

Fall 2008

New Product Guide

PREDATOR • RAPTOR • RAPTOR EP • VICTORY



Quality at Every Turn

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Welcome to CGI's newest innovation in motion control gearheads, the result of more than 40 years of gear design and manufacturing experience, as well as proven performance in the field.

Our new Predator and Raptor planetary gearheads utilize a revolutionary optimized gear design, providing world-class performance and torque density, combined with the most popular housing and mounting features. In addition, our well-known Victory planetary gearhead offers an economical, compact and efficient design, while continuing to utilize advanced materials and provide high torque density.

CGI's Engineering and Manufacturing is 100% USA based, and we operate under an ISO 9001:2000 certified quality management system. Customers around the world depend on us for high-quality products, quick customizations, exceptional engineering support, and outstanding service and value—and so can you.



ISO 9001:2000
FM 66031



American
Gear Manufacturers
Association

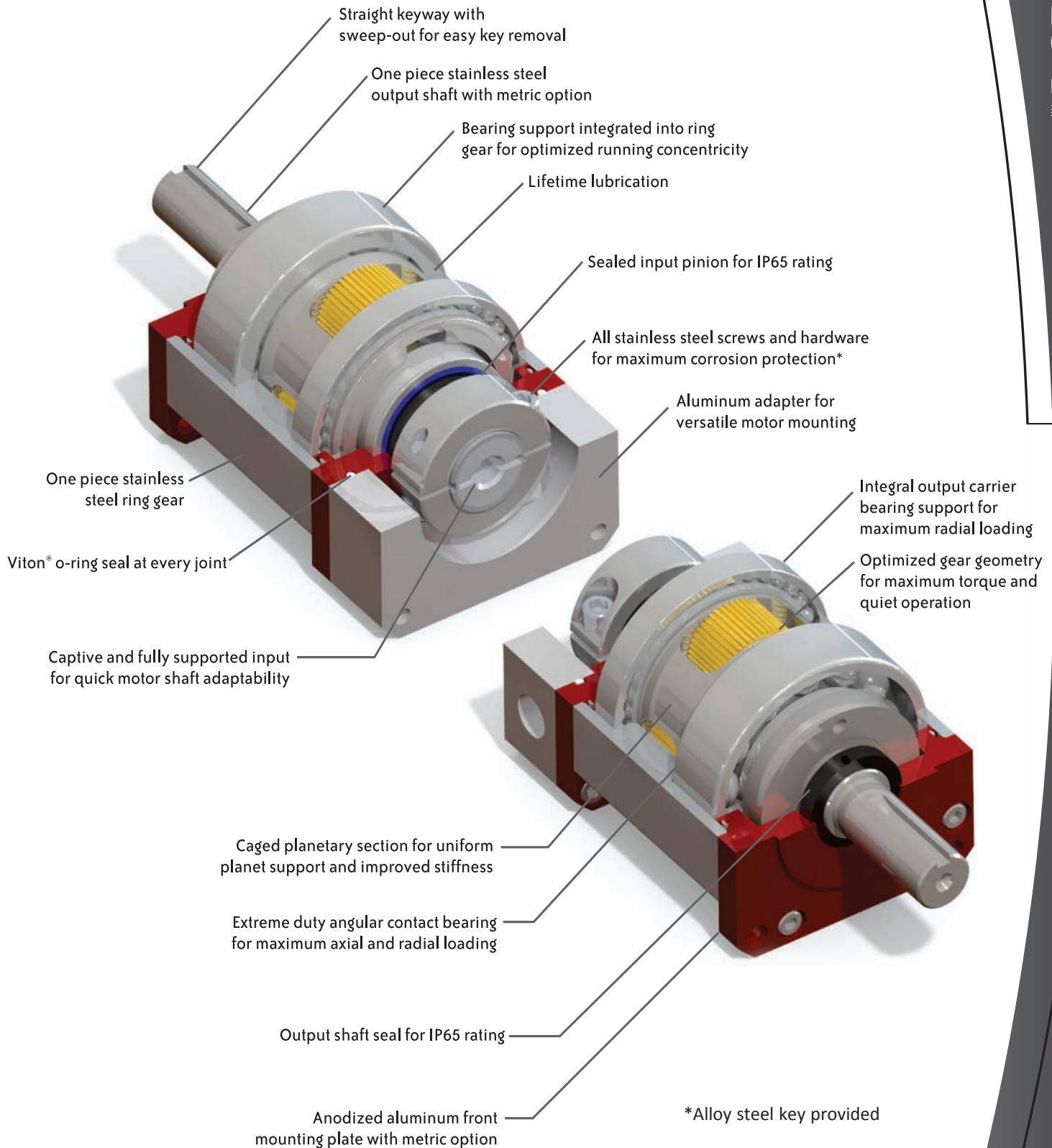
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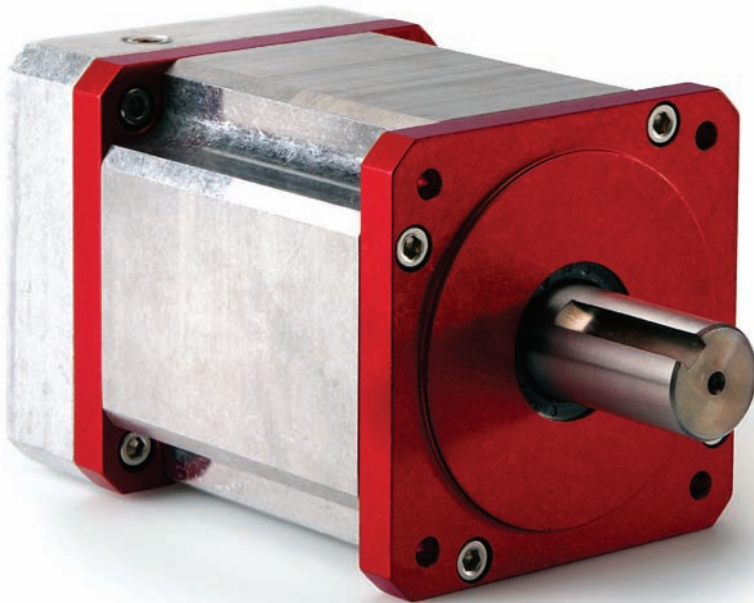
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Quality at Every Turn

Design Highlights





Design Features

- Single-piece construction utilized throughout
- IP65 sealed with Viton® seals at each joint
- High torque design with optimized gear geometry
- Advanced materials and heat treatments
- High torsional stiffness design
- Mounting in any direction
- Captive, bearing supported input pinion
- Simplified quick installation
- NEMA and Metric configurations standard

