ARTISAN®
TECHNOLOGY GROUP

Your **definitive** source for quality pre-owned equipment.

Artisan Technology Group
(217) 352-9330 | sales@artisantg.com | artisantg.com

Full-service, independent repair center
with experienced engineers and technicians on staff.

We buy your excess, underutilized, and idle equipment
along with credit for buybacks and trade-ins.

Custom engineering
so your equipment works exactly as you specify.

- Critical and expedited services
- In stock / Ready-to-ship
- Leasing / Rentals / Demos
- ITAR-certified secure asset solutions

Expert team | Trust guarantee | 100% satisfaction

All trademarks, brand names, and brands appearing herein are the property of their respective owners.

Find the *Stober P301SPN0030M* at our website: *Click HERE*

ServoFit® Gearheads
The Precision Decision

Safety Instructions

In order to obtain long life and trouble-free operation from your STOBER gearhead, it is essential that the proper installation and operating procedures be followed. Failure to follow these instructions will void the drive's warranty.

The torque required by the application must not exceed the gearhead torque capacity shown on the nameplate. For safety purposes, a safety coupling should be installed between the gearhead and the driven load. Otherwise, overload may cause damage to the interior parts of the gearhead which may result in breaking the gearhead housing. As a result, persons could be injured by flying parts or splashing hot gear oil.

If you have questions about the installation, operation or maintenance of your gearhead, please contact your local STOBER distributor or STOBER Technical Support for assistance.

WARNING: Safety is the most important consideration when operating any type of drive. Through proper application, safe handling methods, and wearing appropriate clothing, you can prevent accidents and injury to yourself and fellow workers.

The shafts of STOBER gearheads rotate at very high speeds and can cut off or severely injure hands, fingers, and arms. Use appropriate guards for shafts and other rotating parts at all times. Follow all directions in the service instruction manual. Obey all federal, state and local safety regulations when operating the drive.



- Always be sure electrical power is off while making electrical connections and during installation and maintenance of the unit.
- Keep clothing, hands, and tools away from ventilation openings on motors and from all rotating parts during operation.
- Lift the drive with a double rope sling or other proper lifting equipment of adequate strength. Make sure load is secured and balanced to prevent shifting when unit is being moved. Lifting drives by hand may be dangerous and should be avoided.
- The intended use of lifting lugs is to handle the weight of the unit only. Never use a lifting lug to lift attached assemblies.
- Never operate drive at speeds higher than those shown on the nameplate, or personal injury may result. Contact STOBER Drives Inc., if there is any change of operating conditions from those for which the unit was originally sold (as stamped on the nameplate). Failure to comply could result in personal injury and or machinery damage.
- Always follow good safety practices at all times.

Each drive is tested before delivery. Before installation, however, it is advisable to examine the unit for possible damage which might have occurred during transit. If damage is discovered, it should be immediately reported to the transport agent.

If installation is delayed after receipt of the gearhead, the drive should be stored in a clean, dry place until put into service. Long term storage requires special procedures. If not kept in a heated, dry area, consult STOBER Drives, Inc. for storage instructions.

NOTE: If it is necessary to clean drive shafts, take care to protect the oil seals.

IMPORTANT: Do not use any device to hammer the unit onto the output shaft during installation since the bearing races could be damaged.

Other maintenance and lubrication information can be found in this catalog, on our website, or by calling STOBER Technical Support.

Table of Contents

P Series
Overview 8
Features 9
Selection Data 10
Dimensions 18



PA Series
Overview 20
Features 21
Selection Data 22
Dimensions 28



PKX Series
Overview 30
Features 31
Selection Data 32
Dimensions 36



PH Series
Overview 38
Features 39
Selection Data 40
Dimensions 46



PHA Series
Overview 50
Features 51
Selection Data 52
Dimensions 58



PHKX Series
Overview 60
Features 61
Selection Data 62
Dimensions 68



PE Series
Overview 70
Features 71
Selection Data 72
Dimensions 73



C Series
Overview 74
Features 75
Selection Data 76
Dimensions 96



F Series
Overview 104
Features 105
Selection Data 106
Dimensions 112



K Series
Overview 122
Features 123
Selection Data 124
Dimensions 142



Miscellanous/Engineering
Direction of Rotation 156
Motor Plate Specifications 157
Motor Installation 158
Wobble Free Bushing Installation 160
Hollow Output Installation 163
Shaft Options and Loads 164
Lubrication Information 170
Selection Procedure 172

ServoFit® Gearheads
The Precision Decision

PA Series

- Backlash — ≤ 1 arc/mins
- Ratios — 3:1 to100:1
- Input RPM — up to 6000
- Noise Level — as low as 58 dB(A)**
- Output Torque up to 8,850 in.lbs.
- Available:
  - —Washdown Food Duty



P Series

- Backlash — ≤ 3 arc/mins
- Ratios — 3:1 to100:1
- Input RPM — up to 6000
- Noise Level — as low as 58 dB(A)**
- Output Torque up to 17,700 in.lbs.
- Available:
  - —Washdown Food Duty



PHA Series

- Backlash — ≤ 1 arc/mins
- Ratios — 4:1 to 910:1
- Input RPM — up to 6,000
- Noise Level — as low as 58 dB(A)**
- Output Torque up to 35,400 in.lbs.



PH Series

- Backlash — ≤ 3 arc/mins
- Ratios — 4:1 to 910:1
- Input RPM — up to 6,000
- Noise Level — as low as 58 dB(A)**
- Output Torque up to 35,400 in.lbs.



PKX Series

- Backlash — ≤ 6.5 arc/mins
- Ratios — 3:1 to 300:1
- Input RPM — up to 6,000
- Noise Level — as low as 69 dB(A)**
- Output Torque up to 17,700 in.lbs.

Available:

- —Washdown Food Duty



PHKX Series

- Backlash — ≤ 5 arc/mins
- Ratios — 4:1 to 300:1
- Input RPM — up to 6,000
- Noise Level — as low as 69 dB(A)**
- Output Torque up to 35,400 in.lbs.



F Series

- Backlash:
  - Standard ≤ 11 arc/mins
  - Reduced ≤ 7 arc/mins
- Ratios — 4:1 to 540:1*
- Input RPM — up to 4,500
- Noise Level — as low as 53 dB(A)**
- Output Torque up to 9,700 in.lbs.
- Available:
  - — Inch or Metric Output
  - —Solid, Hollow, Single and Double Bushing
  - —Beverage and Food Duty



K Series

- Backlash:
  - Standard ≤ 12 arc/mins
  - Reduced ≤ 6 arc/mins
- Ratios — 4:1 to 381:1*
- Input RPM — up to 4,500
- Noise Level — as low as 53 dB(A)**
- Output Torque up to 106,000 in.lbs.
- Available:
  - — Inch or Metric Output
  - —Solid, Hollow, Single and Double Bushing
  - —Beverage and Food Duty



PE Series

- Backlash — ≤ 15 arc/mins
- Ratios — 5:1 to 100:1
- Input RPM — up to 8,000
- Noise Level — as low as 60 dB(A)**
- Output Torque up to 1,060 in.lbs.



C Series

- Backlash — ≤ 20 arc/mins
- Ratios — 2:1 to 276:1*
- Input RPM — up to 4,500
- Noise Level — as low as 53 dB(A)**
- Output Torque up to 62,000 in.lbs.
- Available:
  - —Inch or Metric Output
  - —Beverage and Food Duty



* Ratios standard in one housing. Higher ratios available in compound units.
** dB(A) rating measured at 1 meter distance with 3000 RPM input.

See web site for drawings.

ServoFit® Gearheads
The Precision Decision

The STOBER offering of ServoFit™ gearheads will enable you to fit all your servo needs. The ServoFit™ Precision Planetary Gearheads are for compact, highly dynamic applications. The ServoFit™ Modular System was designed for those applications where the compact size of a planetary gearhead is not needed. With these two lines, STOBER Drives offers the world's largest variety of servo gearheads.

The STOBER difference = VALUE for you!

5 YEAR LIMITED WARRANTY

Full warranty on all reducer components: gears, covers, material and workmanship, etc. Normal wear items (oil seals, bearings, etc.) are covered for 2 years.



Fits Any Servo Motor

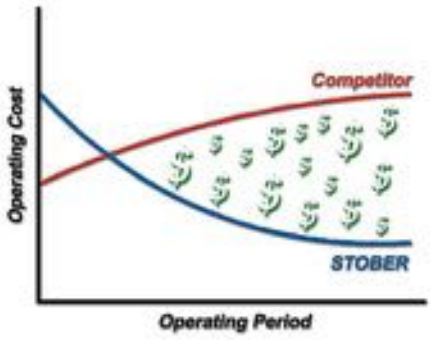
Motor plates for the TriAdapt™ mounting system will fit a wide selection of NEMA, IEC, or custom servo motors.

STANDARD 3-DAY DELIVERY

Most sizes are available with STANDARD 3 DAY DELIVERY. (Does not apply to PA and PHA.) Custom motor plates — 10 days maximum.

SAME DAY EMERGENCY SHIPPING

24 Hours — No expedite fee.



Helical Gears

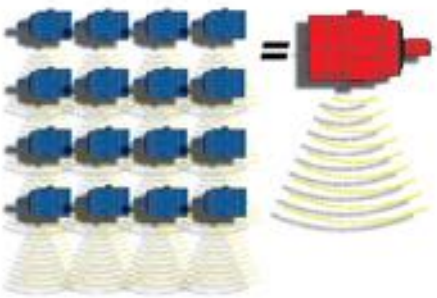
- Highest torque capacity
- Maximum efficiency
- Maintains low noise level



Exceptional Performance

- Low noise level
- Cool running
- High speed capacity
- High torque capacity
- Low backlash

1 conventional planetary gearhead produces the same noise level as 16 STOBER planetary gearheads with HeliCamber™ gearing technology.



See web site for drawings.

ServoFit® Gearheads
Beverage and Food Duty

Beverage and Food Duty

- Lubricated for Life — Double Output Seals
- Maintenance Free — No Breather
- Stainless Output Bushing, Shaft, or Bore — Includes Output Covers for Bushings and Quills
- Multilayer Industrial 316 Stainless Steel Epoxy Coating
- 5 Year Warranty

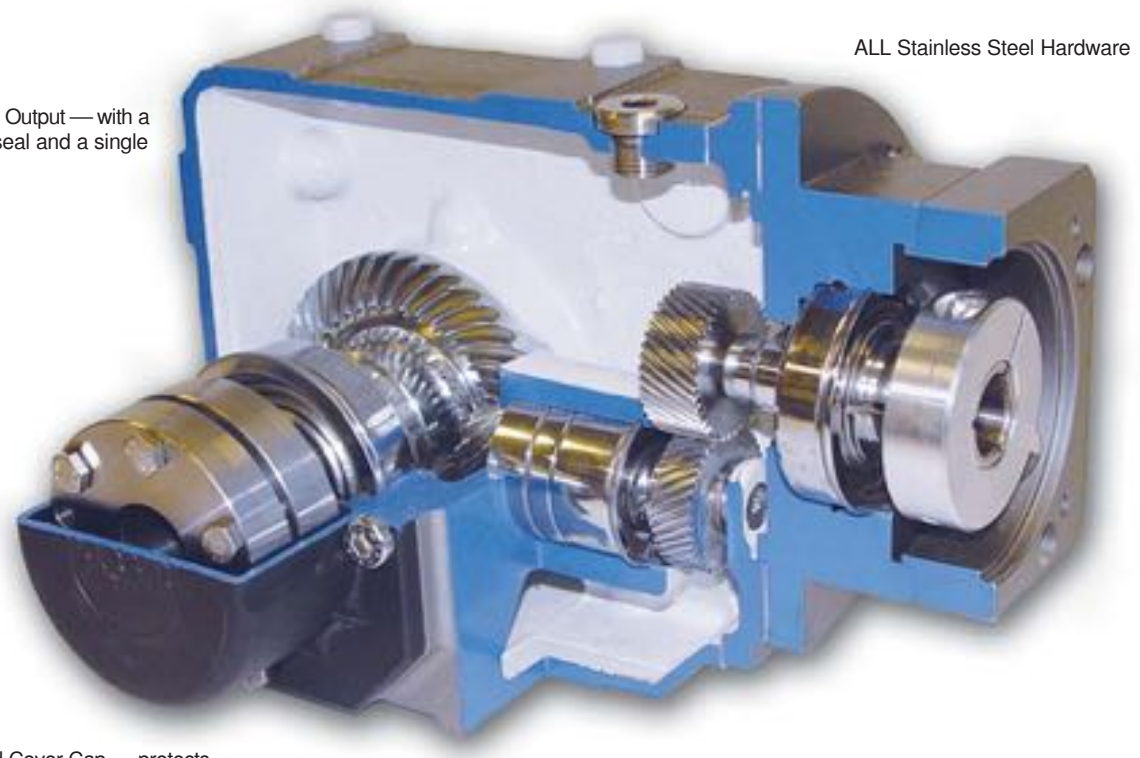
Standard Coating:

• BEVERAGE	1-Primer 2-Industrial 316 Stainless Steel Epoxy
• FOOD	1-Primer 2-Industrial 316 Stainless Steel Epoxy 1-Silver Bullet Anti-Microbial™ Epoxy
• Options	Layer of Ultra Clear Industrial Epoxy White Epoxy



ALL Stainless Steel Hardware

Double Sealed Output — with a dual lip outer seal and a single lip inner seal



Outside Closed Cover Cap — protects seals from high pressure washing

Inside Split Cover Cap — enables easy assembly onto the shaft

OUTPUT OPTIONS:

- Patented (U.S. Patent Number 5,496,127) Stainless Steel Double Sided Bushing Mounted into Stainless Steel Output Quill — easily mounts onto standard cold finished, ground, or stainless shafting.
- Single side output shaft
- Hollow output

Silver Bullet AM™ is a registered trademark of Burke Industrial Coatings.

Mounting Position must be specified when ordering. See Page 171.

See web site for drawings.

ServoFit® Gearheads
Beverage and Food Duty

"F" Series Hollow Output.
(Stainless steel output is not available in all sizes.)



"C" Series Solid Shaft
(Stainless steel output is not available in all sizes.)





"P" and "PKX" Series Precision Planetary – Sizes 3 thru 5
(Stainless steel output is not available in all sizes.)

Mounting Position must be specified when ordering. See Page 171.

ServoFit® Gearheads
ServoCool

The compact design of planetary gearhead allows very little area for heat dissipation. While the STOBER Precision Planantary Gearhead has the lowest operating temperature available, even it's rating in continuous applications is limited by heat, especially with large planetaries or units with small ratios. The ServoCool planetary gearhead is made possible by adding a ventilation module to the existing ServoFit Precision Planetary Gearhead. These units are currently available in P and PH Series. For other sizes in the ServoFit Modular Series, contact STOBER Technical Support.

Connection flange Cool Plate with intake and outlet slots

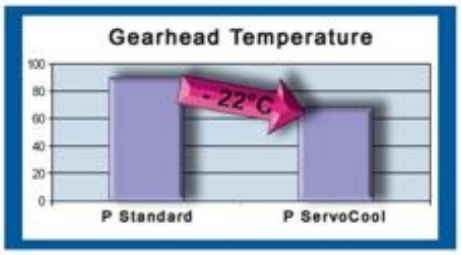
Standard coupling

Modular design — the ventilation module can be purchased as a kit to retrofit existing P and PH Series gearheads.

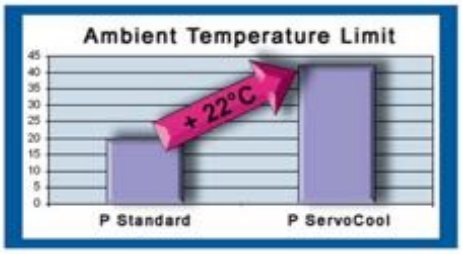


Air is accelerated outward in a radial manner and then escapes through the outlet slots. Due to the resulting negative pressure in the motor adapter, air is pulled in through the inlet slots.

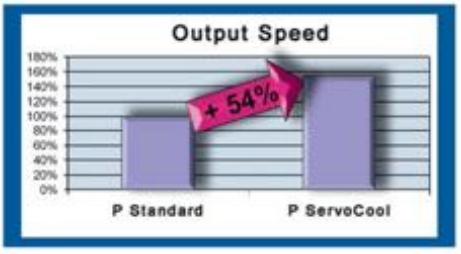
Radial ventilator



According to data from lubricant suppliers, the lifespan of oil doubles, at certain temperatures, if operating temperature is reduced by 10°C. Adding the ServoCool ventilator reduces gearhead temperature 22°C — quadrupling the expected lubricant life.



- Synthetic oil
- Lower temperature means longer life
- Lubricated for life — maintenance free solutions



- Ventilator fan mounts to motor shaft
- Forced air ventilation improves performance
- Modular design "fits" existing units
- Optional for P and PH Series



- Increased motor performance
- No added motor
- No additional wiring
- More compact than external motor fan

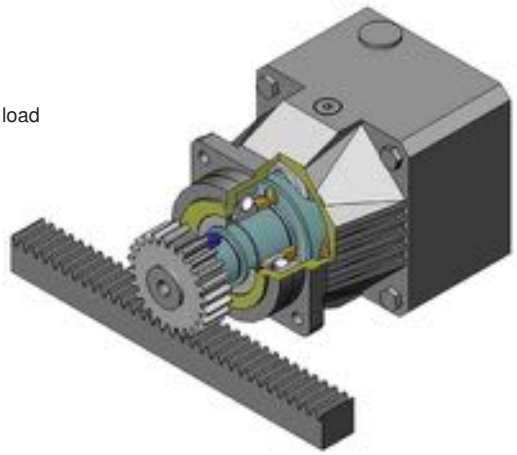
See web site for drawings.

ServoFit® Gearheads
"P" Series – Precision Planetary
Output Shaft Loads

"R" – Deep Groove Ball Bearing

Characteristics:

Minimal frictional torque
Good Radial load capacity
Axial load approx. 35% of radial load



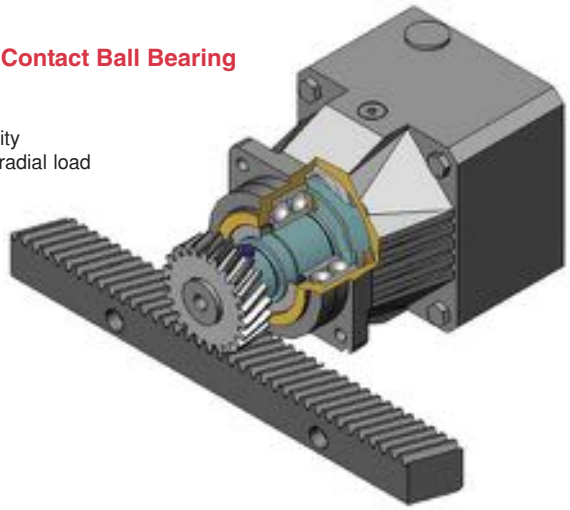
Applications:

Spur geared rack/pinion
Couplings
Belt with or without light tension

"D" – Double Row Angular Contact Ball Bearing

Characteristics:

Low frictional torque
Good radial bearing capacity
Axial load approx. 50% of radial load



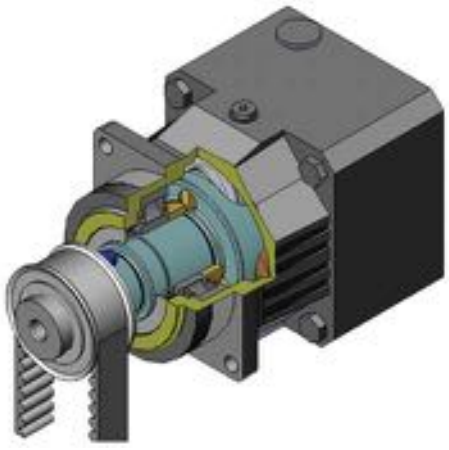
Applications:

Helical geared rack/pinion
Couplings with high axial load
Belt with or without light tension

"Z" – Cylindrical Roller Bearing

Characteristics:

Very good radial load capacity
Axial load approx. 20% of radial load



Applications:

Prestressed belt drive
Prestressed spur rack drive
Applications with high radial loads
and/or high service requirements

See Page 165 for shaft load.

"P" Series
ServoFit® Precision Planetary Gearhead
Performance Specification Overview

		P221	P222	P321	P322	P421	P422	P521	P522	P721	P722	P821	P822	P921	P922
Acceleration Torque $T_{2B\,MAX}$	in.lbs.	195		575		1052		2,655		6,195		14,160		26,570	
	Nm	22		65		120		300		700		1,600		3,000	
Output Torque Nom.[1] T_{2N}	in.lbs.	142		399		753		1,860		3,898		8,858		17,716	
	Nm	16		45		85		210		440		1,000		2,000	
Input Speed Max. n_{1MAX}	Continuous	4,500	4,500	4,500	4,500	4,000	4,500	3,700	4,000	3,300	3,700	2,800	3,300	2,500	2,800
	Cyclic	8,000	8,000	8,000	8,000	7,000	8,000	6,500	7,000	6,000	6,500	4,500	6,000	4,000	4,500
ServoCool Input Speed Max. n_{1MAX}	Continuous	—		—		4,500	—	5,500	4,500	5,000	5,000	4,500	4,500	4,000	4,000
	Cyclic	—		—		7,000	—	6,500	7,000	6,000	6,500	6,000	6,000	5,000	6,000
Torsional Backlash[2] $\Delta\varphi$	arcmin	≤6	≤8	≤4	≤5	≤4	≤5	≤3	≤4	≤3	≤4	≤3	≤4	≤3	≤4
Torsional Stiffness C_2	in.lbs./arcmin	17		44		100		266		486		1,557		3,094	3,016
	Nm/arcmin	1.9		5		11		33		55		176		350	340
Axial Load Maximum	R lbs.	112		225		337		518		653		1,058		1,350	
	R N	500		1,000		1,500		2,300		2,900		4,700		6,000	
F_{2AMAX}[3]	D lbs.	—		315		506		788		1,013		1,688		2,250	
	D N			1,400		2,250		3,500		4,500		7,500		10,000	
	Z lbs.	—		135		225		360		450		810		1,125	
	Z N			600		1,000		1,600		2,000		3,600		5,000	
Radial Load Maximum[4]	R lbs.	270		563		900		1,463		1,800		2,925		4,050	
	R N	1,200		2,500		4,000		6,500		8,000		13,000		18,000	
F_{2RMAX}[3]	D lbs.	—		619		1,013		1,575		2,025		3,375		4,500	
	D N			2,750		4,500		7,000		9,000		15,000		20,000	
	Z lbs.	—		675		1,125		1,800		2,250		4,050		6,075	
	Z N			3,000		5,000		8,000		10,000		18,000		27,000	
Tilting Moment Maximum[4]	R in.lbs.	300		779		1,416		2,991		4,774		5,938		14,735	
	R Nm	34		88		160		338		536		897		1,665	
T_{2Kmax}[3]	D in.lbs.	—		929		1,717		3,593		5,735		10,089		18,320	
	D Nm			105		194		406		648		1,140		2,070	
	Z in.lbs.	—		929		1,770		3,682		5,929		10,992		22,125	
	Z Nm			105		200		416		670		1,242		2,500	
Efficiency (at Nom. Torque) h	%	97%	95%	97%	95%	97%	95%	97%	95%	97%	95%	97%	95%	97%	95%
Weight m	pounds	3	4.0	6	8	9	12	14	19	27	33	57	71	110	135
	kg	1.2	1.8	2.6	3.5	4.0	5.3	6.5	8.5	12	15	26	32	50	61
Noise Level L_{PA}	dB(A)[5]	≤61	≤61	≤61	≤61	≤62	≤60	≤63	≤61	≤64	≤62	≤65	≤63	≤65	≤64
Balance Quality		Q 2.5 (Quality Class-2.5 millimeters per second)													
Lubrication		Synthetic Oil — Lubricated for Life													
Degree of Protection		IP65 - FKM Shaft Seals													
Mounting Position		Unrestricted													
Direction of Rotation		Input and Output Rotate the SAME Direction.													
Ambient Temperature		0°C to +40°C (104° F) Other temperatures, contact STOBER Drives.													
Finish		Black (Standard), Washdown (White), Food and Beverage (Stainless) Options Available													
Lifetime.[6] L_h	hours	L_h > 10,000 hours if T_{2K}/T_{2A} < 1.25 and > 1.00													
		L_h > 20,000 hours if T_{2K}/T_{2A} > 1.25 and < 1.50													
		L_h > 30,000 hours if T_{2K}/T_{2A} > 1.5													
Warranty		5 Year Limited (2 Years on normal wear items: bearings, seals, etc.)													

1) Ratings based on input speed (n_1) of 2000 RPM.
For torque at higher input speeds (T_{2NX}) solve the formula, where n_1 = Actual Input Speed. $T_{2NX} = \dfrac{T_{2N}}{\sqrt[3]{\dfrac{n_1}{2000}}}$

2) Tested at 1.5% of nominal torque and recorded on the input side of the gearhead.
For reduced value see the PA Series.

3) See Page 165 for output bearing options.

4) Rating based on output speed (n_2) of 100 RPM. For values at other speeds see Page 165.

5) Measurement at one (1) meter distance with input speed (n_1) of 2000 RPM.

6) T_{2A} equals actual tilting moment of the application. See Page 165 for calculation details.

Refer to Page 172 for ServoFit Precision Planetary Gearhead Selection Procedure.

"P" Series
ServoFit® Precision Planetary Gearhead
Features

The "P" Series ServoFit Precision Planetary Gearheads feature HeliCamber® gearing, TriAdapt® motor adapter system and many other components which make them the most accurate and efficient planetary gearheads available. HeliCamber® gear technology provides minimum wear, low backlash and low noise. All units are lubricated for life with synthetic oil and sealed to IP65 standards to prevent lubricant contamination for long life.

Some of these features are:

- Readily Attaches to Any Servo Motor (IEC, NEMA, or Customized Motor Plates*)
- 5 Year Limited Warranty (2 years on bearings, seals, etc.)
- Lowest Standard Backlash
- High Torsional Stiffness
- Advanced Gear Technology
- 95 to 97% Efficiency
- Quiet Running
- Assembled in the U.S.A.

* Maximum 10 working days for custom motor plates.



NO EXPEDITE FEE FOR 24 HOUR SERVICE

Ring gear machined integral to the housing — not welded or pressed in — provides greater concentricity and eliminates speed fluctuation

Highest running smoothness achieved by proven helical gearing and gear tooth microgeometry. Gear quality provided by case-hardened and finish-ground sun and planet gears.

Magnetic oil filtration

Highest running accuracy and precision ensured by single piece housing made from high-tensile tempered ductile iron with the additional characteristics of dissipating heat, noise dampening, and greater lubrication retention on the ring gear

Triple-split collet — for greater concentricity and low inertia — is rated in excess of 200 percent of the gearheads input torque capacity

FKM seals — for the smallest possible diameter—reducing friction and heat buildup, increasing efficiency, and allowing continuous duty without additional cooling

Adapter bushings to fit all motor shafts — no key required

Motor plate pilot toleranced to fit your motor for precise concentricity

Bearing options for application specific radial load, axial load, and tilting moments

Planet carrier straddle mounted for robust output capacity

Motor plate can easily be changed to fit your choice of motors

The patented TriAdapt® motor coupling is designed to allow thermal expansion of the motor shaft — ensuring long motor life by preventing thrust load on the motor bearings.

The TriAdapt® motor shaft adapter system allows installation of motor in minutes — no special tools required



Also available with input shaft (AW).

Available as ServoCool in Sizes P4 thru P8.





See web site for drawings.



"P" Series
ServoFit® Precision Planetary Gearhead
Selection Data

Part Number (Gearhead + Input)	Exact Ratio	Maximum Input Speed		Maximum Motor Shaft	Mass Moment of Inertia	Torsional Stiffness per arcmin		Output Torque					
								Nominal [1]		Acceleration		Peak [2]	
Gearhead		Continuous	Cyclic										
	i	RPM (n_1)		mm	kgcm²	in.lbs.	Nm	in.lbs.	Nm	in.lbs.	Nm	in.lbs.	Nm
P221 with Motor Mounting Plate													
P221S_0040 MT	4.000	4,500	8,000	14	0.14	16.2	1.8	142	16	195	22	390	44
P221S_0040 MTL	4.000	4,500	8,000	19	0.61	16.8	1.9	142	16	195	22	390	44
P221S_0050 MT	5.000	4,500	8,000	14	0.12	16.4	1.9	142	16	195	22	390	44
P221S_0050 MTL	5.000	4,500	8,000	19	0.59	16.8	1.9	142	16	195	22	390	44
P221S_0070 MT	7.000	4,500	8,000	14	0.11	15.7	1.8	142	16	195	22	390	44
P221S_0070 MTL	7.000	4,500	8,000	19	0.57	15.9	1.8	142	16	195	22	390	44
P221S_0080 MT	8.000	4,500	8,000	14	0.10	14.9	1.7	124	14	159	18	319	36
P221S_0080 MTL	8.000	4,500	8,000	19	0.57	15.1	1.7	124	14	159	18	319	36
P221S_0100 MT	10.00	4,500	8,000	14	0.10	14.1	1.6	106	12	159	18	319	36
P221S_0100 MTL	10.00	4,500	8,000	19	0.56	14.2	1.6	106	12	159	18	319	36
P222 with Motor Mounting Plate													
P222S_0160 MT	16.00	4,500	8,000	14	0.14	15.8	1.8	142	16	195	22	390	44
P222S_0160 MTL	16.00	4,500	8,000	19	0.61	15.8	1.8	142	16	195	22	390	44
P222S_0200 MT	20.00	4,500	8,000	14	0.14	16.2	1.8	142	16	195	22	390	44
P222S_0200 MTL	20.00	4,500	8,000	19	0.61	16.2	1.8	142	16	195	22	390	44
P222S_0250 MT	25.00	4,500	8,000	14	0.12	16.2	1.8	142	16	195	22	390	44
P222S_0250 MTL	25.00	4,500	8,000	19	0.59	16.2	1.8	142	16	195	22	390	44
P222S_0280 MT	28.00	4,500	8,000	14	0.11	15.8	1.8	142	16	195	22	390	44
P222S_0280 MTL	28.00	4,500	8,000	19	0.57	15.8	1.8	142	16	195	22	390	44
P222S_0320 MT	32.00	4,500	8,000	14	0.13	14.8	1.7	124	14	159	18	319	36
P222S_0320 MTL	32.00	4,500	8,000	19	0.60	14.9	1.7	124	14	159	18	319	36
P222S_0350 MT	35.00	4,500	8,000	14	0.11	16.1	1.8	142	16	195	22	390	44
P222S_0350 MTL	35.00	4,500	8,000	19	0.57	16.1	1.8	142	16	195	22	390	44
P222S_0400 MT	40.00	4,500	8,000	14	0.10	15.7	1.8	142	16	195	22	390	44
P222S_0400 MTL	40.00	4,500	8,000	19	0.56	15.7	1.8	142	16	195	22	390	44
P222S_0500 MT	50.00	4,500	8,000	14	0.10	16.1	1.8	142	16	195	22	390	44
P222S_0500 MTL	50.00	4,500	8,000	19	0.56	16.1	1.8	142	16	195	22	390	44
P222S_0700 MT	70.00	4,500	8,000	14	0.10	15.6	1.8	142	16	195	22	390	44
P222S_0700 MTL	70.00	4,500	8,000	19	0.56	15.6	1.8	142	16	195	22	390	44
P222S_1000 MT	100.0	4,500	8,000	14	0.10	14.0	1.6	106	12	159	18	319	36
P222S_1000 MTL	100.0	4,500	8,000	19	0.56	14.0	1.6	106	12	159	18	319	36

[1] Based on input speed: n1 = 2000 RPM
For torque at higher input speeds (T_{2NX}) solve the formula, where n1 = Actual Input Speed. $T_{2NX} = \frac{T_{2N}}{\sqrt[3]{\frac{n_1}{2000}}}$

[2] Maximum momentary torque for emergency stops or heavy shock load. Admissible stops per life of gearhead = 1,000 stops maximum.

See web site for drawings.

"P" Series
ServoFit® Precision Planetary Gearhead
Selection Data



Part Number (Gearhead + Input)	Exact Ratio	Maximum Input Speed		Maximum Motor Shaft	Mass Moment of Inertia	Torsional Stiffness per arcmin		Output Torque					
								Nominal [1]		Acceleration		Peak [2]	
Gearhead		Continuous	Cyclic			C_2		T_{2N}		T_{2B}		T_{2PEAK}	
	i	RPM (n_1)		mm	kgcm²	in.lbs.	Nm	in.lbs.	Nm	in.lbs.	Nm	in.lbs.	Nm
P321 with Motor Mounting Plate													
P321S_0030 MT	3.000	3,500	6,000	19	0.77	50.5	5.7	266	30	443	50	1,083	122
P321S_0030 MTL	3.000	3,500	6,000	24	1.45	50.5	5.7	266	30	443	50	1,083	122
P321S_0040 MT	4.000	3,700	6,500	19	0.69	46.9	5.3	399	45	576	65	1,152	130
P321S_0040 MTL	4.000	3,700	6,500	24	1.37	46.9	5.3	399	45	576	65	1,152	130
P321S_0050 MT	5.000	4,000	7,000	19	0.64	45.2	5.1	399	45	576	65	1,152	130
P321S_0050 MTL	5.000	4,000	7,000	24	1.32	45.2	5.1	399	45	576	65	1,152	130
P321S_0070 MT	7.000	4,500	8,000	19	0.59	39.0	4.4	399	45	531	60	1,152	130
P321S_0070 MTL	7.000	4,500	8,000	24	1.26	39.0	4.4	399	45	531	60	1,152	130
P321S_0080 MT	8.000	4,500	8,000	19	0.58	37.2	4.2	354	40	443	50	886	100
P321S_0080 MTL	8.000	4,500	8,000	24	1.25	37.2	4.2	354	40	443	50	886	100
P321S_0100 MT	10.00	4,500	8,000	19	0.57	35.4	4.0	266	30	443	50	886	100
P321S_0100 MTL	10.00	4,500	8,000	24	1.24	35.4	4.0	266	30	443	50	886	100
P322 with Motor Mounting Plate													
P322S_0150 MT	15.00	4,500	8,000	14	0.14	39.7	4.5	266	30	443	50	1,082	122
P322S_0150 MTL	15.00	4,500	8,000	19	0.46	39.7	4.5	266	30	443	50	1,082	122
P322S_0160 MT	16.00	4,500	8,000	14	0.14	39.7	4.5	399	45	576	65	1,152	130
P322S_0160 MTL	16.00	4,500	8,000	19	0.61	40.0	4.5	399	45	576	65	1,152	130
P322S_0200 MT	20.00	4,500	8,000	14	0.14	40.6	4.6	399	45	576	65	1,152	130
P322S_0200 MTL	20.00	4,500	8,000	19	0.61	40.8	4.6	399	45	576	65	1,152	130
P322S_0250 MT	25.00	4,500	8,000	14	0.12	40.7	4.6	399	45	576	65	1,152	130
P322S_0250 MTL	25.00	4,500	8,000	19	0.59	40.8	4.6	399	45	576	65	1,152	130
P322S_0280 MT	28.00	4,500	8,000	14	0.11	39.5	4.5	399	45	576	65	1,152	130
P322S_0280 MTL	28.00	4,500	8,000	19	0.57	39.6	4.5	399	45	576	65	1,152	130
P322S_0320 MT	32.00	4,500	8,000	14	0.14	35.9	4.1	354	40	443	50	886	100
P322S_0320 MTL	32.00	4,500	8,000	19	0.61	36.0	4.1	354	40	443	50	886	100
P322S_0350 MT	35.00	4,500	8,000	14	0.11	40.5	4.6	399	45	576	65	1,152	130
P322S_0350 MTL	35.00	4,500	8,000	19	0.57	40.6	4.6	399	45	576	65	1,152	130
P322S_0400 MT	40.00	4,500	8,000	14	0.10	38.8	4.4	399	45	576	65	1,152	130
P322S_0400 MTL	40.00	4,500	8,000	19	0.56	38.9	4.4	399	45	576	65	1,152	130
P322S_0500 MT	50.00	4,500	8,000	14	0.10	40.0	4.5	399	45	576	65	1,152	130
P322S_0500 MTL	50.00	4,500	8,000	19	0.56	40.1	4.5	399	45	576	65	1,152	130
P322S_0700 MT	70.00	4,500	8,000	14	0.10	36.9	4.2	399	45	531	60	1,152	130
P322S_0700 MTL	70.00	4,500	8,000	19	0.56	36.9	4.2	399	45	531	60	1,152	130
P322S_1000 MT	100.0	4,500	8,000	14	0.10	34.6	3.9	266	30	443	50	886	100
P322S_1000 MTL	100.0	4,500	8,000	19	0.56	34.6	3.9	266	30	443	50	886	100

Index of Symbols

MT ..... Motor adapter with TriAdapt® coupling	i ..... Ratio - Exact	T_{2N} ..... Nominal Torque
MF ..... Motor adapter with FlexiAdapt® coupling	n_1 ..... Maximum input speed RPM	T_{2B} ..... Acceleration Torque Maximum
L ..... Large Input	J_1 ..... Mass moment of inertia (input)	T_{2PEAK} ..... Peak Torque
C ..... ServoCool	C_2 ..... Torsional Stiffness	

See web site for drawings.



"P" Series
ServoFit® Precision Planetary Gearhead
Selection Data

Part Number (Gearhead + Input)	Exact Ratio	Maximum Input Speed		Maximum Motor Shaft	Mass Moment of Inertia	Torsional Stiffness per arcmin		Output Torque					
								Nominal [1]		Acceleration		Peak [2]	
Gearhead		Continuous	Cyclic					T_{2N}		T_{2B}		T_{2PEAK}	
	i	RPM (n_1)		mm	kgcm²	C_2 in.lbs.	Nm	in.lbs.	Nm	in.lbs.	Nm	in.lbs.	Nm
P421 with Motor Mounting Plate													
P421S_0030 MT	3.000	3,000	5,500	24	1.94	110.7	12.5	443	50	886	100	2,126	240
P421S_0030 MTC	3.000	3,500	6,000	24	2.66	98.3	11.1	443	50	886	100	1,289	146
P421S_0030 MTL	3.000	3,000	5,500	32	4.16	110.7	12.5	443	50	886	100	2,126	240
P421S_0040 MT	4.000	3,300	6,000	24	1.54	106.3	12.0	753	85	1,063	120	2,126	240
P421S_0040 MTC	4.000	3,800	6,000	24	2.27	99.5	11.2	753	85	1,063	120	1,718	194
P421S_0040 MTL	4.000	3,300	6,000	32	3.77	106.3	12.0	753	85	1,063	120	2,126	240
P421S_0050 MT	5.000	3,700	6,500	24	1.44	103.6	11.7	753	85	1,063	120	2,126	240
P421S_0050 MTC	5.000	4,200	6,500	24	2.16	99.4	11.2	753	85	1,063	120	2,126	240
P421S_0050 MTL	5.000	3,700	6,500	32	3.66	103.6	11.7	753	85	1,063	120	2,126	240
P421S_0070 MT	7.000	4,000	7,000	24	1.31	89.5	10.1	753	85	974	110	2,126	240
P421S_0070 MTC	7.000	4,500	7,000	24	2.05	87.8	9.9	753	85	974	110	2,126	240
P421S_0070 MTL	7.000	4,000	7,000	32	3.57	89.5	10.1	753	85	974	110	2,126	240
P421S_0080 MT	8.000	4,000	7,000	24	1.29	84.2	9.5	709	80	886	100	1,772	200
P421S_0080 MTC	8.000	4,500	7,000	24	2.03	83.0	9.4	709	80	886	100	1,772	200
P421S_0080 MTL	8.000	4,000	7,000	32	3.55	84.2	9.5	709	80	886	100	1,772	200
P421S_0100 MT	10.00	4,000	7,000	24	1.27	79.7	9.0	531	60	886	100	1,772	200
P421S_0100 MTC	10.00	4,500	7,000	24	2.01	79.1	8.9	531	60	886	100	1,772	200
P421S_0100 MTL	10.00	4,000	7,000	32	3.53	79.7	9.0	531	60	886	100	1,772	200
P422 with Motor Mounting Plate													
P422S_0150 MT	15.00	3,700	6,500	19	.52	92.2	10.4	443	50	885	100	2,124	240
P422S_0150 MTL	15.00	3,700	6,500	24	1.07	92.2	10.4	443	50	885	100	2,124	240
P422S_0160 MT	16.00	3,700	6,500	19	0.71	93.1	10.5	753	85	1,063	120	2,126	240
P422S_0160 MTL	16.00	3,700	6,500	24	1.39	93.1	10.5	753	85	1,063	120	2,126	240
P422S_0200 MT	20.00	3,700	6,500	19	0.70	95.2	10.8	753	85	1,063	120	2,126	240
P422S_0200 MTL	20.00	3,700	6,500	24	1.38	95.2	10.8	753	85	1,063	120	2,126	240
P422S_0250 MT	25.00	4,000	7,000	19	0.65	94.9	10.7	753	85	1,063	120	2,126	240
P422S_0250 MTL	25.00	4,000	7,000	24	1.33	94.9	10.7	753	85	1,063	120	2,126	240
P422S_0280 MT	28.00	4,500	8,000	19	0.60	90.8	10.3	753	85	1,063	120	2,126	240
P422S_0280 MTL	28.00	4,500	8,000	24	1.27	90.8	10.3	753	85	1,063	120	2,126	240
P422S_0320 MT	32.00	3,700	6,500	19	0.69	81.9	9.2	709	80	886	100	1,772	200
P422S_0320 MTL	32.00	3,700	6,500	24	1.37	81.9	9.2	709	80	886	100	1,772	200
P422S_0350 MT	35.00	4,500	8,000	19	0.60	93.7	10.6	753	85	1,063	120	2,126	240
P422S_0350 MTL	35.00	4,500	8,000	24	1.27	93.7	10.6	753	85	1,063	120	2,126	240
P422S_0400 MT	40.00	4,500	8,000	19	0.58	89.5	10.1	753	85	1,063	120	2,126	240
P422S_0400 MTL	40.00	4,500	8,000	24	1.25	89.5	10.1	753	85	1,063	120	2,126	240
P422S_0500 MT	50.00	4,500	8,000	19	0.58	92.8	10.5	753	85	1,063	120	2,126	240
P422S_0500 MTL	50.00	4,500	8,000	24	1.25	92.8	10.5	753	85	1,063	120	2,126	240
P422S_0700 MT	70.00	4,500	8,000	19	0.58	85.1	9.6	753	85	974	110	2,126	240
P422S_0700 MTL	70.00	4,500	8,000	24	1.25	85.1	9.6	753	85	974	110	2,126	240
P422S_1000 MT	100.0	4,500	8,000	19	0.58	78.0	8.8	531	60	886	100	1,772	200
P422S_1000 MTL	100.0	4,500	8,000	24	1.25	78.0	8.8	531	60	886	100	1,772	200

[1] Based on input speed: n1 = 2000 RPM
For torque at higher input speeds (T_{2NX}) solve the formula, where n1 = Actual Input Speed. $T_{2NX} = \frac{T_{2N}}{\sqrt[3]{\frac{n_1}{2000}}}$

[2] Maximum momentary torque for emergency stops or heavy shock load. Admissible stops per life of gearhead = 1,000 stops maximum.

See web site for drawings.

