Parker Precision Gearheads

The New Standard in Precision Gearheads

Parker Automation

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, utilize a premium 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

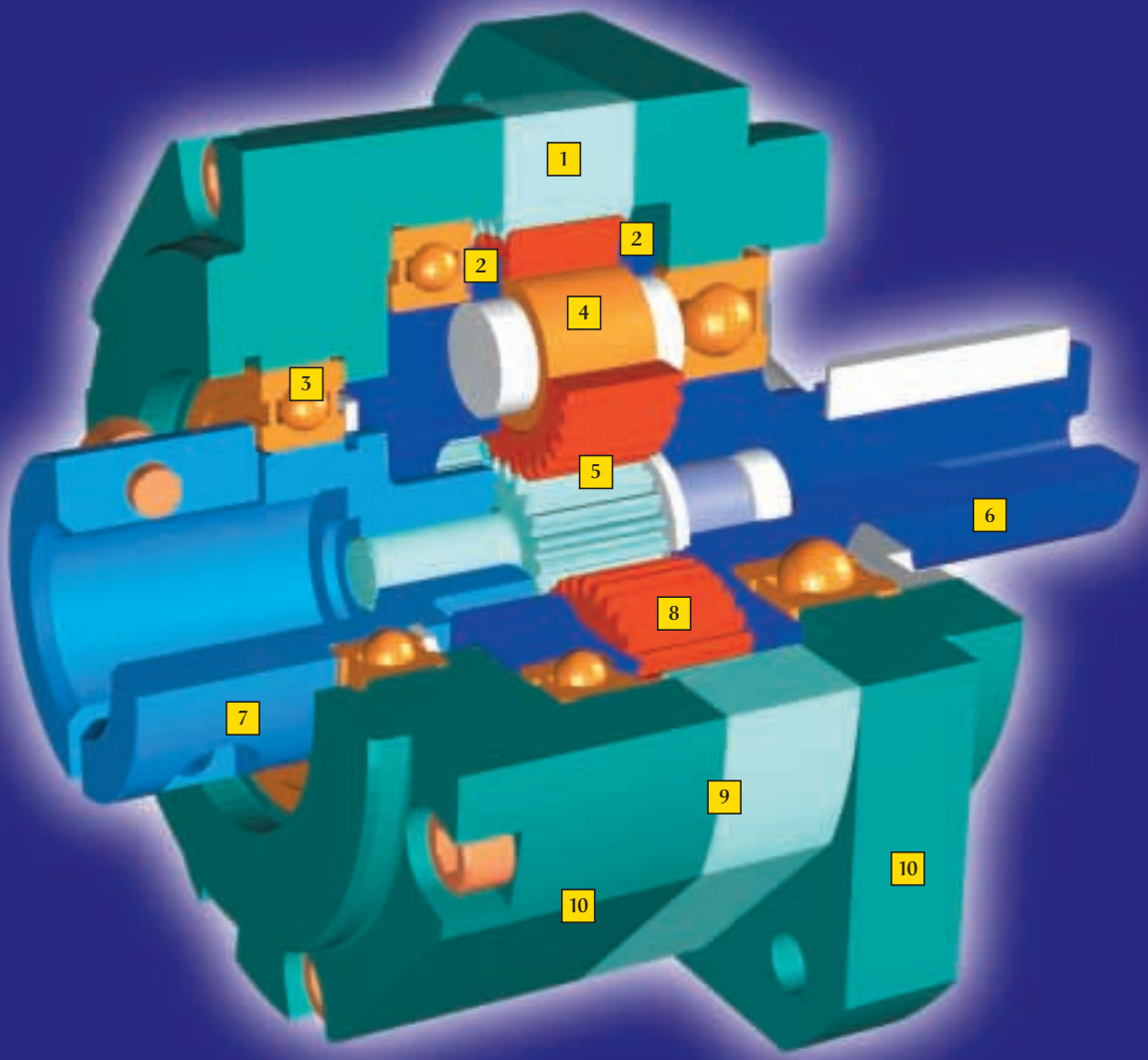
So whether you need a standard precision planetary in-line, precision hypoid right angle, or a complex modification, we can meet your needs with unparalleled precision and performance. Our gearheads are some of the fastest in the industry at full duty cycle—24 hours a day, seven days a week, without 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.