Performance Specifications

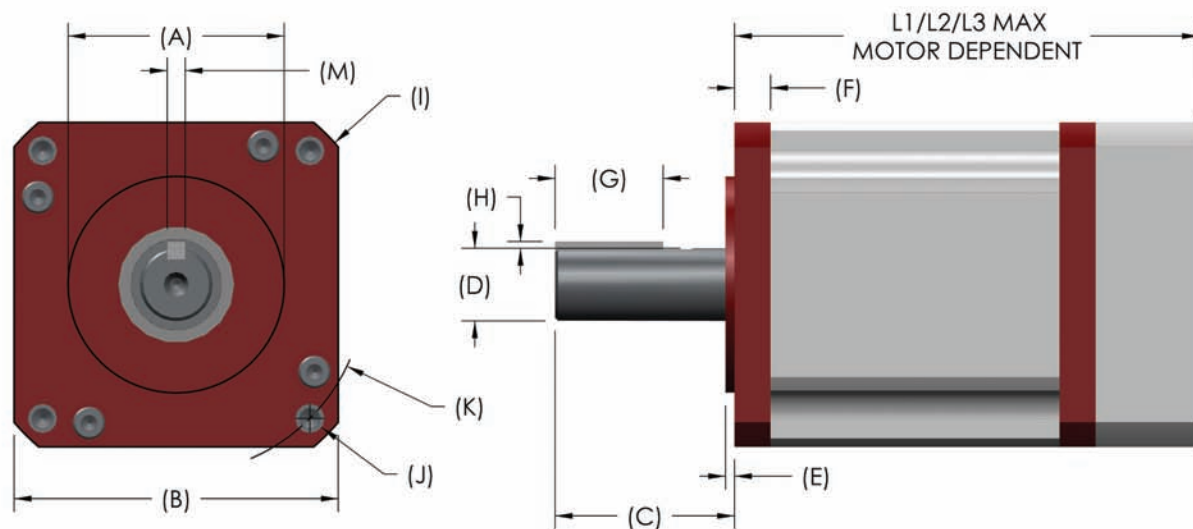
023PRX (NEMA) / 060PRX (METRIC)						034PRX (NEMA) / 090PRX (METRIC)											
Ratio		T ^{NOM} (1) In-lbs (Nm)		T ^{MAX ACCEL} In-lbs (Nm)		T ^{E-STOP} (2) In-lbs (Nm)		T ^{NOM} (1) In-lbs (Nm)		T ^{MAX ACCEL} In-lbs (Nm)		T ^{E-STOP} (2) In-lbs (Nm)					
1 STAGE	4:1	420	(48)	530	(60)	1069	(121)	1487	(168)	1874	(212)	3548	(401)				
	5:1	360	(41)	455	(51)	1043	(118)	1328	(150)	1674	(189)	3481	(393)				
	7:1	250	(28)	315	(36)	964	(109)	895	(101)	1128	(127)	2954	(334)				
	10:1	165	(19)	210	(24)	720	(81)	580	(66)	732	(83)	2564	(290)				
2 STAGE	16:1	420	(48)	530	(60)	1069	(121)	1487	(168)	1874	(212)	3548	(401)				
	20:1	420	(48)	530	(60)	1069	(121)	1487	(168)	1874	(212)	3548	(401)				
	25:1	360	(41)	455	(51)	1043	(118)	1328	(150)	1674	(189)	3481	(393)				
	28:1	420	(48)	530	(60)	1069	(121)	1487	(168)	1874	(212)	3548	(401)				
	35:1	360	(41)	455	(51)	1043	(118)	1328	(150)	1674	(189)	3481	(393)				
	40:1	420	(48)	530	(60)	1069	(121)	1487	(168)	1874	(212)	3548	(401)				
	50:1	360	(41)	455	(51)	1043	(118)	1328	(150)	1674	(189)	3481	(393)				
	70:1	286	(32)	360	(41)	964	(109)	1029	(116)	1297	(146)	2954	(334)				
	100:1	192	(22)	241	(27)	720	(81)	674	(76)	849	(96)	2564	(290)				
Gearbox Weight (lbs)						1 stage 2.8 lbs / 2 stage 3.8 lbs						1 stage 9.1 lbs / 2 stage 12.7 lbs					
Torsional Stiffness ⁽³⁾						20 in-lbs/arc-min						80 in-lbs/arc-min					
Input Speed						6500 RPM Maximum											
Backlash (arc-min)						4 (1 stage), 6 (2 stage)											
IP Rating						IP65											
Service Life						>20,000 HOURS											
Efficiency ⁽⁴⁾						1 stage >95% 2 stage >90%											
Operating Temperature						-40°F to +250°F											
Shaft Loads						See Tables on Page 12											

1. All torque ratings are based upon 3,000 RPM nominal input speed, and 20,000 hours minimum service life.

2. E-STOP torque rating is limited to 1,000 occurrences.

3. Torsional Stiffness rating varies by type and ratio. Specified rating based on Metric, 5:1 ratio.

4. Efficiency rated at 3,000 RPM input speed, at Nominal Rated Torque.



Gearhead Dimensions

Dimension	Code	023PRX Inch (mm)	060PRX Metric (in)	034PRX Inch (mm)	090PRX Metric (in)
Pilot Diameter (+.000/-0.002 in)	A	1.500 (38)	50 (1.969)	2.875 (73)	80 (3.150)
Square Flange	B	2.25 (57)	60 (2.36)	3.45 (87)	90 (3.540)
Shaft Length	C	1.25 (32)	30 (1.18)	1.50 (38)	40 (1.57)
Shaft Diameter (+.0000/-0.0005 in)	D	0.500 (13)	16 (0.6299)	0.75 (19)	22 (0.8661)
Pilot Length	E	0.062 (2)	3 (0.118)	0.062 (2)	3 (0.118)
Flange Thickness	F	0.250 (6.4)	6.4 (0.250)	0.375 (10)	9 (0.375)
Key Length	G	0.75 (19)	20 (0.79)	0.98 (25)	25 (0.98)
Key Width (3)	M	0.125 (3.18)	5 (0.1969)	0.188 (5)	6 (0.2362)
Key Height	H	0.047 (1)	2 (0.079)	0.081 (2)	2.5 (0.098)
Housing Diameter	I	2.95 (75)	80 (3.15)	4.58 (116)	116 (4.58)
Bolt Hole Diameter	J	0.205 (5)	5.6 (0.220)	0.220 (5.6)	6.6 (0.260)
Bolt Circle Diameter	K	2.625 (67)	70 (2.756)	3.875 (98)	100 (3.937)
Gearhead Length (1)	L1	3.23 (82)	82 (3.230)	4.73 (120)	120 (4.730)
	L2	4.38 (111)	111 (4.380)	6.50 (165)	165 (6.500)

Moment of Inertia Table (2) (oz-in-sec²)

Ratio	023PRX	060PRX	034PRX	090PRX
4:1	2.190E-03	2.206E-03	1.554E-02	1.557E-02
5:1	1.887E-03	1.896E-03	1.310E-02	1.312E-02
7:1	1.661E-03	1.666E-03	1.117E-02	1.118E-02
10:1	1.547E-03	1.550E-03	1.018E-02	1.019E-02
16:1	1.852E-03	1.853E-03	1.303E-02	1.303E-02
20:1	1.670E-03	1.671E-03	1.149E-02	1.149E-02
25:1	1.659E-03	1.659E-03	1.139E-02	1.139E-02
28:1	1.551E-03	1.551E-03	1.036E-02	1.035E-02
35:1	1.545E-03	1.545E-03	1.030E-02	1.030E-02
40:1	1.493E-03	1.493E-03	9.778E-03	9.778E-03
50:1	1.490E-03	1.490E-03	9.753E-03	9.753E-03
70:1	1.488E-03	1.488E-03	9.734E-03	9.734E-03
100:1	1.487E-03	1.487E-03	9.724E-03	9.724E-03

(1) Gearhead Length based on NEMA motor mounting.