"P" Series
ServoFit® Precision Planetary Gearhead
Selection Data



Part Number (Gearhead + Input)	Exact Ratio	Maximum Input Speed		Maximum Motor Shaft	Mass Moment of Inertia	Torsional Stiffness per arcmin		Output Torque					
								Nominal [1]		Acceleration		Peak [2]	
Gearhead		Continuous	Cyclic					T_{2N}		T_{2B}		T_{2PEAK}	
	i	RPM (n_1)		mm	kgcm²	in.lbs.	Nm	in.lbs.	Nm	in.lbs.	Nm	in.lbs.	Nm
P521 with Motor Mounting Plate													
P521S_0030 MT	3.000	2,500	4,500	32	4.76	321.5	36.3	1,063	120	1,772	200	3,686	416
P521S_0030 MTC	3.000	3,500	6,000	32	6.98	262.7	29.7	1,063	120	1,772	200	2,294	259
P521S_0030 MTL	3.000	2,500	4,500	38	7.79	321.5	36.3	1,063	120	1,772	200	3,686	416
P521S_0040 MT	4.000	3,000	5,000	32	4.55	284.3	32.1	1,860	210	2,657	300	4,915	555
P521S_0040 MTC	4.000	4,000	6,000	32	6.77	255.8	28.9	1,860	210	2,447	276	3,059	345
P521S_0040 MTL	4.000	3,000	5,000	38	7.57	284.3	32.1	1,860	210	2,657	300	4,915	555
P521S_0050 MT	5.000	3,500	6,000	32	4.14	275.5	31.1	1,860	210	2,657	300	5,315	600
P521S_0050 MTC	5.000	4,500	6,000	32	6.36	257.7	29.1	1,860	210	2,657	300	3,824	432
P521S_0050 MTL	5.000	3,500	6,000	38	7.16	275.5	31.1	1,860	210	2,657	300	5,315	600
P521S_0070 MT	7.000	3,700	6,500	32	3.74	248.0	28.0	1,860	210	2,392	270	5,315	600
P521S_0070 MTC	7.000	4,500	6,500	32	5.98	240.4	27.1	1,860	210	2,392	270	5,315	600
P521S_0070 MTL	7.000	3,700	6,500	38	6.79	248.0	28.0	1,860	210	2,392	270	5,315	600
P521S_0080 MT	8.000	3,700	6,500	32	3.67	230.3	26.0	1,772	200	2,215	250	4,429	500
P521S_0080 MTC	8.000	5,000	6,500	32	5.91	225.2	25.4	1,772	200	2,215	250	4,429	500
P521S_0080 MTL	8.000	3,700	6,500	38	6.72	230.3	26.0	1,772	200	2,215	250	4,429	500
P521S_0100 MT	10.00	3,700	6,500	32	3.61	221.5	25.0	1,240	140	2,215	250	4,429	500
P521S_0100 MTC	10.00	5,500	6,500	32	5.85	218.4	24.7	1,240	140	2,215	250	4,429	500
P521S_0100 MTL	10.00	3,700	6,500	38	6.66	221.5	25.0	1,240	140	2,215	250	4,429	500
P522 with Motor Mounting Plate Continued Next Page													
P522S_ 0150MT	15.00	3,300	6,000	24	1.22	241.5	27.3	1,062	120	1,770	200	3,683	416
P522S_ 0150MTC	15.00	3,800	6,000	24	2.29	241.5	27.3	1,062	120	1,770	200	3,683	416
P522S_ 0150MTL	15.00	3,300	6,000	32	3.13	241.5	27.3	1,062	120	1,770	200	3,683	416
P522S_0160 MT	16.00	3,300	6,000	24	1.59	243.6	27.5	1,860	210	2,657	300	4,915	555
P522S_0160 MTC	16.00	3,800	6,000	24	2.32	241.3	27.2	1,860	210	2,657	300	4,915	555
P522S_0160 MTL	16.00	3,300	6,000	32	3.82	243.6	27.5	1,860	210	2,657	300	4,915	555
P522S_0200 MT	20.00	3,300	6,000	24	1.57	249.6	28.2	1,860	210	2,657	300	5,315	600
P522S_0200 MTC	20.00	3,800	6,000	24	2.29	248.0	28.0	1,860	210	2,657	300	5,315	600
P522S_0200 MTL	20.00	3,300	6,000	32	3.79	249.6	28.2	1,860	210	2,657	300	5,315	600
P522S_0250 MT	25.00	3,700	6,500	24	1.46	249.0	28.1	1,860	210	2,657	300	5,315	600
P522S_0250 MTC	25.00	4,200	6,500	24	2.18	248.0	28.0	1,860	210	2,657	300	5,315	600
P522S_0250 MTL	25.00	3,700	6,500	32	3.68	249.0	28.1	1,860	210	2,657	300	5,315	600
P522S_0280 MT	28.00	4,000	7,000	24	1.34	237.2	26.8	1,860	210	2,657	300	4,915	555
P522S_0280 MTC	28.00	4,500	7,000	24	2.08	236.5	26.7	1,860	210	2,657	300	4,915	555
P522S_0280 MTL	28.00	4,000	7,000	32	3.60	237.2	26.8	1,860	210	2,657	300	4,915	555
P522S_0320 MT	32.00	3,300	6,000	24	1.54	222.8	25.1	1,772	200	2,215	250	4,429	500
P522S_0320 MTC	32.00	3,800	6,000	24	2.27	222.3	25.1	1,772	200	2,215	250	4,429	500
P522S_0320 MTL	32.00	3,300	6,000	32	3.76	222.8	25.1	1,772	200	2,215	250	4,429	500
P522S_0350 MT	35.00	4,000	7,000	24	1.33	245.3	27.7	1,860	210	2,657	300	5,315	600
P522S_0350 MTC	35.00	4,500	7,000	24	2.07	244.8	27.6	1,860	210	2,657	300	5,315	600
P522S_0350 MTL	35.00	4,000	7,000	32	3.59	245.3	27.7	1,860	210	2,657	300	5,315	600
P522S_0400 MT	40.00	4,000	7,000	24	1.28	232.5	26.2	1,860	210	2,657	300	4,915	555
P522S_0400 MTC	40.00	4,500	7,000	24	2.03	232.2	26.2	1,860	210	2,657	300	4,915	555
P522S_0400 MTL	40.00	4,000	7,000	32	3.55	232.5	26.2	1,860	210	2,657	300	4,915	555
P522S_0500 MT	50.00	4,000	7,000	24	1.28	242.0	27.3	1,860	210	2,657	300	5,315	600
P522S_0500 MTC	50.00	4,500	7,000	24	2.02	241.8	27.3	1,860	210	2,657	300	5,315	600
P522S_0500 MTL	50.00	4,000	7,000	32	3.54	242.0	27.3	1,860	210	2,657	300	5,315	600

Index of Symbols

MT ..... Motor adapter with TriAdapt® coupling	i ..... Ratio - Exact	T_{2N} ..... Nominal Torque
MF ..... Motor adapter with FlexiAdapt® coupling	n_1 ..... Maximum input speed RPM	T_{2B} ..... Acceleration Torque Maximum
L ..... Large Input	J_1 ..... Mass moment of inertia (input)	T_{2PEAK} ..... Peak Torque
C ..... ServoCool	C_2 ..... Torsional Stiffness	

See web site for drawings.



"P" Series
ServoFit® Precision Planetary Gearhead
Selection Data

Part Number (Gearhead + Input)	Exact Ratio	Maximum Input Speed		Maximum Motor Shaft	Mass Moment of Inertia	Torsional Stiffness per arcmin		Output Torque					
								Nominal [1]		Acceleration		Peak [2]	
Gearhead	i	Continuous RPM (n_1)	Cyclic	$øD^6$ mm	J_1 kgcm²	C_2 in.lbs.	Nm	T_{2N} in.lbs.	Nm	T_{2B} in.lbs.	Nm	T_{2PEAK} in.lbs.	Nm
P522 with Motor Mounting Plate Continued													
P522S_0700 MT	70.00	4,000	7,000	24	1.27	233.2	26.3	1,860	210	2,392	270	5,315	600
P522S_0700 MTC	70.00	4,500	7,000	24	2.02	233.1	26.3	1,860	210	2,392	270	5,315	600
P522S_0700 MTL	70.00	4,000	7,000	32	3.54	233.2	26.3	1,860	210	2,392	270	5,315	600
P522S_1000 MT	100.0	4,000	7,000	24	1.27	215.5	24.3	1,240	140	2,215	250	4,429	500
P522S_1000 MTC	100.0	4,500	7,000	24	2.02	215.4	24.3	1,240	140	2,215	250	4,429	500
P522S_1000 MTL	100.0	4,000	7,000	32	3.54	215.5	24.3	1,240	140	2,215	250	4,429	500
P721 with Motor Mounting Plate													
P721S_0030 MT	3.000	2,200	3,700	38	14.81	571.3	64.5	2,480	280	4,429	500	9,177	1,036
P721S_0030 MTC	3.000	3,000	6,000	38	26.04	484.5	54.7	2,480	280	4,429	500	9,177	1,036
P721S_0030 MTL	3.000	2,200	3,700	48	32.66	571.3	64.5	2,480	280	4,429	500	9,177	1,036
P721S_0040 MT	4.000	2,500	4,500	38	10.09	531.5	60.0	3,898	440	6,201	700	12,235	1,381
P721S_0040 MTC	4.000	3,300	6,000	38	21.33	485.9	54.9	3,898	440	6,201	700	12,235	1,381
P721S_0040 MTL	4.000	2,500	4,500	48	27.94	531.5	60.0	3,898	440	6,201	700	12,235	1,381
P721S_0050 MT	5.000	3,000	5,500	38	8.55	509.3	57.5	3,898	440	6,201	700	12,401	1,400
P721S_0050 MTC	5.000	3,800	6,000	38	19.79	481.6	54.4	3,898	440	6,201	700	12,401	1,400
P721S_0050 MTL	5.000	3,000	5,500	48	26.40	509.3	57.5	3,898	440	6,201	700	12,401	1,400
P721S_0070 MT	7.000	3,300	6,000	38	7.55	487.2	55.0	3,898	440	5,758	650	11,127	1,256
P721S_0070 MTC	7.000	4,500	6,000	38	18.46	470.7	53.1	3,898	440	5,758	650	11,127	1,256
P721S_0070 MTL	7.000	3,300	6,000	48	25.86	487.2	55.0	3,898	440	5,758	650	11,127	1,256
P721S_0080 MT	8.000	3,300	6,000	38	7.29	469.5	53.0	3,543	400	4,429	500	8,858	1,000
P721S_0080 MTC	8.000	5,000	6,000	38	18.20	457.6	51.7	3,543	400	4,429	500	8,858	1,000
P721S_0080 MTL	8.000	3,300	6,000	48	25.60	469.5	53.0	3,543	400	4,429	500	8,858	1,000
P721S_0100 MT	10.00	3,300	6,000	38	7.05	438.5	49.5	2,657	300	4,429	500	8,858	1,000
P721S_0100 MTC	10.00	5,000	6,000	38	17.95	431.8	48.7	2,657	300	4,429	500	8,858	1,000
P721S_0100 MTL	10.00	3,300	6,000	48	25.35	438.5	49.5	2,657	300	4,429	500	8,858	1,000
P722 with Motor Mounting Plate Continued Next Page													
P722S_0150 MT	15.00	3,000	5,000	32	3.04	470.4	53.1	2,478	280	4,429	500	9,168	1,036
P722S_0150 MTC	15.00	4,000	6,000	32	5.56	470.4	53.1	2,478	280	4,429	500	9,168	1,036
P722S_0150 MTL	15.00	3,000	5,000	38	6.76	470.4	53.1	2,478	280	4,429	500	9,168	1,036
P722S_0160 MT	16.00	3,000	5,000	32	4.63	475.9	53.7	3,898	440	6,201	700	12,235	1,381
P722S_0160 MTC	16.00	4,000	6,000	32	6.85	470.4	53.1	3,898	440	6,201	700	11,868	1,340
P722S_0160 MTL	16.00	3,000	5,000	38	7.66	475.9	53.7	3,898	440	6,201	700	12,235	1,381
P722S_0200 MT	20.00	3,000	5,000	32	4.54	475.3	53.7	3,898	440	6,201	700	12,401	1,400
P722S_0200 MTC	20.00	4,000	6,000	32	6.76	471.8	53.3	3,898	440	6,201	700	12,401	1,400
P722S_0200 MTL	20.00	3,000	5,000	38	7.57	475.3	53.7	3,898	440	6,201	700	12,401	1,400
P722S_0250 MT	25.00	3,500	6,000	32	4.14	474.3	53.5	3,898	440	6,201	700	12,401	1,400
P722S_0250 MTC	25.00	4,500	6,000	32	6.36	472.0	53.3	3,898	440	6,201	700	12,401	1,400
P722S_0250 MTL	25.00	3,500	6,000	38	7.17	474.3	53.5	3,898	440	6,201	700	12,401	1,400
P722S_0280 MT	28.00	3,700	6,500	32	3.83	468.7	52.9	3,898	440	6,201	700	12,235	1,381
P722S_0280 MTC	28.00	4,500	6,500	32	6.07	466.9	52.7	3,898	440	6,201	700	12,235	1,381
P722S_0280 MTL	28.00	3,700	6,500	38	6.88	468.7	52.9	3,898	440	6,201	700	12,235	1,381
P722S_0320 MT	32.00	3,000	5,000	32	4.46	457.7	51.7	3,543	400	4,429	500	8,858	1,000
P722S_0320 MTC	32.00	4,000	5,000	32	6.68	456.4	51.5	3,543	400	4,429	500	8,858	1,000
P722S_0320 MTL	32.00	3,000	5,000	38	7.49	457.7	51.7	3,543	400	4,429	500	8,858	1,000

[1] Based on input speed: n1 = 2000 RPM
For torque at higher input speeds (T_{2NX}) solve the formula, where n1 = Actual Input Speed. $T_{2NX} = \frac{T_{2N}}{\sqrt[3]{\frac{n_1}{2000}}}$

[2] Maximum momentary torque for emergency stops or heavy shock load. Admissible stops per life of gearhead = 1,000 stops maximum.

"P" Series
ServoFit® Precision Planetary Gearhead
Selection Data



Part Number (Gearhead + Input)	Exact Ratio	Maximum Input Speed		Maximum Motor Shaft	Mass Moment of Inertia	Torsional Stiffness		Output Torque					
								Nominal [1]		Acceleration		Peak [2]	
Gearhead		Continuous	Cyclic			per arcmin		T_{2N}		T_{2B}		T_{2PEAK}	
	i	RPM (n_1)		mm	kgcm²	in.lbs.	Nm	in.lbs.	Nm	in.lbs.	Nm	in.lbs.	Nm
P722 with Motor Mounting Plate Continued													
P722S_0350 MT	35.00	3,700	6,500	32	3.80	470.7	53.1	3,898	440	6,201	700	12,401	1,400
P722S_0350 MTC	35.00	4,500	6,500	32	6.04	469.5	53.0	3,898	440	6,201	700	12,401	1,400
P722S_0350 MTL	35.00	3,700	6,500	38	6.85	470.7	53.1	3,898	440	6,201	700	12,401	1,400
P722S_0400 MT	40.00	3,700	6,500	32	3.65	462.2	52.2	3,898	440	6,201	700	12,235	1,381
P722S_0400 MTC	40.00	5,000	6,500	32	5.90	461.3	52.1	3,898	440	6,201	700	12,235	1,381
P722S_0400 MTL	40.00	3,700	6,500	38	6.70	462.2	52.2	3,898	440	6,201	700	12,235	1,381
P722S_0500 MT	50.00	3,700	6,500	32	3.64	466.4	52.7	3,898	440	6,201	700	12,401	1,400
P722S_0500 MTC	50.00	5,000	6,500	32	5.88	465.9	52.6	3,898	440	6,201	700	12,401	1,400
P722S_0500 MTL	50.00	3,700	6,500	38	6.69	466.4	52.7	3,898	440	6,201	700	12,401	1,400
P722S_0700 MT	70.00	3,700	6,500	32	3.63	466.3	52.6	3,898	440	5,758	650	11,127	1,256
P722S_0700 MTC	70.00	5,000	6,500	32	5.87	466.0	52.6	3,898	440	5,758	650	11,127	1,256
P722S_0700 MTL	70.00	3,700	6,500	38	6.68	466.3	52.6	3,898	440	5,758	650	11,127	1,256
P722S_1000 MT	100.0	3,700	6,500	32	3.62	430.0	48.5	2,657	300	4,429	500	8,858	1,000
P722S_1000 MTC	100.0	5,000	6,500	32	5.86	429.8	48.5	2,657	300	4,429	500	8,858	1,000
P722S_1000 MTL	100.0	3,700	6,500	38	6.67	430.0	48.5	2,657	300	4,429	500	8,858	1,000
P821 with Motor Mounting Plate													
P821S_0030 MT	3.000	1,800	3,000	48	65.03	1,948.8	220.0	7,086	800	10,630	1,200	17,064	1,926
P821S_0030 MTC	3.000	2,500	4,500	48	86.28	1,464.9	165.4	7,086	800	10,630	1,200	15,518	1,752
P821S_0030 MTL	3.000	1,800	3,000	60	92.59	1,787.0	201.7	7,086	800	10,630	1,200	17,064	1,926
P821S_0040 MT	4.000	2,200	3,500	48	41.18	1,815.9	205.0	7,086	800	14,173	1,600	22,752	2,569
P821S_0040 MTC	4.000	3,000	5,000	48	62.44	1,547.9	174.7	7,086	800	14,173	1,600	20,690	2,336
P821S_0040 MTL	4.000	2,200	3,500	60	68.75	1,733.6	195.7	7,086	800	14,173	1,600	22,752	2,569
P821S_0050 MT	5.000	2,500	4,000	48	34.36	1,718.5	194.0	8,858	1,000	14,173	1,600	28,346	3,200
P821S_0050 MTC	5.000	3,500	6,000	48	55.62	1,555.4	175.6	8,858	1,000	14,173	1,600	25,863	2,920
P821S_0050 MTL	5.000	2,500	4,000	60	57.31	1,670.4	188.6	8,858	1,000	14,173	1,600	28,346	3,200
P821S_0070 MT	7.000	2,800	4,500	48	29.23	1,563.4	176.5	8,858	1,000	12,401	1,400	24,900	2,811
P821S_0070 MTC	7.000	4,000	6,000	48	50.96	1,478.9	167.0	8,858	1,000	12,401	1,400	24,900	2,811
P821S_0070 MTL	7.000	2,800	4,500	60	57.24	1,542.9	174.2	8,858	1,000	12,401	1,400	24,900	2,811
P821S_0080 MT	8.000	2,800	4,500	48	27.99	1,472.2	166.2	7,086	800	10,630	1,200	21,259	2,400
P821S_0080 MTC	8.000	4,500	6,000	48	49.72	1,413.9	159.6	7,086	800	10,630	1,200	21,259	2,400
P821S_0080 MTL	8.000	2,800	4,500	60	56.00	1,458.2	164.6	7,086	800	10,630	1,200	21,259	2,400
P821S_0100 MT	10.00	2,800	4,500	48	26.82	1,355.3	153.0	6,201	700	10,630	1,200	21,259	2,400
P821S_0100 MTC	10.00	4,500	6,000	48	48.55	1,323.1	149.4	6,201	700	10,630	1,200	21,259	2,400
P821S_0100 MTL	10.00	2,800	4,500	60	54.84	1,347.6	152.1	6,201	700	10,630	1,200	21,259	2,400
P822 with Motor Mounting Plate Continued Next Page													
P822S_0150 MT	15.00	2,500	4,500	38	8.65	1,470.7	166.2	7,086	800	10,620	1,200	17,049	1,926
P822S_0150 MTC	15.00	3,300	6,000	38	11.85	1,470.7	166.2	7,086	800	10,620	1,200	17,049	1,926
P822S_0150 MTL	15.00	2,500	4,500	48	26.63	1,470.7	166.2	7,086	800	10,620	1,200	17,049	1,926
P822S_0160 MT	16.00	2,500	4,500	38	10.65	1,496.4	168.9	7,086	800	14,173	1,600	28,346	3,200
P822S_0160 MTC	16.00	3,300	6,000	38	21.89	1,472.1	166.2	7,086	800	14,173	1,600	28,346	3,200
P822S_0160 MTL	16.00	2,500	4,500	48	28.50	1,496.4	168.9	7,086	800	14,173	1,600	28,346	3,200
P822S_0200 MT	20.00	2,500	4,500	38	10.22	1,521.7	171.8	8,858	1,000	14,173	1,600	28,346	3,200
P822S_0200 MTC	20.00	3,300	6,000	38	21.46	1,505.5	170.0	8,858	1,000	14,173	1,600	28,346	3,200
P822S_0200 MTL	20.00	2,500	4,500	48	28.07	1,521.7	171.8	8,858	1,000	14,173	1,600	28,346	3,200

Index of Symbols

MT ..... Motor adapter with TriAdapt® coupling	i ..... Ratio - Exact	T_{2N} ..... Nominal Torque
MF ..... Motor adapter with FlexiAdapt® coupling	n_1 ..... Maximum input speed RPM	T_{2B} ..... Acceleration Torque Maximum
L ..... Large Input	J_1 ..... Mass moment of inertia (input)	T_{2PEAK} ..... Peak Torque
C ..... ServoCool	C_2 ..... Torsional Stiffness	

See web site for drawings.



"P" Series
ServoFit® Precision Planetary Gearhead
Selection Data

Part Number (Gearhead + Input)	Exact Ratio	Maximum Input Speed		Maximum Motor Shaft	Mass Moment of Inertia	Torsional Stiffness per arcmin		Output Torque					
								Nominal [1]		Acceleration		Peak [2]	
Gearhead	i	Continuous RPM (n_1)	Cyclic	øD^6 mm	J_1 kgcm²	C_2 in.lbs.	Nm	T_{2N} in.lbs.	Nm	T_{2B} in.lbs.	Nm	T_{2PEAK} in.lbs.	Nm
P822 with Motor Mounting Plate Continued													
P822S_0250 MT	25.00	3,000	5,500	38	8.83	1,514.1	170.9	8,858	1,000	14,173	1,600	28,346	3,200
P822S_0250 MTC	25.00	3,800	6,000	38	20.07	1,503.8	169.8	8,858	1,000	14,173	1,600	28,346	3,200
P822S_0250 MTL	25.00	3,000	5,500	48	26.68	1,514.1	170.9	8,858	1,000	14,173	1,600	28,346	3,200
P822S_0280 MT	28.00	3,300	6,000	38	7.81	1,472.8	166.3	7,086	800	14,173	1,600	28,346	3,200
P822S_0280 MTC	28.00	4,300	6,000	38	18.71	1,463.1	165.2	7,086	800	14,173	1,600	28,346	3,200
P822S_0280 MTL	28.00	3,300	6,000	48	26.11	1,472.8	166.3	7,086	800	14,173	1,600	28,346	3,200
P822S_0320 MT	32.00	2,500	4,500	38	9.85	1,411.1	159.3	7,086	800	10,630	1,200	21,259	2,400
P822S_0320 MTC	32.00	3,300	6,000	38	21.09	1,405.7	158.7	7,086	800	10,630	1,200	21,259	2,400
P822S_0320 MTL	32.00	2,500	4,500	48	27.70	1,411.1	159.3	7,086	800	10,630	1,200	21,259	2,400
P822S_0350 MT	35.00	3,300	6,000	38	7.67	1,506.0	170.0	8,858	1,000	14,173	1,600	28,346	3,200
P822S_0350 MTC	35.00	4,300	6,000	38	18.58	1,499.5	169.3	8,858	1,000	14,173	1,600	28,346	3,200
P822S_0350 MTL	35.00	3,300	6,000	48	25.97	1,506.0	170.0	8,858	1,000	14,173	1,600	28,346	3,200
P822S_0400 MT	40.00	3,300	6,000	38	7.17	1,442.5	162.8	7,086	800	14,173	1,600	28,346	3,200
P822S_0400 MTC	40.00	4,500	6,000	38	18.08	1,437.9	162.3	7,086	800	14,173	1,600	28,346	3,200
P822S_0400 MTL	40.00	3,300	6,000	48	25.47	1,442.5	162.8	7,086	800	14,173	1,600	28,346	3,200
P822S_0500 MT	50.00	3,300	6,000	38	7.10	1,485.6	167.7	8,858	1,000	14,173	1,600	28,346	3,200
P822S_0500 MTC	50.00	4,500	6,000	38	18.01	1,482.5	167.4	8,858	1,000	14,173	1,600	28,346	3,200
P822S_0500 MTL	50.00	3,300	6,000	48	25.40	1,485.6	167.7	8,858	1,000	14,173	1,600	28,346	3,200
P822S_0700 MT	70.00	3,300	6,000	38	7.06	1,457.4	164.5	8,858	1,000	12,401	1,400	24,900	2,811
P822S_0700 MTC	70.00	4,500	6,000	38	17.96	1,455.9	164.4	8,858	1,000	12,401	1,400	24,900	2,811
P822S_0700 MTL	70.00	3,300	6,000	48	25.36	1,457.4	164.5	8,858	1,000	12,401	1,400	24,900	2,811
P822S_1000 MT	100.0	3,300	6,000	38	7.03	1,314.6	148.4	6,201	700	10,630	1,200	21,259	2,400
P822S_1000 MTC	100.0	4,500	6,000	38	17.94	1,314.0	148.3	6,201	700	10,630	1,200	21,259	2,400
P822S_1000 MTL	100.0	3,300	6,000	48	25.33	1,314.6	148.4	6,201	700	10,630	1,200	21,259	2,400

[1] Based on input speed: n1 = 2000 RPM
For torque at higher input speeds (T_{2NX}) solve the formula, where n1 = Actual Input Speed. $T_{2NX} = \frac{T_{2N}}{\sqrt[3]{\frac{n_1}{2000}}}$

[2] Maximum momentary torque for emergency stops or heavy shock load. Admissible stops per life of gearhead = 1,000 stops maximum.

"P" Series
ServoFit® Precision Planetary Gearhead
Selection Data



Part Number (Gearhead + Input)	Exact Ratio	Maximum Input Speed		Maximum Motor Shaft	Mass Moment of Inertia	Torsional Stiffness per arcmin		Output Torque					
								Nominal [1]		Acceleration		Peak [2]	
Gearhead		Continuous	Cyclic					T_{2N}		T_{2B}		T_{2PEAK}	
	i	RPM (n_1)		mm	kgcm²	in.lbs.	Nm	in.lbs.	Nm	in.lbs.	Nm	in.lbs.	Nm
P921 with Motor Mounting Plate													
P921S_0040 MT	4.000	2,000	3,000	60	98.17	3,093.9	349.3	17,716	2,000	26,574	3,000	48,117	5,432
P921S_0040 MTC	4.000	3,000	4,500	60	105.81	3,093.9	349.3	17,716	2,000	26,574	3,000	51,554	5,820
P921S_0050 MT	5.000	2,200	3,500	60	80.39	3,027.4	341.8	17,716	2,000	26,574	3,000	53,148	6,000
P921S_0050 MTC	5.000	3,500	5,000	60	88.03	3,027.4	341.8	17,716	2,000	26,574	3,000	53,148	6,000
P921S_0070 MT	7.000	2,500	4,000	60	67.08	2,852.0	322.0	17,716	2,000	23,917	2,700	47,833	5,400
P921S_0070 MTC	7.000	4,000	5,000	60	74.72	2,852.0	322.0	17,716	2,000	23,917	2,700	47,833	5,400
P921S_0100 MT	10.00	2,500	4,000	60	59.46	2,281.1	257.5	12,401	1,400	17,716	2,000	35,432	4,000
P921S_0100 MTC	10.00	4,000	5,000	60	67.09	2,281.1	257.5	12,401	1,400	17,716	2,000	35,432	4,000
P922 with Motor Mounting Plate													
P922S_0160 MT	16.00	2,200	3,500	48	42.16	3,016.6	340.5	17,716	2,000	26,574	3,000	53,148	6,000
P922S_0160 MTC	16.00	3,000	5,000	48	63.41	2,963.3	334.5	17,716	2,000	26,574	3,000	53,148	6,000
P922S_0160 MTL	16.00	2,200	3,500	60	69.72	3,001.8	338.9	17,716	2,000	26,574	3,000	53,148	6,000
P922S_0200 MT	20.00	2,200	3,500	48	41.04	2,979.6	336.4	17,716	2,000	26,574	3,000	53,148	6,000
P922S_0200 MTC	20.00	3,000	5,000	48	62.30	2,946.1	332.6	17,716	2,000	26,574	3,000	53,148	6,000
P922S_0200 MTL	20.00	2,200	3,500	60	68.61	2,970.3	335.3	17,716	2,000	26,574	3,000	53,148	6,000
P922S_0250 MT	25.00	2,500	4,000	48	34.78	2,968.5	335.1	17,716	2,000	26,574	3,000	53,148	6,000
P922S_0250 MTC	25.00	3,500	6,000	48	56.04	2,947.2	332.7	17,716	2,000	26,574	3,000	53,148	6,000
P922S_0250 MTL	25.00	2,500	4,000	60	62.35	2,962.7	334.5	17,716	2,000	26,574	3,000	53,148	6,000
P922S_0280 MT	28.00	2,800	4,500	48	29.81	2,966.8	334.9	17,716	2,000	26,574	3,000	53,148	6,000
P922S_0280 MTC	28.00	3,750	5,000	48	51.54	2,946.8	332.7	17,716	2,000	26,574	3,000	53,148	6,000
P922S_0280 MTL	28.00	2,800	4,500	60	57.82	2,962.1	334.4	17,716	2,000	26,574	3,000	53,148	6,000
P922S_0350 MT	35.00	2,800	4,500	48	29.45	2,948.3	332.8	17,716	2,000	26,574	3,000	53,148	6,000
P922S_0350 MTC	35.00	3,750	6,000	48	51.18	2,935.7	331.4	17,716	2,000	26,574	3,000	53,148	6,000
P922S_0350 MTL	35.00	2,800	4,500	60	57.46	2,945.4	332.5	17,716	2,000	26,574	3,000	53,148	6,000
P922S_0400 MT	40.00	2,800	4,500	48	26.78	2,913.7	328.9	17,716	2,000	26,574	3,000	53,148	6,000
P922S_0400 MTC	40.00	4,000	6,000	48	48.51	2,904.3	327.9	17,716	2,000	26,574	3,000	53,148	6,000
P922S_0400 MTL	40.00	2,800	4,500	60	54.79	2,911.5	328.7	17,716	2,000	26,574	3,000	53,148	6,000
P922S_0500 MT	50.00	2,800	4,500	48	26.60	2,914.6	329.0	17,716	2,000	26,574	3,000	53,148	6,000
P922S_0500 MTC	50.00	4,000	6,000	48	48.33	2,908.5	328.3	17,716	2,000	26,574	3,000	53,148	6,000
P922S_0500 MTL	50.00	2,800	4,500	60	54.61	2,913.1	328.9	17,716	2,000	26,574	3,000	53,148	6,000
P922S_0700 MT	70.00	2,800	4,500	48	26.47	2,799.9	316.1	17,716	2,000	23,917	2,700	47,833	5,400
P922S_0700 MTC	70.00	4,000	6,000	48	48.20	2,797.0	315.8	17,716	2,000	23,917	2,700	47,833	5,400
P922S_0700 MTL	70.00	2,800	4,500	60	54.48	2,799.2	316.0	17,716	2,000	23,917	2,700	47,833	5,400
P922S_1000 MT	100.0	2,800	4,500	48	26.39	2,264.6	255.7	12,401	1,400	17,716	2,000	35,432	4,000
P922S_1000 MTC	100.0	4,000	6,000	48	48.12	2,263.7	255.6	12,401	1,400	17,716	2,000	35,432	4,000
P922S_1000 MTL	100.0	2,800	4,500	60	54.40	2,264.4	255.6	12,401	1,400	17,716	2,000	35,432	4,000

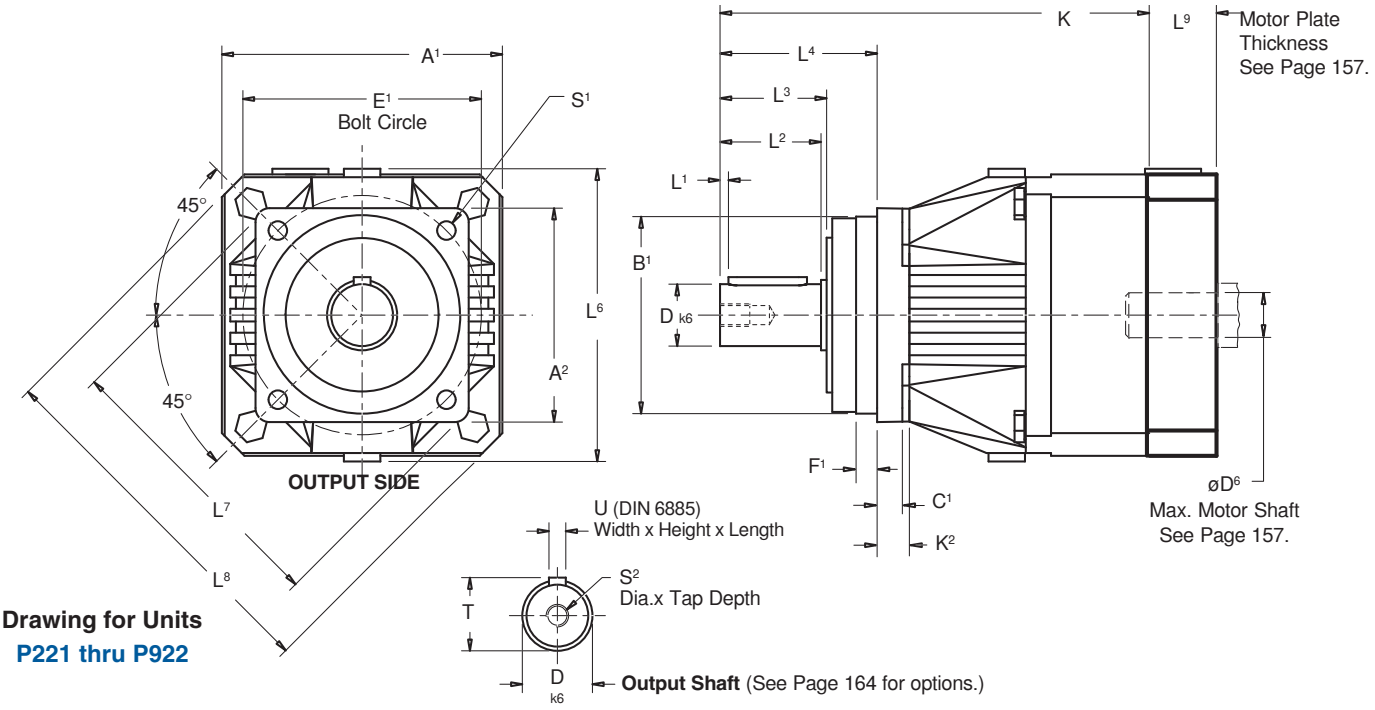
Index of Symbols

MT ..... Motor adapter with TriAdapt® coupling	i ..... Ratio - Exact	T_{2N} ..... Nominal Torque
MF ..... Motor adapter with FlexiAdapt® coupling	n_1 ..... Maximum input speed RPM	T_{2B} ..... Acceleration Torque Maximum
L ..... Large Input	J_1 ..... Mass moment of inertia (input)	T_{2PEAK} ..... Peak Torque
C ..... ServoCool	C_2 ..... Torsional Stiffness	

See web site for drawings.



"P" Series
ServoFit® Precision Planetary Gearhead
Dimensional Data



Drawing for Units
P221 thru P922

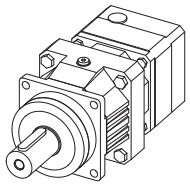
Table No. 1 **"P" Series – Precision Planetary Gearhead Dimensions (mm/inches)**

Unit	A1	A2	B1 h6	C1	D k6	E1	F1	K2	L1	L2	L3	L4	L6	L7	L8	S1	S2	T	U
P221/P222	55	55	50 +.000/-.019	6	12 +.012/+.001	63	7	—	2	22	24	36	62	74	80	5.5	M4x10	13.5	A4x4x18
	2.17	2.17	1.969 +.0000/-.0007	.24		2.48	.28	—	.08	.87	.94	1.42	2.44	2.91	3.15	.22		.53	
P321/P322	72	72	60 +.000/-.019	7	16 +.012/+.001	75	7.5	—	2	28	30	48	79	92	92	5.5	M5x12.5	18	A5x5x22
	2.83	2.83	2.362 +.0000/-.0007	.28		2.95	.30	—	.08	1.10	1.18	1.89	3.11	3.62	3.62	.22		.71	
P421/P422	98	76	70 +.000/-.019	9	22 +.015/+.002	85	7.5	12	3	36	38	56	98	103.3	130	6.6	M8x19	24.5	A6x6x28
	3.86	2.99	2.756 +.0000/-.0007	.35		3.35	.30	.47	.12	1.42	1.50	2.20	3.86	4.07	5.12	.26		.96	
P521/P522	115	101	90 +.000/-.022	10	32 +.018/+.002	120	15	14	3	58	60	88	121	139	149	9	M12x28	35	A10x8x50
	4.53	3.98	3.543 +.0000/-.0009	.39		4.72	.59	.55	.12	2.28	2.36	3.46	4.76	5.47	5.87	.35		1.38	
P721/P722	145	145	130 +.000/-.025	15	40 +.018/+.002	165	3.5	—	4	82	85	112	145	—	190	11	M16x36	43	A12x8x70
	5.71	5.71	5.118 +.000/-.001	.59		6.50	.14	—	.16	3.23	3.35	4.41	5.71	—	7.48	.43		1.69	
P821/P822	190	190	160 +.000/-.025	15	55 +.021/+.002	215	10	—	6	82	85	112	190	—	250	13.5	M20x42	59	A16x10x70
	7.48	7.48	6.299 +.000/-.001	.59		8.46	.39	—	.24	3.23	3.35	4.41	7.48	—	9.84	.53		2.32	
P921/P922	225	212	180 +.000/-.025	17	75 +.021/+.002	250	10	22	7	105	109	143	225	285	300	17.5	M20x42	79.5	A20x12x90
	8.86	8.35	7.086 +.000/-.001	.67		9.84	.39	.87	.28	4.13	4.29	5.63	8.86	11.22	11.81	.69		3.13	

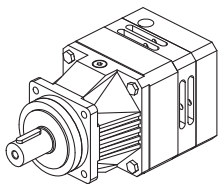
Part No. Explanation

P 4 2 1 S P R 0030 MT C

- **C** – Option for ServoCool
- **MT** – Motor Plate with TriAdapt Coupling
- **0030** – Ratio (**0030** = 3.0:1)
- **R** – Normal Bearing
- **D** – Reinforced Bearings-Axial
- **Z** – Reinforced Bearings-Radial
- **G** – Shaft — no Key
- **P** – Output Shaft with Key
- **V** – Splined Shaft
- **S** – Standard Housing
- **1** – No. of Gear Stages (**1** = 1 Stage, **2** = 2 Stages)
- **2** – Generation Number
- **4** – Unit No.
- **P** – "P" Series ServoFit Precision Planetary Gearhead



Typical 2 Stage Configuration



Typical ServoCool Configuration

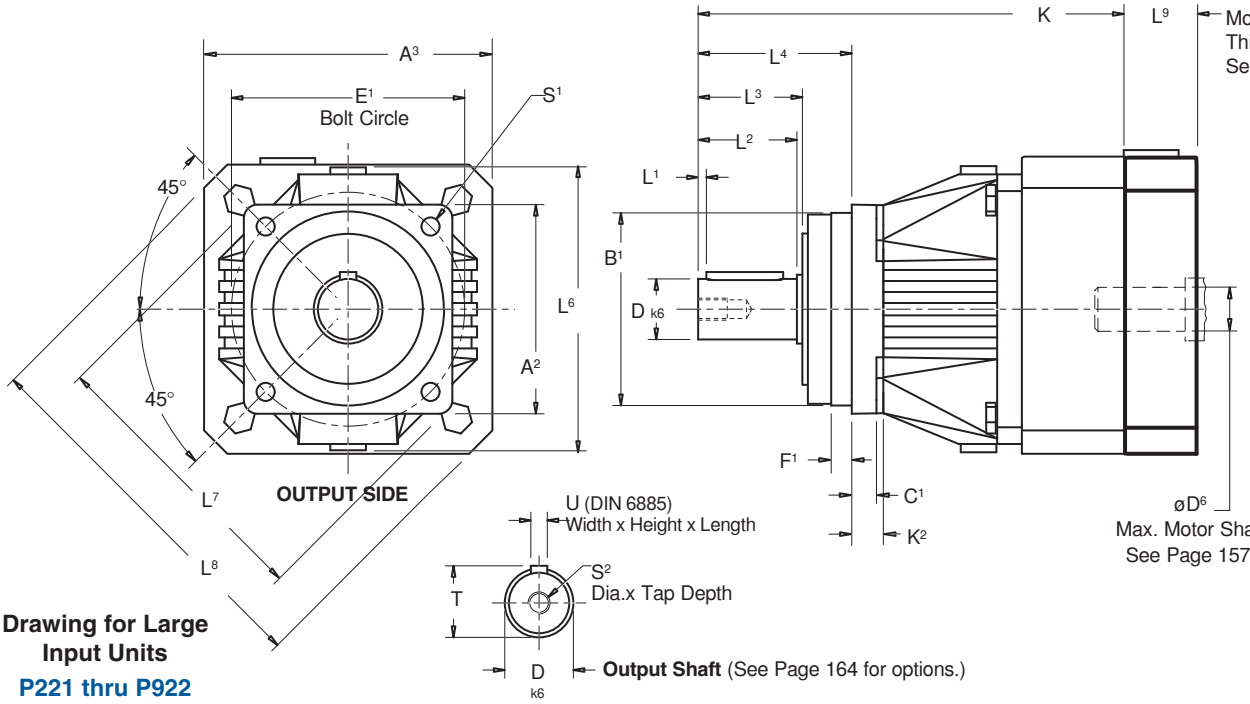
Table No. 2

K Dimension					
Standard			ServoCool		
Unit	mm	inches	Unit	mm	inches
P221	94.5	3.72	—		
P222	126.5	4.98	—		
P321	135	5.31	—		
P322	158.5	6.24	—		
P421	153	6.02	**P421_C**	176.5	6.95
P422	200.5	7.89	—		
P521	193	7.60	**P521_C**	221	8.70
P522	242.5	9.55	**P522_C**	266	10.47
P721	242	9.53	**P721_C**	272	10.71
P722	294	11.57	**P722_C**	322	12.68
P821	283	11.14	**P821_C**	331	13.03
P822	350.5	13.80	**P822_C**	380.5	14.98
P921	353	13.89	**P921_C**	418	16.45
P922	441	17.36	**P922_C**	489	19.25

When ordering a planetary gearhead, specify the motor manufacturer and part number, provide the motor drawing with dimensions, or specify the motor mounting dimensions. (See Page 157.)

"P" Series–Large Input ServoFit® Precision Planetary Gearhead Dimensional Data





Drawing for Large Input Units
P221 thru P922

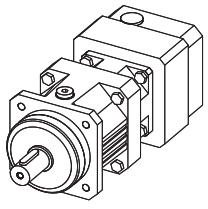
Table No. 1 **"P" Series – Large Input – Precision Planetary Gearhead Dimensions (mm/inches)**

Unit	A^2	B^1 h6	C^1	D k6	E^1	F^1	K^2	L^1	L^2	L^3	L^4	L^6	L^7	S^1	S^2	T	U
P221/P222_L	55 2.17	50 +.000/-.019 1.969 +.0000/-.0007	6 .24	12 +.012/+.001	63 2.48	7 .28	— —	2 .08	22 .87	24 .94	36 1.42	92 3.62	74 2.91	5.5 .22	M4x10	13.5 .53	A4x4x18
P321/P322_L	72 2.83	60 +.000/-.019 2.362 +.0000/-.0007	7 .28	16 +.012/+.001	75 2.95	7.5 .30	— —	2 .08	28 1.10	30 1.18	48 1.89	130 5.12	92 3.62	5.5 .22	M5x12.5	18 .71	A5x5x22
P421/P422_L	76 2.99	70 +.000/-.019 2.756 +.0000/-.0007	9 .35	22 +.015/+.002	85 3.35	7.5 .30	12 .47	3 .12	36 1.42	38 1.50	56 2.20	149 5.87	103.3 4.07	6.6 .26	M8x19	24.5 .96	A6x6x28
P521/P522_L	101 3.98	90 +.000/-.022 3.543 +.0000/-.0009	10 .39	32 +.018/+.002	120 4.72	15 .59	14 .55	3 .12	58 2.28	60 2.36	88 3.46	190 7.48	139 5.47	9 .35	M12x28	35 1.38	A10x8x50
P721/P722_L	145 5.71	130 +.000/-.025 5.118 +.000/-.001	15 .59	40 +.018/+.002	165 6.50	3.5 .14	— —	4 .16	82 3.23	85 3.35	112 4.41	250 5.71	— —	11 .43	M16x36	43 1.69	A12x8x70
P821/P822_L	190 7.48	160 +.000/-.025 6.299 +.000/-.001	15 .59	55 +.021/+.002	215 8.46	10 .39	— —	6 .24	82 3.23	85 3.35	112 4.41	190 7.48	— —	13.5 .53	M20x42	59 2.32	A16x10x70
P922_L	212 8.35	180 +.000/-.025 7.086 +.000/-.001	17 .67	75 +.021/+.002	250 9.84	10 .39	22 .87	7 .28	105 4.13	109 4.29	143 5.63	225 8.86	285 11.22	17.5 .69	M20x42	79.5 3.13	A20x12x90

Part No. Explanation

P 4 2 1 S P R 0030 MT L

- L – Large Input
- MT – Motor Plate with TriAdapt Coupling
- 0030 – Ratio (**0030** = 3.0:1)
- R – Normal Bearing
- D – Reinforced Bearings-Axial
- Z – Reinforced Bearings-Radial
- G – Shaft — no Key
- P – Output Shaft with Key
- V – Splined Shaft
- S – Standard Housing
- 1 – No. of Gear Stages (**1** = 1 Stage, **2** = 2 Stages)
- 2 – Generation Number
- 4 – Unit No.
- P – "P" Series ServoFit Precision Planetary Gearhead



Typical 2 Stage Configuration
Large Input

When ordering a planetary gearhead, specify the motor manufacturer and part number, provide the motor drawing with dimensions, or specify the motor mounting dimensions. (See Page 157.)