IP57M Protection • 100% Duty Cycle • 2x Continuous Peak • Made in USA • 3 Year Warranty

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
Backlash [-LB] (single) [arc-min]	<4	<3	<3	<3
Backlash [-LB] (dual) [arc-min]	<6	<4	<4	<4
Backlash (single) [arc-min]	<6	<5	<5	<5
Backlash (dual) [arc-min]	<8	<6	<6	<6
Max Input Speed [RPM]	10000	10000	8000	6000
Torque Continuous [Nm]* 3, 30:1	44	106	266	419
5, 15, 25, 40, 50:1	49	117	486	731
8, 64, 80:1	47	75	230	436
10, 100:1	19	49	147	292
Noise [dBa]	<60	<62	<65	<68

Max input torque must be less than 2x rated continuous output divided by the ratio

	60	92	115	142
Efficiency	>96%	>96%	>96%	>96%
Life [hrs]	15000	15000	15000	15000
Warranty [yrs]	3	3	3	3
Max Overhung Load [N]	75.6	156	244	267
Torsional Stiffness [Nm/arcm]	4	7.9	28	48
Max Weight (single/dual) [Kg]	1.3/2.0	2.1/3.9	5.9/8.1	13.6/18.4
Max Load [N]				
Radial - 10 RPM**	2936	4261	6094	7281
Radial - 1000 RPM**	632	916	1312	1570
Axial - 10 RPM**	2847	4101	5382	6610
Axial - 1000 RPM**	614	890	1161	1423

Utility Series In-Line

	60	92	115	142
Backlash (single) [arc-min]	<10	<10	<10	<10
Backlash (dual) [arc-min]	<12	<12	<12	<12
Max Input Speed [RPM]	8000	8000	6000	5000
Torque Continuous [Nm]* 3, 30:1	40	95	239	377
5, 15, 25, 40, 50:1	44	105	437	658
8, 64, 80:1	42	68	207	392
10, 100:1	17	44	132	263
Noise [dBa]	<62	<65	<67	<70
Efficiency	>94%	>94%	>94%	>94%

	60	92	115	142
Life [hrs]	10000	10000	10000	10000
Warranty [yrs]	2	2	2	2
Max Overhung Load [N]	75.6	156	244	267
Torsional Stiffness [Nm/arcm]	4	7.9	28	48
Max Weight (single/dual) [Kg]	1.3/2.0	2.1/3.9	5.9/8.1	13.6/18.4
Max Load [N]				
Radial - 10 RPM**	2936	4261	6094	7281
Radial - 1000 RPM**	632	916	1312	1570
Axial - 10 RPM**	2847	4101	5382	6610
Axial - 1000 RPM**	614	890	1161	1423

Value Series In-Line

	60	92	115	142
Backlash (single) [arc-min]	<12	<12	<12	<12
Backlash (dual) [arc-min]	<15	<15	<15	<15
Max Input Speed [RPM]	6000	6000	5000	4000
Torque Continuous [Nm]* 3, 30:1	33	80	200	314
5, 15, 25, 40, 50 :1	37	88	365	548
8, 64, 80:1	35	56	173	327
10, 100:1	14	37	110	219
Noise [dBa]	<63	<66	<68	<71
Efficiency	>92%	>92%	>92%	>92%

	60	92	115	142
Life [hrs]	10000	10000	10000	10000
Warranty [yrs]	2	2	2	2
Max Overhung Load [N]	75.6	156	244	267
Torsional Stiffness [Nm/arcm]	4	7.9	28	48
Max Weight (single/dual) [Kg]	1.3/2.0	2.1/3.9	5.9/8.1	13.6/18.4
Max Load [N]				
Radial - 10 RPM**	2789	4048	5789	6917
Radial - 1000 RPM**	600	870	1247	1492
Axial - 10 RPM**	2704	3896	5113	6279
Axial - 1000 RPM**	583	845	1103	1352

NEMA Series In-Line

	23	34	42
Backlash (single) [arc-min]	<12	<12	<12
Backlash (dual) [arc-min]	<15	<15	<15
Max Input Speed [RPM]	7500	7500	6000
Torque Continuous [Nm]* 3, 30:1	33	80	179
5, 15, 25, 40, 50 :1	37	88	179
8, 64, 80:1	35	56	173
10, 100:1	14	37	110
Noise [dBa]	<63	<66	<68
Efficiency	>92%	>92%	>92%