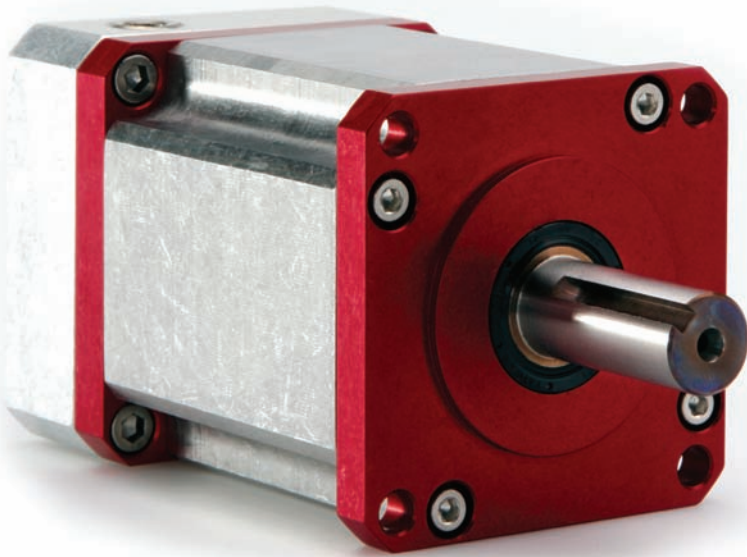
(2) Gearhead inertia values shown include pinion, clamp and sleeve, and are for standard NEMA mounting.

(3) Key Width tolerance for English keys is:
+.001 / -.000 in.
Key Width tolerance for Metric keys is:
+.000 / -.0012 in.

• All specifications are subject to change without prior notice.



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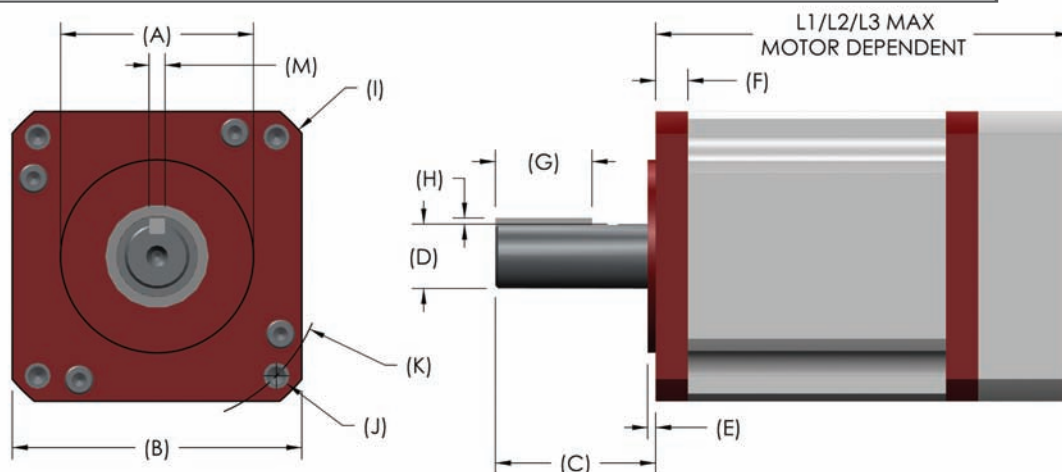
Design Features

- Improved design for stiffness and loading
- High torque gear geometry
- Advanced materials and heat treatments
- IP65 sealed
- Mounting in any direction
- Captive input pinion
- Simplified quick installation
- NEMA and Metric configurations standard

Performance Specifications

023RTX (NEMA) / 060RTX (METRIC)				034RTX (NEMA) / 090RTX (METRIC)			
	T _{NOM} (1)	T _{MAX ACCEL}	T _{E-STOP} (2)	T _{NOM} (1)	T _{MAX ACCEL}	T _{E-STOP} (2)	
Ratio	In-lbs (Nm)	In-lbs (Nm)	In-lbs (Nm)	In-lbs (Nm)	In-lbs (Nm)	In-lbs (Nm)	
1 STAGE	4:1	395 (45)	468 (53)	947 (107)	1452 (164)	1829 (207)	3473 (392)
	5:1	340 (38)	400 (45)	926 (105)	1274 (144)	1605 (181)	3316 (375)
	7:1	231 (26)	280 (32)	861 (97)	863 (98)	1088 (123)	2821 (319)
	10:1	150 (17)	190 (22)	720 (81)	559 (63)	704 (80)	2456 (277)
2 STAGE	16:1	395 (45)	468 (53)	947 (107)	1452 (164)	1829 (207)	3473 (392)
	20:1	395 (45)	468 (53)	947 (107)	1452 (164)	1829 (207)	3473 (392)
	25:1	340 (38)	400 (45)	926 (105)	1274 (144)	1605 (181)	3316 (375)
	28:1	395 (45)	468 (53)	947 (107)	1452 (164)	1829 (207)	3473 (392)
	35:1	340 (38)	400 (45)	926 (105)	1274 (144)	1605 (181)	3316 (375)
	40:1	395 (45)	468 (53)	947 (107)	1452 (164)	1829 (207)	3473 (392)
	50:1	340 (38)	400 (45)	926 (105)	1274 (144)	1605 (181)	3316 (375)
	70:1	265 (30)	320 (36)	861 (97)	993 (112)	1251 (141)	2821 (319)
3 STAGE (5)	100:1	175 (20)	221 (25)	720 (81)	642 (73)	810 (92)	2456 (277)
	160:1	395 (45)	468 (53)	947 (107)	1452 (164)	1829 (207)	3473 (392)
	280:1	395 (45)	468 (53)	947 (107)	1452 (164)	1829 (207)	3473 (392)
	400:1	395 (45)	468 (53)	947 (107)	1452 (164)	1829 (207)	3473 (392)
	500:1	340 (38)	400 (45)	926 (105)	1274 (144)	1605 (181)	3316 (375)
	700:1	265 (30)	320 (36)	861 (97)	993 (112)	1251 (141)	2821 (319)
Torsional Stiffness (3)				70 in-lbs/arc-min			
Gearbox Weight (lbs)				1 stage 9.6 lbs / 2 stage 13 lbs / 3 stage 16.3 lbs			
Input Speed				6500 RPM Maximum			
Backlash (arc-min)				4 (1 stage), 6 (2 stage), 8 (3 stage)			
IP Rating				IP65			
Service Life				>15,000 HOURS			
Efficiency (4)				1 stage >95% / 2 stage >90% / 3 stage >85%			
Operating Temperature				-40°F to +250°F			
Shaft Loads				See Tables on Page 12			

1. All torque ratings are based upon 3,000 RPM nominal input speed, and 15,000 hours minimum service life.
2. E-STOP torque rating is limited to 1,000 occurrences.
3. Torsional Stiffness rating varies by type and ratio. Specified rating based on Metric, 5:1 ratio.
4. Efficiency rated at 3,000 RPM input speed, at Nominal Rated Torque.
5. Other ratios available.