Table No. 2

Unit	A^3		K		L^8	
	mm	inches	mm	inches	mm	inches
P221_L	75	2.95	111	4.37	100	3.94
P222_L	75	2.95	143	5.63	100	3.94
P321_L	100	3.94	138.3	5.44	130	5.12
P322_L	75	2.95	175	6.89	100	3.94
P421_L	115	4.53	161.5	6.36	149	5.87
P422_L	100	3.94	203.8	8.02	130	5.12
P521_L	145	5.71	207	8.15	190	7.48
P522_L	115	4.53	251	9.88	149	5.87
P721_L	190	7.48	259	10.20	250	9.84
P722_L	145	5.71	308	12.13	190	7.48
P821_L	225	8.85	291	11.45	300	11.81
P822_L	190	7.48	367.5	14.47	250	9.84
P922_L	225	8.85	449	17.68	300	11.81

See web site for drawings.

"PA" Series–Advanced ServoFit® Precision Planetary Gearhead Performance Specification Overview

			PA321 PA322	PA421 PA422	PA521 PA522	PA721 PA722	PA821 PA822
Acceleration Torque Maximum	T_{2B}	in.lbs. Nm	575 65	1052 120	2,655 300	6,195 700	14,160 1,600
Nominal Output Torque [1]	T_{2N}	in.lbs. Nm	399 45	753 85	1,860 210	3,898 440	8,858 1,000
Input Speed Maximum	n_{1MAX}	Continuous Cyclic	4,500 8,000	4,000 4,500 7,000 8,000	3,700 4,000 6,500 7,000	3,300 3,700 6,000 6,500	2,800 3,300 4,500 6,000
ServoCool Input RPM Maximum	n_{1MAX}	Continuous Cyclic	— —	6,000 — 7,000 —	6,000 5,500 6,500 7,000	5,500 5,500 6,000 6,500	5,500 5,000 6,000 6,000
Torsional Backlash [2]	$\Delta\varphi$	arcmin	≤2 ≤3	≤2 ≤3	≤1 ≤2	≤1 ≤2	≤1 ≤2
Torsional Stiffness	C_2	in.lbs./arcmin Nm/arcmin	44 5	100 11	266 33	486 55	1,557 176
Axial Load Max.	F_{2AMAX}	lbs. N	315 1,400	506 2,250	788 3,500	1,013 4,500	1,688 7,500
Radial Load Max. [3]	F_{2RMAX}	lbs. N	619 2,750	1,012 4,500	1,575 7,000	2,025 9,000	3,375 15,000
Tilting Moment Max. [3]	T_{2KMAX}	in.lbs. Nm	2,044 231	3,885 439	7,496 847	11,629 1,314	23,497 2,655
Efficiency (at Nominal Torque)	h	%	97% 95%	97% 95%	97% 95%	97% 95%	97% 95%
Weight	m	pounds kg	6 8 2.6 3.5	9 12 4.0 5.3	14 19 6.5 8.5	27 33 12 15	57 71 26 32
Noise Level	L_{PA}	dB(A) [4]	≤61 ≤61	≤62 ≤60	≤63 ≤61	≤64 ≤62	≤65 ≤63
Balance Quality			Q 2.5 (Quality Class-2.5 millimeters per second)				
Lubrication			Synthetic Oil — Lubricated for Life				
Degree of Protection			IP65 - FKM Shaft Seals				
Mounting Position			Unrestricted				
Direction of Rotation			Input and Output Rotate the SAME Direction.				
Ambient Temperature			0°C to +40°C (104° F) Other temperatures, contact STOBER Drives.				
Finish			Black (Standard), Washdown, Food and Beverage Options Available				
Lifetime.[5]	L_h	hours	L_h > 10,000 hours if T_{2K}/T_{2A} < 1.25 and > 1.00 L_h > 20,000 hours if T_{2K}/T_{2A} > 1.25 and < 1.50 L_h > 30,000 hours if T_{2K}/T_{2A} > 1.5				
Warranty			5 Year Limited (2 Years on normal wear items: bearings, seals, etc.)				

1) Ratings based on input speed (n_1) of 2000 RPM.
For torque at higher input speeds (T_{2NX}) solve the formula, where n_1 = Actual Input Speed. $T_{2NX} = \frac{T_{2N}}{\sqrt[3]{\frac{n_1}{2000}}}$

2) Tested at 1.5% of nominal torque and recorded on the input side of the gearhead.

3) Rating based on output speed (n_2) of 100 RPM. For values at other speeds see Page 165.

4) Measurement at one (1) meter distance with input speed (n_1) of 2000 RPM.

5) T_{2A} equals actual tilting moment of the application. See Page 165 for calculation details.

Refer to Page 172 for ServoFit Precision Planetary Gearhead Selection Procedure.

"PA" Series–Advanced ServoFit® Precision Planetary Gearhead Features

The "PA" Series Advanced ServoFit Precision Planetary Gearheads feature HeliCamber® gearing, FlexiAdapt® motor adapter system and other features which make them the most accurate, efficient, and lowest backlash planetary gearheads available. HeliCamber® gear technology provides minimum wear, low backlash and low noise. All units are lubricated for life with synthetic oil and sealed to IP65 standards to prevent lubricant contamination.

Some of these features are:

- Lowest Backlash on the Market
- Advanced Gear Technology
- Quiet Running
- 5 Year Limited Warranty (2 years on bearings, seals, etc.)
- Readily Attaches to Any Servo Motor (IEC, NEMA, or customized motor plates*)
- High Torsional Stiffness
- 95 to 97% Efficiency
- Ground and honed gearing

* Maximum 10 working days for custom motor plates.

Motor plate pilot toleranced to fit your motor for precise concentricity

Backlash ≤ 1 arcminute — Precision selection of parts ensure optimal performance without binding gear teeth — resulting in a more accurate and smooth direct drive

Motor plate can easily be changed to fit your choice of motors



Magnetic oil filtration

Adapter bushings to fit all motor shafts — no key required

Double row ball bearings on the output for high radial and axial capacity while maintaining efficiency.

Ring gear machined integral to the housing — not welded or pressed in — provides greater concentricity and eliminates speed fluctuation

High quality gearing provided by case-hardened and ground sun and planet gears and honed ring gear.

Oversized single-piece planet carrier made of high-tensile material assure the highest torsional stiffness while straddle mounted bearings minimize misalignment.

FKM seals for the smallest possible diameter—reducing friction and heat buildup, increasing efficiency, and allowing continuous duty without additional cooling.

Highest running accuracy and precision ensured by single piece housing made from high-tensile tempered ductile iron with the additional characteristics of dissipating heat, noise dampening, and greater lubrication retention on the ring gear



Available as ServoCool in Sizes P4 thru P8.



The FlexiAdapt® motor coupling is designed for accurate and precise motor installation. The integrated thermal expansion feature in the shape of a bellows compensates for linear expansion of the motor shaft.

The FlexiAdapt® motor shaft adapter system allows installation of motor in minutes without special tools.

See web site for drawings.



"PA" Series–Advanced ServoFit® Precision Planetary Gearhead Selection Data

Part Number (Gearhead + Input)	Exact Ratio	Maximum Input Speed		Maximum Motor Shaft	Mass Moment of Inertia	Torsional Stiffness per arcmin		Output Torque					
								Nominal [1]		Acceleration		Peak [2]	
Gearhead		Continuous	Cyclic										
	i	RPM (n_1)		mm	kgcm²	in.lbs.	Nm	in.lbs.	Nm	in.lbs.	Nm	in.lbs.	Nm
PA321 with Motor Mounting Plate													
PA321S_D0030 MF	3.000	3,500	6,000	19	0.69	44.3	5.0	266	30	443	50	1,083	122
PA321S_D0030 MFL	3.000	3,500	6,000	24	1.77	48.3	5.5	266	30	443	50	1,083	122
PA321S_D0040 MF	4.000	3,700	6,500	19	0.61	43.7	4.9	399	45	576	65	1,152	130
PA321S_D0040 MFL	4.000	3,700	6,500	24	1.69	45.9	5.2	399	45	576	65	1,152	130
PA321S_D0050 MF	5.000	4,000	7,000	19	0.57	43.2	4.9	399	45	576	65	1,152	130
PA321S_D0050 MFL	5.000	4,000	7,000	24	1.64	44.5	5.0	399	45	576	65	1,152	130
PA321S_D0070 MF	7.000	4,500	8,000	19	0.51	38.1	4.3	399	45	531	60	1,152	130
PA321S_D0070 MFL	7.000	4,500	8,000	24	1.57	38.7	4.4	399	45	531	60	1,152	130
PA321S_D0080 MF	8.000	4,500	8,000	19	0.50	36.6	4.1	354	40	443	50	886	100
PA321S_D0080 MFL	8.000	4,500	8,000	24	1.56	37.0	4.2	354	40	443	50	886	100
PA321S_D0100 MF	10.00	4,500	8,000	19	0.50	35.1	4.0	266	30	443	50	886	100
PA321S_D0100 MFL	10.00	4,500	8,000	24	1.56	35.3	4.0	266	30	443	50	886	100
PA322 with Motor Mounting Plate													
PA322S_D0160 MF	16.00	4,500	8,000	14	0.21	39.7	4.5	399	45	576	65	1,152	130
PA322S_D0200 MF	20.00	4,500	8,000	14	0.20	40.6	4.6	399	45	576	65	1,152	130
PA322S_D0250 MF	25.00	4,500	8,000	14	0.18	40.7	4.6	399	45	576	65	1,152	130
PA322S_D0280 MF	28.00	4,500	8,000	14	0.17	39.5	4.5	399	45	576	65	1,152	130
PA322S_D0320 MF	32.00	4,500	8,000	14	0.20	35.9	4.1	354	40	443	50	886	100
PA322S_D0350 MF	35.00	4,500	8,000	14	0.17	40.5	4.6	399	45	576	65	1,152	130
PA322S_D0400 MF	40.00	4,500	8,000	14	0.16	38.8	4.4	399	45	576	65	1,152	130
PA322S_D0500 MF	50.00	4,500	8,000	14	0.16	40.0	4.5	399	45	576	65	1,152	130
PA322S_D0700 MF	70.00	4,500	8,000	14	0.16	36.9	4.2	399	45	531	60	1,152	130
PA322S_D1000 MF	100.0	4,500	8,000	14	0.16	34.6	3.9	266	30	443	50	886	100

[1] Based on input speed: n1 = 2000 RPM
For torque at higher input speeds (T_{2NX}) solve the formula, where n1 = Actual Input Speed. $T_{2NX} = \frac{T_{2N}}{\sqrt[3]{\frac{n_1}{2000}}}$

[2] Maximum momentary torque for emergency stops or heavy shock load. Admissible stops per life of gearhead = 1,000 stops maximum.

See web site for drawings.

"PA" Series–Advanced ServoFit® Precision Planetary Gearhead Selection Data



Part Number (Gearhead + Input)	Exact Ratio	Maximum Input Speed		Maximum Motor Shaft	Mass Moment of Inertia	Torsional Stiffness per arcmin		Output Torque					
								Nominal [1]		Acceleration		Peak [2]	
Gearhead		Continuous	Cyclic					T_{2N}		T_{2B}		T_{2PEAK}	
	i	RPM (n_1)		mm	kgcm²	in.lbs.	Nm	in.lbs.	Nm	in.lbs.	Nm	in.lbs.	Nm
PA421 with Motor Mounting Plate													
PA421S_D0030 MF	3.000	3,000	5,500	24	2.35	100.7	11.4	443	50	886	100	1,753	198
PA421S_D0030 MFC	3.000	4,500	6,000	24	2.66	98.3	11.1	443	50	886	100	1,289	146
PA421S_D0030 MFL	3.000	3,000	5,500	32	5.46	104.2	11.8	443	50	886	100	2,126	240
PA421S_D0040 MF	4.000	3,300	6,000	24	1.96	100.9	11.4	753	85	1,063	120	2,126	240
PA421S_D0040 MFC	4.000	5,000	6,000	24	2.27	99.5	11.2	753	85	1,063	120	1,718	194
PA421S_D0040 MFL	4.000	3,300	6,000	32	5.07	102.8	11.6	753	85	1,063	120	2,126	240
PA421S_D0050 MF	5.000	3,700	6,500	24	1.85	100.3	11.3	753	85	1,063	120	2,126	240
PA421S_D0050 MFC	5.000	5,000	6,500	24	2.16	99.4	11.2	753	85	1,063	120	2,126	240
PA421S_D0050 MFL	5.000	3,700	6,500	32	4.96	101.5	11.5	753	85	1,063	120	2,126	240
PA421S_D0070 MF	7.000	4,000	7,000	24	1.72	87.8	9.9	753	85	974	110	2,126	240
PA421S_D0070 MFC	7.000	5,500	7,000	24	2.05	87.8	9.9	753	85	974	110	2,126	240
PA421S_D0070 MFL	7.000	4,000	7,000	32	4.78	88.5	10.0	753	85	974	110	2,126	240
PA421S_D0080 MF	8.000	4,000	7,000	24	1.70	83.0	9.4	709	80	886	100	1,772	200
PA421S_D0080 MFC	8.000	5,500	7,000	24	2.03	83.0	9.4	709	80	886	100	1,772	200
PA421S_D0080 MFL	8.000	4,000	7,000	32	4.76	83.5	9.4	709	80	886	100	1,772	200
PA421S_D0100 MF	10.00	4,000	7,000	24	1.68	79.1	8.9	531	60	886	100	1,772	200
PA421S_D0100 MFC	10.00	6,000	7,000	24	2.01	79.1	8.9	531	60	886	100	1,772	200
PA421S_D0100 MFL	10.00	4,000	7,000	32	4.74	79.3	9.0	531	60	886	100	1,772	200
PA422 with Motor Mounting Plate													
PA422S_D0150MF	15.00	3,700	6,500	19	.630	92.2	10.4	443	50	885	100	2,124	240
PA422S_D0150MFL	15.00	3,700	6,500	24	.630	92.2	10.4	443	50	885	100	2,124	240
PA422S_D0160 MF	16.00	3,700	6,500	19	0.63	92.3	10.4	753	85	1,063	120	2,126	240
PA422S_D0160 MFL	16.00	3,700	6,500	24	1.70	92.8	10.5	753	85	1,063	120	2,126	240
PA422S_D0200 MF	20.00	3,700	6,500	19	0.62	94.7	10.7	753	85	1,063	120	2,126	240
PA422S_D0200 MFL	20.00	3,700	6,500	24	1.70	95.0	10.7	753	85	1,063	120	2,126	240
PA422S_D0250 MF	25.00	4,000	7,000	19	0.57	94.6	10.7	753	85	1,063	120	2,126	240
PA422S_D0250 MFL	25.00	4,000	7,000	24	1.65	94.8	10.7	753	85	1,063	120	2,126	240
PA422S_D0280 MF	28.00	4,500	8,000	19	0.52	90.5	10.2	753	85	1,063	120	2,126	240
PA422S_D0280 MFL	28.00	4,500	8,000	24	1.58	90.7	10.2	753	85	1,063	120	2,126	240
PA422S_D0320 MF	32.00	3,700	6,500	19	0.62	81.7	9.2	709	80	886	100	1,772	200
PA422S_D0320 MFL	32.00	3,700	6,500	24	1.69	81.8	9.2	709	80	886	100	1,772	200
PA422S_D0350 MF	35.00	4,500	8,000	19	0.52	93.5	10.6	753	85	1,063	120	2,126	240
PA422S_D0350 MFL	35.00	4,500	8,000	24	1.58	93.6	10.6	753	85	1,063	120	2,126	240
PA422S_D0400 MF	40.00	4,500	8,000	19	0.50	89.4	10.1	753	85	1,063	120	2,126	240
PA422S_D0400 MFL	40.00	4,500	8,000	24	1.56	89.5	10.1	753	85	1,063	120	2,126	240
PA422S_D0500 MF	50.00	4,500	8,000	19	0.50	92.7	10.5	753	85	1,063	120	2,126	240
PA422S_D0500 MFL	50.00	4,500	8,000	24	1.56	92.7	10.5	753	85	1,063	120	2,126	240
PA422S_D0700 MF	70.00	4,500	8,000	19	0.50	85.0	9.6	753	85	974	110	2,126	240
PA422S_D0700 MFL	70.00	4,500	8,000	24	1.56	85.1	9.6	753	85	974	110	2,126	240
PA422S_D1000 MF	100.0	4,500	8,000	19	0.50	78.0	8.8	531	60	886	100	1,772	200
PA422S_D1000 MFL	100.0	4,500	8,000	24	1.56	78.0	8.8	531	60	886	100	1,772	200

Index of Symbols

MT ..... Motor adapter with TriAdapt® coupling	i ..... Ratio - Exact	T_{2N} ..... Nominal Torque
MF ..... Motor adapter with FlexiAdapt® coupling	n_1 ..... Maximum input speed RPM	T_{2B} ..... Acceleration Torque Maximum
L ..... Large Input	J_1 ..... Mass moment of inertia (input)	T_{2PEAK} ..... Peak Torque
C ..... ServoCool	C_2 ..... Torsional Stiffness	

See web site for drawings.



"PA" Series–Advanced ServoFit® Precision Planetary Gearhead Selection Data

Part Number (Gearhead + Input)	Exact Ratio	Maximum Input Speed		Maximum Motor Shaft	Mass Moment of Inertia	Torsional Stiffness per arcmin		Output Torque					
								Nominal [1]		Acceleration		Peak [2]	
Gearhead		Continuous	Cyclic	$\varnothing D^6$	J_1	C_2		T_{2N}		T_{2B}		T_{2PEAK}	
	i	RPM (n_1)		mm	kgcm²	in.lbs.	Nm	in.lbs.	Nm	in.lbs.	Nm	in.lbs.	Nm
PA521 with Motor Mounting Plate													
PA521S_D0030 MF	3.000	2,500	4,500	32	6.14	271.7	30.7	1,063	120	1,772	200	3,686	416
PA521S_D0030 MFC	3.000	4,000	6,000	32	6.98	262.7	29.7	1,063	120	1,772	200	2,294	259
PA521S_D0030 MFL	3.000	2,500	4,500	38	13.23	292.1	33.0	1,063	120	1,772	200	3,686	416
PA521S_D0040 MF	4.000	3,000	5,000	32	5.93	260.6	29.4	1,860	210	2,657	300	4,915	555
PA521S_D0040 MFC	4.000	4,500	6,000	32	6.77	255.8	28.9	1,860	210	2,447	276	3,059	345
PA521S_D0040 MFL	4.000	3,000	5,000	38	13.02	270.8	30.6	1,860	210	2,657	300	4,915	555
PA521S_D0050 MF	5.000	3,500	6,000	32	5.52	260.7	29.4	1,860	210	2,657	300	5,315	600
PA521S_D0050 MFC	5.000	5,000	6,000	32	6.36	257.7	29.1	1,860	210	2,657	300	3,824	432
PA521S_D0050 MFL	5.000	3,500	6,000	38	12.61	267.2	30.2	1,860	210	2,657	300	5,315	600
PA521S_D0070 MF	7.000	3,700	6,500	32	5.07	240.4	27.1	1,860	210	2,392	270	5,315	600
PA521S_D0070 MFC	7.000	5,000	6,500	32	5.98	240.4	27.1	1,860	210	2,392	270	5,315	600
PA521S_D0070 MFL	7.000	3,700	6,500	38	11.90	243.7	27.5	1,860	210	2,392	270	5,315	600
PA521S_D0080 MF	8.000	3,700	6,500	32	5.00	225.2	25.4	1,772	200	2,215	250	4,429	500
PA521S_D0080 MFC	8.000	5,500	6,500	32	5.91	225.2	25.4	1,772	200	2,215	250	4,429	500
PA521S_D0080 MFL	8.000	3,700	6,500	38	11.83	227.4	25.7	1,772	200	2,215	250	4,429	500
PA521S_D0100 MF	10.00	3,700	6,500	32	4.94	218.4	24.7	1,240	140	2,215	250	4,429	500
PA521S_D0100 MFC	10.00	6,000	6,500	32	5.85	218.4	24.7	1,240	140	2,215	250	4,429	500
PA521S_D0100 MFL	10.00	3,700	6,500	38	11.77	219.7	24.8	1,240	140	2,215	250	4,429	500

[1] Based on input speed: n1 = 2000 RPM
For torque at higher input speeds (T_{2NX}) solve the formula, where n1 = Actual Input Speed. $T_{2NX} = \frac{T_{2N}}{\sqrt[3]{\frac{n_1}{2000}}}$

[2] Maximum momentary torque for emergency stops or heavy shock load. Admissible stops per life of gearhead = 1,000 stops maximum.

See web site for drawings.

"PA" Series–Advanced ServoFit® Precision Planetary Gearhead Selection Data



Part Number (Gearhead + Input)	Exact Ratio	Maximum Input Speed		Maximum Motor Shaft	Mass Moment of Inertia	Torsional Stiffness per arcmin		Output Torque					
								Nominal [1]		Acceleration		Peak [2]	
Gearhead		Continuous	Cyclic					T_{2N}		T_{2B}		T_{2PEAK}	
	i	RPM (n_1)		mm	kgcm²	in.lbs.	Nm	in.lbs.	Nm	in.lbs.	Nm	in.lbs.	Nm
PA522 with Motor Mounting Plate													
PA522S_D0150MF	15.00	3,300	6,000	24	1.91	241.5	27.3	1,062	120	1,770	200	3,683	416
PA522S_D0150MFC	15.00	5,000	6,000	24	1.91	241.5	27.3	1,062	120	1,770	200	3,683	416
PA522S_D0150MFL	15.00	3,300	6,000	32	1.91	241.5	27.3	1,062	120	1,770	200	3,683	416
PA522S_D0160 MF	16.00	3,300	6,000	24	2.01	241.8	27.3	1,860	210	2,657	300	4,915	555
PA522S_D0160 MFC	16.00	5,000	6,000	24	2.32	241.3	27.2	1,860	210	2,657	300	4,915	555
PA522S_D0160 MFL	16.00	3,300	6,000	32	5.12	242.4	27.4	1,860	210	2,657	300	4,915	555
PA522S_D0200 MF	20.00	3,300	6,000	24	1.98	248.4	28.0	1,860	210	2,657	300	5,315	600
PA522S_D0200 MFC	20.00	5,000	6,000	24	2.29	248.0	28.0	1,860	210	2,657	300	5,315	600
PA522S_D0200 MFL	20.00	3,300	6,000	32	5.09	248.8	28.1	1,860	210	2,657	300	5,315	600
PA522S_D0250 MF	25.00	3,700	6,500	24	1.87	248.2	28.0	1,860	210	2,657	300	5,315	600
PA522S_D0250 MFC	25.00	5,000	6,500	24	2.18	248.0	28.0	1,860	210	2,657	300	5,315	600
PA522S_D0250 MFL	25.00	3,700	6,500	32	4.98	248.5	28.1	1,860	210	2,657	300	5,315	600
PA522S_D0280 MF	28.00	4,000	7,000	24	1.75	236.5	26.7	1,860	210	2,657	300	4,915	555
PA522S_D0280 MFC	28.00	5,500	7,000	24	2.08	236.5	26.7	1,860	210	2,657	300	4,915	555
PA522S_D0280 MFL	28.00	4,000	7,000	32	4.81	236.8	26.7	1,860	210	2,657	300	4,915	555
PA522S_D0320 MF	32.00	3,300	6,000	24	1.95	222.4	25.1	1,772	200	2,215	250	4,429	500
PA522S_D0320 MFC	32.00	5,000	6,000	24	2.27	222.3	25.1	1,772	200	2,215	250	4,429	500
PA522S_D0320 MFL	32.00	3,300	6,000	32	5.06	222.5	25.1	1,772	200	2,215	250	4,429	500
PA522S_D0350 MF	35.00	4,000	7,000	24	1.74	244.8	27.6	1,860	210	2,657	300	5,315	600
PA522S_D0350 MFC	35.00	5,500	7,000	24	2.07	244.8	27.6	1,860	210	2,657	300	5,315	600
PA522S_D0350 MFL	35.00	4,000	7,000	32	4.80	245.0	27.7	1,860	210	2,657	300	5,315	600
PA522S_D0400 MF	40.00	4,000	7,000	24	1.69	232.2	26.2	1,860	210	2,657	300	4,915	555
PA522S_D0400 MFC	40.00	5,500	7,000	24	2.03	232.2	26.2	1,860	210	2,657	300	4,915	555
PA522S_D0400 MFL	40.00	4,000	7,000	32	4.75	232.3	26.2	1,860	210	2,657	300	4,915	555
PA522S_D0500 MF	50.00	4,000	7,000	24	1.69	241.8	27.3	1,860	210	2,657	300	5,315	600
PA522S_D0500 MFC	50.00	5,500	7,000	24	2.02	241.8	27.3	1,860	210	2,657	300	5,315	600
PA522S_D0500 MFL	50.00	4,000	7,000	32	4.75	241.9	27.3	1,860	210	2,657	300	5,315	600
PA522S_D0700 MF	70.00	4,000	7,000	24	1.69	233.1	26.3	1,860	210	2,392	270	5,315	600
PA522S_D0700 MFC	70.00	5,500	7,000	24	2.02	233.1	26.3	1,860	210	2,392	270	5,315	600
PA522S_D0700 MFL	70.00	4,000	7,000	32	4.75	233.1	26.3	1,860	210	2,392	270	5,315	600
PA522S_D1000 MF	100.0	4,000	7,000	24	1.69	215.4	24.3	1,240	140	2,215	250	4,429	500
PA522S_D1000 MFC	100.0	5,500	7,000	24	2.02	215.4	24.3	1,240	140	2,215	250	4,429	500
PA522S_D1000 MFL	100.0	4,000	7,000	32	4.75	215.4	24.3	1,240	140	2,215	250	4,429	500

Index of Symbols

MT ..... Motor adapter with TriAdapt® coupling	i ..... Ratio - Exact	T_{2N} ..... Nominal Torque
MF ..... Motor adapter with FlexiAdapt® coupling	n_1 ..... Maximum input speed RPM	T_{2B} ..... Acceleration Torque Maximum
L ..... Large Input	J_1 ..... Mass moment of inertia (input)	T_{2PEAK} ..... Peak Torque
C ..... ServoCool	C_2 ..... Torsional Stiffness	

See web site for drawings.



"PA" Series–Advanced ServoFit® Precision Planetary Gearhead Selection Data

Part Number (Gearhead + Input)	Exact Ratio	Maximum Input Speed		Maximum Motor Shaft	Mass Moment of Inertia	Torsional Stiffness per arcmin		Output Torque					
								Nominal [1]		Acceleration		Peak [2]	
Gearhead	i	Continuous RPM (n_1)	Cyclic	øD^6 mm	J_1 kgcm²	C_2 in.lbs.	Nm	T_{2N} in.lbs.	Nm	T_{2B} in.lbs.	Nm	T_{2PEAK} in.lbs.	Nm
PA721 with Motor Mounting Plate													
PA721S_D0030 MF	3.000	2,200	3,700	38	20.25	484.5	54.7	2,480	280	4,429	500	9,177	1,036
PA721S_D0030 MFC	3.000	3,400	6,000	38	23.04	484.5	54.7	2,480	280	4,429	500	9,177	1,036
PA721S_D0030 MFL	3.000	2,200	3,700	48	22.26	520.9	58.8	2,480	280	4,429	500	9,177	1,036
PA721S_D0040 MF	4.000	2,500	4,500	38	15.53	485.9	54.9	3,898	440	6,201	700	12,235	1,381
PA721S_D0040 MFC	4.000	3,600	6,000	38	18.33	485.9	54.9	3,898	440	6,201	700	12,235	1,381
PA721S_D0040 MFL	4.000	2,500	4,500	48	17.55	505.8	57.1	3,898	440	6,201	700	12,235	1,381
PA721S_D0050 MF	5.000	3,000	5,500	38	14.00	481.6	54.4	3,898	440	6,201	700	12,401	1,400
PA721S_D0050 MFC	5.000	4,200	6,000	38	16.79	481.6	54.4	3,898	440	6,201	700	12,401	1,400
PA721S_D0050 MFL	5.000	3,000	5,500	48	16.01	494.0	55.8	3,898	440	6,201	700	12,401	1,400
PA721S_D0070 MF	7.000	3,300	6,000	38	12.66	470.7	53.1	3,898	440	5,758	650	11,127	1,256
PA721S_D0070 MFC	7.000	4,700	6,000	38	15.46	470.7	53.1	3,898	440	5,758	650	11,127	1,256
PA721S_D0070 MFL	7.000	3,300	6,000	48	15.03	478.7	54.0	3,898	440	5,758	650	11,127	1,256
PA721S_D0080 MF	8.000	3,300	6,000	38	12.40	457.6	51.7	3,543	400	4,429	500	8,858	1,000
PA721S_D0080 MFC	8.000	5,000	6,000	38	15.20	457.6	51.7	3,543	400	4,429	500	8,858	1,000
PA721S_D0080 MFL	8.000	3,300	6,000	48	14.77	463.4	52.3	3,543	400	4,429	500	8,858	1,000
PA721S_D0100 MF	10.00	3,300	6,000	38	12.15	431.8	48.7	2,657	300	4,429	500	8,858	1,000
PA721S_D0100 MFC	10.00	5,500	6,000	38	14.95	431.8	48.7	2,657	300	4,429	500	8,858	1,000
PA721S_D0100 MFL	10.00	3,300	6,000	48	14.52	435.1	49.1	2,657	300	4,429	500	8,858	1,000
PA722 with Motor Mounting Plate													
PA722S_D0160 MF	16.00	3,000	5,000	32	6.01	471.4	53.2	3,898	440	6,201	700	12,235	1,381
PA722S_D0160 MFC	16.00	4,500	6,000	32	6.85	470.4	53.1	3,898	440	6,201	700	11,868	1,340
PA722S_D0160 MFL	16.00	3,000	5,000	38	13.10	473.4	53.4	3,898	440	6,201	700	12,235	1,381
PA722S_D0200 MF	20.00	3,000	5,000	32	5.92	472.4	53.3	3,898	440	6,201	700	12,401	1,400
PA722S_D0200 MFC	20.00	4,500	6,000	32	6.76	471.8	53.3	3,898	440	6,201	700	12,401	1,400
PA722S_D0200 MFL	20.00	3,000	5,000	38	13.01	473.7	53.5	3,898	440	6,201	700	12,401	1,400
PA722S_D0250 MF	25.00	3,500	6,000	32	5.52	472.4	53.3	3,898	440	6,201	700	12,401	1,400
PA722S_D0250 MFC	25.00	5,000	6,000	32	6.36	472.0	53.3	3,898	440	6,201	700	12,401	1,400
PA722S_D0250 MFL	25.00	3,500	6,000	38	12.62	473.2	53.4	3,898	440	6,201	700	12,401	1,400
PA722S_D0280 MF	28.00	3,700	6,500	32	5.16	466.9	52.7	3,898	440	6,201	700	12,235	1,381
PA722S_D0280 MFC	28.00	5,000	6,500	32	6.07	466.9	52.7	3,898	440	6,201	700	12,235	1,381
PA722S_D0280 MFL	28.00	3,700	6,500	38	11.99	467.7	52.8	3,898	440	6,201	700	12,235	1,381
PA722S_D0320 MF	32.00	3,000	5,000	32	5.84	456.6	51.5	3,543	400	4,429	500	8,858	1,000
PA722S_D0320 MFC	32.00	4,500	5,000	32	6.68	456.4	51.5	3,543	400	4,429	500	8,858	1,000
PA722S_D0320 MFL	32.00	3,000	5,000	38	12.93	457.1	51.6	3,543	400	4,429	500	8,858	1,000
PA722S_D0350 MF	35.00	3,700	6,500	32	5.13	469.5	53.0	3,898	440	6,201	700	12,401	1,400
PA722S_D0350 MFC	35.00	5,000	6,500	32	6.04	469.5	53.0	3,898	440	6,201	700	12,401	1,400
PA722S_D0350 MFL	35.00	3,700	6,500	38	11.96	470.0	53.1	3,898	440	6,201	700	12,401	1,400
PA722S_D0400 MF	40.00	3,700	6,500	32	4.98	461.3	52.1	3,898	440	6,201	700	12,235	1,381
PA722S_D0400 MFC	40.00	5,500	6,500	32	5.90	461.3	52.1	3,898	440	6,201	700	12,235	1,381
PA722S_D0400 MFL	40.00	3,700	6,500	38	11.81	461.7	52.1	3,898	440	6,201	700	12,235	1,381
PA722S_D0500 MF	50.00	3,700	6,500	32	4.97	465.9	52.6	3,898	440	6,201	700	12,401	1,400
PA722S_D0500 MFC	50.00	5,500	6,500	32	5.88	465.9	52.6	3,898	440	6,201	700	12,401	1,400
PA722S_D0500 MFL	50.00	3,700	6,500	38	11.80	466.1	52.6	3,898	440	6,201	700	12,401	1,400
PA722S_D0700 MF	70.00	3,700	6,500	32	4.96	466.0	52.6	3,898	440	5,758	650	11,127	1,256
PA722S_D0700 MFC	70.00	5,500	6,500	32	5.87	466.0	52.6	3,898	440	5,758	650	11,127	1,256
PA722S_D0700 MFL	70.00	3,700	6,500	38	11.79	466.1	52.6	3,898	440	5,758	650	11,127	1,256
PA722S_D1000 MF	100.0	3,700	6,500	32	4.95	429.8	48.5	2,657	300	4,429	500	8,858	1,000
PA722S_D1000 MFC	100.0	5,500	6,500	32	5.86	429.8	48.5	2,657	300	4,429	500	8,858	1,000
PA722S_D1000 MFL	100.0	3,700	6,500	38	11.78	429.9	48.5	2,657	300	4,429	500	8,858	1,000

[1] Based on input speed: n1 = 2000 RPM
For torque at higher input speeds (T_{2NX}) solve the formula, where n1 = Actual Input Speed. $T_{2NX} = \frac{T_{2N}}{\sqrt[3]{\frac{n_1}{2000}}}$

[2] Maximum momentary torque for emergency stops or heavy shock load. Admissible stops per life of gearhead = 1,000 stops maximum.

See web site for drawings.

"PA" Series–Advanced ServoFit® Precision Planetary Gearhead Selection Data



Part Number (Gearhead + Input)	Exact Ratio	Maximum Input Speed		Maximum Motor Shaft	Mass Moment of Inertia	Torsional Stiffness per arcmin		Output Torque					
								Nominal [1]		Acceleration		Peak [2]	
Gearhead		Continuous	Cyclic	øD6	J1	C2		T2N		T2B		T2PEAK	
	i	RPM (n1)		mm	kgcm²	in.lbs.	Nm	in.lbs.	Nm	in.lbs.	Nm	in.lbs.	Nm
PA821 with Motor Mounting Plate													
PA821S_D0030 MF	3.000	1,800	3,000	48	71.80	1404.0	158.5	7,086	800	10,630	1,200	13,069	1,475
PA821S_D0030 MFC	3.000	3,000	4,500	48	87.71	1464.9	165.4	7,086	800	10,630	1,200	15,518	1,752
PA821S_D0040 MF	4.000	2,200	3,500	48	47.96	1509.0	170.4	7,086	800	14,173	1,600	17,425	1,967
PA821S_D0040 MFC	4.000	3,200	5,000	48	63.86	1547.9	174.7	7,086	800	14,173	1,600	20,690	2,336
PA821S_D0050 MF	5.000	2,500	4,000	48	41.14	1530.0	172.7	8,858	1,000	14,173	1,600	21,781	2,459
PA821S_D0050 MFC	5.000	3,750	6,000	48	57.04	1555.4	175.6	8,858	1,000	14,173	1,600	25,863	2,920
PA821S_D0070 MF	7.000	2,800	4,500	48	36.48	1478.9	167.0	8,858	1,000	12,401	1,400	24,900	2,811
PA821S_D0070 MFC	7.000	4,500	6,000	48	52.38	1478.9	167.0	8,858	1,000	12,401	1,400	24,900	2,811
PA821S_D0080 MF	8.000	2,800	4,500	48	35.25	1413.9	159.6	7,086	800	10,630	1,200	21,259	2,400
PA821S_D0080 MFC	8.000	5,000	6,000	48	51.14	1413.9	159.6	7,086	800	10,630	1,200	21,259	2,400
PA821S_D0100 MF	10.00	2,800	4,500	48	34.08	1323.1	149.4	6,201	700	10,630	1,200	21,259	2,400
PA821S_D0100 MFC	10.00	5,500	6,000	48	49.97	1323.1	149.4	6,201	700	10,630	1,200	21,259	2,400
PA822 with Motor Mounting Plate													
PA822S_D0150 MF	15.00	2,500	4,500	38	16.09	1472.1	166.2	7,086	800	14,173	1,600	28,346	3,200
PA822S_D0150 MFC	15.00	3,400	6,000	38	18.89	1472.1	166.2	7,086	800	14,173	1,600	28,346	3,200
PA822S_D0150 MFL	15.00	2,500	4,500	48	18.11	1483.1	167.4	7,086	800	14,173	1,600	28,346	3,200
PA822S_D0160 MF	16.00	2,500	4,500	38	16.09	1472.1	166.2	7,086	800	14,173	1,600	28,346	3,200
PA822S_D0160 MFC	16.00	3,400	6,000	38	18.89	1472.1	166.2	7,086	800	14,173	1,600	28,346	3,200
PA822S_D0160 MFL	16.00	2,500	4,500	48	18.11	1483.1	167.4	7,086	800	14,173	1,600	28,346	3,200
PA822S_D0200 MF	20.00	2,500	4,500	38	15.66	1505.5	170.0	8,858	1,000	14,173	1,600	28,346	3,200
PA822S_D0200 MFC	20.00	3,600	6,000	38	18.46	1505.5	170.0	8,858	1,000	14,173	1,600	28,346	3,200
PA822S_D0200 MFL	20.00	2,500	4,500	48	17.68	1512.9	170.8	8,858	1,000	14,173	1,600	28,346	3,200
PA822S_D0250 MF	25.00	3,000	5,500	38	14.28	1503.8	169.8	8,858	1,000	14,173	1,600	28,346	3,200
PA822S_D0250 MFC	25.00	4,000	6,000	38	17.07	1503.8	169.8	8,858	1,000	14,173	1,600	28,346	3,200
PA822S_D0250 MFL	25.00	3,000	5,500	48	16.29	1508.5	170.3	8,858	1,000	14,173	1,600	28,346	3,200
PA822S_D0280 MF	28.00	3,300	6,000	38	12.92	1463.1	165.2	7,086	800	14,173	1,600	28,346	3,200
PA822S_D0280 MFC	28.00	4,500	6,000	38	15.71	1463.1	165.2	7,086	800	14,173	1,600	28,346	3,200
PA822S_D0280 MFL	28.00	3,300	6,000	48	15.29	1467.9	165.7	7,086	800	14,173	1,600	28,346	3,200
PA822S_D0320 MF	32.00	2,500	4,500	38	15.29	1405.7	158.7	7,086	800	10,630	1,200	21,259	2,400
PA822S_D0320 MFC	32.00	3,600	6,000	38	18.09	1405.7	158.7	7,086	800	10,630	1,200	21,259	2,400
PA822S_S0320 MFL	32.00	2,500	4,500	48	17.31	1408.2	159.0	7,086	800	10,630	1,200	21,259	2,400
PA822S_D0350 MF	35.00	3,300	6,000	38	12.78	1499.5	169.3	8,858	1,000	14,173	1,600	28,346	3,200
PA822S_D0350 MFC	35.00	4,500	6,000	38	15.58	1499.5	169.3	8,858	1,000	14,173	1,600	28,346	3,200
PA822S_D0350 MFL	35.00	3,300	6,000	48	15.15	1502.7	169.6	8,858	1,000	14,173	1,600	28,346	3,200
PA822S_D0400 MF	40.00	3,300	6,000	38	12.28	1437.9	162.3	7,086	800	14,173	1,600	28,346	3,200
PA822S_D0400 MFC	40.00	5,000	6,000	38	15.08	1437.9	162.3	7,086	800	14,173	1,600	28,346	3,200
PA822S_D0400 MFL	40.00	3,300	6,000	48	14.65	1440.2	162.6	7,086	800	14,173	1,600	28,346	3,200
PA822S_D0500 MF	50.00	3,300	6,000	38	12.21	1482.5	167.4	8,858	1,000	14,173	1,600	28,346	3,200
PA822S_D0500 MFC	50.00	5,000	6,000	38	15.01	1482.5	167.4	8,858	1,000	14,173	1,600	28,346	3,200
PA822S_D0500 MFL	50.00	3,300	6,000	48	14.58	1484.0	167.5	8,858	1,000	14,173	1,600	28,346	3,200
PA822S_D0700 MF	70.00	3,300	6,000	38	12.17	1455.9	164.4	8,858	1,000	12,401	1,400	24,900	2,811
PA822S_D0700 MFC	70.00	5,000	6,000	38	14.96	1455.9	164.4	8,858	1,000	12,401	1,400	24,900	2,811
PA822S_D0700 MFL	70.00	3,300	6,000	48	14.54	1456.6	164.4	8,858	1,000	12,401	1,400	24,900	2,811
PA822S_D1000 MF	100.0	3,300	6,000	38	12.14	1314.0	148.3	6,201	700	10,630	1,200	21,259	2,400
PA822S_D1000 MFC	100.0	5,000	6,000	38	14.94	1314.0	148.3	6,201	700	10,630	1,200	21,259	2,400
PA822S_D1000 MFL	100.0	3,300	6,000	48	14.51	1314.3	148.4	6,201	700	10,630	1,200	21,259	2,400

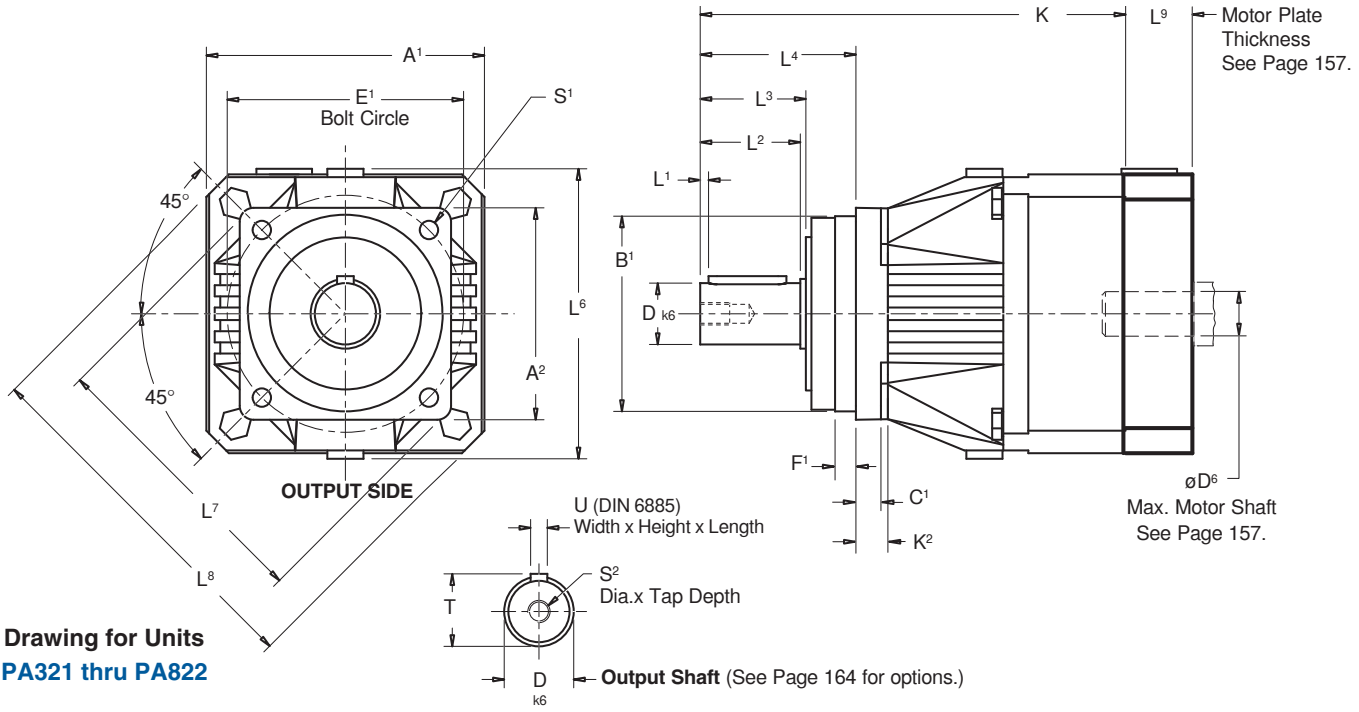
Index of Symbols

MT ..... Motor adapter with TriAdapt® coupling	i ..... Ratio - Exact	T2N ..... Nominal Torque
MF ..... Motor adapter with FlexiAdapt® coupling	n1 ..... Maximum input speed RPM	T2B ..... Acceleration Torque Maximum
L ..... Large Input	J1 ..... Mass moment of inertia (input)	T2PEAK ..... Peak Torque
C ..... ServoCool	C2 ..... Torsional Stiffness	

See web site for drawings.



