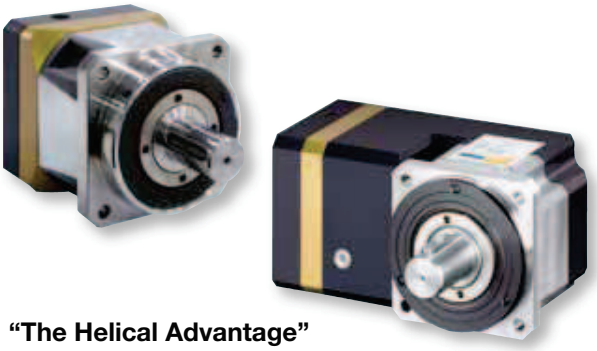
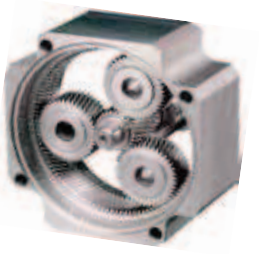
Helical Planetary Gearhead Features

Parker planetary gearheads incorporate the latest technology enhancements...

- **Latest technology in seals to reduce heat and wear**
- **Oil lubrication reduces friction and operating temperature, increasing gear life**

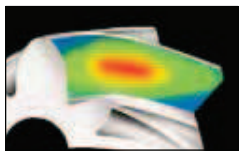


Helical Planetary Design



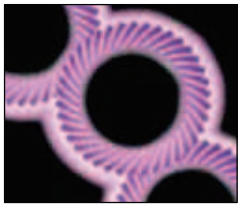
Helical gears have more tooth contact and greater face width than spur gears. This results in higher loads, smoother tooth engagement, quieter operation and lower backlash.

HeliCrown®



Parker developed the HeliCrown gear tooth to further optimize Stealth's® performance. Since most vibration occurs at the entry and exit points of a gear tooth, HeliCrown eliminates metal only in these areas, without sacrificing gear strength, producing a quieter and stronger gear.

Plasma Nitriding



Parker's in-house Plasma Nitriding process results in an ideal gear tooth. The surface is very hard (65 Rc) and the core is strong, but flexible (36 Rc). The result is a wear-resistant gear tooth that can withstand heavy shock, ensuring high accuracy for the life of the gearhead.

ServoMount®

Parker's ServoMount design features a balanced input gear supported by a floating bearing. This unique design compensates for motor shaft runout and misalignment, ensuring TRUE alignment of the input sun gear with the planetary section and allowing input speeds up to 6,000 RPM. ServoMount ensures error-free installation to any motor, in a matter of minutes.

"The Helical Advantage"

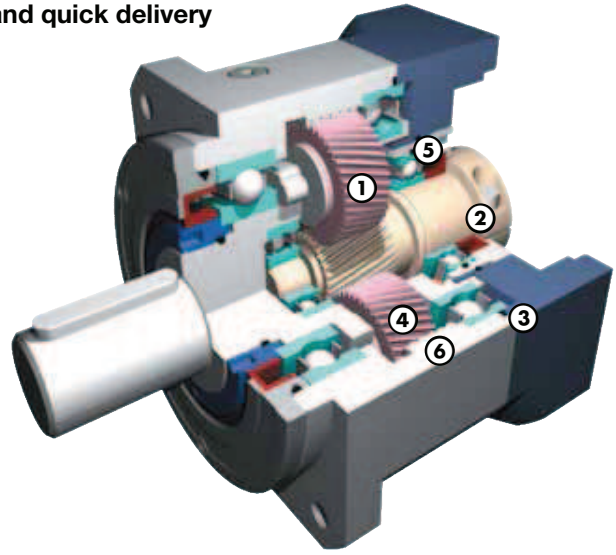
Parker planetary gearheads are a superior design with construction integrity to deliver power, speed and accuracy – quietly and efficiently.

Power...	30% more torque than comparably sized gearheads
Speed...	up to 6,000 RPM input speeds
Accuracy...	Less than 3 arc-minutes backlash
Quiet...	Less than 68 dB noise
Efficiency...	Over 97% efficiency

Parker Stealth® planetary gearhead features

Features unique to Generation II Stealth® gearheads

- **Widely spaced angular contact bearings provide higher radial load capacity**
- **Full compliment of needle bearings for increased service life**
- **Universal mounting kits offer easier mounting and quick delivery**



Common features for all Generation I & II Stealth® gearheads

① **Helical Planetary** – Provides smooth, quiet operation, high torque and high accuracy.

