary gearhead for applications with very high precision, requiring a right angle configuration. The design of this unit features a hypoid right angle stage design (up to 10:1 ratio) and in higher ratios, an integration of the hypoid stage with high output torque planetary stage. As a result of the optimized, precision hardened and lapped hypoid gears, the noise generation is exceptionally low.

- > Low backlash <5 arcmin
- > High output torque - the industry's highest torque density
- > Small installation space
- > Precise, easy, and flexible motor mounting (PCS-2 system)
- > Balanced motor pinion
- > High efficiency (up to 96%)
- > Ground and honed gearing
- > 11 ratios 4:1 to 100:1
- > Low noise (<66 dB(A))
- > Consistent quality (ISO 9001 and 14001)
- > Operable in any mounting positions
- > Lifetime lubrication
- > Numerous options
- > Balanced motor connection



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9	CAD drawings, dimension sheets	www.neugartusa.com
10	Sizing/calculation/selection	NCP Software, free download from the Neugart website

Type-Size		WPLN 70	WPLN 90	WPLN 115	WPLN 142	i ⁽¹⁾	Z ⁽²⁾
Nominal (rated continous duty) Output torque T _{2N} ⁽³⁾⁽⁵⁾	Nm (lbin)	45 (398)	90 (797)	160 (1416)	-	4	1
		42 (372)	75 (664)	140 (1239)	-	5	
		27 (239)	50 (443)	90 (797)	-	8	
		22 (195)	40 (354)	75 (664)	-	10	
	Nm (lbin)	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	
		40 (354)	80 (708)	150 (1328)	450 (3983)	64	
		27 (239)	60 (531)	125 (1106)	305 (2699)	100	

Type-Size		WPLN 70	WPLN 90	WPLN 115	WPLN 142	i ⁽¹⁾	Z ⁽²⁾
Output torque sustainable 30,000 output shaft rotations ⁽³⁾⁽⁵⁾⁽⁸⁾	Nm (lbin)	72 (637)	144 (1274)	256 (2266)	-	4	1
		67 (593)	120 (1062)	224 (1982)	-	5	
		43 (381)	80 (708)	144 (1274)	-	8	
		35 (310)	64 (566)	120 (1062)	-	10	
	Nm (lbin)	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	
		64 (566)	128 (1133)	240 (2124)	720 (6372)	64	
		43 (381)	96 (850)	200 (1770)	488 (4319)	100	

Gearbox type		WPLN	Z ⁽²⁾
Gearbox life at full load	h	20,000	
Gearbox life at 88% nominal torque T _{2N} x 0,88		30,000	
Emergency stop torque ⁽⁶⁾	Nm (lbin)	2 - times T _{2N}	
Efficiency at full load ⁽⁷⁾	%	96	1
		94	2
Min. operating temp. ⁽⁴⁾	°C (°F)	-25 (-13)	
Max. operating temp. ⁽⁴⁾		+90 (194)	
Protection class		IP 65	
Lubrication		lifetime lubrication	
Mounting position		any	
Recommended motor flange / shaft tolerance		DIN 42955-R	
Direction of rotation		Drive and output sides in opposite directions	

(1) Ratio (i=n₁ rpm high speed side/n₂ rpm low speed side)
(2) Number of gear stages
(3) Values reference output shaft speed n₂=100 rpm, S1= 100% duty cycle, K_A=1 application factor and T=30°C, 86°F ambient temperature
(4) Measured at the middle of the gearbox housing surface
(5) Dependent on the motor shaft diameter
(6) Permissible about 1000 times during the gearbox life
(7) Ratio dependent; based on n₂=100 rpm output shaft speed
(8) Permissible for 30,000 output shaft revolutions; see page 80