"PA" Series–Advanced ServoFit® Precision Planetary Gearhead Dimensional Data



Drawing for Units
PA321 thru PA822

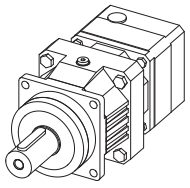
Table No. 1 **"PA" Series – Advanced Precision Planetary Gearhead Dimensions (mm/inches)**

Unit	A1	A2	B1 h6	C1	D k6	E1	F1	K2	L1	L2	L3	L4	L6	L7	L8	S1	S2	T	U
P321/P322	72 2.83	72 2.83	60 +.000/-.019 2.362 +.0000/-.0007	7 .28	16 +.012/+.001	75 2.95	7.5 .30	— —	2 .08	28 1.10	30 1.18	48 1.89	79 3.11	92 3.62	92 3.62	5.5 .22	M5x12.5	18 .71	A5x5x22
P421/P422	98 3.86	76 2.99	70 +.000/-.019 2.756 +.0000/-.0007	9 .35	22 +.015/+.002	85 3.35	7.5 .30	12 .47	3 .12	36 1.42	38 1.50	56 2.20	98 3.86	103.3 4.07	130 5.12	6.6 .26	M8x19	24.5 .96	A6x6x28
P521/P522	115 4.53	101 3.98	90 +.000/-.022 3.543 +.0000/-.0009	10 .39	32 +.018/+.002	120 4.72	15 .59	14 .55	3 .12	58 2.28	60 2.36	88 3.46	121 4.76	139 5.47	149 5.87	9 .35	M12x28	35 1.38	A10x8x50
P721/P722	145 5.71	145 5.71	130 +.000/-.025 5.118 +.000/-.001	15 .59	40 +.018/+.002	165 6.50	3.5 .14	— —	4 .16	82 3.23	85 3.35	112 4.41	145 5.71	— —	190 7.48	11 .43	M16x36	43 1.69	A12x8x70
P821/P822	190 7.48	190 7.48	160 +.000/-.025 6.299 +.000/-.001	15 .59	55 +.021/+.002	215 8.46	10 .39	— —	6 .24	82 3.23	85 3.35	112 4.41	190 7.48	— —	250 9.84	13.5 .53	M20x42	59 2.32	A16x10x70

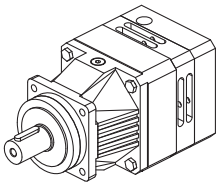
Part No. Explanation

PA 4 2 1 S P D 0030 MF C

- **C** – Option for ServoCool
- **MF** – Motor Plate with FlexiAdapt® Coupling
- **0030** – Ratio (**0030** = 3.0:1)
- **D** – Reinforced Bearings-Axial
- **G** – Shaft — no Key
- **P** – Output Shaft with Key
- **V** – Splined Shaft
- **S** – Standard Housing
- **1** – No. of Gear Stages (**1** = 1 Stage, **2** = 2 Stages)
- **2** – Generation Number
- **4** – Unit No.
- **PA** – Advanced "PA" Series ServoFit Precision Planetary Gearhead



Typical 2 Stage Configuration



Typical ServoCool Configuration

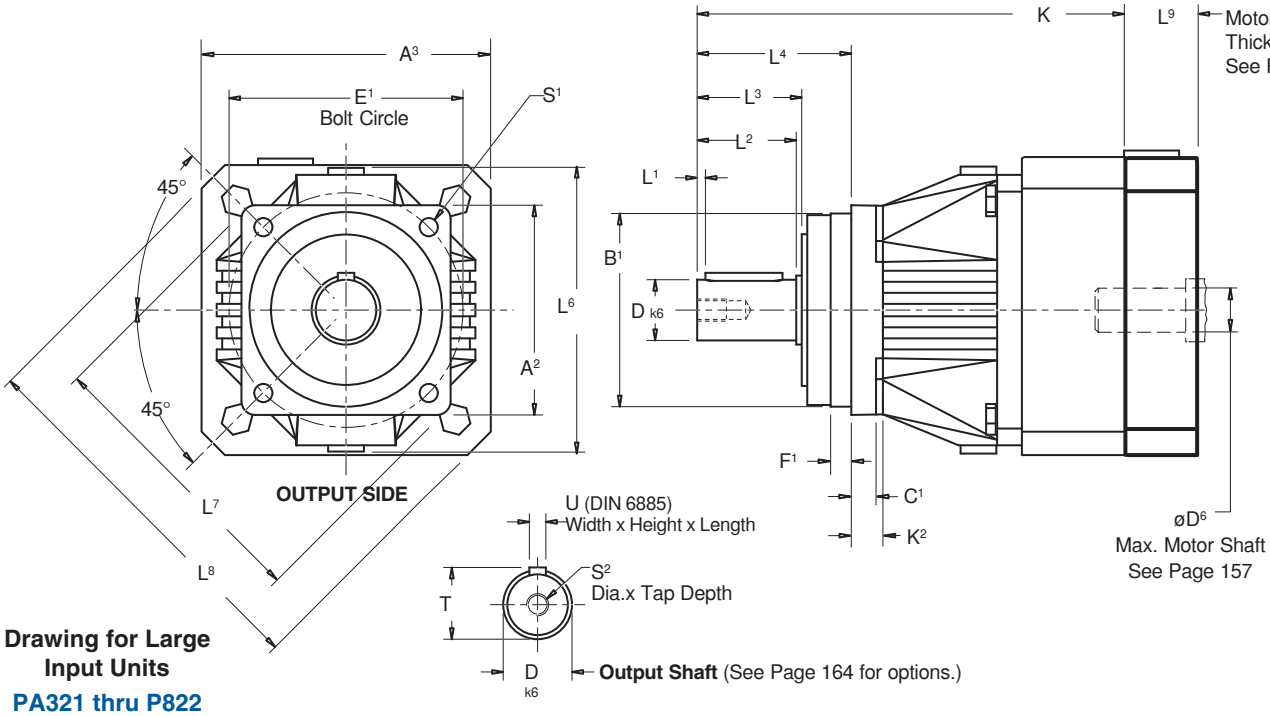
Table No. 2

K Dimension					
Standard			ServoCool		
Unit	mm	inches	Unit	mm	inches
PA321	135	5.31	—		
PA322	158.5	6.24	—		
PA421	153	6.02	**PA421_C**	176.5	6.95
PA422	200.5	7.89	—		
PA521	193	7.60	**PA521_C**	221	8.70
PA522	242.5	9.55	**PA522_C**	266	10.47
PA721	242	9.53	**PA721_C**	272	10.71
PA722	294	11.57	**PA722_C**	322	12.68
PA821	283	11.14	**PA821_C**	331	13.03
PA822	350.5	13.80	**PA822_C**	380.5	14.98

When ordering a planetary gearhead, specify the motor manufacturer and part number, provide the motor drawing with dimensions, or specify the motor mounting dimensions. (See Page 157.)

"PA" Series–Advanced–Large Input ServoFit® Precision Planetary Gearhead Dimensional Data





Drawing for Large Input Units

PA321 thru P822

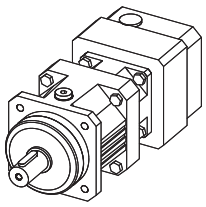
Table No. 1 **"PA" Series – Large Input – Precision Planetary Gearhead Dimensions (mm/inches)**

Unit	A^2	B^1 h6	C^1	D k6	E^1	F^1	K^2	L^1	L^2	L^3	L^4	L^6	L^7	S^1	S^2	T	U
P321/P322_L	72 2.83	60 +.000/-.019 2.362 +.0000/-.0007	7 .28	16 +.012/+.001	75 2.95	7.5 .30	— —	2 .08	28 1.10	30 1.18	48 1.89	130 5.12	92 3.62	5.5 .22	M5x12.5	18 .71	A5x5x22
P421/P422_L	76 2.99	70 +.000/-.019 2.756 +.0000/-.0007	9 .35	22 +.015/+.002	85 3.35	7.5 .30	12 .47	3 .12	36 1.42	38 1.50	56 2.20	149 5.87	103.3 4.07	6.6 .26	M8x19	24.5 .96	A6x6x28
P521/P522_L	101 3.98	90 +.000/-.022 3.543 +.0000/-.0009	10 .39	32 +.018/+.002	120 4.72	15 .59	14 .55	3 .12	58 2.28	60 2.36	88 3.46	190 7.48	139 5.47	9 .35	M12x28	35 1.38	A10x8x50
P721/P722_L	145 5.71	130 +.000/-.025 5.118 +.000/-.001	15 .59	40 +.018/+.002	165 6.50	3.5 .14	— —	4 .16	82 3.23	85 3.35	112 4.41	250 5.71	— —	11 .43	M16x36	43 1.69	A12x8x70
P822_L	190 7.48	160 +.000/-.025 6.299 +.000/-.001	15 .59	55 +.021/+.002	215 8.46	10 .39	— —	6 .24	82 3.23	85 3.35	112 4.41	190 7.48	— —	13.5 .53	M20x42	59 2.32	A16x10x70

Part No. Explanation

PA 4 2 1 S P D 0030 MF L

- **L** – Large Input
- **MF** – Motor Plate with FlexiAdapt Coupling
- **0030** – Ratio (**0030** = 3.0:1)
- **D** – Reinforced Bearings-Axial
- **G** – Shaft — no Key
- **P** – Output Shaft with Key
- **V** – Splined Shaft
- **S** – Standard Housing
- **1** – No. of Gear Stages (**1** = 1 Stage, **2** = 2 Stages)
- **2** – Generation Number
- **4** – Unit No.
- **PA** – Advanced "PA" Series ServoFit Precision Planetary Gearhead



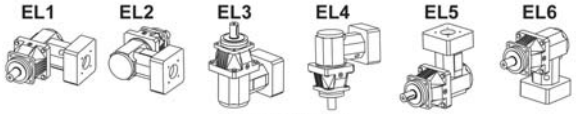
Typical 2 Stage Configuration
Large Input

Table No. 2

Unit	A^3		K		L^8	
	mm	inches	mm	inches	mm	inches
PA321_L	100	3.94	138.3	5.44	130	5.12
PA421_L	115	4.53	161.5	6.36	149	5.87
PA422_L	100	3.94	203.8	8.02	130	5.12
PA521_L	145	5.71	207	8.15	190	7.48
PA522_L	115	4.53	251	9.88	149	5.87
PA721_L	190	7.48	259	10.20	250	9.84
PA722_L	145	5.71	308	12.13	190	7.48
PA822_L	190	7.48	367.5	14.47	250	9.84

When ordering a planetary gearhead, specify the motor manufacturer and part number, provide the motor drawing with dimensions, or specify the motor mounting dimensions. (See Page 157.)

"PKX" Series
ServoFit® Precision Planetary Gearhead
Performance Specification Overview

		P221 KX3	P222 KX3	P321 KX3	P322 KX3	P421 KX4	P422 KX3	P521 KX5	P522 KX4	P721 KX7	P722 KX5	P821 KX8	P822 KX7	P922 KX8
Acceleration Torque	in.lbs.	195		576		1063		2,657		6,201		14,173		26,574
$T_{2B\,MAX}$	Nm	22		65		120		300		700		1,600		3,000
Output Torque Nom.[1]	in.lbs.	142		399		753		1,860		3,898		8,858		17,716
T_{2N}	Nm	16		45		85		210		440		1,000		2,000
Input Speed Max.	Continuous	3,500	3,500	3,500	3,500	3,000	3,500	3,000	3,000	2,100	3,000	1,300	2,100	1,300
n_{1MAX}	Cyclic	6,000	6,000	6,000	6,000	4,500	6,000	4,000	4,500	3,500	4,000	3,000	3,500	3,000
Torsional Backlash [2]														
$\Delta\varphi$	arcmin	≤7 - 8.5		≤5 - 7.5		≤5 - 7.5		≤4 - 6.5		≤4 - 6.5		≤4 - 6.5		≤4 - 4.5
Torsional Stiffness														
C_2	in.lbs./arcmin	17		44		100		266		486		1,557		3,016
	Nm/arcmin	1.9		5		11		33		55		176		340
Axial Load Maximum	R lbs.	112		225		337		518		653		1,058		1,350
	N	500		1,000		1,500		2,300		2,900		4,700		6,000
F_{2AMAX} [3]	D lbs.	—		315		506		788		1,013		1,688		2,250
	N			1,400		2,250		3,500		4,500		7,500		10,000
	Z lbs.	—		135		225		360		450		810		1,125
	N			600		1,000		1,600		2,000		3,600		5,000
Radial Load Maximum [4]	R lbs.	270		563		900		1,463		1,800		2,925		4,050
	N	1,200		2,500		4,000		6,500		8,000		13,000		18,000
F_{2RMAX} [3]	D lbs.	—		619		1,013		1,575		2,025		3,375		4,500
	N			2,750		4,500		7,000		9,000		15,000		20,000
	Z lbs.	—		675		1,125		1,800		2,250		4,050		6,075
	N			3,000		5,000		8,000		10,000		18,000		27,000
Tilting Moment Maximum [4]	R in.lbs.	300		779		1,416		2,991		4,774		5,938		14,735
	Nm	34		88		160		338		536		897		1,665
T_{2Kmax} [3]	D in.lbs.	—		929		1,717		3,593		5,735		10,089		18,320
	Nm			105		194		406		648		1,140		2,070
	Z in.lbs.	—		929		1,770		3,682		5,929		10,992		22,125
	Nm			105		200		416		670		1,242		2,500
Weight	pounds	7.3	8.6	8.8	101	15	16	28.5	25	51	47	105	95	181
m	kg	3.3	3.9	4.0	4.6	6.8	7.0	12.8	11.3	23.2	21.3	47.4	43.2	82
Noise Level														
L_{PA}	dB(A) [5]	≤70		≤70		≤70		≤70	≤72	≤72	≤72	≤74	≤72	≤74
Efficiency (at Nom. Torque)														
h	%	≥ 93% — 95%												
Balance Quality		Q 2.5 (Quality Class-2.5 millimeters per second)												
Lubrication		Synthetic Oil — Lubricated for Life												
Degree of Protection		IP65 - FKM Shaft Seals												
Mounting Position		 Must be Specified.												
Direction of Rotation		See Page156.												
Ambient Temperature		0°C to +40°C (104° F) Other temperatures, contact STOBER Drives.												
Finish		Black												
Lifetime.[6]	hours	L_h > 10,000 hours if T_{2K}/T_{2A} < 1.25 and > 1.00												
L_h		L_h > 20,000 hours if T_{2K}/T_{2A} > 1.25 and < 1.50												
		L_h > 30,000 hours if T_{2K}/T_{2A} > 1.5												
Warranty		5 Year Limited (2 Years on normal wear items: bearings, seals, etc.)												

1) Ratings based on input speed (n_1) of 2000 RPM.
For torque at higher input speeds (T_{2NX}) solve the formula, where n_1 = Actual Input Speed. $T_{2NX} = \dfrac{T_{2N}}{\sqrt[3]{\dfrac{n_1}{2000}}}$

2) Tested at 1.5% of nominal torque and recorded on the input side of the gearhead.
For lower than standard backlash, contact STOBER Technical Support.

3) See Page 165 for output bearing options.

4) Rating based on output speed (n_2) of 100 RPM. For values at other speeds see Page 165.

5) Measurement at one (1) meter distance with input speed (n_1) of 2000 RPM.

6) T_{2A} equals actual tilting moment of the application. See Page 165 for calculation details.

Refer to Page 172 for ServoFit Precision Planetary Gearhead Selection Procedure.

"PKX" Series
ServoFit® Precision Planetary Gearhead
Features

The "PKX" Series ServoFit Precision Planetary Gearheads combines the "P" Series gearhead and a low ratio right angle which uses the FlexiAdapt® motor coupling. HeliCamber® gear technology provides minimum wear, low backlash, and low noise. "PKX" Series units are lubricated for life with synthetic oil and sealed to IP65 standards to prevent lubricant contamination for long life. They have all the great features of the "P" Series unit with the configuration of a right angle.

Some of these features are:

- Readily Attaches to Any Servo Motor (IEC, NEMA, or Customized Motor Plates*)
- 5 Year Limited Warranty (2 years on bearings, seals, etc.)
- Lowest Standard Backlash
- High Torsional Stiffness
- Advanced Gear Technology
- 93 to 95% Efficiency
- Quiet Running
- Assembled in the U.S.A.

* Maximum 10 working days for custom motor plates.



NO EXPEDITE FEE FOR 24 HOUR SERVICE

Highest running accuracy and precision ensured by single piece housing made from high-tensile tempered ductile iron with the additional characteristics of dissipating heat, noise dampening, and greater lubrication retention on the ring gear

Ring gear machined integral to the housing — not welded or pressed in — provides greater concentricity and eliminates speed fluctuation

Bearing options for application specific radial load, axial load, and tilting moments

Magnetic oil filtration



FKM seals for the smallest possible diameter—reducing friction and heat buildup, increasing efficiency, and allowing continuous duty without additional cooling.

Planet carrier straddle mounted for robust output capacity

Adapter bushings to fit all motor shafts — no key required

Highest running smoothness achieved by proven helical gearing and gear tooth microgeometry. Gear quality provided by case-hardened and finish-ground sun and planet gears.

Motor plate can easily be changed to fit your choice of motors

Motor plate pilot toleranced to fit your motor for precise concentricity

The FlexiAdapt® motor coupling is designed for accurate and precise motor installation. The integrated thermal expansion feature in the shape of a bellows compensates for linear expansion of the motor shaft.

The FlexiAdapt® motor shaft adapter system allows installation of motor in minutes without special tools.

See web site for drawings.



"PKX" Series–Right Angle ServoFit® Precision Planetary Gearhead Selection Data

Part Number (Gearhead + Input)	Exact Ratio	Max. Input RPM (n_1) Continuous Mounting Position EL 1,2,5,6	Max. Input RPM (n_1) Continuous Mounting Position EL 3,4	Max. Input RPM (n_1) Cyclic All	Max. Motor Shaft øD6	Mass Moment of Inertia J_1	Torsional Stiffness per arcmin C_2		Output Torque Nominal 1) T_{2N}		Output Torque Acceleration T_{2B}		Output Torque Peak 2) T_{2PEAK}	
	i				mm	kgcm²	in.lbs.	Nm	in.lbs.	Nm	in.lbs.	Nm	in.lbs.	Nm
P221S_ _KX3 with Motor Mounting Plate														
P221S_ _0040 KX301VF0010 MF	4.000	3,000	2,500	4,000	19	1.05	13.6	1.5	142	16	195	22	390	44
P221S_ _0050 KX301VF0010 MF	5.000	3,000	2,500	4,000	19	1.03	14.6	1.6	142	16	195	22	390	44
P221S_ _0070 KX301VF0010 MF	7.000	3,000	2,500	4,000	19	1.02	14.9	1.7	142	16	195	22	390	44
P221S_ _0040 KX301VF0020 MF	8.000	3,500	3,000	5,000	19	0.81	13.6	1.5	142	16	195	22	390	44
P221S_ _0050 KX301VF0020 MF	10.00	3,500	3,000	5,000	19	0.81	14.6	1.6	142	16	195	22	390	44
P221S_ _0050 KX301VF0030 MF	15.00	3,500	3,500	6,000	19	0.75	14.6	1.6	142	16	195	22	390	44
P221S_ _0100 KX301VF0020 MF	20.00	3,500	3,000	5,000	19	0.80	13.7	1.6	106	12	159	18	319	36
P221S_ _0070 KX301VF0030 MF	21.00	3,500	3,500	6,000	19	0.75	14.9	1.7	142	16	195	22	390	44
P221S_ _0080 KX301VF0030 MF	24.00	3,500	3,500	6,000	19	0.75	14.3	1.6	124	14	159	18	319	36
P221S_ _0100 KX301VF0030 MF	30.00	3,500	3,500	6,000	19	0.75	13.7	1.6	106	12	159	18	319	36
P222S_ _KX3 with Motor Mounting Plate														
P222S_ _0350 KX301VF0010 MF	35.00	3,000	2,500	4,000	19	1.02	16.1	1.8	142	16	195	22	390	44
P222S_ _0200 KX301VF0020 MF	40.00	3,500	3,000	5,000	19	0.81	16.0	1.8	142	16	195	22	390	44
P222S_ _0250 KX301VF0020 MF	50.00	3,500	3,000	5,000	19	0.81	16.1	1.8	142	16	195	22	390	44
P222S_ _0280 KX301VF0020 MF	56.00	3,500	3,000	5,000	19	0.81	15.7	1.8	142	16	195	22	390	44
P222S_ _0200 KX301VF0030 MF	60.00	3,500	3,500	6,000	19	0.75	16.0	1.8	142	16	195	22	390	44
P222S_ _0350 KX301VF0020 MF	70.00	3,500	3,000	5,000	19	0.81	16.1	1.8	142	16	195	22	390	44
P222S_ _0250 KX301VF0030 MF	75.00	3,500	3,500	6,000	19	0.75	16.1	1.8	142	16	195	22	390	44
P222S_ _0400 KX301VF0020 MF	80.00	3,500	3,000	5,000	19	0.80	15.6	1.8	142	16	195	22	390	44
P222S_ _0280 KX301VF0030 MF	84.00	3,500	3,500	6,000	19	0.75	15.7	1.8	142	16	195	22	390	44
P222S_ _0500 KX301VF0020 MF	100.0	3,500	3,000	5,000	19	0.80	16.0	1.8	142	16	195	22	390	44
P222S_ _0350 KX301VF0030 MF	105.0	3,500	3,500	6,000	19	0.75	16.1	1.8	142	16	195	22	390	44
P222S_ _0400 KX301VF0030 MF	120.0	3,500	3,500	6,000	19	0.75	15.6	1.8	142	16	195	22	390	44
P222S_ _0700 KX301VF0020 MF	140.0	3,500	3,000	5,000	19	0.80	15.6	1.8	142	16	195	22	390	44
P222S_ _0500 KX301VF0030 MF	150.0	3,500	3,500	6,000	19	0.75	16.0	1.8	142	16	195	22	390	44
P222S_ _1000 KX301VF0020 MF	200.0	3,500	3,000	5,000	19	0.80	14.0	1.6	106	12	159	18	319	36
P222S_ _0700 KX301VF0030 MF	210.0	3,500	3,500	6,000	19	0.75	15.6	1.8	142	16	195	22	390	44
P222S_ _1000 KX301VF0030 MF	300.0	3,500	3,500	6,000	19	0.75	14.0	1.6	106	12	159	18	319	36
P321S_ _KX3 with Motor Mounting Plate														
P321S_ _0030 KX301VF0010 MF	3.000	3,000	2,500	4,000	19	1.21	22.3	2.5	258	29	335	38	567	64
P321S_ _0040 KX301VF0010 MF	4.000	3,000	2,500	4,000	19	1.13	28.2	3.2	344	39	447	50	756	85
P321S_ _0050 KX301VF0010 MF	5.000	3,000	2,500	4,000	19	1.08	32.1	3.6	399	45	558	63	945	107
P321S_ _0030 KX301VF0020 MF	6.000	3,500	3,000	5,000	19	0.85	22.3	2.5	258	29	335	38	644	73
P321S_ _0070 KX301VF0010 MF	7.000	3,000	2,500	4,000	19	1.04	33.0	3.7	399	45	531	60	1,152	130
P321S_ _0040 KX301VF0020 MF	8.000	3,500	3,000	5,000	19	0.83	28.2	3.2	344	39	447	50	859	97
P321S_ _0050 KX301VF0020 MF	10.00	3,500	3,000	5,000	19	0.82	32.1	3.6	399	45	558	63	1,074	121
P321S_ _0050 KX301VF0030 MF	15.00	3,500	3,500	6,000	19	0.75	32.1	3.6	399	45	558	63	1,074	121
P321S_ _0100 KX301VF0020 MF	20.00	3,500	3,000	5,000	19	0.81	32.8	3.7	266	30	443	50	886	100
P321S_ _0070 KX301VF0030 MF	21.00	3,500	3,500	6,000	19	0.75	33.0	3.7	399	45	531	60	1,152	130
P321S_ _0080 KX301VF0030 MF	24.00	3,500	3,500	6,000	19	0.75	32.9	3.7	354	40	443	50	886	100
P321S_ _0100 KX301VF0030 MF	30.00	3,500	3,500	6,000	19	0.75	32.8	3.7	266	30	443	50	886	100
P322S_ _KX3 with Motor Mounting Plate Continued Next Page														
P322S_ _0350 KX301VF0010 MF	35.00	3,000	2,500	4,000	19	1.02	40.3	4.5	399	45	576	65	1,152	130
P322S_ _0200 KX301VF0020 MF	40.00	3,500	3,000	5,000	19	0.81	39.9	4.5	399	45	576	65	1,152	130
P322S_ _0250 KX301VF0020 MF	50.00	3,500	3,000	5,000	19	0.81	40.2	4.5	399	45	576	65	1,152	130
P322S_ _0280 KX301VF0020 MF	56.00	3,500	3,000	5,000	19	0.81	39.2	4.4	399	45	576	65	1,152	130
P322S_ _0200 KX301VF0030 MF	60.00	3,500	3,500	6,000	19	0.75	39.9	4.5	399	45	576	65	1,152	130
P322S_ _0350 KX301VF0020 MF	70.00	3,500	3,000	5,000	19	0.81	40.3	4.5	399	45	576	65	1,152	130
P322S_ _0250 KX301VF0030 MF	75.00	3,500	3,500	6,000	19	0.75	40.2	4.5	399	45	576	65	1,152	130
P322S_ _0400 KX301VF0020 MF	80.00	3,500	3,000	5,000	19	0.80	38.7	4.4	399	45	576	65	1,152	130
P322S_ _0280 KX301VF0030 MF	84.00	3,500	3,500	6,000	19	0.75	39.2	4.4	399	45	576	65	1,152	130

1) Based on input speed: n1 = 2000 RPM
For torque at higher input speeds (T_{2NX}) solve the formula, where n1 = Actual Input Speed. $T_{2NX} = \frac{T_{2N}}{\sqrt[3]{\frac{n_1}{2000}}}$

2) Maximum momentary torque for emergency stops or heavy shock load. Admissible stops per life of gearhead = 1,000 stops maximum.

"PKX" Series–Right Angle ServoFit® Precision Planetary Gearhead Selection Data



Part Number (Gearhead + Input)	Exact Ratio i	Max. Input RPM (n_1) Continuous Mounting Position EL 1,2,5,6	Max. Input RPM (n_1) Continuous Mounting Position EL 3,4	Max. Input RPM (n_1) Cyclic All	Max. Motor Shaft øD^6 mm	Mass Moment of Inertia J_1 kgcm²	Torsional Stiffness per arcmin C_2 in.lbs.	C_2 Nm	Output Torque Nominal [1] T_{2N} in.lbs.	Nominal Nm	Acceleration T_{2B} in.lbs.	Acceleration Nm	Peak [2] T_{2PEAK} in.lbs.	Peak Nm
P322S_ _KX3 with Motor Mounting Plate Continued														
P322S_ _0500 KX301VF0020 MF	100.0	3,500	3,000	5,000	19	0.80	39.9	4.5	399	45	576	65	1,152	130
P322S_ _0350 KX301VF0030 MF	105.0	3,500	3,500	6,000	19	0.75	40.3	4.5	399	45	576	65	1,152	130
P322S_ _0400 KX301VF0030 MF	120.0	3,500	3,500	6,000	19	0.75	38.7	4.4	399	45	576	65	1,152	130
P322S_ _0700 KX301VF0020 MF	140.0	3,500	3,000	5,000	19	0.80	36.8	4.2	399	45	531	60	1,152	130
P322S_ _0500 KX301VF0030 MF	150.0	3,500	3,500	6,000	19	0.75	39.9	4.5	399	45	576	65	1,152	130
P322S_ _1000 KX301VF0020 MF	200.0	3,500	3,000	5,000	19	0.80	34.5	3.9	266	30	443	50	886	100
P322S_ _0700 KX301VF0030 MF	210.0	3,500	3,500	6,000	19	0.75	36.8	4.2	399	45	531	60	1,152	130
P322S_ _1000 KX301VF0030 MF	300.0	3,500	3,500	6,000	19	0.75	34.5	3.9	266	30	443	50	886	100
P421S_ _KX4 with Motor Mounting Plate														
P421S_ _0030 KX401VF0010 MF	3.000	2,500	2,000	3,500	24	3.05	46.4	5.2	443	50	644	73	1,289	146
P421S_ _0040 KX401VF0010 MF	4.000	2,500	2,000	3,500	24	2.65	60.7	6.9	687	78	859	97	1,718	194
P421S_ _0050 KX401VF0010 MF	5.000	2,500	2,000	3,500	24	2.55	70.6	8.0	753	85	1,063	120	2,126	240
P421S_ _0030 KX401VF0020 MF	6.000	2,500	2,500	4,000	24	1.79	46.4	5.2	443	50	644	73	1,289	146
P421S_ _0070 KX401VF0010 MF	7.000	2,500	2,000	3,500	24	2.44	74.2	8.4	753	85	974	110	2,126	240
P421S_ _0040 KX401VF0020 MF	8.000	2,500	2,500	4,000	24	1.70	60.7	6.9	687	78	859	97	1,718	194
P421S_ _0050 KX401VF0020 MF	10.00	2,500	2,500	4,000	24	1.67	70.6	8.0	753	85	1,063	120	2,126	240
P421S_ _0050 KX401VF0030 MF	15.00	3,000	3,000	4,500	24	1.45	70.6	8.0	753	85	1,063	120	2,126	240
P421S_ _0100 KX401VF0020 MF	20.00	2,500	2,500	4,000	24	1.63	73.1	8.3	531	60	886	100	1,772	200
P421S_ _0070 KX401VF0030 MF	21.00	3,000	3,000	4,500	24	1.44	74.2	8.4	753	85	974	110	2,126	240
P421S_ _0080 KX401VF0030 MF	24.00	3,000	3,000	4,500	24	1.44	73.3	8.3	709	80	886	100	1,772	200
P421S_ _0100 KX401VF0030 MF	30.00	3,000	3,000	4,500	24	1.44	73.1	8.3	531	60	886	100	1,772	200
P422S_ _KX3 with Motor Mounting Plate														
P422S_ _0160 KX301VF0020 MF	32.00	3,500	3,000	5,000	19	0.84	86.0	9.7	753	85	1,063	120	2,126	240
P422S_ _0350 KX301VF0010 MF	35.00	3,000	2,500	4,000	19	1.05	92.1	10.4	753	85	1,063	120	2,126	240
P422S_ _0200 KX301VF0020 MF	40.00	3,500	3,000	5,000	19	0.84	90.4	10.2	753	85	1,063	120	2,126	240
P422S_ _0250 KX301VF0020 MF	50.00	3,500	3,000	5,000	19	0.82	91.8	10.4	753	85	1,063	120	2,126	240
P422S_ _0200 KX301VF0030 MF	60.00	3,500	3,500	6,000	19	0.76	90.4	10.2	753	85	1,063	120	2,126	240
P422S_ _0350 KX301VF0020 MF	70.00	3,500	3,000	5,000	19	0.81	92.1	10.4	753	85	1,063	120	2,126	240
P422S_ _0250 KX301VF0030 MF	75.00	3,500	3,500	6,000	19	0.75	91.8	10.4	753	85	1,063	120	2,126	240
P422S_ _0400 KX301VF0020 MF	80.00	3,500	3,000	5,000	19	0.81	88.4	10.0	753	85	1,063	120	2,126	240
P422S_ _0500 KX301VF0020 MF	100.0	3,500	3,000	5,000	19	0.81	92.0	10.4	753	85	1,063	120	2,126	240
P422S_ _0400 KX301VF0030 MF	120.0	3,500	3,500	6,000	19	0.75	88.4	10.0	753	85	1,063	120	2,126	240
P422S_ _0700 KX301VF0020 MF	140.0	3,500	3,000	5,000	19	0.81	84.7	9.6	753	85	974	110	2,126	240
P422S_ _0500 KX301VF0030 MF	150.0	3,500	3,500	6,000	19	0.75	92.0	10.4	753	85	1,063	120	2,126	240
P422S_ _1000 KX301VF0020 MF	200.0	3,500	3,000	5,000	19	0.81	77.8	8.8	531	60	886	100	1,772	200
P422S_ _0700 KX301VF0030 MF	210.0	3,500	3,500	6,000	19	0.75	84.7	9.6	753	85	974	110	2,126	240
P422S_ _1000 KX301VF0030 MF	300.0	3,500	3,500	6,000	19	0.75	77.8	8.8	531	60	886	100	1,772	200
P521S_ _KX5 with Motor Mounting Plate														
P521S_ _0030 KX501VF0010 MF	3.000	2,500	2,000	3,000	32	8.73	120.0	13.5	1,063	120	1,624	183	3,222	364
P521S_ _0040 KX501VF0010 MF	4.000	2,500	2,000	3,000	32	8.52	154.9	17.5	1,718	194	2,165	244	4,296	485
P521S_ _0050 KX501VF0010 MF	5.000	2,500	2,000	3,000	32	8.11	181.4	20.5	1,860	210	2,657	300	5,315	600
P521S_ _0030 KX501VF0020 MF	6.000	2,500	2,500	3,500	32	5.59	120.0	13.5	1,063	120	1,624	183	3,222	364
P521S_ _0070 KX501VF0010 MF	7.000	2,500	2,000	3,000	32	7.74	200.3	22.6	1,860	210	2,392	270	5,315	600
P521S_ _0040 KX501VF0020 MF	8.000	2,500	2,500	3,500	32	5.54	154.9	17.5	1,718	194	2,165	244	4,296	485
P521S_ _0050 KX501VF0020 MF	10.00	2,500	2,500	3,500	32	5.43	181.4	20.5	1,860	210	2,657	300	5,315	600
P521S_ _0050 KX501VF0030 MF	15.00	3,000	3,000	4,000	32	4.85	181.4	20.5	1,860	210	2,657	300	5,315	600
P521S_ _0100 KX501VF0020 MF	20.00	2,500	2,500	3,500	32	5.31	200.6	22.6	1,240	140	2,215	250	4,429	500
P521S_ _0070 KX501VF0030 MF	21.00	3,000	3,000	4,000	32	4.81	200.3	22.6	1,860	210	2,392	270	5,315	600
P521S_ _0080 KX501VF0030 MF	24.00	3,000	3,000	4,000	32	4.80	197.0	22.2	1,772	200	2,215	250	4,429	500
P521S_ _0100 KX501VF0030 MF	30.00	3,000	3,000	4,000	32	4.79	200.6	22.6	1,240	140	2,215	250	4,429	500

Index of Symbols

MT ..... Motor adapter with TriAdapt® coupling
MF ..... Motor adapter with FlexiAdapt® coupling
L ..... Large Input
C ..... ServoCool

i ..... Ratio - Exact
n_1 ..... Maximum input speed RPM
J_1 ..... Mass moment of inertia (input)
C_2 ..... Torsional Stiffness

T_{2N} ..... Nominal Torque
T_{2B} ..... Acceleration Torque Maximum
T_{2PEAK} ..... Peak Torque

See web site for drawings.



"PKX" Series–Right Angle ServoFit® Precision Planetary Gearhead Selection Data

Part Number (Gearhead + Input)	Exact Ratio	Max. Input RPM (n_1) Continuous Mounting Position EL 1,2,5,6	Max. Input RPM (n_1) Continuous Mounting Position EL 3,4	Max. Input RPM (n_1) Cyclic All	Max. Motor Shaft øD6	Mass Moment of Inertia J_1	Torsional Stiffness per arcmin C_2		Output Torque Nominal [1] T_{2N}		Output Torque Acceleration T_{2B}		Output Torque Peak [2] T_{2PEAK}	
	i				mm	kgcm²	in.lbs.	Nm	in.lbs.	Nm	in.lbs.	Nm	in.lbs.	Nm
P522S_ _KX4 with Motor Mounting Plate														
P522S_ _0160 KX401VF0020 MF	32.00	2,500	2,500	4,000	24	1.71	220.0	24.8	1,860	210	2,657	300	4,915	555
P522S_ _0350 KX401VF0010 MF	35.00	2,500	2,000	3,500	24	2.46	239.9	27.1	1,860	210	2,657	300	5,315	600
P522S_ _0200 KX401VF0020 MF	40.00	2,500	2,500	4,000	24	1.70	233.2	26.3	1,860	210	2,657	300	5,315	600
P522S_ _0250 KX401VF0020 MF	50.00	2,500	2,500	4,000	24	1.67	238.3	26.9	1,860	210	2,657	300	5,315	600
P522S_ _0200 KX401VF0030 MF	60.00	3,000	3,000	4,500	24	1.47	233.2	26.3	1,860	210	2,657	300	5,315	600
P522S_ _0350 KX401VF0020 MF	70.00	2,500	2,500	4,000	24	1.65	239.9	27.1	1,860	210	2,657	300	5,315	600
P522S_ _0250 KX401VF0030 MF	75.00	3,000	3,000	4,500	24	1.46	238.3	26.9	1,860	210	2,657	300	5,315	600
P522S_ _0400 KX401VF0020 MF	80.00	2,500	2,500	4,000	24	1.64	228.8	25.8	1,860	210	2,657	300	4,915	555
P522S_ _0500 KX401VF0020 MF	100.0	2,500	2,500	4,000	24	1.64	239.4	27.0	1,860	210	2,657	300	5,315	600
P522S_ _0400 KX401VF0030 MF	120.0	3,000	3,000	4,500	24	1.44	228.8	25.8	1,860	210	2,657	300	4,915	555
P522S_ _0700 KX401VF0020 MF	140.0	2,500	2,500	4,000	24	1.63	232.0	26.2	1,860	210	2,392	270	5,315	600
P522S_ _0500 KX401VF0030 MF	150.0	3,000	3,000	4,500	24	1.44	239.4	27.0	1,860	210	2,657	300	5,315	600
P522S_ _1000 KX401VF0020 MF	200.0	2,500	2,500	4,000	24	1.63	214.9	24.3	1,240	140	2,215	250	4,429	500
P522S_ _0700 KX401VF0030 MF	210.0	3,000	3,000	4,500	24	1.44	232.0	26.2	1,860	210	2,392	270	5,315	600
P522S_ _1000 KX401VF0030 MF	300.0	3,000	3,000	4,500	24	1.44	214.9	24.3	1,240	140	2,215	250	4,429	500
P721S_ _KX7 with Motor Mounting Plate														
P721S_ _0030 KX701VF0010 MF	3.000	1,800	1,600	2,250	38	33.17	325.7	36.8	2,480	280	2,399	271	5,671	640
P721S_ _0040 KX701VF0010 MF	4.000	1,800	1,600	2,250	38	28.45	381.1	43.0	3,437	388	4,296	485	7,561	854
P721S_ _0050 KX701VF0010 MF	5.000	1,800	1,600	2,250	38	26.92	410.1	46.3	3,898	440	5,370	606	9,451	1,067
P721S_ _0030 KX701VF0020 MF	6.000	1,800	1,800	3,000	38	16.79	325.7	36.8	2,480	280	2,399	271	6,444	728
P721S_ _0070 KX701VF0010 MF	7.000	1,800	1,600	2,250	38	25.92	435.7	49.2	3,898	440	5,758	650	11,127	1,256
P721S_ _0040 KX701VF0020 MF	8.000	1,800	1,800	3,000	38	15.61	381.1	43.0	3,437	388	4,296	485	8,592	970
P721S_ _0050 KX701VF0020 MF	10.00	1,800	1,800	3,000	38	15.23	410.1	46.3	3,898	440	5,370	606	10,740	1,213
P721S_ _0050 KX701VF0030 MF	15.00	2,100	2,100	3,500	38	12.65	410.1	46.3	3,898	440	5,370	606	10,740	1,213
P721S_ _0100 KX701VF0020 MF	20.00	1,800	1,800	3,000	38	14.85	416.8	47.0	2,657	300	4,429	500	8,858	1,000
P721S_ _0070 KX701VF0030 MF	21.00	2,100	2,100	3,500	38	12.54	435.7	49.2	3,898	440	5,758	650	11,127	1,256
P721S_ _0080 KX701VF0030 MF	24.00	2,100	2,100	3,500	38	12.51	431.8	48.8	3,543	400	4,429	500	8,858	1,000
P721S_ _0100 KX701VF0030 MF	30.00	2,100	2,100	3,500	38	12.48	416.8	47.0	2,657	300	4,429	500	8,858	1,000
P722S_ _KX5 with Motor Mounting Plate														
P722S_ _0160 KX501VF0020 MF	32.00	2,500	2,500	3,500	32	5.56	437.6	49.4	3,898	440	6,201	700	12,235	1,381
P722S_ _0350 KX501VF0010 MF	35.00	2,500	2,000	3,000	32	7.80	462.3	52.2	3,898	440	6,201	700	12,401	1,400
P722S_ _0200 KX501VF0020 MF	40.00	2,500	2,500	3,500	32	5.53	450.1	50.8	3,898	440	6,201	700	12,401	1,400
P722S_ _0250 KX501VF0020 MF	50.00	2,500	2,500	3,500	32	5.43	457.9	51.7	3,898	440	6,201	700	12,401	1,400
P722S_ _0200 KX501VF0030 MF	60.00	3,000	3,000	4,000	32	4.89	450.1	50.8	3,898	440	6,201	700	12,401	1,400
P722S_ _0350 KX501VF0020 MF	70.00	2,500	2,500	3,500	32	5.35	462.3	52.2	3,898	440	6,201	700	12,401	1,400
P722S_ _0250 KX501VF0030 MF	75.00	3,000	3,000	4,000	32	4.85	457.9	51.7	3,898	440	6,201	700	12,401	1,400
P722S_ _0400 KX501VF0020 MF	80.00	2,500	2,500	3,500	32	5.32	456.0	51.5	3,898	440	6,201	700	12,235	1,381
P722S_ _0500 KX501VF0020 MF	100.0	2,500	2,500	3,500	32	5.31	462.4	52.2	3,898	440	6,201	700	12,401	1,400
P722S_ _0400 KX501VF0030 MF	120.0	3,000	3,000	4,000	32	4.80	456.0	51.5	3,898	440	6,201	700	12,235	1,381
P722S_ _0700 KX501VF0020 MF	140.0	2,500	2,500	3,500	32	5.31	464.2	52.4	3,898	440	5,758	650	11,127	1,256
P722S_ _0500 KX501VF0030 MF	150.0	3,000	3,000	4,000	32	4.79	462.4	52.2	3,898	440	6,201	700	12,401	1,400
P722S_ _1000 KX501VF0020 MF	200.0	2,500	2,500	3,500	32	5.31	429.1	48.4	2,657	300	4,429	500	8,858	1,000
P722S_ _0700 KX501VF0030 MF	210.0	3,000	3,000	4,000	32	4.79	464.2	52.4	3,898	440	5,758	650	11,127	1,256
P722S_ _1000 KX501VF0030 MF	300.0	3,000	3,000	4,000	32	4.79	429.1	48.4	2,657	300	4,429	500	8,858	1,000

[1] Based on input speed: n1 = 2000 RPM
For torque at higher input speeds (T_{2NX}) solve the formula, where n1 = Actual Input Speed. $T_{2NX} = \frac{T_{2N}}{\sqrt[3]{\frac{n_1}{2000}}}$

[2] Maximum momentary torque for emergency stops or heavy shock load. Admissible stops per life of gearhead = 1,000 stops maximum.