Gearhead Dimensions

Dimension	Code	023RTX		060RTX		034RTX		090RTX	
		Inch	(mm)	Metric	(in)	Inch	(mm)	Metric	(in)
Pilot Diameter (+.000/-0.002 in)	A	1.500	(38)	50	(1.969)	2.875	(73)	80	(3.150)
Square Flange	B	2.25	(57)	60	(2.36)	3.450	(87)	90	(3.540)
Shaft Length	C	1.25	(32)	30	(1.18)	1.500	(38)	40	(1.57)
Shaft Diameter (+.0000/-0.0005 in)	D	0.500	(12.7)	16	(0.6299)	0.750	(19)	22	(0.8661)
Pilot Length	E	0.062	(2)	3	(0.118)	0.062	(2)	3	(0.118)
Flange Thickness	F	0.250	(6.4)	6.4	(0.250)	0.375	(9.5)	9.5	(0.375)
Key Length	G	0.75	(19)	20	(0.790)	0.980	(25)	25	(0.980)
Key Height	H	0.047	(1.2)	2	(0.079)	0.081	(2.06)	2.5	(0.098)
Key Width (3)	M	0.125	(3.18)	5	(0.1969)	0.188	(5)	6	(0.2362)
Housing Diameter	I	2.95	(75)	80	(3.15)	4.58	(116)	116	(4.58)
Bolt Hole Diameter	J	0.205	(5.2)	5.6	(0.220)	0.220	(5.6)	6.6	(0.260)
Bolt Circle Diameter	K	2.625	(67)	70	(2.756)	3.875	(98)	100	(3.937)
Gearhead Length (1)	L1	3.39	(86)	86	(3.39)	4.82	(122)	122	(4.82)
	L2	4.28	(109)	108	(4.28)	6.23	(158)	158	(6.23)
	L3	5.17	(131)	131	(5.17)	7.63	(193)	194	(7.63)

Moment of Inertia Table (2) (oz-in-sec²)

Ratio	023RTX	060RTX	034RTX	090RTX
4:1	1.861E-03	1.868E-03	1.295E-02	1.297E-02
5:1	1.676E-03	1.680E-03	1.119E-02	1.121E-02
7:1	1.536E-03	1.538E-03	9.808E-03	9.816E-03
10:1	1.464E-03	1.465E-03	9.111E-03	9.115E-03
16:1	1.702E-03	1.702E-03	1.200E-02	1.200E-02
20:1	1.574E-03	1.575E-03	1.059E-02	1.059E-02
25:1	1.567E-03	1.567E-03	1.051E-02	1.052E-02
28:1	1.484E-03	1.485E-03	9.498E-03	9.498E-03
35:1	1.481E-03	1.481E-03	9.462E-03	9.462E-03
40:1	1.439E-03	1.439E-03	8.944E-03	8.944E-03
50:1	1.437E-03	1.437E-03	8.926E-03	8.926E-03
70:1	1.436E-03	1.436E-03	8.912E-03	8.912E-03
100:1	1.435E-03	1.435E-03	8.920E-03	8.920E-03
160:1	1.437E-03	1.437E-03	8.934E-03	8.934E-03
280:1	1.435E-03	1.435E-03	8.909E-03	8.909E-03
400:1	1.435E-03	1.435E-03	8.919E-03	8.919E-03
500:1	1.435E-03	1.435E-03	8.919E-03	8.919E-03
700:1	1.435E-03	1.435E-03	8.918E-03	8.918E-03

(1) Gearhead Length based on NEMA motor mounting.

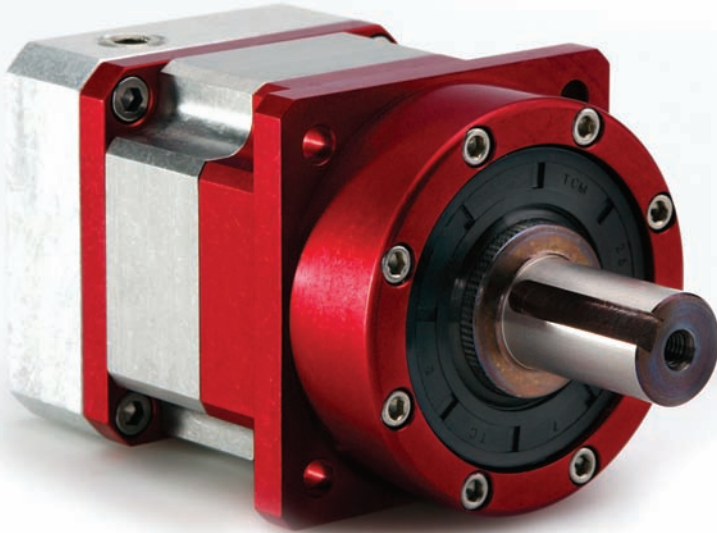
(2) Gearhead inertia values shown include pinion, clamp and sleeve, and are for standard NEMA mounting.

(3) Key Width tolerance for English keys is:
+.001 / -.000 in.
Key Width tolerance for Metric keys is:
+.000 / -.0012 in.

• All specifications are subject to change without prior notice.



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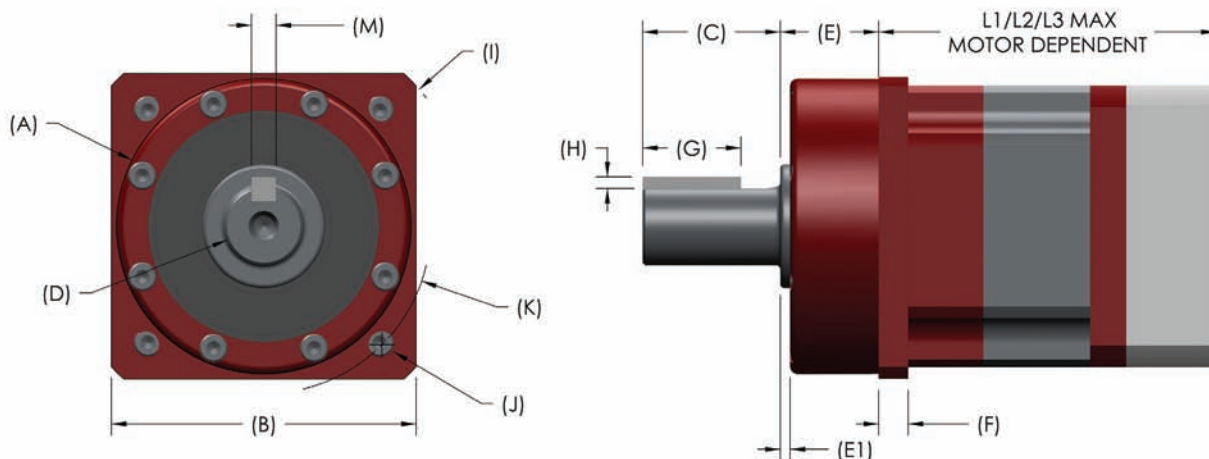
Design Features

- Metric extended pilot (EP) configuration
- High torque gear geometry
- Advanced materials and heat treatments
- Improved design for stiffness and loading
- Mounting in any direction
- Captive input pinion
- IP65 sealed
- Simplified quick installation

