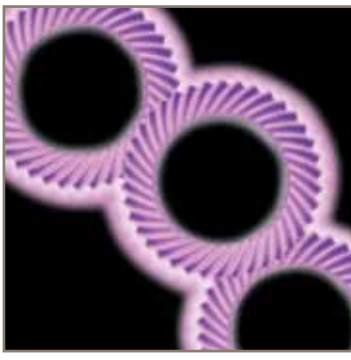
aerospace
climate control
electromechanical
filtration
fluid & gas handling
hydraulics
pneumatics
process control
sealing & shielding

Gearheads and Gearmotors



ENGINEERING YOUR SUCCESS.

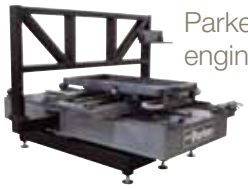
Parker Hannifin Corporation

A Fortune 300 company with annual sales exceeding $10 billion and more than 400,000 customers in 43 countries, Parker Hannifin is the world's leading supplier of innovative motion control components and system solutions serving the industrial, mobile, and aerospace markets. We are the only manufacturer offering customers a choice of electromechanical, hydraulic, pneumatic, or computer-controlled motion systems.

Total System Solutions

Parker's team of highly qualified application engineers, product development engineers, and system specialists can turn pneumatic, structural, and electromechanical products into an integrated system solution.

Moreover, our Selectable Levels of Integration™ allows you to choose the appropriate system, subsystem, or component to meet your specific need.



Parker offers complete engineered systems.

First in Delivery, Distribution, and Support

In today's competitive, fast-moving economy, what good is an application that isn't ready on time? This is especially true when compressed design cycles make the quick delivery of critical components essential. With factories strategically located on five continents, Parker offers an unrivaled delivery record, getting solutions out our door and onto your floor faster than ever.

Parker also has the industry's largest global distribution network, with more than 8,600 distributors worldwide. Each of these locations maintains ample product inventory to keep your downtime to a minimum. And many distributors have in-house design capabilities to support your system and subsystem requirements.

Throughout the design process, Parker's factory-trained electromechanical engineers work hand in hand with you and day or night at 1-800-C-Parker. Our operators will connect you with a live, on-call representative who will identify replacement parts or services for all motion technologies.

Parker world headquarters in Cleveland

Training

Parker's best-in-class technology training includes hands-on classes, Web-based instruction, and comprehensive texts for employees, distributors, and customers. Parker also provides computer-based training, PowerPoint presentations, exams, drafting and simulation software, and trainer stands.

parkermotion.com

Our award-winning Web site is your single source for:

- **Product information**
- **Downloadable catalogs**
- **Motion-sizing software**
- **3D design files**
- **Training materials**
- **Product-configuration software**
- **RFQ capabilities**
- **Videos and application stories**

24/7 Emergency Breakdown Support

The Parker product information center is available any time of the day or night at 1-800-C-Parker. Our operators will connect you with a live, on-call representative who will identify replacement parts or services for all motion technologies.

Table of Contents

If you don't find exactly what you are looking for in this catalog, please contact us for information on other suitable Parker products or to have an application engineer discuss your requirements.

Visit our Website

Complete up-to-date technical assistance can be found on our web at www.parkermotion.com. This includes all the latest information on current products, new product introductions, local assistance and support, plus a comprehensive "Engineering Reference Library" including: complete product catalog data, product selection Wizards, performance charts and graphs, engineering data and calculations, CAD drawings, local service and support directory, on-line purchasing, application stories and videos.

Welcome!

Thank you for your interest in the products offered by the Parker Hannifin Electromechanical Automation Division. This catalog presents Parker's electromechanical solutions for high-precision and high-speed automation. Our gearheads, motors, and integrated products are recognized around the world for their functionality, performance, and reliability.

Bayside pioneered the market for precision servo gearheads many years ago. Parker continues this tradition in quality and design with innovations like our Stealth Generation II Helical Planetary Gearhead, enhanced to provide superior performance for the most demanding applications. Our PV Series planetary gearhead combines power and versatility in an economical package. Our line of Frameless Motors, Servo Wheels, and other integrated products provide an ideal solution for machine designs that require high performance in small spaces.

As you read through this catalog, you will discover that Parker offers the widest variety of electromechanical solutions that are delivered in the shortest amount of time. Still, many customers require special solutions to satisfy unique or special requirements. Parker has been providing custom engineered solutions for over 30 years to satisfy those requirements. If your application cannot be fulfilled by the complement of products found in this catalog, please contact an authorized Parker Automation Technology Center or a factory applications engineer.

Parker is proud to present these high precision products to you. We invite you to discover the advantages that can be realized by relying on Parker for products and systems which represent the very best value in the electromechanical marketplace.

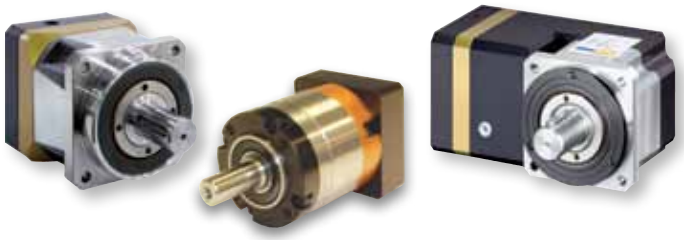
Sincerely,

Ken Sweet

Ken Sweet
General Manager

Product Overview

Planetary Gearheads



Our new Generation II Stealth® Series provides higher radial load, increased service life and ease of mounting than comparably sized planetary gearheads. The Stealth Generation II Helical Planetary Gearheads incorporate design enhancements to provide superior performance for the most demanding high performance applications. For larger frame sizes, Parker offers Generation I Stealth® Series gearheads in 142 to 220 mm and NEMA 56 frame sizes. For standard precision applications, the PV Series gearhead combines power and versatility in an economical package available in a wide range of options.

Product Series		Gear Geometry	Performance	Configuration	Frame Size	Nominal Continuous Torque Nm (in-lb)	Radial Load N (lbs)	Backlash arc-min	Page
Generation II Stealth®	PS	Helical Planetary	High Precision	In-Line	60 – 115 mm	27 – 230 (240 – 2047)	1650 – 7500 (370 – 1683)	8 – <3	12
	PX	Helical Planetary	Mid Precision	In-Line	60 – 115 mm NEMA 23 – 42	20 – 160 (178 – 1424)	1550 – 6800 (348 – 1526)	10 – <6	16
	RS	Helical Planetary/ Spiral Bevel	High Precision	Right Angle	60 – 115 mm	13 – 220 (115 – 1958)	1650 – 7500 (370 – 1683)	14 – <6	20
	RX	Helical Planetary/ Right Angle	Mid Precision	Right Angle	60 – 115 mm NEMA 23 – 42	10 – 136 (89 – 1210)	1550 – 6800 (348 – 1526)	20 – <12	24
Generation I Stealth®	PS	Helical Planetary	High Precision	In-Line	180 – 220 mm	294 – 1808 (2616 – 16,091)	7900 – 58,000 (1775 – 13,020)	8 – <3	30
	PX	Helical Planetary	Mid Precision	In-Line	142 mm NEMA 56	220 – 278 (1958 – 2474)	6000 (1347)	10 – <8	34
	RS	Helical Planetary/ Spiral Bevel	High Precision	Right Angle	180 – 220 mm	141 – 1808 (1255 – 16,091)	7900 – 58,000 (1775 – 13,020)	10 – <4	36
	PV	Planetary	Standard	In-Line	40 – 115 mm NEMA 17 – 42	3.5 – 148 (31 – 1317)	190 – 10,555 (43 – 2370)	15 – <12	40

MultiDrive Gearheads

Stealth® MultiDrive (MD) offers three different output options for true flexibility. MultiDrive models include low-ratio, dual-shaft and hollow-shaft options in a compact, right angle package. With 5 frame sizes and multiple ratios to choose from,you are guaranteed to find a Stealth® MultiDrive to fit your servo motor application.

Product Series	Gear Geometry	Performance	Configuration	Frame Size	Continuous Torque Nm (in-lb)	Radial Load N (lbs)	Backlash arc-min	Page
RT	Helical	High Precision	Right Angle Hollow Shaft	90 – 220 mm	23 – 565 (204 – 5178)	2800 – 7500 (692 – 1685)	<14 – <6	50
RD	Helical	High Precision	Right Angle Double Shaft	90 – 220 mm	30 – 150 (266 – 1328	2800 – 7500 (692 – 1685)	<14 – <6	50
RB	Helical	High Precision	Right Angle Low Ratio	90 – 220 mm	35 – 190 (266 – 1682)	2800 – 7500 (692 – 1685)	<14 – <6	50

NEMA Gearheads

NEMA gearheads feature a high-efficiency spur gear design, in a light, compact package, and are ideal for applications requiring smooth operation and low starting torque. Ratios from 3:1 to 100:1 are available.

Product Series	Gear Geometry	Performance	Configuration	Frame Size	Continuous Torque Nm (in-lb)	Radial Load N	Backlash arc-min	Page
NE	Spur Gear	Economy	In-Line	NEMA 23 – 42	6 – 40 (50 – 350)	90 – 890 (20 – 200)	10 – 30	58

Integral Solution Gearmotors

Stealth® Gearmotors represent the first time a brushless servo motor and a helical planetary gearhead have been integrated into a single product. Previously, engineers needing a gear drive with servo motor were forced to purchase the gearhead and motor separately. Parker Bayside manufactures precision gearheads and gearmotors under one roof.

Product Series	Gear Geometry	Performance	Configuration	Frame Size	Continuous Torque Nm (in-lb)	Feedback	Backlash arc-min	Page
GM	Helical Planetary	Mid-Precision	In-Line	60 – 142 mm NEMA 23 – 56	3 – 60	Encoder/ Resolver	< 10	Consult Factory
DX	Planetary	Mid-Precision	In-Line	6 and 8 inch dia. Wheel Drive	26 – 48	Encoder	—	62

Application Examples

Plastic Bottle Extrusion

The manufacturer of high-performance plastic extrusion equipment needed a drop-in replacement gearhead for an existing worm gearbox used with their motor without having to alter the design of their machine. The gearhead/motor combination is being used to drive the machine's rollers, controlling the speed at which the plastic is extruded into high-quality plastic sheets. The smoothness of the rollers is critical to the quality of the plastic sheets being produced.

Application Challenges:

High Transmission Error and Velocity Ripple

The customer used worm gearheads to control the rollers. Worm gears exhibit a sliding action of involute gears instead of a rolling action, contributing to the lack of smoothness of the machine rollers. Due to the high transmission error and velocity ripple from the worm drive, the rollers operated at differing speeds. This produced small lines and imperfections on the plastic sheets, rendering it unusable.

High Wear and Low Efficiency

The high level of rubbing (sliding action) between the worm and wheel teeth in the worm gearhead caused a high gear-tooth-wear rate and a lower efficiency (70%) than other major gear types.

Parker SOLUTION:

Stealth PS Gearhead and RT MultiDrive (hollow shaft) Gearhead were used in combination to provide the required 120:1 ratio. The result was high-quality plastics sheets that exceeded the customer's specifications.

The Stealth's all-helical planetary design (HeliCrown Gear Tooth) features extremely high gear tooth accuracy, minimizing transmission error and velocity ripple. The HeliCrown design features extremely high efficiency (95%) while minimizing tooth wear by providing a pure rolling action. Parker's Plasma Nitriding heat-treating process further heightens the gear tooth's wear resistance.

The MultiDrive gearhead features a space-saving bore (hollow shaft) option, eliminating compliance that occurs when coupling a gearhead shaft to the rollers being driven. This solution can be used for a variety of applications, including packaging, food, semiconductor, automotive and medical.

Food/Packaging Automation

A manufacturer of machines for gluing, fill, sealing and diverting food containers for the food-processing industry had a requirement for the motor and gearhead to be mounted above the food plane. Certain modifications were also needed for the gearhead to make it safe for the food environment, and capable to withstand frequent washdowns.

Gearhead Design Considerations:

- **Lubrication – must be USDA food grade approved in case of incidental contact to food**
- **Sealing –must prevent any leaking as well as prevent any ingress of the fluid during washdown**
- **Finish – special FDA-approved finish must be used making it very durable and resistant to chipping, oxidizing or rusting**
- **Output Shaft – stainless steel prevents any rust from developing and contaminating the processing food.**

Parker SOLUTION:

Stealth PS planetary gearhead with standard F01 food grade special option

Stealth PS planetary gearhead with standard food grade option provides the gearhead with standard modifications including special lubrication, viton seals, special finish and a stainless steel output shaft.

Since this food grade modification is a standard option, delivery is only one week over the standard gearhead lead time. (Note: Similar standard modifications exist for vacuum, clean room, high temperature and radiation.)

High-Speed Milling

High-speed milling machines are commonplace in industries such as aerospace and automotive because they allow large structural components to be machined from one piece rather than assembled from many smaller subcomponents. For a customer that manufactures high-speed milling machines, spindle heads are operating at speeds ranging from 18,000 to 40,000 RPM, so that the cutting is above the resonant frequency of the machine. Because of this, many characteristics become more critical than with their standard machines. The extremely large size of the spindle head also posed problems for the manufacturer in trying to keep it accurately positioned during the milling stage.

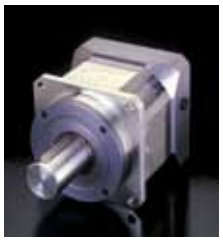
Application Challenge:

Low Stiffness

The spindle head was moved rotationally by 2 bull gears, driving a large ring gear. Because of the system characteristics, it was difficult to keep the spindle head absolutely stiff during the milling process. The problems associated with low stiffness are:

- **Poor surface finish**
- **Accuracy errors**
- **Excessive tool chatter**
- **Reduced tool life**

Parker SOLUTION:



Two Stealth® PS Helical Planetary Gearheads were used in tandem to create a stiff platform for the spindle machine head. One gearhead, acting as the master, and the other as the slave, were attached to the bull gears to simultaneously turn the ring gear that positioned the machine head. While the master gearhead moved the ring, the slave was taking up the backlash. In this way, the precision gears allowed for the spindle to be moved accurately, while the two gearhead combination maintained maximum system stiffness.

Parker's Stealth PS gearhead features an all-helical planetary gear design. Helical gears have a much higher tooth-contact ratio and greater face width than straight-spur gears, providing higher loads, smoother tooth engagement and quieter operation. The Stealth's HeliCrown Gear Tooth design provides extremely high gear tooth accuracy, while minimizing tooth wear. Parker Bayside's Plasma Nitriding heat-treating process further heightens the gear tooth's wear resistance.

This solution can also be used in the aerospace and automotive industries.

High-, Mid- and Standard-Precision Planetary Gearheads

Helical planetary technology is superb for low-backlash, high-stiffness and high-accuracy requirements, making the Parker Generation II Stealth® line of helical planetary gearheads ideal for these high-and medium-level performance applications. The introduction of the PV Series gearhead completes the Parker gear family by offering a standard-grade gearhead with the highest radial load capacity available today in a cost-effective solution. Whether you need high-, medium- or standard-grade performance, Parker can match the need. All Parker gearheads are proudly manufactured in the USA in our state-of-the-art facility which, displays the best use of Lean manufacturing practices. For more information go to parkermotion.com.

Generation II Stealth® PS/PX/RS/RX:

Our new Generation II Stealth® series provides higher radial load, increased service life and ease of mounting

The Generation II Stealth® Helical Planetary Gearheads incorporate design enhancements to provide superior performance for the most demanding high performance applications.

Stealth Generation II incorporates dual angular contact bearings providing higher radial load capacities while maintaining high input speeds. Design enhancements also include full complement needle bearings allowing for increased service life and extended warranties. Internal design changes and optimized gearing geometries allow for one oil fill level for any orientation, resulting in shortened part number designation and simplified order placement.

Universal mounting kits provide common mounting kits across multiple product lines to promote quicker deliveries and ease of mounting to any servo motor. Applications that require either high precision (PS/RS Series Gearheads) or mid-range precision (PX/RX Series Gearheads) utilize the same mounting kit part numbers within the same frame size.

Mounting to any servo motor is as easy as A-B-C (adapter, bushing, collet).

Features & Benefits

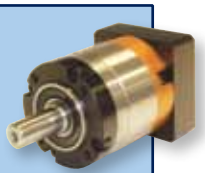
- **Higher radial load capacity: widely spaced angular contact output bearings**
- **Increased service life: full complement of planet needle bearings**
- **Universal mounting kits: quicker deliveries and easier mounting**
- **High torque and low backlash: helical planetary gearing**
- **High stiffness: Integral ring gear and rigid sun gear**
- **Higher gear wear resistance: plasma nitriding heat treating**
- **PX models are optionally available with flange mounting for easy installation. (Contact factory for flange mount availability for RX models.)**

Other Planetary Gearheads:

Generation I Stealth® PS, PX and RS Gearheads

For larger frame sizes, Parker offers Generation I Stealth® Series gearheads in 142 to 220 mm and NEMA 56 frame sizes.

PV Series Precision Gearheads



The PV Series gearhead combines power and versatility in an economical package. It comes in a wide range of options including dimensional output face crossovers to the Parker Bayside PX, Alpha LP, Neugart PLE, Stober PE and Standard NEMA gearheads.

Standard Options for Planetary Gearheads

Gearheads Ready to Mount to Linear Actuators

Most belt driven linear slides need a gearhead to reduce inertia. Parker has pre-engineered in-line and right-angle gearheads to mount directly to most popular linear slides, eliminating the need for couplings or adapters.

Input Shaft Speed Reducer/Speed Increaser for Increased Design Flexibility

Parker gearheads are available with an input-shaft option. The input-shaft option allows more design flexibility, as options like brakes, encoders, or safety couplings can be used between the motor and the gearhead. This option also allows you to operate the gearhead as a speed increaser.

Mil-Spec Gearheads

Parker has extensive experience in military and aerospace applications. The Stealth Bomber, M1 Tank and the Space Shuttle all use Parker gearheads. Parker's quality system has been approved by NASA and the US Government to MIL-I-45208A.

Special Environments

Put a Parker gearhead anywhere! Parker can supply gearheads to operate in the harshest environments:

Vacuum - Available as a standard option to 10^{-6} Torr vacuum ratings.

Clean Room - Special gearheads for Class 10,000 clean room applications.

High Temperature - Special lubricants and seals for temperatures up to 250° C.

Radiation - Gearheads customized to operate within radioactive environments.

Food Grade/Washdown - Gearheads customized to operate within food-handling and washdown environments.

Planetary Gearhead Selection Overview

Product Series		Gear Geometry	Performance	Configuration	Frame Size	Nominal Continuous Torque Nm (in-lb)	Radial Load N (lbs)	Backlash arc-min	Page
Generation II Stealth®	**PS**	Helical Planetary	High Precision	In-Line	60 – 115 mm	27 – 230 (240 – 2047)	1650 – 7500 (370 – 1683)	8 – <3	12
	PX	Helical Planetary	Mid Precision	In-Line	60 – 115 mm NEMA 23 – 42	20 – 160 (178 – 1424)	1550 – 6800 (348 – 1526)	10 – <6	16
	RS	Helical Planetary/ Spiral Bevel	High Precision	Right Angle	60 – 115 mm	13 – 220 (115 – 1958)	1650 – 7500 (370 – 1683)	14 – <6	20
	RX	Helical Planetary/ Right Angle	Mid Precision	Right Angle	60 – 115 mm NEMA 23 – 42	10 – 136 (89 – 1210)	1550 – 6800 (348 – 1526)	20 – <12	24
Generation I Stealth®	**PS**	Helical Planetary	High Precision	In-Line	180 – 220 mm	294 – 1808 (2616 – 16,091)	7900 – 58,000 (1775 – 13,020)	8 – <3	30
	PX	Helical Planetary	Mid Precision	In-Line	142 mm NEMA 56	220 – 278 (1958 – 2474)	6000 (1347)	10 – <8	34
	RS	Helical Planetary/ Spiral Bevel	High Precision	Right Angle	180 – 220 mm	141 – 1808 (1255 – 16,091)	7900 – 58,000 (1775 – 13,020)	10 – <4	36
	PV	Planetary	Standard	In-Line	40 – 115 mm NEMA 17 – 42	3.5 – 148 (31 – 1317)	190 – 10,555 (43 – 2370)	15 – <12	40

Helical Planetary Gearhead Features

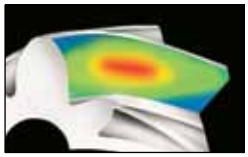
Parker planetary gearheads incorporate the latest technology enhancements...

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

Helical Planetary Design

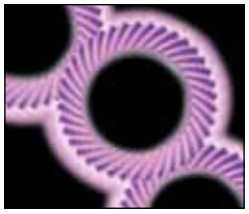
Helical gears have more tooth contact and greater face width than spur gears. This results in higher loads, smoother tooth engagement, quieter operation and lower backlash.

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"

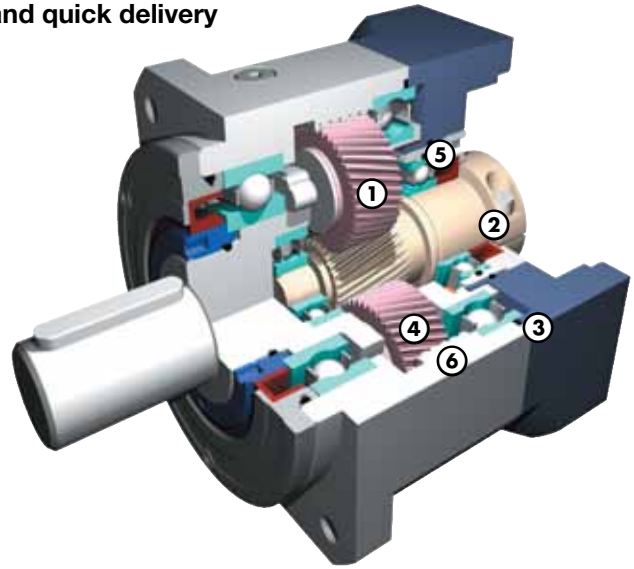
Parker planetary gearheads are a superior design with construction integrity to deliver power, speed and accuracy – quietly and efficiently.

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.

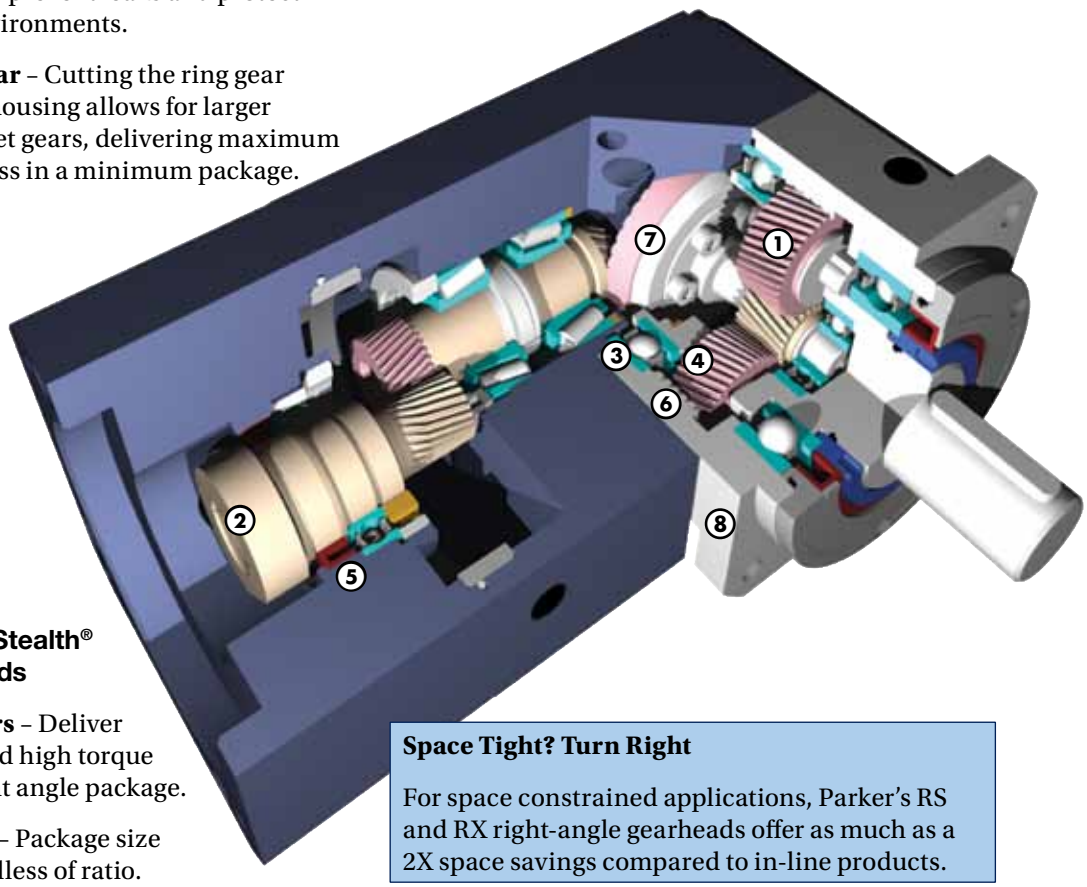
② **ServoMount®** – Motor-mounting design ensures error-free installation and the balanced pinion allows higher input speeds.