See web site for drawings.

"PKX" Series–Right Angle ServoFit® Precision Planetary Gearhead Selection Data



Part Number (Gearhead + Input)	Exact Ratio i	Max. Input RPM (n_1) Continuous Mounting Position EL 1,2,5,6	Max. Input RPM (n_1) Continuous Mounting Position EL 3,4	Max. Input RPM (n_1) Cyclic All	Max. Motor Shaft øD^6 mm	Mass Moment of Inertia J_1 kgcm²	Torsional Stiffness per arcmin C_2 in.lbs.	Torsional Stiffness per arcmin C_2 Nm	Output Torque Nominal [1] T_{2N} in.lbs.	Output Torque Nominal [1] T_{2N} Nm	Output Torque Acceleration T_{2B} in.lbs.	Output Torque Acceleration T_{2B} Nm	Output Torque Peak [2] T_{2PEAK} in.lbs.	Output Torque Peak [2] T_{2PEAK} Nm
P821S_ _KX8 with Motor Mounting Plate														
P821S_ _0030 KX801VF0010 MF	3.000	1,000	750	1,750	48	117.58	741.1	83.7	5,155	582	7,089	800	10,826	1,222
P821S_ _0040 KX801VF0010 MF	4.000	1,000	750	1,750	48	93.73	979.4	110.6	6,874	776	9,451	1,067	14,435	1,630
P821S_ _0050 KX801VF0010 MF	5.000	1,000	750	1,750	48	86.91	1132.5	127.9	8,592	970	11,814	1,334	18,044	2,037
P821S_ _0030 KX801VF0020 MF	6.000	1,100	1,100	2,500	48	58.98	741.1	83.7	5,155	582	7,089	800	12,888	1,455
P821S_ _0070 KX801VF0010 MF	7.000	1,000	750	1,750	48	82.23	1260.7	142.3	8,858	1,000	12,401	1,400	24,900	2,811
P821S_ _0040 KX801VF0020 MF	8.000	1,100	1,100	2,500	48	53.02	979.4	110.6	6,874	776	9,451	1,067	17,185	1,940
P821S_ _0050 KX801VF0020 MF	10.00	1,100	1,100	2,500	48	51.31	1132.5	127.9	8,592	970	11,814	1,334	21,481	2,425
P821S_ _0050 KX801VF0030 MF	15.00	1,300	1,300	3,000	48	44.31	1132.5	127.9	8,592	970	11,814	1,334	21,481	2,425
P821S_ _0100 KX801VF0020 MF	20.00	1,100	1,100	2,500	48	49.54	1229.8	138.8	6,201	700	10,630	1,200	21,259	2,400
P821S_ _0070 KX801VF0030 MF	21.00	1,300	1,300	3,000	48	43.79	1260.7	142.3	8,858	1,000	12,401	1,400	24,900	2,811
P821S_ _0080 KX801VF0030 MF	24.00	1,300	1,300	3,000	48	43.65	1254.9	141.7	7,086	800	10,630	1,200	21,259	2,400
P821S_ _0100 KX801VF0030 MF	30.00	1,300	1,300	3,000	48	43.52	1229.8	138.8	6,201	700	10,630	1,200	21,259	2,400
P822S_ _KX7 with Motor Mounting Plate														
P822S_ _0160 KX701VF0020 MF	32.00	1,800	1,800	3,000	38	15.75	1399.2	158.0	7,086	800	14,173	1,600	28,346	3,200
P822S_ _0350 KX701VF0010 MF	35.00	1,800	1,600	2,250	38	26.03	1484.3	167.6	8,858	1,000	14,173	1,600	28,346	3,200
P822S_ _0200 KX701VF0020 MF	40.00	1,800	1,800	3,000	38	15.64	1455.8	164.4	8,858	1,000	14,173	1,600	28,346	3,200
P822S_ _0250 KX701VF0020 MF	50.00	1,800	1,800	3,000	38	15.30	1471.7	166.1	8,858	1,000	14,173	1,600	28,346	3,200
P822S_ _0200 KX701VF0030 MF	60.00	2,100	2,100	3,500	38	12.83	1455.8	164.4	8,858	1,000	14,173	1,600	28,346	3,200
P822S_ _0350 KX701VF0020 MF	70.00	1,800	1,800	3,000	38	15.01	1484.3	167.6	8,858	1,000	14,173	1,600	28,346	3,200
P822S_ _0250 KX701VF0030 MF	75.00	2,100	2,100	3,500	38	12.68	1471.7	166.1	8,858	1,000	14,173	1,600	28,346	3,200
P822S_ _0400 KX701VF0020 MF	80.00	1,800	1,800	3,000	38	14.88	1427.2	161.1	7,086	800	14,173	1,600	28,346	3,200
P822S_ _0500 KX701VF0020 MF	100.0	1,800	1,800	3,000	38	14.86	1475.1	166.5	8,858	1,000	14,173	1,600	28,346	3,200
P822S_ _0400 KX701VF0030 MF	120.0	2,100	2,100	3,500	38	12.49	1427.2	161.1	7,086	800	14,173	1,600	28,346	3,200
P822S_ _0700 KX701VF0020 MF	140.0	1,800	1,800	3,000	38	14.85	1452.3	163.9	8,858	1,000	12,401	1,400	24,900	2,811
P822S_ _0500 KX701VF0030 MF	150.0	2,100	2,100	3,500	38	12.49	1475.1	166.5	8,858	1,000	14,173	1,600	28,346	3,200
P822S_ _1000 KX701VF0020 MF	200.0	1,800	1,800	3,000	38	14.85	1312.6	148.2	6,201	700	10,630	1,200	21,259	2,400
P822S_ _0700 KX701VF0030 MF	210.0	2,100	2,100	3,500	38	12.48	1452.3	163.9	8,858	1,000	12,401	1,400	24,900	2,811
P822S_ _1000 KX701VF0030 MF	300.0	2,100	2,100	3,500	38	12.48	1312.6	148.2	6,201	700	10,630	1,200	21,259	2,400
P922S_ _KX8 with Motor Mounting Plate														
P922S_ _0160 KX801VF0020 MF	32.00	1,100	1,100	2,500	48	53.26	2770.8	312.8	17,716	2,000	26,574	3,000	53,148	6,000
P922S_ _0350 KX801VF0010 MF	35.00	1,000	750	1,750	48	82.45	2895.9	326.9	17,716	2,000	26,574	3,000	53,148	6,000
P922S_ _0200 KX801VF0020 MF	40.00	1,100	1,100	2,500	48	52.98	2821.4	318.5	17,716	2,000	26,574	3,000	53,148	6,000
P922S_ _0250 KX801VF0020 MF	50.00	1,100	1,100	2,500	48	51.41	2866.1	323.6	17,716	2,000	26,574	3,000	53,148	6,000
P922S_ _0200 KX801VF0030 MF	60.00	1,300	1,300	3,000	48	45.05	2821.4	318.5	17,716	2,000	26,574	3,000	53,148	6,000
P922S_ _0350 KX801VF0020 MF	70.00	1,100	1,100	2,500	48	50.19	2895.9	326.9	17,716	2,000	26,574	3,000	53,148	6,000
P922S_ _0250 KX801VF0030 MF	75.00	1,300	1,300	3,000	48	44.35	2866.1	323.6	17,716	2,000	26,574	3,000	53,148	6,000
P922S_ _0400 KX801VF0020 MF	80.00	1,100	1,100	2,500	48	49.53	2874.4	324.5	17,716	2,000	26,574	3,000	53,148	6,000
P922S_ _0500 KX801VF0020 MF	100.0	1,100	1,100	2,500	48	49.48	2889.2	326.2	17,716	2,000	26,574	3,000	53,148	6,000
P922S_ _0400 KX801VF0030 MF	120.0	1,300	1,300	3,000	48	43.51	2874.4	324.5	17,716	2,000	26,574	3,000	53,148	6,000
P922S_ _0700 KX801VF0020 MF	140.0	1,100	1,100	2,500	48	49.45	2787.9	314.7	17,716	2,000	23,917	2,700	47,833	5,400
P922S_ _0500 KX801VF0030 MF	150.0	1,300	1,300	3,000	48	43.49	2889.2	326.2	17,716	2,000	26,574	3,000	53,148	6,000
P922S_ _1000 KX801VF0020 MF	200.0	1,100	1,100	2,500	48	49.43	2260.7	255.2	12,401	1,400	17,716	2,000	35,432	4,000
P922S_ _0700 KX801VF0030 MF	210.0	1,300	1,300	3,000	48	43.48	2787.9	314.7	17,716	2,000	23,917	2,700	47,833	5,400
P922S_ _1000 KX801VF0030 MF	300.0	1,300	1,300	3,000	48	43.47	2260.7	255.2	12,401	1,400	17,716	2,000	35,432	4,000

Index of Symbols

MT ..... Motor adapter with TriAdapt® coupling
MF ..... Motor adapter with FlexiAdapt® coupling
L ..... Large Input
C ..... ServoCool

i ..... Ratio - Exact
n_1 ..... Maximum input speed RPM
J_1 ..... Mass moment of inertia (input)
C_2 ..... Torsional Stiffness

T_{2N} ..... Nominal Torque
T_{2B} ..... Acceleration Torque Maximum
T_{2PEAK} ..... Peak Torque

See web site for drawings.



"PKX" Series–Right Angle ServoFit® Precision Planetary Gearhead Dimensional Data

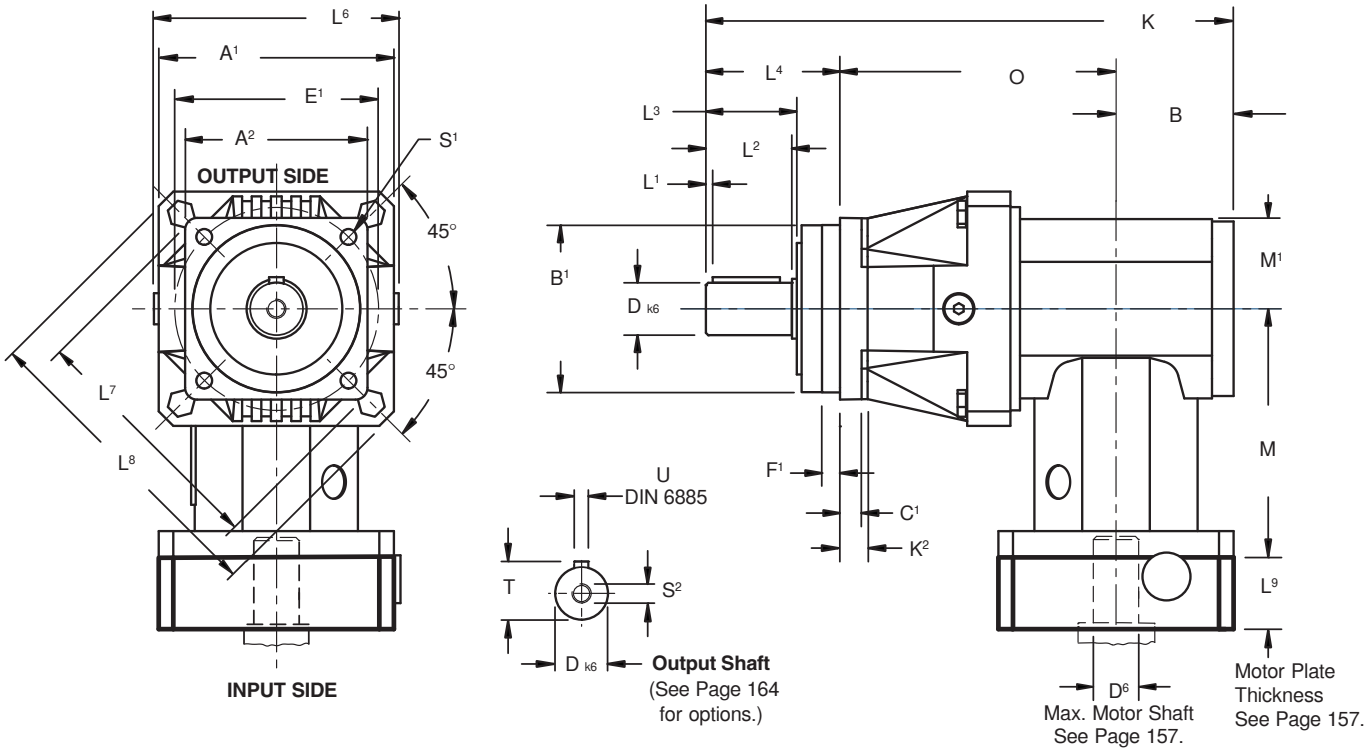


Table No. 1 **"PKX" Series – ServoFit Precision Planetary Gearhead Dimensions (mm/inches)**

Unit	A1	A2	B1 h6	C1	D k6	E1	F1	K2	L1	L2	L3	L4	L6	L7	L8	S1	S2	T	U
P221S_KX3	55	55	50 +.000/-.016	6	12 +.012/+.001	63	7.0	—	2	22	24	36	62	74	80	5.5	M4x13.5	18	A4x4x18
	2.17	2.17	1.969 +.0000/-.0006	.24		2.48	.28	—	.08	.87	.94	1.42	2.44	2.91	3.15	.22		.71	
P321S_KX3	72	72	60 +.000/-.019	7	16 +.012/+.001	75	7.5	—	2	28	30	48	79	—	92	5.5	M5x12.5	18	A5x5x22
	2.83	2.83	2.362 +.0000/-.0007	.28		2.95	.30	—	.08	1.10	1.18	1.89	3.11	—	3.62	.22		.71	
P421S_KX4	98	76	70 +.000/-.019	9	22 +.015/+.002	85	7.5	12	3	36	38	56	98	103.3	130	6.6	M8x19	24.5	A6x6x28
	3.86	2.99	2.756 +.0000/-.0007	.35		3.35	.30	.47	.12	1.42	1.50	2.20	3.86	4.07	5.12	.26		.96	
P521S_KX5	115	101	90 +.000/-.022	10	32 +.018/+.002	120	15	14	3	58	60	88	121	139	149	9	M12x28	35	A10x8x50
	4.53	3.98	3.543 +.0000/-.0009	.39		4.72	.59	.55	.12	2.28	2.36	3.46	4.76	5.47	5.87	.35		1.38	
P721S_KX7	145	145	130 +.000/-.025	15	40 +.018/+.002	165	3.5	—	4	82	85	112	145	—	190	11	M16x36	43	A12x8x70
	5.71	5.71	5.118 +.000/-.001	.59		6.50	.14	—	.16	3.23	3.35	4.41	5.71	—	7.48	.43		1.69	
P821S_KX8	190	190	160 +.000/-.025	15	55 +.021/+.002	215	10	—	6	82	85	112	190	—	250	13.5	M20x42	59	A12x8x70
	7.48	7.48	6.299 +.000/-.001	.59		8.46	.39	—	.24	3.23	3.35	4.41	7.48	—	9.84	.53		2.32	

Table No. 2 Dimensions (mm/inches)

Unit	B	K	M	M1	O
P221S_KX3	40	160	95.5	31	84
	1.57	6.30	3.76	1.22	3.31
P321S_KX3	40	184	95.5	31	96
	1.57	7.24	3.76	1.22	3.78
P421S_KX4	49	220	104	37.5	115
	1.93	8.66	4.09	1.48	4.53
P521S_KX5	60	277	132	45	129
	2.36	10.91	5.20	1.77	5.08
P721S_KX7	74	343	172.5	60	157
	2.91	13.50	6.79	2.36	6.18
P821S_KX8	92	417	210	75	213
	3.62	16.42	8.27	2.95	8.39

When ordering a planetary gearhead, specify the motor manufacturer and part number, provide the motor drawing with dimensions, or specify the motor mounting dimensions. (See Page 157.)

Part No. Explanation

P 4 2 1 S P R 0100 KX401VF 0030 MF

- MF – Motor Plate with FlexiAdapt® Coupling
- 0030 – Ratio (0030 = 3.0:1)
- KX401VF – Right Angle Unit, Size **4**, **1** Stage
- 0100 – Ratio (**0100** = 10.0:1)
- R – **R** – Normal Bearing
  - **D** – Reinforced Bearings-Axial
  - **Z** – Reinforced Bearings-Radial
- P – **G** – Shaft — no Key
  - **P** – Output Shaft with Key
  - **V** – Splined Shaft
- S – Standard Housing
- 1 – No. of Gear Stages (**1** = 1 Stage, **2** = 2 Stages)
- 2 – Generation Number
- 4 – Unit No.
- P – "P" Series ServoFit Precision Planetary Gearhead

See web site for drawings.

"PKX" Series–Right Angle ServoFit® Precision Planetary Gearhead Dimensional Data



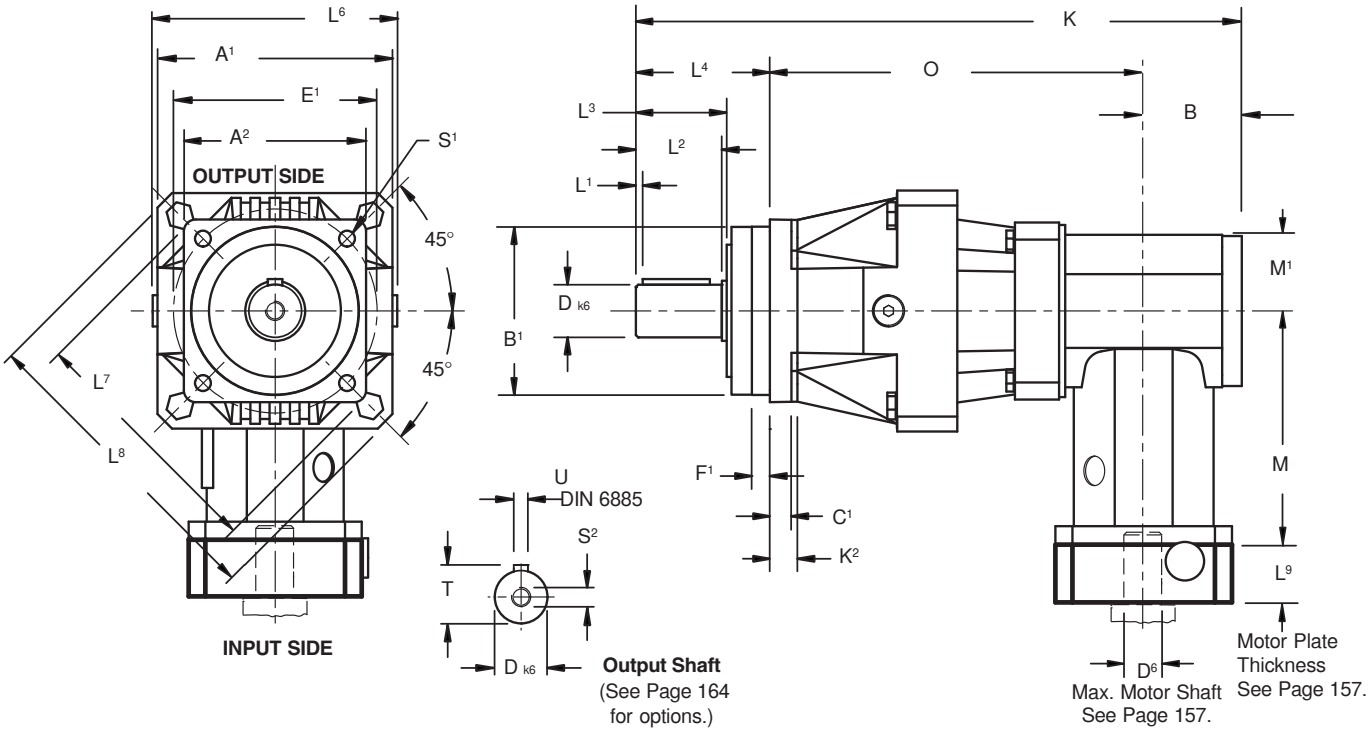


Table No. 3 **"PKX" Series – ServoFit Precision Planetary Gearhead Dimensions (mm/inches)**

Unit	A1	A2	B1 h6	C1	D k6	E1	F1	K2	L1	L2	L3	L4	L6	L7	L8	S1	S2	T	U
P222S_KX3	55	55	50 +.000/-.016	6	12 +.012/+.001	63	7.0	—	2	22	24	36	62	74	80	5.5	M4x13.5	24.5	A4x4x18
	2.17	2.17	1.969 +.0000/-.0006	.24		2.48	.28	—	.08	.87	.94	1.42	2.44	2.91	3.15	.22		.96	
P322S_KX3	72	72	60 +.000/-.019	7	16 +.012/+.001	75	7.5	—	2	28	30	48	79	92	92	5.5	M5x18	24.5	A5x5x22
	2.83	2.83	2.362 +.0000/-.0007	.28		2.95	.30	—	.08	1.10	1.18	1.89	3.11	3.62	3.62	.22		.96	
P422S_KX3	98	76	70 +.000/-.019	9	22 +.015/+.002	85	7.5	12	3	36	38	56	98	103.3	130	6.6	M8x19	24.5	A6x6x28
	3.86	2.99	2.756 +.0000/-.0007	.35		3.35	.30	.47	.12	1.42	1.50	2.20	3.86	4.07	5.12	.26		.96	
P522S_KX4	115	101	90 +.000/-.022	10	32 +.018/+.002	120	15	14	3	58	60	88	121	139	149	9	M12x28	35	A10x8x50
	4.53	3.98	3.543 +.0000/-.0009	.39		4.72	.59	.55	.12	2.28	2.36	3.46	4.76	5.47	5.87	.35		1.38	
P722S_KX5	145	145	130 +.000/-.025	15	40 +.018/+.002	165	3.5	—	4	82	85	112	145	—	190	11	M16x36	43	A12x8x70
	5.71	5.71	5.118 +.000/-.001	.59		6.50	.14	—	.16	3.23	3.35	4.41	5.71	—	7.48	.43		1.69	
P822S_KX7	190	190	160 +.000/-.025	15	55 +.021/+.002	215	10	—	6	82	85	112	190	—	250	13.5	M20x42	59	A16x10x70
	7.48	7.48	6.299 +.000/-.001	.59		8.46	.39	—	.24	3.23	3.35	4.41	7.48	—	9.84	.53		2.32	
P922S_KX8	225	212	180 +.000/-.025	17	75 +.021/+.002	250	10	22	7	105	109	143	225	285	300	17.5	M20x42	79.5	A20x12x90
	8.86	8.35	7.087 +.000/-.001	.67		9.84	.39	.87	.28	4.29	3.35	5.63	8.86	11.22	11.81	.69		3.13	

Part No. Explanation

P 4 2 2 S P R 0250 KX301VF 0030 MF

- Motor Plate with FlexiAdapt® Coupling
- Ratio(**0030** = 3.0:1)
- Right Angle Unit, Size **3, 1** Stage
- Ratio (**0250** = 25.0:1)
- **R –** Normal Bearing
- **D –** Reinforced Bearings-Axial
- **Z –** Reinforced Bearings-Radial
- **G –** Shaft — no Key
- **P –** Output Shaft with Key
- **V –** Splined Shaft
- Standard Housing
- No. of Gear Stages (**1** = 1 Stage, **2** = 2 Stages)
- Generation Number
- Unit No.
- "P" Series ServoFit Precision Planetary Gearhead

When ordering a planetary gearhead, specify the motor manufacturer and part number, provide the motor drawing with dimensions, or specify the motor mounting dimensions. (See Page 157.)

Table No. 4 Dimensions (mm/inches)

Unit	B	K	M	M1	O
P222S_KX3	40	192	95.5	31	116
	1.57	7.56	3.76	1.22	4.57
P322S_KX3	40	224	95.5	31	136
	1.57	8.82	3.76	1.22	5.35
P422S_KX3	40	249.5	95.5	31	153.5
	1.57	9.83	3.76	1.22	6.04
P522S_KX4	49	309.5	104	37.5	172.5
	1.93	12.19	4.09	1.48	6.79
P722S_KX5	60	378	132	45	206
	2.36	14.88	5.20	1.77	8.11
P822S_KX7	74	451.5	172.5	60	265.5
	2.91	17.76	6.79	2.36	10.45
P922S_KX8	92	575	210	75	340
	3.62	22.64	8.27	2.95	13.39

See web site for drawings.

"PH" Series
ServoFit® Precision Planetary Gearhead
Performance Specifications

		Size	PH321 PH322	PH421 PH422	PH521 PH522	PH721 PH722	PH821 PH822	PH912 PH923	PH1012 PH1023
Acceleration Torque Max.	T_{2B}	in.lbs. Nm	575 65	1,150 130	2,832 320	6,195 700	17,700 2,000	37,612 4,250	66,375 7,500
Output Torque Nominal [1]	T_{2N}	in.lbs. Nm	398 45	796 90	1,947 220	3,894 440	11,062 1,250	22,125 2,500	35,400 4,000
Input Speed Maximum	n_{1MAX}	Continuous Cyclic	3,800 4,500 6,000 8,000	3,500 4,500 6,000 8,000	3,300 4,000 6,000 7,000	3,000 3,700 5,000 6,500	2,500 3,300 4,000 6,000	2,800 2,500 4,500	2,300 2,500 4,500
ServoCool Input RPM Max.	n_{1MAX}	Continuous Cyclic	— —	4,500 — 6,000 —	4,500 5,000 6,000 7,000	4,000 4,700 5,000 6,500	3,700 4,300 4,500 6,000	4,000 3,200 4,500	4,000 3,000 4,500
Torsional Backlash [2]	$\Delta\varphi$	arcmin	≤3	≤3	≤3	≤3	≤3	≤3	≤3
Torsional Stiffness	C_2	in.lbs./arcmin Nm/arcmin	≤106 ≤12	≤292 ≤33	≤708 ≤80	≤1,371 ≤155	≤3,752 ≤424	≤5,858 ≤662	≤9,673 ≤1,093
Axial Load Maximum	F_{2AMAX}	lbs. N	371 1,650	484 2,150	934 4,150	1,384 6,150	2,260 10,050	7,425 33,000	11,250 50,000
Tilting Moment Maximum	T_{2K}	in.lbs. Nm	885 100	2,301 260	3,894 440	13,275 1,500	30,975 3,500	57,525 6,500	77,880 8,800
Tilting Stiffness	C_{2K}	in.lbs./arcmin Nm/arcmin	— —	1,416 160	2,655 300	4,425 500	13,718 1,550	48,675 5,500	84,075 9,500
Efficiency (at Nominal Torque)	h	%	96% 94%	96% 94%	96% 94%	96% 94%	96% 94%	96% 94%	94% 92%
Weight	m	pounds kg	4 1.8	9 10 3.9 4.6	15 18 6.6 8.1	27 32 12.3 14.6	76 88 34.6 39.8	157 139 71 63	190 216 86 98
Noise Level [4]	L_{PA}	dB(A)	≤61	≤62	≤63	≤64	≤65	≤65	≤65
Balance Quality			Q 2.5 (Quality Class-2.5 millimeters per second)						
Lubrication			Synthetic Oil (ISO VG 150)						
Degree of Protection			IP65						
Mounting Position			Unrestricted.						
Ambient Temperature			0°C to +40°C (104° F) Other temperatures, contact STOBER Drives.						
Finish			Black (RAL 9005)						
Lifetime [5]	L_h	hours	L_h > 10,000 hours if T_{2K}/T_{2A} < 1.25 L_h > 20,000 hours if T_{2K}/T_{2A} > 1.25						
Warranty			5 Year Limited (2 Years on normal wear items: bearings, seals, etc.)						

[1] Ratings based on input speed (n_1) of 2000 RPM.
For torque at higher input speeds (T_{2NX}) solve the formula, where n1 = Actual Input Speed. $T_{2NX} = \frac{T_{2N}}{\sqrt[3]{\frac{n_1}{2000}}}$

[2] Tested at 1.5% of nominal torque and recorded on the input side of the gearhead.

[3] Rating based on output speed (n2) of 100 RPM. For values at other speeds see Page 167.

[4] Measurement at one (1) meter distance with input speed (n1) of 3000 RPM.

[5] T_{2A} equals actual tilting moment of the application. See Page 167 for calculation details.

"PH" Series
ServoFit® Precision Planetary Gearhead
Features

The "PH" Series ServoFit Precision Planetary Gearheads are designed for high demands of torsional stiffness and tilting rigidity. The "PH" series is well suited where a smooth, precise, reliable drive is needed. All units are lubricated for life with synthetic oil and sealed to IP65 standards to prevent lubricant contamination for long life.

Some features are:

- Readily Attaches to Any Servo Motor
- ISO Output Flange for Coupling Free Mounting
- Superior Torsional Stiffness
- Advanced Helicamber Gear Technology
- 90-96% Efficiency
- 5 Year Limited Warranty (2 Year on bearings, seals, etc.)
- Excellent Axial Load Capacity
- Wide Selection of IEC, NEMA, or Customized* Motor Plates



* Maximum 10 working day for custom motor plates.

HeliCamber® gear technology provides minimum wear, low backlash, and low noise

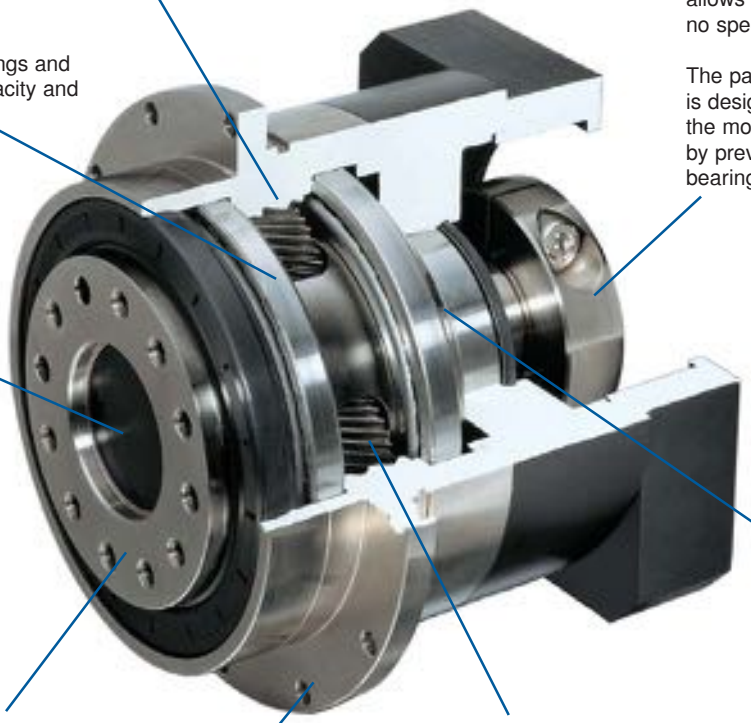
Triple-split steel collet for greater concentricity and low inertia

Ring gear machined integral to the housing — not welded or pressed in

TriAdapt® motor shaft adapter system allows installation of motor in minutes – no special tools required.

The patented TriAdapt® motor coupling is designed to allow thermal expansion of the motor shaft—ensuring long motor life by preventing thrust load on the motor bearings.

Oversized tapered roller bearings and shafts for high radial load capacity and superior torsional stiffness



Blind pilot hole

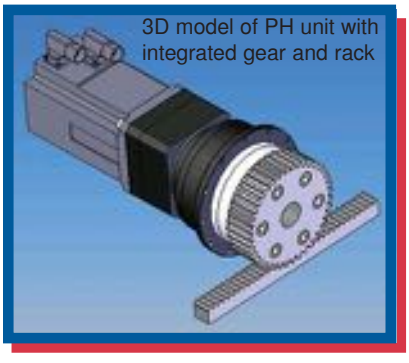
Adapter bushings fit all motor shafts — no key required

FKM seals for the smallest possible diameter—reducing friction and heat buildup, increasing efficiency, and allowing continuous duty without additional cooling.

The output flange dimensions are ISO 9409 and allow easy mounting to rotary or indexing tables, pinions, timing belt pulleys, transmission shafting, etc., without using a coupling.

Gears are case hardened to 61 Rockwell "C" and ground for maximum efficiency

Single piece steel housing provides greater concentricity and more precise alignment





Also available with input shaft (AW).



Available as ServoCool in Sizes PH4 thru PH10.

See web site for drawings.



"PH" Series
ServoFit® Precision Planetary Gearhead
Selection Data

Part Number (Gearhead + Input)	Exact Ratio	Maximum Input Speed		Maximum Motor Shaft	Mass Moment of Inertia	Torsional Stiffness per arcmin		Output Torque					
								Nominal [1]		Acceleration		Peak [2]	
Gearhead		Continuous	Cyclic			C_2		T_{2N}		T_{2B}		T_{2PEAK}	
	i	RPM (n_1)		mm	kgcm²	in.lbs.	Nm	in.lbs.	Nm	in.lbs.	Nm	in.lbs.	Nm
PH321 with Motor Mounting Plate													
PH321F0050MT	5.000	3,000	6,000	19	0.64	115	13.0	399	45	576	65	1,152	130
PH321F0050MTL	5.000	3,000	6,000	24	1.32	115	13.0	399	45	576	65	1,152	130
PH321F0070MT	7.000	3,500	6,000	19	0.59	102	11.5	399	45	531	60	1,152	130
PH321F0070MTL	7.000	3,500	6,000	24	1.26	102	11.5	399	45	531	60	1,152	130
PH321F0100MT	10.00	3,800	6,000	19	0.57	79.7	9.0	266	30	443	50	886	100
PH321F0100MTL	10.00	3,800	6,000	24	1.25	79.7	9.0	266	30	443	50	886	100
PH322 with Motor Mounting Plate													
PH322F0200MT	20.00	4,500	8,000	14	0.14	89.7	10.1	399	45	576	65	1,152	130
PH322F0200MTL	20.00	4,500	8,000	19	0.61	90.4	10.2	399	45	576	65	1,152	130
PH322F0250MT	25.00	4,500	8,000	14	0.12	89.9	10.2	399	45	576	65	1,152	130
PH322F0250MTL	25.00	4,500	8,000	19	0.59	90.4	10.2	399	45	576	65	1,152	130
PH322F0280MT	28.00	4,500	8,000	14	0.14	90.3	10.2	399	45	531	60	1,152	130
PH322F0280MTL	28.00	4,500	8,000	19	0.61	90.7	10.2	399	45	531	60	1,152	130
PH322F0350MT	35.00	4,500	8,000	14	0.11	89.0	10.0	399	45	576	65	1,152	130
PH322F0350MTL	35.00	4,500	8,000	19	0.57	89.3	10.1	399	45	576	65	1,152	130
PH322F0400MT	40.00	4,500	8,000	14	0.14	76.0	8.6	266	30	443	50	886	100
PH322F0400MTL	40.00	4,500	8,000	19	0.61	76.1	8.6	266	30	443	50	886	100
PH322F0500MT	50.00	4,500	8,000	14	0.10	86.7	9.8	399	45	576	65	1,152	130
PH322F0500MTL	50.00	4,500	8,000	19	0.56	86.9	9.8	399	45	576	65	1,152	130
PH322F0700MT	70.00	4,500	8,000	14	0.10	88.7	10.0	399	45	531	60	1,152	130
PH322F0700MTL	70.00	4,500	8,000	19	0.56	88.8	10.0	399	45	531	60	1,152	130
PH322F1000MT	100.0	4,500	8,000	14	0.10	75.4	8.5	266	30	443	50	886	100
PH322F1000MTL	100.0	4,500	8,000	19	0.56	75.5	8.5	266	30	443	50	886	100
PH421 with Motor Mounting Plate													
PH421F0040MT	4.000	2,300	5,000	24	1.73	346	39	753	85	1,152	130	2,126	240
PH421F0040MTC	4.000	3,300	5,000	24	2.46	283	32	753	85	1,152	130	1,701	192
PH421F0040MTL	4.000	2,300	5,000	32	3.96	346	39	753	85	1,152	130	2,126	240
PH421F0050MT	5.000	2,700	6,000	24	1.55	328	37	753	85	1,152	130	2,126	240
PH421F0050MTC	5.000	3,700	6,000	24	2.28	289	33	753	85	1,152	130	2,126	240
PH421F0050MTL	5.000	2,700	6,000	32	3.78	328	37	753	85	1,152	130	2,126	240
PH421F0070MT	7.000	3,200	6,000	24	1.38	275	31	753	85	974	110	2,126	240
PH421F0070MTC	7.000	4,200	6,000	24	2.13	260	29	753	85	974	110	2,126	240
PH421F0070MTL	7.000	3,200	6,000	32	3.65	275	31	753	85	974	110	2,126	240
PH421F0100MT	10.00	3,500	6,000	24	1.30	186	21	531	60	886	100	1,772	200
PH421F0100MTC	10.00	4,500	6,000	24	2.05	183	21	531	60	886	100	1,772	200
PH421F0100MTL	10.00	3,500	6,000	32	3.57	186	21	531	60	886	100	1,772	200
PH422 with Motor Mounting Plate Continued Next Page													
PH422F0160MT	16.00	3,700	6,500	19	0.72	237	27	797	90	1,152	130	2,126	240
PH422F0160MTL	16.00	3,700	6,500	24	1.40	237	27	797	90	1,152	130	2,126	240
PH422F0200MT	20.00	3,700	6,500	19	0.71	256	29	797	90	1,152	130	2,126	240
PH422F0200MTL	20.00	3,700	6,500	24	1.39	256	29	797	90	1,152	130	2,126	240
PH422F0250MT	25.00	4,000	7,000	19	0.65	254	29	797	90	1,152	130	2,126	240
PH422F0250MTL	25.00	4,000	7,000	24	1.34	254	29	797	90	1,152	130	2,126	240

[1] Based on input speed: n1 = 2000 RPM
For torque at higher input speeds (T_{2NX}) solve the formula, where n1 = Actual Input Speed. $T_{2NX} = \frac{T_{2N}}{\sqrt[3]{\frac{n_1}{2000}}}$

[2] Maximum momentary torque for emergency stops or heavy shock load. Admissible stops per life of gearhead = 1,000 stops maximum.

See web site for drawings.

"PH" Series
ServoFit® Precision Planetary Gearhead
Selection Data



Part Number (Gearhead + Input)	Exact Ratio	Maximum Input Speed		Maximum Motor Shaft	Mass Moment of Inertia	Torsional Stiffness per arcmin		Output Torque					
								Nominal [1]		Acceleration		Peak [2]	
Gearhead		Continuous	Cyclic	øD⁶		C_2		T_{2N}		T_{2B}		T_{2PEAK}	
	i	RPM (n_1)		mm	kgcm²	in.lbs.	Nm	in.lbs.	Nm	in.lbs.	Nm	in.lbs.	Nm
PH422 with Motor Mounting Plate Continued													
PH422F0280MT	28.00	4,500	8,000	19	0.60	222	25	797	90	1,152	130	2,126	240
PH422F0280MTL	28.00	4,500	8,000	24	1.27	222	25	797	90	1,152	130	2,126	240
PH422F0350MT	35.00	4,500	8,000	19	0.60	245	28	797	90	1,152	130	2,126	240
PH422F0350MTL	35.00	4,500	8,000	24	1.27	245	28	797	90	1,152	130	2,126	240
PH422F0400MT	40.00	4,500	8,000	19	0.58	215	24	797	90	1,152	130	2,126	240
PH422F0400MTL	40.00	4,500	8,000	24	1.25	215	24	797	90	1,152	130	2,126	240
PH422F0500MT	50.00	4,500	8,000	19	0.58	239	27	797	90	1,152	130	2,126	240
PH422F0500MTL	50.00	4,500	8,000	24	1.25	239	27	797	90	1,152	130	2,126	240
PH422F0700MT	70.00	4,500	8,000	19	0.58	237	27	797	90	974	110	2,126	240
PH422F0700MTL	70.00	4,500	8,000	24	1.25	237	27	797	90	974	110	2,126	240
PH422F1000MT	100.0	4,500	8,000	19	0.58	177	20	531	60	886	100	1,772	200
PH422F1000MTL	100.0	4,500	8,000	24	1.25	177	20	531	60	886	100	1,772	200
PH521 with Motor Mounting Plate													
PH521F0040MT	4.000	2,200	5,000	32	3.65	868	98	1,860	210	2,835	320	4,915	555
PH521F0040MTC	4.000	3,200	5,000	32	5.87	648	73	1,860	210	2,447	276	3,059	345
PH521F0040MTL	4.000	2,200	5,000	38	6.68	868	98	1,860	210	2,835	320	4,915	555
PH521F0050MT	5.000	2,500	5,500	32	4.47	824	93	1,860	210	2,835	320	5,315	600
PH521F0050MTC	5.000	3,500	5,500	32	6.69	683	77	1,860	210	2,835	320	3,824	432
PH521F0050MTL	5.000	2,500	5,500	38	7.50	824	93	1,860	210	2,835	320	5,315	600
PH521F0070MT	7.000	3,000	6,000	32	3.97	682	77	1,860	210	2,392	270	5,315	600
PH521F0070MTC	7.000	4,000	6,000	32	6.21	627	71	1,860	210	2,392	270	5,315	600
PH521F0070MTL	7.000	3,000	6,000	38	7.02	682	77	1,860	210	2,392	270	5,315	600
PH521F0100MT	10.00	3,300	6,000	32	3.72	487	55	1,240	140	2,215	250	4,429	500
PH521F0100MTC	10.00	4,500	6,000	32	5.96	473	53	1,240	140	2,215	250	4,429	500
PH521F0100MTL	10.00	3,300	6,000	38	6.77	487	55	1,240	140	2,215	250	4,429	500
PH522 with Motor Mounting Plate Continued Next Page													
PH522F0160 MT	16.00	3,300	6,000	24	1.54	575	65	1,860	210	2,835	320	4,915	555
PH522F0160MTC	16.00	4,300	6,000	24	2.26	562	63	1,860	210	2,835	320	4,915	555
PH522F0160MTL	16.00	3,300	6,000	32	3.76	575	65	1,860	210	2,835	320	4,915	555
PH522F0200MT	20.00	3,300	6,000	24	1.59	629	71	1,949	220	2,835	320	5,315	600
PH522F0200MTC	20.00	4,300	6,000	24	2.31	619	70	1,949	220	2,835	320	5,315	600
PH522F0200MTL	20.00	3,300	6,000	32	3.81	629	71	1,949	220	2,835	320	5,315	600
PH522F0250MT	25.00	3,700	6,500	24	1.47	625	71	1,949	220	2,835	320	5,315	600
PH522F0250MTC	25.00	4,500	6,500	24	2.19	619	70	1,949	220	2,835	320	5,315	600
PH522F0250MTL	25.00	3,700	6,500	32	3.69	625	71	1,949	220	2,835	320	5,315	600
PH522F0280MT	28.00	4,000	7,000	24	1.32	540	61	1,860	210	2,835	320	4,915	555
PH522F0280MTC	28.00	5,000	7,000	24	2.06	537	61	1,860	210	2,835	320	4,915	555
PH522F0280MTL	28.00	4,000	7,000	32	3.58	540	61	1,860	210	2,835	320	4,915	555
PH522F0350 MT	35.00	4,000	7,000	24	1.33	602	68	1,949	220	2,835	320	5,315	600
PH522F0350MTC	35.00	5,000	7,000	24	2.08	599	68	1,949	220	2,835	320	5,315	600
PH522F0350MTL	35.00	4,000	7,000	32	3.60	602	68	1,949	220	2,835	320	5,315	600
PH522F0400MT	40.00	4,000	7,000	24	1.27	517	58	1,860	210	2,835	320	4,915	555
PH522F0400MTC	40.00	5,000	7,000	24	2.02	515	58	1,860	210	2,835	320	4,915	555
PH522F0400MTL	40.00	4,000	7,000	32	3.54	517	58	1,860	210	2,835	320	4,915	555

Index of Symbols

MT ..... Motor adapter with TriAdapt® coupling	i ..... Ratio - Exact	T_{2N} ..... Nominal Torque
MF ..... Motor adapter with FlexiAdapt® coupling	n_1 ..... Maximum input speed RPM	T_{2B} ..... Acceleration Torque Maximum
L ..... Large Input	J_1 ..... Mass moment of inertia (input)	T_{2PEAK} ..... Peak Torque
C ..... ServoCool	C_2 ..... Torsional Stiffness	

See web site for drawings.



