

Parker Precision Gearheads



The New Standard in Precision Gearheads

72

Hour Shipping

ISO 9001

Facilities

75

Years of Experience

Straightforward numbers, from a straightforward company. Simply put, we don't think there's a place for hype or exaggeration in this business. We give you straight answers, fair prices, and honest specs based not on some idealized laboratory simulation, but on real-world experience.

ISO 9001 Facilities

We can do this thanks to the decades of high precision gear manufacturing experience of Parker Hannifin's Zenith Products Division. Our ISO 9001 certified facilities in Sanford, North Carolina and Monterrey, Mexico, utilize a premium gear manufacturing technique – precision grinding. Yes, it's more expensive than some others methods. But it produces a better-quality and longer-lasting product. And we produce in a volume (all told, six times as many as our nearest competitor) that makes it cost effective for us – and for you.

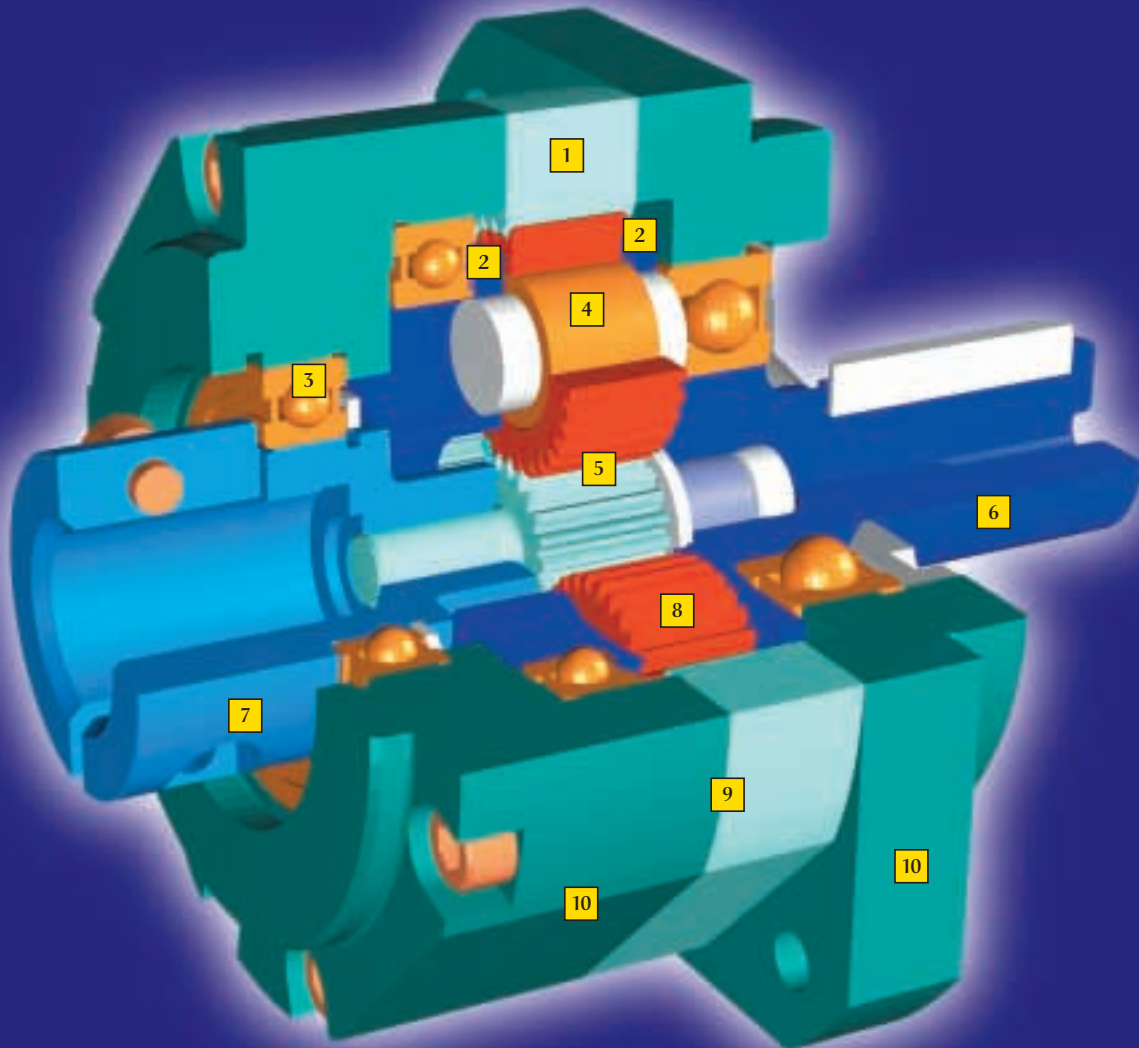
72 Hour Shipping

So whether you need a standard precision planetary in-line, precision hypoid right angle, or a complex modification, we can meet your needs with unparalleled precision and performance. Our gearheads are some of the fastest in the industry at full duty cycle – 24 hours a day, seven days a week, without a break. And we can ship any standard model, configured for any motor, within 72 hours.

