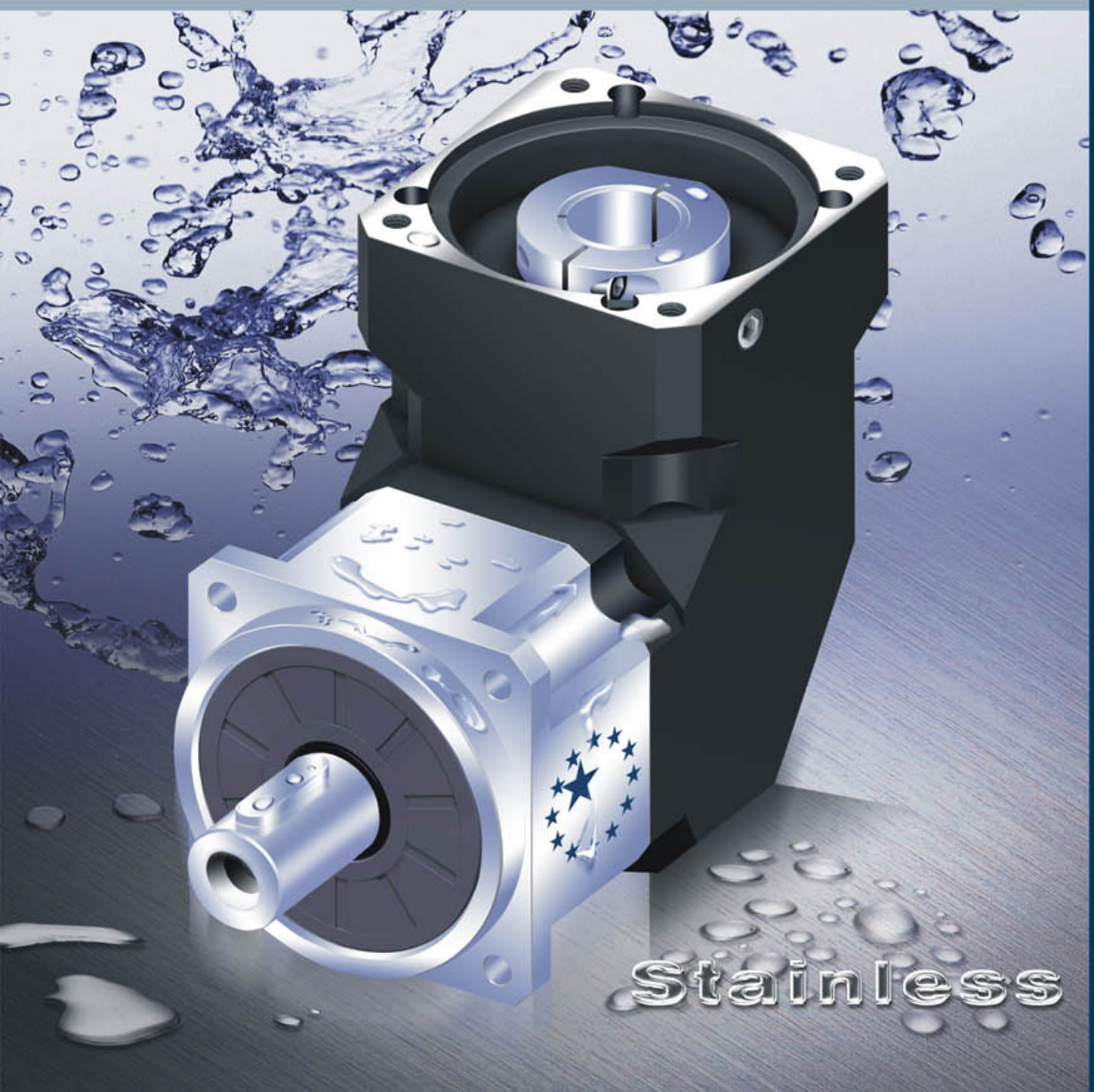