"PH" Series
ServoFit® Precision Planetary Gearhead
Selection Data

Part Number (Gearhead + Input)	Exact Ratio	Maximum Input Speed		Maximum Motor Shaft	Mass Moment of Inertia	Torsional Stiffness per arcmin		Output Torque					
								Nominal [1]		Acceleration		Peak [2]	
Gearhead	i	Continuous RPM (n_1)	Cyclic	øD^6 mm	J_1 kgcm²	C_2 in.lbs.	Nm	T_{2N} in.lbs.	Nm	T_{2B} in.lbs.	Nm	T_{2PEAK} in.lbs.	Nm
PH522 with Motor Mounting Plate Continued													
PH522F0500MT	50.00	4,000	7,000	24	1.28	583	66	1,949	220	2,835	320	5,315	600
PH522F0500MTC	50.00	5,000	7,000	24	2.03	582	66	1,949	220	2,835	320	5,315	600
PH522F0500MTL	50.00	4,000	7,000	32	3.55	583	66	1,949	220	2,835	320	5,315	600
PH522F0700MT	70.00	4,000	7,000	24	1.28	581	66	1,860	210	2,392	270	5,315	600
PH522F0700MTC	70.00	5,000	7,000	24	2.02	580	66	1,860	210	2,392	270	5,315	600
PH522F0700 MTL	70.00	4,000	7,000	32	3.54	581	66	1,860	210	2,392	270	5,315	600
PH522F1000MT	100.0	4,000	7,000	24	1.27	459	52	1,240	140	2,215	250	4,429	500
PH522F1000MTC	100.0	5,000	7,000	24	2.02	459	52	1,240	140	2,215	250	4,429	500
PH522F1000MTL	100.0	4,000	7,000	32	3.54	459	52	1,240	140	2,215	250	4,429	500
PH721 with Motor Mounting Plate													
PH721F0040MT	4.000	1,900	4,000	38	11.18	1,639	185	3,898	440	6,201	700	12,235	1,381
PH721F0040MTC	4.000	2,400	4,000	38	22.42	1,271	144	3,898	440	6,201	700	12,235	1,381
PH721F0040MTL	4.000	1,900	4,000	48	29.03	1,639	185	3,898	440	6,201	700	12,235	1,381
PH721F0050MT	5.000	2,200	5,000	38	9.34	1,630	184	3,898	440	6,201	700	12,401	1,400
PH721F0050MTC	5.000	3,000	5,000	38	20.58	1,377	155	3,898	440	6,201	700	12,401	1,400
PH721F0050MTL	5.000	2,200	5,000	48	27.19	1,630	184	3,898	440	6,201	700	12,401	1,400
PH721F0070MT	7.000	2,500	5,000	38	7.92	1,417	160	3,898	440	5,758	650	11,127	1,256
PH721F0070 MTC	7.000	3,500	5,000	38	18.82	1,286	145	3,898	440	5,758	650	11,127	1,256
PH721F0070MTL	7.000	2,500	5,000	48	26.22	1,417	160	3,898	440	5,758	650	11,127	1,256
PH721F0100MT	10.00	3,000	5,000	38	7.23	1,036	117	2,657	300	4,429	500	8,858	1,000
PH721F0100MTC	10.00	4,000	5,000	38	18.13	1,000	113	2,657	300	4,429	500	8,858	1,000
PH721F0100MTL	10.00	3,000	5,000	48	25.53	1,036	117	2,657	300	4,429	500	8,858	1,000
PH722 with Motor Mounting Plate Continued Next Page													
PH722F0160MT	16.00	3,000	5,000	32	4.70	1,205	136	3,898	440	6,201	700	12,235	1,381
PH722F0160MTC	16.00	4,000	5,000	32	6.92	1,170	132	3,898	440	6,201	700	11,746	1,326
PH722F0160MTL	16.00	3,000	5,000	38	7.73	1,205	136	3,898	440	6,201	700	12,235	1,381
PH722F0200MT	20.00	3,000	5,000	32	4.59	1,326	150	3,898	440	6,201	700	12,401	1,400
PH722F0200MTC	20.00	4,000	5,000	32	6.81	1,299	147	3,898	440	6,201	700	12,401	1,400
PH722F0200MTL	20.00	3,000	5,000	38	7.61	1,326	150	3,898	440	6,201	700	12,401	1,400
PH722F0250MT	25.00	3,500	6,000	32	4.18	1,318	149	3,898	440	6,201	700	12,401	1,400
PH722F0250MTC	25.00	4,200	6,000	32	6.40	1,301	147	3,898	440	6,201	700	12,401	1,400
PH722F0250MTL	25.00	3,500	6,000	38	7.20	1,318	149	3,898	440	6,201	700	12,401	1,400
PH722F0280MT	28.00	3,700	6,500	32	3.86	1,160	131	3,898	440	6,201	700	12,235	1,381
PH722F0280MTC	28.00	4,500	6,500	32	6.10	1,149	130	3,898	440	6,201	700	12,235	1,381
PH722F0280MTL	28.00	3,700	6,500	38	6.90	1,160	131	3,898	440	6,201	700	12,235	1,381
PH722F0350MT	35.00	3,700	6,500	32	3.82	1,291	146	3,898	440	6,201	700	12,401	1,400
PH722F0350MTC	35.00	4,500	6,500	32	6.06	1,282	145	3,898	440	6,201	700	12,401	1,400
PH722F0350MTL	35.00	3,700	6,500	38	6.87	1,291	146	3,898	440	6,201	700	12,401	1,400
PH722F0400MT	40.00	3,700	6,500	32	3.67	1,121	127	3,898	440	6,201	700	12,235	1,381
PH722F0400MTC	40.00	4,700	6,500	32	5.91	1,116	126	3,898	440	6,201	700	12,235	1,381
PH722F0400MTL	40.00	3,700	6,500	38	6.71	1,121	127	3,898	440	6,201	700	12,235	1,381
PH722F0500MT	50.00	3,700	6,500	32	3.65	1,259	142	3,898	440	6,201	700	12,401	1,400
PH722F0500MTC	50.00	4,700	6,500	32	5.89	1,255	142	3,898	440	6,201	700	12,401	1,400
PH722F0500MTL	50.00	3,700	6,500	38	6.70	1,259	142	3,898	440	6,201	700	12,401	1,400

[1] Based on input speed: n1 = 2000 RPM
For torque at higher input speeds (T_{2NX}) solve the formula, where n1 = Actual Input Speed. $T_{2NX} = \frac{T_{2N}}{\sqrt[3]{\frac{n_1}{2000}}}$

[2] Maximum momentary torque for emergency stops or heavy shock load. Admissible stops per life of gearhead = 1,000 stops maximum.

See web site for drawings.

"PH" Series
ServoFit® Precision Planetary Gearhead
Selection Data



Part Number (Gearhead + Input)	Exact Ratio	Maximum Input Speed		Maximum Motor Shaft	Mass Moment of Inertia	Torsional Stiffness per arcmin		Output Torque					
								Nominal [1]		Acceleration		Peak [2]	
Gearhead		Continuous	Cyclic					T_{2N}		T_{2B}		T_{2PEAK}	
	i	RPM (n_1)		mm	kgcm²	in.lbs.	Nm	in.lbs.	Nm	in.lbs.	Nm	in.lbs.	Nm
PH722 with Motor Mounting Plate Continued													
PH722F0700MT	70.00	3,700	6,500	32	3.63	1,254	142	3,898	440	5,758	650	11,127	1,256
PH722F0700MTC	70.00	4,700	6,500	32	5.87	1,252	141	3,898	440	5,758	650	11,127	1,256
PH722F0700MTL	70.00	3,700	6,500	38	6.68	1,254	142	3,898	440	5,758	650	11,127	1,256
PH722F1000MT	100.0	3,700	6,500	32	3.63	990	112	2,657	300	4,429	500	8,858	1,000
PH722F1000MTC	100.0	4,700	6,500	32	5.87	989	112	2,657	300	4,429	500	8,858	1,000
PH722F1000MTL	100.0	3,700	6,500	38	6.67	990	112	2,657	300	4,429	500	8,858	1,000
PH821 with Motor Mounting Plate													
PH821F0040MT	4.000	1,500	3,500	48	48.88	5,315	600	7,086	800	14,173	1,600	22,752	2,569
PH821F0040MTC	4.000	2,200	3,500	48	70.14	3,527	398	7,086	800	14,173	1,600	20,477	2,312
PH821F0050MT	5.000	1,700	4,000	48	39.89	4,872	550	8,858	1,000	15,059	1,700	28,346	3,200
PH821F0050 MTC	5.000	2,500	4,000	48	61.15	3,755	424	8,858	1,000	15,059	1,700	25,596	2,890
PH821F0070MT	7.000	2,000	4,000	48	32.00	4,075	460	8,858	1,000	14,173	1,600	24,900	2,811
PH821F0070MTC	7.000	3,200	4,000	48	53.73	3,546	400	8,858	1,000	14,173	1,600	24,900	2,811
PH821F0100MT	10.00	2,500	4,000	48	28.19	2,790	315	7,086	800	10,630	1,200	21,259	2,400
PH821F0100MTC	10.00	3,700	4,500	48	49.92	2,657	300	7,086	800	10,630	1,200	21,259	2,400
PH822 with Motor Mounting Plate													
PH822F0160MT	16.00	2,500	4,500	38	11.13	3,271	369	9,744	1,100	17,716	2,000	28,346	3,200
PH822F0160MTC	16.00	3,250	4,500	38	22.37	3,157	356	9,744	1,100	17,716	2,000	28,346	3,200
PH822F0160MTL	16.00	2,500	4,500	48	28.98	3,271	369	9,744	1,100	17,716	2,000	28,346	3,200
PH822F0200MT	20.00	2,500	4,500	38	10.57	3,565	402	11,073	1,250	17,716	2,000	28,346	3,200
PH822F0200MTC	20.00	3,300	4,500	38	21.80	3,477	393	11,073	1,250	17,716	2,000	28,346	3,200
PH822F0200MTL	20.00	2,500	4,500	48	28.42	3,565	402	11,073	1,250	17,716	2,000	28,346	3,200
PH822F0250 MT	25.00	3,000	5,500	38	9.05	3,524	398	11,073	1,250	17,716	2,000	28,346	3,200
PH822F0250MTC	25.00	3,800	5,500	38	20.29	3,469	392	11,073	1,250	17,716	2,000	28,346	3,200
PH822F0250MTL	25.00	3,000	5,500	48	26.91	3,524	398	11,073	1,250	17,716	2,000	28,346	3,200
PH822F0280MT	28.00	3,300	6,000	38	7.97	3,160	357	9,744	1,100	17,716	2,000	28,346	3,200
PH822F0280MTC	28.00	4,000	6,000	38	18.87	3,116	352	9,744	1,100	17,716	2,000	28,346	3,200
PH822F0280MTL	28.00	3,300	6,000	48	26.27	3,160	357	9,744	1,100	17,716	2,000	28,346	3,200
PH822F0350MT	35.00	3,300	6,000	38	7.78	3,480	393	11,073	1,250	17,716	2,000	28,346	3,200
PH822F0350MTC	35.00	4,000	6,000	38	18.69	3,445	389	11,073	1,250	17,716	2,000	28,346	3,200
PH822F0350MTL	35.00	3,300	6,000	48	26.09	3,480	393	11,073	1,250	17,716	2,000	28,346	3,200
PH822F0400MT	40.00	3,300	6,000	38	7.25	3,024	341	9,744	1,100	17,007	1,920	28,346	3,200
PH822F0400MTC	40.00	4,300	6,000	38	18.15	3,004	339	9,744	1,100	17,007	1,920	28,346	3,200
PH822F0400MTL	40.00	3,300	6,000	48	25.55	3,024	341	9,744	1,100	17,007	1,920	28,346	3,200
PH822F0500MT	50.00	3,300	6,000	38	7.16	3,373	381	11,073	1,250	17,716	2,000	28,346	3,200
PH822F0500MTC	50.00	4,300	6,000	38	18.06	3,357	379	11,073	1,250	17,716	2,000	28,346	3,200
PH822F0500MTL	50.00	3,300	6,000	48	25.46	3,373	381	11,073	1,250	17,716	2,000	28,346	3,200
PH822F0700MT	70.00	3,300	6,000	38	7.08	3,425	387	8,858	1,000	14,173	1,600	24,900	2,811
PH822F0700MTC	70.00	4,300	6,000	38	17.99	3,417	386	8,858	1,000	14,173	1,600	24,900	2,811
PH822F0700MTL	70.00	3,300	6,000	48	25.39	3,425	387	8,858	1,000	14,173	1,600	24,900	2,811
PH822F1000MT	100.0	3,300	6,000	38	7.05	2,623	296	7,086	800	10,630	1,200	21,259	2,400
PH822F1000MTC	100.0	4,300	6,000	38	17.95	2,621	296	7,086	800	10,630	1,200	21,259	2,400
PH822F1000MTL	100.0	3,300	6,000	48	25.35	2,623	296	7,086	800	10,630	1,200	21,259	2,400

Index of Symbols

MT ..... Motor adapter with TriAdapt® coupling	i ..... Ratio - Exact	T_{2N} ..... Nominal Torque
MF ..... Motor adapter with FlexiAdapt® coupling	n_1 ..... Maximum input speed RPM	T_{2B} ..... Acceleration Torque Maximum
L ..... Large Input	J_1 ..... Mass moment of inertia (input)	T_{2PEAK} ..... Peak Torque
C ..... ServoCool	C_2 ..... Torsional Stiffness	

See web site for drawings.



"PH" Series
ServoFit® Precision Planetary Gearhead
Selection Data

Part Number (Gearhead + Input)	Exact Ratio	Maximum Input Speed		Maximum Motor Shaft	Mass Moment of Inertia	Torsional Stiffness per arcmin		Output Torque					
								Nominal [1]		Acceleration		Peak [2]	
Gearhead	i	Continuous RPM (n_1)	Cyclic RPM (n_1)	øD^6 mm	J_1 kgcm²	C_2 in.lbs.	C_2 Nm	T_{2N} in.lbs.	T_{2N} Nm	T_{2B} in.lbs.	T_{2B} Nm	T_{2PEAK} in.lbs.	T_{2PEAK} Nm
PH912 with Motor Mounting Plate													
PH912F0160MT	16.00	2,200	3,500	48	44.87	5,342	603	22,145	2,500	37,647	4,250	75,293	8,500
PH912F0160MTC	16.00	2,900	3,500	48	66.13	5,178	585	22,145	2,500	37,647	4,250	75,293	8,500
PH912F0180MT	18.00	1,800	3,000	48	68.89	5,987	676	22,145	2,500	37,647	4,250	75,293	8,500
PH912F0180MTC	18.00	2,700	3,000	48	90.15	5,823	657	22,145	2,500	37,647	4,250	75,293	8,500
PH912F0200MT	20.00	2,500	4,000	48	37.23	5,287	597	22,145	2,500	37,647	4,250	75,293	8,500
PH912F0200MTC	20.00	3,300	4,000	48	58.49	5,183	585	22,145	2,500	37,647	4,250	75,293	8,500
PH912F0240MT	24.00	2,200	3,500	48	41.47	5,950	672	22,145	2,500	37,647	4,250	75,293	8,500
PH912F0240MTC	24.00	2,900	3,500	48	62.72	5,858	661	22,145	2,500	37,647	4,250	75,293	8,500
PH912F0280MT	28.00	2,800	4,500	48	30.69	5,188	586	22,145	2,500	37,647	4,250	75,293	8,500
PH912F0280MTC	28.00	4,000	4,500	48	52.42	5,128	579	22,145	2,500	37,647	4,250	75,293	8,500
PH912F0300MT	30.00	2,500	4,000	48	35.05	5,920	668	22,145	2,500	37,647	4,250	75,293	8,500
PH912F0300MTC	30.00	3,500	4,000	48	56.31	5,861	662	22,145	2,500	37,647	4,250	75,293	8,500
PH912F0320MT	32.00	2,800	4,500	48	29.38	5,123	578	22,145	2,500	37,647	4,250	75,293	8,500
PH912F0320MTC	32.00	4,000	4,500	48	51.11	5,077	573	22,145	2,500	37,647	4,250	75,293	8,500
PH912F0400MT	40.00	2,800	4,500	48	27.21	5,028	568	22,145	2,500	37,647	4,250	75,293	8,500
PH912F0400MTC	40.00	4,000	4,500	48	48.94	5,000	565	22,145	2,500	37,647	4,250	75,293	8,500
PH912F0420MT	42.00	2,800	4,500	48	29.58	5,864	662	22,145	2,500	37,647	4,250	75,293	8,500
PH912F0420 MTC	42.00	4,000	4,500	48	51.31	5,829	658	22,145	2,500	37,647	4,250	75,293	8,500
PH912F0480MT	48.00	2,800	4,500	48	28.53	5,826	658	22,145	2,500	37,647	4,250	75,293	8,500
PH912F0480MTC	48.00	4,000	4,500	48	50.26	5,800	655	22,145	2,500	37,647	4,250	75,293	8,500
PH912F0600MT	60.00	2,800	4,500	48	26.67	5,772	652	22,145	2,500	37,647	4,250	75,293	8,500
PH912F0600MTC	60.00	4,000	4,500	48	48.40	5,755	645	22,145	2,500	37,647	4,250	75,293	8,500
PH923 with Motor Mounting Plate													
PH923F0610MT	61.00	2,500	4,500	38	49.32	3,543	400	22,145	2,500	37,647	4,250	75,293	8,500
PH923F0610MTC	61.00	3,200	4,500	38	60.56	3,534	399	22,145	2,500	37,647	4,250	75,293	8,500
PH923F0610MTL	61.00	2,500	4,500	48	67.17	3,543	400	22,145	2,500	37,647	4,250	75,293	8,500
PH923F0910 MT	91.00	2,500	4,500	38	45.51	3,543	400	22,145	2,500	37,647	4,250	75,293	8,500
PH923F0910MTC	91.00	3,200	4,500	38	56.41	3,538	399	22,145	2,500	37,647	4,250	75,293	8,500
PH923F0910MTL	91.00	2,500	4,500	48	63.81	3,543	400	22,145	2,500	37,647	4,250	75,293	8,500
PH923F1210MT	121.0	2,500	4,500	38	44.12	3,543	400	22,145	2,500	37,647	4,250	75,293	8,500
PH923F1210MTC	121.0	3,200	4,500	38	55.02	3,540	400	22,145	2,500	37,647	4,250	75,293	8,500
PH923F1210MTL	121.0	2,500	4,500	48	62.42	3,543	400	22,145	2,500	37,647	4,250	75,293	8,500

[1] Based on input speed: n1 = 2000 RPM
For torque at higher input speeds (T_{2NX}) solve the formula, where n1 = Actual Input Speed. $T_{2NX} = \frac{T_{2N}}{\sqrt[3]{\frac{n_1}{2000}}}$

[2] Maximum momentary torque for emergency stops or heavy shock load. Admissible stops per life of gearhead = 1,000 stops maximum.

See web site for drawings.

"PH" Series
ServoFit® Precision Planetary Gearhead
Selection Data



Part Number (Gearhead + Input)	Exact Ratio	Maximum Input Speed		Maximum Motor Shaft	Mass Moment of Inertia	Torsional Stiffness per arcmin		Output Torque					
								Nominal [1]		Acceleration		Peak [2]	
Gearhead	i	Continuous RPM (n_1)	Cyclic	mm	kgcm²	in.lbs.	Nm	T_{2N} in.lbs.	Nm	T_{2B} in.lbs.	Nm	T_{2PEAK} in.lbs.	Nm
PH1012 with Motor Mounting Plate													
PH1012F0180MT	18.00	1,800	3,000	48	72.04	10,029	1,132	35,432	4,000	61,226	6,912	98,290	11,096
PH1012F0180MTC	18.00	2,500	3,000	48	93.30	9,577	1,081	35,432	4,000	61,226	6,912	89,266	10,077
PH1012F0240MT	24.00	2,200	3,500	48	43.24	9,925	1,120	35,432	4,000	66,435	7,500	131,053	14,795
PH1012F0240MTC	24.00	2,700	3,500	48	64.50	9,671	1,092	35,432	4,000	66,435	7,500	119,022	13,437
PH1012F0300 MT	30.00	2,500	4,000	48	36.19	9,840	1,111	35,432	4,000	66,435	7,500	132,870	15,000
PH1012F0300MTC	30.00	3,200	4,000	48	57.45	9,679	1,093	35,432	4,000	66,435	7,500	132,870	15,000
PH1012F0420MT	42.00	2,800	4,500	48	30.16	9,687	1,094	35,432	4,000	66,435	7,500	132,870	15,000
PH1012F0420MTC	42.00	4,000	4,500	48	51.89	9,593	1,083	35,432	4,000	66,435	7,500	132,870	15,000
PH1012F0480MT	48.00	2,800	4,500	48	28.98	9,585	1,082	35,432	4,000	61,226	6,912	132,870	15,000
PH1012F0480MTC	48.00	4,000	4,500	48	50.71	9,514	1,074	35,432	4,000	61,226	6,912	132,870	15,000
PH1012F0600MT	60.00	2,800	4,500	48	26.95	9,438	1,066	35,432	4,000	61,226	6,912	132,870	15,000
PH1012F0600MTC	60.00	4,000	4,500	48	48.68	9,394	1,061	35,432	4,000	61,226	6,912	132,870	15,000
PH1023 with Motor Mounting Plate													
PH1023F0610MT	61.00	2,500	4,500	48	146.08	4,872	550	35,432	4,000	66,435	7,500	132,870	15,000
PH1023F0610MTC	61.00	3,000	4,500	48	167.34	4,862	549	35,432	4,000	66,435	7,500	132,870	15,000
PH1023F0910 MT	91.00	2,500	4,500	48	120.21	4,872	550	35,432	4,000	66,435	7,500	132,870	15,000
PH1023F0910MTC	91.00	3,000	4,500	48	141.94	4,867	549	35,432	4,000	66,435	7,500	132,870	15,000

Index of Symbols

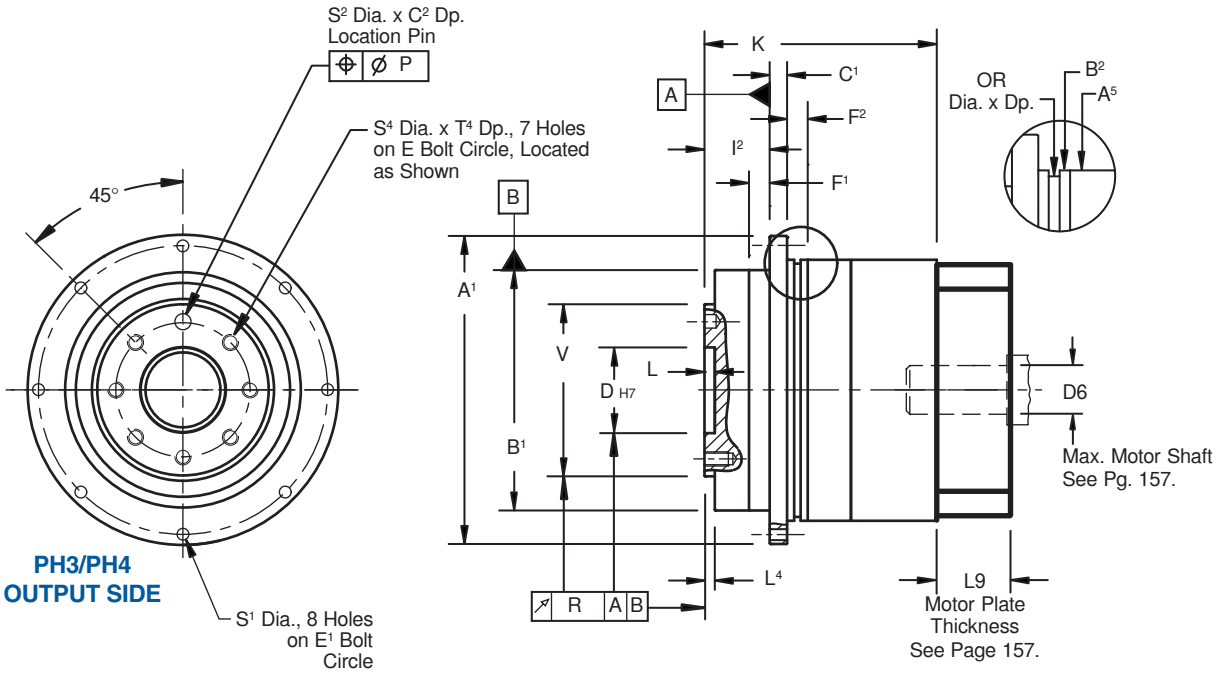
MT ..... Motor adapter with TriAdapt® coupling	i ..... Ratio - Exact	T_{2N} ..... Nominal Torque
MF ..... Motor adapter with FlexiAdapt® coupling	n_1 ..... Maximum input speed RPM	T_{2B} ..... Acceleration Torque Maximum
L ..... Large Input	J_1 ..... Mass moment of inertia (input)	T_{2PEAK} ..... Peak Torque
C ..... ServoCool	C_2 ..... Torsional Stiffness	

See web site for drawings.

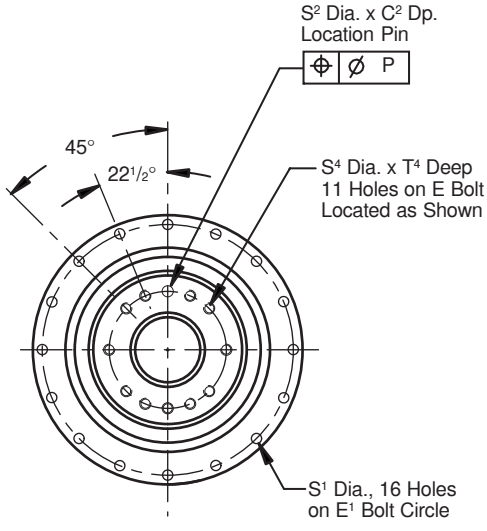


"PH" Series
ServoFit® Precision Planetary Gearhead
Dimensional Data

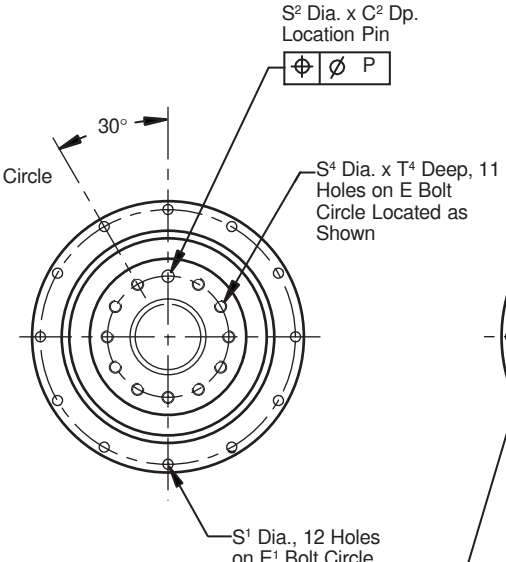
Drawing for Units
PH321 thru PH1023



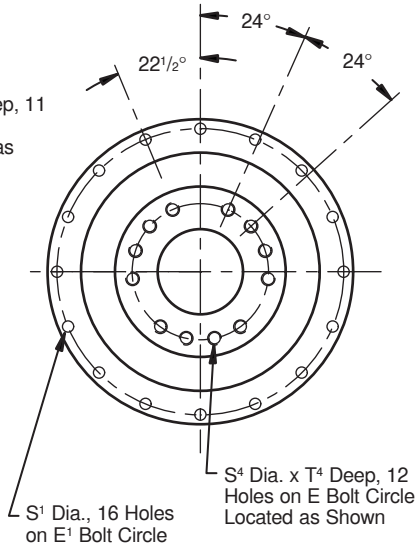
PH3/PH4
OUTPUT SIDE



PH5
OUTPUT SIDE



PH7/PH8
OUTPUT SIDE



PH9/PH10
OUTPUT SIDE

See web site for drawings.

"PH" Series
ServoFit® Precision Planetary Gearhead
Dimensional Data



Table No. 1 **"PH" Series – Gearhead with Motor Plate – Dimensions (mm/inches)**

Unit	A[1]	A[5]	B[1] h7	B[2] h7	C[1]	C[2]	D H7	E	E[1]	F[1]	F[2]	I[2]	L	L[2]	L[4]	OR
PH321/PH322	86	70	64 +.000/-.030	70 * +.000/-.030	4	3	20 +.021/-.0	31.5	79	7	8	19.5	4	3	3.5	65x2
	3.39	2.76	2.520 +.0000/-.0012	2.756 +.0000/-.0012	.16	.12	.787 +.0008/-.0000	1.24	3.11	.28	.31	.77	.16	.12	.14	2.55x.08
PH421/PH422	118	95	90 +.000/-.035	95 +.000/-.035	7	7	31.5 +.025/-.0	50	109	10	10	30	6	6	6	90x3
	4.65	3.74	3.543 +.0000/-.0014	3.740 +.0000/-.0014	.28	.28	1.240 +.0010/-.0000	1.97	4.29	.39	.39	1.18	.24	.24	.24	3.54x.12
PH521/PH522	145	120	110 +.000/-.035	120 * +.000/-.035	8	7	40 +.025/-.0	63	135	10	12	29	6	6	6	110x3
	5.71	4.72	4.331 +.0000/-.0014	4.724 +.0000/-.0014	.32	.28	1.575 +.0010/-.0000	2.48	5.31	.39	.47	1.14	.24	.24	.24	4.33x.12
PH721/PH722	179	152	140 +.000/-.040	152 +.000/-.040	10	7	50 +.025/-.0	80	168	12	12	38	6	6	6	145x3
	7.05	5.98	5.513 +.0000/-.0016	5.984 +.0000/-.0016	.39	.28	1.969 +.0010/-.0000	3.15	6.61	.47	.47	1.50	.24	.24	.24	5.71x.12
PH821/PH822	247	212	200 +.000/-.046	212 +.000/-.046	12	10	80 +.030/-.0	125	233	15	15	50	8	8	8	200x5
	9.72	8.35	7.874 +.0000/-.0018	8.346 +.0000/-.0018	.47	.39	3.150 +.0012/-.0000	4.92	9.17	.59	.59	1.97	.31	.31	.31	7.87x.20
PH912/PH923	300	152	255 +.000/-.052	255 +.000/-.052	18	—	90 +.035/-.0	140	280	20	20	66	12	11	12	238x5
	11.81	5.98	10.039 +.000/-.0020	10.039 +.0000/-.0020	.71		3.543 +.0014/-.0000	5.51	11.02	.79	.79	2.60	.47	.43	.47	9.37x.20
PH1012/PH1023	330	212	285 +.000/-.057	285 +.000/-.052	20	—	95 +.035/-.0	160	310	20	20	75	10	15	15	270x6
	12.99	8.35	11.220 +.000/-.0022	11.221 +.0000/-.0020	.79		3.740 +.0014/-.0000	6.30	12.20	.79	.79	2.95	.39	.59	.59	10.63x.24

* Not applicable for PH322 and PH522.

Table No. 2 **"PH" Series – Dimensions (mm/inches)**

Unit	P	R	S[1]	S[2] H7	S[4]	T[4]	V h7
PH321/PH322	.02	.020	4.5	5 +.012/-.000	M5	7	40 +.000/-.025
	.0008	.0008	.18	.20 +.0005/-.0000		.28	1.575 +.000/-.0010
PH421/PH422	.02	.020	5.5	6 +.012/-.000	M6	10	63 +.000/-.030
	.0008	.0008	.22	.236 +.0005/-.0000		.39	2.480 +.000/-.0012
PH521/PH522	.02	.020	5.5	6 +.012/-.000	M6	11	80 +.000/-.030
	.0008	.0008	.22	.236 +.0005/-.0000		.43	3.150 +.000/-.0012
PH721/PH722	.02	.025	6.6	8 +.015/-.000	M8	14	100 +.000/-.035
	.0008	.0010	.26	.315 +.0006/-.0000		.55	3.937 +.000/-.0014
PH821/PH822	—	.030	9	10 +.015/-.000	M10	18	160 +.000/-.040
		.0012	.35	.393 +.0006/-.0000		.71	6.299 +.000/-.0016
PH912/PH923	—	.030	13.5	—	M16	24	180 +.000/-.040
		.0012	.53			.94	7.087 +.000/-.0016
PH1012/PH1023	—	.040	13.5	—	M20	30	200 +.000/-.046
		.0016	.53			1.18	7.874 +.000/-.0018

Table No. 3

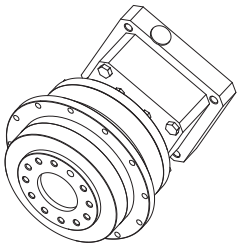
K Dimension					
Standard			ServoCool		
Unit	mm	inches	Unit	mm	inches
PH321	80.5	3.17	—		
PH322	104	4.09	—		
PH421	106	4.17	**PH421_C**	82.5	3.24
PH422	146.5	5.77	–		
PH521	110	4.33	**PH521_C**	138	5.43
PH522	159.5	6.28	**PH522_C**	183	7.20
PH721	138	5.43	**PH721_C**	168	6.61
PH722	190	7.48	**PH722_C**	218	8.58
PH821	183	7.20	**PH821_C**	231	9.09
PH822	251	9.88	**PH822_C**	281	11.06
PH912	336.5	13.24	**PH921_C**	384.5	15.14
PH923	257	10.12	**PH923_C**	287	11.30
PH1012	366	14.41	**PH1012_C**	414	16.30
PH1023	307	12.09	**PH1023_C**	355	13.98

Part No. Explanation

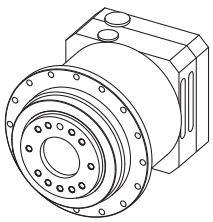
PH 8 2 1 F 0050 MT C

- **C** – Option for ServoCool
- **MT** – Motor Plate with TriAdapt Coupling
- **0050** – Ratio (**0050** = 5.0:1)
- **F** – Output Flange
- **1** – No. of Stages (**1** = 1 Stage, **2** = 2 Stage)
- **2** – Generation No.
- **8** – Unit No.
- **PH** – "PH" Series ServoFit Precision Planetary Gearhead

When ordering a planetary gearhead, specify the motor manufacturer and part number, provide the motor drawing with dimensions, or specify the motor mounting dimensions. (See Page 157.)



Typical 2 Stage Configuration



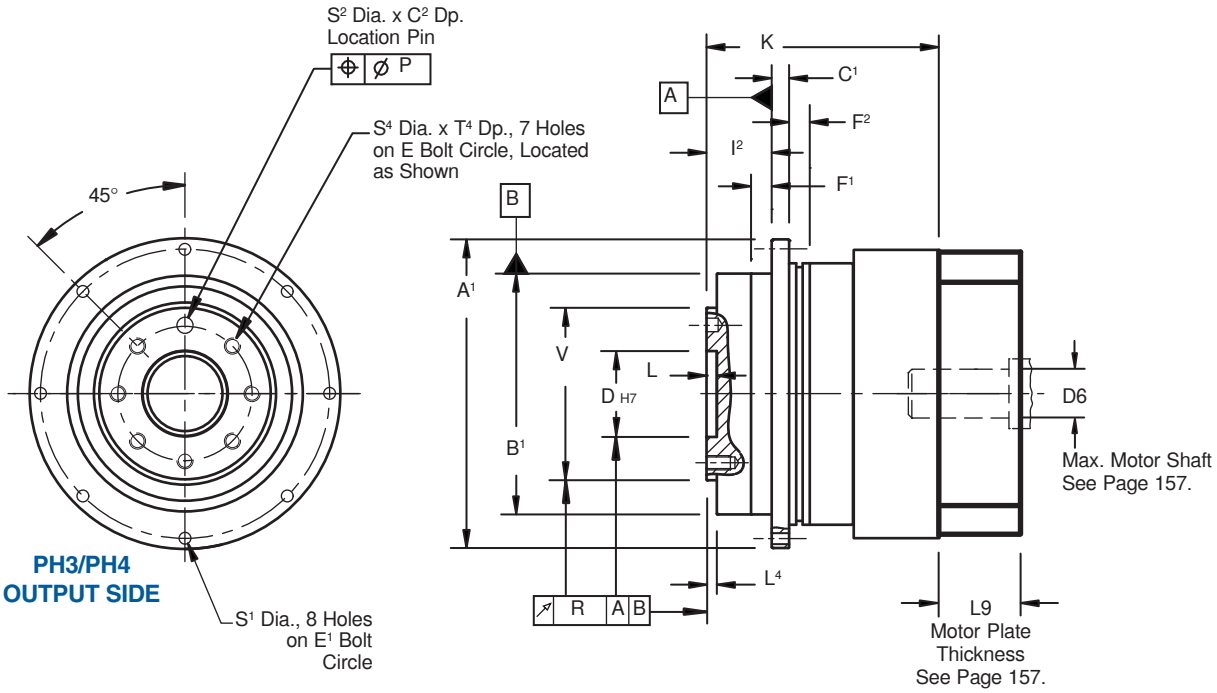
Typical ServoCool

See web site for drawings.

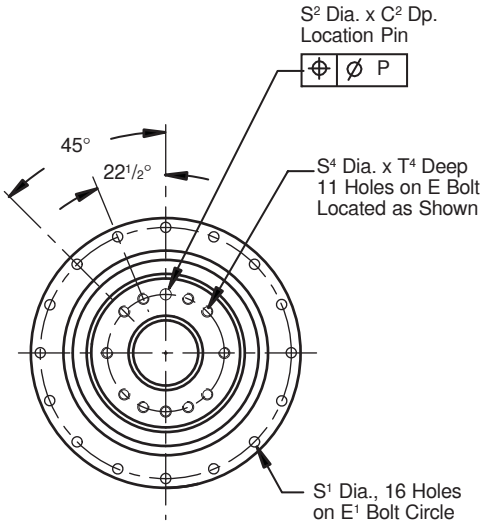


"PH" Series– Large Input ServoFit® Precision Planetary Gearhead Dimensional Data

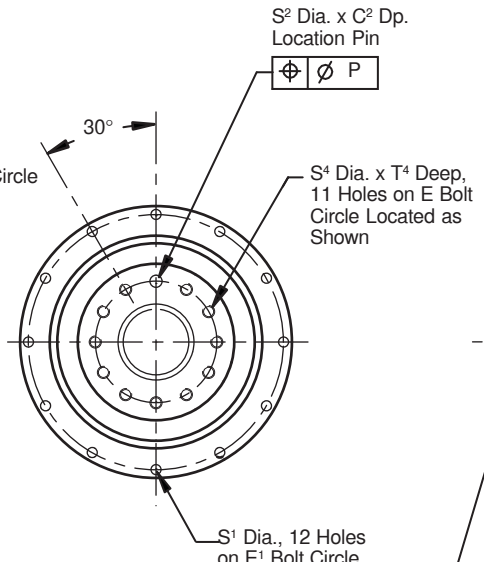
Drawing for Units
PH321_L thru PH923_L



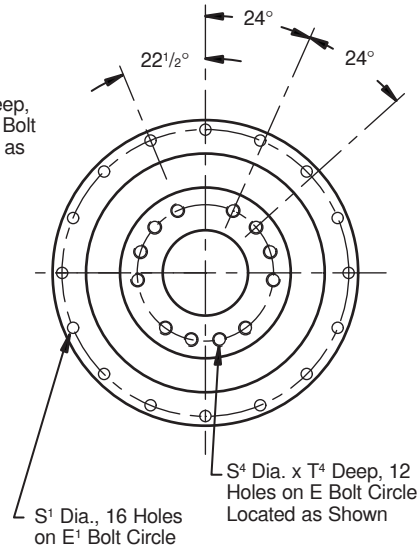
PH3/PH4
OUTPUT SIDE



PH5
OUTPUT SIDE



PH7/PH8
OUTPUT SIDE



PH9
OUTPUT SIDE

See web site for drawings.

"PH" Series– Large Input ServoFit® Precision Planetary Gearhead Dimensional Data



Table No. 1 **"PH" Series – Large Input Gearhead – Dimensions (mm/inches)**

Unit	A[1]	B[1] h7	C[1]	C[2]	D H7	E	E[1]	F[1]	F[2]	I[2]	L	L[2]	L[4]
PH321/PH322_L	86 3.39	64 +.000/-.030 2.520 +.0000/-.0012	4 6.16	3 .12	20 +.021/-.0 .787 +.0008/-.0000	31.5 1.24	79 3.11	7 .28	8 .31	19.5 .77	4 .16	3 .12	3.5 .14
PH421/PH422_L	118 4.65	90 +.000/-.035 3.543 +.0000/-.0014	7 .28	7 .28	31.5 +.025/-.0 1.240 +.0010/-.0000	50 1.97	109 4.29	10 .39	10 .39	30 1.18	6 .24	6 .24	6 .24
PH521/PH522_L	145 5.71	110 +.000/-.035 4.331 +.0000/-.0014	8 .32	7 .28	40 +.025/-.0 1.575 +.0010/-.0000	63 2.48	135 5.31	10 .39	12 .47	29 1.14	6 .24	6 .24	6 .24
PH721/PH722_L	179 7.05	140 +.000/-.040 5.513 +.0000/-.0016	10 .39	7 .28	50 +.025/-.0 1.969 +.0010/-.0000	80 3.15	168 6.61	12 .47	12 .47	38 1.50	6 .24	6 .24	6 .24
PH822_L	247 9.72	200 +.000/-.046 7.874 +.0000/-.0018	12 .47	10 .39	80 +.030/-.0 3.150 +.0012/-.0000	125 4.92	233 9.17	15 .59	15 .59	50 1.97	8 .31	8 .31	8 .31
PH923_L	300 11.81	255 +.000/-.052 10.039 +.000/-.0020	18 .71	—	90 +.035/-.0 3.543 +.0014/-.0000	140 5.51	280 11.02	20 .79	20 .79	66 2.60	12 .47	11 .43	12 .47

Table No. 2 **"PH" Series – Large Input – Dimensions (mm/inches)**

Unit	P	R	S[1]	S[2] H7	S[4]	T[4]	V h7
PH321/PH322_L	.02 .0008	.020 .0008	4.5 .18	5 +.012/-.000 .20 +.0005/-.0000	M5	7 .28	40 +.000/-.025 1.575 +.000/-.0010
PH421/PH422_L	.02 .0008	.020 .0008	5.5 .22	6 +.012/-.000 .236 +.0005/-.0000	M6	10 .39	63 +.000/-.030 2.480 +.000/-.0012
PH521/PH522_L	.02 .0008	.020 .0008	5.5 .22	6 +.012/-.000 .236 +.0005/-.0000	M6	11 .43	80 +.000/-.030 3.150 +.000/-.0012
PH721/PH722_L	.02 .0008	.025 .0010	6.6 .26	8 +.015/-.000 .315 +.0006/-.0000	M8	14 .55	100 +.000/-.035 3.937 +.000/-.0014
PH822_L	—	.030 .0012	9 .35	10 +.015/-.000 .393 +.0006/-.0000	M10	18 .71	160 +.000/-.040 6.299 +.000/-.0016
PH923_L	—	.030 .0012	13.5 .53	—	M16	24 .94	180 +.000/-.040 7.087 +.000/-.0016

Table No. 3

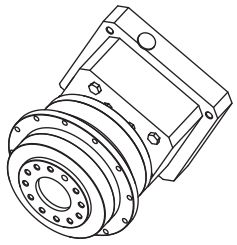
Unit	K Dimension mm	K Dimension inches
PH321_L	84.5	3.33
PH322_L	121	4.76
PH421_L	117.5	4.63
PH422_L	150.5	5.93
PH521_L	124	4.88
PH522_L	171	6.73
PH721_L	155	6.10
PH722_L	204	8.03
PH822_L	268	10.55
PH923_L	274	10.79

Part No. Explanation

PH 4 2 1 F 0050 MT L

- **L** — Large Input
- **MT** — Motor Plate with TriAdapt Coupling
- **0050** — Ratio (**0050** = 5.0:1)
- **F** — Output Flange
- **1** — No. of Stages (**1** = 1 Stage, **2** = 2 Stage)
- **4** — Generation No.
- **2** — Unit No.
- **PH** — "PH" Series ServoFit Precision Planetary Gearhead

When ordering a planetary gearhead, specify the motor manufacturer and part number, provide the motor drawing with dimensions, or specify the motor mounting dimensions. (See Page 157.)



Typical 2 Stage Configuration

See web site for drawings.