Parker Automation


Plus, Parker Hannifin's broad range of automation products allow us to provide single component, sub-systems, or total system solutions along with premier customer service that no other company can match. The bottom line? No matter how you add it up, we have what it takes to be your gearhead supplier of choice.

Features & Benefits




- 1 High Carbon Alloy Steel Ring Gear for Durability & Low Backlash
- 2 Dual End Supported Planet Gears Provides Strength & High Precision
- 3 Sealed Deep Groove Rolling Element Bearings Provide High Speed, Long Life & Heavy Load Capacity. 100% Duty Cycle.
- 4 High Speed Needle Bearings For Consistent Precision
- 5 Thixotropic Grease Means its Lubed for Life. Good in any Orientation.
- 6 Tool Steel Output Shaft for Strength & Toughness
- 7 One Piece Balanced Coupling and Input Shaft
- 8 Through Hardened Gears Provides Strength, Wear Resistance & Low Backlash
- 9 Self-Sealing Stacked Plate Design
- 10 Aluminum Housing for Heat Dissipation & Light Weight


Precision and Low-Backlash Series In-Line

	60	92	115	142		60	92	115	142
									
Backlash [-LB] (single) [arc-min]	<4	<3	<3	<3	Life [hrs]	15000	15000	15000	15000
Backlash [-LB] (dual) [arc-min]	<6	<4	<4	<4	Warranty [yrs]	3	3	3	3
Backlash (single) [arc-min]	<6	<5	<5	<5	Max Overhung Load [N]	75.6	156	244	267
Backlash (dual) [arc-min]	<8	<6	<6	<6	Torsional Stiffness [Nm/arcmin]	4	7.9	28	48
Max Input Speed [RPM]	10000	10000	8000	6000	Max Weight (single/dual) [Kg]	1.3/2.0	3.1/3.9	5.9/8.1	13.6/18.4
Torque Continuous [Nm]* 3, 30:1	44	106	266	419	Max Load [N]				
5, 15, 25, 40, 50:1	49	117	486	731	Radial - 10 RPM**	2936	4261	6094	7281
8, 64, 80:1	47	75	230	436	Radial - 1000 RPM**	632	916	1312	1570
10, 100:1	19	49	147	292	Axial - 10 RPM**	2847	4101	5382	6610
Noise [dBa]	<60	<62	<65	<68	Axial - 1000 RPM**	614	890	1161	1423
Efficiency	>96%	>96%	>96%	>96%					


Utility Series In-Line

	60	92	115	142		60	92	115	142
									
Backlash (single) [arc-min]	<10	<10	<10	<10	Life [hrs]	10000	10000	10000	10000
Backlash (dual) [arc-min]	<12	<12	<12	<12	Warranty [yrs]	2	2	2	2
Max Input Speed [RPM]	8000	8000	6000	5000	Max Overhung Load [N]	75.6	156	244	267
Torque Continuous [Nm]* 3, 30:1	40	95	239	377	Torsional Stiffness [Nm/arcmin]	4	7.9	28	48
5, 15, 25, 40, 50:1	44	105	437	658	Max Weight (single/dual) [Kg]	1.3/2.0	3.1/3.9	5.9/8.1	13.6/18.4
8, 64, 80:1	42	68	207	392	Max Load [N]				
10, 100:1	17	44	132	263	Radial - 10 RPM**	2936	4261	6094	7281
Noise [dBa]	<62	<65	<67	<70	Radial - 1000 RPM**	632	916	1312	1570
Efficiency	>94%	>94%	>94%	>94%	Axial - 10 RPM**	2847	4101	5382	6610
					Axial - 1000 RPM**	614	890	1161	1423


Value Series In-Line

	60	92	115	142		60	92	115	142
									
Backlash (single) [arc-min]	<12	<12	<12	<12	Life [hrs]	10000	10000	10000	10000
Backlash (dual) [arc-min]	<15	<15	<15	<15	Warranty [yrs]	2	2	2	2
Max Input Speed [RPM]	6000	6000	5000	4000	Max Overhung Load [N]	75.6	156	244	267
Torque Continuous [Nm]* 3, 30:1	33	80	200	314	Torsional Stiffness [Nm/arcmin]	4	7.9	28	48
5, 15, 25, 40, 50 :1	37	88	365	548	Max Weight (single/dual) [Kg]	1.3/2.0	3.1/3.9	5.9/8.1	13.6/18.4
8, 64, 80:1	35	56	173	327	Max Load [N]				
10, 100:1	14	37	110	219	Radial - 10 RPM**	2789	4048	5789	6917
Noise [dBa]	<63	<66	<68	<71	Radial - 1000 RPM**	600	870	1247	1492
Efficiency	>92%	>92%	>92%	>92%	Axial - 10 RPM**	2704	3896	5113	6279
					Axial - 1000 RPM**	583	845	1103	1352