Performance Specifications

060RTA (METRIC)				075RTA (METRIC)			
	T_{NOM} (1)	T_{MAX ACCEL}	T_{E-STOP} (2)	T_{NOM} (1)	T_{MAX ACCEL}	T_{E-STOP} (2)	
Ratio	In-lbs (Nm)	In-lbs (Nm)	In-lbs (Nm)	In-lbs (Nm)	In-lbs (Nm)	In-lbs (Nm)	
1 STAGE	4:1	395 (45)	468 (53)	947 (107)	1452 (164)	1829 (207)	3473 (392)
	5:1	340 (38)	400 (45)	926 (105)	1274 (144)	1605 (181)	3316 (375)
	7:1	231 (26)	280 (32)	861 (97)	863 (98)	1088 (123)	2821 (319)
	10:1	150 (17)	190 (22)	720 (81)	559 (63)	704 (80)	2456 (277)
2 STAGE	16:1	395 (45)	468 (53)	947 (107)	1452 (164)	1829 (207)	3473 (392)
	20:1	395 (45)	468 (53)	947 (107)	1452 (164)	1829 (207)	3473 (392)
	25:1	340 (38)	400 (45)	926 (105)	1274 (144)	1605 (181)	3316 (375)
	28:1	395 (45)	468 (53)	947 (107)	1452 (164)	1829 (207)	3473 (392)
	35:1	340 (38)	400 (45)	926 (105)	1274 (144)	1605 (181)	3316 (375)
	40:1	395 (45)	468 (53)	947 (107)	1452 (164)	1829 (207)	3473 (392)
	50:1	340 (38)	400 (45)	926 (105)	1274 (144)	1605 (181)	3316 (375)
	70:1	265 (30)	320 (36)	861 (97)	993 (112)	1251 (141)	2821 (319)
	100:1	175 (20)	221 (25)	720 (81)	642 (73)	810 (91.5)	2456 (277)
3 STAGE (5)	160:1	395 (45)	468 (53)	947 (107)	1452 (164)	1829 (207)	3473 (392)
	280:1	395 (45)	468 (53)	947 (107)	1452 (164)	1829 (207)	3473 (392)
	400:1	395 (45)	468 (53)	947 (107)	1452 (164)	1829 (207)	3473 (392)
	500:1	340 (38)	400 (45)	926 (105)	1274 (144)	1605 (181)	3316 (375)
	700:1	265 (30)	320 (36)	861 (97)	993 (112)	1251 (141)	2821 (319)
Torsional Stiffness (3)				15 in-lbs/arc-min			
Gearbox Weight (lbs)				70 in-lbs/arc-min			
				1 stage 2.5 lbs / 2 stage 3.5 lbs / 3 stage 4.3 lbs			
				1 stage 6.9 lbs / 2 stage 10.4 lbs / 3 stage 13.6 lbs			
Input Speed				6500 RPM Maximum			
Backlash (arc-min)				4 (1 stage), 6 (2 stage), 8 (3 stage)			
IP Rating				IP65			
Service Life				>15,000 HOURS			
Efficiency (4)				1 stage >95% / 2 stage >90% / 3 stage >85%			
Operating Temperature				-40°F to +250°F			
Shaft Loads				See Tables on Page 12			

1. All torque ratings are based upon 3,000 RPM nominal input speed, and 15,000 hours minimum service life.
2. E-STOP torque rating is limited to 1,000 occurrences.
3. Torsional Stiffness rating varies by type and ratio. Specified rating based on Metric, 5:1 ratio.
4. Efficiency rated at 3,000 RPM input speed, at Nominal Rated Torque.
5. Other ratios available.



Gearhead Dimensions

Dimension	Code	060RTA		075RTA	
		Metric (in)		Metric (in)	
Pilot Diameter (+.000/-0.002 in)	A	60	(2.362)	70	(2.756)
Square Flange	B	62	(2.44)	76	(2.99)
Shaft Length	C	28	(1.10)	36	(1.42)
Shaft Diameter (+.0000/-0.0005 in)	D	16	(0.6299)	22	(0.8661)
Pilot Length	E	20	(0.787)	20	(0.787)
Step Length	E1	2	(0.079)	2.5	(0.098)
Flange Thickness	F	6	(0.236)	7	(0.276)
Key Length	G	20	(0.79)	25	(0.98)
Key Height	H	2	(0.079)	3	(0.115)
Key Width ⁽³⁾	M	5	(0.1969)	6	(0.2362)
Housing Diameter	I	84	(3.32)	116	(4.58)
Bolt Hole Diameter	J	5.5	(0.217)	6.6	(0.260)
Bolt Circle Diameter	K	68	(2.677)	85	(3.346)
Gearhead Length ⁽¹⁾	L1	69	(2.70)	114	(4.46)
	L2	91	(3.60)	149	(5.88)
	L3	114	(4.49)	185	(7.28)

Moment of Inertia Table ⁽²⁾ (oz-in-sec²)

Ratio	060RTA	075RTA	Ratio	060RTA	075RTA
4:1	1.886E-03	1.246E-02	40:1	1.439E-03	8.939E-03
5:1	1.692E-03	1.088E-02	50:1	1.437E-03	8.923E-03
7:1	1.544E-03	9.646E-03	70:1	1.436E-03	8.911E-03
10:1	1.468E-03	9.016E-03	100:1	1.435E-03	8.919E-03
16:1	1.703E-03	1.198E-02	160:1	1.437E-03	8.934E-03
20:1	1.575E-03	1.057E-02	280:1	1.435E-03	8.909E-03
25:1	1.568E-03	1.050E-02	400:1	1.435E-03	8.919E-03
28:1	1.485E-03	9.488E-03	500:1	1.435E-03	8.919E-03
35:1	1.481E-03	9.455E-03	700:1	1.435E-03	8.918E-03

(1) Gearhead Length based on NEMA motor mounting.

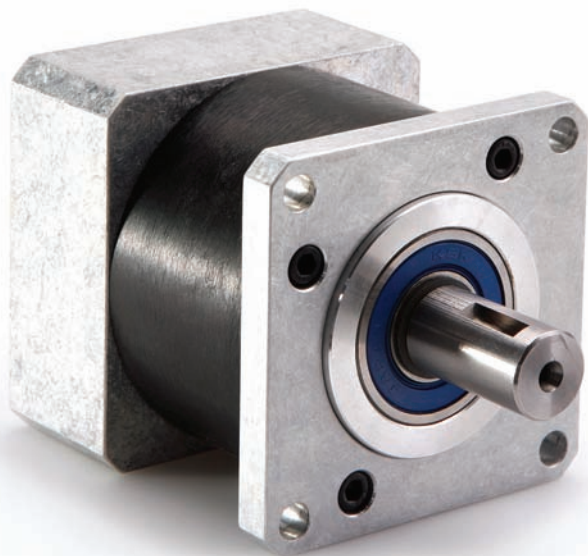
(2) Gearhead inertia values shown include pinion, clamp and sleeve, and are for standard NEMA mounting.

(3) Key Width tolerance for English keys is: +.001 / -.000 in.
Key Width tolerance for Metric keys is: +.000 / -.0012 in.

• All specifications are subject to change without prior notice.