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

PS Generation II Performance Specifications

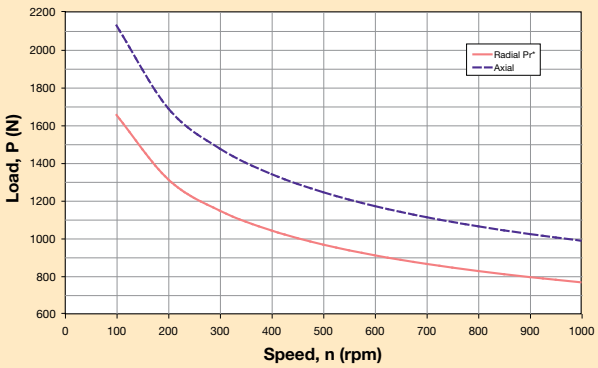
Parameter	Units	Ratio	PS60 Gen II	PS90 Gen II	PS115 Gen II	PS142 Gen II
Nominal Output Torque [1] $T_{nom\ r}$	Nm (in-lb)	3,15,30	27 (239)	76 (673)	172 (1522)	300 (2656)
		4,5,7,20,25,40,50,70	37 (327)	110 (974)	230 (2036)	430 (3807)
		10,100	32 (283)	93 (823)	205 (1814)	310 (2745)
Maximum Acceleration Output Torque [2] $T_{acc\ r}$	Nm (in-lb)	3,15,30	34 (300)	105 (930)	225 (1990)	450 (3984)
		4,5,7,20,25,40,50,70	48 (425)	123 (1090)	285 (2525)	645 (5711)
		10,100	37 (325)	112 (990)	240 (2125)	465 (4117)
Emergency Stop Output Torque [3] $T_{em\ r}$	Nm (in-lb)	3,15,30	80 (710)	260 (2300)	600 (5310)	1100 (9739)
		4,5,7,20,25,40,50,70	70 (620)	230 (2035)	500 (4425)	970 (8588)
		10,100	60 (530)	200 (1770)	430 (3805)	830 (7349)
Nominal Input Speed $N_{nom\ r}$	RPM	3	3000	2500	2000	1500
		4,5	3500	3000	2500	2000
		7,10,15	4000	3500	3000	2500
		20,25,30	4500	4000	3500	3000
		40,50	4800	4400	3800	3200
		70,100	5200	4800	4200	3600
Maximum Input Speed $N_{max\ r}$ [4]	RPM	3 – 100	6000	5500	4500	4000
Maximum Radial Load Pr_{max} [5, 7]	N (lbs)		1650 (370)	4800 (1080)	7500 (1685)	10,000 (2247)
Maximum Axial Load Pa_{max} [6]	N (lbs)		2100 (475)	3600 (810)	6800 (1530)	8800 (1976)
Service Life	h		20,000			
Standard Backlash [8]	arc-min	3 – 10	<6	<6	<4	<4
		15 – 100	<8	<8	<6	<6
Low Backlash [8]	arc-min	3 – 10	<4	<4	<3	<3
		15 – 100	<6	<6	<5	<5
Efficiency at Nominal Torque	%	3 – 10	97	97	97	97
		15 – 100	94	94	94	94
Noise Level at 3000 RPM [9]	db	3 – 100	<62	<62	<65	<66
Torsional Stiffness	Nm/arc-min (in-lb/arc-min)	3 – 100	3 (27)	12 (105)	27 (240)	50 (438)
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	1.3 (2.9)	3.0 (6.6)	7.0 (15.4)	14.0 (30.0)
		15 – 100	1.7 (3.7)	5.0 (11.0)	10.0 (22.0)	20.0 (43.0)

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.

PS Generation II Output Shaft Load Rating

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

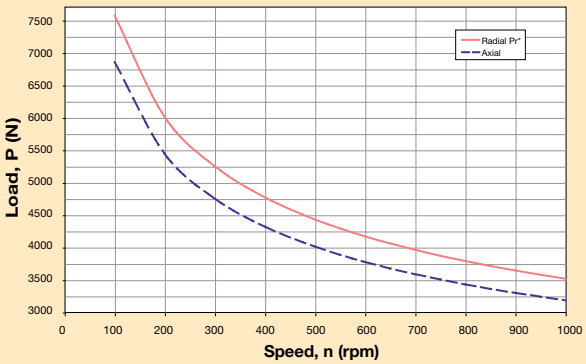
PS60



Prx = Pr * 75 mm / (49 + X)

Prx = Pr * 2.95 in / (1.93 in + X)

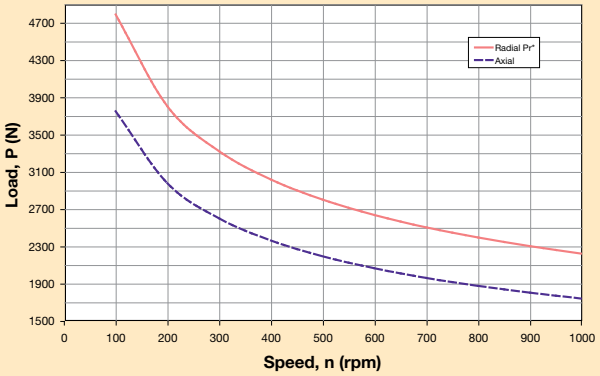
PS115



Prx = Pr * 124 mm / (81 + X)

Prx = Pr * 4.88 in / (3.19 in + X)

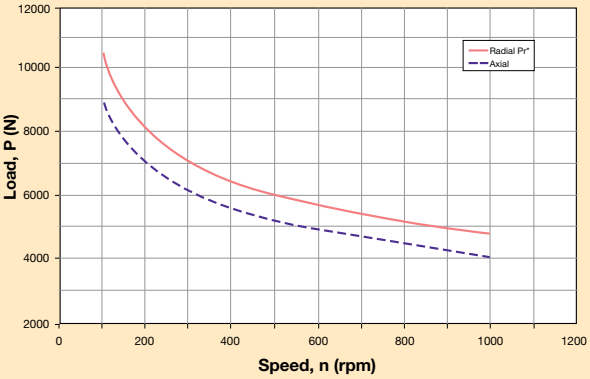
PS90



Prx = Pr * 96 mm / (62 + X)

Prx = Pr * 3.78 in / (2.44 in + X)

PS142



Prx = Pr * 156 mm / (93 + X)

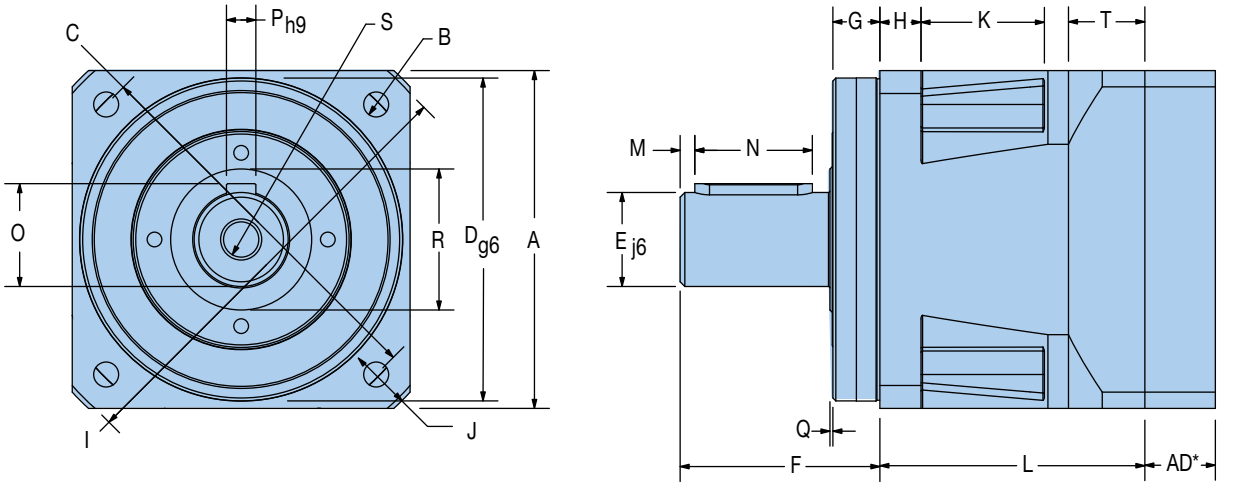
Prx = Pr * 6.14 in / (3.66 in + X)

* Radial load applied to center of the shaft.

Generation II Stealth® Series

PS Generation II Dimensions

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



Metric Frame Sizes

Frame Size	A		B		C		D		E		F		G	
	Square Flange		Bolt Hole		Bolt Circle		Pilot Diameter		Output Shaft Diameter		Output Shaft Length		Pilot Thickness	
	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in
PS60	62	2.441	5.5	0.217	70	2.756	50	1.969	16	0.630	40	1.575	11	0.433
PS90	90	3.543	6.5	0.256	100	3.937	80	3.150	22	0.866	52	2.047	15	0.591
PS115	115	4.528	8.5	0.335	130	5.118	110	4.331	32	1.260	68	2.677	16	0.630
PS142	142	5.591	11.0	0.433	165	6.496	130	5.118	40	1.575	102	4.016	20	0.787

Frame Size	H		I		J		K		L1		L2		M	
	Flange Thickness		Housing Diameter		Housing Recess		Recess Length		Length (3–10 Ratios)		Length (15–100 Ratios)		Distance from Shaft End	
	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in
PS60	8	0.315	80	3.150	5	0.197	24	0.945	59.8	2.354	94.8	3.732	2	0.079
PS90	10	0.394	116	4.567	6.5	0.256	33	1.299	69.5	2.736	113	4.449	3	0.118
PS115	14	0.551	152	5.984	7.5	0.295	42	1.654	90.2	3.551	143.4	5.646	5	0.197
PS142	15	0.591	185	7.283	10.0	0.394	45	1.772	103.7	4.083	170.7	6.720	5	0.197

Frame Size	N		O		P		Q		R		S	T	
	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
PS60	25	0.984	18	0.709	5	0.197	1	0.039	22	0.866	M5x8	20.3	0.799
PS90	32	1.260	24.5	0.965	6	0.236	1	0.039	35	1.378	M8x16	20	0.787
PS115	40	1.575	35	1.378	10	0.394	1.5	0.059	50	1.969	M12x25	26	1.024
PS142	63	2.480	43	1.693	12	0.472	2.5	0.098	78	3.071	M16x32	31	1.220

PS Generation II Universal Mounting Kit*

Adapter Length "AD" Dimension

Frame Size	Motor Shaft Length		Gearhead Adapter Length	
	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 62.1 – 82	1.023 – 2.441 2.445 – 3.228	30 50	1.181 1.969

* 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

PS Generation II Inertia

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

Ratio	Units*	PS60	PS90	PS115	PS142
3	kg-cm²	0.2500	0.9700	3.4000	14.8000
	in-lb-sec²	0.000221	0.000858	0.003009	0.013098
4	kg-cm²	0.1700	0.6700	2.2000	9.8000
	in-lb-sec²	0.000150	0.000593	0.001947	0.008673
5	kg-cm²	0.1500	0.5100	1.7000	7.0000
	in-lb-sec²	0.000133	0.000451	0.001505	0.006195
7	kg-cm²	0.1400	0.4100	1.3000	5.3000
	in-lb-sec²	0.000124	0.000363	0.001151	0.004691
10	kg-cm²	0.1400	0.3700	1.1000	4.4000
	in-lb-sec²	0.000124	0.000327	0.000974	0.003894
15	kg-cm²	0.1500	0.5200	0.1700	6.4000
	in-lb-sec²	0.150000	0.000460	0.000150	0.005664
20	kg-cm²	0.1500	0.5100	1.7000	6.4000
	in-lb-sec²	0.000133	0.000451	0.001505	0.005664
25	kg-cm²	0.1500	0.5100	1.7000	6.4000
	in-lb-sec²	0.000133	0.000451	0.001505	0.005664
30, 40, 50, 70, 100	kg-cm²	0.1300	0.3700	1.1000	4.2000
	in-lb-sec²	0.000115	0.000327	0.000974	0.003717

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

Generation II Stealth® Series

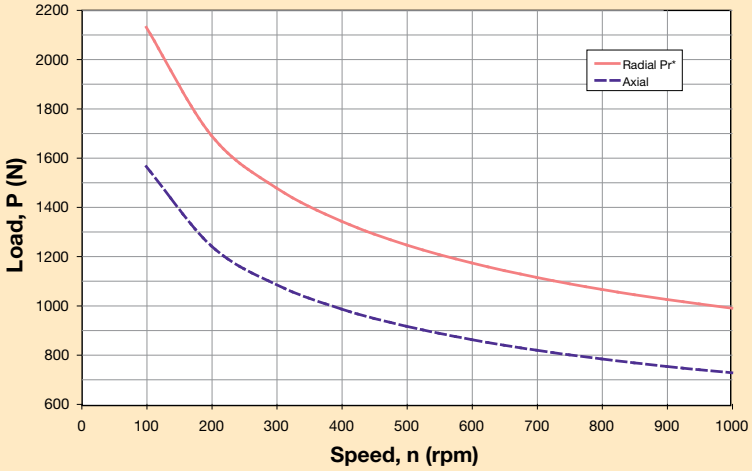
PX Generation II Performance Specifications

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

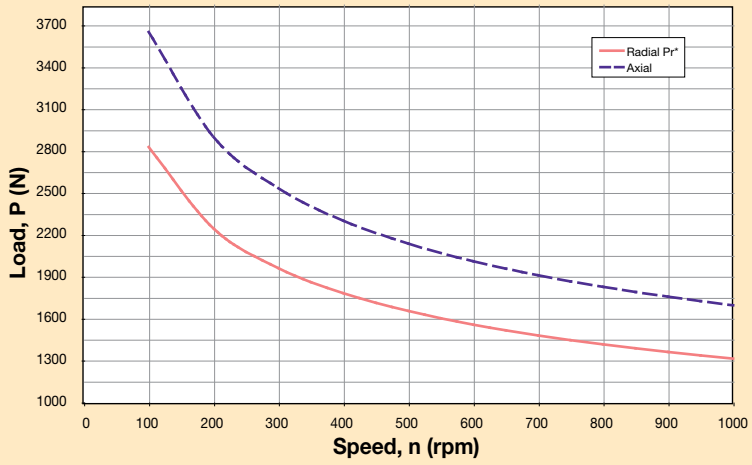


Formulas to calculate radial load (Prx) at any distance "X" from the gearhead mounting surface:

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

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

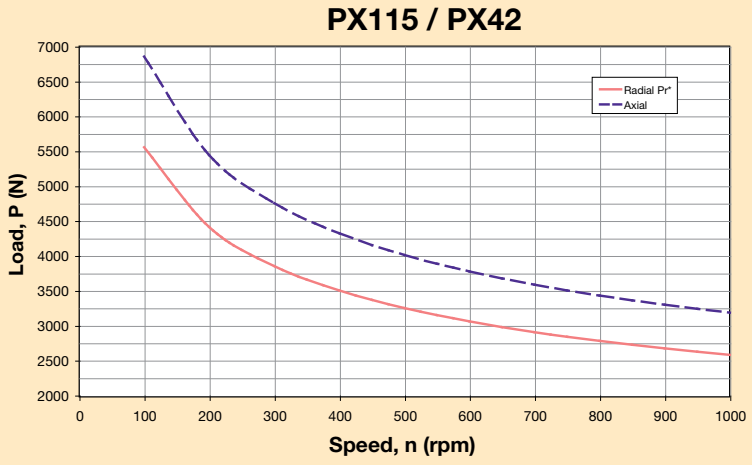
PX90 / PX34



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

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

PX115 / PX42



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

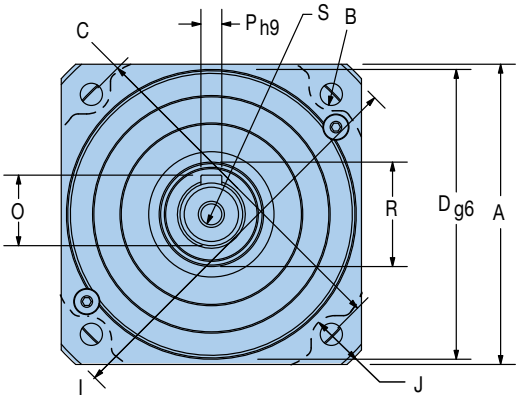
Prx = Pr * 4.53 in / (3.43 in + X)

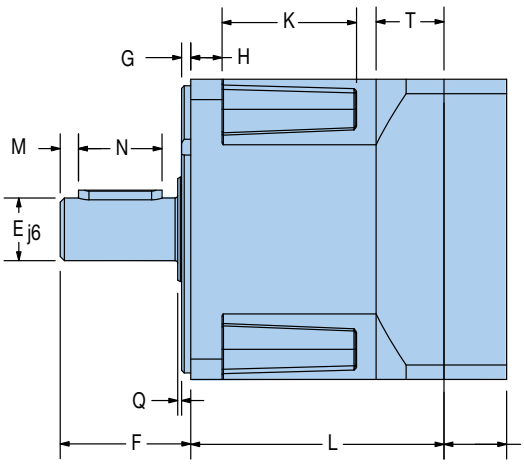
* Radial load applied to center of the shaft.

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

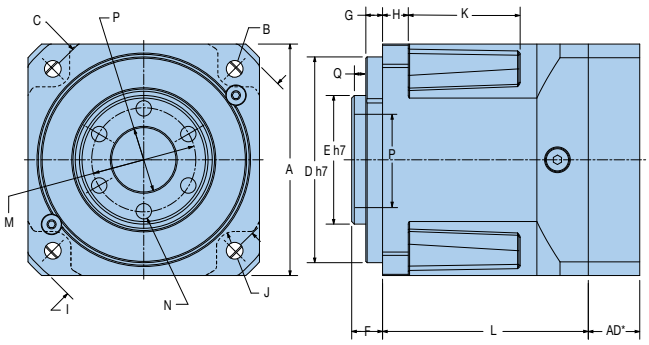
Frame Size	L1		L2		M		N		O		P		Q		R		S	T		
	Length Single Stage		Length Double Stage		Distance from Shaft End		Keyway Length		Key Height		Keyway Width		Shoulder Height		Shoulder Diameter		Tap & Depth (end of shaft)	Rear Housing Thickness		
	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in		mm	in	
PX60	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 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

* 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

RS Generation II Performance Specifications

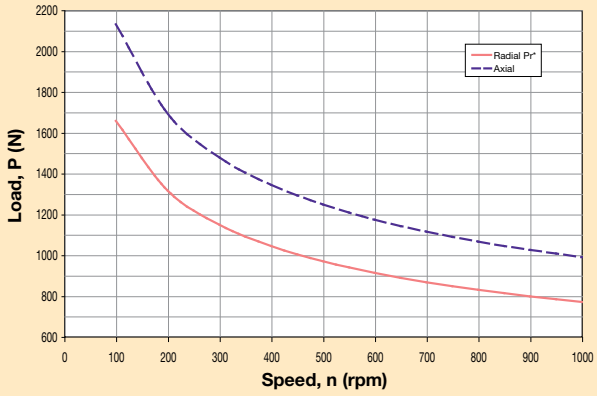
Parameter	Units	Ratio	RS60 Gen II	RS90 Gen II	RS115 Gen II	RS142 Gen II
Nominal Output Torque [1] $T_{nom\ r}$	Nm (in-lb)	5	13 (115)	55 (487)	85 (752)	225 (1992)
		10	24 (212)	80 (708)	160 (1415)	365 (3232)
		15,20,25,50	35 (310)	88 (779)	220 (1947)	430 (3807)
		30,40,100	30 (266)	86 (752)	195 (1726)	310 (2745)
Maximum Acceleration Output Torque [2] $T_{acc\ r}$	Nm (in-lb)	5	19 (168)	83 (743)	127 (1124)	337 (2984)
		10	36 (320)	120 (743)	240 (2124)	547 (4843)
		15,20,25,50	45 (400)	123 (867)	255 (2257)	645 (5711)
		30,40,100	37 (327)	112 (797)	240 (2124)	465 (4717)
Emergency Stop Output Torque [3] $T_{em\ r}$	Nm (in-lb)	5	40 (355)	150 (1327)	270 (2390)	625 (5534)
		10	72 (637)	240 (2125)	480 (4248)	1000 (8854)
		15,20,25,50	80 (708)	250 (2213)	510 (4514)	1100 (9739)
		30,40,100	60 (531)	200 (1770)	430 (3806)	830 (7349)
Nominal Input Speed $N_{nom\ r}$	RPM	5 to 10	3200	2800	2400	2000
		15,20,25,30,40	3700	3300	2900	2500
		50,100	4200	3800	3400	3000
Maximum Input Speed $N_{max\ r}$ [4]	RPM	5 – 100	6000	5300	4500	3800
Maximum Radial Load Pr_{max} [5, 7]	N (lbs)		1650 (370)	4800 (1080)	7500 (1685)	10,000 (2247)
Maximum Axial Load Pa_{max} [6]	N (lbs)		2100 (475)	3600 (810)	6800 (1530)	8800 (1976)
Service Life	h		20,000			
Standard Backlash [8]	arc-min	5 – 10	<14	<12	<12	<10
		15 – 100	<12	<10	<10	<8
Low Backlash [8]	arc-min	5 – 10	<10	<8	<8	<6
		15 – 100	<8	<6	<6	<4
Efficiency at Nominal Torque	%	5 – 100	94	94	94	94
Noise Level at 3000 RPM [9]	db	5 – 100	<65	<68	<68	<70
Torsional Stiffness	Nm/arc-min (in-lb/arc-min)	5 – 100	2.5 (22)	10 (90)	22 (195)	42 (372)
Maximum Allowable Case Temperature	° C	5 – 100	-20 to 90			
Lubrication		5 – 100	Per Maintenance Schedule			
Mounting Position		5 – 100	Any			
Degree of Protection			IP65			
Maximum Weight	kg (lbs)	5 – 100	2.0 (4.4)	6.0 (13.2)	11.0 (24.2)	24 (52)

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.