NEMA Series In-Line

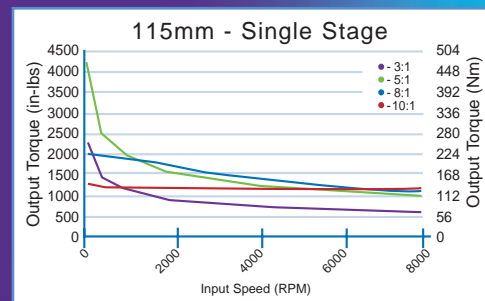
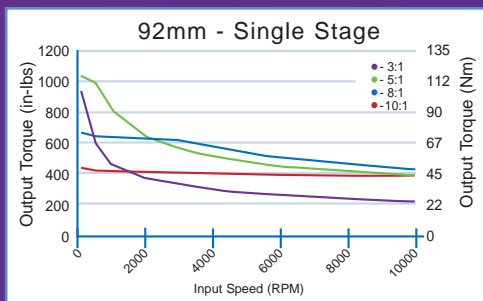
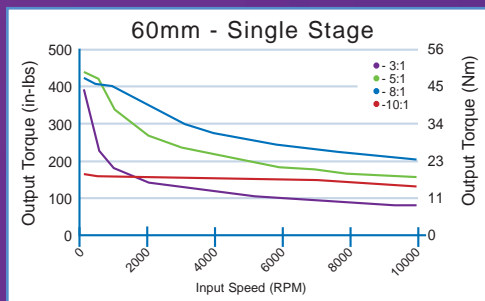
	23	34	42		23	34	42
							
Backlash (single) [arc-min]	<12	<12	<12	Life [hrs]	10000	10000	10000
Backlash (dual) [arc-min]	<15	<15	<15	Warranty [yrs]	2	2	2
Max Input Speed [RPM]	7500	7500	6000	Max Overhung Load [N]	75.6	156	244
Torque Continuous [Nm]* 3, 30:1	33	80	200	Torsional Stiffness [Nm/arcmin]	4	7.9	28
5, 15, 25, 40, 50 :1	37	88	365	Max Weight (single/dual) [Kg]	1.3/2.0	3.1/3.9	5.9/8.1
8, 64, 80:1	35	56	173	Max Load [N]			
10, 100:1	14	37	110	Radial - 10 RPM**	2789	4048	5789
Noise [dBa]	<63	<66	<68	Radial - 1000 RPM**	600	870	1247
Efficiency	>92%	>92%	>92%	Axial - 10 RPM**	2704	3896	5113
				Axial - 1000 RPM**	583	845	1103

Precision Series Right Angle

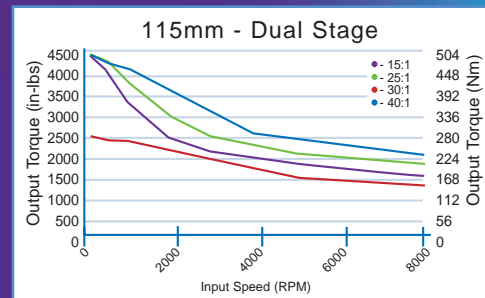
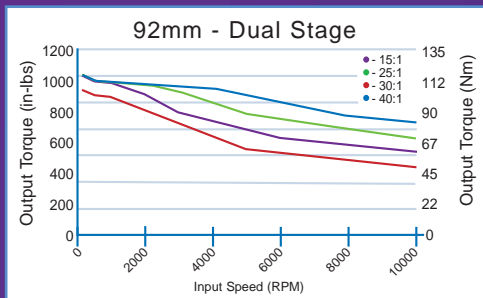
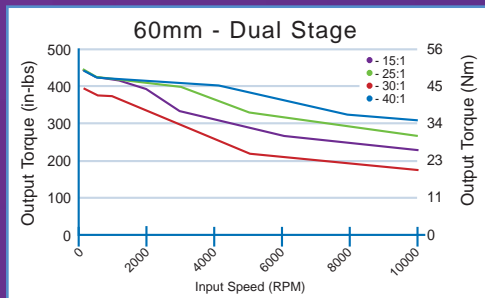
	60	92	115	142		60	92	115	142
									
Backlash (single) [arc-min]	<5	<5	<4	<4	Life [hrs]	30000	30000	30000	30000
Backlash (dual) [arc-min]	<7	<7	<6	<6	Warranty [yrs]	3	3	3	3
Max Input Speed [RPM]	8000	8000	7000	6000	Max Overhung Load [N]	61.4	122	211	267
Torque Continuous [Nm]* 15:1	25	50	95	180	Torsional Stiffness [Nm/arcmin]	3.5	7	17.5	48
3, 5, 8, 10, >15:1	35	70	140	260	Max Weight (single/dual) [Kg]	2.5/3.8	5.0/7.1	8.5/14.4	15.0/29.1
Noise [dBa]	<66	<66	<68	<68	Max Load [N]				
Efficiency	>96%	>96%	>96%	>96%	Radial - 500 RPM**	3300	4900	7200	10000
					Radial - 1000 RPM**	3011	4403	6663	8940
					Axial - 500 RPM**	1650	2450	3600	5000
					Axial - 1000 RPM**	1481	2228	3251	4546