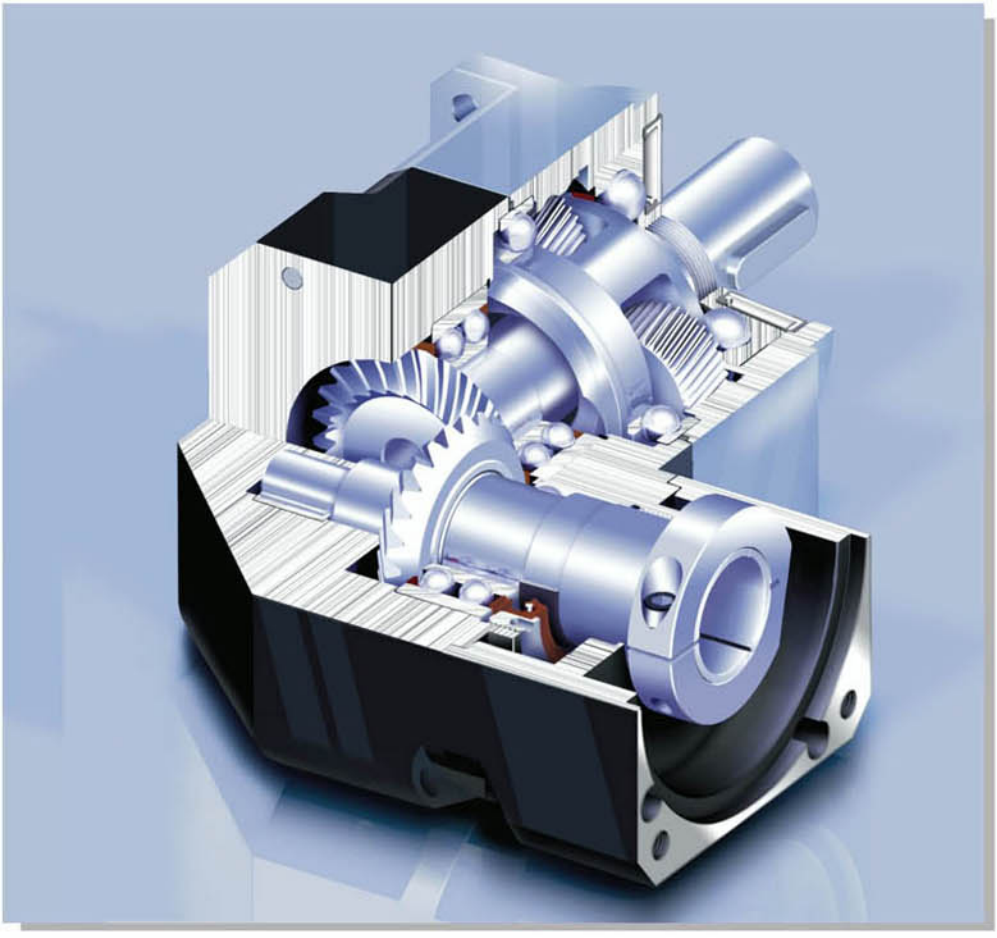
APEX DYNAMICS, INC.