RS Generation II Output Shaft Load Rating

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

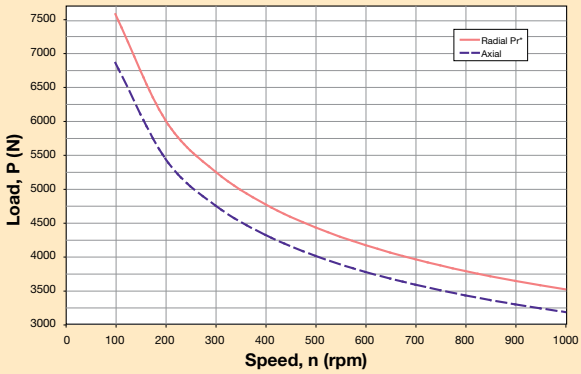
RS60



Prx = Pr * 75 mm / (49 + X)

Prx = Pr * 2.95 in / (1.93 in + X)

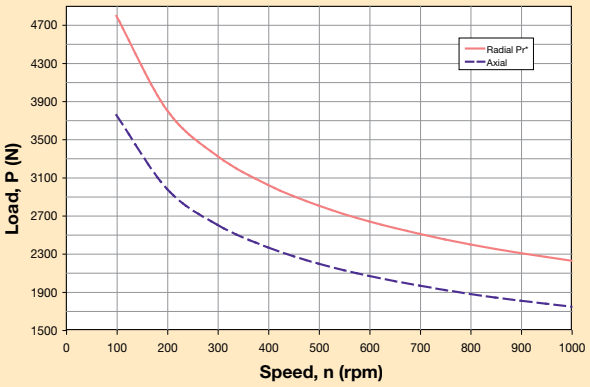
RS115



Prx = Pr * 124 mm / (81 + X)

Prx = Pr * 4.88 in / (3.19 in + X)

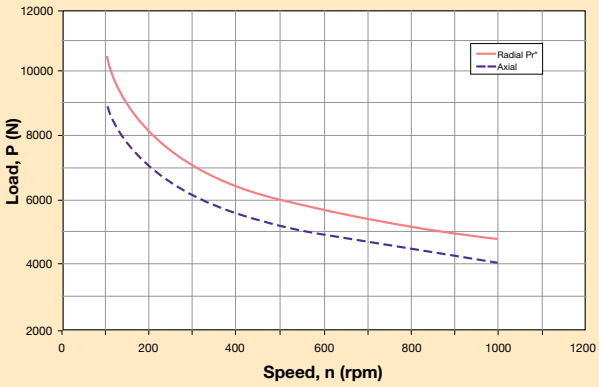
RS90



Prx = Pr * 96 mm / (62 + X)

Prx = Pr * 3.78 in / (2.44 in + X)

RS142



Prx = Pr * 156 mm / (93 + X)

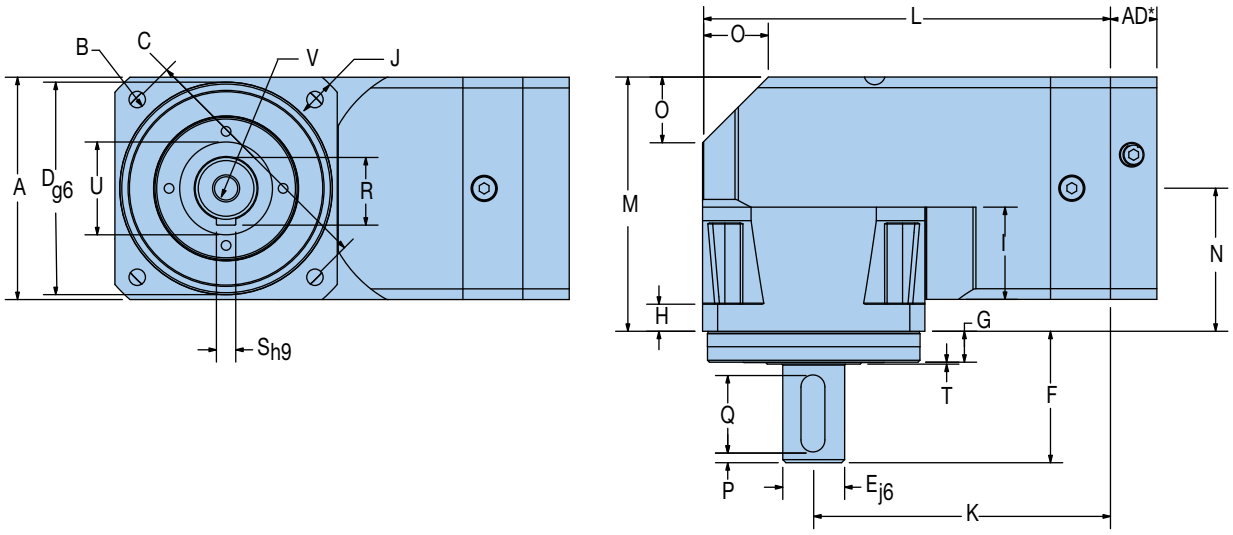
Prx = Pr * 6.14 in / (3.66 in + X)

* Radial load applied to center of the shaft.

Generation II Stealth® Series

RS Generation II Dimensions

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



Metric Frame Sizes

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	
	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in
RS60	62	2.441	5.5	0.217	70	2.756	50	1.969	16	0.630	40	1.575	11	0.433	8	0.315
RS90	90	3.543	6.5	0.256	100	3.937	80	3.150	22	0.866	52	2.047	15	0.591	10	0.394
RS115	115	4.528	8.5	0.335	130	5.118	110	4.331	32	1.260	68	2.677	16	0.630	14	0.551
RS142	142	5.591	11.0	0.433	165	6.496	130	5.118	40	1.575	102	4.016	20	0.787	15	0.591

Frame Size	I Recess Length		J Housing Recess		K Distance to Output Centerline		L Housing Length		M Housing Width		N Distance to Input Centerline		O Taper Distance		P Distance from Shaft End	
	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in
RS60	23.5	0.925	5.0	0.197	66.0	2.598	124.7	4.909	78.0	3.071	47.0	1.850	15	0.591	2	0.079
RS90	33.0	1.299	6.5	0.256	132.0	5.197	177.0	6.969	103.0	4.055	58.0	2.283	27	1.063	3	0.118
RS115	42.0	1.653	7.5	0.295	153.5	6.043	211.0	8.307	132.0	5.177	74.0	2.913	34	1.339	5	0.197
RS142	56.5	2.224	10.0	0.394	198.5	7.815	269.5	10.610	158.2	6.228	87.2	3.433	42	1.654	5	0.197

Frame Size	Q Keyway Length		R Key Height		S Keyway Width		T Shoulder Height		U Shoulder Diameter		V Tap & Depth (end of shaft)
	mm	in	mm	in	mm	in	mm	in	mm	in	
RS60	25	0.984	18.0	0.709	5	0.197	0.5	0.020	22	0.866	M5x8
RS90	32	1.260	24.5	0.965	6	0.236	0.5	0.020	35	1.378	M8x16
RS115	40	1.575	35.0	1.378	10	0.394	1	0.039	45	1.772	M12x25
RS142	63	2.480	43.0	1.693	12	0.472	2.5	0.098	78	3.071	M16x32

RS Generation II Universal Mounting Kits*

Adapter Length "AD" Dimension

Frame Size	Motor Shaft Length		Gearhead Adapter Length	
	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 62.1 – 82	1.023 – 2.441 2.445 – 3.228	30 50	1.181 1.969

* 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

RS Generation II Inertia

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

Ratio	Units*	RS60	RS90	RS115	RS142
5	kg-cm²	0.2200	0.8100	2.5000	9.4000
	in-lb-sec²	0.000195	0.000717	0.002213	0.008319
10	kg-cm²	0.1900	0.6100	1.9000	6.7000
	in-lb-sec²	0.000168	0.000540	0.001682	0.005929
15	kg-cm²	0.1800	0.6000	1.7000	6.6000
	in-lb-sec²	0.150000	0.000531	0.001505	0.005841
20	kg-cm²	0.1700	0.5100	1.4000	5.2000
	in-lb-sec²	0.000150	0.000451	0.001239	0.004602
25	kg-cm²	0.1600	0.4200	1.3000	4.5000
	in-lb-sec²	0.000142	0.000372	0.001151	0.003983
30	kg-cm²	0.1800	0.6000	1.7000	6.7000
	in-lb-sec²	0.000159	0.000531	0.001505	0.005929
40	kg-cm²	0.1700	0.5100	1.4000	5.2000
	in-lb-sec²	0.000150	0.000451	0.001239	0.004602
50	kg-cm²	0.1500	0.4000	1.1000	3.4000
	in-lb-sec²	0.000133	0.000354	0.000974	0.003009
100	kg-cm²	0.1500	0.4000	1.1000	3.4000
	in-lb-sec²	0.000133	0.000354	0.000974	0.003009

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

Generation II Stealth® Series

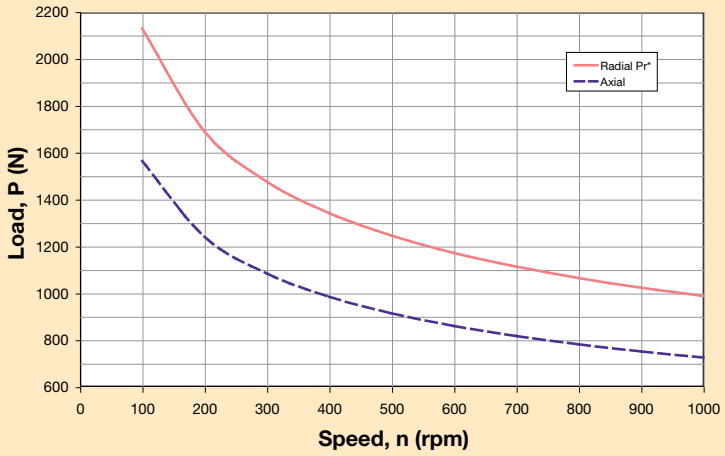
RX Generation II Performance Specifications

Parameter	Units	Ratio	RX60 Gen II		RX90 Gen II		RX115 Gen II	
Nominal Output Torque [1] $T_{nom\ r}$	Nm (in-lb)	5	10	(89)	44	(390)	68	(602)
		10	19	(168)	64	(566)	128	(566)
		15,20,25,50	24	(212)	66	(585)	136	(584)
		30,40,100	20	(177)	60	(530)	128	(531)
Maximum Acceleration Output Torque [2] $T_{acc\ r}$	Nm (in-lb)	5	15	(133)	66	(584)	102	(903)
		10	28	(248)	96	(850)	128	(1132)
		15,20,25,50	36	(319)	100	(885)	136	(1203)
		30,40,100	30	(266)	90	(797)	128	(1132)
Emergency Stop Output Torque [3] $T_{em\ r}$	Nm (in-lb)	5	32	(283)	120	(1062)	216	(1912)
		10	58	(513)	192	(1700)	384	(3398)
		15,20,25,50	64	(566)	200	(1770)	408	(3611)
		30,40,100	48	(425)	160	(1416)	345	(3053)
Nominal Input Speed $N_{nom\ r}$	RPM	5,10	3200		2800		2400	
		15,20,25,30,40	3700		3300		2900	
		50,100	4200		3800		3400	
Maximum Input Speed $N_{max\ r}$ [4]	RPM	5 – 100	6000		5300		4500	
Maximum Radial Load Pr_{max} [5, 7]	N (lbs)		1550	(348)	2800	(1079)	5500	(1236)
Maximum Axial Load Pa_{max} [6]	N (lbs)		2100	(475)	3600	(810)	6800	(1530)
Service Life	h		20,000					
Standard Backlash [8]	arc-min	5 – 10	<20		<18		<16	
		15 – 100	<20		<18		<16	
Low Backlash [8]	arc-min	5 – 10	<18		<16		<14	
		15 – 100	<16		<14		<12	
Efficiency at Nominal Torque	%	5 – 100	94		94		94	
Noise Level at 3000 RPM [9]	db	5 – 100	<65		<68		<68	
Torsional Stiffness	Nm/arc-min (in-lb/arc-min)	5 – 100	2.5	(22)	10	(90)	22	(195)
Maximum Allowable Case Temperature	° C	5 – 100	-20 to 90					
Lubrication		5 – 100	Per Maintenance Schedule					
Mounting Position		5 – 100	Any					
Degree of Protection			IP65					
Maximum Weight	kg (lbs)	5 – 100	2.0	(4.4)	6.0	(13.2)	11.0	(24.2)

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.

RX Generation II Output Shaft Load Rating

RX60 / RX23

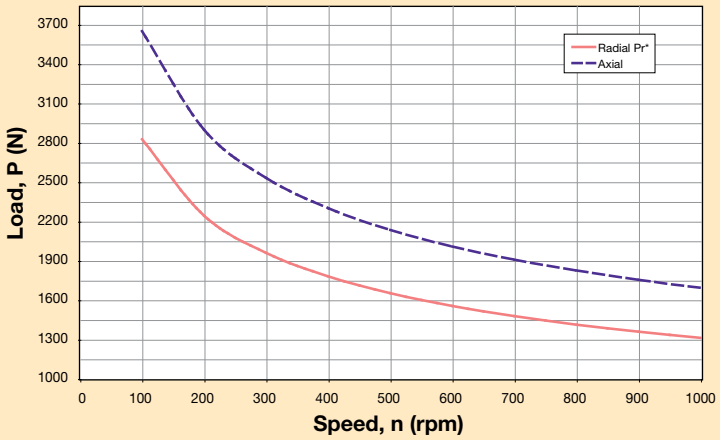


Formulas to calculate radial load (Prx) at any distance "X" from the gearhead mounting surface:

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

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

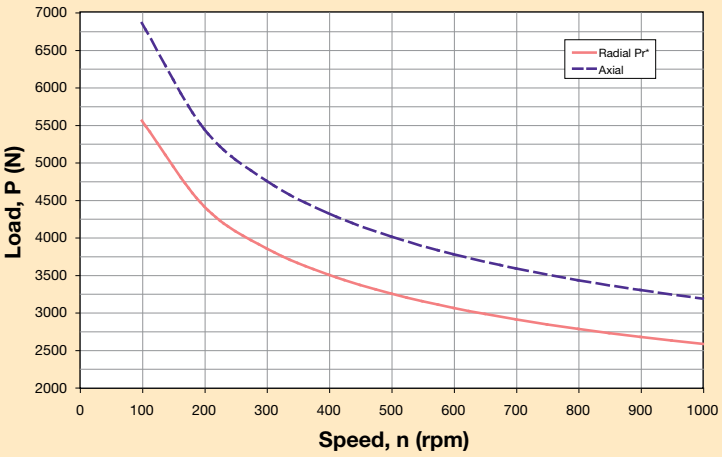
RX90 / RX34



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

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

RX115 / RX42



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

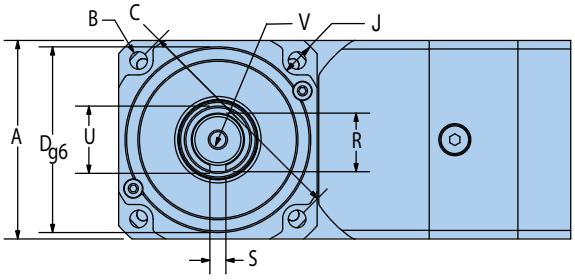
Prx = Pr * 4.53 in / (3.43 in + X)

* Radial load applied to center of the shaft.

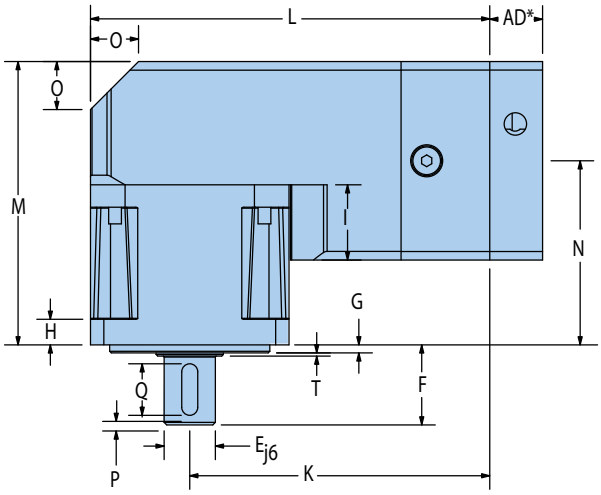
Generation II Stealth® Series

RX Generation II Dimensions

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



RX Gearheads also available with
Flange Mount Option – Contact Factory



Metric Frame Sizes

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 Recess Length		J Housing Recess		K Distance to Output Centerline	
	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in
RX60	62	2.441	5.5	0.217	70	2.756	50	1.969	16	0.630	25	0.984	2.5	0.098	13	0.512	23.5	0.925	5	0.197	93.7	3.689
RX90	90	3.543	6.5	0.256	100	3.937	80	3.150	20	0.787	40	1.575	3	0.118	17	0.669	36.5	1.437	6.5	0.256	132	5.197
RX115	115	4.528	8.5	0.335	130	5.118	110	4.331	24	0.945	50	1.969	3.5	0.138	20	0.787	47.5	1.870	7.5	0.295	153.5	6.043

Frame Size	L Housing Length		M Housing Width		N Distance to Input Centerline		O Taper Distance		P Distance from Shaft End		Q Keyway Length		R Key Height		S Keyway Width		T Shoulder Height		U Shoulder Diameter		V Tap & Depth (end of shaft)
	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	
RX60	124.5	4.902	88.5	3.484	57.5	2.264	14	0.551	3	0.118	16	0.630	18	0.709	5	0.197	0.5	0.020	21	0.827	M5x8
RX90	177	6.969	114	4.469	68.5	2.697	25	0.984	5	0.197	28	1.102	24.5	0.965	6	0.236	0.5	0.020	29	1.142	M8x16
RX115	211	8.307	138	5.445	81	3.189	32	1.260	7	0.276	32	1.260	27	1.063	8	0.315	1	0.039	36	1.417	M8x16

NEMA Frame Sizes

Frame Size	B Bolt Hole		C Bolt Circle		D Pilot Diameter		E Output Shaft Diameter		F Output Shaft Length		Q Keyway Length		R Keyway Depth		S Keyway Width	
	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm
RX23	0.2	4.953	2.625	66.675	1.5	38.100	0.38	9.525	1	25.400	—	—	—	—	—	—
RX34	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
RX42	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

RX23 has a flat on output shaft, not a keyway
NOTE: NEMA Sizes have 20% lower torque/stiffness ratings due to smaller output shaft diameter.

RX Generation II Universal Mounting Kits*

Adapter Length "AD" Dimension

Frame Size	Motor Shaft Length		Gearhead Adapter Length	
	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

* 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

RX Generation II Inertia

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

Ratio	Units*	RX60 / RX23	RS90 / RX34	RS115 / RX42
5	kg-cm²	0.2200	0.8100	2.5000
	in-lb-sec²	0.000195	0.000717	0.002213
10	kg-cm²	0.1900	0.6100	1.9000
	in-lb-sec²	0.000168	0.000540	0.001682
15	kg-cm²	0.1800	0.6000	1.7000
	in-lb-sec²	0.150000	0.000531	0.001505
20	kg-cm²	0.1700	0.5100	1.4000
	in-lb-sec²	0.000150	0.000451	0.001239
25	kg-cm²	0.1600	0.4200	1.3000
	in-lb-sec²	0.000142	0.000372	0.001151
30	kg-cm²	0.1800	0.6000	1.7000
	in-lb-sec²	0.000159	0.000531	0.001505
40	kg-cm²	0.1700	0.5100	1.4000
	in-lb-sec²	0.000150	0.000451	0.001239
50	kg-cm²	0.1500	0.4000	1.1000
	in-lb-sec²	0.000133	0.000354	0.000974
100	kg-cm²	0.1500	0.4000	1.1000
	in-lb-sec²	0.000133	0.000354	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 GenI 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			

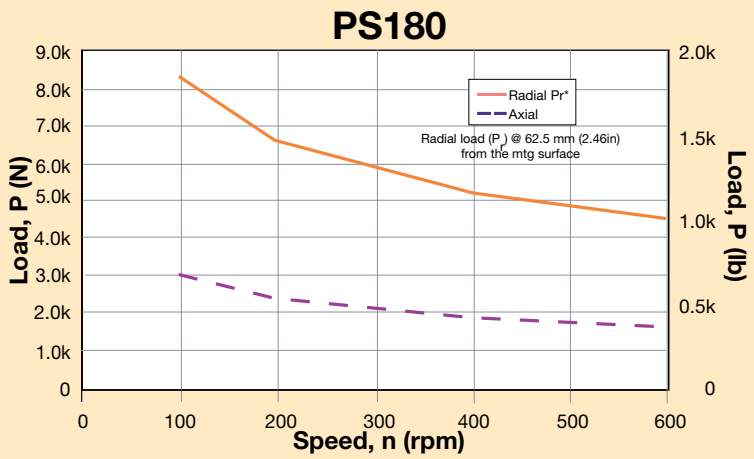
Generation I Stealth® Series

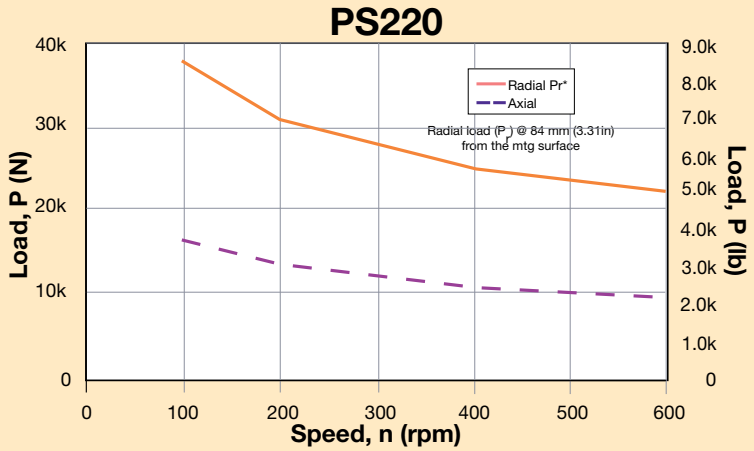
PS Performance Specifications

Parameter	Units	Ratio	PS180		PS220	
Nominal Output Torque $T_{nom\ r}$	Nm (in-lb)	3,4,5,7,10	735	(6500)	1413	(12,500)
		15,20,25, 30,40,50	1017	(9000)	1808	(16,000)
		70,100	893	(7900)	1582	(14,000)
Maximum Acceleration Output Torque [1] $T_{acc\ r}$	Nm (in-lb)	3,4,5,7,10 70,100	972	(8600)	1763	(15,600)
		15,20,25, 30,40,50	1198	(10,600)	2011	(17,800)
Emergency Stop Output Torque [2] $T_{em\ r}$	Nm (in-lb)	3,4,5,7,10 70,100	2237	(19,800)	4068	(36,000)
		15,20,25, 30,40,50	2757	(24,400)	4520	(40,000)
Nominal Input Speed $N_{nom\ r}$	RPM	3,4,5	1600		1200	
		7,10	2000		1500	
		15,20,25, 30,40,50	2400		1800	
		70,100	2800		2100	
Maximum Input Speed $N_{max\ r}$	RPM	3 – 100	3000		2300	
Standard Backlash [3]	arc-min	3 – 10	4		4	
		15 – 100	6		6	
Low Backlash [3]	arc-min	3 – 10	3		3	
		15 – 100	5		5	
Efficiency at Nominal Torque	%	3 – 10	97		97	
		15 – 100	94		94	
Noise Level at: **2000 RPM [4]** **3000 RPM [4]**	db	3 – 100	66 —		68 —	
Torsional Stiffness	Nm/arc-min (in-lb/arc-min)	3 – 100	110	(973)	210	(1,858)
Maximum Allowable Case Temperature	° C	3 – 100	-20 to 90			
Degree of Protection			IP65			
Maximum Weight	kg (lbs)	3 – 10	26	(57)	49	(108)
		15 – 100	35	(77)	71	(157)

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

PS Output Shaft Load Rating





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

Prx = Pr * 138 mm / (76 + X)

Prx = Pr * 5.43 in / (2.99 in + X)

Prx = Pr * 190 mm / (106 + X)

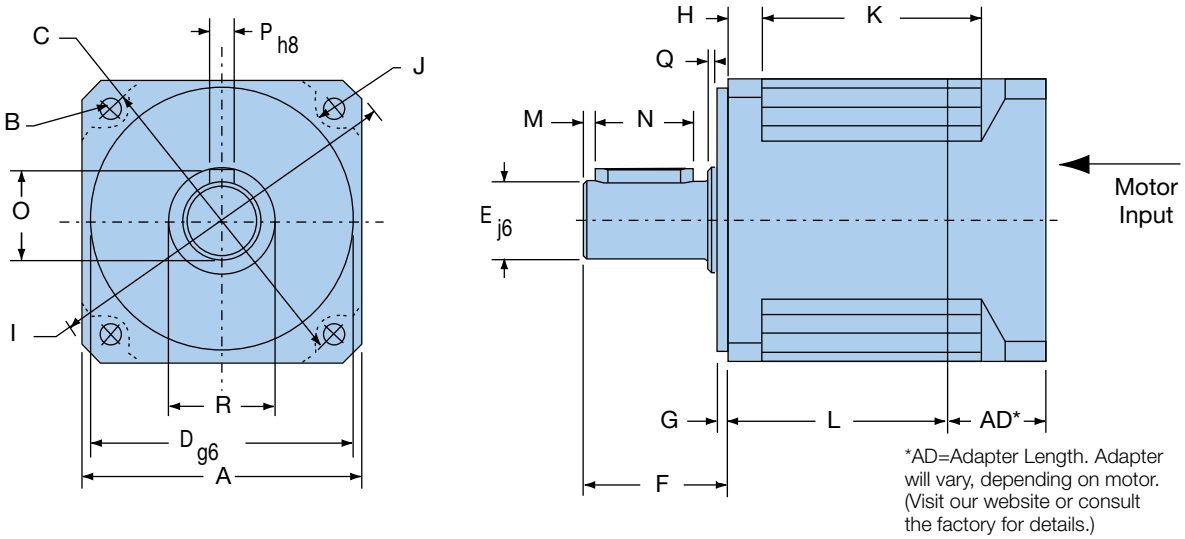
Prx = Pr * 7.48 in / (4.17 in + X)

* Radial load applied to center of the shaft.