	23	34	42
Life [hrs]	10000	10000	10000
Warranty [yrs]	2	2	2
Max Overhung Load [N]	75.6	156	244
Torsional Stiffness [Nm/arcm]	4	7.9	28
Max Weight (single/dual) [Kg]	1.3/2.0	2.1/3.9	5.9/8.1
Max Load [N]			
Radial - 10 RPM**	2789	4048	5789
Radial - 1000 RPM**	600	870	1247
Axial - 10 RPM**	2704	3896	5113
Axial - 1000 RPM**	583	845	1103

NEMA corresponds to the gearhead output face. All Parker Precision gearheads metric or NEMA can accept either NEMA or metric motors

Precision and Low Backlash Series Right Angle

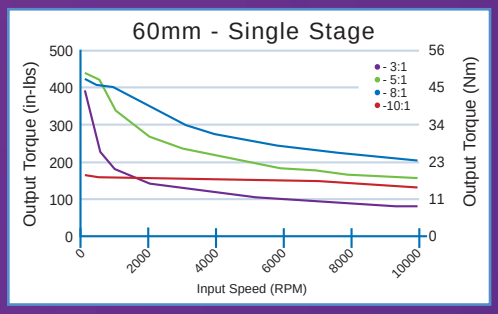
	60	92	115	142
Backlash [-LB] (single) [arc-min]	<3	<3	<2	<2
Backlash [-LB] (dual) [arc-min]	<5	<5	<4	<4
Backlash (single) [arc-min]	<5	<5	<4	<4
Backlash (dual) [arc-min]	<7	<7	<6	<6
Max Input Speed [RPM]	8000	8000	7000	6000
Torque Continuous [Nm]* 15:1	25	50	95	180
3, 5, 8, 10, >15:1	35	70	140	260
Noise [dBa]	<66	<66	<68	<68
Efficiency	>96%	>96%	>96%	>96%

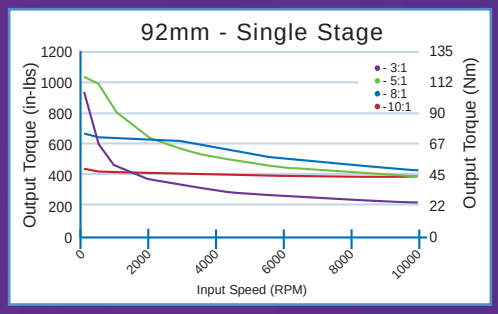
Also available in dual shaft and hollow bore configurations

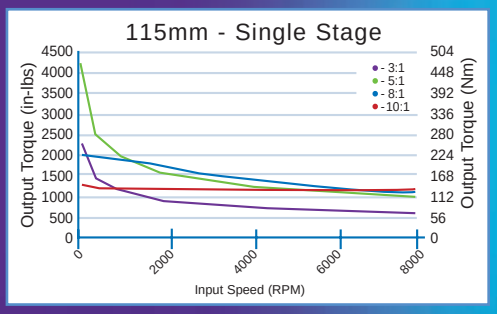
	60	92	115	142
Life [hrs]	30000	30000	30000	30000
Warranty [yrs]	3	3	3	3
Max Overhung Load [N]	61.4	122	211	267
Torsional Stiffness [Nm/arcm]	3.5	7	17.5	48
Max Weight (single/dual) [Kg]	2.5/3.8	5.0/7.1	8.5/14.4	15.0/29.1
Max Load [N]				
Radial - 500 RPM**	3300	4900	7200	10000
Radial - 1000 RPM**	3011	4403	6663	8940
Axial - 500 RPM**	1650	2450	3600	5000
Axial - 1000 RPM**	1481	2228	3251	4546

Limit the input torque to the peak output torque divided by the ratio
*Peak Torque is 2x Continuous for up to 5% Duty Cycle • **Output speed

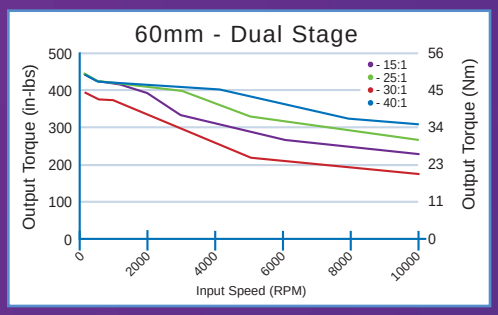
Precision, Low-Backlash Series In-Line – Single Stage (3:1, 5:1, 8:1, 10:1)