High precision Planetary Gearboxes



Characteristic Highlights

- Higher output torque rating by using spiral bevel gear design. 30% more than straight bevel gear.
- Allows input speeds up to 8 times than with straight bevel gearing.
- Improved load sharing through precision tooth design and longer service life.
- Ground gears verified with sophisticated software, ensures smooth, quiet operation with reduced backlash (≤ 2 arcmin).



- High tensile low weight single piece aluminum alloy housing for highest stiffness.
- Maintenance free lifetime lubrication.
- Patented sealing design for high speed and continuous running.
- High efficiency up to 95%. Low noise level down to 61 dB.
- Most ratios available from 3~200.

Specifications

Gearbox Performance

Model No.		Stages	Ratio[1]	ABR042	ABR060	ABR090	ABR115	ABR142	ABR180	ABR220
Nominal Output Torque T_{2N}	Nm	1	3	9	36	90	195	342	588	1,140
			4	12	48	120	195	520	1,040	1,680
			5	15	60	150	260	650	1,200	2,000
			6	18	55	150	325	600	1,100	1,900
			7	19	50	140	310	550	1,100	1,800
			8	17	45	120	300	500	1,000	1,600
			9	14	40	100	260	450	900	1,500
			10	14	40	100	230	450	900	1,500
			14	-	42	140	300	550	1,100	1,800
			20	-	40	100	230	450	900	1,500
		2	15	14	-	-	-	-	-	-
			20	14	-	-	-	-	-	-
			25	15	60	150	325	650	1,200	2,000
			30	20	55	150	310	600	1,100	1,900
			35	19	50	140	300	550	1,100	1,800
			40	17	45	120	260	500	1,000	1,600
			45	14	40	100	230	450	900	1,500
			50	14	60	100	230	650	1,200	2,000
			60	20	55	150	310	600	1,100	1,900
			70	19	50	140	300	550	1,100	1,800
			80	17	45	120	260	500	1,000	1,600
			90	14	40	100	230	450	900	1,500
			100	14	40	100	230	450	900	1,500
			120	-	-	150	310	600	1,100	1,900
			140	-	-	140	300	550	1,100	1,800
			160	-	-	120	260	550	1,000	1,600
			180	-	-	100	230	450	900	1,500
			200	-	-	100	230	450	900	1,500
Max. Output Torque T_{2B}	Nm	1,2	3~200	3 times of Nominal Output Torque						
Nominal Input Speed n_{1N}	rpm	1,2	3~200	5,000	5,000	4,000	4,000	3,000	3,000	2,000
Max. Input Speed n_{1B}	rpm	1,2	3~200	10,000	10,000	8,000	8,000	6,000	6,000	4,000
Micro Backlash P0	arcmin	1	3~20	-	-	≤2	≤2	≤2	≤2	≤2
		2	25~200	-	-	≤4	≤4	≤4	≤4	≤4
Reduced Backlash P1	arcmin	1	3~20	≤4	≤4	≤4	≤4	≤4	≤4	≤4
		2	25~200	≤7	≤7	≤7	≤7	≤7	≤7	≤7
Standard Backlash P2	arcmin	1	3~20	≤6	≤6	≤6	≤6	≤6	≤6	≤6
		2	25~200	≤9	≤9	≤9	≤9	≤9	≤9	≤9
Torsional Rigidity	Nm/arcmin	1,2	3~200	3	7	14	25	50	145	225
Max. Radial Load F_{2rB}[2]	N	1,2	3~200	780	1,530	3,250	6,700	9,400	14,500	50,000
Max. Axial Load F_{2aB}[2]	N	1,2	3~200	390	765	1,625	3,350	4,700	7,250	25,000
Service Life	hr	1,2	3~200	20,000*						
Efficiency η	%	1	3~20	≥95%						
		2	25~200	≥92%						
Weight	kg	1	3~20	0.9	2.1	6.4	13	24.5	51	83
		2	25~200	1.2	1.5	7.8	14.2	27.5	54	95
Operating Temp	°C	1,2	3~200	-10°C~+90°C						
Lubrication		1,2	3~200	synthetic gear grease (NYOGEL 792D)						
Degree of Gearbox Protection		1,2	3~200	IP65						
Mounting Position		1,2	3~200	all directions						
Noise Level (n_1=3000rpm)	dB	1,2	3~200	≤61	≤63	≤65	≤68	≤70	≤72	≤74