Generation I Stealth® Series

PS 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 Sizes

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
PS180	182	7.165	13	0.512	215	8.465	160	6.299	55	2.165	105	4.134	20	0.787	16	0.630	240	9.449	16	0.630
PS220	220	8.661	17	0.669	250	9.843	180	7.087	75	2.953	138	5.433	30	1.181	22	0.866	290	11.417	16	0.630

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
PS180	88	3.465	158	6.220	83.5	3.287	153.5	6.043	6	0.236	70	2.756	59	2.323	16	0.630	3	0.118	70	2.756
PS220	116	4.567	218	8.583	108	4.252	210.5	8.287	6	0.236	90	3.543	79.5	3.130	20	0.787	3	0.118	95	3.740

PS Inertia

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

	Ratio	Units	Frame Size	
			PS180	PS220
Small Motor Shaft Diameter Range	3 to 100	mm	15.9-35	24-48
		in	0.626-1.378	0.945-1.89
	3	gm-cm-sec^2	28.6	—
		oz-in-sec^2	0.397	—
	4, 5	gm-cm-sec^2	17.6	62.6
		oz-in-sec^2	0.244	0.869
	7, 10	gm-cm-sec^2	9.24	34.3
		oz-in-sec^2	0.128	0.476
	15	gm-cm-sec^2	15.8	51.0
		oz-in-sec^2	0.219	0.708
	20, 25	gm-cm-sec^2	16.7	53.3
		oz-in-sec^2	0.232	0.741
	30, 40, 50, 70, 100	gm-cm-sec^2	7.450	27.1
		oz-in-sec^2	0.104	0.377

	Ratio	Units	Frame Size	
			PS180	PS220
Large Motor Shaft Diameter Range	3 to 100	mm	35-42	48-55
		in	1.38-1.65	1.89-2.17
	3	gm-cm-sec^2	37.8	111
		oz-in-sec^2	0.526	1.54
	4, 5	gm-cm-sec^2	25.6	72.4
		oz-in-sec^2	0.356	1.01
	7, 10	gm-cm-sec^2	15.8	44.1
		oz-in-sec^2	0.219	0.613
	15	gm-cm-sec^2	23.8	60.8
		oz-in-sec^2	0.331	0.845
	20, 25	gm-cm-sec^2	24.7	62.9
		oz-in-sec^2	0.344	0.874
	30, 40, 50, 70, 100	gm-cm-sec^2	14.0	37.0
		oz-in-sec^2	0.195	0.513

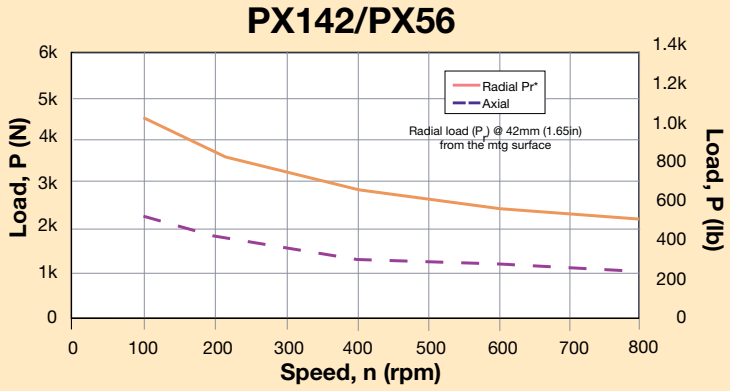
Generation I Stealth® Series

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:

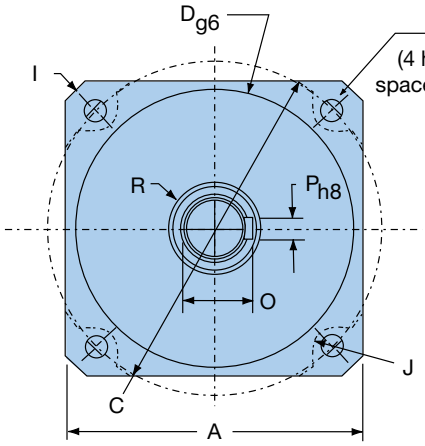
Prx = Pr * 121 mm / (65 + X)

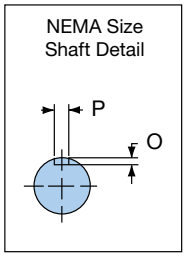
Prx = Pr * 4.76 in / (2.56 in + X)

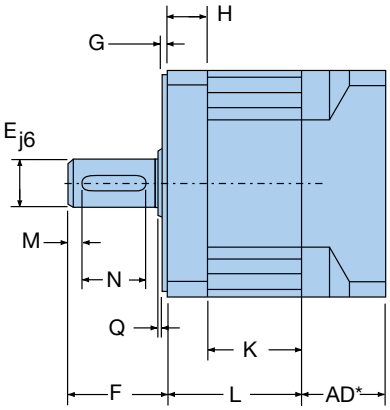
* Radial load applied to center of the shaft.

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	gm-cm-sec^2	8.826	4.514	3.326	4.849	5.179	2.840
PX56	oz-in-sec^2	0.124	0.063	0.047	0.068	0.073	0.040

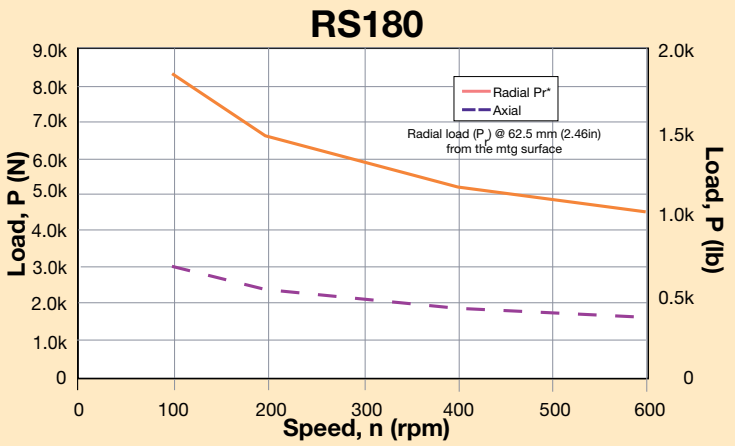
Generation I Stealth® Series

RS Performance Specifications

Parameter	Units	Ratio	RS180		RS220	
Nominal Output Torque $T_{nom\ r}$	Nm (in-lb)	5	316	(2800)	678	(16,000)
		10	621	(5500)	1299	(11,500)
		15,20,25	938	(8300)	1808	(16,000)
		30,40,50,100	836	(7400)	1469	(13,000)
Maximum Acceleration Output Torque [1] $T_{acc\ r}$	Nm (in-lb)	5	373	(3300)	902	(7,100)
		10	734	(6500)	1582	(14,000)
		15,20,25, 30,40,50,100	1096	(9700)	2000	(17,700)
Emergency Stop Output Torque [2] $T_{em\ r}$	Nm (in-lb)	5	870	(7700)	1853	(16,400)
		10	1695	(15,000)	3684	(32,600)
		15,20,25, 30,40,50,100	2520	(22,300)	4588	(40,600)
Nominal Input Speed $N_{nom\ r}$	RPM	5,10	1600		1200	
		5,20, 25,30,40	2000		1500	
		50,100	2400		1800	
Maximum Input Speed $N_{max\ r}$	RPM	5 – 100	3000		2300	
Standard Backlash [3]	arc-min	5 – 10	10		10	
		15 – 100	8		8	
Low Backlash [3]	arc-min	5 – 10	6		6	
		15 – 100	4		4	
Efficiency at Nominal Torque	%	5 – 100	94		94	
Noise Level at: **1500 RPM [4]** **2000 RPM [4]** **3000 RPM [4]**	db	5 – 100	— 72 —		— — 72	
Torsional Stiffness	Nm/arc-min (in-lb/arc-min)	5 – 100	90	(800)	170	(1,500)
Maximum Allowable Case Temperature	° C	5 – 100	-20 to 90			
Degree of Protection			IP65			
Maximum Weight	kg (lbs)	5 – 100	43	(94)	80	(177)

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.

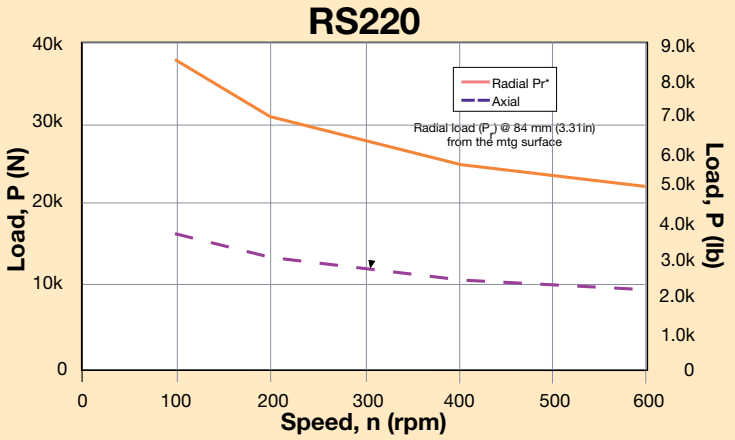
RS Output Shaft Load Rating



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

Prx = Pr * 138 mm / (76 + X)

Prx = Pr * 5.43 in / (2.99 in + X)



Prx = Pr * 190 mm / (106 + X)

Prx = Pr * 7.48 in / (4.17 in + X)

* Radial load applied to center of the shaft.

RS Inertia

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

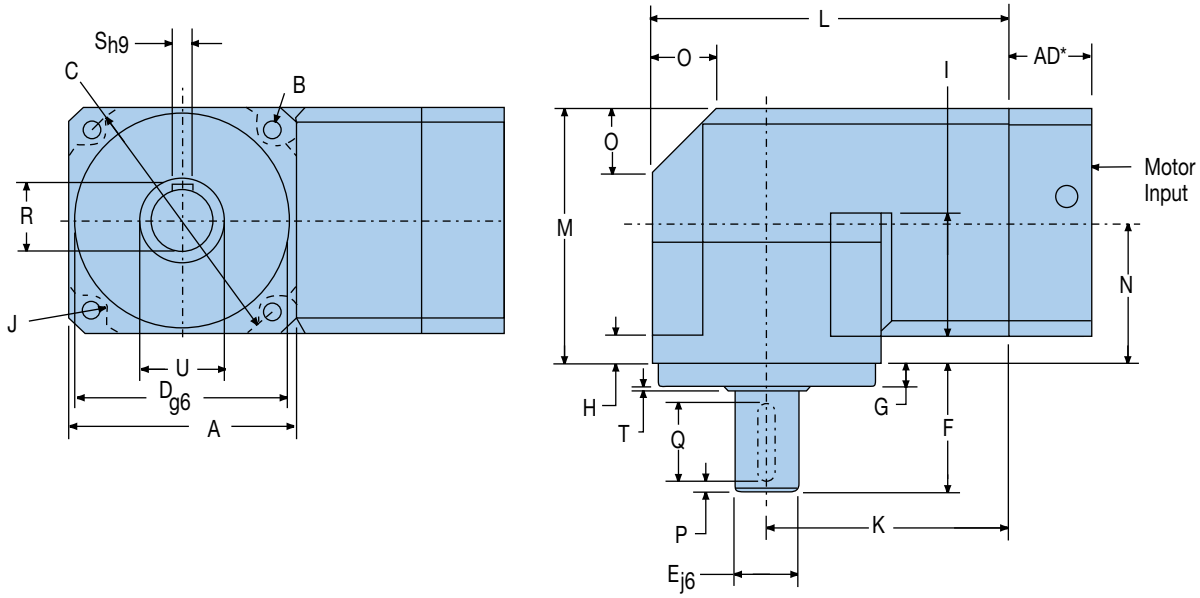
Ratio	Units	Frame Size	
		RS180	RS220
5	gm-cm-sec^2	26.5	82.2
	oz-in-sec^2	0.368	1.14
10	gm-cm-sec^2	16.7	50.4
	oz-in-sec^2	0.232	0.700
15, 30	gm-cm-sec^2	15.2	47.4
	oz-in-sec^2	0.211	0.658
20, 25, 40	gm-cm-sec^2	10.7	34.3
	oz-in-sec^2	0.149	0.476
50, 100	gm-cm-sec^2	6.70	21.2
	oz-in-sec^2	0.093	0.294

Generation I Stealth® Series

RS 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 Sizes

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	
	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in
RS180	182	7.165	13	0.512	215	8.465	160	6.299	55	2.165	105	4.134	20	0.787
RS220	220	8.661	17	0.669	250	9.843	180	7.087	75	2.953	138	5.433	30	1.181

Frame Size	H Flange Thickness		I Recess Length		J Housing Recess		K Distance to Output Centerline		L Housing Length		M Housing Width		N Distance to Input Centerline	
	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in
RS180	16	0.630	97.5	3.839	16	0.630	172	6.772	263	10.354	197	7.756	106	4.173
RS220	22	0.866	101	3.976	16	0.630	230	9.055	340	13.386	245	9.646	135	5.315

Frame Size	O Taper Distance		P Distance from Shaft End		Q Keyway Length		R Key Height		S Keyway Width		T Shoulder Height		U Shoulder Diameter	
	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in
RS180	55	2.165	6	0.236	70	2.756	59	2.323	16	0.630	3	0.118	70	2.756
RS220	60	2.362	6	0.236	90	3.543	79.5	3.130	20	0.787	3	0.118	95	3.740

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

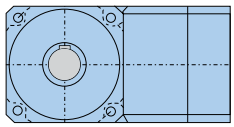
Frame Size	Recommended Servo Motor		
	Motor	Mounting Kit	AD Dimension
PS180	MPP142 MPP180	MT180-131 MT180-096	67.5 mm 109 mm
PS220	MPP180 MPP230	MT220-021 MT220-022	104 mm 138 mm
PX142	MPP115 MPP142	MX142-107 MX142-008	70 mm 75 mm
RS180	MPP142 MPP190	MZ180-025 MZ180-032	80 mm 120 mm
RS220	MPP190 MPP230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

Sizing/Selection Design Assistance

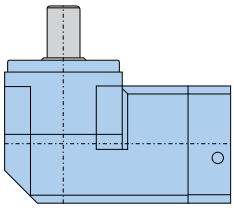
To properly size and select a gearhead for a specific application requires consideration of several interrelated parameters including: speed, continuous torque, repetitive peak torque or acceleration torque, emergency stop torque, duty cycle, ambient temperature and radial and axial shaft load.

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

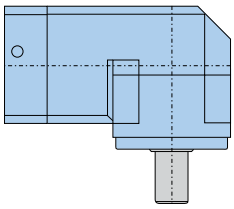
Right Angle Gearhead Orientation



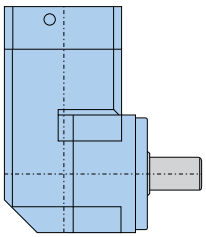
H
Horizontal Orientation



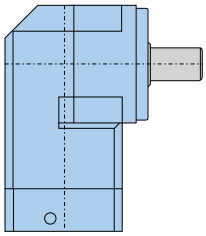
U
Output Shaft Up



D
Output Shaft Down



E
Motor InpuT
Facing Up



F
Motor Input
Facing Down

PV Series Gearheads

PV Series: Value Alternative Precision Planetary Gearheads

PV = Power + Versatility

The PV Series planetary gearhead combines power and versatility in an economical package. It comes in a wide range of options, including dimensional output face crossovers to the Parker PX, Alpha LP, Neugart PLE, Stober PE and standard NEMA gearheads.

The PV Series is available in metric or NEMA frame sizes: 40, 60, 90 and 115 mm, and NEMA sizes 17, 23, 34 and 42. Ratios are available from 3:1 to 100:1.

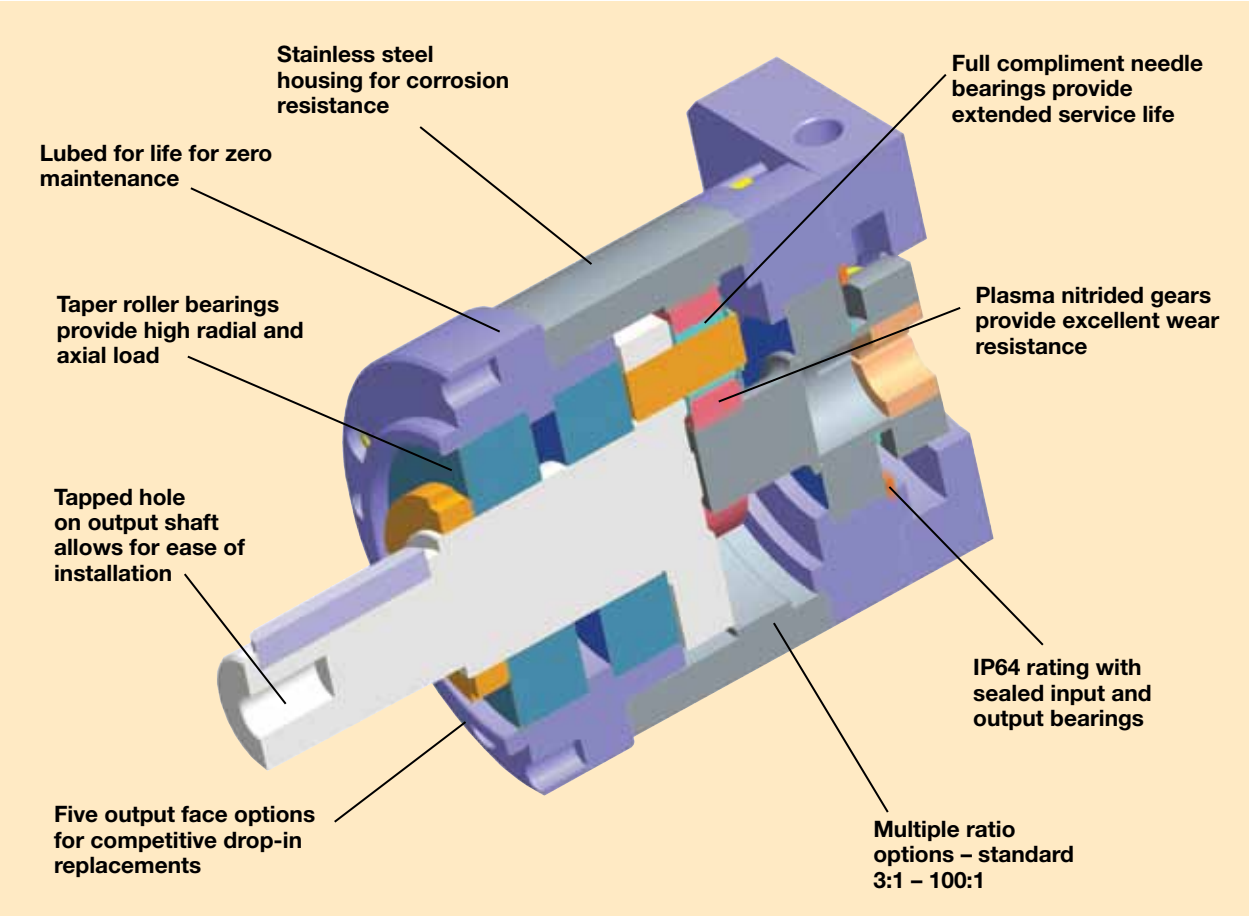
Whether you're an OEM or an end user searching for competitive alternatives, the PV offers a superior solution. Parker's PV Series gearheads are made in the USA.

- **Higher radial load capacity: Taper roller output bearings**
- **Competitive Alternatives: Five Drop-In Output Face Options**
- **Universal mounting kits: Quicker deliveries and easier mounting**
- **Higher gear wear resistance: Plasma Nitriting heat treating**

PV Series Precision Gearheads

Product Series	Gear Geometry	Configuration	Frame Size (mm)	Nominal Continuous Torque (Nm)	Radial Load (N)	Backlash arc-min	IP Rating
PV40/17	Planetary	In-Line	40 (NEMA 17)	3.5 – 6.7	190 – 590	<15	IP64
PV60/23	Planetary	In-Line	60 (NEMA 23)	10.2 – 22.5	665 – 2535	<12	IP64
PV90/34	Planetary	In-Line	90 (NEMA 34)	33 – 71	1040 – 4270	<10	IP64
PV115/42	Planetary	In-Line	115 (NEMA 42)	67 – 144	1235 – 10,550	<8	IP64

PV Series Gearhead Features and Benefits



PV Series Gearheads

Performance Specifications

Parameter	Units	Ratio	PV40/PV17		PV60/PV23		PV90/PV34		PV115/PV42	
Nominal Output Torque $T_{nom\ r}$	Nm (in-lb)	3	–	–	12.0	(106.200)	35	(309.75)	74	(654.90)
		4	5.9	(52.215)	18.9	(167.265)	56	(495.60)	111	(982.30)
		5	6.2	(54.870)	19.6	(173.460)	58	(513.30)	115	(1017.70)
		7	5.5	(48.675)	16.7	(147.795)	52	(460.20)	104	(920.40)
		10	3.5	(30.975)	10.6	(93.810)	33	(292.05)	67	(592.95)
		12	–	–	18.2	(161.070)	54	(477.90)	112	(991.20)
		15	–	–	19.4	(171.690)	58	(513.30)	120	(1062.00)
		16	6.5	(57.525)	–	–	–	–	–	–
		20	6.5	(57.525)	21.5	(190.275)	67	(592.95)	136	(1203.60)
		25	6.7	(59.295)	20.0	(177.000)	63	(557.55)	126	(1115.10)
		30	–	–	22.5	(199.275)	71	(628.35)	144	(1274.40)
		35	6.7	(59.295)	–	–	–	–	–	–
		40	6.5	(57.525)	21.5	(190.275)	67	(592.95)	136	(1203.60)
		50	6.7	(59.295)	20.0	(177.000)	63	(557.55)	126	(1115.10)
		70	5.5	(48.675)	16.7	(147.795)	52	(460.20)	104	(920.40)
		100	3.5	(30.975)	10.6	(93.810)	33	(292.05)	67	(592.95)
Maximum Acceleration Output Torque [1] $T_{acc\ r}$	Nm (in-lb)	3	–	–	24.0	(212.400)	70	(619.50)	148	(1309.80)
		4,5, 12,15	11.8	(104.430)	36.4	(322.140)	108	(955.80)	222	(1964.70)
		7,70	11.0	(97.350)	33.4	(295.590)	104	(920.40)	208	(1840.80)
		10,100	7.0	(61.950)	21.2	(187.620)	66	(584.10)	134	(1185.90)
		16,20, 25,30, 35,40,50	13.0	(115.050)	40.0	(354.000)	126	(1115.10)	252	(2230.20)
Emergency Stop Output Torque [2] $T_{em\ r}$	Nm (in-lb)	3,4,5, 12,15,16, 20,25,30, 35,40,50	16.0	(141.600)	55.0	(486.750)	170	(1504.50)	350	(3097.50)
		7, 70	13.7	(121.245)	44.0	(389.400)	137	(1212.45)	290	(2466.50)
		10, 100	9.2	(81.420)	39.0	(345.150)	122	(1079.70)	255	(2256.75)
Nominal Input Speed $N_{nom\ r}$	RPM	3 – 100	4500		4000		3500		3000	
Maximum Input Speed $N_{max\ r}$	RPM	3 – 100	8000		6000		6000		5000	
Service Life	h	3 – 100	20,000							
Standard Backlash [3]	arc-min	3 – 10	<15		<12		<10		<8	
		15 – 100	<18		<16		<14		<12	
Efficiency at Nominal Torque	%	3 – 10	96							
		15 – 100	94							
Noise Level at 3000 RPM [4]	db	3 – 100	<60		<65		<65		<70	
Maximum Allowable Case Temperature	° C	3 – 100	-20 to 100							
Lubrication		3 – 100	Lifetime lubrication							
Mounting Position		3 – 100	Any							
Direction of Rotation		3 – 100	Same as Input							
Degree of Protection		3 – 100	IP64							
Maximum Weight	kg (lbs)	3 – 10	0.6	(1.2)	1.2	(2.5)	3.2	(7.0)	6.8	(13.5)
		15 – 100	0.9	(2.0)	1.6	(3.5)	4.3	(9.5)	9.7	(19.3)

1) Parker MotionSizer sizing software available for free download at parkermotion.com. tacc + tdec = 0.2 (tacc + tcont + tdec) Tcont = 0.25 Tacc
2) Maximum of 1000 stops.
3) Measured at 2% of rated torque.
4) Measure at 1m.