*Continuous Torque rated at at 100 RPM input speed **Output speed

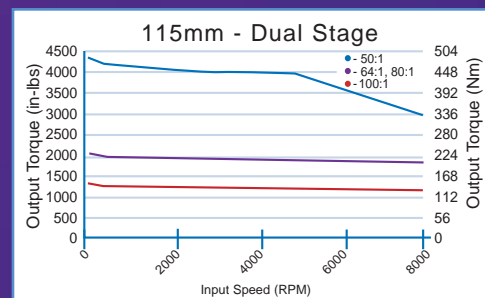
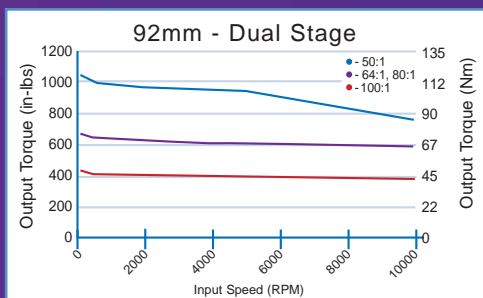
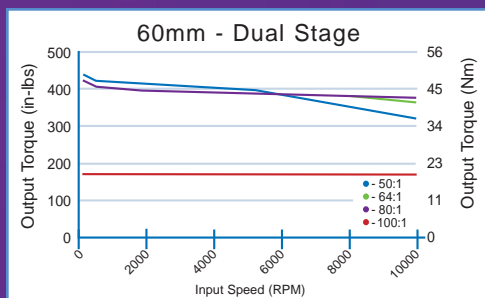
Precision, Low-Backlash Series In-Line – Single Stage (3:1, 5:1, 8:1, 10:1)



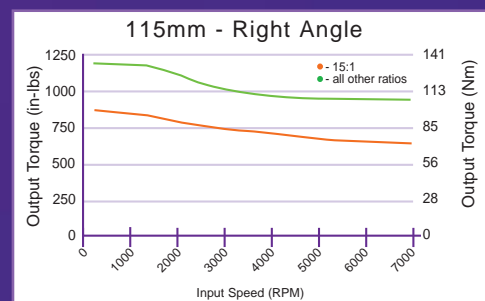
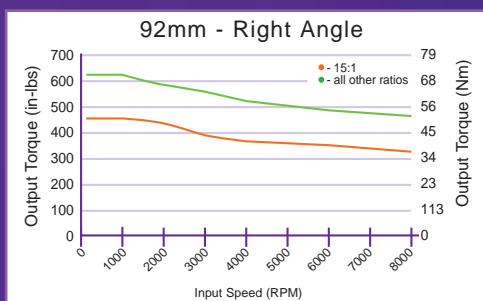
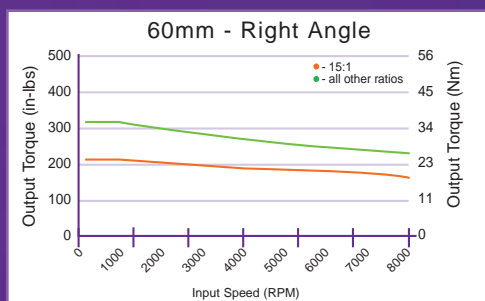
Precision, Low-Backlash Series In-Line – Dual Stage (15:1, 25:1, 30:1, 40:1)



Precision, Low-Backlash Series In-Line – Dual Stage (50:1, 64:1, 80:1, 100:1)



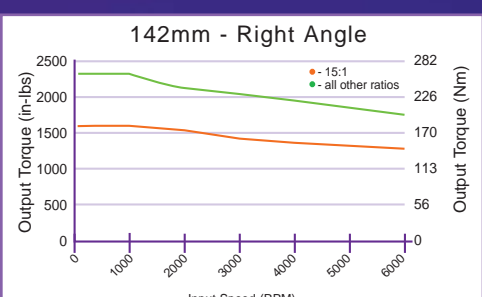
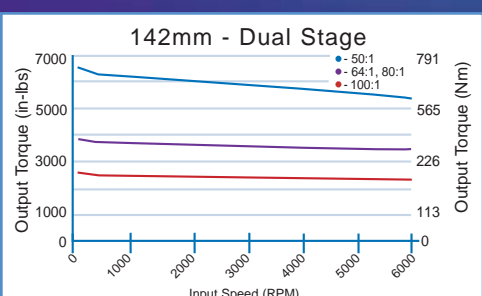
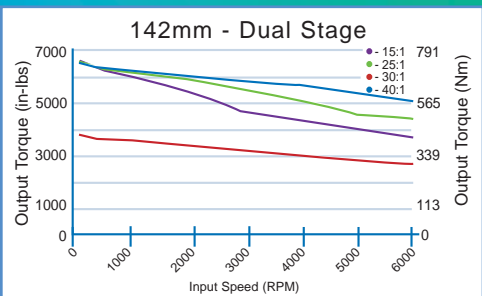
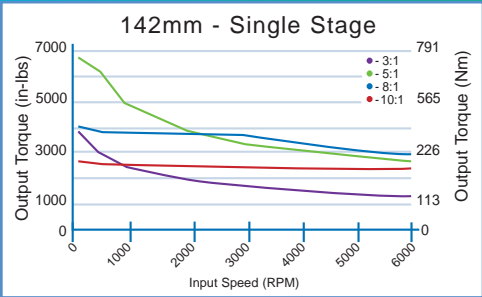
Precision Series Right Angle (3:1, 5:1, 8:1, 10:1, 15:1, 25:1, 30:1, 40:1, 50:1, 64:1, 80:1, 100:1)