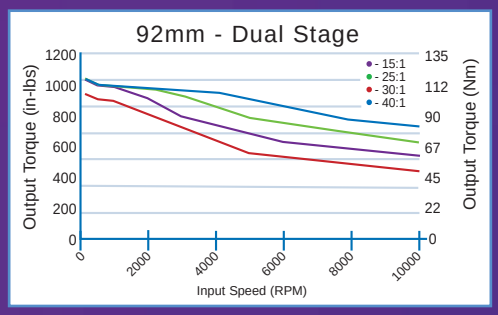


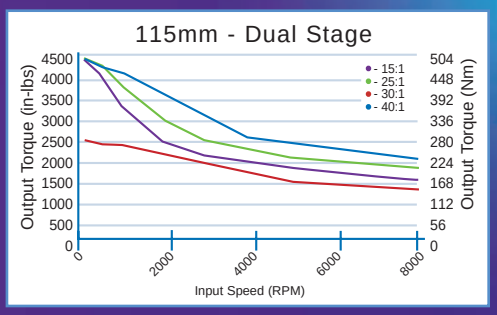




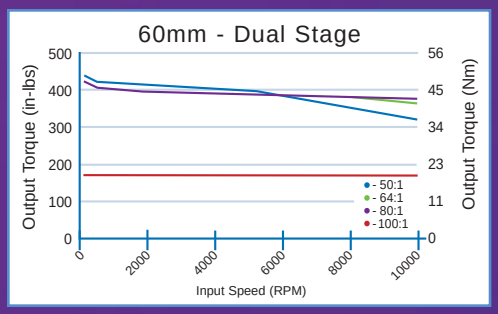
Precision, Low-Backlash Series In-Line – Dual Stage (15:1, 25:1, 30:1, 40:1)

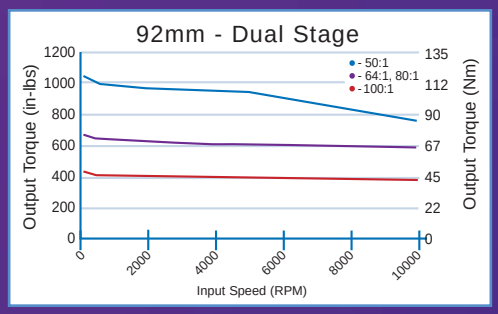


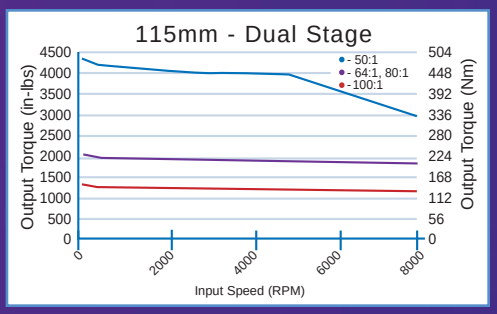




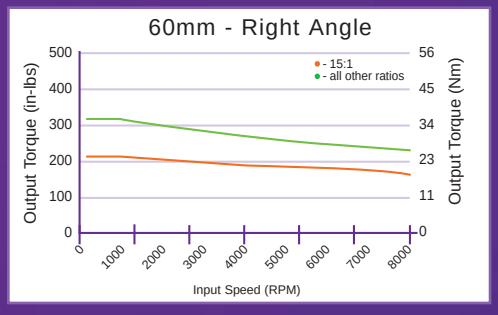
Precision, Low-Backlash Series In-Line – Dual Stage (50:1, 64:1, 80:1, 100:1)

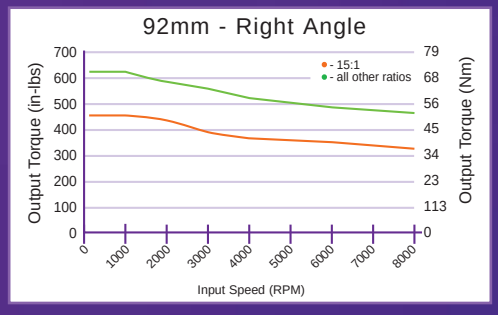


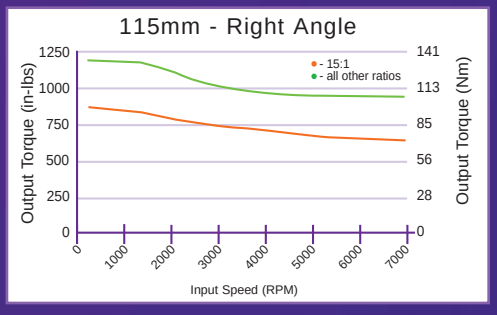




Precision Series Right Angle (3:1, 5:1, 8:1, 10:1, 15:1, 25:1, 30:1, 40:1, 50:1, 64:1, 80:1, 100:1)