"PHA" Series–Advanced ServoFit® Precision Planetary Gearhead Performance Specifications

	Size	PHA321 PHA322	PHA421 PHA422	PHA521 PHA522	PHA721 PHA722	PHA821 PHA822	PHA912 PHA923	PHA1012 PHA1023
Acceleration Torque Max. T_{2B}	in.lbs.	575	1,150	2,832	6,195	17,700	37,612	66,375
	Nm	65	130	320	700	2,000	4,250	7,500
Output Torque Nominal [1] T_{2N}	in.lbs.	398	796	1,947	3,894	11,062	22,125	35,400
	Nm	45	90	220	440	1,250	2,500	4,000
Input Speed Maximum n_{1MAX}	Continuous	3,800 4,500	3,500 4,500	3,300 4,000	3,000 3,700	2,500 3,300	2,800 2,500	2,800 2,500
	Cyclic	6,000 8,000	6,000 8,000	6,000 7,000	5,000 6,500	4,000 6,000	4,500 4,500	4,500 4,500
ServoCool Input RPM Max. n_{1MAX}	Continuous	—	4,500 —	4,500 5,000	4,000 4,700	3,700 4,300	4,000 3,200	4,000 3,000
	Cyclic	—	6,000 —	6,000 7,000	5,000 6,500	4,500 6,000	4,500 4,500	4,500 4,500
Torsional Backlash [2] $\Delta\varphi$	arcmin	≤2	≤1	≤1	≤1	≤1	≤1	≤1
Torsional Stiffness C_2	in.lbs./arcmin	≤106	≤292	≤708	≤1,371	≤3,752	≤5,858	≤9,673
	Nm/arcmin	≤12	≤33	≤80	≤155	≤424	≤662	≤1,093
Axial Load Maximum F_{2AMAX}	lbs.	371	484	934	1,384	2,260	7,425	11,250
	N	1,650	2,150	4,150	6,150	10,050	33,000	50,000
Tilting Moment Maximum T_{2K}	in.lbs.	885	2,301	3,894	13,275	30,975	57,525	77,880
	Nm	100	260	440	1,500	3,500	6,500	8,800
Tilting Stiffness C_{2K}	in.lbs./arcmin	—	1,416	2,655	4,425	13,718	48,675	84,075
	Nm/arcmin	—	160	300	500	1,550	5,500	9,500
Efficiency (at Nominal Torque) h	%	96% 94%	96% 94%	96% 94%	96% 94%	96% 94%	96% 94%	94% 92%
Weight m	pounds	4	9 10	15 18	27 32	76 88	157 139	190 216
	kg	1.8	3.9 4.6	6.6 8.1	12.3 14.6	34.6 39.8	71 63	86 98
Noise Level [4] L_{PA}	dB(A)	≤61	≤62	≤63	≤64	≤65	≤65	≤65
Balance Quality		Q 2.5 (Quality Class-2.5 millimeters per second)						
Lubrication		Synthetic Oil (ISO VG 150)						
Degree of Protection		IP65						
Mounting Position		Unrestricted						
Ambient Temperature		0°C to +40°C (104° F) Other temperatures, contact STOBER Drives.						
Finish		Black (RAL 9005)						
Lifetime [5] L_h	hours	L_h > 10,000 hours if T_{2K}/T_{2A} < 1.25 L_h > 20,000 hours if T_{2K}/T_{2A} > 1.25						
Warranty		5 Year Limited (2 Years on normal wear items: bearings, seals, etc.)						

[1] Ratings based on input speed (n_1) of 2000 RPM.
For torque at higher input speeds (T_{2NX}) solve the formula, where n1 = Actual Input Speed. $T_{2NX} = \frac{T_{2N}}{\sqrt[3]{\frac{n_1}{2000}}}$

[2] Tested at 1.5% of nominal torque and recorded on the input side of the gearhead.

[3] Rating based on output speed (n2) of 100 RPM. For values at other speeds see Page 167.

[4] Measurement at one (1) meter distance with input speed (n1) of 3000 RPM.

[5] T_{2A} equals actual tilting moment of the application. See Page 167 for calculation details.

"PHA" Series–Advanced ServoFit® Precision Planetary Gearhead Features

The "PHA" Series ServoFit Precision Planetary Gearheads are designed for high demands of torsional stiffness and tilting rigidity. The "PHA" series is well suited where a smooth, precise, reliable drive is needed. All units are lubricated for life with synthetic oil and sealed on the smallest diameters possible with FKM radial oil seals to IP65 standards — reduces friction and prevents heat build up, increases efficiency, and prevents lubricant contamination for long life.

Some features are:

- Readily Attaches to Any Servo Motor
- Superior Torsional Stiffness
- 90-96% Efficiency
- Excellent Axial Load Capacity
- ≤ 1 arc minute backlash
- ISO Output Flange for Coupling Free Mounting
- Advanced Helicamber Gear Technology
- 5 Year Limited Warranty (2 Year on bearings, seals, etc.)
- Wide Selection of IEC, NEMA, or Customized* Motor Plates
- Ground and honed gearing

* Maximum 10 working day for custom motor plates.

Helical gears made with the proven experience of HeliCamber® gear technology provides the highest running smoothness — ensuring backlash stability and extremely quiet operation.

The FlexiAdapt® motor coupling is designed for large motor shaft diameters and features a bellows coupling to compensate for thermal expansion of the motor shaft—ensuring long motor life by preventing thrust load on the motor bearings.

Balanced clamp coupling for smooth operation at high speeds.

Ring gear machined integral to the housing — not welded or pressed in



The FlexiAdapt® motor shaft adapter system allows easy and accurate installation of motor in minutes – no special tools required.

Adapter bushings fit all motor shafts — no key required

FKM double-lip radial oil seals for continuous duty applications and very good chemical resistance.

Blind pilot hole

Gears are case hardened to 61 Rockwell “C” and ground and honed for maximum accuracy.

Backlash ≤ 1 arcminute — Precision selection of parts ensure optimal performance without binding gear teeth — resulting in a more accurate and smooth direct drive

The output flange dimensions are ISO 9409 and allow easy mounting to rotary or indexing tables, pinions, timing belt pulleys, transmission shafting, etc., without using a coupling.

Single piece high tensile steel housing provides greater concentricity and more precise alignment — ensuring high running accuracy and precision.

Oversized tapered roller bearings and shafts for high radial load capacity and superior torsional stiffness



Precision selection of gears and parts ensures backlash of less than 1 arcminute.

Available as ServoCool in Sizes PH7 and PH8.

See web site for drawings.



"PHA" Series–Advanced ServoFit® Precision Planetary Gearhead Selection Data

Part Number (Gearhead + Input)	Exact Ratio	Maximum Input Speed		Maximum Motor Shaft	Mass Moment of Inertia	Torsional Stiffness per arcmin		Output Torque					
								Nominal [1]		Acceleration		Peak [2]	
Gearhead	i	Continuous RPM (n_1)	Cyclic RPM (n_1)	øD^6 mm	J_1 kgcm²	C_2 in.lbs.	C_2 Nm	T_{2N} in.lbs.	T_{2N} Nm	T_{2B} in.lbs.	T_{2B} Nm	T_{2PEAK} in.lbs.	T_{2PEAK} Nm
PHA321 with Motor Mounting Plate													
PHA321F0050MF	5.000	3,000	6,000	19	0.56	103	11.7	399	45	576	65	1,152	130
PHA321F0050MFL	5.000	3,000	6,000	24	1.64	111	12.5	399	45	576	65	1,152	130
PHA321F0070MF	7.000	3,500	6,000	19	0.52	95.8	10.8	399	45	531	60	1,152	130
PHA321F0070MFL	7.000	3,500	6,000	24	1.58	100	11.3	399	45	531	60	1,152	130
PHA321F0100MF	10.00	3,800	6,000	19	0.50	77.8	8.8	266	30	443	50	886	100
PHA321F0100MFL	10.00	3,800	6,000	24	1.56	79.1	8.9	266	30	443	50	886	100
PHA322 with Motor Mounting Plate													
PHA322F0200MF	20.00	4,500	8,000	14	0.20	89.7	10.1	399	45	576	65	1,152	130
PHA322F0250MF	25.00	4,500	8,000	14	0.18	89.9	10.2	399	45	576	65	1,152	130
PHA322F0280MF	28.00	4,500	8,000	14	0.20	90.3	10.2	399	45	531	60	1,152	130
PHA322F0350MF	35.00	4,500	8,000	14	0.17	89.0	10.0	399	45	576	65	1,152	130
PHA322F0400MF	40.00	4,500	8,000	14	0.20	76.0	8.6	266	30	443	50	886	100
PHA322F0500MF	50.00	4,500	8,000	14	0.16	86.7	9.8	399	45	576	65	1,152	130
PHA322F0700MF	70.00	4,500	8,000	14	0.16	88.7	10.0	399	45	531	60	1,152	130
PHA322F1000MF	100.0	4,500	8,000	14	0.16	75.4	8.5	266	30	443	50	886	100
PHA421 with Motor Mounting Plate													
PHA421F0040MF	4.000	2,300	5,000	24	2.15	294	33	753	85	1,152	130	2,126	240
PHA421F0040MFC	4.000	3,300	5,000	24	2.46	283	32	753	85	1,152	130	1,701	192
PHA421F0040MFL	4.000	2,300	5,000	32	5.26	311	35	753	85	1,152	130	2,126	240
PHA421F0050MF	5.000	2,700	6,000	24	1.97	296	33	753	85	1,152	130	2,126	240
PHA421F0050MFC	5.000	3,700	6,000	24	2.28	289	33	753	85	1,152	130	2,126	240
PHA421F0050MFL	5.000	2,700	6,000	32	5.08	307	35	753	85	1,152	130	2,126	240
PHA421F0070MF	7.000	3,200	6,000	24	1.79	260	29	753	85	974	110	2,126	240
PHA421F0070MFC	7.000	4,200	6,000	24	2.13	260	29	753	85	974	110	2,126	240
PHA421F0070MFL	7.000	3,200	6,000	32	4.85	265	30	753	85	974	110	2,126	240
PHA421F0100MF	10.00	3,500	6,000	24	1.72	183	21	531	60	886	100	1,772	200
PHA421F0100MFC	10.00	4,500	6,000	24	2.05	183	21	531	60	886	100	1,772	200
PHA421F0100MFL	10.00	3,500	6,000	32	4.78	184	21	531	60	886	100	1,772	200
PHA422 with Motor Mounting Plate Continued Next Page													
PHA422F0160MF	16.00	3,700	6,500	19	0.64	231	26	797	90	1,152	130	2,126	240
PHA422F0160MFL	16.00	3,700	6,500	24	1.72	235	27	797	90	1,152	130	2,126	240
PHA422F0200MF	20.00	3,700	6,500	19	0.63	252	28	797	90	1,152	130	2,126	240
PHA422F0200MFL	20.00	3,700	6,500	24	1.70	255	29	797	90	1,152	130	2,126	240
PHA422F0250MF	25.00	4,000	7,000	19	0.58	251	28	797	90	1,152	130	2,126	240
PHA422F0250MFL	25.00	4,000	7,000	24	1.65	253	29	797	90	1,152	130	2,126	240
PHA422F0280MF	28.00	4,500	8,000	19	0.53	220	25	797	90	1,152	130	2,126	240
PHA422F0280MFL	28.00	4,500	8,000	24	1.59	222	25	797	90	1,152	130	2,126	240
PHA422F0350MF	35.00	4,500	8,000	19	0.52	244	28	797	90	1,152	130	2,126	240
PHA422F0350MFL	35.00	4,500	8,000	24	1.58	245	28	797	90	1,152	130	2,126	240
PHA422F0400MF	40.00	4,500	8,000	19	0.50	214	24	797	90	1,152	130	2,126	240
PHA422F0400MFL	40.00	4,500	8,000	24	1.56	214	24	797	90	1,152	130	2,126	240
PHA422F0500MF	50.00	4,500	8,000	19	0.50	239	27	797	90	1,152	130	2,126	240
PHA422F0500MFL	50.00	4,500	8,000	24	1.56	239	27	797	90	1,152	130	2,126	240

[1] Based on input speed: n1 = 2000 RPM
For torque at higher input speeds (T_{2NX}) solve the formula, where n1 = Actual Input Speed. $T_{2NX} = \frac{T_{2N}}{\sqrt[3]{\frac{n_1}{2000}}}$

[2] Maximum momentary torque for emergency stops or heavy shock load. Admissible stops per life of gearhead = 1,000 stops maximum.

See web site for drawings.

"PHA" Series–Advanced ServoFit® Precision Planetary Gearhead Selection Data



Part Number (Gearhead + Input)	Exact Ratio	Maximum Input Speed		Maximum Motor Shaft	Mass Moment of Inertia	Torsional Stiffness per arcmin		Output Torque					
								Nominal [1]		Acceleration		Peak [2]	
Gearhead	i	Continuous RPM (n_1)	Cyclic	øD[6] mm	J_1 kgcm²	C_2 in.lbs.	Nm	T_{2N} in.lbs.	Nm	T_{2B} in.lbs.	Nm	T_{2PEAK} in.lbs.	Nm
PHA422 with Motor Mounting Plate Continued													
PHA422F0700MF	70.00	4,500	8,000	19	0.50	237	27	797	90	974	110	2,126	240
PHA422F0700MFL	70.00	4,500	8,000	24	1.56	237	27	797	90	974	110	2,126	240
PHA422F1000MF	100.0	4,500	8,000	19	0.50	177	20	531	60	886	100	1,772	200
PHA422F1000MFL	100.0	4,500	8,000	24	1.56	177	20	531	60	886	100	1,772	200
PHA521 with Motor Mounting Plate													
PHA521F0040MF	4.000	2,200	5,000	32	5.03	679	77	1,860	210	2,835	320	4,915	555
PHA521F0040MFC	4.000	3,200	5,000	32	5.87	648	73	1,860	210	2,447	276	3,059	345
PHA521F0040MFL	4.000	2,200	5,000	38	12.12	753	85	1,860	210	2,835	320	4,915	555
PHA521F0050MF	5.000	2,500	5,500	32	5.85	705	80	1,860	210	2,835	320	5,315	600
PHA521F0050MFC	5.000	3,500	5,500	32	6.69	683	77	1,860	210	2,835	320	3,824	432
PHA521F0050MFL	5.000	2,500	5,500	38	12.94	754	85	1,860	210	2,835	320	5,315	600
PHA521F0070MF	7.000	3,000	6,000	32	5.30	627	71	1,860	210	2,392	270	5,315	600
PHA521F0070MFC	7.000	4,000	6,000	32	6.21	627	71	1,860	210	2,392	270	5,315	600
PHA521F0070MFL	7.000	3,000	6,000	38	12.13	650	73	1,860	210	2,392	270	5,315	600
PHA521F0100MF	10.00	3,300	6,000	32	5.05	473	53	1,240	140	2,215	250	4,429	500
PHA521F0100MFC	10.00	4,500	6,000	32	5.96	473	53	1,240	140	2,215	250	4,429	500
PHA521F0100MFL	10.00	3,300	6,000	38	11.88	479	54	1,240	140	2,215	250	4,429	500
PHA522 with Motor Mounting Plate													
PHA522F0160MF	16.00	3,300	6,000	24	1.95	565	64	1,860	210	2,835	320	4,915	555
PHA522F0160MFC	16.00	4,300	6,000	24	2.26	562	63	1,860	210	2,835	320	4,915	555
PHA522F0160MFL	16.00	3,300	6,000	32	5.06	568	64	1,860	210	2,835	320	4,915	555
PHA522F0200MF	20.00	3,300	6,000	24	2.00	621	70	1,949	220	2,835	320	5,315	600
PHA522F0200MFC	20.00	4,300	6,000	24	2.31	619	70	1,949	220	2,835	320	5,315	600
PHA522F0200MFL	20.00	3,300	6,000	32	5.11	624	70	1,949	220	2,835	320	5,315	600
PHA522F0250MF	25.00	3,700	6,500	24	1.88	620	70	1,949	220	2,835	320	5,315	600
PHA522F0250MFC	25.00	4,500	6,500	24	2.19	619	70	1,949	220	2,835	320	5,315	600
PHA522F0250MFL	25.00	3,700	6,500	32	4.99	622	70	1,949	220	2,835	320	5,315	600
PHA522F0280MF	28.00	4,000	7,000	24	1.73	537	61	1,860	210	2,835	320	4,915	555
PHA522F0280MFC	28.00	5,000	7,000	24	2.06	537	61	1,860	210	2,835	320	4,915	555
PHA522F0280MFL	28.00	4,000	7,000	32	4.79	538	61	1,860	210	2,835	320	4,915	555
PHA522F0350MF	35.00	4,000	7,000	24	1.75	599	68	1,949	220	2,835	320	5,315	600
PHA522F0350MFC	35.00	5,000	7,000	24	2.08	599	68	1,949	220	2,835	320	5,315	600
PHA522F0350MFL	35.00	4,000	7,000	32	4.81	600	68	1,949	220	2,835	320	5,315	600
PHA522F0400MF	40.00	4,000	7,000	24	1.69	515	58	1,860	210	2,835	320	4,915	555
PHA522F0400MFC	40.00	5,000	7,000	24	2.02	515	58	1,860	210	2,835	320	4,915	555
PHA522F0400MFL	40.00	4,000	7,000	32	4.75	516	58	1,860	210	2,835	320	4,915	555
PHA522F0500MF	50.00	4,000	7,000	24	1.69	581	66	1,949	220	2,835	320	5,315	600
PHA522F0500MFC	50.00	5,000	7,000	24	2.03	581	66	1,949	220	2,835	320	5,315	600
PHA522F0500MFL	50.00	4,000	7,000	32	4.75	582	66	1,949	220	2,835	320	5,315	600
PHA522F0700MF	70.00	4,000	7,000	24	1.69	580	65	1,860	210	2,392	270	5,315	600
PHA522F0700MFC	70.00	5,000	7,000	24	2.02	580	65	1,860	210	2,392	270	5,315	600
PHA522F0700MFL	70.00	4,000	7,000	32	4.75	580	66	1,860	210	2,392	270	5,315	600
PHA522F1000MF	100.0	4,000	7,000	24	1.69	459	52	1,240	140	2,215	250	4,429	500
PHA522F1000MFC	100.0	5,000	7,000	24	2.02	459	52	1,240	140	2,215	250	4,429	500
PHA522F1000MFL	100.0	4,000	7,000	32	4.75	459	52	1,240	140	2,215	250	4,429	500

Index of Symbols

MT ..... Motor adapter with TriAdapt® coupling	i ..... Ratio - Exact	T_{2N} ..... Nominal Torque
MF ..... Motor adapter with FlexiAdapt® coupling	n_1 ..... Maximum input speed RPM	T_{2B} ..... Acceleration Torque Maximum
L ..... Large Input	J_1 ..... Mass moment of inertia (input)	T_{2PEAK} ..... Peak Torque
C ..... ServoCool	C_2 ..... Torsional Stiffness	

See web site for drawings.



"PHA" Series–Advanced ServoFit® Precision Planetary Gearhead Selection Data

Part Number (Gearhead + Input)	Exact Ratio	Maximum Input Speed		Maximum Motor Shaft	Mass Moment of Inertia	Torsional Stiffness per arcmin		Output Torque					
								Nominal [1]		Acceleration		Peak [2]	
Gearhead	i	Continuous RPM (n_1)	Cyclic	øD^6 mm	J_1 kgcm²	C_2 in.lbs.	Nm	T_{2N} in.lbs.	Nm	T_{2B} in.lbs.	Nm	T_{2PEAK} in.lbs.	Nm
PHA721 with Motor Mounting Plate													
PHA721F0040MF	4.000	1,900	4,000	38	16.63	1,271	144	3,898	440	6,201	700	12,235	1,381
PHA721F0040MFC	4.000	2,400	4,000	38	22.42	1,271	144	3,898	440	6,201	700	12,235	1,381
PHA721F0040MFL	4.000	1,900	4,000	48	35.43	1,417	160	3,898	440	6,201	700	12,235	1,381
PHA721F0050MF	5.000	2,200	5,000	38	14.78	1,377	155	3,898	440	6,201	700	12,401	1,400
PHA721F0050MFC	5.000	3,000	5,000	38	20.58	1,377	155	3,898	440	6,201	700	12,401	1,400
PHA721F0050MFL	5.000	2,200	5,000	48	33.58	1,482	167	3,898	440	6,201	700	12,401	1,400
PHA721F0070MF	7.000	2,500	5,000	38	13.03	1,286	145	3,898	440	5,758	650	11,127	1,256
PHA721F0070MFC	7.000	3,500	5,000	38	18.82	1,286	145	3,898	440	5,758	650	11,127	1,256
PHA721F0070MFL	7.000	2,500	5,000	48	32.18	1,347	152	3,898	440	5,758	650	11,127	1,256
PHA721F0100MF	10.00	3,000	5,000	38	12.33	1,000	113	2,657	300	4,429	500	8,858	1,000
PHA721F0100MFC	10.00	4,000	5,000	38	18.13	1,000	113	2,657	300	4,429	500	8,858	1,000
PHA721F0100MFL	10.00	3,000	5,000	48	31.49	1,017	115	2,657	300	4,429	500	8,858	1,000
PHA722 with Motor Mounting Plate													
PHA722F0160MF	16.00	3,000	5,000	32	6.08	1,176	133	3,898	440	6,201	700	12,235	1,381
PHA722F0160MFC	16.00	4,000	5,000	32	6.92	1,170	132	3,898	440	6,201	700	11,746	1,326
PHA722F0160MFL	16.00	3,000	5,000	38	13.17	1,189	134	3,898	440	6,201	700	12,235	1,381
PHA722F0200MF	20.00	3,000	5,000	32	5.97	1,304	147	3,898	440	6,201	700	12,401	1,400
PHA722F0200MFC	20.00	4,000	5,000	32	6.81	1,299	147	3,898	440	6,201	700	12,401	1,400
PHA722F0200MFL	20.00	3,000	5,000	38	13.06	1,314	148	3,898	440	6,201	700	12,401	1,400
PHA722F0250MF	25.00	3,500	6,000	32	5.56	1,304	147	3,898	440	6,201	700	12,401	1,400
PHA722F0250MFC	25.00	4,200	6,000	32	6.40	1,301	147	3,898	440	6,201	700	12,401	1,400
PHA722F0250MFL	25.00	3,500	6,000	38	12.65	1,310	148	3,898	440	6,201	700	12,401	1,400
PHA722F0280MF	28.00	3,700	6,500	32	5.18	1,149	130	3,898	440	6,201	700	12,235	1,381
PHA722F0280MFC	28.00	4,500	6,500	32	6.10	1,149	130	3,898	440	6,201	700	12,235	1,381
PHA722F0280MFL	28.00	3,700	6,500	38	12.01	1,154	130	3,898	440	6,201	700	12,235	1,381
PHA722F0350MF	35.00	3,700	6,500	32	5.15	1,282	145	3,898	440	6,201	700	12,401	1,400
PHA722F0350MFC	35.00	4,500	6,500	32	6.06	1,282	145	3,898	440	6,201	700	12,401	1,400
PHA722F0350MFL	35.00	3,700	6,500	38	11.98	1,286	145	3,898	440	6,201	700	12,401	1,400
PHA722F0400MF	40.00	3,700	6,500	32	4.99	1,116	126	3,898	440	6,201	700	12,235	1,381
PHA722F0400MFC	40.00	4,700	6,500	32	5.91	1,116	126	3,898	440	6,201	700	12,235	1,381
PHA722F0400MFL	40.00	3,700	6,500	38	11.82	1,118	126	3,898	440	6,201	700	12,235	1,381
PHA722F0500MF	50.00	3,700	6,500	32	4.98	1,255	142	3,898	440	6,201	700	12,401	1,400
PHA722F0500MFC	50.00	4,700	6,500	32	5.89	1,255	142	3,898	440	6,201	700	12,401	1,400
PHA722F0500MFL	50.00	3,700	6,500	38	11.80	1,257	142	3,898	440	6,201	700	12,401	1,400
PHA722F0700MF	70.00	3,700	6,500	32	4.96	1,252	141	3,898	440	5,758	650	11,127	1,256
PHA722F0700MFC	70.00	4,700	6,500	32	5.87	1,252	141	3,898	440	5,758	650	11,127	1,256
PHA722F0700MFL	70.00	3,700	6,500	38	11.79	1,252	141	3,898	440	5,758	650	11,127	1,256
PHA722F1000MF	100.0	3,700	6,500	32	4.95	989	112	2,657	300	4,429	500	8,858	1,000
PHA722F1000MFC	100.0	4,700	6,500	32	5.87	989	112	2,657	300	4,429	500	8,858	1,000
PHA722F1000MFL	100.0	3,700	6,500	38	11.78	990	112	2,657	300	4,429	500	8,858	1,000

[1] Based on input speed: n1 = 2000 RPM
For torque at higher input speeds (T_{2NX}) solve the formula, where n1 = Actual Input Speed. $T_{2NX} = \frac{T_{2N}}{\sqrt[3]{\frac{n_1}{2000}}}$

[2] Maximum momentary torque for emergency stops or heavy shock load. Admissible stops per life of gearhead = 1,000 stops maximum.

See web site for drawings.

"PHA" Series–Advanced ServoFit® Precision Planetary Gearhead Selection Data



Part Number (Gearhead + Input)	Exact Ratio	Maximum Input Speed		Maximum Motor Shaft	Mass Moment of Inertia	Torsional Stiffness per arcmin		Output Torque					
								Nominal [1]		Acceleration		Peak [2]	
Gearhead		Continuous	Cyclic					T_{2N}		T_{2B}		T_{2PEAK}	
	i	RPM (n_1)		mm	kgcm²	in.lbs.	Nm	in.lbs.	Nm	in.lbs.	Nm	in.lbs.	Nm
PHA821 with Motor Mounting Plate													
PHA821F0040MF	4.000	1,500	3,500	48	55.66	3,332	376	7,086	800	14,173	1,600	17,245	1,947
PHA821F0040MFC	4.000	2,200	3,500	48	70.14	3,527	398	7,086	800	14,173	1,600	20,477	2,312
PHA821F0050MF	5.000	1,700	4,000	48	46.67	3,611	408	8,858	1,000	15,059	1,700	21,557	2,434
PHA821F0050MFC	5.000	2,500	4,000	48	61.15	3,755	424	8,858	1,000	15,059	1,700	25,596	2,890
PHA821F0070MF	7.000	2,000	4,000	48	39.26	3,546	400	8,858	1,000	14,173	1,600	24,900	2,811
PHA821F0070MFC	7.000	3,200	4,000	48	53.73	3,546	400	8,858	1,000	14,173	1,600	24,900	2,811
PHA821F0100MF	10.00	2,500	4,000	48	35.44	2,657	300	7,086	800	10,630	1,200	21,259	2,400
PHA821F0100MFC	10.00	3,700	4,500	48	49.92	2,657	300	7,086	800	10,630	1,200	21,259	2,400
PHA822 with Motor Mounting Plate													
PHA822F0160MF	16.00	2,500	4,500	38	16.57	3,157	356	9,744	1,100	17,716	2,000	28,346	3,200
PHA822F0160MFC	16.00	3,250	4,500	38	19.37	3,157	356	9,744	1,100	17,716	2,000	28,346	3,200
PHA822F0160MFL	16.00	2,500	4,500	48	18.59	3,208	362	9,744	1,100	17,716	2,000	28,346	3,200
PHA822F0200MF	20.00	2,500	4,500	38	16.01	3,477	393	11,073	1,250	17,716	2,000	28,346	3,200
PHA822F0200MFC	20.00	3,300	4,500	38	18.80	3,477	393	11,073	1,250	17,716	2,000	28,346	3,200
PHA822F0200MFL	20.00	2,500	4,500	48	18.02	3,517	397	11,073	1,250	17,716	2,000	28,346	3,200
PHA822F0250MF	25.00	3,000	5,500	38	14.50	3,469	392	11,073	1,250	17,716	2,000	28,346	3,200
PHA822F0250MFC	25.00	3,800	5,500	38	17.29	3,469	392	11,073	1,250	17,716	2,000	28,346	3,200
PHA822F0250MFL	25.00	3,000	5,500	48	16.51	3,494	394	11,073	1,250	17,716	2,000	28,346	3,200
PHA822F0280MF	28.00	3,300	6,000	38	13.08	3,116	352	9,744	1,100	17,716	2,000	28,346	3,200
PHA822F0280MFC	28.00	4,000	6,000	38	15.87	3,116	352	9,744	1,100	17,716	2,000	28,346	3,200
PHA822F0280MFL	28.00	3,300	6,000	48	15.45	3,137	354	9,744	1,100	17,716	2,000	28,346	3,200
PHA822F0350MF	35.00	3,300	6,000	38	12.89	3,445	389	11,073	1,250	17,716	2,000	28,346	3,200
PHA822F0350MFC	35.00	4,000	6,000	38	15.69	3,445	389	11,073	1,250	17,716	2,000	28,346	3,200
PHA822F0350MFL	35.00	3,300	6,000	48	15.26	3,462	391	11,073	1,250	17,716	2,000	28,346	3,200
PHA822F0400MF	40.00	3,300	6,000	38	12.36	3,004	339	9,744	1,100	17,007	1,920	28,346	3,200
PHA822F0400MFC	40.00	4,300	6,000	38	15.15	3,004	339	9,744	1,100	17,007	1,920	28,346	3,200
PHA822F0400MFL	40.00	3,300	6,000	48	14.73	3,014	340	9,744	1,100	17,007	1,920	28,346	3,200
PHA822F0500MF	50.00	3,300	6,000	38	12.27	3,357	379	11,073	1,250	17,716	2,000	28,346	3,200
PHA822F0500MFC	50.00	4,300	6,000	38	15.06	3,357	379	11,073	1,250	17,716	2,000	28,346	3,200
PHA822F0500MFL	50.00	3,300	6,000	48	14.64	3,365	380	11,073	1,250	17,716	2,000	28,346	3,200
PHA822F0700MF	70.00	3,300	6,000	38	12.19	3,417	386	8,858	1,000	14,173	1,600	24,900	2,811
PHA822F0700MFC	70.00	4,300	6,000	38	14.99	3,417	386	8,858	1,000	14,173	1,600	24,900	2,811
PHA822F0700MFL	70.00	3,300	6,000	48	14.56	3,421	386	8,858	1,000	14,173	1,600	24,900	2,811
PHA822F1000MF	100.0	3,300	6,000	38	12.15	2,621	296	7,086	800	10,630	1,200	21,259	2,400
PHA822F1000MFC	100.0	4,300	6,000	38	14.95	2,621	296	7,086	800	10,630	1,200	21,259	2,400
PHA822F1000MFL	100.0	3,300	6,000	48	14.52	2,622	296	7,086	800	10,630	1,200	21,259	2,400

Index of Symbols

MT ..... Motor adapter with TriAdapt® coupling	i ..... Ratio - Exact	T_{2N} ..... Nominal Torque
MF ..... Motor adapter with FlexiAdapt® coupling	n_1 ..... Maximum input speed RPM	T_{2B} ..... Acceleration Torque Maximum
L ..... Large Input	J_1 ..... Mass moment of inertia (input)	T_{2PEAK} ..... Peak Torque
C ..... ServoCool	C_2 ..... Torsional Stiffness	

See web site for drawings.



"PHA" Series–Advanced ServoFit® Precision Planetary Gearhead Selection Data

Part Number (Gearhead + Input)	Exact Ratio	Maximum Input Speed		Maximum Motor Shaft	Mass Moment of Inertia	Torsional Stiffness per arcmin		Output Torque					
								Nominal [1]		Acceleration		Peak [2]	
Gearhead	i	Continuous RPM (n_1)	Cyclic RPM (n_1)	øD^6 mm	J_1 kgcm²	C_2 in.lbs.	C_2 Nm	T_{2N} in.lbs.	T_{2N} Nm	T_{2B} in.lbs.	T_{2B} Nm	T_{2PEAK} in.lbs.	T_{2PEAK} Nm
PHA912 with Motor Mounting Plate													
PHA912F0160MF	16.00	2,200	3,500	48	53.54	5,150	581	22,145	2,500	37,647	4,250	66,826	7,544
PHA912F0160MFC	16.00	2,900	3,500	48	69.44	5,178	585	22,145	2,500	37,647	4,250	75,293	8,500
PHA912F0180MF	18.00	1,800	3,000	48	75.67	5,795	654	22,145	2,500	37,647	4,250	75,179	8,487
PHA912F0180MFC	18.00	2,700	3,000	48	91.57	5,823	657	22,145	2,500	37,647	4,250	75,293	8,500
PHA912F0200MF	20.00	2,500	4,000	48	44.71	5,165	583	22,145	2,500	37,647	4,250	75,293	8,500
PHA912F0200MFC	20.00	3,300	4,000	48	60.61	5,183	585	22,145	2,500	37,647	4,250	75,293	8,500
PHA912F0240MF	24.00	2,200	3,500	48	50.14	5,842	660	22,145	2,500	37,647	4,250	75,293	8,500
PHA912F0240MFC	24.00	2,900	3,500	48	66.04	5,858	661	22,145	2,500	37,647	4,250	75,293	8,500
PHA912F0280MF	28.00	2,800	4,500	48	38.30	5,128	579	22,145	2,500	37,647	4,250	75,293	8,500
PHA912F0280MFC	28.00	4,000	4,500	48	54.20	5,128	579	22,145	2,500	37,647	4,250	75,293	8,500
PHA912F0300MF	30.00	2,500	4,000	48	42.53	5,851	661	22,145	2,500	37,647	4,250	75,293	8,500
PHA912F0300MFC	30.00	3,500	4,000	48	58.43	5,861	662	22,145	2,500	37,647	4,250	75,293	8,500
PHA912F0320MF	32.00	2,800	4,500	48	36.64	5,077	573	22,145	2,500	37,647	4,250	75,293	8,500
PHA912F0320MFC	32.00	4,000	4,500	48	52.54	5,077	573	22,145	2,500	37,647	4,250	75,293	8,500
PHA912F0400MF	40.00	2,800	4,500	48	34.97	5,000	564	22,145	2,500	37,647	4,250	75,293	8,500
PHA912F0400MFC	40.00	4,000	4,500	48	50.87	5,000	564	22,145	2,500	37,647	4,250	75,293	8,500
PHA912F0420MF	42.00	2,800	4,500	48	37.19	5,829	658	22,145	2,500	37,647	4,250	75,293	8,500
PHA912F0420MFC	42.00	4,000	4,500	48	53.09	5,829	658	22,145	2,500	37,647	4,250	75,293	8,500
PHA912F0480MF	48.00	2,800	4,500	48	35.79	5,800	655	22,145	2,500	37,647	4,250	75,293	8,500
PHA912F0480MFC	48.00	4,000	4,500	48	51.69	5,800	655	22,145	2,500	37,647	4,250	75,293	8,500
PHA912F0600MF	60.00	2,800	4,500	48	34.42	5,755	650	22,145	2,500	37,647	4,250	75,293	8,500
PHA912F0600MFC	60.00	4,000	4,500	48	50.32	5,755	650	22,145	2,500	37,647	4,250	75,293	8,500
PHA923 with Motor Mounting Plate													
PHA923F0610MF	61.00	2,500	4,500	38	54.76	3,534	399	22,145	2,500	37,647	4,250	75,293	8,500
PHA923F0610MFC	61.00	3,200	4,500	38	60.56	3,534	399	22,145	2,500	37,647	4,250	75,293	8,500
PHA923F0610MFL	61.00	2,500	4,500	48	73.56	3,538	399	22,145	2,500	37,647	4,250	75,293	8,500
PHA923F0910MF	91.00	2,500	4,500	38	50.61	3,538	399	22,145	2,500	37,647	4,250	75,293	8,500
PHA923F0910MFC	91.00	3,200	4,500	38	56.41	3,538	399	22,145	2,500	37,647	4,250	75,293	8,500
PHA923F0910MFL	91.00	2,500	4,500	48	69.77	3,540	400	22,145	2,500	37,647	4,250	75,293	8,500
PHA923F1210MF	121.0	2,500	4,500	38	49.23	3,540	400	22,145	2,500	37,647	4,250	75,293	8,500
PHA923F1210MFC	121.0	3,200	4,500	38	55.02	3,540	400	22,145	2,500	37,647	4,250	75,293	8,500
PHA923F1210MFL	121.0	2,500	4,500	48	68.39	3,542	400	22,145	2,500	37,647	4,250	75,293	8,500

[1] Based on input speed: n1 = 2000 RPM
For torque at higher input speeds (T_{2NX}) solve the formula, where n1 = Actual Input Speed. $T_{2NX} = \frac{T_{2N}}{\sqrt[3]{\frac{n_1}{2000}}}$

[2] Maximum momentary torque for emergency stops or heavy shock load. Admissible stops per life of gearhead = 1,000 stops maximum.

See web site for drawings.

"PHA" Series–Advanced ServoFit® Precision Planetary Gearhead Selection Data



Part Number (Gearhead + Input)	Exact Ratio	Maximum Input Speed		Maximum Motor Shaft	Mass Moment of Inertia	Torsional Stiffness per arcmin		Output Torque					
								Nominal [1]		Acceleration		Peak [2]	
Gearhead		Continuous	Cyclic					T_{2N}		T_{2B}		T_{2PEAK}	
	i	RPM (n_1)		mm	kgcm²	in.lbs.	Nm	in.lbs.	Nm	in.lbs.	Nm	in.lbs.	Nm
PHA1012 with Motor Mounting Plate													
PHA1012F0180MF	18.00	1,800	3,000	48	78.82	9,502	1,073	35,432	4,000	61,226	6,912	75,179	8,487
PHA1012F0180MFC	18.00	2,500	3,000	48	94.72	9,576	1,081	35,432	4,000	61,226	6,912	89,266	10,077
PHA1012F0240MF	24.00	2,200	3,500	48	51.91	9,628	1,087	35,432	4,000	66,435	7,500	100,239	11,316
PHA1012F0240MFC	24.00	2,700	3,500	48	67.81	9,671	1,092	35,432	4,000	66,435	7,500	119,022	13,437
PHA1012F0300MF	30.00	2,500	4,000	48	43.66	9,651	1,090	35,432	4,000	66,435	7,500	125,299	14,145
PHA1012F0300MFC	30.00	3,200	4,000	48	59.57	9,679	1,093	35,432	4,000	66,435	7,500	132,870	15,000
PHA1012F0420MF	42.00	2,800	4,500	48	37.77	9,593	1,083	35,432	4,000	66,435	7,500	132,870	15,000
PHA1012F0420MFC	42.00	4,000	4,500	48	53.67	9,593	1,083	35,432	4,000	66,435	7,500	132,870	15,000
PHA1012F0480MF	48.00	2,800	4,500	48	36.23	9,514	1,074	35,432	4,000	61,226	6,912	132,870	15,000
PHA1012F0480MFC	48.00	4,000	4,500	48	52.13	9,514	1,074	35,432	4,000	61,226	6,912	132,870	15,000
PHA1012F0600MF	60.00	2,800	4,500	48	34.71	9,394	1,060	35,432	4,000	61,226	6,912	132,870	15,000
PHA1012F0600MFC	60.00	4,000	4,500	48	50.61	9,394	1,060	35,432	4,000	61,226	6,912	132,870	15,000
PHA1023 with Motor Mounting Plate													
PHA1023F0610MF	61.00	2,500	4,500	48	152.86	4,861	549	35,432	4,000	66,435	7,500	132,870	15,000
PHA1023F0610MFC	61.00	3,000	4,500	48	167.34	4,862	549	35,432	4,000	66,435	7,500	132,870	15,000
PHA1023F0910MF	91.00	2,500	4,500	48	127.47	4,867	549	35,432	4,000	66,435	7,500	132,870	15,000
PHA1023F0910MFC	91.00	3,000	4,500	48	141.94	4,867	549	35,432	4,000	66,435	7,500	132,870	15,000

Index of Symbols

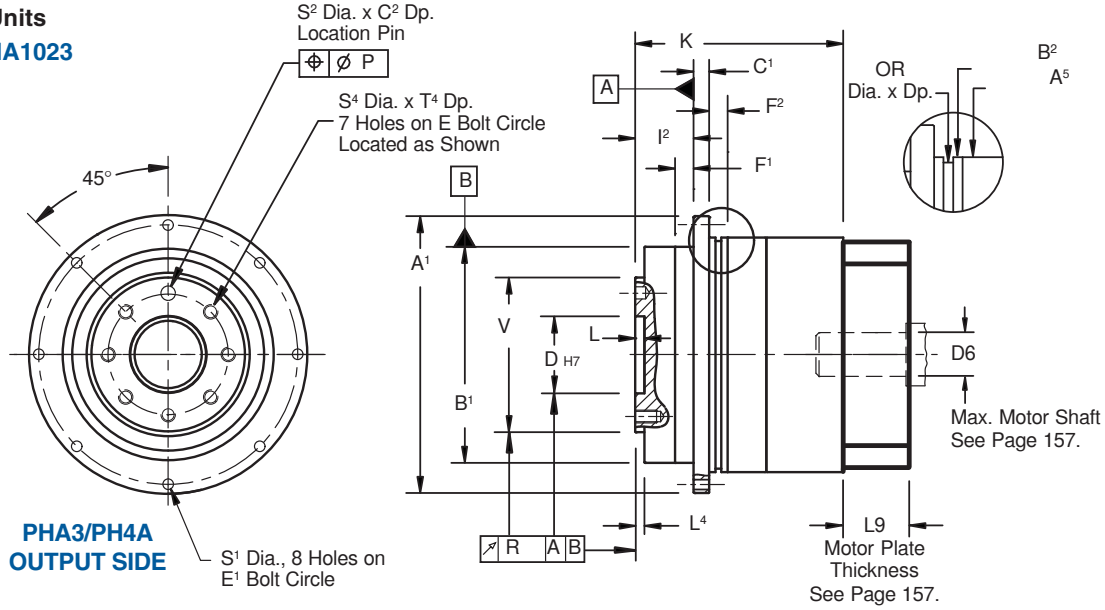
MT ..... Motor adapter with TriAdapt® coupling	i ..... Ratio - Exact	T_{2N} ..... Nominal Torque
MF ..... Motor adapter with FlexiAdapt® coupling	n_1 ..... Maximum input speed RPM	T_{2B} ..... Acceleration Torque Maximum
L ..... Large Input	J_1 ..... Mass moment of inertia (input)	T_{2PEAK} ..... Peak Torque
C ..... ServoCool	C_2 ..... Torsional Stiffness	

See web site for drawings.