Moment of Inertia [kg-cm²]

In-Line	60	92	115	142	Right Angle	60	92	115	142
3:1	0.14	0.83	2.20	12.5	3:1	0.43	1.10	2.50	6.7
5:1	0.13	0.54	1.28	6.3	5:1	0.24	0.63	1.40	3.8
8:1	0.12	0.47	1.22	4.8	8:1	0.18	0.47	1.10	2.8
10:1	0.11	0.45	1.18	4.4	10:1	0.16	0.43	1.00	2.5
15:1	0.15	0.78	2.10	6.3	15:1	0.14	0.39	0.89	2.3
25:1	0.14	0.50	1.77	5.9	25:1	0.14	0.57	1.34	1.43
30:1	0.15	0.48	1.51	6.5	30:1	0.16	0.88	2.30	2.47
40:1	0.15	0.47	1.10	5.4	40:1	0.14	0.56	1.32	1.39
50:1	0.12	0.50	1.20	4.5	50:1	0.14	0.56	1.32	1.38
64:1	0.12	0.47	1.14	4.5	64:1	0.13	0.48	1.24	1.26
80:1	0.12	0.44	1.15	4.6	80:1	0.13	0.48	1.23	1.26
100:1	0.12	0.46	1.15	4.3	100:1	0.12	0.46	1.19	1.21

Conversion Table	
1 kg	= 2.2 lb _m
1 N	= 0.225 lb _f
1 mm	= 0.03937 in
1 Nm	= 8.92 in-lbs
1 Nm	= 0.737 ft-lbs
1 kg-cm ²	= 0.0001 kg-m ²
1 kg-cm ²	= 0.000885 lb-in-s ²

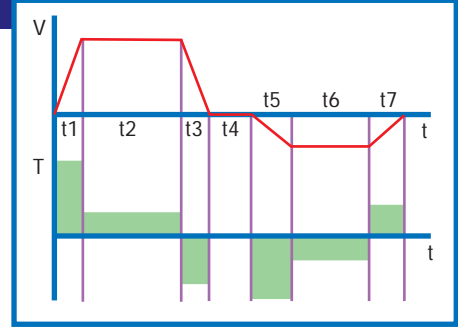


Speed-Torque Curves for UTN, VLN and NEN De-rating Guide

To determine Speed-Torque:
 Multiply PRN(LB) torque rating by 0.9 for Utility In-Line Series.
 Multiply PRN(LB) torque rating by 0.75 for Value and NEMA In-line Series.
 For NEMA 23, 34 and 42 use 60, 92 and 115mm respectively.
 The max speed is reduced for the Utility, Value and NEMA series. See the performance specifications for max ratings.

Sizing & Selection Process

1. Develop Motion Profile – Based on Application's Requirements (*Output* from the Gearhead)



Determine time, velocity, and torque for each segment:

$$t_n \quad t_T \quad oV_n \quad oT_n$$

2. Calculate Max Input Speed (iV_{MAX}), and Mean Input Speed (iV_{MEAN})

$$iV_{MAX} = oV_{MAX} \cdot i \quad iV_{MEAN} = \frac{\sum (oV_n \cdot t_n)}{\sum t_n}$$

3. Calculate RMS Torque

$$oT_{RMS} = \sqrt{\frac{\sum_{n=1}^N (oV_n \cdot t_n \cdot oT_n^2)}{\sum_{n=1}^N (oV_n \cdot t_n)}}$$

4. Adjust for Sub-cycles (the number of "Start-stops") per hour

$$N_c = \frac{3600}{t_T} \quad N_{s-c} = N_c \cdot \frac{Subcycles}{Cycle}$$

Look up f_b for corresponding N_{s-c} and adjust T_{RMS} :

$$oT_{RMS} = oT_{RMS} \cdot f_b$$

Sub Cycles per Hour	Shock Factor (f_b)
< 500	1.00
500 to 1000	1.05
1000 to 1500	1.10
1500 to 2000	1.30
2000 to 3000	1.60
> 3000	2.00

Ex: Given a 3 sec cw move, 1 sec dwell and 5 sec ccw move
 $t_T = 9sec$ $N_c = 400$ with 2 start-stops per cycle $N_{s-c} = 800$, $f_b = 1.05$

5. Go to Speed Torque Curves for Selected Family and Ratio and check:

- 5.1. oT_{RMS} at $iV_{MAX} \leq oT_{CONT}$
- 5.2. $iV_{MAX} <$ Max Input speed of gearhead
- 5.3. $iV_{MEAN} <$ 80% of Rated Input Speed
- 5.4. Check that Application $T_{PEAK} < 2 \cdot T_{CONT}$ Rated
- 5.5. Check that application does not spend more than 5% of time above continuous rating

$$DC = \frac{\sum time_{(T < T_{cont})}}{Total Cycle Time} \cdot 100\%$$

- 5.6. Also check Axial and Radial Load requirements

Backed by the Power of Parker

Zenith zenithproducts.com
 Compumotor compumotor.com
 Daedal daedalpositioning.com
 Automation Actuator... parker.com/automation
 CTC..... ctcsusa.com
 Parker Hannifin parker.com