Type-Size		WPLN 70	WPLN 90	WPLN 115	WPLN 142	Z ⁽²⁾
Standard backlash ⁽⁷⁾	arcmin	<5	<5	<5	-	1
		<7	<7	<7	<7	2
Fr _{max.} for 20,000 h ⁽³⁾⁽⁴⁾	N (lb)	3200 (720)	5200 (1170)	6000 (1350)	-	1
		3200 (720)	5500 (1238)	6000 (1350)	12500 (2813)	2
Fa _{max.} for 20,000 h ⁽³⁾⁽⁴⁾		4300 (968)	5900 (1328)	7000 (1575)	-	1
		4400 (990)	6400 (1440)	8000 (1800)	15000 (3375)	2
Fr _{max.} for 30,000 h ⁽³⁾⁽⁴⁾		3200 (720)	5200 (1170)	6000 (1350)	-	1
		3200 (720)	4800 (1080)	5400 (1215)	11400 (2565)	2
Fa _{max.} for 30,000 h ⁽³⁾⁽⁴⁾		3700 (833)	5200 (1170)	6100 (1373)	-	1
		3900 (878)	5700 (1283)	7000 (1575)	13200 (2-970)	2
Torsional stiffness	Nm /arcmin (lbin /arcmin)	2.4 (21)	6.6 (58)	14.3 (127)	-	1
		2.4 (21)	11 (97)	34 (301)	58 (513)	2
Weight	kg (lb)	3.0 (6.62)	5.0 (11.03)	10.5 (23.15)	-	1
		3.9 (8.60)	5.3 (11.69)	9.2 (20.29)	21.5 (47.41)	2
Running noise ⁽⁵⁾	dB(A)	66	67	68	70	
Max. recommended input speed ⁽⁶⁾	min ⁻¹ (rpm)	16000	14000	9500	-	1
		16000	16000	14000	9500	2

Type-Size		WPLN 70	WPLN 90	WPLN 115	WPLN 142	i ⁽¹⁾
Recommended max. mean input speed at 50% rated continuous duty torque (S1) rpm ⁽⁶⁾⁽⁸⁾	min ⁻¹ (rpm)	2850	2450	1700	-	4
		3250	2900	1950	-	5
		4150	3700	2450	-	8
		4500	4050	2600	-	10
		3100	3150	2650	1700	16
		3400	3500	2900	1750	20
		3700	3900	3350	2000	25
		3800	4300	3700	2450	32
		4100	4450	3900	2600	40
		4500	5300	4700	2900	64
		4750	5700	5050	3200	100

Type-Size		WPLN 70	WPLN 90	WPLN 115	WPLN 142	i ⁽¹⁾
Recommended max. mean input speed at 100% rated continuous duty torque (S1) rpm ⁽⁶⁾⁽⁸⁾	min ⁻¹ (rpm)	2100	1700	1200	-	4
		2450	2150	1450	-	5
		3450	3050	2050	-	8
		3900	3500	2250	-	10
		2550	2350	1900	1200	16
		2850	2700	2150	1200	20
		3250	3150	2650	1500	25
		3300	3650	3100	2100	32
		3700	3750	3250	2150	40
		4300	4900	4300	2550	64
		4650	5450	4800	3000	100

⁽¹⁾ Ratio (i=n₁ rpm high speed side/n₂ rpm low speed side)

⁽²⁾ Number of gear stages

⁽³⁾ Values reference output shaft speed n₂=100 rpm, S1= 100% duty cycle, K_A=1 application factor and T=30°C, 86°F ambient temperature

⁽⁴⁾ Measured at the middle of the gearbox housing surface

⁽⁵⁾ Sound pressure level measured 1 m from the gearbox for ratio 5:1 at 3000 input rpm and no load

⁽⁶⁾ Recommended gearbox operating temperature should not be exceeded, consult Neugart in case higher than listed rpm is required

