



PL series

Precision Planetary Gear Boxes

Ratio	i=3:1~10,000:1
Backlash	Up to < 3 arcmin
Output torque	Up to 250,000N.m
Frame size	PL40~PL800

ordering code

PL	90	32	P2	S2	OP2(MOTOR)
MODEL	SIZE	Ratio i	Backlash	Output type	Input type
	40, 60 80, 120 140, 160 200, 250 300, 350 400, 450 550, 700 800	1-stage/1 3, 4, 5, 6, 8, 10 2-stage/2- 9, 12, 15, 16, 18, 20, 24, 25, 30, 32, 36, 40, 48, 64, 100 3-stage/3- 60, 64, 72, 80, 90, 100, 120, 144, 150, 160, 180, 200, 240, 256, 288, 320, 384, 512, 600, 800, 1,000	P0: P1: P2:	S1: shaft S2: shaft with key S3: splined shaft K1: Hollow shaft K2: Hollow with key K3: SWpline hollow T: Special require OP 4: Foot mounting Standard connection if no mark	OP 2: Motor mounting OP 1: shaft mounting



WPL series

Precision Planetary Gear Boxes

Ratio	i=3:1~10,000:1
Backlash	Up to < 5 arcmin
Output torque	Up to 250,000N.m
Frame size	WPL40~WPL800

ordering code

WPL	90	32	P2	S2	OP2(MOTOR)
MODEL	SIZE	Ratio i	Backlash	Output type	Input type
	40, 60 80, 120 140, 160 200, 250 300, 350 400, 450 550, 700 800	1-stage/1 3, 4, 5, 6, 8, 10 2-stage/2- 9, 12, 15, 16, 18, 20, 24, 25, 30, 32, 36, 40, 48, 64, 100 3-stage/3- 60, 64, 72, 80, 90, 100, 120, 144, 150, 160, 180, 200, 240, 256, 288, 320, 384, 512, 600, 800, 1,000	P0: P1: P2:	S1: shaft S2: shaft with key S3: splined shaft K1: Hollow shaft K2: Hollow with key K3: SWpline hollow T: Special require OP 4: Foot mounting Standard connection if no mark	OP 2: Motor mounting OP 1: shaft mounting

Data		Type Stage	PL WPL 40	PL WPL 60	PL WPL 80	PL WPL 120	PL WPL 140	PL WPL 160	PL WPL 200	
		Nominal output Torque T _{2N}	Nm	1-stage-1	3:1	17	28	85	115	210
4:1	20				44	120	260	450	800	1,780
5:1	18				40	110	230	400	700	1,600
6:1					25	75	200	260	650	1,000
8:1	6				18	50	120	210	450	950
10:1					15	32	100	130	305	
2-stage-1	9:1			17	28	85	125	210	400	1,000
	12:1			20	44	120	260	450	800	1,780
	15:1			18	40	110	230	400	700	1,600
	16:1			20	44	120	260	450	800	1,000
	20:1			20	44	120	260	450	800	1,780
	25:1			18	40	110	230	400	700	1,600
	30:1				40	110	230	260	700	1,600
	32:1			20	44	120	260	450	800	1,780
	36:1				25	75	200	260	650	1,000
	40:1			20	40	110	230	400	700	1,600
	48:1				25	75	200	260	650	1,000
	50:1			18	40	110	230	300	700	1,250
	64:1			6	18	50	120	210	450	1,000
	100:1				15	32	100	130	305	
3-stage-1	60:1			20	44	120	260	450	800	1,780
	64:1			20	44	120	260	450	800	1,780
	75:1			18	40	110	230	400	700	1,600
	80:1			20	44	120	260	450	800	1,780
	90:1			18	40	110	230	400	700	1,600
	100:1			20	44	120	260	450	800	1,780
	120:1			20	40	120	260	450	800	1,780
	125:1			18	40	110	230		700	
	150:1			18	40	110	230	400	700	1,600
	160:1			20	44	120	120	450	800	1,780
	180:1			18	40	110	110	400	700	1,600
	200:1			18	40	110	230	400	700	1,600
	240:1			18	40	110	230	400	700	1,600
	256:1			20	44	120	260	450	800	1,780
	320:1			18	40	110	230	400	700	1,600
	384:1				25	75	200	260	650	1,000
	512:1			6	18	50	120	210	450	1,000
	600:1				25	75	200	260	650	
800:1				18	50	120	210	450		
1,000:1				15	32	100	130	400		

