APEX DYNAMICS, INC.

PLANETARY GEARBOX
NEW GENERATION P-SERIES

PEii / PGII / PAIi / PSII / PNII / PD / PL
PEIIR/ PGIIR/ PAIIR/ PSIIR/ PNIIR/ PDR/ PLR

PGII / PGIIR Gearbox Performance

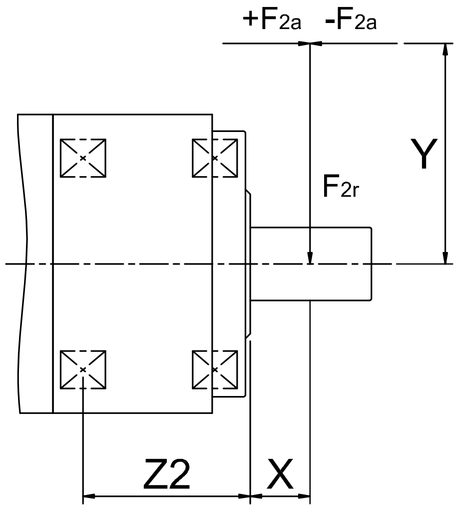
Model No.		Stages[6]	Ratio[1]	Type	PGII 040	PGII 060	PGII 080	PGII 120	PGII 160
					PGIIR 040	PGIIR 060	PGIIR 080	PGIIR 120	PGIIR 160
Nominal Output Torque T_{2N}	Nm	1	3	All	16	42	110	217	430
			4		16	42	113	223	440
			5		15	40	118	220	435
			7		12	35	96	198	366
			9		8	24	60	125	273
			10		10	27	68	155	295
		2	12		16	42	110	217	430
			15		15	40	109	213	424
			16		16	42	116	228	452
			20		16	42	116	230	454
			25		15	40	123	228	450
			30		15	40	108	212	422
			35		12	35	100	206	382
			40		16	43	117	232	459
			50		15	40	123	228	450
			70		12	35	100	206	382
			81		8	24	59	131	285
			100		10	27	70	162	308
		3	120		19	50	137	-	-
			160		16	43	118	-	-
			200		16	43	118	-	-
			280		12	35	99	-	-
			350		12	35	99	-	-
			500		15	40	122	-	-
			700		12	35	99	-	-
			1000		10	27	70	-	-
Emergency Stop Torque T_{2NOT}	Nm	1,2,3	3~1000	All	3 times T_{2N}				
Max. Acceleration Torque T_{2B}	Nm	1,2,3	3~1000	All	T_{2B} = 60% of T_{2NOT}				
No Load Running Torque[4]	Nm	1	3~10	PGII	0.05	0.10	0.40	0.80	2.50
				PGIIR	0.15	0.6	1.6	3	6.8
		2	12~100	PGII	0.05	0.10	0.30	0.40	0.80
				PGIIR	0.15	0.58	1.58	2.5	3
		3	120~1000	PGII	0.05	0.10	0.40	-	-
				PGIIR	0.15	0.58	1.58	-	-
Backlash[2]	arcmin	1	3~10	PGII	≦ 8	≦ 7	≦ 6	≦ 6	≦ 6
				PGIIR	≦ 12	≦ 11	≦ 10	≦ 10	≦ 10
		2	12~100	PGII	≦ 10	≦ 9	≦ 8	≦ 8	≦ 8
				PGIIR	≦ 14	≦ 13	≦ 12	≦ 12	≦ 12
		3	120~1000	PGII	≦ 12	≦ 11	≦ 10	-	-
				PGIIR	≦ 16	≦ 15	≦ 14	-	-
Torsional Rigidity	Nm/arcmin	1,2,3	3~1000	All	0.5	2	8	12	16
Nominal Input Speed n_{1N}	rpm	1,2,3	3~1000	All	4,500	4,000	3,600	3,600	2,500
Max. Input Speed n_{1B}	rpm	1,2,3	3~1000	All	8,000	6,000	6,000	4,800	3,600
Max. Radial Load F_{2rB}[3]	N	1,2,3	3~1000	All	520	1,030	1,570	3,590	4,690
Max. Axial Load F_{2aB}[3]	N	1,2,3	3~1000	All	260	515	785	1,795	2,345
Max. Tilting Moment M_{2K}	Nm	1,2,3	3~1000	All	10	35	55	170	300
Operating Temp	° C	1,2,3	3~1000	All	0° C~ +90° C				
Degree of Gearbox Protection		1,2,3	3~1000	All	IP65				
Lubrication		1,2,3	3~1000	All	Synthetic lubrication grease				
Mounting Position		1,2,3	3~1000	All	All directions				
Running Noise[4]	dB(A)	1,2,3	3~1000	PGII	≦ 60	≦ 62	≦ 64	≦ 66	≦ 68
				PGIIR	≦ 70	≦72	≦ 74	≦ 75	≦ 77
Max. bending moment based on the gearbox input flange Mb[5]	Nm	1,2,3	3~1000	PGII	5	12	22	45	54
				PGIIR	3	6	10	17	19
Efficiency η	%	1	3~10	PGII	≧ 97%				
				PGIIR	≧ 93%				
		2	12~100	PGII	≧ 94%				
				PGIIR	≧ 90%				
		3	120~1000	PGII	≧ 91%				
				PGIIR	≧ 87%				