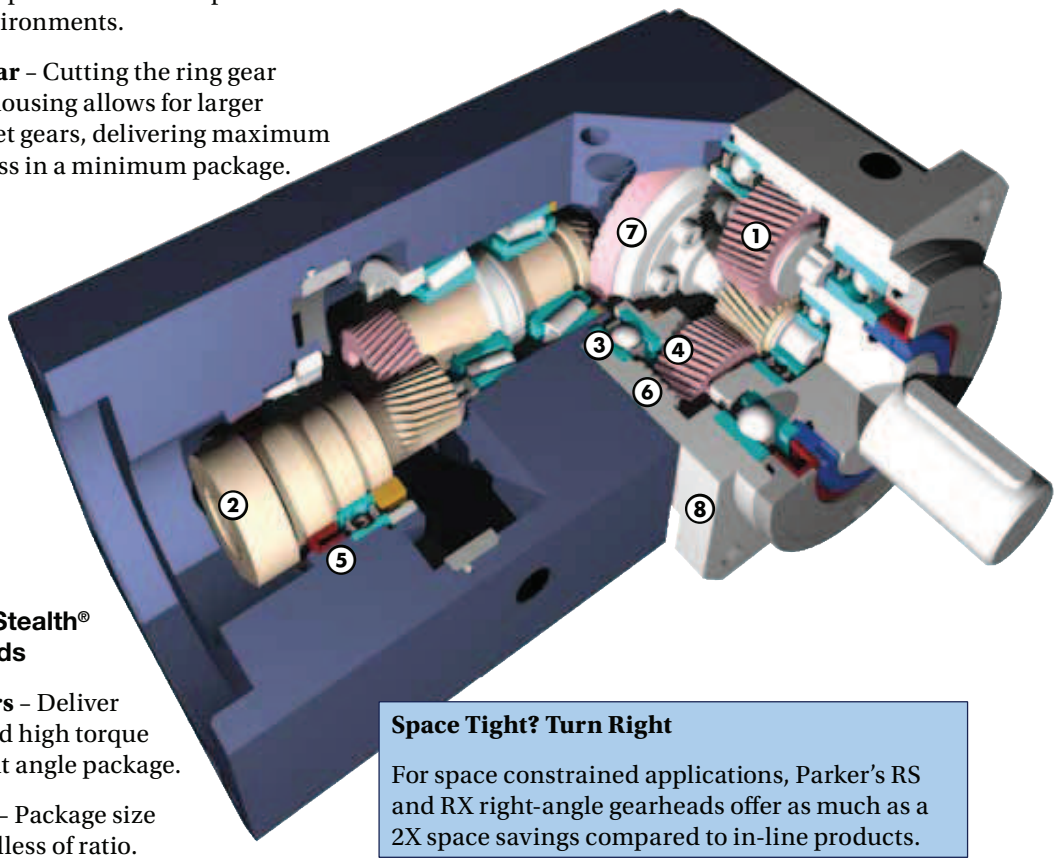
② **ServoMount®** – Motor-mounting design ensures error-free installation and the balanced pinion allows higher input speeds.

③ **Precision Bearings** – Provide high speed and high radial and axial load capacity.

④ **HeliCrown®** – Parker's proprietary gear tooth geometry ensures quieter operation and higher loads than conventional gears.

⑤ **Sealed Unit** – Vition seals and O-Rings provide IP65 protection to prevent leaks and protect against harsh environments.

⑥ **Integral Ring Gear** – Cutting the ring gear directly into the housing allows for larger bearing and planet gears, delivering maximum power and stiffness in a minimum package.



Features unique to Stealth® right-angle gearheads

⑦ **Spiral Bevel Gears** – Deliver high efficiency and high torque in a compact, right angle package.

⑧ **Compact Design** – Package size is the same regardless of ratio.

Space Tight? Turn Right

For space constrained applications, Parker's RS and RX right-angle gearheads offer as much as a 2X space savings compared to in-line products.

Generation II Stealth® Series

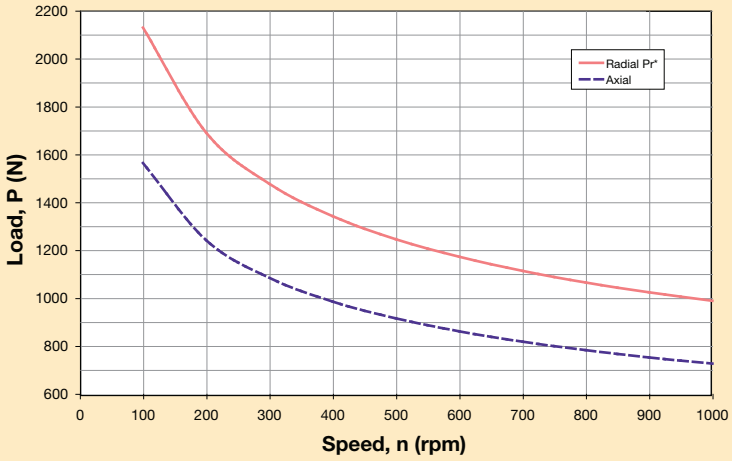
PX Generation II Performance Specifications