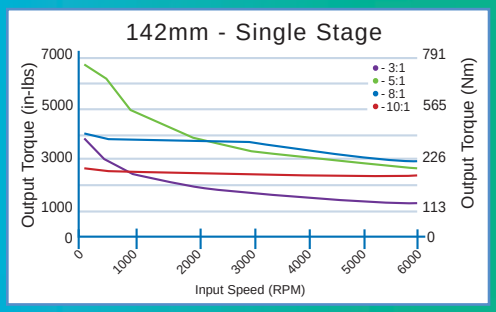


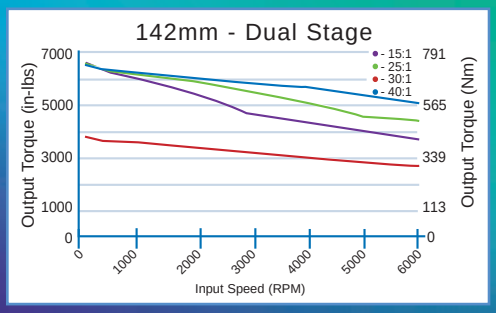
Moment of Inertia [kg-cm²]

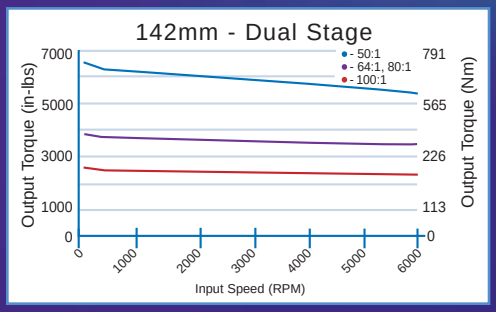
In-Line	60	92	115	142
3:1	0.14	0.83	2.20	12.5
5:1	0.13	0.54	1.28	6.3
8:1	0.12	0.47	1.22	4.8
10:1	0.11	0.45	1.18	4.4
15:1	0.15	0.78	2.10	6.3
25:1	0.14	0.50	1.77	5.9
30:1	0.15	0.48	1.51	6.5
40:1	0.15	0.47	1.10	5.4
50:1	0.12	0.50	1.20	4.5
64:1	0.12	0.47	1.14	4.5
80:1	0.12	0.44	1.15	4.6
100:1	0.12	0.46	1.15	4.3

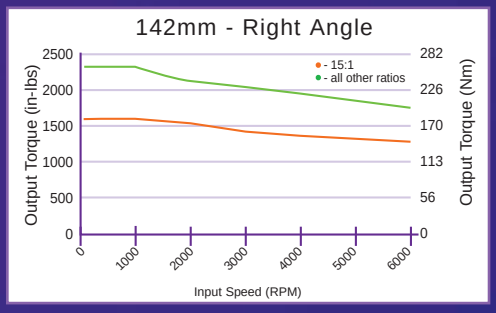
Right Angle	60	92	115	142
3:1	0.43	1.10	2.50	6.7
5:1	0.24	0.63	1.40	3.8
8:1	0.18	0.47	1.10	2.8
10:1	0.16	0.43	1.00	2.5
15:1	0.14	0.39	0.89	2.3
25:1	0.14	0.57	1.34	1.43
30:1	0.16	0.88	2.30	2.47
40:1	0.14	0.56	1.32	1.39
50:1	0.14	0.56	1.32	1.38
64:1	0.13	0.48	1.24	1.26
80:1	0.13	0.48	1.23	1.26
100:1	0.12	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-cm²	=	0.0001 kg-m²
1 kg-cm²	=	0.000885 lb-in-s²