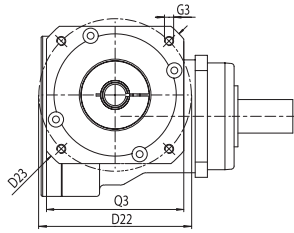
⁽⁷⁾ Lower backlash on inquiry

⁽⁸⁾ Exact definition see page 81

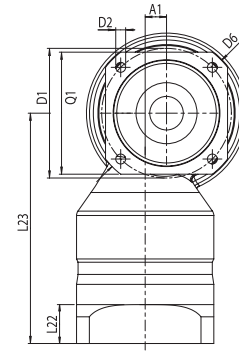
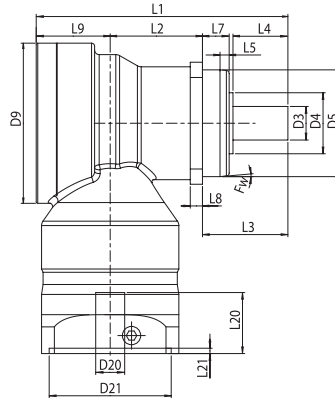
Type-Size		WPLN 70	WPLN 90	WPLN 115	WPLN 142	i ⁽¹⁾
Mass moment of inertia ⁽²⁾	kgcm ² (lbin s ² x 10 ⁻⁴)	0.654 (5.79)	1.331 (11.78)	5.924 (52.43)	-	4
		0.6 (5.31)	1.168 (10.34)	5.441 (48.15)	-	5
		0.532 (4.71)	1.004 (8.89)	4.989 (44.15)	-	8
		0.516 (4.57)	0.966 (8.55)	4.883 (43.21)	-	10
		0.639 (5.66)	0.642 (5.68)	1.366 (12.09)	6.082 (53.83)	16
		0.591 (5.23)	0.593 (5.25)	1.190 (10.53)	6.016 (53.24)	20
		0.590 (5.22)	0.591 (5.23)	1.186 (10.50)	5.500 (48.68)	25
		0.528 (4.67)	0.529 (4.68)	1.013 (8.97)	5.028 (44.50)	32
		0.528 (4.67)	0.528 (4.67)	1.011 (8.95)	5.012 (44.36)	40
		0.528 (4.67)	0.528 (4.67)	1.010 (8.94)	5.004 (44.29)	64
		0.514 (4.55)	0.514 (4.55)	0.970 (8.58)	4.892 (43.29)	100

⁽¹⁾ Ratio (i=n₁ rpm high speed side/n₂ rpm low speed side)

⁽²⁾ The moment of inertia relates to the high speed side (typically motor shaft)



Input side view



Output side view

Type-Size		WPLN 70	WPLN 90	WPLN 115	WPLN 142	Z ⁽²⁾
All dimensions in mm						
A1 Axle offset		10	14	20	-	1
		10	10	14	20	2
D1 Flange bolt hole circle		68-75	85	120	165	
D2 Mounting bolt hole diameter	4x	5.5	6.5	8.5	11	
D3 Output shaft diameter	k6	16	22	32	40	
D4 Output shaft collar diameter		30	40	45	-	1
		35	40	45	70	2
D5 Pilot diameter	h7	60	70	90	130	
D6 Output flange diagonal		92	100	140	185	
D9 Max. diameter		86	105	120	-	1
		86	86	105	120	2
D20 Pinion bore diameter ⁽¹⁾⁽⁴⁾		11	14	19	-	1
		11	11	14	19	2
D21 Motor centering pilot diameter ⁽¹⁾		60	80	95	-	1
		60	60	80	95	2
D22 Motor matching bolt circle diameter ⁽¹⁾		75	100	115	-	1
		75	75	100	115	2
D23 Motor matching adapter diagonal		92	116	145	-	1
		92	92	116	145	2
Fw Chamfer angle	°	5	5	5	5	
G3 Mounting hole thread x depth ⁽¹⁾	4x	M5 x 10	M6 x 12	M8 x 16	-	1
		M5 x 10	M5 x 10	M6 x 12	M8 x 16	2
L1 Overall length ⁽³⁾		137.5	165	218	-	1
		185	207	248.5	342.5	2
L2 Main-body length		46.5	60.5	73.5	-	1
		94	108	112	176	2
L3 Output shaft length from mounting face		48	56	88	110	
L4 Output shaft length from collar		28	36	58	80	
L5 Chamfer length		8	6	8	8	
L7 Pilot length		19	17.5	28	28	
L8 Flange width		7	8	10	12	
L9 Offset length		43	48.5	56.5	56.5	
L20 Reference motor shaft length ⁽³⁾		23	30	40	-	1
		23	23	30	40	2
L21 Motor pilot depth		3	3.5	3.5	-	1
		3	3	3.5	3.5	2
L22 Reference motor adapter flange width ⁽³⁾		19	25.5	27.5	-	1
		19	19	25.5	27.5	2
L23 Overall height ⁽³⁾		136	151	187.5	-	1
		136	136	151	187.5	2
Q1 Gearbox output flange square		70	80	110	142	
Q3 Motor adapter square ⁽¹⁾	□	70	90	115	-	1
		70	70	90	115	2