(1) Ratio ($i = N_{in} / N_{out}$) .
(2) Backlash is measured at 2% of Nominal Output Torque T_{2N} .
(3) Applied to the output shaft center at 100 rpm
(4) The dB values are measured by gearbox with ratio 10 (1-stage) or ratio 100 (2-stage), or ratio 1,000 (3-stage) no loading at 3,000 RPM or at the respective Nominal Input Speed by bigger model size.
By lower ratio and/or higher RPM, the noise level could be 3 to 5 dB higher.

(5) Max. motor weight* (kg) = $\dfrac{0.1 \times \text{Mb}}{\text{motor length (m)}}$

*with symmetrically distributed motor weight
*with horizontal and stationary mounting

Max. Tilting Moment M2k



$$M_{2K} = \frac{F_{2a} * Y + F_{2r} * (X+Z2)}{1000}$$

M_{2K} : 【Nm】
F_{2a}, F_{2r} : 【N】
X, Y, Z2 : 【mm】

PGII / PGIIR	040	060	080	120	160
Z2 【mm】	21	27,5	26.5	37	43.5

Note : Applied to the output flange center at 100 rpm.
For more details on F_{2a} and F_{2r} please refer to page 10.

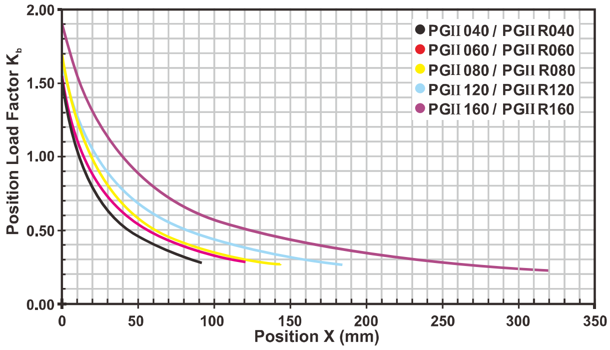
PGII Gearbox Inertia

Model No.		PGII 040			PGII 060			PGII 080			PGII 120		PGII 160	
Ø[(A)] (C3)		1-st.	2-st.	3-st.	1-st.	2-st.	3-st.	1-st.	2-st.	3-st.	1-st.	2-st.	1-st.	2-st.
8		0.10	0.10	0.10	0.12	0.10	0.10	-	-	-	-	-	-	-
11		0.16	0.16	0.16	0.19	0.16	0.16	-	-	-	-	-	-	-
14		0.20	0.20	0.19	0.22	0.20	0.20	0.36	0.24	0.20	-	-	-	-
19		-	-	-	1.53	1.51	1.51	1.70	1.58	1.54	2.20	1.73	-	2.18
24	$kg.cm^2$	-	-	-	-	-	-	2.24	2.12	2.09	2.74	2.27	4.52	2.73
28		-	-	-	-	-	-	2.68	2.55	2.52	3.17	2.70	4.94	3.15
32		-	-	-	-	-	-	-	-	-	7.77	7.30	9.70	7.91
35		-	-	-	-	-	-	-	-	-	10.80	10.30	12.80	11.00
38		-	-	-	-	-	-	-	-	-	14.00	13.50	16.00	14.20
42		-	-	-	-	-	-	-	-	-	-	-	24.50	-