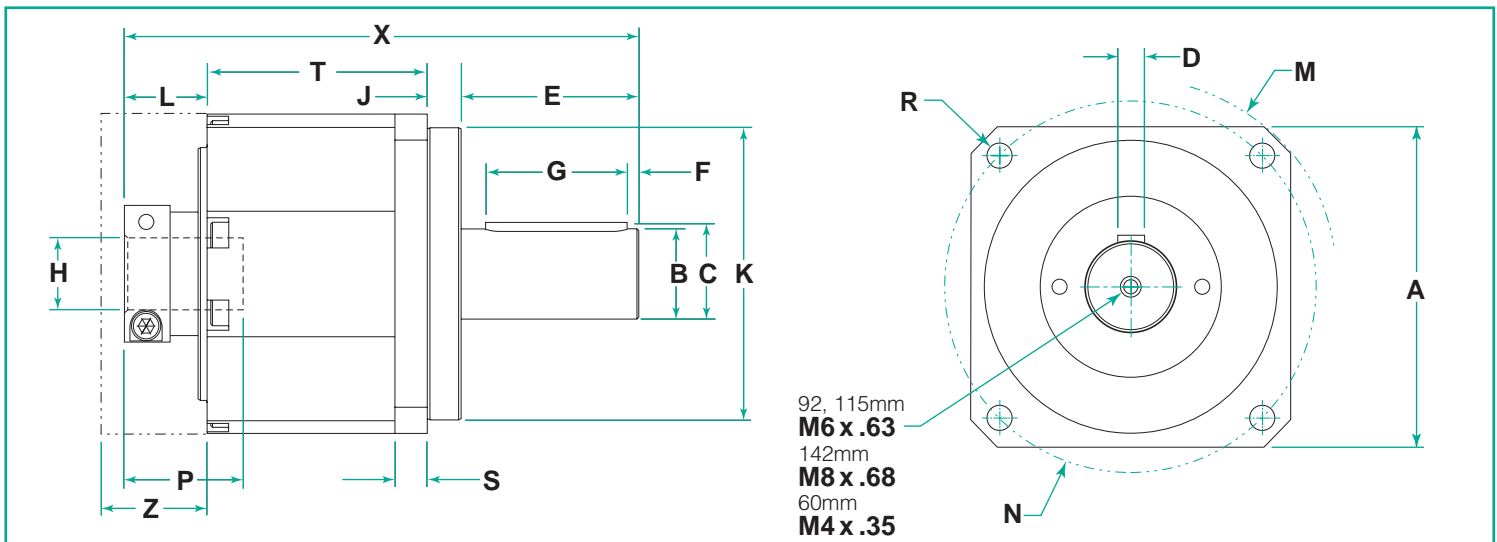
iV_n = Input Velocity for Motion Profile Segment n
 oV_n = Output Velocity for Motion Profile Segment n
 iT_n = Input Torque for Motion Profile Segment n
 oT_n = Output Torque for Motion Profile Segment n
 i = Gearhead ratio
 e = Gearhead efficiency

J = Inertia
 DC = Duty Cycle
 N_a = Number of Something
 t_n = Time of Motion Profile Segment n
 t_T = Total Cycle Time
 f_b = Shock Factor for Sub-cycles

All standard gearheads ship in
72 hours or less*
 *5 units or less

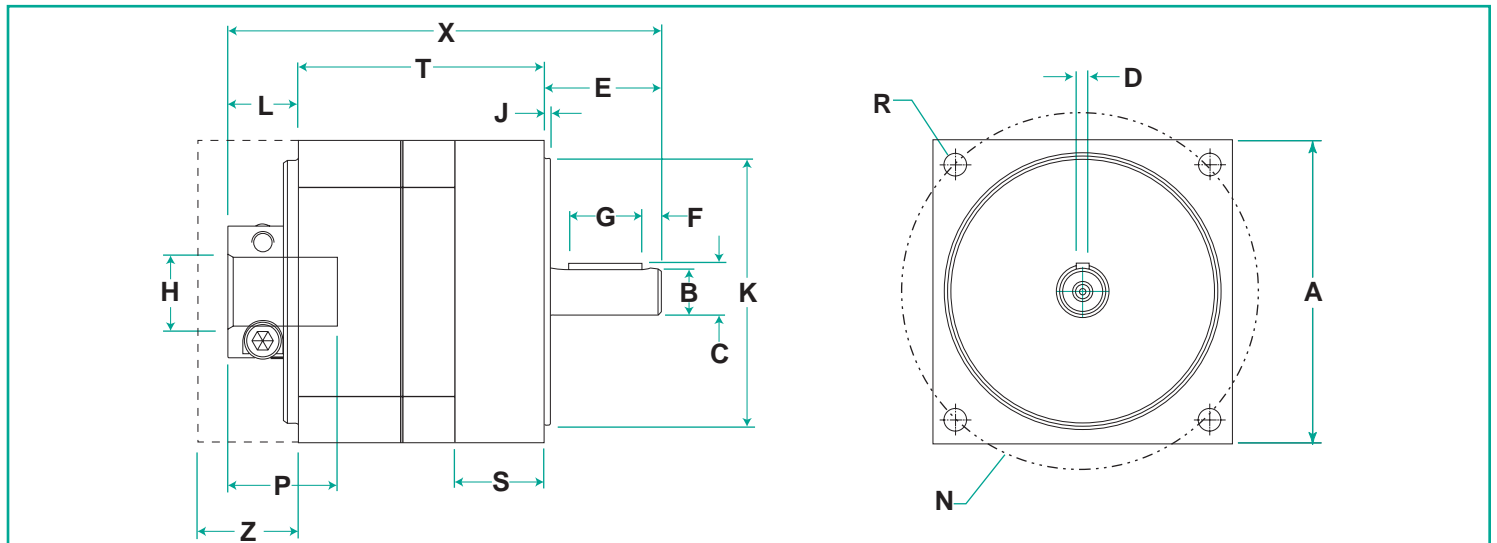
"Input" and "Output" are defined with respect to the gearhead. The *output* of the motor is the *input* to the Gearhead. The *input* to the Application comes from the *output* of the gearhead.