⁽¹⁾ Dimensions reference to the mounted motor-type, see page 24

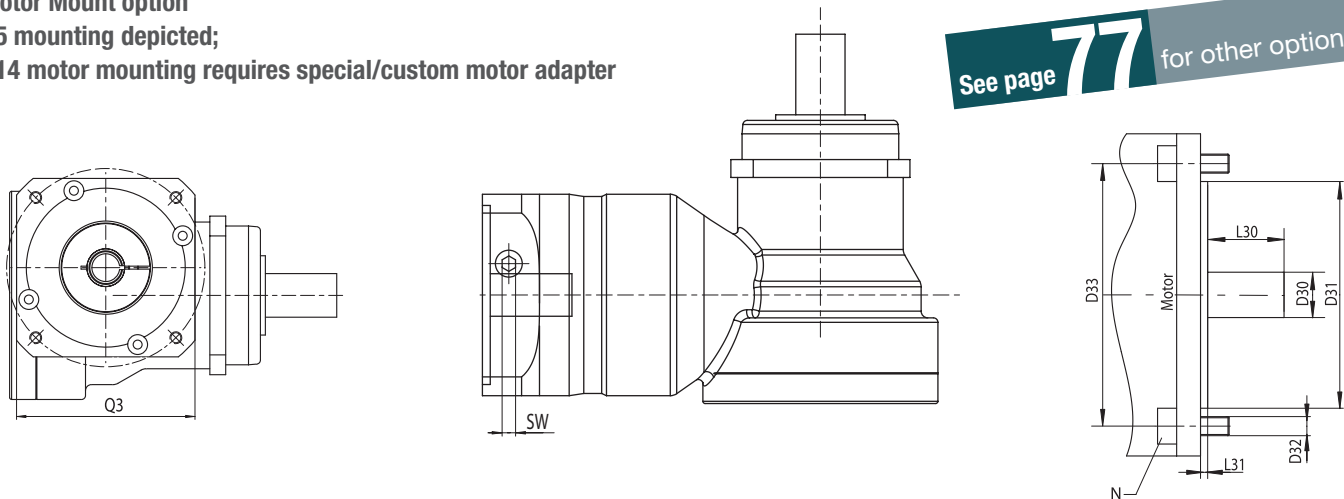
⁽²⁾ Number of gear stages

⁽³⁾ For longer motor shaft > L20, actual minimal L22 dimension = L22 + (Motor shaft length – L20)

⁽⁴⁾ For shaft fit j6 to k6

OP 2: Motor Mount option
Note: B5 mounting depicted;
B14 motor mounting requires special/custom motor adapter

See page **77** for other options



Type-Size		WPLN 70		WPLN 90			WPLN 115			WPLN 142		Z ⁽²⁾
D30 Motor shaft diameter/ Available pinion bores / bushings ⁽¹⁾⁽⁵⁾	mm	8/9/9.525/10/ 11/12/14/15.87/ 16/19		9.525/10/11/ 12/12.7/14/15.87/ 16/19/22/24			11/12.7/14/ 15.87/16/19/22/ 24/28/32/35			-		1
		8/9/9.525/10/ 11/12/14/15.87/ 16/19		8/9/9.525/10/ 11/12/12.7/14/ 15.87/16/19			9.525/10/11/ 12.7/14/15.87/ 16/19/22/24			11/12.7/14/ 15.87/16/19/22/ 24/28/32/35		2
D31 Motor pilot diameter ⁽³⁾		any		any			any			any		
D32 Motor bolt hole diameter ⁽³⁾		any		any			any			any		
D33 Hole circle diameter ⁽³⁾		any		any			any			any		
G4 Motor mounting thread size		any		any			any			any		
L30 min. motor shaft length ⁽¹⁾	mm	20 (23 ⁽⁶⁾)		23 (25 ⁽⁷⁾)			25 (32 ⁽⁸⁾)			-		1
		20 (23 ⁽⁶⁾)		20 (23 ⁽⁷⁾)			23 (25 ⁽⁸⁾)			25 (32 ⁽⁹⁾)		2
L31 pilot depth		any		any			any			any		
N Number of bolt holes		4		4			4			4		
Q3 Flange square ⁽¹⁾	□	70		90			115			-		1
		70		70			90			115		2
Recommended max. motor weight ⁽⁴⁾	kg (lb)	10 (22.05)		15 (33.08)			34 (74.97)			50 (110.25)		
Motor type ⁽¹⁾		B5		B5			B5			B5		
Recommended clamping screw tightening torque	Nm (lbin)	4.5 (40)	9.5 ⁽⁶⁾ (84) ⁽⁶⁾	4.5 (40)	9.5 (84)	16.5 ⁽⁷⁾ (146) ⁽⁷⁾	9.5 (84)	16.5 (146)	40 ⁽⁹⁾ (354) ⁽⁹⁾	16.5 (146)	40 ⁽⁹⁾ (354) ⁽⁹⁾	
SW wrench width	mm	3	4 ⁽⁶⁾	3	4	5 ⁽⁷⁾	4	5	6 ⁽⁸⁾	5	6 ⁽⁹⁾	