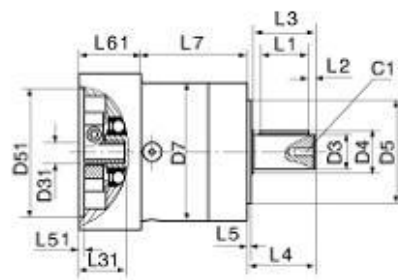
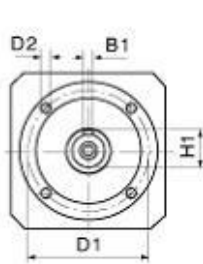
Type Stage		PL WPL 40	PL WPL 60	PL WPL 80	PL WPL 120	PL WPL 140	PL WPL 160	PL WPL 200				
Data												
Max. output torque	N.m	1.5 times T _{2N} 1.5										
Emergency stop	N.m	2 times T _{2N} 2										
F _{max} .for 10.000h	N	185	265	400	1,240	2,250	3,700	13,300				
F _{amax} .for 10.000h	N	150	220	420	1,000	1,500	3,500	7,500				
Torsional rigidity	Nm arcmin	0.7	1.8	4.8	11	22	35	50				
Max.input speed	rpm	10,000	8,000	6,000	6,000	4,500	4,500	4,000				
Average input speed	rpm	4,500	4,000	3,500	3,500	3,000	3,000	2,500				
Noise	PL WPL	<56	<58	<60	<65	<68	<70	<70				
Average lifetime	h	<60	<61	<63	<68	<70	<75	<75				
Efficiency with full load	η	20,000										
		1 ≥ 96%		2 ≥ 94%		3 ≥ 90%						
Backlash	PL	P0	1			<3	<3	<3	<3			
			2			<5	<5	<5	<5			
			3			<7	<7	<7	<7			
		P1	1	<14	<5	<5	<5	<5	<5			
			2	<16	<7	<7	<7	<7	<7			
			3	<18	<9	<9	<9	<9	<9			
	P2	1	<20	<14	<8	<8	<8	<8				
		2	<24	<16	<10	<10	<10	<10				
		3	<28	<18	<12	<12	<12	<12				
	WPL	P0	1			<5	<5	<5	<5			
			2			<7	<7	<7	<7			
			3			<9	<9	<9	<9			
P1		1	<16	<7	<7	<7	<7	<7				
		2	<18	<9	<9	<9	<9	<9				
		3	<20	<11	<11	<11	<11	<11				
P2	1	<22	<16	<10	<10	<10	<10					
	2	<26	<18	<12	<12	<12	<12					
	3	<30	<20	<14	<14	<14	<14					
Moment of inertia	kgcm ²	1	3:1	0.031	0.135	0.77	2.63	5.83	12.14	28.98		
			4:1	0.022	0.093	0.52	1.79	3.21	7.78	23.67		
			5:1	0.019	0.078	0.45	1.53	3.10	6.07	23.29		
			6:1	0.018	0.075	0.42	1.40	2.85	5.24	22.75		
			8:1	0.017	0.065	0.39	1.30	2.10	4.63	20.51		
			10:1	0.016	0.063	0.39	1.28	1.95	4.60	20.51		
		2	15:1	0.015	0.039	0.72	2.40	3.35	7.47	16.50		
			20:1	0.007	0.049	0.35	1.60	2.73	6.95	9.35		
			25:1	0.007	0.039	0.25	1.40	2.25	6.65	9.00		
			32:1	0.007	0.038	0.18	1.40	2.25	5.81	8.75		
			40:1	0.005	0.027	0.18	1.30	2.25	5.81	8.75		
			64:1	0.005	0.027	0.16	1.30	2.25	5.28	8.10		
		3	100:1	0.005	0.025	0.16	1.30	2.25	5.28	8.10		
			60:1	0.015	0.039	0.28	1.57	2.87	6.85	6.92		
			80:1	0.007	0.039	0.25	1.38	2.25	6.10	6.92		
			100:1	0.007	0.016	0.25	1.35	2.15	5.70	6.55		
			160:1	0.013	0.016	0.18	1.35	2.10	5.55	6.55		
			200:1	0.005	0.016	0.18	1.30	2.10	5.32	6.55		
		Weight	kg	PL	1	0.37	0.93	2.35	6.15	11.30	19.00	31.00
					2	0.45	1.15	2.70	8.00	13.50	24.00	42.00
					3	0.55	1.35	3.20	10.00	15.80	29.00	50.00
				WPL	1	0.51	1.7	4.4	12	17	26.5	50
					2	0.61	1.9	5.0	14	19	29.6	61
					3	0.71	2.1	5.5	16	21	32.6	70