Parameter	Units	Ratio	PX60 Gen II		PX90 Gen II		PX115 Gen II	
Nominal Output Torque [1] $T_{nom\ r}$	Nm (in-lb)	3,15,30	20	(177)	56	(496)	120	(1062)
		4,5,7,20,25,40,50,70	32	(283)	66	(584)	152	(1345)
		10,100	25	(221)	60	(531)	160	(1416)
Maximum Acceleration Output Torque [2] $T_{acc\ r}$	Nm (in-lb)	3,15,30	27	(240)	84	(743)	180	(1593)
		4,5,7,20,25,40,50,70	39	(345)	98	(867)	228	(2018)
		10,100	30	(265)	90	(797)	192	(1700)
Emergency Stop Output Torque [3] $T_{em\ r}$	Nm (in-lb)	3,15,30	64	(565)	208	(1840)	480	(4248)
		4,5,7,20,25,40,50,70	56	(495)	184	(1628)	400	(3540)
		10,100	48	(425)	160	(1416)	344	(3044)
Nominal Input Speed $N_{nom\ r}$	RPM	3	3000		2500		2000	
		4,5	3500		3000		2500	
		7,10,15	4000		3500		3000	
		20,25,30	4500		4000		3500	
		40,50	4800		4400		3800	
		70,100	5200		4800		4200	
Maximum Input Speed $N_{max\ r}$ [4]	RPM	3 – 100	6000		5500		4500	
Maximum Radial Load Pr_{max} [5, 7]	N (lbs)		1550	(348)	2800	(630)	5500	(1235)
Maximum Axial Load Pa_{max} [6]	N (lbs)		2100	(475)	3600	(810)	6800	(1530)
Service Life	h		20,000					
Standard Backlash [8]	arc-min	3 – 10	<10		<9		<8	
		15 – 100	<12		<11		<10	
Low Backlash [8]	arc-min	3 – 10	<8		<7		<6	
		15 – 100	<10		<9		<8	
Efficiency at Nominal Torque	%	3 – 10	97		97		97	
		15 – 100	94		94		94	
Noise Level at 3000 RPM [9]	db	3 – 100	<62		<62		<65	
Torsional Stiffness	Nm/arc-min (in-lb/arc-min)	3 – 100	2.5	(22)	10	(90)	22	(195)
Maximum Allowable Case Temperature	° C	3 – 100	-20 to 90					
Lubrication		3 – 100	Per Maintenance Schedule					
Mounting Position		3 – 100	Any					
Direction of Rotation		3 – 100	Same as Input					
Degree of Protection			IP65					
Maximum Weight	kg (lbs)	3 – 10	1.0	(2.2)	3.0	(6.6)	7.0	(15.4)
		15 – 100	2.0	(4.4)	5.0	(11.0)	10.0	(22.0)

1) At nominal speed Nnom r.
2) Parker MotionSizer sizing software available for free download at parkermotion.com.
3) Maximum of 1000 stops.
4) For intermittent operation.
5) Max radial load applied to the center of the shaft at 100 rpm.
6) Max axial load at 100 rpm.
7) For combined radial and axial load consult factory.
8) Measured at 2% of rated torque.
9) Measure at 1m.

PX Generation II Output Shaft Load Rating

PX60 / PX23

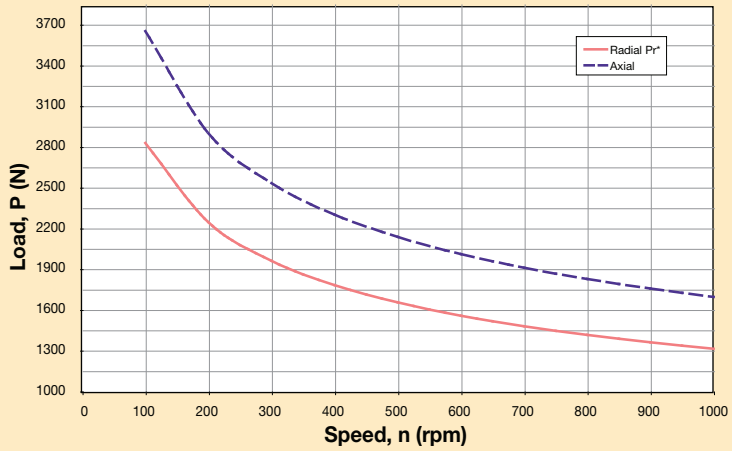


Formulas to calculate radial load (Prx) at any distance "X" from the gearhead mounting surface:

Prx = Pr * 78 mm / (63 + X)

Prx = Pr * 3.07 in / (2.48 in + X)

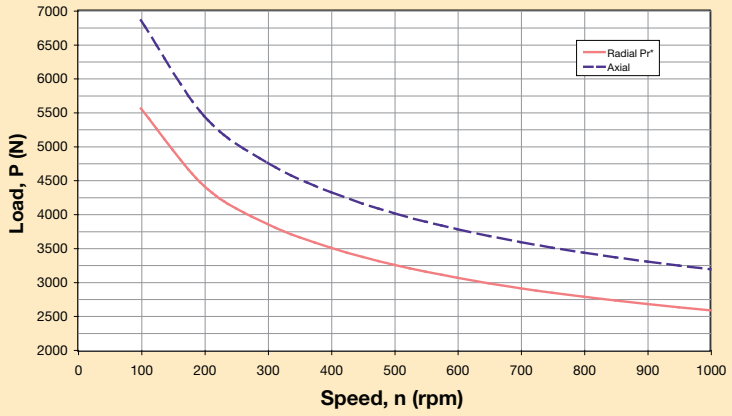
PX90 / PX34



Prx = Pr * 95 mm / (73 + X)

Prx = Pr * 3.74 in / (2.87 in + X)

PX115 / PX42



Prx = Pr * 115 mm / (73 + X)

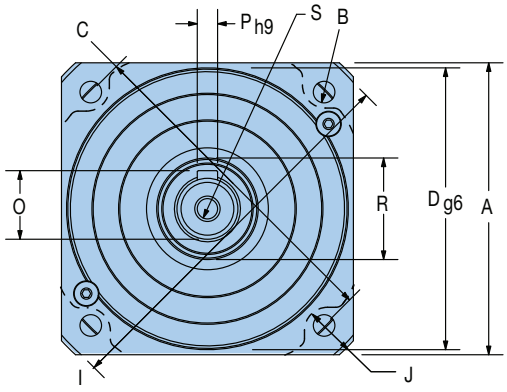
Prx = Pr * 4.53 in / (3.43 in + X)

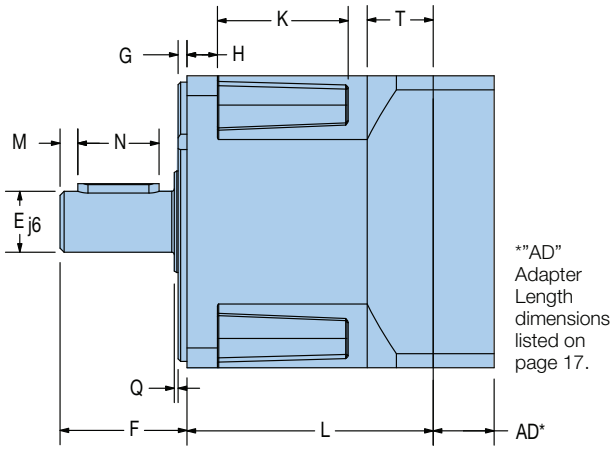
* Radial load applied to center of the shaft.

Generation II Stealth® Series

PX Generation II Dimensions

Free 3D Solid Models and drawings available at parkermotion.com





**"AD" Adapter Length dimensions listed on page 17.

Metric Frame Sizes

Frame Size	A		B		C		D		E		F		G		H		I		J		K	
	Square Flange		Flange Bolt Hole		Flange Bolt Circle		Pilot Diameter		Output Shaft Diameter		Output Shaft Length		Pilot Thickness		Flange Thickness		Housing Diameter		Housing Recess		Recess Length	
	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in
PX60	62	2.441	5.5	0.217	70	2.756	50	1.969	16	0.630	25	0.984	2.5	0.098	8	0.315	82	3.228	5	0.197	24	0.945
PX90	90	3.543	6.5	0.256	100	3.937	80	3.150	20	0.787	40	1.575	3	0.118	10	0.394	116	4.567	6.5	0.256	33	1.299
PX115	115	4.528	8.5	0.335	130	5.118	110	4.331	24	0.945	50	1.969	3.5	0.138	14	0.551	152	5.984	7.5	0.295	42	1.654