⁽¹⁾ Other dimensions on inquiry
⁽²⁾ Number of gear stages
⁽³⁾ Provided that flange dimensions are compatible
⁽⁴⁾ In horizontal and stationary mounting position
⁽⁵⁾ Shaft fit: j6; k6
⁽⁶⁾ D30 > 14 mm
⁽⁷⁾ D30 > 19 mm
⁽⁸⁾ D30 > 24 mm
⁽⁹⁾ D30 = 42 mm

- thermal length compensation with respect to the A end shield of the motor

OP 5: Spline type code⁽⁴⁾

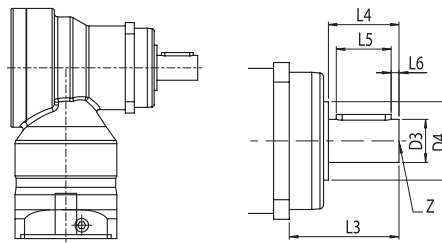
Type-Size	Spline type code	Tooth face width	Z Shaft end bore
WPLN 70	DIN 5480 - W 16 x 0.8 x 30 x 18 x 7 m	15	DIN 332 DR M5x12.5
WPLN 70-OP14	DIN 5480 - W 19 x 0.8 x 30 x 22 x 7 m	15	DIN 332 DR M6x16
WPLN 90	DIN 5480 - W 22 x 0.8 x 30 x 26 x 7 m	21	DIN 332 DR M8x19
WPLN 115	DIN 5480 - W 32 x 1.25 x 30 x 24 x 7m	42	DIN 332 DR M12x28
WPLN 142	DIN 5480 - W 40 x 1.25 x 30 x 30 x 7m	65	DIN 332 DR M16x35

OP 7: Output shaft with key DIN 6885 T1^{(1) (4)}

Type-Size		WPLN 70	WPLN 70-OP14	WPLN 90	WPLN 115	WPLN 142
Key type (Height x width x length)		A5 x 5 x 25	A6 x 6 x 20	A6 x 6 x 28	A10 x 8 x 50	A12 x 8 x 65
D3 [k6] Output shaft diameter	mm	16	19	22	32	40
L4 Output shaft length from collar		28	28	36	58	80
L5 Key length		25	20	28	50	65
L6 Distance from shaft end		2	4	4	4	8
Z Shaft end bore		M5 x 12.5	M6 x 16	M8 x 19	M12 x 19	M16 x 35
Output torque sustainable 30 000 output shaft rotations ⁽²⁾	Nm (lbin)	77 (681)	77 (681)	150 (1328)	300 (2655)	1000 (8850)

OP 8: Special / custom shaft⁽³⁾⁽⁴⁾

Output shaft diameter	D3	
Output shaft length from collar	L4	
Output shaft length from mounting face	L3	
Key length	L5	
Distance from shaft end	L6	
Key width	B	
Shaft end bore	Z	