Inertia

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

Ratio	Units*	PV40/PV17	PV60/PV23	PV90/PV34	PV115/PV42
3	kg-cm²	–	0.1400	0.7400	1.9700
	in-lb-sec²	–	0.000124	0.000655	0.001743
4	kg-cm²	0.0200	0.1000	0.5000	1.3400
	in-lb-sec²	0.000018	0.000089	0.000443	0.001186
5	kg-cm²	0.0180	0.0840	0.3900	1.1300
	in-lb-sec²	0.000016	0.000074	0.000345	0.001000
7	kg-cm²	0.0160	0.0750	0.3400	0.9300
	in-lb-sec²	0.000014	0.000066	0.000301	0.000823
10	kg-cm²	0.0160	0.0700	0.3000	0.8500
	in-lb-sec²	0.000014	0.000062	0.000266	0.000752
12	kg-cm²	–	0.0970	0.4900	1.2300
	in-lb-sec²	–	0.000086	0.000434	0.001089
15	kg-cm²	–	0.0830	0.3900	1.0400
	in-lb-sec²	–	0.000073	0.000345	0.000920
16	kg-cm²	0.0190	–	–	–
	in-lb-sec²	0.000017	–	–	–
20	kg-cm²	0.0170	0.0830	0.3900	1.0400
	in-lb-sec²	0.000015	0.000073	0.000345	0.000920
25	kg-cm²	0.0170	0.0830	0.3900	1.0400
	in-lb-sec²	0.000015	0.000073	0.000345	0.000920
30	kg-cm²	–	0.0700	0.3000	0.8400
	in-lb-sec²	–	0.000062	0.000266	0.000743
35	kg-cm²	0.0160	–	–	–
	in-lb-sec²	0.000014	–	–	–
40, 50, 70, 100	kg-cm²	0.0160	0.0700	0.3000	0.8400
	in-lb-sec²	0.000014	0.000062	0.000266	0.000743

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

Maximum Output Shaft Load Rating

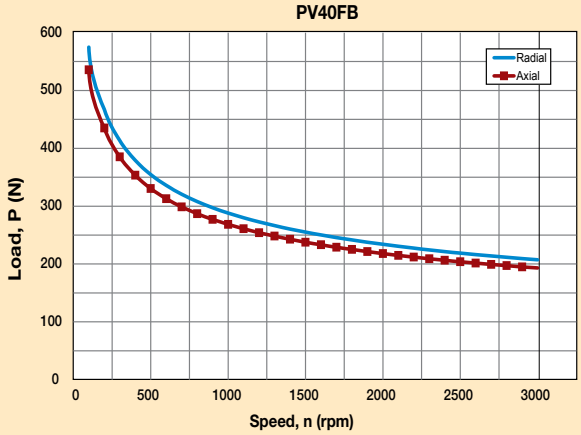
See load rating charts on pages 44-45

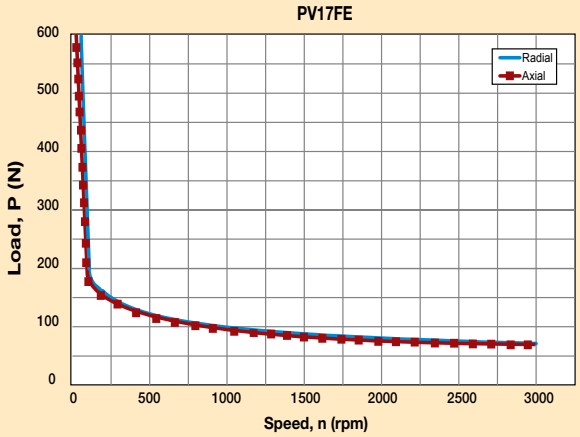
	Output Face Option*	PV40/PV17	PV60/PV23	PV90/PV34	PV115/PV42
Maximum Radial Load Pr, N ** (3-100 ratios)	FE	200	665	1040	1235
	TN	440	665	1040	2100
	FB, FN, TA	590	2535	4270	8550
Maximum Axial Load Pr, N ** (3-100 ratios)	FE	190	765	1140	1300
	TN	430	765	1140	2380
	FB, FN, TA	530	2350	4670	10550

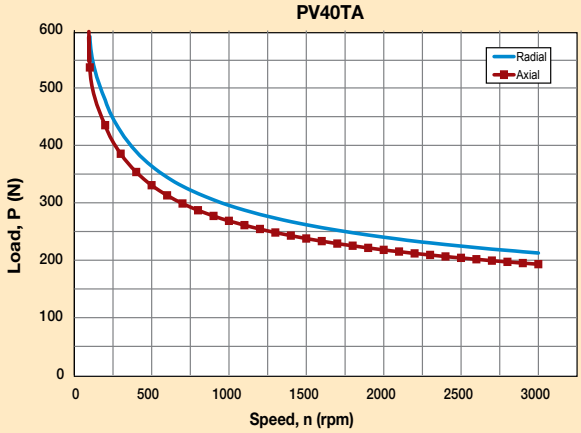
* See How to Order page 48, items 3 & 4 for front face/output face code definitions.
** @100 rpm, radial load applied at center of shaft

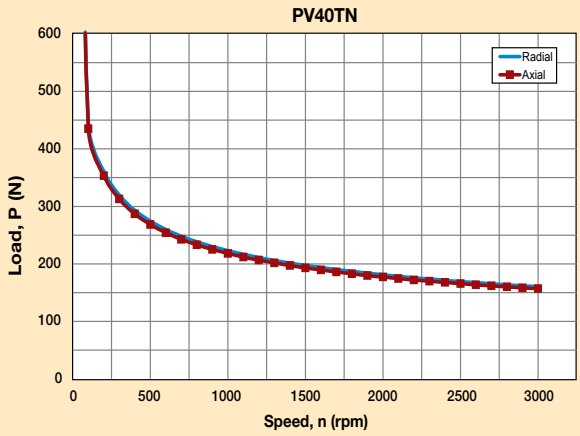
PV Series Gearheads

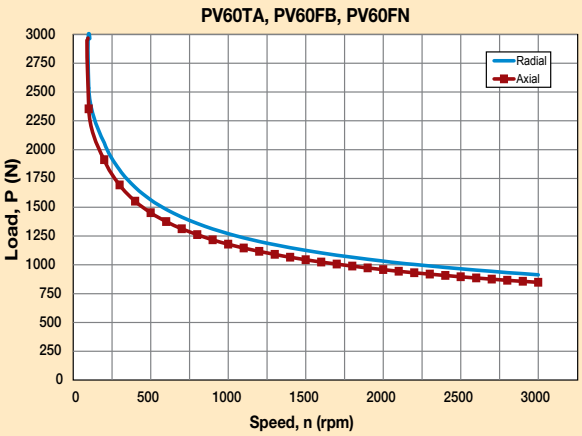
Output Shaft Load Ratings – PV40/PV17 & PV60/PV23

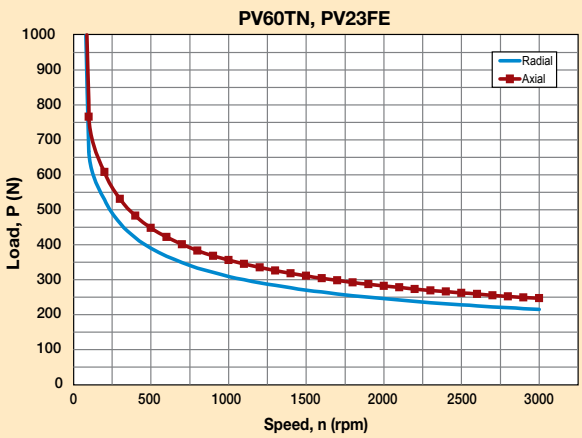






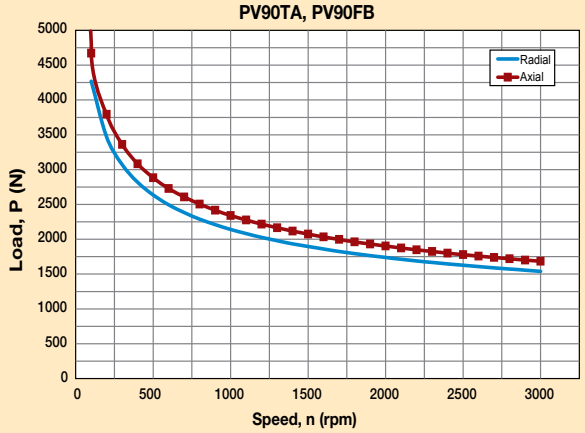


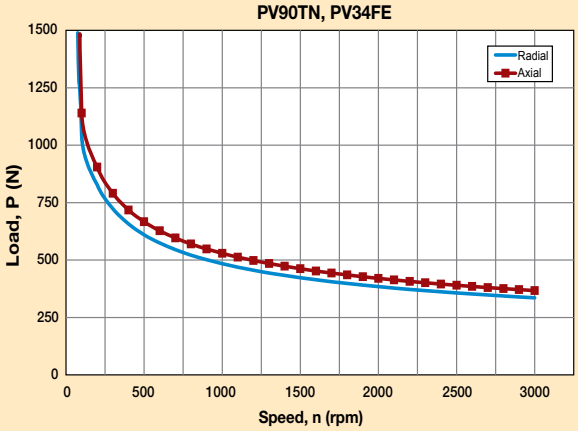


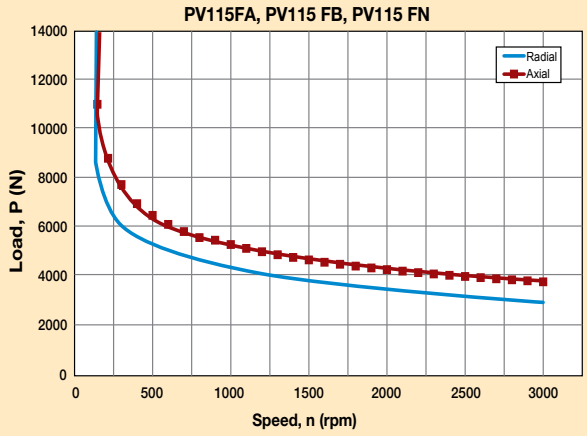


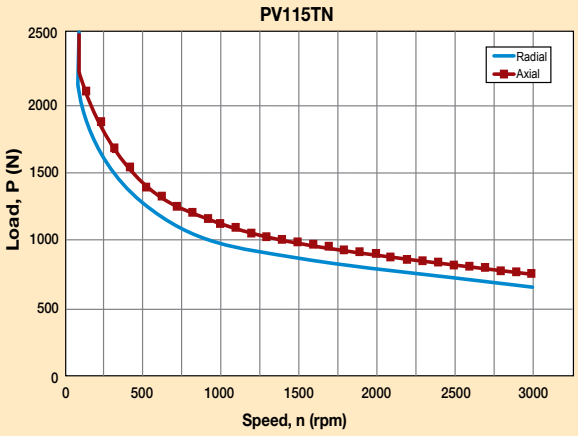
See How to Order page 48, items 3 & 4 for front face/output face code definitions.
1) Maximum axial load, Fa.
2) Maximum radial load applied to the center of the shaft, Fr.
3) Radial load curves can be used to combine (radial + axial) load if Fa/Fr < 0.22.
4) If Fa/Fr > 0.22 consult factory.

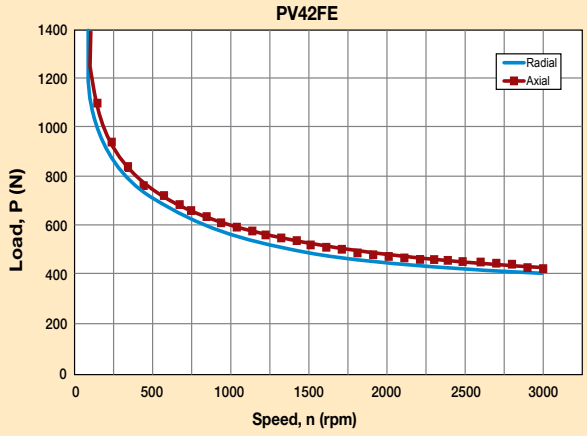
Output Shaft Load Ratings – PV90/PV34 & PV115/PV42









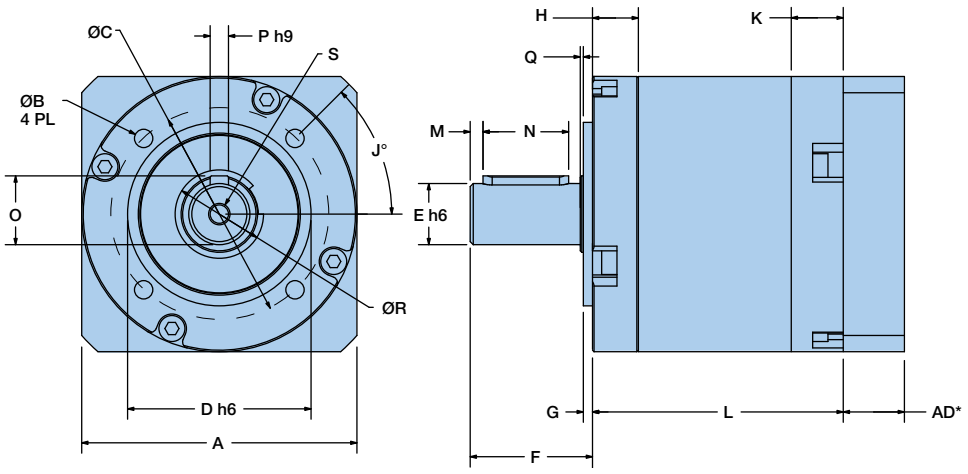


See How to Order page 48, items 3 & 4 for front face/output face code definitions.
1) Maximum axial load, Fa.
2) Maximum radial load applied to the center of the shaft, Fr.
3) Radial load curves can be used to combine (radial + axial) load if Fa/Fr < 0.22.
4) If Fa/Fr > 0.22 consult factory.

PV Series Gearheads

Dimensions – Tapped Face (TA & TN)

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



*AD = Adapter length. See how to order page for mounting kit adapter lengths.

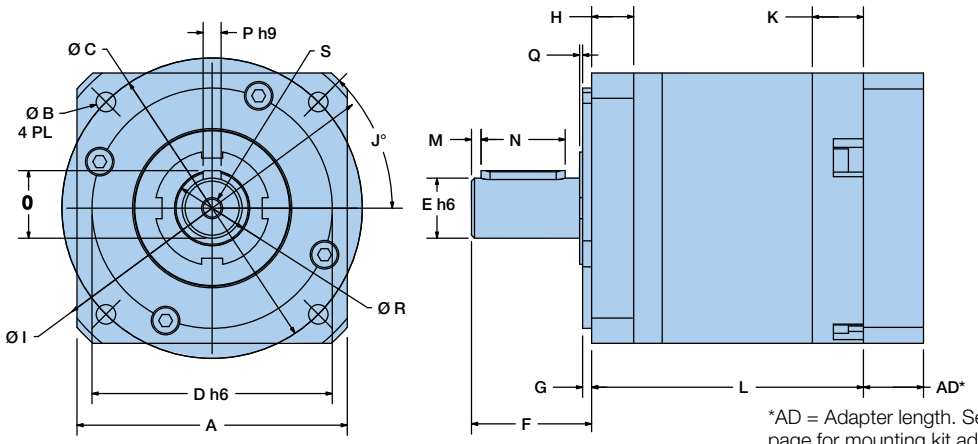
Metric Frame Sizes

Frame Size	A		B	C		D		E		F		G		H		J	K	
	Body Diameter		Tap x Depth	Bolt Circle		Pilot Diameter		Output Shaft Diameter		Output Shaft Length		Pilot Thickness		Flange Thickness		Lead Angle	Rear Thickness	
	mm	in		mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	°	mm	in
PV40TN	43	1.693	M4x7	34	1.339	26	1.024	10	0.394	26	1.024	1.5	0.059	10	0.394	45	11	0.433
PV40TA	50	1.969	M4X10	44	1.732	35	1.378	12	0.472	25	0.984	3	0.118	10	0.394	90	11	0.433
PV60TN	62	2.441	M5x10	52	2.047	40	1.575	14	0.551	35	1.378	2.5	0.098	12	0.472	45	16	0.630
PV60TA	70	2.756	M5x10	62	2.362	52	2.047	16	0.630	36	1.417	5	0.197	16	0.630	90	16	0.630
PV90TN	90	3.543	M6x11	70	2.756	60	2.362	20	0.787	40	1.575	3	0.118	15	0.591	45	17	0.670
PV90TA	90	3.543	M6x12	80	3.150	68	2.677	22	0.866	46	1.811	5	0.197	18.5	0.728	90	17	0.670
PV115TN	115	4.528	M10x16	100	3.937	80	3.150	25	0.984	55	2.165	4	0.157	20	0.787	45	23	0.906
PV115TA	120	4.724	M8x20	108	4.252	90	3.543	32	1.260	70	2.756	6	0.236	28	1.102	90	23	0.906

Frame Size	L1		L2		M		N		O		P		Q		R		S
	Length (3 – 10 Ratios)		Length (12 – 100 Ratios)		Distance from Shaft End		Keyway Length		Key Height		Keyway Width		Shoulder Height		Shoulder Diameter		Tap & Depth (end of shaft)
	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	
PV40TN	48.5	1.909	63	2.480	3.1	0.122	16	0.630	10.2	0.402	3	0.118	0.6	0.024	11.633	0.458	M3X6
PV40TA	48.5	1.909	63	2.480	1.3	0.051	16	0.630	13.5	0.531	4	0.157	3.5	0.138	17.831	0.702	M4x8
PV60TN	63	2.480	83	3.268	2.71	0.107	25	0.984	16		5	0.197	2.5	0.098	19.939	0.785	M5x12
PV60TA	67	2.638	87	3.425	2.21	0.087	25	0.984	18	0.709	5	0.197	3	0.118	28	1.102	M5x12
PV90TN	82	3.228	105.5	4.154	4.197	0.165	28	1.102	22.5	0.886	6	0.236	1	0.039	25	0.984	M6x12
PV90TA	85.5	3.366	109	4.291	3.197	0.126	28	1.102	24.5	0.965	6	0.236	5	0.197	38	1.496	M8x13
PV115TN	102	4.016	136	5.354	5.2	0.205	40	1.575	28	1.102	8	0.315	1	0.039	35	1.378	M10x20
PV115TA	110	4.331	144	5.669	4	0.157	50	1.969	35	1.378	10	0.394	1.8	0.071	40	1.575	M12x22

Dimensions – Flange Face (FB, FE & FN)

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



*AD = Adapter length. See how to order page for mounting kit adapter lengths.

Metric & NEMA Frame Sizes

	Frame Size	A Body Diameter mm	A Body Diameter in	B Bolt Hole mm	B Bolt Hole in	C Bolt Circle mm	C Bolt Circle in	D Pilot Diameter mm	D Pilot Diameter in	E Output Shaft Diameter mm	E Output Shaft Diameter in	F Output Shaft Length mm	F Output Shaft Length in	G Pilot Thickness mm	G Pilot Thickness in	H Flange Thickness mm	H Flange Thickness in	I Housing Diameter mm	I Housing Diameter in	J Lead Angle °
Metric	PV40FB	43	1.693	3.4	0.134	50	1.969	35	1.378	13	0.512	26	1.024	3	0.118	10	0.394	56	2.205	45
	PV60FB	62	2.441	5.5	0.217	70	2.756	50	1.969	16	0.630	25	0.984	2.5	0.098	10.3	0.406	80	3.150	45
	PV60FN	62	2.441	5.5	0.217	70	2.756	50	1.969	14	0.551	25	0.984	2.5	0.098	10.3	0.406	80	3.150	45
	PV90FB	90	3.543	6.5	0.256	100	3.937	80	3.150	20	0.787	40	1.575	3	0.118	14	0.551	116	4.567	45
	PV90FN	90	3.543	6.5	0.256	100	3.937	80	3.150	20	0.787	40	1.575	3	0.118	14	0.551	116	4.567	45
	PV115FB	115	4.528	8.5	0.335	130	5.118	110	4.331	24	0.945	50	1.969	3.5	0.138	18	0.709	152	5.984	45
	PV115FN	115	4.528	8.5	0.335	130	5.118	110	4.331	25	0.984	55	2.165	3.5	0.138	18	0.709	152	5.984	45

		A in	A mm	B in	B mm	C in	C mm	D in	D mm	E in	E mm	F in	F mm	G in	G mm	H in	H mm	I in	I mm	J °
NEMA	PV17FE	1.693	43	0.138	3.5	1.724	43.8	0.866	22	0.250	6.35	0.984	25	0.059	1.5	0.236	6	2.165	55	45
	PV23FE	2.441	62	0.195	4.95	2.625	66.675	1.500	38.1	0.375	9.525	1.000	25.4	0.098	2.5	0.374	9.5	3.150	80	45
	PV34FE	3.543	90	0.217	5.52	3.875	98.43	2.875	73.025	0.500	12.7	1.250	31.75	0.118	3	0.591	15	4.567	116	45
	PV42FE	4.528	115	0.281	7.14	4.949	125.7	2.187	55.55	0.625	15.875	1.500	38.1	0.094	2.4	0.787	20	5.984	152	45

	Frame Size	K Rear Thickness mm	K Rear Thickness in	L1 Length (3 – 10 Ratios) mm	L1 Length (3 – 10 Ratios) in	L2 Length (12 – 100 Ratios) mm	L2 Length (12 – 100 Ratios) in	M Distance from Shaft End mm	M Distance from Shaft End in	N Keyway Length mm	N Keyway Length in	O Key Height mm	O Key Height in	P Keyway Width mm	P Keyway Width in	Q Shoulder Height mm	Q Shoulder Height in	R Shoulder Diameter mm	R Shoulder Diameter in	S Tap & Depth
Metric	PV40FB	11	0.433	48.5	1.909	63	2.480	2.1	0.083	16	0.630	15	0.591	5	0.197	2	0.079	17.831	0.702	M4x8
	PV60FB	16	0.630	71.5	2.815	91.5	3.602	3.2	0.126	16	0.630	18	0.709	5	0.197	1	0.039	28	1.102	M5x12
	PV60FN	16	0.630	71.5	2.815	91.5	3.602	3.2	0.126	16	0.630	16	0.630	5	0.197	1	0.039	28	1.102	M5x12
	PV90FB	17	0.670	90.5	3.563	119	4.685	3.197	0.126	28	1.102	22.5	0.886	6	0.236	1	0.039	38	1.496	M6x12
	PV115FB	23	0.906	114.5	4.508	148.5	5.846	4.2	0.165	40	1.575	27	1.063	8	0.315	1.5	0.059	40	1.575	M10x22
	PV115FN	23	0.906	114.5	4.508	148.5	5.846	4.2	0.165	40	1.575	27	1.063	8	0.315	1.5	0.059	40	1.575	M10x22

		K in	K mm	L1 in	L1 mm	L2 in	L2 mm	M in	M mm	N in	N mm	O in	O mm	P in	P mm	Q in	Q mm	R in	R mm	S
NEMA	PV17FE	0.433	11	1.909	48.5	2.480	63	–	–	–	–	–	–	–	–	0.091	2.3	0.458	11.633	–
	PV23FE	0.630	16	2.382	60.5	3.169	80.5	–	–	0.748	19	0.372	9.444	Flat		0.039	1	0.785	19.939	M5x12
	PV34FE	0.670	17	3.228	82	4.154	105.5	–	–	1.063	27	0.561	14.247	0.125	3.175	0.039	1	0.984	25	M6x12
	PV42FE	0.906	23	4.016	102	5.354	136	0.016	0.4	1.120	28.45	0.705	17.91	0.188	4.775	–	–	–	–	M6x20

PV Series Gearheads

How to Order

Use the tables below to configure your PV gearhead and motor mounting kit part number.