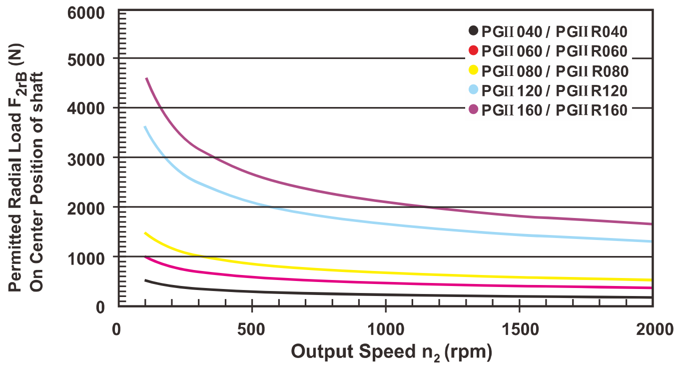
PGIIR Gearbox Inertia

Model No.		PGII R 040			PGII R 060			PGII R 080			PGII R 120		PGII R 160	
Ø(A) (C3)		1-st.	2-st.	3-st.	1-st.	2-st.	3-st.	1-st.	2-st.	3-st.	1-st.	2-st.	1-st.	2-st.
8	kg.cm ^{2}	0.18	0.18	0.18	0.36	0.36	0.36	-	-	-	-	-	-	-
11		0.20	0.20	0.20	0.39	0.39	0.39	-	-	-	-	-	-	-
14		0.24	0.24	0.24	0.43	0.43	0.43	1.87	1.87	1.87	-	-	-	-
19		-	-	-	1.24	1.24	1.24	2.67	2.67	2.67	6.80	6.80	-	13.57
24		-	-	-	-	-	-	2.97	2.97	2.97	7.10	7.10	13.87	13.87
28		-	-	-	-	-	-	3.47	3.47	3.47	7.59	7.59	14.36	14.36
32		-	-	-	-	-	-	-	-	-	10.56	10.56	17.33	17.33
35		-	-	-	-	-	-	-	-	-	11.97	11.97	18.74	18.74
38		-	-	-	-	-	-	-	-	-	13.95	13.95	20.79	20.79
42		-	-	-	-	-	-	-	-	-	-	-	26.54	-

Permitted Radial And Axial Loads(B)



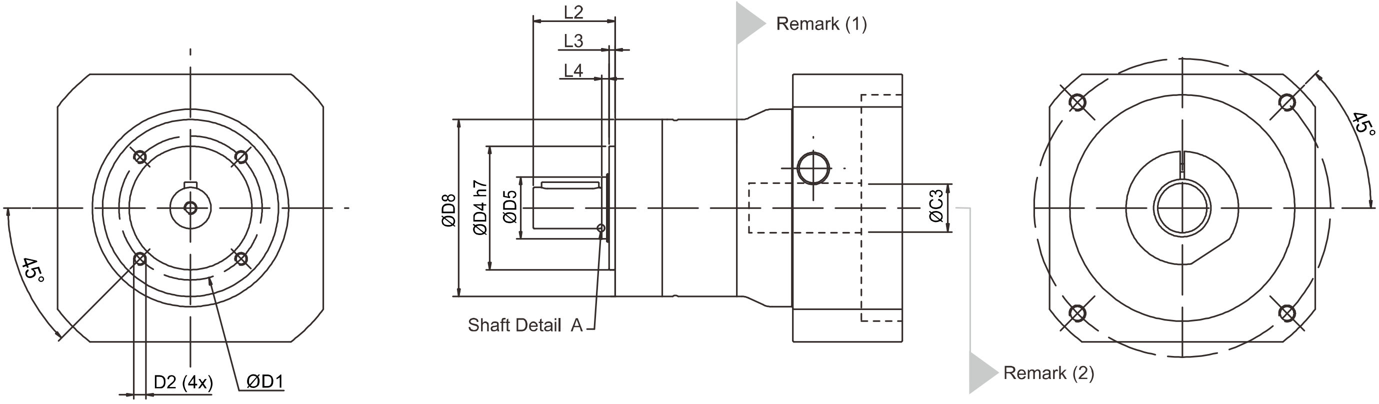
If radial force F_{2r} is not exerted on the center of theoutput shaft X<1/2 L or X>1/2 L, the permitted radial and axial loads can be calculated by the position load factor K_b on the above diagram.

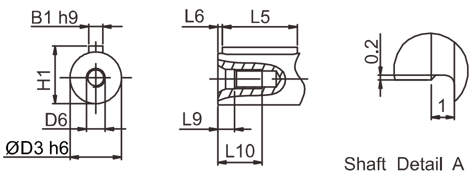


Permitted radial load F_{2r} on center of output shaft X=1/2 L for various output speeds.

(A) Ø = Input shaft diameter.
(B) Permitted loading values on the output shaft. Please refer to P. 34 glossary.