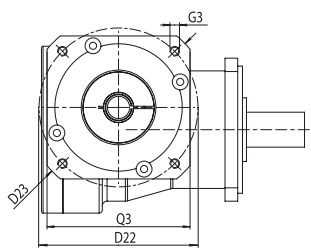
⁽¹⁾ Sketch for variables see OP 8

⁽²⁾ Strength based on unidirectional dynamic load

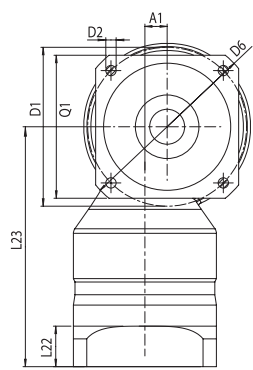
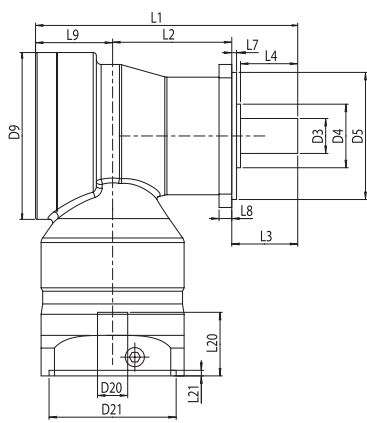
⁽³⁾ Fax page with data or send sketch with your inquiry

⁽⁴⁾ On inquiry

OP 14: dimensions for the WPLS output



Input side view



Output side view

Type-Size		WPLN 70 OP 14	WPLN 90 OP 14	WPLN 115 OP 14	WPLN 142 OP 14	Z ⁽²⁾	
All dimensions in mm							
A1 Axle offset		10	14	20		1	
		10	10	14	20	2	
D1 Flange bolt hole circle		75	75	130	165		
D2 Mounting bolt hole diameter	4x	5.5	6.5	8.5	11		
D3 Output shaft diameter	k6	19	22	32	40		
D4 Output shaft collar diameter		30	40	45	-	1	
		35	40	45	70	2	
D5 Pilot diameter	h7	60	80	90	130		
D6 Output flange diagonal		92	116	140	185		
D9 Max. diameter		86	105	120	-	1	
		86	86	105	120	2	
D20 Pinion bore diameter ⁽¹⁾⁽⁴⁾		11	14	19		1	
		11	11	14	19	2	
D21 Motor centering pilot diameter ⁽¹⁾		60	80	95		1	
		60	60	80	95	2	
D22 Motor matching bolt circle diameter ⁽¹⁾		75	100	115		1	
		75	75	100	115	2	
D23 Motor matching adapter diagonal		92	116	145		1	
		92	92	116	145	2	
G3 Mounting hole thread x depth ⁽¹⁾		4x	M5 x 10	M6 x 12	M8 x 16		1
			M5 x 10	M5 x 10	M6 x 12	M8 x 16	2
L1 Overall length ⁽³⁾			137.5	165	218		1
			185	207	248.5	342.5	2
L2 Main-body length			62.5	75	97		1
			110	122.5	135.5	199	2
L3 Output shaft length from mounting face			32	41.5	64.5	87	
L4 Output shaft length from collar			28	36	58	80	
L7 Pilot length			3	3	4.5	5	
L8 Flange width			7	8	10	20	
L9 Offset length	43		48.5	56.5	56.5		
L20 Reference motor shaft length ⁽³⁾	23		30	40		1	
	23		23	30	40	2	
L21 Motor pilot depth	3		3.5	3.5		1	
	3		3	3.5	3.5	2	
L22 Reference motor adapter flange width ⁽³⁾	19		25.5	27.5	-	1	
	19		19	25.5	27.5	2	
L23 Overall height ⁽³⁾	136		151	187.5		1	
	136	136	151	187.5	2		
Q1 Gearbox output flange square	□	70	80	110	142		
Q3 Motor adapter square ⁽¹⁾		70	90	115		1	
		70	70	90	115	2	

(1) Dimensions reference to the mounted motor-type, see page 24
(2) Number of gear stages
(3) For longer motor shaft > L20, actual minimal L22 dimension = L22 + (Motor shaft length – L20)
(4) For shaft fit j6 to k6