Gearbox Inertia

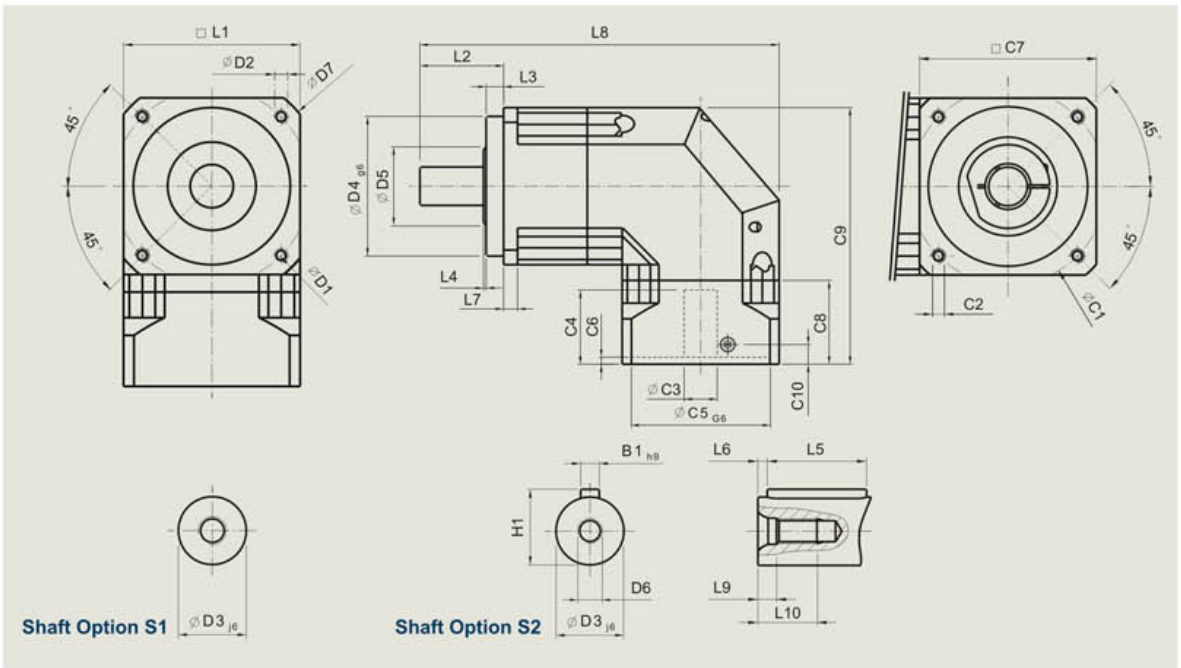
Model No.		Stages	Ratio[1]	ABR042	ABR060	ABR090	ABR115	ABR142	ABR180	ABR220
Mass Moments of Inertia J_1	kg • cm²	1	3~10	0.09	0.35	2.25	6.84	23.4	68.9	135.4
			14	-	0.07	1.87	6.25	21.8	65.6	119.8
			20	-	0.07	1.87	6.25	21.8	65.6	119.8
		2	15	0.09	-	-	-	-	-	-
			20	0.09	-	-	-	-	-	-
			25~100	0.09	0.09	0.35	2.25	6.84	23.4	68.9
			120~200	-	-	0.31	1.87	6.25	21.8	65.6

1. Ratio ($i=N_{in} / N_{out}$)

2. F_{2rB} 、 F_{2aB} applied to the output shaft center @ 100 rpm

* S1 service life 10,000 hrs

Dimensions (1-stage, Ratio i=3~20)