Precision, Low-Backlash, Utility and Value Series In-Line Dimensions (mm)



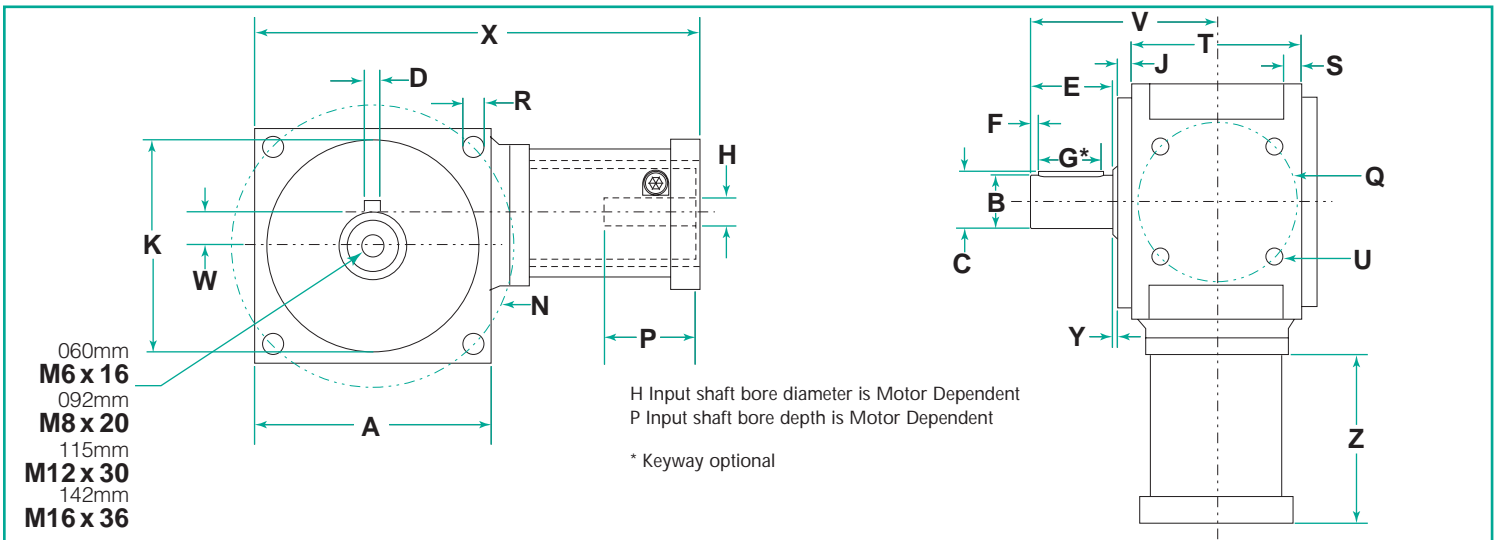
PRN, UTN, (VLN)	60	92	115	142		60	92	115	142
A Square output flange	60	92	115	142	M Overall diameter	80	116	152	185
B Output shaft diameter (j6)	16	22 (20)	32 (24)	40	N Flange bolt circle diameter	70	100	130	165
C Output shaft over key dimension	18	24.5 (22.5)	34.9 (27)	42.9 (43)	P Input shaft bore depth	23	30	40	50
D Output key width	5	6	10 (8)	12	R Mounting bolt hole diameter	5.5	6.5	8.5	11
E Useable output shaft length	28.5 (22.5)	36.5 (37)	51 (46.5)	79	S Flange thickness	12.7 (18.7)	13.5 (20.5)	14.8 (23.3)	14.2 (25.2)
F Distance from end of shaft to key	2	3.2	5 (7)	5	T Body length (single stage)	58 (64)	56.4 (63.4)	77.4 (85.9)	97.7 (108.7)
G Key length	25	31.9	39.9 (31.9)	62.9	T Body length (dual stage)	104.5 (110.5)	105 (112)	145.8 (154.3)	186.5 (197.5)
H Input shaft bore diameter (E6)	14	19	24	32 (24)	X Overall length (single stage)	104.9 (98.9)	122.4 (122.8)	170 (165.5)	228.5
J Output pilot thickness	8.5	10 (3)	12/(3.5)	15 (4)	X Overall length (dual stage)	151.4 (145.4)	171 (171.3)	238.3 (234)	317.3
K Output pilot diameter (g6)	50	80	110	130	Z Motor adapter thickness	15-23	20-38	33-46	38-71
L Input side extension	10	19.5	29.6	36.8					