	①	②	③	④	⑤
Order Example:	PV	40	T	N	- 004

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.

① Series	② Frame Size		③ Front Face		④ Output Face Compatible		⑤ Ratio	
PV **Power Versatility Series**	40	40 mm	T	Tapped (round)	A N	Alpha/Stober Neugart	004 005	4:1 5:1
			F	Flanged (square)	B	Parker Bayside (PX)	007	7:1
	17	NEMA 17	F	Flanged (square)	E	NEMA (English)	010 016 020 025 035 040 050 070 100	10:1 16:1 20:1 25:1 35:1 40:1 50:1 70:1 100:1
	60	60 mm	T	Tapped (round)	A N	Alpha/Stober Neugart	003 004	3:1 4:1
			F	Flanged (square)	B N	Parker Bayside (PX) Neugart	005 007	5:1 7:1
	23	NEMA 23	F	Flanged (square)	E	NEMA (English)	010	10:1
	90	90 mm	T	Tapped (round)	A N	Alpha/Stober Neugart	012 015	12:1 15:1
			F	Flanged (square)	B	Parker Bayside (PX)	020 025	20:1 25:1
	34	NEMA 34	F	Flanged (square)	E	NEMA (English)	030	30:1
	115	115 mm	T	Tapped (round)	A N	Alpha/Stober Neugart	040 050	40:1 50:1
			F	Flanged (square)	B	Parker Bayside (PX)	070	70:1
	42	NEMA 42	F	Flanged (square)	E	NEMA (English)	100	100:1

Mounting Kit Ordering Information

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

	⑥	⑦	⑧
Order Example:	MV	60	XXX

⑥ Series	⑦ Frame Size		⑧ Factory Assigned	
MV	40	40 or 17	XXX	See Motor Mounting Search Tool on parkermotion.com or consult factory for part number
(Mounting kit for PV)	60	60 or 23		
	90	90 or 34		
	115	115 or 42		

Mounting Kit Adapter Length*

Frame Size	Motor Shaft Length		"AD"	
	mm	(in)	mm	(in)
40/17	12 – 20	(0.472 – 0.787)	13.7	(0.539)
	20.1 – 25.4	(0.791 – 1.000)	19.0	(0.748)
60/23	16 – 25.4	(0.630 – 1.000)	16.5	(0.650)
	25.4 – 31.8	(1.004 – 1.252)	22.5	(0.886)
90/34	20 – 31.8	(0.787 – 1.252)	20.0	(0.787)
	31.9 – 40	(1.256 – 1.575	28.5	(1.122)
115/42	22 – 40	(0.866 – 1.575)	24.0	(0.945)
	40.1 – 51	(1.579 – 2.008)	35.0	(1.378)

* Adapter length may vary depending on motor make and model.

Recommended Parker Motor and Mounting Kit*

Frame Size	Recommended Servo Motor			Recommended Stepper Motor		
	Motor	Mounting Kit	AD Dimension	Motor	Mounting Kit	AD Dimension
40 or 17	BE16 SM16	MV40-005	19 mm	LV17 HV17	MV40-003	19 mm
60 or 23	BE23 SM23	MV60-001 MV60-005	22.5 mm 16.5 mm	LV23 HV23	MV60-002	16.5 mm
90 or 34	BE34 MPP092	MV90-005 MV90-002	20 mm 28.5 mm	LV34 HV34	MV90-005	20 mm
115 or 42	MPP100 MPP115	MV115-039 MV115-010	24 mm 35 mm			

*Parker MotionSizer sizing software available for free download at: www.parkermotion.com

Stealth® MultiDrive Gearheads

Stealth® MultiDrive Series:

The Flexible Right Angle Gearhead Solution

Stealth® MultiDrive (MD) offers three different output options for true flexibility. MultiDrive models include low-ratio, dual-shaft and hollow-shaft options in a compact, right angle package. MultiDrive gearheads features Stealth helical gearing for high torque, high accuracy and quiet operation. With five frame sizes and multiple ratios to choose from, you are sure to find a Stealth MultiDrive to fit your servo motor application.

- **Space Saving: Compact, right-angle design saves space in many applications**
- **Low Backlash: Standard as low as 8 arc-minutes and 4 arc-minutes optional**
- **Smooth, Quiet Operation and Long Life: Hardened, precision spiral bevel gears ensure quiet operation**
- **Quick, Error-Free Mounting to any servo or stepper motor using Parker's ServoMount® design**
- **Sealed Unit: Seals and O-rings provide IP65 protection to prevent leaks and to protect against harsh environments**

MultiDrive RT, RD and RB Series Precision Gearheads

Product Series	Configuration	Ratios	Gear Geometry	Performance	Frame Size (mm)	Continuous Torque Nm (in-lb)	Radial Load N (lbs)	Backlash arc-min
RT	Right Angle Hollow Shaft	3, 9, 15, 21 and 30:1	Helical	High Precision	90 – 220	23 – 565 (204 – 5178)	2800 – 7500 (692 – 1685)	<14 to <6
RD	Right Angle Double Shaft	1, 2, 3, 9, 15, 21 and 30:1	Helical	High Precision	90 – 220	30 – 150 (266 – 1328	2800 – 7500 (692 – 1685)	<14 to <6
RB	Right Angle Low Ratio	1, 2 and 3:1	Helical	High Precision	90 – 220	35 – 190 (266 – 1682)	2800 – 7500 (692 – 1685)	<14 to <6

Performance Specifications

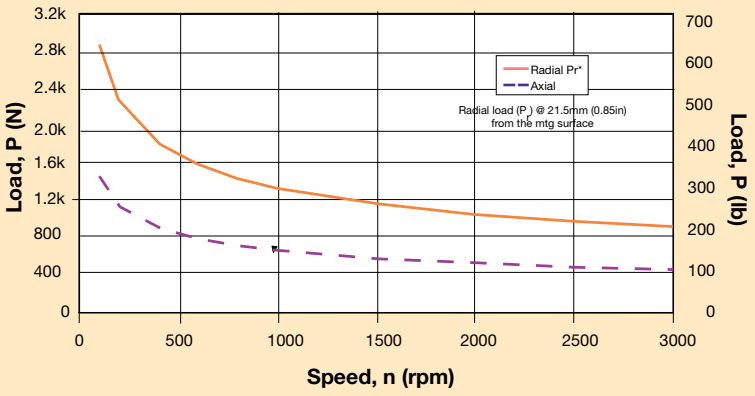
	Units	Frame Size (RT, RD, RB)					
		Ratio	R_90	R_115	R_142	R_180	R_220
Nominal Output Torque $T_{nom\ r}$	Nm (in-lb)	1	23 (200)	45 (400)	113 (1000)	192 (1700)	508 (4500)
		2,3,9,15, 21,30	34 (300)	90 (800)	136 (1200)	260 (2300)	565 (5000)
Max. Acceleration Output Torque $T_{acc\ r}$	Nm (in-lb)	1	28 (250)	56 (500)	141 (1250)	240 (2125)	636 (5625)
		2,3,9,15, 21,30	42 (375)	113 (1000)	169 (1500)	324 (2875)	636 (5625)
Emergency (1) Stop Output Torque $T_{em\ r}$	Nm (in-lb)	1	45 (400)	90 (800)	226 (2000)	384 (3400)	1017 (9000)
		2,3,9, 15,21,30	68 (600)	181 (1600)	271 (2400)	520 (4600)	1130 (10,000)
Nominal Input Speed, $N_{nom\ r}$	RPM	1,2,3	3000	2600	2200	1800	1400
		9,15,21,30	3800	3400	3000	2400	1800
Max. Input Speed, $N_{max\ r}$	RPM	1,2,3	4000	3500	2900	2500	1600
		9,15,21,30	5300	4500	3800	3000	2300
Standard Backlash	arc-min	1,2,3	10	9	9	8	8
		9,15,21,30	12	11	11	10	10
Low Backlash	arc-min	1,2,3	6	5	5	4	4
		9,15,21,30	8	7	7	6	6
Efficiency at Nominal Torque	%	1,2,3	95	95	95	95	95
		9,15,21,30	92	92	92	92	92
Noise Level (2) at:	dB	All					
2,500 RPM			70	70	70	—	—
1,500 RPM			—	—	—	72	72
Torsional Stiffness	Nm/arc-min (in-lb/arc-min)	All	3 (28)	6 (56)	16 (140)	43 (380)	90 (800)
Maximum Weight	kg (lb)	All	7 (16)	13 (28)	25 (56)	54 (120)	114 (250)
Maximum Allowable Case Temperature	°C	All			100		

(1) Maximum of 1,000 stops
(2) Measured at 1 meter

Stealth® MultiDrive Gearheads

MultiDrive RT/RD/RB Output Shaft Load Rating

RT90/RD90/RB90

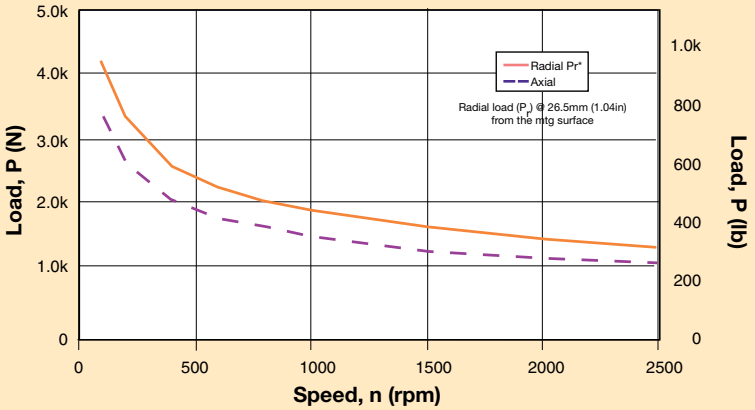


Formulas to calculate radial load (Prx) at any distance "X" from the gearhead mounting surface:

Prx = Pr * 121 mm / (100 mm + X)

Prx = Pr * 4.76 in / (3.94 in + X)

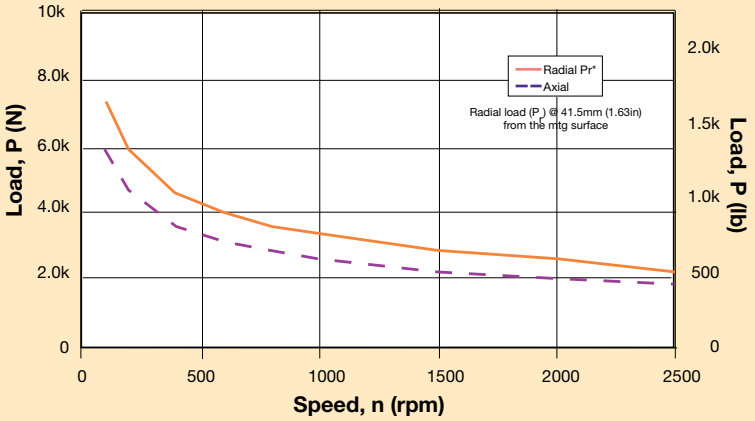
RT115/RD115/RB115



Prx = Pr * 151 mm / (125 + X)

Prx = Pr * 5.94 in / (4.92 in + X)

RT142/RD142/RB142

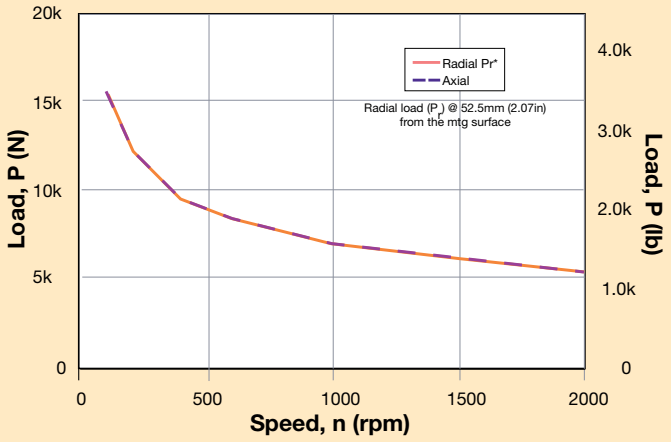


Prx = Pr * 201 mm / (160 + X)

Prx = Pr * 7.91 in / (6.30 in + X)

MultiDrive RT/RD/RB Output Shaft Load Rating

RT180/RD180/RB180

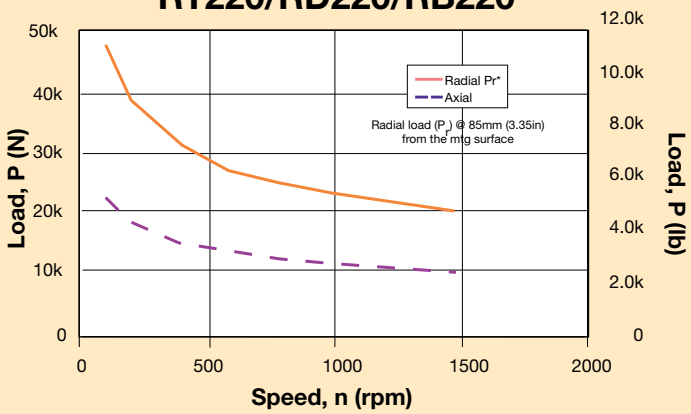


Formulas to calculate radial load (Prx) at any distance "X" from the gearhead mounting surface:

Prx = Pr * 260 mm / (208 mm + X)

Prx = Pr * 10.24 in / (8.19 in + X)

RT220/RD220/RB220



Prx = Pr * 352 mm / (267 + X)

Prx = Pr * 13.86 in / (10.5 in + X)

Inertia

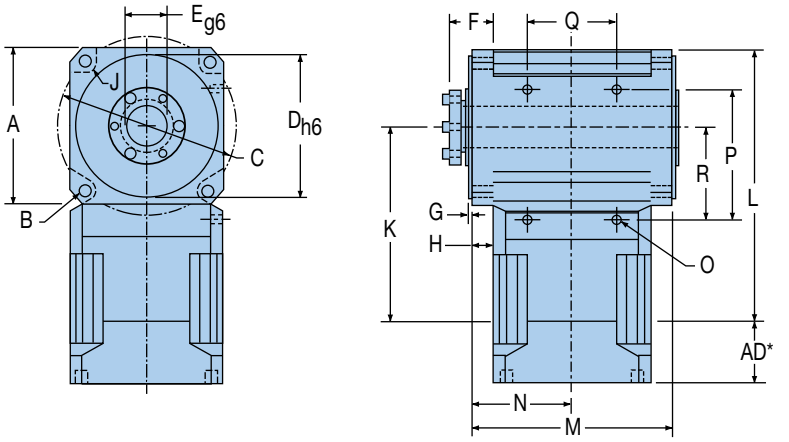
All moment of inertia values are as reflected at the input of the gearhead

		Frame Size (RT, RD, RB)				
Ratio	**Units**	**R_90**	**R_115**	**R_142**	**R_180**	**R_220**
1	gm-cm-sec^2	3.28	11.0	38.7	101	444
	oz-in-sec^2	0.046	0.153	0.538	1.41	6.17
2	gm-cm-sec^2	4.17	11.3	32.8	95.4	274
	oz-in-sec^2	0.058	0.157	0.455	1.32	3.81
3	gm-cm-sec^2	2.68	7.75	22.3	65.6	191
	oz-in-sec^2	0.037	0.108	0.311	0.911	2.65
9	gm-cm-sec^2	1.07	3.28	10.4	35.8	119
	oz-in-sec^2	0.015	0.046	0.145	0.497	1.66
15, 21, 30	gm-cm-sec^2	0.566	2.09	5.36	17.9	62.6
	oz-in-sec^2	0.008	0.029	0.075	0.248	0.869

Stealth® MultiDrive Gearheads

Dimensions – RT Hollow Shaft

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.)

Frame Size	A Square Flange		B Bolt Hole		C Bolt Circle		D Pilot Diameter		E – Bore Diameter *		F Taper Bushing Extension		G Pilot Thickness		H Flange Thickness	
	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in
RT90	90	3.543	6.5	0.256	100	3.937	80	3.150	22	0.866	26.5	1.043	3	0.118	12	0.472
RT115	115	4.528	8.5	0.335	130	5.118	110	4.331	30	1.181	31	1.220	3.5	0.138	14	0.551
RT142	142	5.591	11	0.433	165	6.496	130	5.118	38	1.496	43	1.693	3.5	0.138	20	0.787
RT180	182	7.165	13	0.512	215	8.465	160	6.299	48	1.890	54.2	2.134	10	0.394	25	0.984
RT220	220	8.661	17	0.669	250	9.843	180	7.087	60	2.362	74.1	2.917	15	0.591	35	1.378

Frame Size	J Housing Recess		K1 Distance to Output Centerline (For ratio = 3:1)		K2 Distance to Output Centerline (For ratio > 3:1)		L1 Housing Length (For ratio = 3:1)		L2 Housing Length (For ratio > 3:1)		M Housing Width		N Distance to Input Centerline	
	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in
RT90	6.6	0.260	95	3.740	117	4.606	140	5.512	162	6.378	114	4.488	57	2.244
RT115	7.9	0.311	116	4.567	144.2	5.677	173.5	6.831	201.7	7.941	143	5.630	71.5	2.815
RT142	10.5	0.413	134	5.276	179	7.047	205	8.071	250	9.843	182	7.165	91	3.583
RT180	10	0.394	169	6.654	209.1	8.228	260	10.236	300.1	11.815	232	9.134	116	4.567
RT220	16	0.630	206	8.110	266	10.472	316	12.441	376	14.803	290	11.417	145	5.709

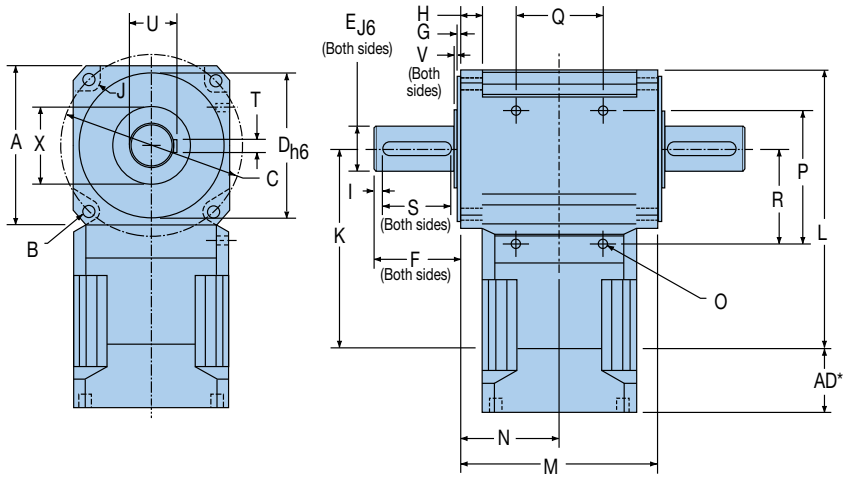
Both output flanges have identical dimensions.
*Maximum bushing bore diameter. Actual through bore of output shaft is larger. For additional bore diameter, contact Parker's Application Engineers for information.

Foot Mounting Holes Location

Frame Size	O Thread Size x Depth	P		Q		R	
		mm	in	mm	in	mm	in
RT90	M4x6	80	3.150	60	2.362	60	2.362
RT115	M6x9	100	3.937	70	2.756	75	2.953
RT142	M8x12	120	4.724	80	3.150	85	3.346
RT180	M10x15	160	6.299	100	3.937	110	4.331
RT220	M12x20	195	7.677	130	5.118	136	5.354

Dimensions – RD Dual Shaft

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.)

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 Distance from Shaft End		J Housing Recess	
	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in
RT90	90	3.543	6.5	0.256	100	3.937	80	3.150	20	0.787	40	1.575	3	0.118	12	0.472	5	0.197	6.6	0.260
RT115	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	7	0.276	7.9	0.311
RT142	142	5.591	11	0.433	165	6.496	130	5.118	40	1.575	80	3.150	3.5	0.138	20	0.787	8	0.315	10.5	0.413
RT180	182	7.165	13	0.512	215	8.465	160	6.299	50	1.969	95	3.740	10	0.394	25	0.984	6	0.236	10	0.394
RT220	220	8.661	17	0.669	250	9.843	180	7.087	75	2.953	155	6.102	15	0.591	35	1.378	8	0.315	16	0.630

Frame Size	K1 Distance to Output Centerline (For ratio = 3:1)		K2 Distance to Output Centerline (For ratio > 3:1)		L1 Housing Length (For ratio = 3:1)		L2 Housing Length (For ratio > 3:1)		M Housing Width		N Distance to Input Centerline		S Keyway Length		T Keyway Thickness		U Keyway Height		V Shoulder Height		X Shoulder Diameter	
	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in
RT90	95	3.740	117	4.606	140	5.512	162	6.378	114	4.488	57	2.244	28	1.102	6	0.236	22.5	0.886	2.5	0.098	45	1.575
RT115	116	4.567	144.2	5.677	173.5	6.831	201.7	7.941	143	5.630	71.5	2.815	32	1.260	8	0.315	27	1.063	2.5	0.098	50	1.969
RT142	134	5.276	179	7.047	205	8.071	250	9.843	182	7.165	91	3.583	63	2.480	12	0.472	43	1.693	2.5	0.098	50	1.969
RT180	169	6.654	209.1	8.228	260	10.236	300.1	11.815	232	9.134	116	4.567	70	2.756	14	0.551	53.5	2.106	2.5	0.098	55	2.165
RT220	206	8.110	266	10.472	316	12.441	376	14.803	290	11.417	145	5.709	100	3.937	20	0.787	79.5	3.130	2.5	0.098	100	3.937

Both output flanges have identical dimensions.

Foot Mounting Holes Location

Frame Size	O Thread Size x Depth	P		Q		R	
		mm	in	mm	in	mm	in
RT90	M4x6	80	3.150	60	2.362	60	2.362
RT115	M6x9	100	3.937	70	2.756	75	2.953
RT142	M8x12	120	4.724	80	3.150	85	3.346
RT180	M10x15	160	6.299	100	3.937	110	4.331
RT220	M12x20	195	7.677	130	5.118	136	5.354

Encoder Mounting Option

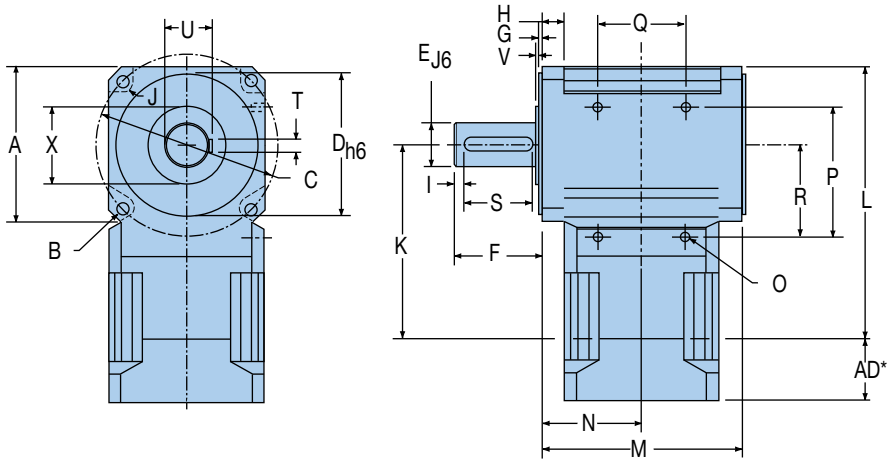
	Dimensions For All Frame Sizes – mm (in)
Shaft Diameter	9.525 (0.375)
Shaft Length	19.050 (0.750)
Bolt Circle	74.981 (2.952)
Tapped Holes	M4x6 (Min. Depth)
Encoder (Not Supplied)	DRC C25, BEI E25, RENCO C2520

An additional flange is required on the gearhead for encoder mounting. it will increase the thickness of one output flange by 10mm.