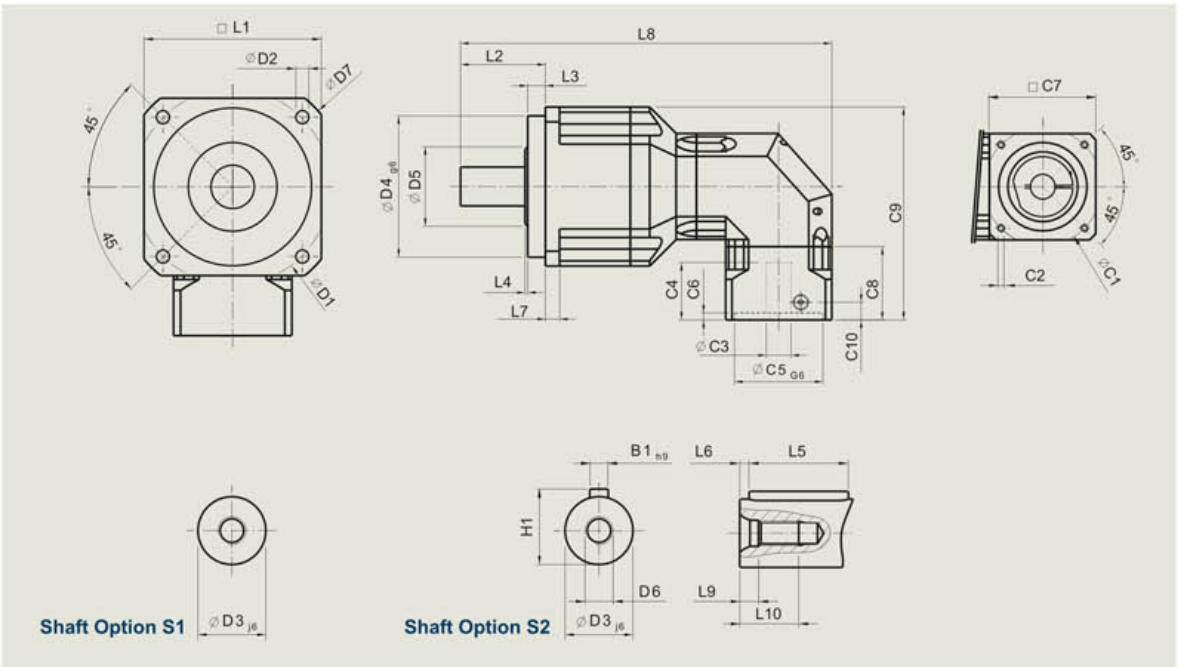
[unit: mm]

Dimension	ABR042	ABR060	ABR090	ABR115	ABR142	ABR180	ABR220
D1	50	70	100	130	165	215	250
D2	3.4	5.5	6.6	9	11	13	17
D3 j6	13	16	22	32	40	55	75
D4 g6	35	50	80	110	130	160	180
D5	22	45	60	80	75	95	115
D6	M4 x 0.7P	M5 x 0.8P	M8 x 1.25P	M12 x 1.75P	M16 x 2P	M20 x 2.5P	M20 x 2.5P
D7	56	80	116	152	185	240	292
L1	42	60	90	115	142	180	220
L2	26	37	48	65	97	105	138
L3	5.5	7	10	12	15	20	30
L4	1	1.5	1.5	2	3	3	3
L5	16	25	32	40	63	70	90
L6	2	2	3	5	5	6	7
L7	4	6	8	10	12	15	20
L8	111.5	145	203	259	333	394	484
L9	3.2	4	6	9.5	12	15	15
L10	10	12.5	19	28	36	42	42
C1[3]	46	70	100	130	165	215	235
C2[3]	M4 x 0.7P	M5 x 0.8P	M6 x 1P	M8 x 1.25P	M10 x 1.5P	M12 x 1.75P	M12 x 1.75P
C3[3]	≤11	*≤14 / ≤16	*≤19 / ≤24	≤32	≤38	≤48	≤55
C4[3]	25	30	40	50	60	82	82
C5[3] G6	30	50	80	110	130	180	200
C6[3]	3.5	4	4	5	6	6	6
C7[3]	42	60	90	115	142	190	220
C8[3]	29.5	41.5	48	61	71	96	100
C9[3]	90.5	108	153	192	236	301	345
C10[3]	8.75	10	11.25	13.5	16	18.25	20
B1 h9	5	5	6	10	12	16	20
H1	15	18	24.5	35	43	59	79.5

3. C1~C10 are motor specific dimensions (metric std shown). Refer to Apexdyna.com and Design Tool to view your specific motor mounting system.

*ABR060 C3 option ≤ 16. *ABR090 C3 option = 24 without ceramic bushing.