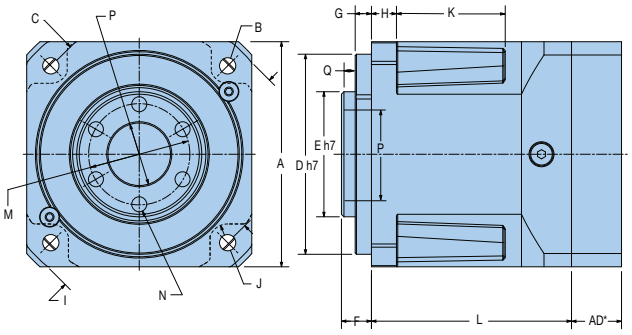
Frame Size	L1		L2		M		N		O		P		Q		R		S	T		
	Length Single Stage		Length Double Stage		Distance from Shaft End		Keyway Length		Key Height		Keyway Width		Shoulder Height		Shoulder Diameter		Tap & Depth (end of shaft)	Rear Housing Thickness		
	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in		mm	in	
PX60	70.3	2.768	105.3	4.146	3	0.118	16	0.630	18	0.709	5	0.197	1	0.039	21	0.827	M5x8	20.3	0.799	
PX90	80	3.150	123.5	4.862	5	0.197	28	1.102	22.5	0.886	6	0.236	1	0.039	29	1.142	M8x16	20	0.787	
PX115	97	3.819	150.2	5.913	7	0.276	32	1.260	27	1.063	8	0.315	1.5	0.059	36	1.417	M8x16	26	1.024	

NEMA Frame Sizes

Frame Size	B		C		D		E		F		N		O		P	
	Bolt Hole		Bolt Circle		Pilot Diameter		Output Shaft Diameter		Output Shaft Length		Keyway Length		Keyway Depth		Keyway Width	
	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm
PX23	0.2	4.953	2.625	66.675	1.5	38.100	0.38	9.525	1	25.400	—	—	—	—	—	—
PX34	0.22	5.512	3.88	98.425	2.88	73.025	0.5	12.700	1.25	31.750	1.06	27.000	0.07	1.829	0.13	3.251
PX42	0.28	7.137	4.95	125.730	2.19	55.550	0.63	15.875	1.5	38.100	1.14	29.007	0.09	2.388	0.19	4.775

PX23 has a flat on output shaft, not a keyway
NOTE: NEMA Sizes have 20% lower torque/stiffness ratings due to smaller output shaft diameter.

PX Flange Mount Option Dimensions



Dimensions A through D and H through L2 are the same as the metric frame dimensions shown on the previous page 18.

Frame Size	E		F		G	
	Output Hollow Shaft Diameter		Output Hollow Shaft Depth		Pilot Thickness	
	mm	in	mm	in	mm	in
PX60-T01	32	1.26	7.5	0.30	2.5	0.10
PX90-T01	50	1.97	12	0.47	6.5	0.26
PX115-T01	70	2.76	14.5	0.57	8.5	0.33

Frame Size	M		N	P		Q	
	Shaft Bolt Circle		Tap Size	Shaft Pilot Diameter		Shaft Pilot Depth	
	mm	in		mm	in	mm	in
PX60-T01	25	0.984	M5 x 0.8	18	0.709	4	0.157
PX90-T01	40	1.575	M6 x 1	25	0.984	5	0.197
PX115-T01	55	2.165	M8 x 1.25	40	1.575	5.5	0.217

PX Generation II Universal Mounting Kits*

Adapter Length "AD" Dimension

Frame Size	Motor Shaft Length		Gearhead Adapter Length	
	mm	in	mm	in
60	16 – 35	0.630 – 1.378	16.5	0.65
	35.1 – 41	1.382 – 1.614	22.5	0.886
90	20 – 40	0.787 – 1.575	20	0.787
	40.1 – 48	1.579 – 1.890	28.5	1.122
115	22 – 50	0.866 – 1.969	24	0.945
	50.1 – 61	1.972 – 2.402	35	1.378

* Know your motor and need our mounting kit part number? See page 29 or use our Motor Mounting Search Tool on our website at: www.parkermotion.com

PX Generation II Inertia

All moment of inertia values are as reflected at the input of the gearhead

Ratio	Units*	PX60 / PX23	PX90 / PX34	PX115 / PX42
3	kg-cm²	0.2500	0.9700	3.4000
	in-lb-sec²	0.000221	0.000858	0.003009
4	kg-cm²	0.1700	0.6700	2.2000
	in-lb-sec²	0.000150	0.000593	0.001947
5	kg-cm²	0.1500	0.5100	1.7000
	in-lb-sec²	0.000133	0.000451	0.001505
7	kg-cm²	0.1400	0.4100	1.3000
	in-lb-sec²	0.000124	0.000363	0.001151
10	kg-cm²	0.1400	0.3700	1.1000
	in-lb-sec²	0.000124	0.000327	0.000974
15	kg-cm²	0.1500	0.5200	0.1700
	in-lb-sec²	0.150000	0.000460	0.000150
20	kg-cm²	0.1500	0.5100	1.7000
	in-lb-sec²	0.000133	0.000451	0.001505
25	kg-cm²	0.1500	0.5100	1.7000
	in-lb-sec²	0.000133	0.000451	0.001505
30, 40, 50, 70, 100	kg-cm²	0.1300	0.3700	1.1000
	in-lb-sec²	0.000115	0.000327	0.000974