PGII Series Dimension

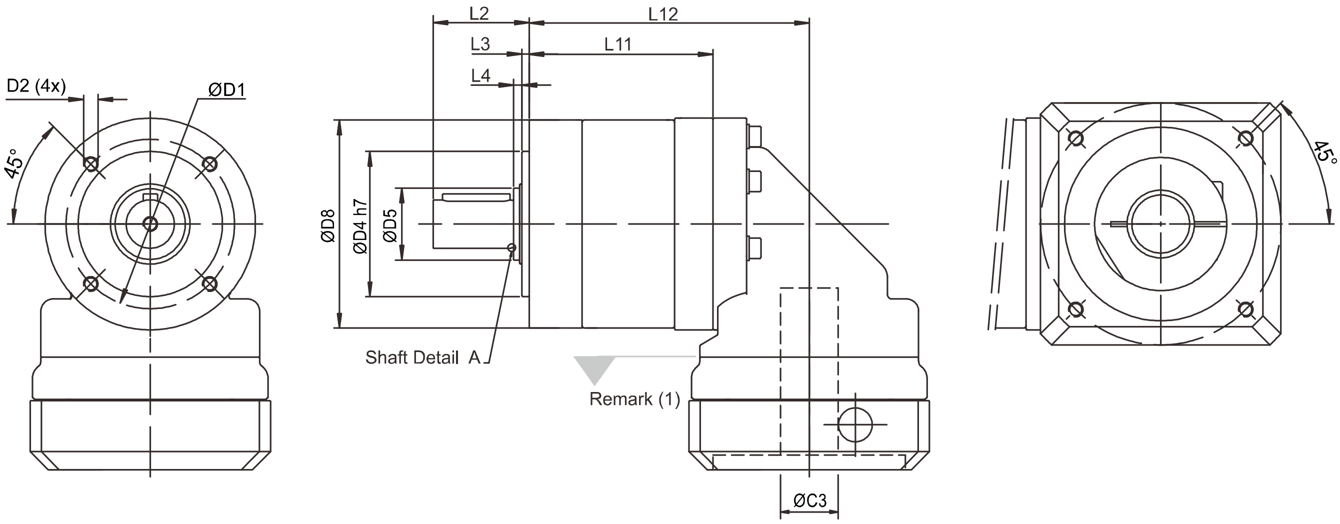


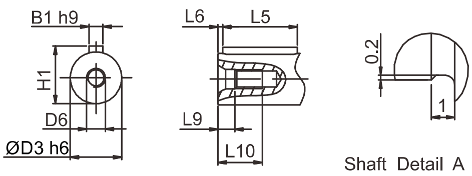


Dimension	PGII 040			PGII 060			PGII 080			PGII 120			PGII 160		
	1-st.	2-st.	3-st.	1-st.	2-st.	3-st.	1-st.	2-st.	3-st.	1-st.	2-st.	-	1-st.	2-st.	-
D1	34			52			70			100			145		
D2	M4X9			M5X10			M6X12			M10X18			M12X22		
D3 h6	10			14			20			25			40		
D4 h7	26			40			60			80			130		
D5	17			17			30			40			55		
D6	M3X0.5P			M5X0.8P			M6X1P			M10X1.5P			M16X2P		
D8	44			60			86			114			160		
L2	26			35			40			55			87		
L3	2			3			3			4			5		
L4	1			2			3.5			5			5.5		
L5	18			25			28			40			65		
L6	2.5			2.5			4			5			8		
L9	2.6			4.8			5			7.5			12		
L10	9			12.5			16.5			22			36		
B1 h9	3			5			6			8			12		
H1	11.2			16			22.5			28			43		

(1) Dimensions are related to motor interface. Please contact APEX for details.
(2) As alternative to input “HUB”, input “SHAFT” is also available, please find in page 32.

PGIIR Series Dimension





Dimension	PGII R 040			PGII R 060			PGII R 080			PGII R 120			PGII R 160		
	1-st.	2-st.	3-st.	1-st.	2-st.	3-st.	1-st.	2-st.	3-st.	1-st.	2-st.	-	1-st.	2-st.	-
D1	34			52			70			100			145		
D2	M4X9			M5X10			M6X12			M10X18			M12X22		
D3 h6	10			14			20			25			40		
D4 h7	26			40			60			80			130		
D5	17			17			30			40			55		
D6	M3X0.5P			M5X0.8P			M6X1P			M10X1.5P			M16X2P		
D8	44			60			86			114			160		
L2	26			35			40			55			87		
L3	2			3			3			4			5		
L4	1			2			3.5			5			5.5		
L5	18			25			28			40			65		
L6	2.5			2.5			4			5			8		
L9	2.6			4.8			5			7.5			12		
L10	9			12.5			16.5			22			36		
L11	53	68	82	66.5	86.5	105.5	76.5	103	128.5	104	140	-	125.5	173	-
L12	78	93	107	96	116	135	116.5	143	168.5	155	191	-	182.5	230	-
B1 h9	3			5			6			8			12		
H1	11.2			16			22.5			28			43		

(1) Dimensions are related to motor interface. Please contact APEX for details.