Dimensions (2-stage, Ratio i=25~200)



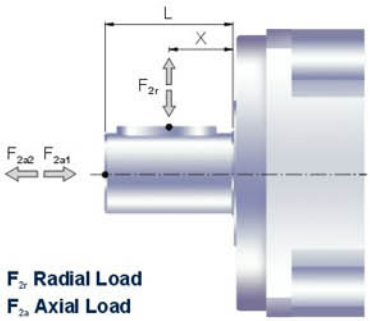
[unit: mm]

Dimension	ABR042	ABR060	ABR090	ABR115	ABR142	ABR180	ABR220
D1	50	70	100	130	165	215	250
D2	3.4	5.5	6.6	9	11	13	17
D3 j6	13	16	22	32	40	55	75
D4 g6	35	50	80	110	130	160	180
D5	22	45	60	80	75	95	115
D6	M4 x 0.7P	M5 x 0.8P	M8 x 1.25P	M12 x 1.75P	M16 x 2P	M20 x 2.5P	M20 x 2.5P
D7	56	80	116	152	185	240	292
L1	42	60	90	115	142	180	220
L2	26	37	48	65	97	105	138
L3	5.5	7	10	12	15	20	30
L4	1	1.5	1.5	2	3	3	3
L5	16	25	32	40	63	70	90
L6	2	2	3	5	5	6	7
L7	4	6	8	10	12	15	20
L8	139	163.5	206.5	285	365	431	521
L9	3.2	4	6	9.5	12	15	15
L10	10	12.5	19	28	36	42	42
C1[4]	46	46	70	100	130	165	215
C2[4]	M4 x 0.7P	M4 x 0.7P	M5 x 0.8P	M6 x 1P	M8 x 1.25P	M10 x 1.5P	M12 x 1.75P
C3[4]	≤11	*≤11 / ≤12	*≤14 / ≤15.875 / ≤16	*≤19 / ≤24	≤32	≤38	≤48
C4[4]	25	25	30	40	50	60	82
C5[4] G6	30	30	50	80	110	130	180
C6[4]	3.5	3.5	4	4	5	6	6
C7[4]	42	42	60	90	115	142	190
C8[4]	29.5	29.5	41.5	48	61	71	96
C9[4]	90.5	99.5	123	165.5	205.5	255	321
C10[4]	8.75	8.75	10	11.25	13.5	16	18.25
B1 h9	5	5	6	10	12	16	20
H1	15	18	24.5	35	43	59	79.5

4. C1~C10 are motor specific dimensions (metric std shown). Refer to Apexdyna.com and Design Tool to view your specific motor mounting system.

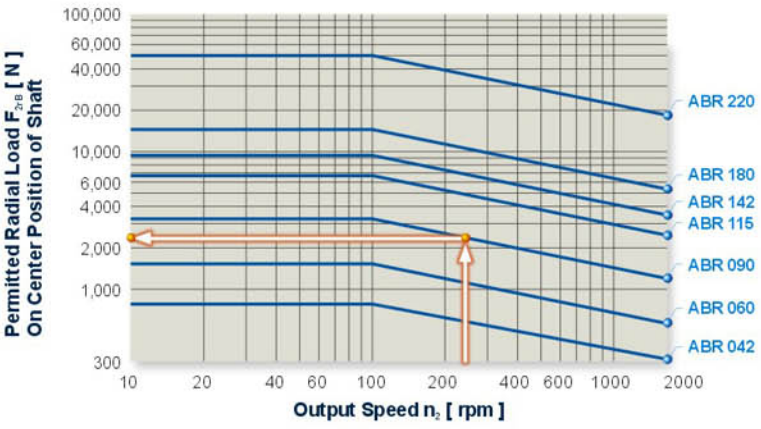
*ABR060 C3 option ≤ 12. *ABR090 C3 option ≤ 15.845 / ≤16. *ABR115 C3 option = 24 without ceramic bushing.