Quality at Every Turn



Design Features

- Economical true planetary design
- High torque gear geometry
- Advanced materials and heat treatments
- Compact and efficient design
- 2-year warranty
- NEMA standard frame sizes
- Quick installation
- High reliability design

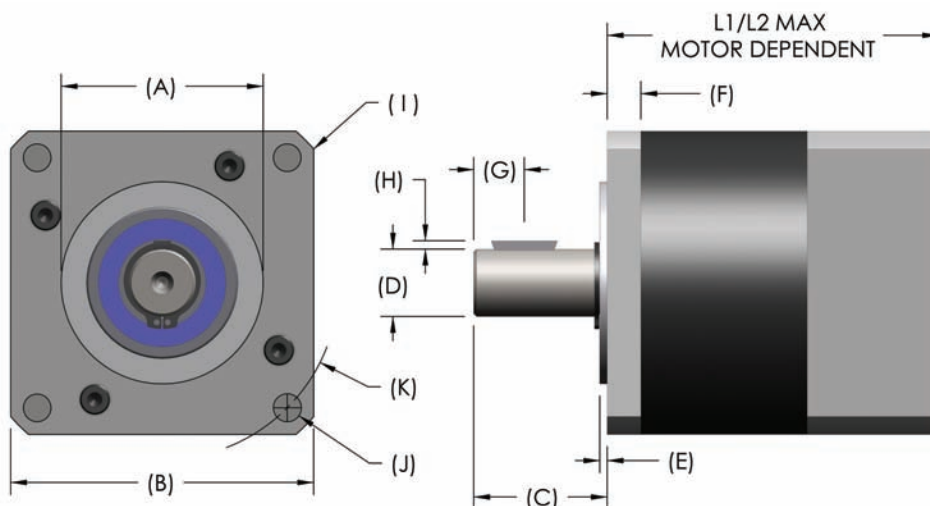
Performance Specifications

Performance Specifications										
017VPX					023VPX			034VPX		
1 STAGE	Ratio	T _{NOM} (1) In-lbs (Nm)	T _{MAX ACCEL} In-lbs (Nm)	T _{E-STOP} (2) In-lbs (Nm)	T _{NOM} (1) In-lbs (Nm)	T _{MAX ACCEL} In-lbs (Nm)	T _{E-STOP} (2) In-lbs (Nm)	T _{NOM} (1) In-lbs (Nm)	T _{MAX ACCEL} In-lbs (Nm)	T _{E-STOP} (2) In-lbs (Nm)
	4:1	109 (12)	137 (16)	221 (25)	201 (23)	253 (29)	409 (46)	744 (84)	937 (106)	1515 (171)
	5:1	103 (12)	130 (15)	210 (24)	195 (22)	248 (28)	400 (45)	702 (80)	884 (100)	1429 (161)
	7:1	90 (10)	113 (13)	183 (21)	160 (18)	201 (23)	325 (37)	621 (70)	782 (88)	1264 (143)
	10:1	81 (9)	102 (12)	153 (17)	140 (16)	177 (20)	285(32)	530 (60)	668 (76)	1080 (122)
2 STAGE	15:1	110 (12)	138 (16)	224 (25)	210 (24)	265 (30)	428 (48)	756 (85)	952 (108)	1539 (174)
	20:1	120 (14)	151 (17)	244 (28)	221 (25)	279 (32)	451 (51)	830 (94)	1046 (118)	1690(191)
	25:1	113 (13)	142 (16)	230 (26)	216 (24)	272 (31)	440 (50)	778 (88)	980 (111)	1585 (179)
	28:1	121 (14)	153 (17)	248 (28)	225 (26)	284 (32)	459 (52)	845 (96)	1065 (120)	1721 (194)
	40:1	124 (14)	156 (18)	252 (29)	229 (26)	289 (33)	467 (53)	861 (97)	1085 (123)	1754 (198)
	50:1	117 (13)	147 (17)	237 (27)	223 (26)	281 (32)	454 (51)	806 (91)	1016 (115)	1642 (186)
	70:1	101 (11)	127 (14)	205 (23)	179 (20)	226 (26)	366 (41)	706 (80)	889 (100)	1437(162)
	100:1	81 (9)	102 (12)	153 (17)	140 (16)	177 (20)	285 (32)	598 (68)	753 (85)	1217(138)
Gearbox Weight 1 stage 0.8 lbs / 2 stage 1.1 lbs				1 stage 1.7 lbs / 2 stage 2.2 lbs			1 stage 5.0 lbs / 2 stage 6.0 lbs			
Input Speed				5000 RPM Maximum						
Backlash (arc-min)				12 (1 stage), 16 (2 stage)						
IP Rating				IP54						
Service Life				>10,000 HOURS						
Efficiency (3)				1 stage >90% / 2 stage >85%						
Operating Temperature				-40°F to +250°F						
Shaft Loads				See Tables on Page 12						

1. All torque ratings are based upon 3,000 RPM nominal input speed, and 10,000 hours minimum service life.

2. E-STOP torque rating is limited to 1,000 occurrences.

3. Efficiency rated at 3,000 RPM input speed, at Nominal Rated Torque.



Gearhead Dimensions

Dimension	Code	017VPX	023VPX	034VPX
		Inch (mm)	Inch (mm)	Inch (mm)
Pilot Diameter (+.000/-0.002 in)	A	0.866 (22)	1.500 (38.1)	2.875 (73)
Square Flange	B	1.70 (43.2)	2.25 (57.2)	3.45 (87.6)
Shaft Length	C	0.75 (19)	1.00 (25.4)	1.25 (31.8)
Shaft Diameter (+.0000/-0.0005 in)	D	0.500 (12.7)	0.500 (12.7)	0.750 (19)
Pilot Length	E	0.060 (1.5)	0.060 (1.5)	0.060 (1.5)
Flange Thickness	F	0.190 (4.8)	0.250 (6.4)	0.312 (7.9)
Key Location	G	0.28 (7.1)	0.38 (9.7)	0.50 (12.7)
Key Height	H	0.062 (1.6)	0.062 (1.6)	0.094 (2.4)
Woodruff Key Size		#404	#404	#606
Housing Diameter	I	2.25 (57)	3.00 (76.2)	4.63 (118)
Bolt Hole Diameter	J	0.125 (31.8)	0.205 (5.2)	0.220 (5.6)
Bolt Circle Diameter	K	1.725 (43.8)	2.625 (66.7)	3.875 (98.4)
Gearhead Length ⁽¹⁾	L1	2.41 (61.2)	2.46 (62.5)	3.33 (85)
	L2	2.96 (75.2)	3.14 (79.8)	4.26 (1-8)

Moment of Inertia Table ⁽²⁾ (oz-in-sec²)

Ratio	017VPX	023VPX	034VPX
4:1	2.331E-04	1.322E-03	4.594E-03
5:1	1.895E-04	1.202E-03	3.544E-03
7:1	1.566E-04	1.110E-03	2.748E-03
10:1	1.395E-04	1.061E-03	2.332E-03
16:1	3.606E-04	1.755E-03	7.719E-03
20:1	1.896E-04	1.208E-03	3.611E-03
25:1	1.878E-04	1.203E-03	3.569E-03
28:1	1.566E-04	1.113E-03	2.782E-03
40:1	1.396E-04	1.062E-03	2.349E-03
50:1	1.391E-04	1.061E-03	2.338E-03
70:1	1.388E-04	1.060E-03	2.330E-03
100:1	1.386E-04	1.060E-03	2.326E-03

(1) Gearhead Length based on NEMA motor mounting.

(2) Gearhead inertia values shown include pinion, clamp and sleeve, and are for standard NEMA mounting.

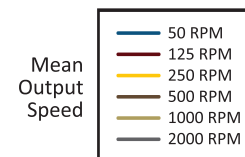
- All specifications are subject to change without prior notice.