* Note: 1 kg-cm² = 0.000885 in-lb-sec²

Generation II Stealth® Series

Generation II Stealth® How to Order

Choose gearhead series, frame size, ratio, backlash and specify motor, make and model for mounting kit from the charts below and on the following page.

Sizing/Selection Design Assistance

To properly size and select a gearhead for a specific application requires consideration of several interrelated parameters including: speed, continuous torque, repetitive peak torque or acceleration torque, emergency stop torque, duty cycle, ambient temperature and radial and axial shaft load.

The 9 step procedure on pages 72-73 provides a straightforward method of selecting the correct gearhead for your application.

Gearhead Ordering Information

	①	②		③		④		⑤	⑥
Order Example:	PS	60	-	003	-	XXX	-	S	2

① Series	② Frame Size	③ Ratio	④ Special Options*	⑤ Backlash	⑥ GEN 2 Identifier
PS	60, 90, 115, 142	003, 004, 005, 007, 010, 015, 020, 025, 030, 040, 050, 070, 100	XXX = Factory issued	S = Standard L = Low	2
PX	60, 90, 115, 23, 34, 42	003, 004, 005, 007, 010, 015, 020, 025, 030, 040, 050, 070, 100	XXX = Factory issued T01 = Flange Mount		
RS	60, 90, 115, 142	005, 010, 015, 020, 025, 030, 040, 050, 100	XXX = Factory issued		
RX	60, 90, 115, 23, 34, 42	005, 010, 015, 020, 025, 030, 040, 050, 100	XXX = Factory issued (Contact factory for Flange Mount Option)		

* Standard special options include: F01 Food Grade, W01 Washdown, G01 Genl Spacer Plate, L02 No lubricant (standard is oil filled), V01 Vacuum, C01 CleanRoom Class 10,000. Leave blank if no special option required.

Motor Mounting How to Order

Know your motor and need our mounting kit part number? Use the charts below or use our Motor Mounting Search Tool on our website at:

www.parkermotion.com

	⑦		⑧
Order Example:	MU	60 -	XXX

	⑦	⑧
Universal Mounting*	**Frame Size ****	**Mounting Kit Suffix Number**
MU	60, 90, 115	See Motor Mounting Selection Tool on our website at: www.parkermotion.com

* Common to PS, PX, RS and RX Series Gearheads
**PX/RX23 use MU60, PX/RX34 use MU90, PX/RX42 use MU115

Universal Mounting Kit Adapter Length "AD" Dimension

	Motor Shaft Length		Gearhead Adapter Length	
Frame Size	**mm**	**in**	**mm**	**in**
60	16 – 35 35.1 – 41	0.630 – 1.378 1.382 – 1.614	16.5 22.5	0.65 0.886
90	20 – 40 40.1 – 48	0.787 – 1.575 1.579 – 1.890	20 28.5	0.787 1.122
115	22 – 50 50.1 – 61	0.866 – 1.969 1.972 – 2.402	24 35	0.945 1.378
142	26 – 62 46 – 82	1.023 – 2.44 1.811 – 3.23	30 50	1.181 1.969

Recommended Parker Motor and Mounting Kit

	Recommended Servo Motor			Recommended Stepper Motor		
Frame Size	**Motor**	**Mounting Kit**	**AD Dimension**	**Motor**	**Mounting Kit**	**AD Dimension**
60 or 23	BE23 SM23	MU60-033	16.5 mm	LV23 HV23	MU60-005	16.5 mm
90 or 34	MPP092 BE34	MU90-092 MU90-005	20 mm	LV34 HV34	MU90-005	20 mm
115 or 42	MPP100 MPP115	MU-115-039 MU115-010	24 mm			
142	MPP115 MPP142	MU142-010 Mu142-146	30 mm			