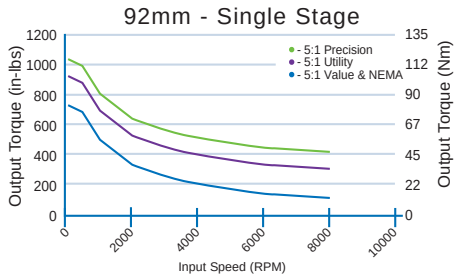
Backed by the Power of Parker

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

All standard gearheads ship in 72 hours or less*

*5 units or less

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



To determine Speed-Torque:

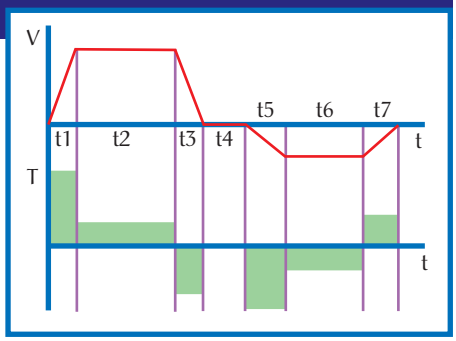
Multiply PRN(LB) torque rating by 0.9 for Utility In-Line Series.

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 (${}_iV_{MEAN}$)

$$ {}_iV_{MAX} = {}_oV_{MAX} \cdot i \qquad {}_iV_{MEAN} = \frac{\Sigma\,({}_oV_a \cdot t_n)}{\Sigma t_n} $$

3. Calculate RMS Torque

$$ \overline{{}_oT_{RMS}} = \sqrt{\frac{\sum_{n=1}^{N} ({}_oV_n \cdot t_n \cdot {}_oT^2{}_n)}{\sum_{n=1}^{N} ({}_oV_n \cdot t_n)}} $$

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

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

Look up f_b for corresponding $N_{S\text{-}C}$ and adjust T_{RMS}:

$$ {}_oT_{RMS} = \overline{{}_oT_{RMS}} \cdot f_b $$

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
$t_T = 9$sec $N_C = 400$ with 2 start-stops per cycle $N_{S\text{-}C} = 800$, $f_b = 1.05$

5. Go to Speed Torque Curves for Selected Family and Ratio and check:
   - 5.1. ${}_oT_{RMS}$ at ${}_iV_{MAX} \le {}_oT_{CONT}$
   - 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

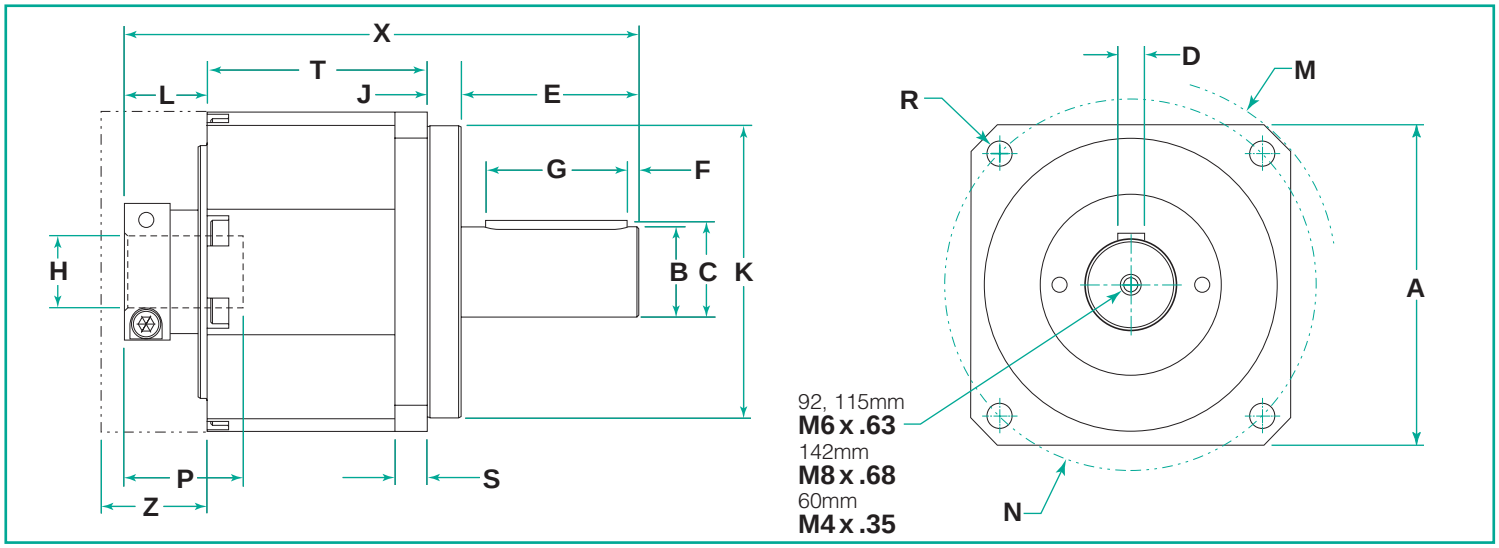
$$ DC = \frac{\Sigma time_{(T < T_{cont})}}{Total\ Cycle\ Time} \cdot 100\% $$