NEMA Series In-Line Dimensions (in)



NEN	23	34	42		23	34	42
A Square output flange	2.25	3.25	4.20	L Input Pilot Length	0.39	0.77	1.16
B Output shaft diameter #	0.375	0.500	0.625	N Flange bolt circle diameter	2.63	3.88	4.95
C Output shaft over key dimension	flat	0.556	0.706	P Input shaft bore depth	0.91	1.18	1.58
D Output key width	flat	0.125	0.188	R Mounting bolt hole diameter	0.22	0.22	0.28
E Useable output shaft length	1.00	1.25	1.50	S Flange thickness	0.84	0.96	1.12
F Distance from end of shaft to key	flat	0.20	0.21	T Body length (single stage)	2.62	2.65	3.59
G Key length	flat	0.79	0.98	T Body length (dual stage)	4.45	4.57	6.28
H Input shaft bore diameter	0.55	0.75	0.95	X Overall length (single stage)	4.01	4.67	6.25
J Output pilot thickness	0.06	0.06	0.09	X Overall length (dual stage)	5.84	6.59	8.94
K Output pilot diameter	1.50	2.88	2.19	Z Motor adapter thickness	.60-90	.80-1.50	1.30-1.80

Precision Series Right Angle Dimensions (mm)



PRR	60	92	115	142		60	92	115	142
A Square output flange	90	115	140	170	Q External mounting bolt circle	62.2	76.4	93.3	113.1
B Output shaft diameter (k6)	20	24	32	40	R Motor mount bolt hole diameter	6.6	9	11	14
C Output shaft over key dimension	22.5	27	35	43	S Flange thickness	8	10	11	13
D Output key width	6	8	10	12	T Output body length	73	88.5	108	128
E Useable output shaft length	35	40	50	60	U External mounting bolt hole size	M6	M8	M10	M12
F Distance from end of shaft to key	4	2	3	2	V Center line to end of output shaft	80	90	110	130
G Key length*	28	36	45	56	W Input shaft to output shaft offset	9	14	18	23
J Output pilot thickness	13	8.5	8	8	X Overall length (single stage)	175	225.5	261	305
K Output pilot diameter (g6)	89	105	125	150	Y Overall length (dual stage)	249	368	456	500
N Flange bolt circle	110.3	138.6	166.9	203.6	X Shaft hub thickness	1.5	1.5	2	2
					Z Motor adapter thickness	49	82	95	108

Part Number Ordering Code (Sample: Precision In-line Low Backlash, Size 60, 15:1 Ratio using Compumotor/SM233)

P	R	N	LB	-	0	6	0	-	0	1	5	-	Compumotor/SM233
Series					Frame Size				Ratio			Options	Manufacturer/Model
PRN-LB - Precision In-Line Low Backlash PRN - Precision In-Line PRR - Precision Right Angle UTN - Utility In-line VLN - Value In-Line NEN - NEMA					060 - 60mm 092 - 92mm 115 - 115mm 142 - 142mm	023 - NEMA23* 054 - NEMA34* 042 - NEMA42* <small>* NEN series only</small>		003 - 3:1 005 - 5:1 008 - 8:1 010 - 10:1 015 - 15:1 025 - 25:1	030 - 30:1 040 - 40:1 050 - 50:1 064 - 64:1 080 - 80:1 100 - 100:1	omit - Standard X - Special	Call toll free 1-877-959-GEAR for customized options		

Motor Adapters Available for:

Allen Bradley	IDC	Compumotor
AMP	Indramat	Digiplan
Animatics	Kollmorgen	Hauser
Baldor	Leeson	Quicksilver
Custom	MCG	Sanyo Denke
Servomotor	Microkinetics	Siemens
Electrocraft	Mitsubishi	Superior Electric
Emerson	MTS	Teknic
GE Fanuc	Oriental	Warner Electric
Giddings & Lewis	Ormec	Yaskawa
IAI	Pacific Scientific	Many Others
	Panasonic	

Ask About Options:

- C-Face Motor Adapters
- Keyed Input Coupling
- Extra Mounting Kits
- Shaft Dimension Changes
- Special Materials
- Ratios above 100:1
- Keyway Alterations
- Right Angle: Ratios to 1500:1
- Right Angle: Hollow Bore
- Right Angle: Dual Shafts
- Right Angle: Low Backlash

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