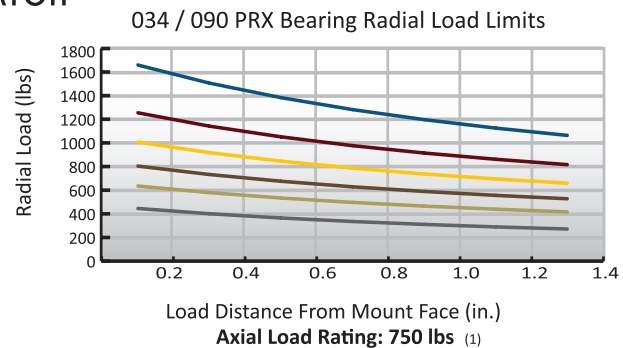
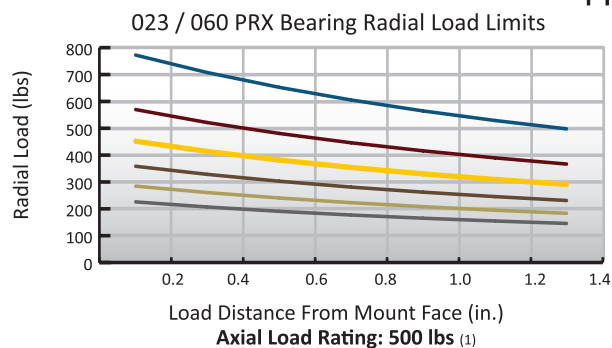
Quality at Every Turn

Selection Guide

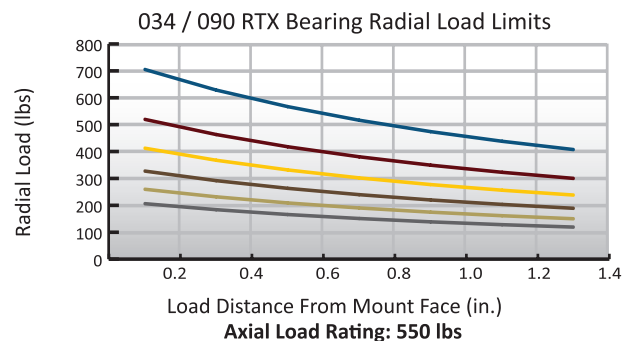
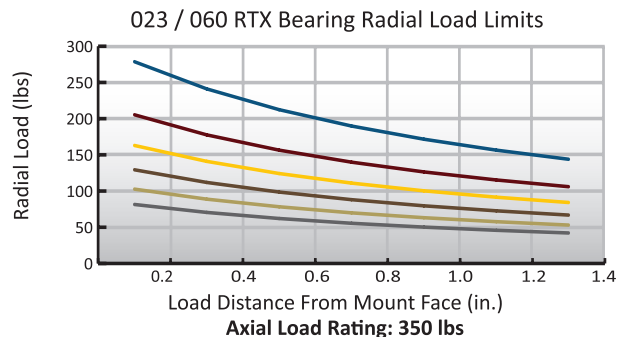
Radial and Axial Output Shaft Loading Tables



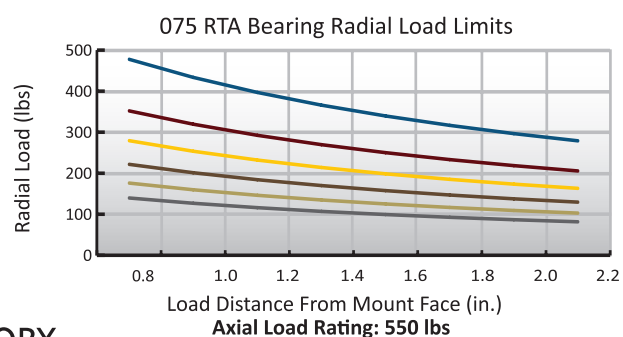
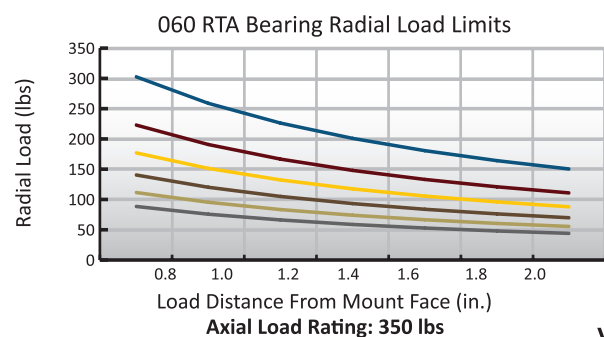
PREDATOR



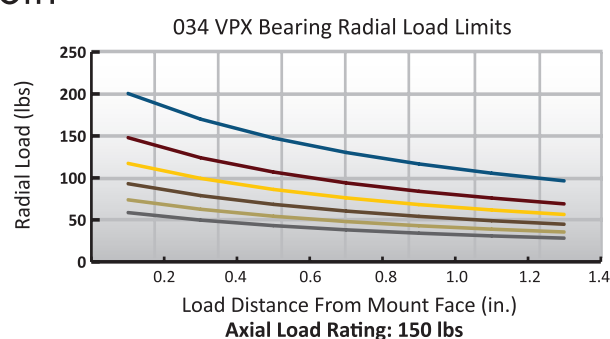
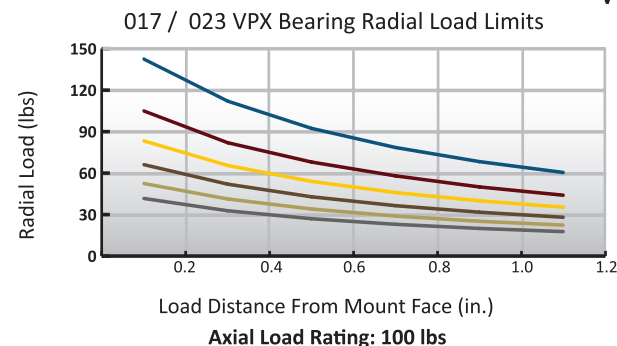
RAPTOR



RAPTOR EP



VICTORY



(1) Predator Axial load values shown are for loads into the gearbox face. For loads away from the face, reduce by 50%.

* The above graphs display the allowable radial load (lbs) at a given distance (inches) from the Gearhead face based on an L_{10} bearing life of; 20,000 hours (PRX), 15,000 hours (RTX/RTA), 10,000 hours (VPX)

CGI Product Selection Chart

Step 1. Determine the Duty Cycle

$$\text{Duty Cycle} = \frac{(t_1 + t_2 + t_3)}{(\text{Cycle Time})} * 100\%$$

$$t_1 + t_2 + t_3 + t_4 = \text{Cycle Time}$$

Step 2. Is the Duty Cycle < 60% and the Cycle Time < 20 minutes?

If Yes, then use the Cyclic Operation steps A through C
If No, then use the Continuous Operation steps D through E

CYCLIC OPERATION

- Select the desired gearhead ratio
- Determine the Nominal Torque (TNOM)
 $T_{NOM} = T_{MEAN} \times S_f$
 T_{MEAN} = Average Torque = Root Mean Cube of application torques. (see Formula no. 1)
 S_f = Speed Factor (see Table no. 1)
- Determine the Max Acceleration Torque (TMAX)
 If the application TMAX is unknown, then use this formula to approximate:
 $T_{MAX} = T_{MOTOR} \times \text{Ratio} \times C_f \times \text{Gearhead Efficiency}$
 T_{MOTOR} = Motor Peak Torque
 Ratio = Reduction Ratio (from catalog)
 C_f = Cycle Factor (see Table no. 2)
 Gearhead Efficiency (from catalog)

CONTINUOUS OPERATION

- Select the desired gearhead ratio
- Determine the Nominal Torque (TNOM)
 $T_{NOM} = T_{MEAN} \times S_f \times C_f$
 T_{MEAN} = Average Torque = Root Mean Cube of application torques. (see Formula no. 1)
 S_f = Speed Factor (see Table no. 1)
 C_f = Cycle Factor (see Table no. 2)