   - 5.6. Also check Axial and Radial Load requirements

${}_iV_n$=Input Velocity for Motion Profile Segment n	J=Inertia
${}_oV_n$=Output Velocity for Motion Profile Segment n	DC=Duty Cycle
${}_iT_n$=Input Torque for Motion Profile Segment n	N_a=Number of Something
${}_oT_n$=Output Torque for Motion Profile Segment n	t_n=Time of Motion Profile Segment n
i=Gearhead ratio	t_T=Total Cycle Time
e=Gearhead efficiency	f_b=Shock Factor for Sub-cycles

"*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.

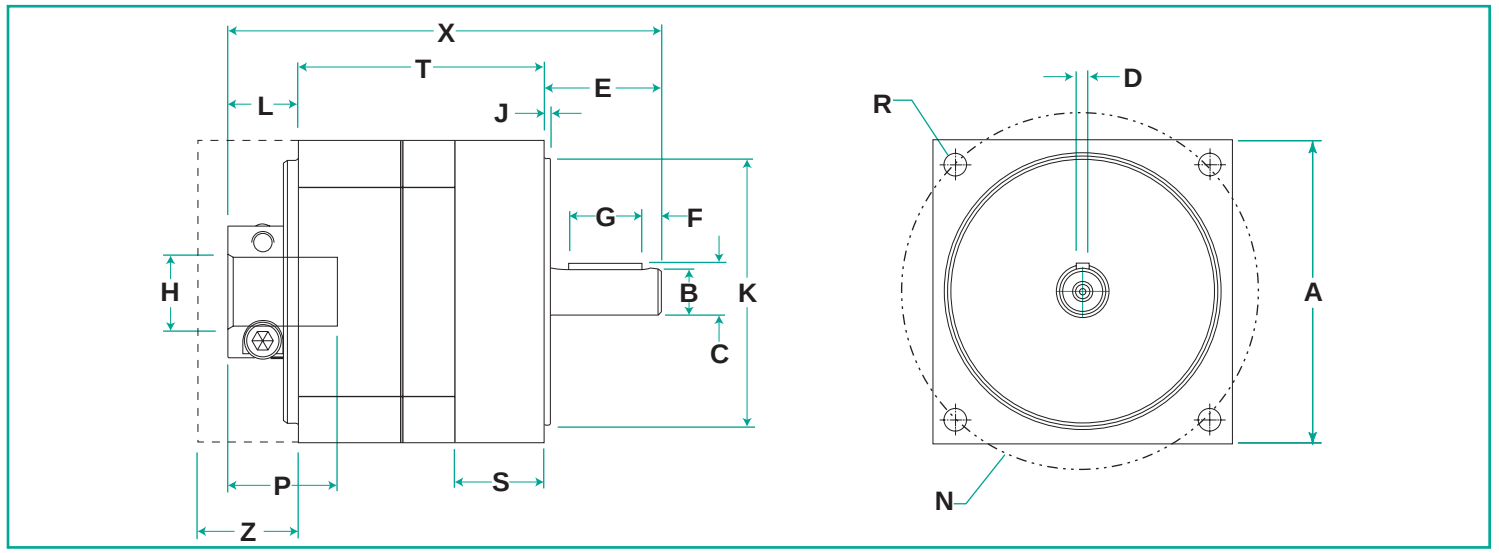
Precision, Low-Backlash, Utility and Value Series In-Line Dimensions (mm)



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)	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)	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 (16)	31.9	40 (32)	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	X Overall length (single stage)	104.9 (98.9)	122.4 (122.8)	170 (165.5)	228.5
J Output pilot thickness	8.5 (2.5)	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					