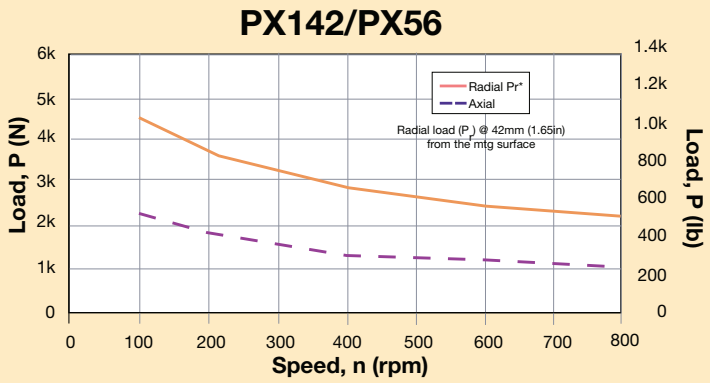
Generation I Stealth® Series

PX Performance Specifications

Parameter	Units	Ratio	PX142 / PX56
Nominal Output Torque $T_{nom\ r}$	Nm (in-lb)	3, 4, 5	226 (1,994)
		7, 10, 15	231 (2,038)
		20, 25, 30, 50	278 (2,453)
		70,100	261 (2,303)
Maximum Acceleration Output Torque [1] $T_{acc\ r}$	Nm (in-lb)	3, 4, 5, 7, 10, 15, 70, 100	282 (2,488)
		20, 25, 30, 50	347 (3,062)
Emergency Stop Output Torque [2] $T_{em\ r}$	Nm (in-lb)	3, 4, 5, 7, 10, 15, 70, 100	656 (5,789)
		20, 25, 30, 50	900 (7,055)
Nominal Input Speed $N_{nom\ r}$	RPM	3,4,5	2000
		7, 10, 15	2500
		20, 25, 30, 50	3000
		70,100	3500
Maximum Input Speed $N_{max\ r}$	RPM	3 – 100	3800
Standard Backlash [3]	arc-min	3 – 10	8
		15 – 100	10
Low Backlash [3]	arc-min	3 – 10	6
		15 – 100	8
Efficiency at Nominal Torque	%	3 – 10	96
		15 – 100	93
Noise Level at 3000 RPM [4]	db	3 – 100	66
Torsional Stiffness	Nm/arc-min (in-lb/arc-min)	3 – 100	39 (345)
Maximum Allowable Case Temperature	° C	3 – 100	-20 to 90
Degree of Protection			IP65
Maximum Weight	kg (lbs)	3 – 10	14 (30)
		15 – 100	20 (43)

1) Parker MotionSizer sizing software available for free download at parkermotion.com.
2) Maximum of 1,000 stops
3) Measured at 2% of rated torque
4) Measured at 1 meter

PX Output Shaft Load Rating



Formulas to calculate radial load (Prx) at any distance "X" from the gearhead mounting surface:

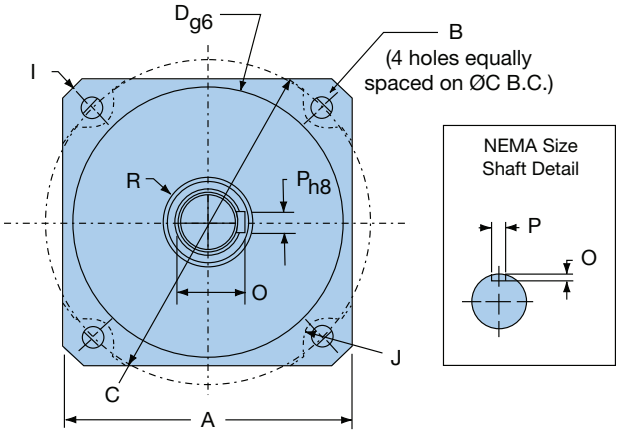
Prx = Pr * 121 mm / (65 + X)

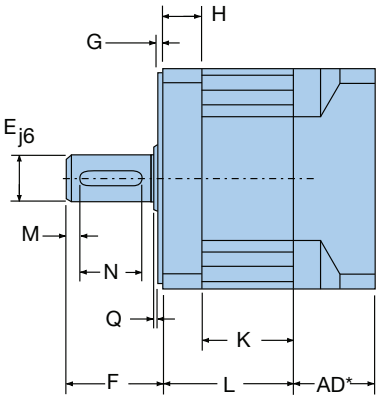
Prx = Pr * 4.76 in / (2.56 in + X)

* Radial load applied to center of the shaft.

PX Dimensions

Free 3D Solid Models and drawings available at parkermotion.com





*AD=Adapter Length. Adapter will vary, depending on motor. (Visit our website or consult the factory for details.)