Step 3. Determine E-STOP load requirements (torque and inertia reflected on gearhead in case of emergency stop)

Step 4. Evaluate speed requirement and determine if appropriate gearhead ratio has been selected

Step 5. Evaluate Radial and Axial load requirements and compare to catalog ratings

Step 6. Compare the above outputs

(TNOM, TMAX & TE-STOP) to the gearhead specifications and ratings to select a gearhead. If needed, choose the next size or configuration that meets your specifications

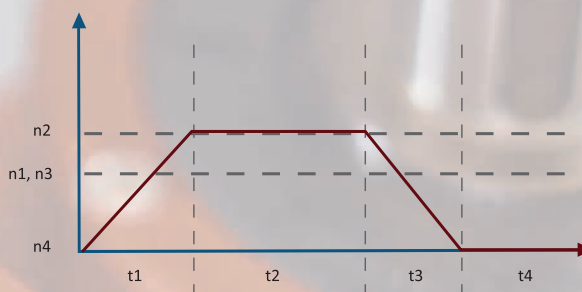
FORMULA 1

$$T_{MEAN} = \sqrt[3]{\frac{(n1 * t1 * T1^3) + (n2 * t2 * T2^3) + (n3 * t3 * T3^3) + (n4 * t4 * T4^3)}{(n1 * t1) + (n2 * t2) + (n3 * t3) + (n4 * t4)}}$$

FORMULA 2

$$RPM_{MEAN} = \frac{(n1 * t1) + (n2 * t2) + (n3 * t3)}{t1 + t2 + t3}$$

SPEED PROFILE



TORQUE PROFILE

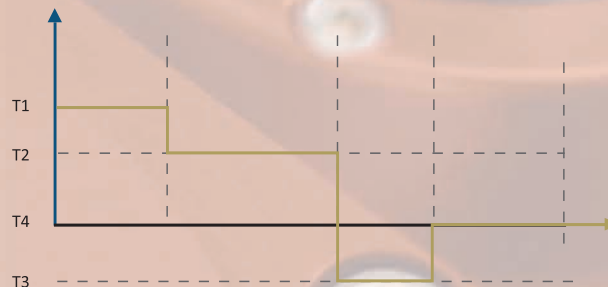


TABLE NO. 1

S_f =	Input RPM (Mean) (Refer to Formula 2)
1.00	0 to 1000
1.15	1000 to 3000
1.30	3000 to 5000
1.50	> 5000

TABLE NO. 2

C_f =	Cycles per Hour
1.00	0 to 1000
1.3	1000 to 2000
1.6	2000 to 3000
1.8	3000 to 5000
2.0	> 5000
2.0	Continuous

DEFINITIONS

TNOM = Nominal Torque
 TMEAN = Average (RMC) Torque
 TMAX = Maximum Acceleration Torque
 TE-STOP = Emergency Stop Torque
 C_f = Cycle Factor
 S_f = Speed Factor
 TMOTOR = Motor Peak Torque

t1 = Acceleration Time
 t2 = Run Time
 t3 = Deceleration Time
 t4 = Dwell / Pause Time

n1 = Average Speed During t1
 n2 = Speed During t2
 n3 = Average Speed During t3
 n4 = Dwell Speed During t4

T1 = Torque During t1
 T2 = Torque During t2
 T3 = Torque During t3
 T4 = Torque During t4

Selection Guide

Application Data Sheet

Contact CGI, Inc. Sales Department
toll free: 800.568.GEAR (4327)
phone: 775.882.3422
fax: 775.882.9599
email: sales@cgimotion.com

Contact Information

Company Name: _____
Contact: _____
Date: _____
Address: _____
City: _____ State: _____ Zip Code: _____
Email: _____
Phone: _____ Fax: _____
Submitted by: _____

Commercial Information

Project Name: _____ Estimated Annual Use: _____ Target Price : _____
Application Description: _____
Project Timing: _____
Is this an existing application? ☐ YES ☐ NO Existing Model Data: _____

Technical Data

Gearbox Type: ☐ Inline ☐ Right Angle Orientation: ☐ Horizontal ☐ Vertical ☐ Shaft Up ☐ Shaft Down
Output Torque (in-lb): CONT _____ ACCEL _____ E-STOP _____
Input Speed (RPM): _____ Output Speed (RPM): _____ Ratio: _____ Positioning Accuracy (Arc-Min): _____
Rotation of Output: ☐ Bi-Directional ☐ Uni-Directional
Motor Manufacturer: _____ Model: _____
Rated Motor Speed (RPM): _____
Motor Torque Rating (in-lbs): Continuous _____ Peak _____

Axis Performance Data

Motion Profile (in seconds): Accel _____ Top Speed _____ Decel _____ At Rest _____
Total Move Time: _____ Duty Cycle (% on): _____ ☐ Continuous ☐ Intermittent
Load Type: ☐ Soft Ramp ☐ Constant ☐ Cyclic ☐ Load Variable ☐ Shock ☐ Vibration
What is mounted to the Output Shaft? _____ Is there overhung Load? ☐ Yes ☐ No
Gearbox Max Length: _____ Gearbox Max Width : _____
Output Radial Load (lbs): _____ Output Axial Load (lbs) : _____
Weight Limit: _____ Environmental Requirements: _____

Special Requirements

Describe Mechanical Special Requirements

(Attach or send sketch if needed) _____

Special Lube: _____ Materials: _____ Sealing: _____

CGI Model Number Designations

Ordering Example: 023PRX0100-XX-23N08

023 PRX 0100 – XX – 23N08

Frame Size

017 (NEMA)
023 (NEMA)
034 (NEMA)
060 (METRIC)
075 (METRIC)
090 (METRIC)

Model Type

PRX Predator Planetary Gearhead
RTX Raptor Planetary Gearhead
RTA Raptor EP Planetary Gearhead
VPX Victory Planetary Gearhead

Features

XX (Standard Catalog)
VM (Vertical Mount VPX only)
KT (Adapter kit)
RK (Rear Bracket kit)

Motor Code

5-digit number (23N08)
 Provide Motor Model Data
 at order entry

Project Code

4-digit number followed by "X"
 (example – 1234X)
 Assigned by CGI Engineering

Standard Ratio Designations

0040 (4:1)	All Models
0050 (5:1)	All Models
0070 (7:1)	All Models
0100 (10:1)	All Models
0150 (15:1)	VPX only
0160 (16:1)	PRX, RTX, RTA
0200 (20:1)	All Models
0250 (25:1)	All Models
0280 (28:1)	All Models
0350 (35:1)	PRX, RTX, RTA
0400 (40:1)	All Models
0500 (50:1)	All Models
0700 (70:1)	All Models
1000 (100:1)	All Models
1600 (160:1)	RTX, RTA
2800 (280:1)	RTX, RTA
4000 (400:1)	RTX, RTA
5000 (500:1)	RTX, RTA
7000 (700:1)	RTX, RTA

Other ratios available



For more than 40 years, motion control and automation professionals have turned to CGI, Inc. for their precision gear solutions. Our engineering innovation and manufacturing expertise ensure robust solutions for even the most challenging precision gearing applications.

CGI, Inc. manufactures exclusively at our state-of-the-art headquarters in Carson City, Nevada, near beautiful Lake Tahoe. Our team of dedicated and experienced employees is focused on each customer's success by providing unparalleled solutions, service and support.



Quality at Every Turn

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www.cgimotion.com