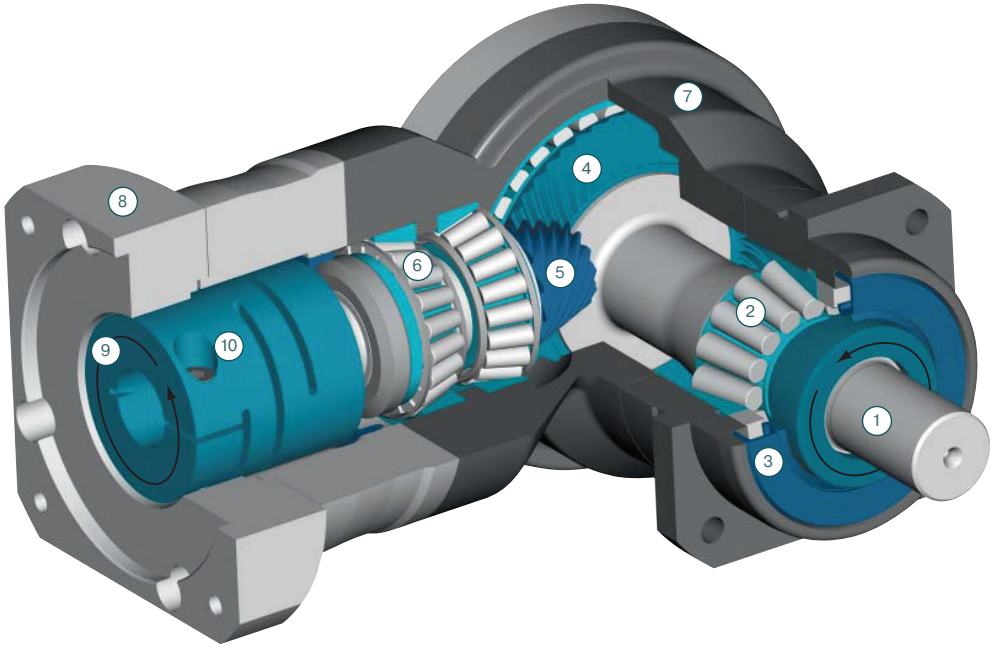
Type-Size		WPLN 70 OP 14	WPLN 90 OP 14	WPLN 115 OP 14	WPLN 142 OP 14	i ⁽¹⁾
Recommended max. mean input speed at 50% rated continuous duty torque (S1) rpmrpm ⁽²⁾⁽³⁾	min ⁻¹ (rpm)	2650	2250	1600	-	4
		3000	2700	1800	-	5
		3850	3450	2250	-	8
		4150	3800	2400	-	10
		2900	2900	2400	1550	16
		3150	3200	2700	1600	20
		3450	3600	3100	1850	25
		3550	3950	3450	2300	32
		3800	4150	3600	2400	40
		4200	4900	4350	2700	64
		4450	5300	4700	3000	100

Type-Size		WPLN 70 OP 14	WPLN 90 OP 14	WPLN 115 OP 14	WPLN 142 OP 14	i ⁽¹⁾
Recommended max. mean input speed at 100% rated continuous duty torque (S1) rpm ⁽²⁾⁽³⁾	min ⁻¹ (rpm)	1900	1600	1100	-	4
		2250	1950	1300	-	5
		3200	2850	1850	-	8
		3600	3250	2050	-	10
		2350	2150	1700	1100	16
		2600	2450	1950	1100	20
		3000	2850	2400	1350	25
		3050	3350	2850	1950	32
		3400	3450	2950	2000	40
		4000	4550	4000	2350	64
		4350	5050	4450	2800	100

⁽¹⁾ Ratio ($i = n_1 \text{ rpm high speed side} / n_2 \text{ rpm low speed side}$)

⁽²⁾ Recommended gearbox operating temperature should not be exceeded, consult Neugart in case higher than listed rpm is required

⁽³⁾ Exact definition see page 81



- 1 Output shaft
Made of high-strength high quality steel for high shaft reliability
- 2 Output shaft bearing
Large high precision preloaded taper roller bearings for zero clearance
- 3 Shaft seal ring
Dedicated double lip seal, keeps the lubricant in, and the external contaminant out; IP 65
- 4 Hypoid gear
Gearing optimized for maximal load capacity and quiet operation
- 5 Hypoid pinion
Gearing optimized for maximal load capacity and quiet operation
- 6 Drive shaft bearing
Pretensioned precision tapered roller bearing for zero play of the drive shaft
- 7 Gearbox housing
Black corrosion-protected housing made of aluminium for minimal mass and optimal ease of mounting
- 8 Motor matching adapter plate
Matches the gear head with virtually any servo motor; made of aluminum for enhanced thermal conductivity
- 9 Coupling
Balanced coupling for high rotational speeds and strong tension force for reliable transfer of torques
- 10 Clamping screw
High strength steel screw for reliable transfer of torques