(1)Means:Allowing radial force and axial force that function in output central place when output speed is 100 rpm.

(2)The weight of reducer in this book is approximation,the practical is depend on the finished product.

(3)The moment of inertia relates to the ratio, frame, input shaft and to standard motor shaft, etc.

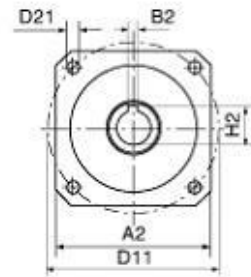
output



input
PL40-200



input



Other shaft

output shaft	S ₁	shaft	S ₂	shaft with key	S ₃	splined shaft	S ₁	special shaft
							According to customers	
output hollow shaft	k ₁	hollow	k ₂	hollow with key	k ₃	splined hollow	k ₁	special hollow
							According to customers	

Type Stage		PL40			PL60			PL80			PL120			PL140			PL160			PL200			
		1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	
output	B1	3			5			6			8			10			12			14			
	C1	M4x10			M5x12			M6x16			M10x22			M12x25			M12x25			M20x42			
	H1	11.2			16			22.5			28			35			43			53.5			
	D1	∅	34			52			70			100			120			145			185		
	D2	4x	M4x6			M5x8			M6x10			M10x16			M10x16			M12x20			M12x25		
	D3	h7	10			14			20			25			32			40			50		
	D4		12			17			25			35			45			55			70		
	D5	h7	26			40			60			80			100			130			160		
	D7		40			60			80			115			140			162			215		
	L1		15			25			25			40			55			65			70		
	L2		2.5			2.5			4			5			6			8			8		
	L3		23			30			36			50			70			80			85		
	L4		26			35			40			55			75			85			100		
	L5		2			3			3			4			5			5			15		
L7 ⁽²⁾		36.6	50.5	64	44.3	59	74.5	60	77.5	95	65.5	88	110.5	78	107.5	137	94.5	133	171	128	167.5	207	
input	A2	motor			motor			motor			motor			motor			motor			motor			
	B2	motor			motor			motor			motor			motor			motor			motor			
	H2	motor			motor			motor			motor			motor			motor			motor			
	D11	motor			motor			motor			motor			motor			motor			motor			
	D21	motor			motor			motor			motor			motor			motor			motor			
	D31	motor			motor			motor			motor			motor			motor			motor			
	D51	motor			motor			motor			motor			motor			motor			motor			
	L31	motor			motor			motor			motor			motor			motor			motor			
	L51	motor			motor			motor			motor			motor			motor			motor			
L61	motor			motor			motor			motor			motor			motor			motor				

(1) dimensions refer to the mounted motor-type, the size can be changed

(2) dimensions refer to the frame of the boxes, the size can be changed