Stealth® MultiDrive Gearheads

Dimensions – RB Low Ratio

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.)

Frame Size	A Square Flange		C Bolt Circle		E Output Shaft Diameter		F Output Shaft Length		G Pilot Thickness		H Flange Thickness		I Distance from Shaft End		J Housing Recess	
	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in
RT90	90	3.543	100	3.937	20	0.787	40	1.575	3	0.118	12	0.472	5	0.197	6.6	0.260
RT115	115	4.528	130	5.118	24	0.945	50	1.969	3.5	0.138	14	0.551	7	0.276	7.9	0.311
RT142	142	5.591	165	6.496	40	1.575	80	3.150	3.5	0.138	20	0.787	8	0.315	10.5	0.413
RT180	182	7.165	215	8.465	50	1.969	95	3.740	10	0.394	25	0.984	6	0.236	10	0.394
RT220	220	8.661	250	9.843	75	2.953	155	6.102	15	0.591	35	1.378	8	0.315	16	0.630

Frame Size	K Distance to Output Centerline		L Housing Length		M Housing Width		N Distance to Input Centerline		S Keyway Length		T Keyway Thickness		U Keyway Height		V Shoulder Height		X Shoulder Diameter	
	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in
RT90	95	3.740	140	5.512	114	4.488	57	2.244	28	1.102	6	0.236	22.5	0.886	2.5	0.098	45	1.575
RT115	116	4.567	173.5	6.831	143	5.630	71.5	2.815	32	1.260	8	0.315	27	1.063	2.5	0.098	50	1.969
RT142	134	5.276	205	8.071	182	7.165	91	3.583	63	2.480	12	0.472	43	1.693	2.5	0.098	50	1.969
RT180	169	6.654	260	10.236	232	9.134	116	4.567	70	2.756	14	0.551	53.5	2.106	2.5	0.098	55	2.165
RT220	206	8.110	316	12.441	290	11.417	145	5.709	100	3.937	20	0.787	79.5	3.130	2.5	0.098	100	3.937

Both output flanges have identical dimensions.

Foot Mounting Holes Location

Frame Size	O Thread Size x Depth	P		Q		R	
		mm	in	mm	in	mm	in
RT90	M4x6	80	3.150	60	2.362	60	2.362
RT115	M6x9	100	3.937	70	2.756	75	2.953
RT142	M8x12	120	4.724	80	3.150	85	3.346
RT180	M10x15	160	6.299	100	3.937	110	4.331
RT220	M12x20	195	7.677	130	5.118	136	5.354

Stealth® MultiDrive How to Order

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

Gearhead Ordering Information

	①	②	③	④		⑤	⑥
Order Example:	RD	142	E	003	-	XXX	LB

① Series		② Frame Size (mm)	③ Encoder	④ Ratio	⑤ Special	⑥ Backlash
RB	**Low Ratio**	090 115 142 180 220	—	001, 002, 003	Factory Assigned (Only if needed)	Blank = Standard LB = Low
RD	**Dual Shaft**	090 115 142 180 220	E	001, 002, 003, 009, 015, 021, 030		
RT	**Hollow Shaft**	090 115 142 180 220	—	003, 009, 015, 021, 030		

Mounting Kit Ordering Information

For 1:1, 2:1 and 3:1 ratios, mounting kit is: MD (frame size)-ratio-xxx. For example MD90-001

For 9:1 or higher, , mounting kit is: MT (frame size)-ratio-xxx. For example MD90-021

Parker MotionSizer sizing software available for free download at: www.parkermotion.com

Recommended Parker Motor and Mounting Kit

Frame Size	Ratio	Recommended Servo Motor			Recommended Stepper Motor		
		Motor	Mounting Kit	AD Dimension	Motor	Mounting Kit	AD Dimension
90	1:1, 2:1, 3:1	BE34 MPP092	MD90-209 MD90-016	24.5 mm	LV34 HV34	MD90-209	24.5 mm
	9:1 or Higher	BE34 MPP092	MT90-005 MT90-051	35.3 mm 44 mm	LV34 HV34	MT90-005	35.3 mm
115	1:1, 2:1, 3:1	MPP092 MPP115	MD115-017 MD115-010	26.5 mm 34.4-mm			
	9:1 or Higher	MPP092 MPP115	MT115-045 MT115-010	43.2 mm 51 mm			
142	1:1, 2:1, 3:1	MPP115 MPP142	MD142-010 MD142-013	40.8 mm 36 mm			
	9:1 or Higher	MPP115 MPP142	MT142-010 MT142-146	58 mm 75 mm			
180	1:1, 2:1, 3:1	MPP142 MPP190	MD180-123 MD180-125	36.4 mm 48 mm			
	9:1 or Higher	MPP142 MPP190	MT180-131 MT180-096	67.5 mm 109 mm			
220	1:1, 2:1, 3:1	MPP190 MPP220	MD220- MD-220	Consult Factory			
	9:1 or Higher	MPP190 MPP220	MT220-021 MT220-022	104 mm 138 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.

NEMA Spur Gearheads

NE Series NEMA Spur Gearheads

Parker's NEMA gearheads feature a high-efficiency spur- gear design, in a light, compact package. Designed to mount directly to the face of NEMA face stepper and servo motors, NEMA gearheads are ideal for applications requiring low weight and low starting torque.

- **Ratios from 3:1 to 100:1**
- **Lightweight, aluminum housing and spur gearing**
- **Compact, short overall length and direct mounting to NEMA 23, 34 and 42 frame size motors**
- **Low friction, low running torque, ideal for stepper motors**

Product Series	Gear Geometry	Configuration	Frame Size	Continuous Torque (Nm)	Ratios	Backlash arc-min	IP Rating
NE	Spur	In-Line	NEMA 23, 34, 42	50 – 350	3, 5, 8, 10, 15, 20, 30, 50, 100	10 – 30	IP54

Direct Mount to NEMA Frame Motors

Gearheads attach directly to motors with NEMA mounting dimensions (see tables on following pages.) Parker's clamp-on-pinion and mounting hardware are included with gearheads, so your motor can be up and running in a matter of minutes.

Adapter Mount to Non-NEMA Frame Motors

For motors with non-NEMA dimensions, Parker supplies a mounting kit including a clamp-on-pinion, adapter plate and all necessary hardware. When ordering, simply provide the part number or outline drawing of your motor, and the gearhead will be shipped ready to mount.

Performance Specifications

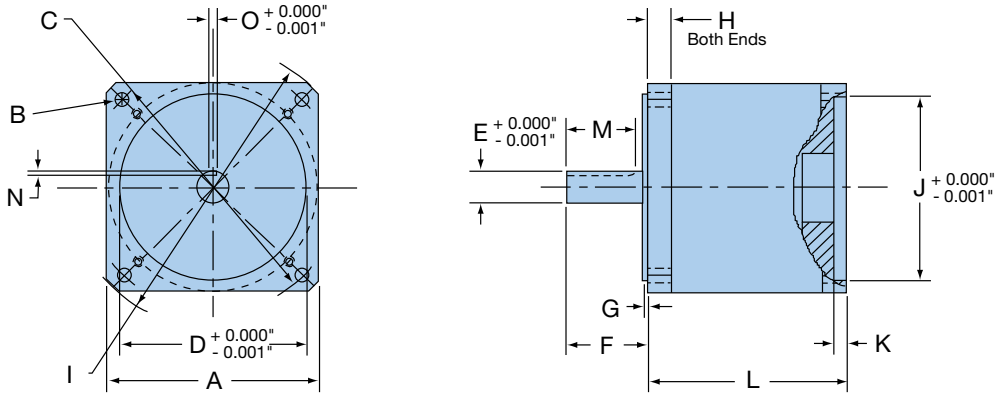
		Frame Size			
	Units	**Ratio**	**NE23**	**NE34**	**NE42**
Nominal Output Torque $T_{nom\ r}$	Nm (in-lb)	3	2 (16)	7 (64)	14 (123)
		5	3 (27)	12 (107)	23 (205)
		8-10	5 (40)	16 (142)	28 (250)
		15	5 (46)	19 (170)	34 (300)
		20 – 100	6 (50)	20 (180)	40 (350)
Max. Acceleration Output Torque $T_{acc\ r}$	Nm (in-lb)	3	3 (24)	11 (95)	21 (185)
		5	5 (40)	18 (160)	35 (307)
		8 – 10	7 (60)	24 (210)	42 (375)
		15	8 (70)	29 (255)	51 (450)
		20 – 100	9 (75)	31 (270)	59 (525)
Nominal Input Speed $N_{nom\ r}$	RPM	All	4000	4000	4000
Max. Input Speed N_{maxr}	RPM	All	5500	5000	4500
Standard Backlash [1)]	arc-min	3, 5, 8, 10	30	25	25
		15 – 100	20	20	20
Low Backlash [1)]	arc-min	3, 5, 8, 10	15	15	15
		15 – 100	10	10	10
Efficiency at Nominal Torque	%	All	98%	98%	98%
Moment of Inertia	gm-cm-sec^2 (oz-in-sec^2)	All	0.0051 (0.00007)	0.0408 (0.0005)	0.306 (0.004)
Maximum Weight	kg (lb)	All	0.5 (1.0)	1.4 (3.0)	3.0 (6.0)
Radial Load [2)]	N (lb)	All	90 (20)	350 (80)	890 (200)
Axial Load	N (lb)	All	45 (10)	135 (30)	265 (60)

1) Measured at 2% of rated torque
2) Radial loads are measured at 12.7mm (0.5in) from the gearhead mounting surface. These ratings are based on gearhead making more than one revolution on output shaft.

NEMA Spur Gearheads

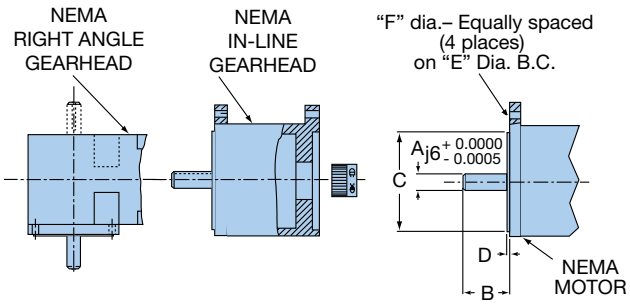
Dimensions – NE NEMA Spur Gearhead

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



Frame Size	A Square Flange mm	A Square Flange in	B Bolt Hole mm	B Bolt Hole in	C Bolt Circle mm	C Bolt Circle in	D Pilot Diameter mm	D Pilot Diameter in	E Output Shaft Diameter mm	E Output Shaft Diameter in	F Output Shaft Length mm	F Output Shaft Length in	G Pilot Thickness mm	G Pilot Thickness in	H Flange Thickness mm	H Flange Thickness in
NE 23	58	2.27	5.0	0.195	66.7	2.625	38.1	1.500	9.5	0.375	25.4	1.00	1.6	0.062	5	0.19
NE 34	83	3.25	5.5	0.218	98.4	3.875	73.0	2.875	12.7	0.500	31.8	1.25	1.7	0.067	10	0.38
NE 42	107	4.20	7.1	0.281	125.7	4.950	55.5	2.187	15.9	0.625	38.1	1.50	2.4	0.093	13	0.50

Frame Size	I Housing Diameter mm	I Housing Diameter in	J Input Pilot Diameter mm	J Input Pilot Diameter in	K Input Pilot Depth mm	K Input Pilot Depth in	L Housing Length mm	L Housing Length in	M Keyway Length (Flat) mm	M Keyway Length (Flat) in	N Keyway Depth (Flat) mm	N Keyway Depth (Flat) in	O Keyway Width mm	O Keyway Width in
NE 23	3.00	76	1.501	38.13	0.125	3.2	2.30	58	0.75	19	0.015	0.4	—	—
NE 34	4.38	111	2.876	73.05	0.200	5.1	3.00	76	1.06	27	0.072	1.8	0.124	3.15
NE 42	5.63	143	2.188	55.58	0.187	4.7	3.75	95	1.13	29	0.108	2.7	0.187	4.75



NEMA Motor Mounting Dimensions

Dimension		NE23 mm	NE23 in	NE34 mm	NE34 in	NE42 mm	NE42 in
A	Motor Shaft Diameter	6.4	0.250	9.5/12.7	0.375/0.500	15.9	0.625
B	Motor Shaft Length	20.6	0.810	31.8	1.250	35.1	1.380
C	Pilot Diameter	38.1	1.500	73.0	2.875	55.5	2.186
D	Pilot Length	1.6	0.063	1.6	0.063	2.4	0.093
E	Mounting Bolt Circle	66.7	2.625	98.4	3.875	125.7	4.950
F	Bolt Hole Size	5.0	0.195	5.5	0.218	7.1	0.281

NE Series NEMA Gearheads How to Order

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

Gearhead Ordering Information

	①	②		③				④
Order Example:	NE	34	-	010	-	XXX	-	LB

①	②	③	④
Series	**Frame Size**	**Ratio**	**Backlash**
NE	23 34 42	003, 005, 008, 015, 020, 030, 050, 100	Blank = Standard LB = Low

Recommended Parker Motor and Mounting Kit

Frame Size	Recommended Servo Motor			Recommended Stepper Motor		
	Motor	**Mounting Kit**	**AD Dimension**	**Motor**	**Mounting Kit**	**AD Dimension**
23	BE23	MM23-136	0.78 in	LV23 HV23	MM23-000	No adapter (pinion gear only)
34	BE34	MM34-016	No adapter (pinion gear only)	LV34 HV34	MM34-171	0.65 in

Parker MotionSizer sizing software available for free download at: www.parkermotion.com

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.

Servo Wheel™ Integral Gearmotors

Compact Wheel Drives for Electric Vehicles

Combining servo motor, gearing and wheel design makes system integration easy

The Servo Wheel™ combines a brushless DC motor with planetary gears in a lightweight, aluminum housing to provide a compact solution for vehicle control. The Power Wheel's unique design makes system integration easy. You no longer have to purchase the motor, gearhead, wheel, electronics and bracket from different sources. Parker does all of the work for you. From component sourcing to actual assembly, Parker engineers designed the Power Wheel with your application in mind. All you have to do is bolt it up and go!

Single-Piece Construction Motor Shaft

The first stage's planetary section sun gear is integrated into the single-piece construction motor shaft, to provide higher reliability in a compact package.

Planetary Gears

The planetary input stage provides a first pass reduction that is capable of carrying high torques with high input speeds in a small package.

Integrated Output Stage

The second stage planetary's unique design uses two planets for higher efficiency. Built entirely into the wheel, it utilizes an otherwise wasted area to provide a compact, space-saving package. Two large diameter bearings support the weight, protecting the gears from shock loading and dramatically increasing the radial load carrying capacity of the wheels.

Features:

Brushless DC motor amplifiers designed for common motion profiles in battery powered vehicles

- **12, 24, 36 and 48 volt operation**
- **Current and temperature feedback control for safe, reliable operation**
- **Multiple input architectures for easy communication with higher-level controllers and navigation systems**

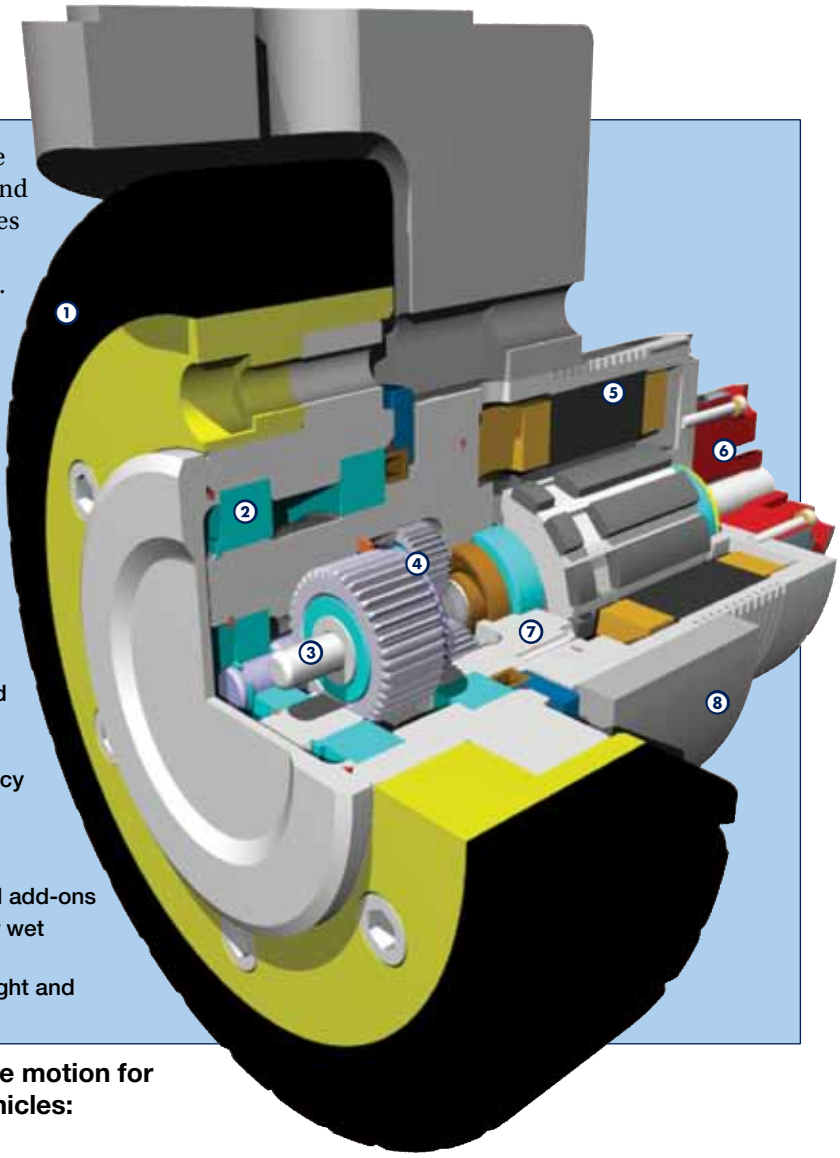
Permanent magnet brushless motors

- **High efficiency for longer run times between battery charges**
- **Greater power to size ratio for a compact package**
- **Integral hall sensors for motor TRAP commutation**
- **Long life and maintenance free-operation**
- **High input speeds in excess of 10,000 RPM**
- **No internal sparking – safe in explosive environments**
- **Low EMI, eliminating the need for heavy shielding**

Planetary gears provide high torque-carrying capability in a small package

The gears are built into the hub of the wheel, making the package compact and lightweight. This design also increases the radial load-carrying and shock loading capacity of the entire system.

Polyurethane tires are ideal for applications in hospitals, schools, and airports – any place requiring non-marking materials. This material is also ideal for high load carrying applications like material handling.



Design Features

1. Polyurethane antistatic tires
2. High load capacity ball bearings to accommodate heavy vehicle loads
3. Single piece stainless steel gears and shaft for high quality and reliability
4. Dual stage planetary gear design delivers high torque and high efficiency in a compact package
5. Brushless motor provides efficient, maintenance-free power
6. Encoder/brake extension for optional add-ons
7. Sealed unit for operation in hostile or wet environments
8. Aluminum alloy housing reduces weight and provides optimum heat dissipation

Servo Wheel™ Drive System provide motion for small, battery-powered, electric vehicles:

- **Automated cleaning equipment**
- **Health care equipment**
- **Robotic & material handling equipment**
- **AGV's**

Servo Wheel™ Integral Gearmotors

Performance Specifications*

		High Speed Motor Performance Models				High Torque Motor Performance Models			
Wheel Diameter (inches)	**Ratio**	**Max Speed (mph)**	**Wheel RPM @ Max Speed**	**Continuous Torque (in -lb)**	**Peak Torque**	**Max Speed (mph)**	**Wheel RPM @ Max Speed**	**Continuous Torque (in -lb)**	**Peak Torque**
6	20:1	3.5	196	150	450	3.0	168	340	1020
	24:1	2.7	151	180	540	2.5	140	408	1224
	30:1	2.3	128	225	675	2.0	112	510	1530
	36:1	2.0	112	270	810	1.5	84	612	1836
8	20:1	4.5	189	150	450	3.8	159	340	1020
	24:1	3.6	151	180	540	3.0	126	408	1224
	30:1	3.0	126	225	675	2.5	105	510	1530
	36:1	2.5	105	270	810	2.0	84	612	1836

* All models have a maximum load capacity of 1000 lbs. Performance based on 24 volt operation. Other performance requirements may be met with a different power supply or choice of different motor winding. Please contact Parker Application Engineering to inquire about these options.

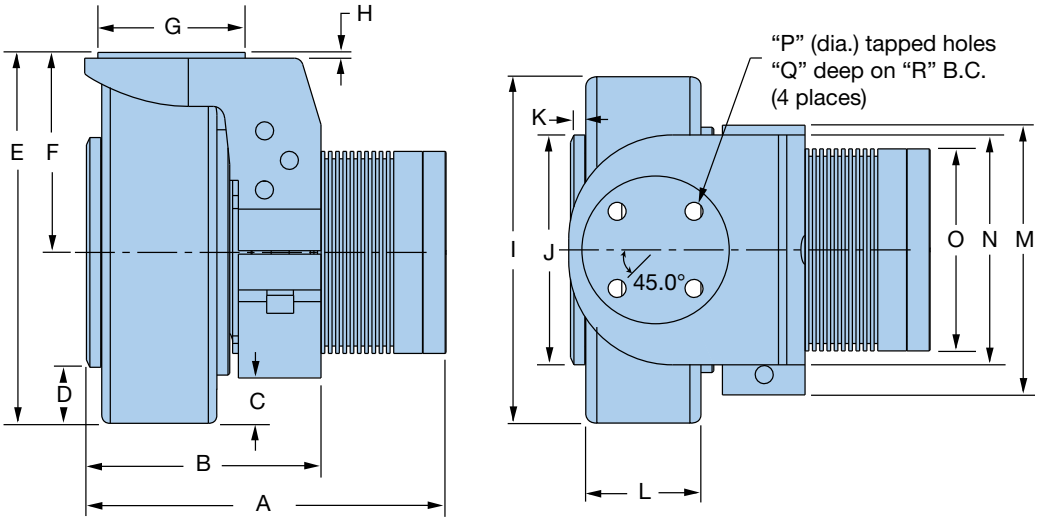
Motor Constants**

	Units	High Speed Motor Performance Models	High Torque Motor Performance Models
Stall Current Continuous	Arms Amps DC	22.2 27.1	41.5 50.8
Peak Current	Arms Amps DC	70.0 85.7	131.1 160.6
Voltage Constant	V/rad/s Vrms/krpm	0.0377 2.79	0.0515 3.81
Torque Constant	Nm/Arms oz-in/Amp DC	0.046 5.33	0.06 7.29
Resistance	ohm	0.070	0.033
Inductance	mH	0.1	0.1
DC bus Voltage	VDC	24	24
Winding Thermal Resistance **Ambient** **Case**	°C/W	 1.68 0.56	 1.02 0.32
Temperature **Ambient** **Max Winding**	°C	 25 155	 25 155
Thermal Time Constant **Motor** **Winding**	minutes	 22 1.7	 28 2.8
Rotor Shaft **Viscous Damping** **Dynamic Friction**	Nm/krpm Nm	 0.0021 0.0060	 0.0068 0.0193
Number of rotor magnet poles		8	12

** Motors used as standard are Parker K064100-3D motor for High Speed Models and K089100-1D winding for High Torque Models.