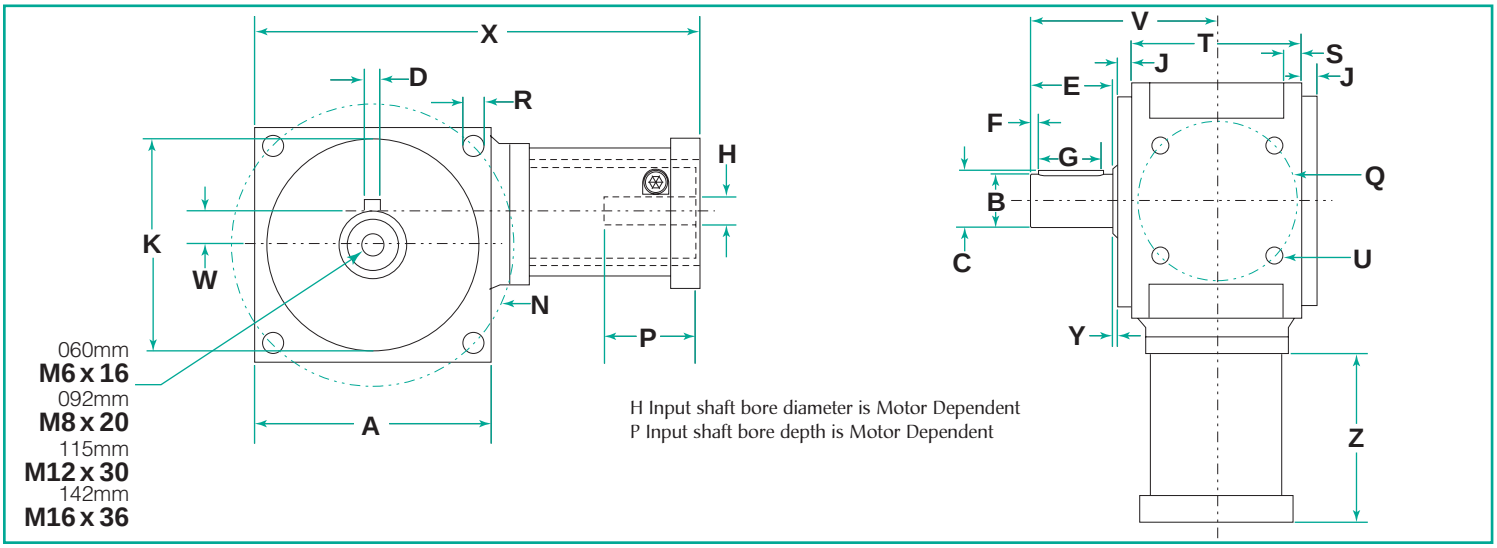
The parenthetical numbers correspond to the VLN series where shown. If only one number is listed it refers to the PRN, UTN and VLN series

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 Side Extension	0.39	0.77	1.16
B Output shaft diameter #	0.375	0.500	0.625	N Flange bolt circle diameter	2.625	3.875	4.95
C Output shaft over key dimension	0.34 over 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 length 0.75	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	2.875	2.185	Z Motor adapter thickness	.60-.90	.80-1.50	1.30-1.80

Precision Series Right Angle Dimensions (mm)



H Input shaft bore diameter is Motor Dependent
P Input shaft bore depth is Motor Dependent

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 Mounting 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	60	80	100	120
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	X Overall length (dual stage)	249	368	456	500
N Flange bolt circle	110.3	138.6	166.9	203.6	Y 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
- **PRNLB** – Precision In-Line Low Backlash
- **PRN** – Precision In-Line
- **PRR** – Precision Right Angle
- **PRRLB** – Precision Right Angle Low Backlash
- **UTN** – Utility In-Line
- **VLN** – Value In-Line
- **NEN** – NEMA In-Line

Frame Size
- **060** – 60mm
- **092** – 92mm
- **115** – 115mm
- **142** – 142mm
- **023** – NEMA23*
- **034** – NEMA34*
- **042** – NEMA42*
- * NEN series only

Ratio
- **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
- * Other custom ratios available

Options
- **omit** – Standard
- **X** – Special

Manufacturer/Model

Call toll free 1-877-959-GEAR for customized options

Motor Adapters Available for:

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

The Parker Precision Gearhead modular design allows for mounting of many different types of motors and sizes by simply replacing the motor mounting kit.

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

QSR-065 1994
QSR-095 1994

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