Permitted Radial and Axial Loads on Output Shaft of the Gearbox



F_{2r} Radial Load
F_{2a} Axial Load

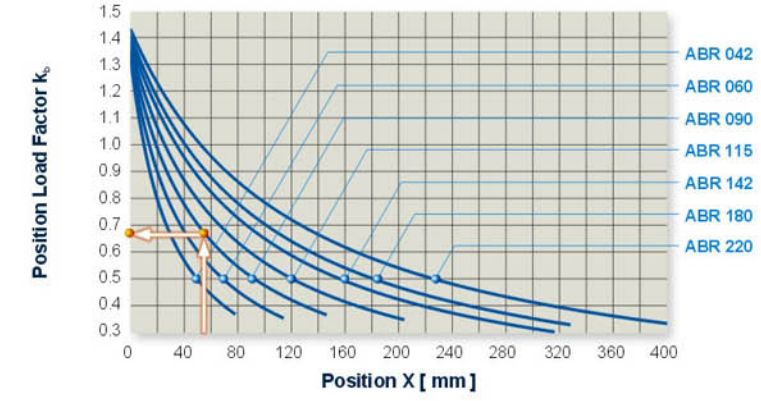
The permitted radial and axial loads on output shaft of the gearbox depend on the design of the gearbox supporting bearings.
APEX use the extension straddle oversized ball bearing design.
It can take heavy load from both axes.



If radial force F_{2r} exert on the center of the output shaft X=1/2 x L.
Under various operating condition the lifetime is over 20,000 hours.*
The permitted radial load is given on left diagram.
The permitted axial load can be calculated by using the formula:

$F_{2a1B}=0.2 \times F_{2rB}$

$F_{2a2B}=0.1 \times F_{2rB}$



If radial force F_{2r} not exert on the center of the output shaft X<1/2 x L or X>1/2 x L
The permitted radial and axial load can be calculated by the position load factor K_b on the left diagram.
Radial load:

$F'_{2rB}=k_b \times F_{2rB}$

Axial load:

$F'_{2a1B}=0.2 \times F'_{2rB}$

$F'_{2a2B}=0.1 \times F'_{2rB}$

* S1 service life 10,000 hrs

Ordering Code

ABR090 – **010** – **S1** – **P1** / **MOTOR**

Gearbox Size:
ABR042, ABR060, ABR090
ABR115, ABR142, ABR180
ABR220

Shaft Option:
S1: Smooth Output Shaft
S2: Output Shaft with Key

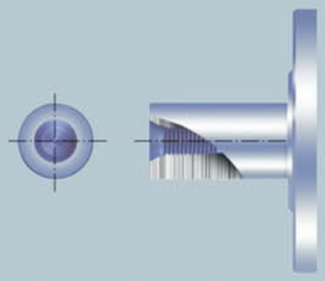
Motor Designation:
Manufacturer Type
And Model

Ratio:
1 Stage: 3, 4, 5, 6, 7, 8, 9, 10, 14, 20
2 Stages: 15, 20, 25, 30, 35, 40, 45, 50, 60, 70, 80, 90, 100, 120, 140, 160, 180, 200

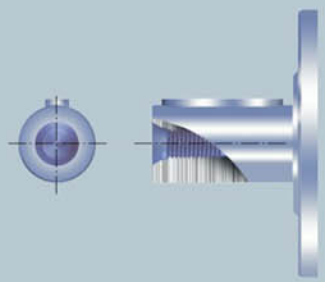
Backlash:
P0: Micro Backlash
P1: Reduced Backlash
P2: Standard Backlash

Ordering Example: ABR090-010-S1-P1 / SIEMENS 1FT6 041-4AF71

S1 and S2 shaft options are shown below:



S1: Standard Output Shaft



S2: Output Shaft With Key

Keyway: Standard DIN 6885. Sheet 1

The dimensions of adapter plate depend on the motor.
Design on-line at www.apexdyna.com.
Download the specific motor / gearhead dxf or pdf.

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www.apexdyna.com

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