Dimensions

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



Wheel Diameter (in)	Motor Performance	A* Without Brake		B		C		D		E		F	
		mm	in	mm	in	mm	in	mm	in	mm	in	mm	in
6	High Speed	158.75	6.25	104.1	4.1	20.3	0.8	25.4	1.0	165.1	6.5	87.9	3.46
	High Torque	175.26	6.90	104.1	4.1	20.3	0.8	25.4	1.0	165.1	6.5	87.9	3.46
8	High Speed	158.75	6.25	104.1	4.1	45.7	1.8	50.8	2.0	218.4	8.6	116.8	4.60
	High Torque	175.26	6.90	104.1	4.1	45.7	1.8	50.8	2.0	218.4	8.6	116.8	4.60

Wheel Diameter (in)	Motor Performance	G		H		I		J		K		L	
		mm	in	mm	in	mm	in	mm	in	mm	in	mm	in
6	High Speed	65.0	2.559	2.54	0.1	152.4	6.0	101.1	3.98	6.86	0.27	50.8	2.0
	High Torque	65.0	2.559	2.54	0.1	152.4	6.0	101.1	3.98	6.86	0.27	50.8	2.0
8	High Speed	65.0	2.559	2.54	0.1	203.2	8.0	101.1	3.98	6.86	0.27	50.8	2.0
	High Torque	65.0	2.559	2.54	0.1	203.2	8.0	101.1	3.98	6.86	0.27	50.8	2.0

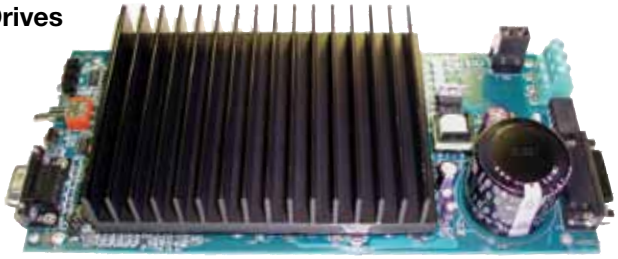
Wheel Diameter (in)	Motor Performance	M		N		O		P		Q		R	
		mm	in	mm	in	mm	in	mm	in	mm	in	mm	in
6	High Speed	118.6	4.67	101.1	3.98	88.9	3.5	7.94	5.16	25.4	1.0	47.98	1.889
	High Torque	118.6	4.67	101.1	3.98	88.9	3.5	7.94	5.16	25.4	1.0	47.98	1.889
8	High Speed	118.6	4.67	101.1	3.98	88.9	3.5	7.94	5.16	25.4	1.0	47.98	1.889
	High Torque	118.6	4.67	101.1	3.98	88.9	3.5	7.94	5.16	25.4	1.0	47.98	1.889

* Consult factory for increased length with encoder and on brake option.

Servo Wheel™ Integral Gearmotors

Digital Servo Amplifier Accessory

Provides High Current Control for Servo Wheel™ Drives



This digital servo amplifier provides DSP-based digital closed-loop, four-quadrant PWM control of force or torque of permanent magnet, linear or rotary, brush or brushless DC motors. Our PWM current control algorithm, current sensing method, and advanced switching scheme yields performance comparable to a linear servo amplifier.

This digital drive will reduce expensive motor drive stocking requirements because it will control brush-type, brushless-trapezoidal and brushless-sinusoidal motors.

Setup is easy. The operating configuration – motor type, motor parameters, operating voltage, peak and continuous current limits and system parameters for velocity or position control are all input by the user to a PC-based setup program that automatically downloads the information, with the computed algorithm, into the flash memory of the drive via an RS-232 port. The drive can be reconfigured at any time by running the setup-program.

Features

- **High-performance DSP-based servo controls motor force or torque. Control of velocity or position using the motor's Hall of encoder signals is an option**
- **Controls brush-type, brushless-trapezoidal and brushless-sinusoidal motors**
- **User inputs motor parameters, voltage, peak and continuous current limit into Windows-based setup software. Setup software automatically downloads the algorithm for a 2kHz current loop bandwidth via RS-232 communications**
- **Proprietary PWM software controlled switching scheme yields ultra-low ripple at low current levels, zero crossover distortion, and minimizes EMI in noise sensitive applications**
- **Differential amplifiers accept a single ±10V analog current command for trapezoidal brushless and brush type motors**
- **Optional inputs allow digital commands through the RS-232 or serial peripheral interface**
- **3 output current ranges and scale factors available**
- **Optically isolated digital inputs for Enable/ Reset, Brake, and ±Travel Limits**
- **Motor current monitor output, and optically isolated digital outputs provide controller fault indication**
- **Configurator program provides drive status and fault history via RS-232 link**
- **Fault protection makes this drive virtually indestructible**
- **Operates from one low-cost 24 – 48 VDC unregulated power supply or battery**

Specifications

Part Number	11564041	11564045
Input Power Bus	24 to 48 VDC	24 to 48 VDC
Continuous Output Power (Max.)	450 watts[1]	1350 watts[1]
Continuous Output Current	10 amps[1]	15 amps[1]
Peak Output Current	20 amps[1] (1 sec typ.)	40 amps[1]
Scale Factor (A / V)	2	6
Voltage @ Continuous Output Current	Input Bus Voltage – 3 Volts Typ.	Input Bus Voltage – 3 Volts Typ.l
Max Heat Sink Temperature	Disables if >70°C	Disables if >70°C
Current Loop Bandwidth	2 kHz Typ.	2 kHz Typ.
Switching Frequency	40 kHz	40 kHz
Minimum Maintenance	100 UH	100 UH
Weight	25 oz	25 oz

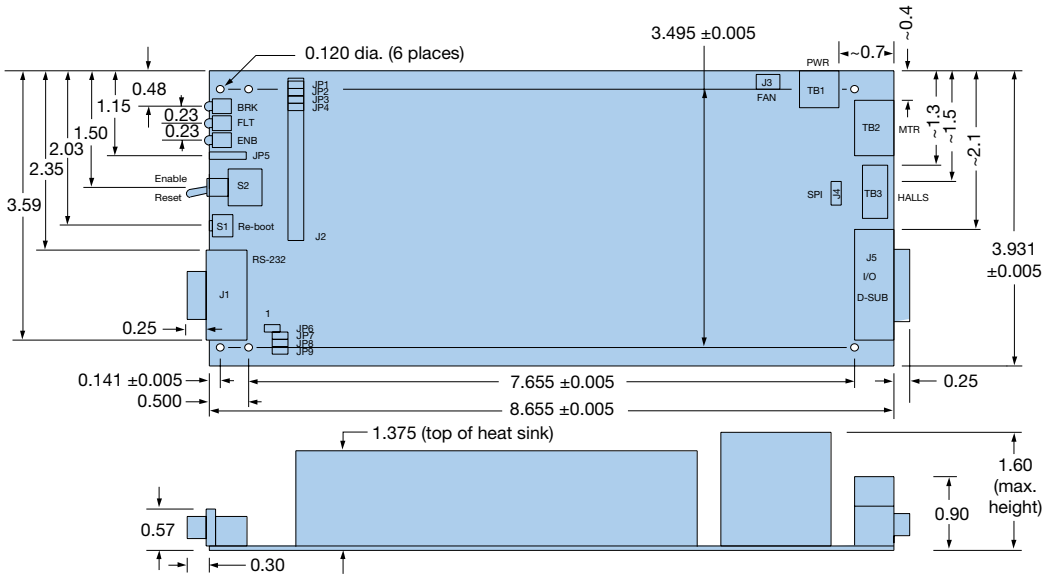
1 Depends on ambient operating temperature and heat sink. For the >10 amperes continuous output, we recommend forced convection cooling with a minimum airflow of 100 CFM. Consult factory for assistance.

Operating Control Signals and Indicators

Input Analog Control Signal	±10 Volts
Digital Input Commands	Rs-232, SPI
Peak Current limit	Software adjustable
Continuous Current Limit	Software adjustable
Drive Enable/Reset	5V logic, optically isolated
(+) Travel Limit	5V logic, optically isolated
(-) Travel Limit	5V logic, optically isolated
Brake	5V logic, optically isolated
Fault and/or Brake Status	5V logic, optically isolated
Drive Enabled indicator	Green LED
Brake Indicator	Red LED
Fault Indicator	Red LED
Digital Hall Effect Sensors	3 channels,+5 Volts,Gnd

Mounting Dimensions

(inches)



Servo Wheel™ Integral Gearmotors

DX Series Servo Wheel How to Order

Choose wheel size, ratio, motor performance, supply voltage, tire material, and brake option from the chart below.

Servo Wheel Ordering Information

	①	②	③	④	⑤	⑥	⑦
Order Example:	DX	A	1	1	K	S	3

① Series	② Wheel Size (Diameter)	③ Ratio	④ Motor Performance	⑤ Supply Voltage	⑥ Tire Material	⑦ Brake/Encoder
DX	A = 6” B = 8”	1 = 20:1 2 = 24:1 3 = 30:1 4 = 36:1	1 = High speed 2 = High torque	K = 24 VDC X = Other	S = Polyurethane black x tread R = Polyurethane black (Other tire compositions available upon request)	0 = None 1 = Encoder 2 = Brake 3 = Encoder & Brake (50 in-lb)

Related Products from Parker

K Series Frameless Kit Motors

Frameless kit motors are the ideal solution for machine designs that require high performance in small spaces. Kit motors are directly integrated with the drive train, resulting in a smaller, more reliable motor package.

Direct drive motion construction also gives equipment designers the advantages of lower costs, increased reliability and improved performance.

When to Use

- **A significant cost savings**
- **Reduced mechanical complexity**
- **Greater design flexibility**
- **High performance in a compact package**
- **Improved dynamic response and settling**
- **Minimum motor size per application space**
- **Low cogging for smooth operation**
- **Low inertia for high acceleration**

Features

- **High peak torque up to 93.37 Nm (826.4 in-lb)**
- **High speeds up to 50,000 RPM**
- **Superior performance – high stiffness and better response**
- **High reliability – no mechanical couplings**
- **Compact design – minimizes product size**
- **Low cogging - special orientation of the laminations and odd slot count**
- **Very low torque ripple at low speeds for smooth and precise rotary motion**

MPP/MPJ Series Rotary Servo Motors

The MaxPlusPlus (MPP) family of brushless servo motors is redefining performance, flexibility, and reliability. The industry's highest-performing servo motor uses eight-pole segmented lamination technology, which produces more torque in a shorter package. Use MaxPlusPlus motors for higher torque applications, customization options, or when high performance is required.

When higher inertia is desired to improve system performance, the MPJ is the perfect choice. It includes all the same features and benefits of the MPP, but increases the rotor inertia by 3 to 8 times over the standard MPP.

- **MPP – 92 to 270 mm frame sizes**
  MPJ – 92 to 142 mm frame sizes
- **1.5 to 158 Nm (13 to 1398 in-lb) continuous stall torque**
- **4.3 to 402 Nm (38.1 to 3558 in-lb) peak torque**
- **Very high torque-to-inertia ratio**
- **Right-angle rotatable connectors**
- **Seven different feedback devices including encoder, serial encoder, resolver, Heidenhain and Stegmann single and multi-turn absolute encoders**
- **IP64 standard, IP65 optional**
- **Special shaft, front flange, and feedback devices available**
- **CE and UL**

Related Products from Parker

RD Series Direct Drive Servo Rotary Positioners

Parker direct drive rotary stages feature a robust construction and high performance in a compact package, providing smooth, near frictionless motion with zero backlash.

Featuring an integral brushless DC servo motor, these rotary stages offer several distinct advantages over traditional worm gear-driven stages. The elimination of the worm gearing offers the ability to reduce wear with zero backlash while exhibiting near frictionless motion.

The RD's high positioning accuracy, solely based on the stage's encoder, provides repeatability within 2 encoder counts, with resolutions down to 1.4 arc-seconds. The RD Direct Drive features speeds up to 700 RPM with significant torque capability.

- **Robust bearing design for high load capacity**
- **Integrated brushless motor features high copper slot fill and rare earth magnets for maximum torque efficiency**
- **In-line rotary encoder for direct position feedback. Also includes once per rev index mark**
- **Aluminum or stainless steel precision ground top plate for accurate mounting**
- **Motor rotor and top plate shaft as one-piece construction for high stiffness**
- **Sub "D" connectors for "plug & play" operation and simple connectivity**

Compax3 Servo Drives & Drive/Controllers

With its high performance and modular design, the Compax3 family of industrial servo drives and drive/controllers offers a new level of servo performance and flexibility.

Enhanced by the IEC 61131-3 programming environment, the modular structure of the Compax3 family allows options such as intelligent motion controllers, fieldbus interfaces and industry standard motor feedback.

Available in single- or multi-axis configurations, with numerous expansion options, all models are rated for 120 – 480 VAC input, continuous current output from 2.5 A (rms) to 155 A (rms), and are CE (EMC &LVD) and UL compliant.

Compax3 Drive

- **5V/24V step/direction and ±10V analog command**
- **Resolver, encoder or high-resolution SinCos® Hiperface™ and Endat 2.1**
- **Torque, velocity or position control modes**
- **Encoder tracking capability**

Compax3 Drive/Controller

- **Available as:**
  – servo positioning
  – programmable positioning with function modules according to PLCopen
  – advanced programmable positioning with electronic camming, gearing, etc.
- **Certified safety technology integrated into drive (EN954-1 Category 3)**
- **Fieldbus options: DeviceNet, Profibus, CANopen, ETHERNET Powerlink and RS232**
- **Supports all five IEC 61131-3 programming languages and continuous flow chart**
- **Resolver, encoder or high-resolution Sin/Cos®, Hiperface™, Endat 2.1 and SSI feedback devices**

Aries Servo Drives & Drive/Controllers

The Aries Series are compact, easy-to-use servo motor drives and drive/controllers. Aries is a cost-effective and flexible digital servo solution where users are required to pay for only the performance they need. All models are CE (EMC & LVD), UL compliant.

Aries Drive

The Aries Drive is standard as a torque-only amplifier, but is software selectable to run in velocity mode. An optional step-and-direction version is also available.

- **120/240 VAC input**
- **100 to 3000 W power levels**
- **Plug in and spin – no set up required; auto-configures when used with Parker's "smart encoder" motor**
- **Drive Talk – ACR9000 controller can access all drive parameters**
- **Supported feedback devices include Smart encoder, quadrature encoder, Heidenhain EnDat absolute encoder and resolver**

Aries Drive/Controller

The Aries Controller combines the versatile and cost-effective Aries digital servo drive platform with the advanced control capabilities of the ACR servo controller into a single-axis drive/controller.

- **Ethernet TCP/IP communications**
- **400 to 1300 W power levels**
- **1 1/2 axis encoder input for camming, following, and gearing**
- **Up to 16 multi-tasking programs**
- **Set-up and auto-tuning via ACR-View SDK**
- **Supports EtherNet/IP**

HPLA/HLE Series Industrial Belt-Driven Positioners

The HLE/HPLA linear modules are ideal as single-axis products or as components for high-speed multi-axis gantries. With thousands of units in operation worldwide, the HPLA/HLE Series are proven performers offering long life and with trouble-free operation.

With flexible design options for bearing selection, profile size, stroke length, and motor/gearbox combination, the HPLA/HLE design has your application covered.

- **Rugged construction for heavy duty applications**
- **Thrust force capacity to 5455 N**
- **Standard travel up to 9 meters**
- **Velocity up to 5 meters/sec.**
- **Positional repeatability of ±0.2 mm**
- **Timing belt and pulley drive mechanism for fast, accurate positioning**
- **Increased system stiffness due to larger belt width**
- **Low-maintenance sealed bearings**
- **Hollow-shaft input option for higher axial forces**
- **Steel-wheel or square-rail designs for normal load capacities up to 15 kN**
- **Quiet operation**
- **Corrosion-resistant option for harsh environments**
- **IP30 seal design**

Gearhead Sizing/Selection

Stealth® Gearhead 9 Step Sizing/Selection Procedure

To properly select an appropriate 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**
- **Radial and axial shaft load**

The following 9 step procedure provides a quick, straightforward method for selecting a gearhead that will provide an L-10 life of 10,000 hours.

1) Load Parameters

Evaluate the following requirements of the load:

Load inertia
Acceleration time (t_{acc})
Continuous run time (t_{cont})
Deceleration time (t_{dec})
Dwell time (t_{dwel})
Maximum continuous speed (N_{cont})

From these, calculate:

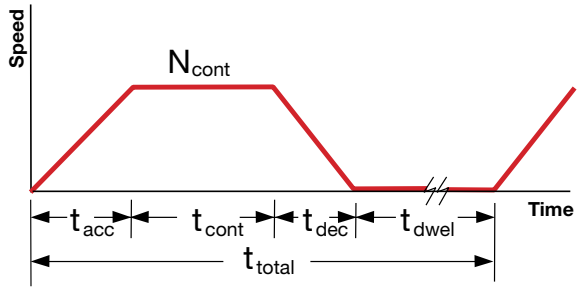
Acceleration torque (T_{acc})
Continuous torque (T_{cont})
Deceleration torque (T_{dec})
Dwell torque (T_{dwel})*

*Although not used in the following torque calculations, torque requirements during dwell (zero speed) must be considered when selecting gearhead size.

2) Duty Cycle

Determine if the application duty cycle is **intermittent** or continuous by calculating the duty cycle as follows:

$$\text{Duty cycle} = (t_{acc}+t_{cont}+t_{dec} / t_{total}) \times 100\%$$

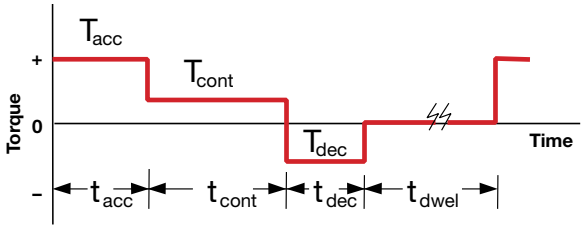


If the duty cycle is <60% and ($t_{acc}+t_{cont}+t_{dec}$) is less than 20 minutes, the motion is considered **intermittent**.

If the duty cycle is ≥60% and ($t_{acc}+t_{cont}+t_{dec}$) is greater than 20 minutes, the motion is considered **continuous**.

3) Calculate the Root Mean Cube Output Torque

$$T_{mean} = \sqrt[3]{\frac{\left[\frac{(T_{acc}^3)(N_{cont})(t_{acc})}{2} + (T_{cont}^3)(N_{cont})(t_{cont}) + \frac{(T_{dec}^3)(t_{dec})}{2}\right]}{\left[\frac{(N_{cont})(t_{acc})}{2} + (N_{cont})(t_{cont}) + \frac{(N_{cont})(t_{dec})}{2}\right]}}$$



4) Select Gearhead Type and Size

Choose the gearhead type (PS, PX, etc) and frame size to match the motor frame size.

5) Check Selected Gearhead Size Ratings

Check the specifications of the gearhead selected and confirm that it meets the following criteria:

$$\text{Rated nominal torque } (T_{nom\ r}) \geq T_{mean}$$

$$\text{Rated accel torque } (T_{acc\ r}) \geq T_{acc} \text{ or } T_{dec}$$

6) Determine Maximum Allowable Gearhead Ratio

Using the selected gearhead's listed specification for maximum rated speed (N_{maxr}), determine the maximum allowable ratio:

$$\text{Maximum ratio} = N_{maxr} / N_{cont}$$

7) Calculate the Mean and Maximum Input Speed

Choose a ratio for the selected gearhead (must be less than the maximum determined in Step 6). With this ratio, calculate the mean input speed ($N_{mean\ i}$) and the maximum input speed ($N_{max\ i}$):

$$N_{mean\ i} = \left(\frac{\frac{(N_{cont})(t_{acc})}{2} + (N_{cont})(t_{cont}) + \frac{N_{cont})(t_{dec})}{2}}{t_{acc} + t_{cont} + t_{dec}}\right)(\text{ratio})$$

$$N_{max\ i} = (N_{cont})\ (\text{ratio})$$

Note: Reflected inertia requirement may determine the actual ratio, as long as it does not exceed the maximum ratio value calculated in Step 6.

8) Determine Thermal (KT) and Shock (KS) Factor

Use the selected gearhead's specifications and the K Factor charts below to compensate for thermal and shock torque effects to comply with the following:

For continuous duty: $T_{nom\ r} > (T_{mean})(K_T)(K_S)$

For intermittent duty: $T_{nom\ r} > (T_{mean})(K_S)$

K_T Thermal Factor

This factor derates the transmitted torque to prevent case temperature from exceeding 100°C. The KT values shown in the table below are for 25°C ambient temperature, medium-size indoor space, with the gearheads mounted to a metal base with a surface area more than 3 times larger than the gearhead surface area.

K_S Shock Factor

This factor is used to derate the transmitted torque when the application is not well defined, has random duty cycles or experiences varying peak torques subjecting the gear teeth to torques above the estimated torques. K_S factor values are shown below for three general application categories. K_S values are independent of gearhead size. If your application does not fit into one of these categories, contact Parker to discuss your requirements.

9) Confirm Selection

Using the selected gearhead's listed specifications and the calculations from the previous steps, check that the following criteria are met:

- T_{accr} must be greater than the larger of T_{acc} or T_{dec}
- Check the emergency stop torque rating
- N_{nomr} must be greater than $N_{mean\ i}$
- N_{maxr} must be greater than $N_{max\ i}$
- Verify radial and axial shaft load

If any of the above comparisons are not met, then:

- Choose a larger gearhead
- Reevaluate the ratio
- Reevaluate the torque
- Reevaluate the speed
- Reevaluate the duty cycle
- Reevaluate shaft load

K_S Shock Factor

Load Type	Application	KS
Known Load Data	All Industries	1.00
Unknown Load Data – Light	Textiles, liquid mixers, can filling, food, conveyors, plastics, fans	1.25
Unknown Load Data – Moderate	Paper mills, rubber industry, sugar industry, metal mills, lumber, robotics	1.50

K_T Thermal Factor

Frame Size	Ratio	KT Factor @ Designated Output Speed (RPM)									
		100	200	400	600	800	1000	1500	2000	2500	3000
PV40		1	1	1	1	1	1	—	—	—	—
PS, PX, PV, RS60		1	1	1	1	1	1	—	—	—	—
PS, PX, PV, RS90		1	1	1	1	1	1.2	—	—	—	—
PS, PX, RS115		1	1	1	1	1.2	1.5	—	—	—	—
PS, RS142		1	1	1	1.3	1.7	—	—	—	—	—
PS, RS180	1 stage (1)	1	1	1.5	2.3	—	—	—	—	—	—
	2 stage (2)	1.1	1.5	—	—	—	—	—	—	—	—
PS, RS220	1 stage (1)	1	1.2	2.1	3.2	—	—	—	—	—	—
	2 stage (2)	1.3	2.5	—	—	—	—	—	—	—	—
PS ,RS300	1 stage (1)	1	1.5	3.1	—	—	—	—	—	—	—
	2 stage (2)	1.9	—	—	—	—	—	—	—	—	—
RT, RD, RB90	1	1	1	1	1	1	1	1	1	1.25	1.5
	2-30	1	1	1	1	1	1	1.1	—	—	—
RT, RD, RB115	1	1	1	1	1	1	1	1	1.3	1.7	—
	2-30	1	1	1	1	1	1.3	2	—	—	—
RT, RD, RB142	1	1	1	1	1	1	1.3	2	2.7	3.4	—
	2-30	1	1	1	1	1.3	1.6	—	—	—	—
RT, RD, RB180	1	1	1	1	1	1.3	1.7	2.5	3.4	—	—
	2-30	1	1	1	1.4	1.8	2.3	—	—	—	—
RT, RD, RB220	1	1	1	1.2	1.8	2.4	3.0	4.5	—	—	—
	2-30	1	1	1.3	2.0	2.6	—	—	—	—	—

(1) Data given for PS 3:1 to 10:1 and all RS ratios
(2) Data given for PS ratios above 10:1

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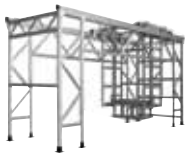

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