Metric Frame Size

Frame Size	A Square Flange		B Bolt Hole		C Bolt Circle		D Pilot Diameter		E Output Shaft Diameter		F Output Shaft Length		G Pilot Thickness		H Flange Thickness		I Housing Diameter		J Housing Recess	
	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in
PX142	142	5.591	11.0	0.433	165	6.496	130	5.118	40	1.575	80	3.150	3.5	0.138	25	0.984	194	7.637	10.0	0.394

Frame Size	K1 Recess Length (for ratios 3-10)		K2 Recess Length (for ratios 15-100)		L1 Length (for ratios 3-10)		L2 Length (for ratios 15-100)		M Distance from Shaft End		N Keyway Length		O Key Height		P Keyway Width		Q Shoulder Height		R Shoulder Diameter	
	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in
PX142	61.5	2.421	123.0	4.843	86.5	3.406	148.0	5.827	8	0.315	63	2.480	43.0	1.693	12	0.472	1.5	0.059	46	1.811

NEMA Frame Size

Frame Size	B Bolt Hole		C Bolt Circle		D Pilot Diameter		E Output Shaft Diameter		F Output Shaft Length		N Keyway Flat Length		O Keyway Flat Depth		P Keyway Flat Width	
	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm
PX56	0.398	10.109	7.000	177.8	4.500	114.30	1.000	25.40	2.000	50.80	1.625	41.275	0.142	3.607	0.250	6.35

NOTE: NEMA size has 20% lower torque/stiffness ratings due to smaller output shaft diameter.

PX Inertia

All moment of inertia values are as reflected at the input of the gearhead

Frame Size	Units	Ratio 3	4, 5	7, 10	15	20, 25	30, 50, 70, 100
PX142 PX56	gm-cm-sec^2	8.826	4.514	3.326	4.849	5.179	2.840
	oz-in-sec^2	0.124	0.063	0.047	0.068	0.073	0.040

Generation I Stealth® Series

Stealth® How to Order

Choose gearhead series, frame size, ratio, backlash and orientation from the chart below.

Gearhead Ordering Information

	①	②		③				④	⑤
Order Example:	PS	180	-	003	-	XXX	-	S	H

① Series	② Frame Size	③ Ratio	④ Backlash	⑤ Orientation
PS	180 (Metric) 220 (Metric)	003, 004, 005, 007, 010, 015, 020, 025, 030, 040, 050, 070, 100	S = Standard L = Low	See illustrations below H = Horizontal orientation U = Output shaft pointing up D = Output shaft pointing down
PX	142 (Metric) 56 (NEMA)	003, 004, 005, 007, 010, 015, 020, 025, 030, 050, 070, 100	Blank = Standard LB = Low	—
RS	180 (Metric) 220 (Metric)	005, 010, 015, 020, 025, 030, 040, 050,100	S = Standard L = Low	See illustrations below H = Horizontal orientation U = Output shaft pointing up D = Output shaft pointing down E = Motor input facing up F = Motor input facing down

Recommended Parker Motor and Mounting Kit

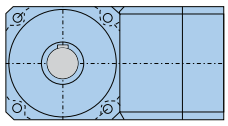
Frame Size	Recommended Servo Motor		
	Motor	Mounting Kit	AD Dimension
PS180	MPP142 MPP180	MT180-131 MT180-096	67.5 mm 109 mm
PS220	MPP180 MPP230	MT220-021 MT220-022	104 mm 138 mm
PX142	MPP115 MPP142	MX142-107 MX142-008	70 mm 75 mm
RS180	MPP142 MPP190	MZ180-025 MZ180-032	80 mm 120 mm
RS220	MPP190 MPP230	MZ220-009 Consult Factory	108 mm —

Sizing/Selection Design Assistance

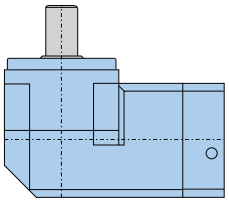
To properly size and select a gearhead for a specific application requires consideration of several interrelated parameters including: speed, continuous torque, repetitive peak torque or acceleration torque, emergency stop torque, duty cycle, ambient temperature and radial and axial shaft load.

The 9 step procedure on pages 72-73 provides a straightforward method of selecting the correct gearhead for your application.

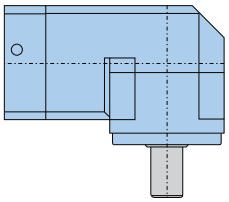
Right Angle Gearhead Orientation



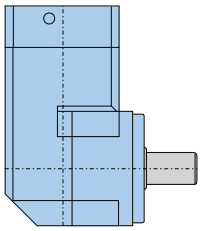
H
Horizontal Orientation



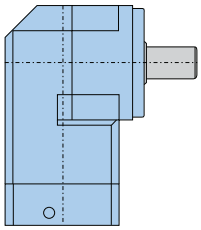
U
Output Shaft Up



D
Output Shaft Down



E
Motor InpuT
Facing Up



F
Motor Input
Facing Down