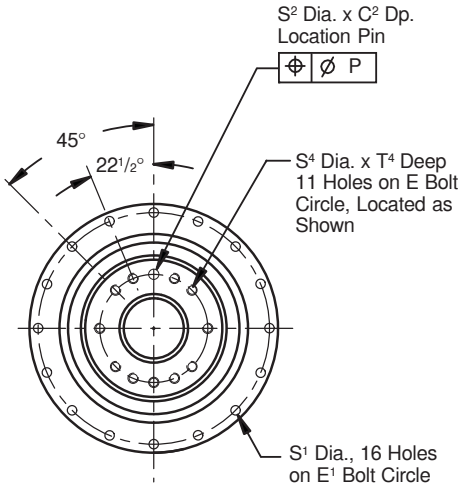


"PHA" Series–Advanced ServoFit® Precision Planetary Gearhead Dimensional Data

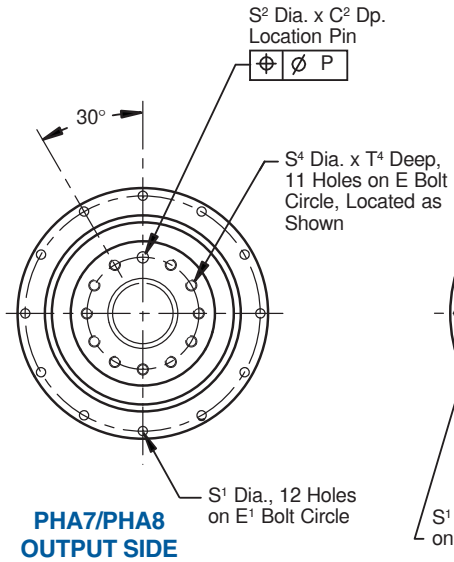
Drawing for Units
PHA321 thru PHA1023



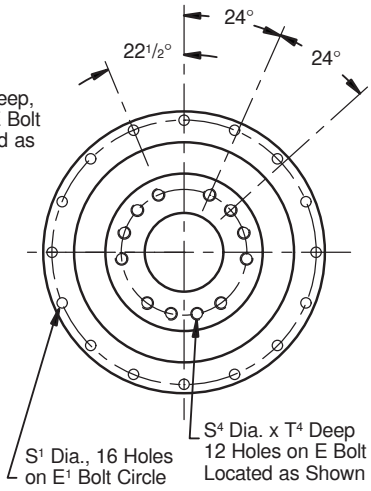
PHA3/PH4A OUTPUT SIDE



PHA5 OUTPUT SIDE



PHA7/PHA8 OUTPUT SIDE



PHA9/PHA10 OUTPUT SIDE

Table No. 1 **"PHA" Series – Advanced Gearhead with Motor Plate – Dimensions (mm/inches)**

Unit	A¹	A⁵	B¹ h7	B² h7	C¹	C²	D H7	E	E¹	F¹	F²	I²	L	L²	L⁴	OR
PHA321/PHA322	86 3.39	70 2.76	64 +.000/-.030 2.520 +.0000/-.0012	70 * +.000/-.030 2.756 +.0000/-.0012	4 .16	3 .12	20 +.021/-.0 .787 +.0008/-.0000	31.5 1.24	79 3.11	7 .28	8 .31	19.5 .77	4 .16	3 .12	3.5 .14	65x2 2.55x.08
PHA421/PHA422	118 4.65	95 3.74	90 +.000/-.035 3.543 +.0000/-.0014	95 +.000/-.035 3.740 +.0000/-.0014	7 .28	7 .28	31.5 +.025/-.0 1.240 +.0010/-.0000	50 1.97	109 4.29	10 .39	10 .39	30 1.18	6 .24	6 .24	6 .24	90x3 3.54x.12
PHA521/PH5A22	145 5.71	120 4.72	110 +.000/-.035 4.331 +.0000/-.0014	120 * +.000/-.035 4.724 +.0000/-.0014	8 .32	7 .28	40 +.025/-.0 1.575 +.0010/-.0000	63 2.48	135 5.31	10 .39	12 .47	29 1.14	6 .24	6 .24	6 .24	110x3 4.33x.12
PHA721/PHA722	179 7.05	152 5.98	140 +.000/-.040 5.513 +.0000/-.0016	152 +.000/-.040 5.984 +.0000/-.0016	10 .39	7 .28	50 +.025/-.0 1.969 +.0010/-.0000	80 3.15	168 6.61	12 .47	12 .47	38 1.50	6 .24	6 .24	6 .24	145x3 5.71x.12
PHA821/PHA822	247 9.72	212 8.35	200 +.000/-.046 7.874 +.0000/-.0018	212 +.000/-.046 8.346 +.0000/-.0018	12 .47	10 .39	80 +.030/-.0 3.150 +.0012/-.0000	125 4.92	233 9.17	15 .59	15 .59	50 1.97	8 .31	8 .31	8 .31	200x5 7.87x.20
PHA912/PHA923	300 11.81	152 5.98	255 +.000/-.052 10.039 +.000/-.0020	255 +.000/-.052 10.039 +.0000/-.0020	18 .71	—	90 +.035/-.0 3.543 +.0014/-.0000	140 5.51	280 11.02	20 .79	20 .79	66 2.60	12 .47	11 .43	12 .47	238x5 9.37x.20
PHA1012/PHA1023	330 12.99	212 8.35	285 +.000/-.057 11.220 +.000/-.0022	285 +.000/-.052 11.221 +.0000/-.0020	20 .79	—	95 +.035/-.0 3.740 +.0014/-.0000	160 6.30	310 12.20	20 .79	20 .79	75 2.95	10 .39	15 .59	15 .59	270x6 10.63x.24

* Not applicable for PHA322 and PHA522.

See web site for drawings.

"PHA" Series–Advanced ServoFit® Precision Planetary Gearhead Dimensional Data



Table No. 2 "PHA" Series – Dimensions (mm/inches)

Unit	P	R	S¹	S² H7	S⁴	T⁴	V h7
PHA321/PHA322	.02 .0008	.020 .0008	4.5 .18	5 +.012/-.000 .20 +.0005/-.0000	M5	7 .28	40 +.000/-.025 1.575 +.000/-.0010
PHA421/PHA422	.02 .0008	.020 .0008	5.5 .22	6 +.012/-.000 .236 +.0005/-.0000	M6	10 .39	63 +.000/-.030 2.480 +.000/-.0012
PHA521/PHA522	.02 .0008	.020 .0008	5.5 .22	6 +.012/-.000 .236 +.0005/-.0000	M6	11 .43	80 +.000/-.030 3.150 +.000/-.0012
PHA721/PHA722	.02 .0008	.025 .0010	6.6 .26	8 +.015/-.000 .315 +.0006/-.0000	M8	14 .55	100 +.000/-.035 3.937 +.000/-.0014
PHA821/PHA822	—	.030 .0012	9 .35	10 +.015/-.000 .393 +.0006/-.0000	M10	18 .71	160 +.000/-.040 6.299 +.000/-.0016
PHA912/PHA923	—	.030 .0012	13.5 .53	—	M16	24 .94	180 +.000/-.040 7.087 +.000/-.0016
PHA1012/PHA1023	— .0016	.040 .53	13.5	—	M20 1.18	30 7.874	200 +.000/-.046 +.000/-.0018

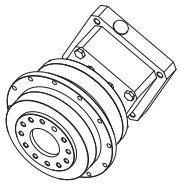
Table No. 3 K Dimension

Standard			ServoCool		
Unit	mm	inches	Unit	mm	inches
PHA321	80.5	3.17	—		
PHA322	104	4.09	—		
PHA421	106	4.17	PHA421_C	82.5	3.24
PHA422	146.5	5.77	–		
PHA521	110	4.33	PHA521_C	138	5.43
PHA522	159.5	6.28	PHA522_C	183	7.20
PHA721	138	5.43	PHA721_C	168	6.61
PHA722	190	7.48	PHA722_C	218	8.58
PHA821	183	7.20	PHA821_C	231	9.09
PHA822	251	9.88	PHA822_C	281	11.06
PHA912	336.5	13.24	PHA921_C	384.5	15.14
PHA923	257	10.12	PHA923_C	287	11.30
PHA1012	366	14.41	PHA1012_C	414	16.30
PHA1023	307	12.09	PHA1023_C	355	13.98

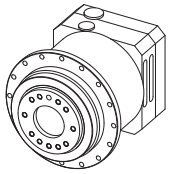
Part No. Explanation

PHA 5 2 1 F 0050 MF C

- **C** – Option for ServoCool
- **MF** – Motor Plate with FlexiAdapt Coupling
- **0050** – Ratio (**0050** = 5.0:1)
- **F** – Output Flange
- **1** – No. of Stages (**1** = 1 Stage, **2** = 2 Stage)
- **2** – Generation No.
- **5** – Unit No.
- **PHA** – Advanced "PHA" Series ServoFit Precision Planetary Gearhead



Typical 2 Stage Configuration



Typical ServoCool

When ordering a planetary gearhead, specify the motor manufacturer and part number, provide the motor drawing with dimensions, or specify the motor mounting dimensions. (See Page 157.)

Large Input – Dimensional Data

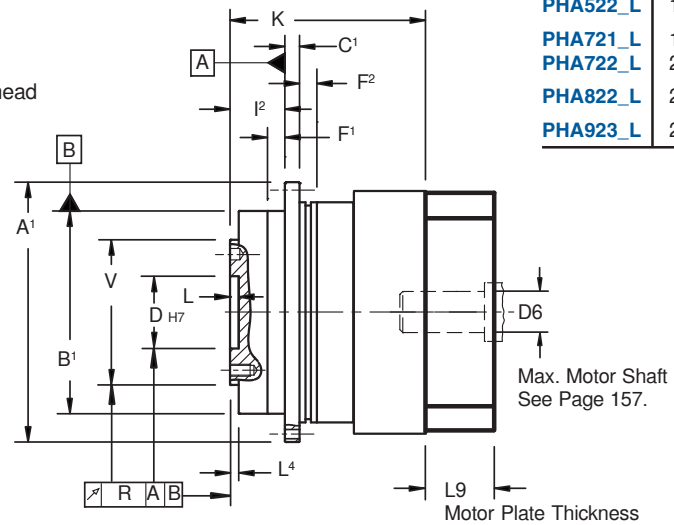
Part No. Explanation

PHA 5 2 1 F 0050 MF L

- **L** – Large Input
- **MF** – Motor Plate with FlexiAdapt Coupling
- **0050** – Ratio (**0050** = 5.0:1)
- **F** – Output Flange
- **1** – No. of Stages (**1** = 1 Stage, **2** = 2 Stage)
- **2** – Generation No.
- **5** – Unit No.
- **PHA** – Advanced "PHA" Series ServoFit Precision Planetary Gearhead

Table No. 4

	K Dimension	
Unit	mm	inches
PHA321_L	84.5	3.33
PHA322_L	121	4.76
PHA421_L	117.5	4.63
PHA422_L	150.5	5.93
PHA521_L	124	4.88
PHA522_L	171	6.73
PHA721_L	155	6.10
PHA722_L	204	8.03
PHA822_L	268	10.55
PHA923_L	274	10.79



See web site for drawings.

"PHKX" Series–Right Angle ServoFit® Precision Planetary Gearhead Performance Specifications

			Size	PH321 KX3	PH322 KX3	PH421 KX4	PH422 KX3	PH521 KX5	PH522 KX4	PH721 KX7	PH722 KX5	PH821 KX8	PH822 KX7	PH922 KX8
Acceleration Torque Maximum	T_{2B}	in.lbs. Nm		558 63	576 65	1,071 121	1,105 130	2,708 306	2,832 320	5,753 650	6,195 700	14,160 1,600	17,700 2,000	37,612 4250
Output Torque [1] **Nominal**	T_{2N}	in.lbs. Nm		398 45		797 90		1,947 220		3,894 440		8,850 1,000	11,063 1,250	22,125 2,500
Input Speed Maximum	n_{1MAX}	Continuous Cyclic		3,500 6,000		3,000 4,500	3,500 6,000	3,000 4,500		2,100 3,500	3,000 4,000	1,300 3,000	2,100 3,500	1,300 3,000
Torsional Backlash [2]	$\Delta\varphi$	arcmin		≤6		≤5.5	≤3.5	≤5.5	≤3.5	≤5	≤3.5	≤5	≤3.5	≤3.5
Torsional Stiffness Maximum	C_2	in.lbs./arcmin Nm/arcmin		69 7.8	88 10	168 19	230 26	416 47	575 65	1,053 119	1,239 140	2,505 283	3,407 385	5,717 646
Axial Load Maximum	F_{2AMAX}	lbs. N		371 1,650		484 2,150		934 4,150		1,384 6,150		2,261 10,050		7,425 33,000
Tilting Moment [3] **Maximum**	T_{2K}	in.lbs. Nm		885 100		2,301 260		3,894 440		2,593 1,500		30,975 3,500		57,525 6,500
Weight	m	pounds kg		8 3.5	9 4.0	12 5.5	14 6.3	28 12.9	24 10.9	52 23.5	46 20.9	124 56	112 51	203 92.0
Noise Level [4]	L_{PA}	dB(A)		≤70		≤70	≤70	≤72	≤70	≤72		≤74	≤72	≤74
Efficiency at Nominal Torque	η	%		≥93 - 96										
Balance Quality				Q 2.5 (Quality Class - 2.5 millimeters per second)										
Lubrication				Synthetic Oil (ISO VG 150)										
Mounting Position				 Must be Specified.										
Direction of Rotation				See Page 156 for direction of rotation.										
Ambient Temperature				0°C to +40°C (104° F) Other temperatures, contact STOBER Drives.										
Finish				Black (RAL 9005)										
Lifetime [5]	L_h	hours		L_h > 10,000 hours if T_{2K}/T_{2A} < 1.25 L_h > 20,000 hours if T_{2K}/T_{2A} > 1.25										
Warranty				5 Year Limited (2 Years on normal wear items: bearings, seals, etc.)										

[1] Ratings based on input speed (n_1) of 2000 RPM.
For torque at higher input speeds (T_{2NX}) solve the formula, where n1 = Actual Input Speed.

[2] Tested at 1.5% of nominal torque and recorded on the input side of the gearhead.

[3] Rating based on output speed (n2) of 100 RPM. For values at other speeds see Page 167. $T_{2NX} = \frac{T_{2N}}{\sqrt[3]{\frac{n_1}{2000}}}$

[4] Measurement at one (1) meter distance with input speed (n1) of 3000 RPM.

[5] T_{2A} equals actual tilting moment of the application. See Page 167 for overhung loads.

See web site for drawings.

"PHKX" Series–Right Angle ServoFit® Precision Planetary Gearhead Features

The "PHKX" Series combines the "PH" Series ServoFit Precision Planetary Gearheads with a right angle to provide a configuration that is a smooth, precise, and reliable drive with the benefit of direct mounting to many types of equipment without a coupling. All units are lubricated for life with synthetic oil and sealed to IP65 standards to prevent lubricant contamination for long life.

Some features are:

- High Axial Load Capacity
- Superior Torsional Stiffness
- 5-300:1 Ratio Range
- Wide Selection of IEC, NEMA, or Customized Motor Wide Plates
- Lowest Backlash
- Advanced Helical Gear Technology
- 5 Year Limited Warranty (2 Year on bearings, seals, etc.)

Motor plate pilot toleranced to fit your motor for precise concentricity

Motor plate can easily be changed to fit your choice of motors

Highly efficient spiral bevel gearsets provide quiet operation and excellent torque carrying capacity.

Adapter bushings to fit all motor shafts — no key required



HeliCamber® gear technology provides minimum wear, low backlash, and low noise

The integrated motor coupling is designed to allow thermal expansion of the motor shaft—ensuring long motor life by preventing thrust load on the motor bearings.

Ring gear machined integral to the housing — not welded or pressed in — provides greater concentricity and more precise alignment

FKM double-lip radial oil seals for continuous duty applications and very good chemical resistance.

Blind pilot hole

Oversized tapered roller bearings and shafts for high radial load capacity and superior torsional stiffness

The output flange dimensions are ISO 9409 and allow easy mounting to rotary or indexing tables, pinions, timing belt pulleys, transmission shafting, etc., without using a coupling.

Gears are case hardened to 61 Rockwell “C” and ground for maximum efficiency

Single piece steel housing

See web site for drawings.



"PHKX" Series–Right Angle ServoFit® Precision Planetary Gearhead Selection Data

Part Number (Gearhead + Input)	Exact Ratio	Max. Input RPM (n_1) Continuous Mounting Position EL 1,2,5,6	Max. Input RPM (n_1) Continuous Mounting Position EL 3,4	Max. Input RPM (n_1) Cyclic Mounting Position All	Max. Motor Shaft øD^6	Mass Moment of Inertia J_1	Torsional Stiffness per arcmin C_2		Output Torque Nominal [1] T_{2N}		Output Torque Acceleration T_{2B}		Output Torque Peak [2] T_{2PEAK}	
	i				mm	kgcm²	in.lbs.	Nm	in.lbs.	Nm	in.lbs.	Nm	in.lbs.	Nm
PH321_KX3 with Motor Mounting Plate														
PH321F0050 KX301VF0010 MF	5.000	3,000	2,500	4,000	19	1.08	56.5	6.4	399	45	553	62	935	106
PH321F0070 KX301VF0010 MF	7.000	3,000	2,500	4,000	19	1.04	69.3	7.8	399	45	531	60	1,152	130
PH321F0050 KX301VF0020 MF	10.00	3,500	3,000	5,000	19	0.82	56.5	6.4	399	45	553	62	1,063	120
PH321F0070 KX301VF0020 MF	14.00	3,500	3,000	5,000	19	0.81	69.3	7.8	399	45	531	60	1,152	130
PH321F0050 KX301VF0030 MF	15.00	3,500	3,500	6,000	19	0.75	56.5	6.4	399	45	553	62	1,063	120
PH321F0100 KX301VF0020 MF	20.00	3,500	3,000	5,000	19	0.81	67.6	7.6	266	30	443	50	886	100
PH321F0070 KX301VF0030 MF	21.00	3,500	3,500	6,000	19	0.75	69.3	7.8	399	45	531	60	1,152	130
PH321F0100 KX301VF0030 MF	30.00	3,500	3,500	6,000	19	0.75	67.6	7.6	266	30	443	50	886	100
PH322_KX3 with Motor Mounting Plate														
PH322F0350 KX301VF0010 MF	35.00	3,000	2,500	4,000	19	1.02	87.9	9.9	399	45	576	65	1,152	130
PH322F0200 KX301VF0020 MF	40.00	3,500	3,000	5,000	19	0.81	86.0	9.7	399	45	576	65	1,152	130
PH322F0250 KX301VF0020 MF	50.00	3,500	3,000	5,000	19	0.81	87.6	9.9	399	45	576	65	1,152	130
PH322F0280 KX301VF0020 MF	56.00	3,500	3,000	5,000	19	0.81	88.4	10.0	399	45	531	60	1,152	130
PH322F0200 KX301VF0030 MF	60.00	3,500	3,500	6,000	19	0.75	86.0	9.7	399	45	576	65	1,152	130
PH322F0350 KX301VF0020 MF	70.00	3,500	3,000	5,000	19	0.81	87.9	9.9	399	45	576	65	1,152	130
PH322F0250 KX301VF0030 MF	75.00	3,500	3,500	6,000	19	0.75	87.6	9.9	399	45	576	65	1,152	130
PH322F0400 KX301VF0020 MF	80.00	3,500	3,000	5,000	19	0.81	75.3	8.5	266	30	443	50	886	100
PH322F0280 KX301VF0030 MF	84.00	3,500	3,500	6,000	19	0.75	88.4	10.0	399	45	531	60	1,152	130
PH322F0500 KX301VF0020 MF	100.0	3,500	3,000	5,000	19	0.80	86.2	9.7	399	45	576	65	1,152	130
PH322F0350 KX301VF0030 MF	105.0	3,500	3,500	6,000	19	0.75	87.9	9.9	399	45	576	65	1,152	130
PH322F0400 KX301VF0030 MF	120.0	3,500	3,500	6,000	19	0.75	75.3	8.5	266	30	443	50	886	100
PH322F0700 KX301VF0020 MF	140.0	3,500	3,000	5,000	19	0.80	88.5	10.0	399	45	531	60	1,152	130
PH322F0500 KX301VF0030 MF	150.0	3,500	3,500	6,000	19	0.75	86.2	9.7	399	45	576	65	1,152	130
PH322F1000 KX301VF0020 MF	200.0	3,500	3,000	5,000	19	0.80	75.4	8.5	266	30	443	50	886	100
PH322F0700 KX301VF0030 MF	210.0	3,500	3,500	6,000	19	0.75	88.5	10.0	399	45	531	60	1,152	130
PH322F1000 KX301VF0030 MF	300.0	3,500	3,500	6,000	19	0.75	75.4	8.5	266	30	443	50	886	100

[1] Based on input speed: n1 = 2000 RPM
For torque at higher input speeds (T_{2NX}) solve the formula, where n1 = Actual Input Speed. $T_{2NX} = \frac{T_{2N}}{\sqrt[3]{\frac{n_1}{2000}}}$

[2] Maximum momentary torque for emergency stops or heavy shock load. Admissible stops per life of gearhead = 1,000 stops maximum.

"PHKX" Series–Right Angle ServoFit® Precision Planetary Gearhead Selection Data



Part Number (Gearhead + Input)	Exact Ratio	Max. Input RPM (n_1) Continuous Mounting Position EL 1,2,5,6	Max. Input RPM (n_1) Continuous Mounting Position EL 3,4	Max. Input RPM (n_1) Cyclic All	Max. Motor Shaft øD^6	Mass Moment of Inertia J_1	Torsional Stiffness per arcmin C_2		Output Torque Nominal [1] T_{2N}		Output Torque Acceleration T_{2B}		Output Torque Peak [2] T_{2PEAK}	
	i				mm	kgcm²	in.lbs.	Nm	in.lbs.	Nm	in.lbs.	Nm	in.lbs.	Nm
PH421_KX4 with Motor Mounting Plate														
PH421F0040 KX401VF0010 MF	4.00	2,500	2,000	3,500	24	2.84	100.5	11.3	680	77	850	96	1,701	192
PH421F0050 KX401VF0010 MF	5.00	2,500	2,000	3,500	24	2.66	132.2	14.9	753	85	1,063	120	2,126	240
PH421F0070 KX401VF0010 MF	7.00	2,500	2,000	3,500	24	2.51	168.2	19.0	753	85	974	110	2,126	240
PH421F0040 KX401VF0020 MF	8.00	2,500	2,500	4,000	24	1.74	100.5	11.3	680	77	850	96	1,701	192
PH421F0050 KX401VF0020 MF	10.00	2,500	2,500	4,000	24	1.70	132.2	14.9	797	90	1,063	120	2,126	240
PH421F0070 KX401VF0020 MF	14.00	2,500	2,500	4,000	24	1.66	168.2	19.0	797	90	974	110	2,126	240
PH421F0050 KX401VF0030 MF	15.00	3,000	3,000	4,500	24	1.47	132.2	14.9	797	90	1,063	120	2,126	240
PH421F0100 KX401VF0020 MF	20.00	2,500	2,500	4,000	24	1.64	153.7	17.4	531	60	886	100	1,772	200
PH421F0070 KX401VF0030 MF	21.00	3,000	3,000	4,500	24	1.45	168.2	19.0	797	90	974	110	2,126	240
PH421F0100 KX401VF0030 MF	30.00	3,000	3,000	4,500	24	1.44	153.7	17.4	531	60	886	100	1,772	200
PH422_KX3 with Motor Mounting Plate														
PH422F0350 KX301VF0010 MF	35.00	3,000	2,500	4,000	19	1.05	234.6	26.5	797	90	1,152	130	2,126	240
PH422F0200 KX301VF0020 MF	40.00	3,500	3,000	5,000	19	0.84	223.8	25.3	797	90	1,152	130	2,126	240
PH422F0160 KX301VF0030 MF	48.00	3,500	3,500	6,000	19	0.76	195.8	22.1	797	90	1,152	130	2,126	240
PH422F0250 KX301VF0020 MF	50.00	3,500	3,000	5,000	19	0.82	232.7	26.3	797	90	1,152	130	2,126	240
PH422F0280 KX301VF0020 MF	56.00	3,500	3,000	5,000	19	0.81	208.9	23.6	797	90	1,152	130	2,126	240
PH422F0200 KX301VF0030 MF	60.00	3,500	3,500	6,000	19	0.76	223.8	25.3	797	90	1,152	130	2,126	240
PH422F0350 KX301VF0020 MF	70.00	3,500	3,000	5,000	19	0.81	234.6	26.5	797	90	1,152	130	2,126	240
PH422F0250 KX301VF0030 MF	75.00	3,500	3,500	6,000	19	0.76	232.7	26.3	797	90	1,152	130	2,126	240
PH422F0400 KX301VF0020 MF	80.00	3,500	3,000	5,000	19	0.81	208.3	23.5	797	90	1,152	130	2,126	240
PH422F0280 KX301VF0030 MF	84.00	3,500	3,500	6,000	19	0.75	208.9	23.6	797	90	1,152	130	2,126	240
PH422F0500 KX301VF0020 MF	100.0	3,500	3,000	5,000	19	0.81	234.2	26.4	797	90	1,152	130	2,126	240
PH422F0350 KX301VF0030 MF	105.0	3,500	3,500	6,000	19	0.75	234.6	26.5	797	90	1,152	130	2,126	240
PH422F0400 KX301VF0030 MF	120.0	3,500	3,500	6,000	19	0.75	208.3	23.5	797	90	1,152	130	2,126	240
PH422F0700 KX301VF0020 MF	140.0	3,500	3,000	5,000	19	0.81	234.5	26.5	797	90	974	110	2,126	240
PH422F0500 KX301VF0030 MF	150.0	3,500	3,500	6,000	19	0.75	234.2	26.4	797	90	1,152	130	2,126	240
PH422F1000 KX301VF0020 MF	200.0	3,500	3,000	5,000	19	0.81	176.0	19.9	531	60	886	100	1,772	200
PH422F0700 KX301VF0030 MF	210.0	3,500	3,500	6,000	19	0.75	234.5	26.5	797	90	974	110	2,126	240
PH422F1000 KX301VF0030 MF	300.0	3,500	3,500	6,000	19	0.75	176.0	19.9	531	60	886	100	1,772	200

Index of Symbols

MT ..... Motor adapter with TriAdapt® coupling	i ..... Ratio - Exact	T_{2N} ..... Nominal Torque
MF ..... Motor adapter with FlexiAdapt® coupling	n_1 ..... Maximum input speed RPM	T_{2B} ..... Acceleration Torque Maximum
L ..... Large Input	J_1 ..... Mass moment of inertia (input)	T_{2PEAK} ..... Peak Torque
C ..... ServoCool	C_2 ..... Torsional Stiffness	

See web site for drawings.



"PHKX" Series–Right Angle ServoFit® Precision Planetary Gearhead Selection Data

Part Number (Gearhead + Input)	Exact Ratio	Max. Input RPM (n_1) Continuous Mounting Position EL 1,2,5,6	Max. Input RPM (n_1) Continuous Mounting Position EL 3,4	Max. Input RPM (n_1) Cyclic All	Max. Motor Shaft øD^6	Mass Moment of Inertia J_1	Torsional Stiffness per arcmin C_2		Output Torque: Nominal [1] T_{2N}		Output Torque: Acceleration T_{2B}		Output Torque: Peak [2] T_{2PEAK}	
	i				mm	$kgcm^2$	in.lbs.	Nm	in.lbs.	Nm	in.lbs.	Nm	in.lbs.	Nm
PH521_KX5 with Motor Mounting Plate														
PH521F0040 KX501VF0010 MF	4.000	2,500	2,000	3,000	32	7.62	244.4	27.6	1,701	192	2,143	242	4,252	480
PH521F0050 KX501VF0010 MF	5.000	2,500	2,000	3,000	32	8.44	323.1	36.5	1,860	210	2,679	302	5,315	600
PH521F0070 KX501VF0010 MF	7.000	2,500	2,000	3,000	32	7.97	412.2	46.5	1,860	210	2,392	270	5,315	600
PH521F0040 KX501VF0020 MF	8.000	2,500	2,500	3,500	32	5.31	244.4	27.6	1,701	192	2,143	242	4,252	480
PH521F0050 KX501VF0020 MF	10.00	2,500	2,500	3,500	32	5.52	323.1	36.5	1,949	220	2,679	302	5,315	600
PH521F0070 KX501VF0020 MF	14.00	2,500	2,500	3,500	32	5.40	412.2	46.5	1,860	210	2,392	270	5,315	600
PH521F0050 KX501VF0030 MF	15.00	3,000	3,000	4,000	32	4.88	323.1	36.5	1,949	220	2,679	302	5,315	600
PH521F0100 KX501VF0020 MF	20.00	2,500	2,500	3,500	32	5.33	396.4	44.7	1,240	140	2,215	250	4,429	500
PH521F0070 KX501VF0030 MF	21.00	3,000	3,000	4,000	32	4.83	412.2	46.5	1,860	210	2,392	270	5,315	600
PH521F0100 KX501VF0030 MF	30.00	3,000	3,000	4,000	32	4.80	396.4	44.7	1,240	140	2,215	250	4,429	500
PH522_KX4 with Motor Mounting Plate														
PH522F0350 KX401VF0010 MF	35.00	2,500	2,000	3,500	24	2.46	570.4	64.4	1,949	220	2,835	320	5,315	600
PH522F0200 KX401VF0020 MF	40.00	2,500	2,500	4,000	24	1.71	534.1	60.3	1,949	220	2,835	320	5,315	600
PH522F0160 KX401VF0030 MF	48.00	3,000	3,000	4,500	24	1.46	458.5	51.8	1,860	210	2,835	320	4,915	555
PH522F0250 KX401VF0020 MF	50.00	2,500	2,500	4,000	24	1.68	561.6	63.4	1,949	220	2,835	320	5,315	600
PH522F0280 KX401VF0020 MF	56.00	2,500	2,500	4,000	24	1.64	501.4	56.6	1,860	210	2,835	320	4,915	555
PH522F0200 KX401VF0030 MF	60.00	3,000	3,000	4,500	24	1.47	534.1	60.3	1,949	220	2,835	320	5,315	600
PH522F0350 KX401VF0020 MF	70.00	2,500	2,500	4,000	24	1.65	570.4	64.4	1,949	220	2,835	320	5,315	600
PH522F0250 KX401VF0030 MF	75.00	3,000	3,000	4,500	24	1.46	561.6	63.4	1,949	220	2,835	320	5,315	600
PH522F0400 KX401VF0020 MF	80.00	2,500	2,500	4,000	24	1.63	498.4	56.3	1,860	210	2,835	320	4,915	555
PH522F0280 KX401VF0030 MF	84.00	3,000	3,000	4,500	24	1.44	501.4	56.6	1,860	210	2,835	320	4,915	555
PH522F0500 KX401VF0020 MF	100.0	2,500	2,500	4,000	24	1.64	567.9	64.1	1,949	220	2,835	320	5,315	600
PH522F0350 KX401VF0030 MF	105.0	3,000	3,000	4,500	24	1.44	570.4	64.4	1,949	220	2,835	320	5,315	600
PH522F0400 KX401VF0030 MF	120.0	3,000	3,000	4,500	24	1.44	498.4	56.3	1,860	210	2,835	320	4,915	555
PH522F0700 KX401VF0020 MF	140.0	2,500	2,500	4,000	24	1.63	573.0	64.7	1,860	210	2,392	270	5,315	600
PH522F0500 KX401VF0030 MF	150.0	3,000	3,000	4,500	24	1.44	567.9	64.1	1,949	220	2,835	320	5,315	600
PH522F1000 KX401VF0020 MF	200.0	2,500	2,500	4,000	24	1.63	456.8	51.6	1,240	140	2,215	250	4,429	500
PH522F0700 KX401VF0030 MF	210.0	3,000	3,000	4,500	24	1.44	573.0	64.7	1,860	210	2,392	270	5,315	600
PH522F1000 KX401VF0030 MF	300.0	3,000	3,000	4,500	24	1.44	456.8	51.6	1,240	140	2,215	250	4,429	500

[1] Based on input speed: n1 = 2000 RPM
For torque at higher input speeds (T_{2NX}) solve the formula, where n1 = Actual Input Speed. $T_{2NX} = \frac{T_{2N}}{\sqrt[3]{\frac{n_1}{2000}}}$

[2] Maximum momentary torque for emergency stops or heavy shock load. Admissible stops per life of gearhead = 1,000 stops maximum.

See web site for drawings.

"PHKX" Series–Right Angle ServoFit® Precision Planetary Gearhead Selection Data



Part Number (Gearhead + Input)	Exact Ratio i	Max. Input RPM (n_1) Continuous Mounting Position EL 1,2,5,6	Max. Input RPM (n_1) Continuous Mounting Position EL 3,4	Max. Input RPM (n_1) Cyclic All	Max. Motor Shaft øD^6 mm	Mass Moment of Inertia J_1 kgcm²	Torsional Stiffness per arcmin C_2 in.lbs.	Torsional Stiffness per arcmin C_2 Nm	Output Torque Nominal [1] T_{2N} in.lbs.	Output Torque Nominal [1] T_{2N} Nm	Output Torque Acceleration T_{2B} in.lbs.	Output Torque Acceleration T_{2B} Nm	Output Torque Peak [2] T_{2PEAK} in.lbs.	Output Torque Peak [2] T_{2PEAK} Nm
PH721_KX7 with Motor Mounting Plate														
PH721F0040 KX701VF0010 MF	4.000	1,800	1,600	2,250	38	29.54	739.1	83.4	3,401	384	4,252	480	7,483	845
PH721F0050 KX701VF0010 MF	5.000	1,800	1,600	2,250	38	27.70	918.4	103.7	3,898	440	5,315	600	9,354	1,056
PH721F0070 KX701VF0010 MF	7.000	1,800	1,600	2,250	38	26.28	1054.7	119.1	3,898	440	5,758	650	11,127	1,256
PH721F0040 KX701VF0020 MF	8.000	1,800	1,800	3,000	38	15.88	739.1	83.4	3,401	384	4,252	480	8,504	960
PH721F0050 KX701VF0020 MF	10.00	1,800	1,800	3,000	38	15.42	918.4	103.7	3,898	440	5,315	600	10,630	1,200
PH721F0070 KX701VF0020 MF	14.00	1,800	1,800	3,000	38	15.07	1054.7	119.1	3,898	440	5,758	650	11,127	1,256
PH721F0050 KX701VF0030 MF	15.00	2,100	2,100	3,500	38	12.74	918.4	103.7	3,898	440	5,315	600	10,630	1,200
PH721F0100 KX701VF0020 MF	20.00	1,800	1,800	3,000	38	14.89	922.7	104.2	2,657	300	4,429	500	8,858	1,000
PH721F0070 KX701VF0030 MF	21.00	2,100	2,100	3,500	38	12.58	1054.7	119.1	3,898	440	5,758	650	11,127	1,256
PH721F0100 KX701VF0030 MF	30.00	2,100	2,100	3,500	38	12.50	922.7	104.2	2,657	300	4,429	500	8,858	1,000
PH722_KX5 with Motor Mounting Plate														
PH722F0350 KX501VF0010 MF	35.00	2,500	2,000	3,000	32	7.82	1229.7	138.8	3,898	440	6,201	700	12,401	1,400
PH722F0200 KX501VF0020 MF	40.00	2,500	2,500	3,500	32	5.55	1147.0	129.5	3,898	440	6,201	700	12,401	1,400
PH722F0160 KX501VF0030 MF	48.00	3,000	3,000	4,000	32	4.91	986.4	111.4	3,898	440	6,201	700	12,235	1,381
PH722F0250 KX501VF0020 MF	50.00	2,500	2,500	3,500	32	5.44	1199.0	135.4	3,898	440	6,201	700	12,401	1,400
PH722F0280 KX501VF0020 MF	56.00	2,500	2,500	3,500	32	5.37	1084.3	122.4	3,898	440	6,201	700	12,235	1,381
PH722F0200 KX501VF0030 MF	60.00	3,000	3,000	4,000	32	4.90	1147.0	129.5	3,898	440	6,201	700	12,401	1,400
PH722F0350 KX501VF0020 MF	70.00	2,500	2,500	3,500	32	5.36	1229.7	138.8	3,898	440	6,201	700	12,401	1,400
PH722F0250 KX501VF0030 MF	75.00	3,000	3,000	4,000	32	4.85	1199.0	135.4	3,898	440	6,201	700	12,401	1,400
PH722F0400 KX501VF0020 MF	80.00	2,500	2,500	3,500	32	5.32	1084.8	122.5	3,898	440	6,201	700	12,235	1,381
PH722F0280 KX501VF0030 MF	84.00	3,000	3,000	4,000	32	4.82	1084.3	122.4	3,898	440	6,201	700	12,235	1,381
PH722F0500 KX501VF0020 MF	100.0	2,500	2,500	3,500	32	5.32	1230.0	138.9	3,898	440	6,201	700	12,401	1,400
PH722F0350 KX501VF0030 MF	105.0	3,000	3,000	4,000	32	4.81	1229.7	138.8	3,898	440	6,201	700	12,401	1,400
PH722F0400 KX501VF0030 MF	120.0	3,000	3,000	4,000	32	4.80	1084.8	122.5	3,898	440	6,201	700	12,235	1,381
PH722F0700 KX501VF0020 MF	140.0	2,500	2,500	3,500	32	5.31	1238.6	139.8	3,898	440	5,758	650	11,127	1,256
PH722F0500 KX501VF0030 MF	150.0	3,000	3,000	4,000	32	4.79	1230.0	138.9	3,898	440	6,201	700	12,401	1,400
PH722F1000 KX501VF0020 MF	200.0	2,500	2,500	3,500	32	5.31	985.5	111.3	2,657	300	4,429	500	8,858	1,000
PH722F0700 KX501VF0030 MF	210.0	3,000	3,000	4,000	32	4.79	1238.6	139.8	3,898	440	5,758	650	11,127	1,256
PH722F1000 KX501VF0030 MF	300.0	3,000	3,000	4,000	32	4.79	985.5	111.3	2,657	300	4,429	500	8,858	1,000

Index of Symbols

MT ..... Motor adapter with TriAdapt® coupling MF ..... Motor adapter with FlexiAdapt® coupling L ..... Large Input C ..... ServoCool	i ..... Ratio - Exact n_1 ..... Maximum input speed RPM J_1 ..... Mass moment of inertia (input) C_2 ..... Torsional Stiffness	T_{2N} ..... Nominal Torque T_{2B} ..... Acceleration Torque Maximum T_{2PEAK} ..... Peak Torque

See web site for drawings.



"PHKX" Series–Right Angle ServoFit® Precision Planetary Gearhead Selection Data

Part Number (Gearhead + Input)	Exact Ratio	Max. Input RPM (n_1) Continuous Mounting Position EL 1,2,5,6	Max. Input RPM (n_1) Continuous Mounting Position EL 3,4	Max. Input RPM (n_1) Cyclic All	Max. Motor Shaft øD^6	Mass Moment of Inertia J_1	Torsional Stiffness per arcmin C_2		Output Torque: Nominal [1] T_{2N}		Output Torque: Acceleration T_{2B}		Output Torque: Peak [2] T_{2PEAK}	
	i				mm	$kgcm^2$	in.lbs.	Nm	in.lbs.	Nm	in.lbs.	Nm	in.lbs.	Nm
PH821_KX8 with Motor Mounting Plate														
PH821F0040 KX801VF0010 MF	4.000	1,000	750	1,750	48	101.43	1518.5	171.4	6,803	768	9,354	1,056	14,286	1,613
PH821F0050 KX801VF0010 MF	5.000	1,000	750	1,750	48	92.44	1975.1	223.0	8,504	960	11,693	1,320	17,858	2,016
PH821F0070 KX801VF0010 MF	7.000	1,000	750	1,750	48	85.00	2506.2	282.9	8,858	1,000	14,173	1,600	24,900	2,811
PH821F0040 KX801VF0020 MF	8.000	1,100	1,100	2,500	48	54.94	1518.5	171.4	6,803	768	9,354	1,056	17,007	1,920
PH821F0050 KX801VF0020 MF	10.00	1,100	1,100	2,500	48	52.69	1975.1	223.0	8,504	960	11,693	1,320	21,259	2,400
PH821F0070 KX801VF0020 MF	14.00	1,100	1,100	2,500	48	50.83	2506.2	282.9	8,858	1,000	14,173	1,600	24,900	2,811
PH821F0050 KX801VF0030 MF	15.00	1,300	1,300	3,000	48	44.92	1975.1	223.0	8,504	960	11,693	1,320	21,259	2,400
PH821F0100 KX801VF0020 MF	20.00	1,100	1,100	2,500	48	49.88	2306.0	260.3	7,086	800	10,630	1,200	21,259	2,400
PH821F0070 KX801VF0030 MF	21.00	1,300	1,300	3,000	48	44.09	2506.2	282.9	8,858	1,000	14,173	1,600	24,900	2,811
PH821F0100 KX801VF0030 MF	30.00	1,300	1,300	3,000	48	43.67	2306.0	260.3	7,086	800	10,630	1,200	21,259	2,400
PH822_KX7 with Motor Mounting Plate														
PH822F0350 KX701VF0010 MF	35.00	1,800	1,600	2,250	38	26.15	3366.3	380.0	11,073	1,250	17,716	2,000	28,346	3,200
PH822F0200 KX701VF0020 MF	40.00	1,800	1,800	3,000	38	15.73	3223.4	363.9	11,073	1,250	17,716	2,000	28,346	3,200
PH822F0160 KX701VF0030 MF	48.00	2,100	2,100	3,500	38	12.93	2839.5	320.6	9,744	1,100	16,476	1,860	28,346	3,200
PH822F0250 KX701VF0020 MF	50.00	1,800	1,800	3,000	38	15.35	3302.4	372.8	11,073	1,250	17,716	2,000	28,346	3,200
PH822F0280 KX701VF0020 MF	56.00	1,800	1,800	3,000	38	15.08	3015.7	340.5	9,744	1,100	17,716	2,000	28,346	3,200
PH822F0200 KX701VF0030 MF	60.00	2,100	2,100	3,500	38	12.87	3223.4	363.9	11,073	1,250	17,716	2,000	28,346	3,200
PH822F0350 KX701VF0020 MF	70.00	1,800	1,800	3,000	38	15.03	3366.3	380.0	11,073	1,250	17,716	2,000	28,346	3,200
PH822F0250 KX701VF0030 MF	75.00	2,100	2,100	3,500	38	12.70	3302.4	372.8	11,073	1,250	17,716	2,000	28,346	3,200
PH822F0400 KX701VF0020 MF	80.00	1,800	1,800	3,000	38	14.90	2957.5	333.9	9,744	1,100	17,007	1,920	28,346	3,200
PH822F0280 KX701VF0030 MF	84.00	2,100	2,100	3,500	38	12.58	3015.7	340.5	9,744	1,100	17,716	2,000	28,346	3,200
PH822F0500 KX701VF0020 MF	100.0	1,800	1,800	3,000	38	14.88	3319.6	374.8	11,073	1,250	17,716	2,000	28,346	3,200
PH822F0350 KX701VF0030 MF	105.0	2,100	2,100	3,500	38	12.56	3366.3	380.0	11,073	1,250	17,716	2,000	28,346	3,200
PH822F0400 KX701VF0030 MF	120.0	2,100	2,100	3,500	38	12.50	2957.5	333.9	9,744	1,100	17,007	1,920	28,346	3,200
PH822F0700 KX701VF0020 MF	140.0	1,800	1,800	3,000	38	14.86	3396.9	383.5	8,858	1,000	14,173	1,600	24,900	2,811
PH822F0500 KX701VF0030 MF	150.0	2,100	2,100	3,500	38	12.49	3319.6	374.8	11,073	1,250	17,716	2,000	28,346	3,200
PH822F1000 KX701VF0020 MF	200.0	1,800	1,800	3,000	38	14.85	2615.2	295.2	7,086	800	10,630	1,200	21,259	2,400
PH822F0700 KX701VF0030 MF	210.0	2,100	2,100	3,500	38	12.49	3396.9	383.5	8,858	1,000	14,173	1,600	24,900	2,811
PH822F1000 KX701VF0030 MF	300.0	2,100	2,100	3,500	38	12.48	2615.2	295.2	7,086	800	10,630	1,200	21,259	2,400

[1] Based on input speed: n1 = 2000 RPM
For torque at higher input speeds (T_{2NX}) solve the formula, where n1 = Actual Input Speed. $T_{2NX} = \frac{T_{2N}}{\sqrt[3]{\frac{n_1}{2000}}}$

[2] Maximum momentary torque for emergency stops or heavy shock load. Admissible stops per life of gearhead = 1,000 stops maximum.

See web site for drawings.

"PHKX" Series–Right Angle ServoFit® Precision Planetary Gearhead Selection Data



Part Number (Gearhead + Input)	Exact Ratio i	Max. Input RPM (n_1) Continuous Mounting Position EL 1,2,5,6	Max. Input RPM (n_1) Continuous Mounting Position EL 3,4	Max. Input RPM (n_1) Cyclic All	Max. Motor Shaft øD^6 mm	Mass Moment of Inertia J_1 kgcm²	Torsional Stiffness per arcmin C_2 in.lbs.	Torsional Stiffness per arcmin C_2 Nm	Output Torque Nominal [1] T_{2N} in.lbs.	Output Torque Nominal [1] T_{2N} Nm	Output Torque Acceleration T_{2B} in.lbs.	Output Torque Acceleration T_{2B} Nm	Output Torque Peak [2] T_{2PEAK} in.lbs.	Output Torque Peak [2] T_{2PEAK} Nm
PH912_KX8 with Motor Mounting Plate														
PH912F0160 KX801VF0010 MF	16.00	1,000	750	1,750	48	97.42	4617.2	521.2	22,145	2,500	36,247	4,092	55,359	6,250
PH912F0180 KX801VF0010 MF	18.00	1,000	750	1,750	48	121.44	5256.3	593.4	22,145	2,500	37,647	4,250	62,279	7,031
PH912F0200 KX801VF0010 MF	20.00	1,000	750	1,750	48	89.78	4808.9	542.9	22,145	2,500	37,647	4,250	69,199	7,812
PH912F0120 KX801VF0020 MF	24.00	1,100	1,100	2,500	48	61.45	4217.6	476.1	19,771	2,232	27,185	3,069	49,428	5,580
PH912F0300 KX801VF0010 MF	30.00	1,000	750	1,750	48	87.60	5640.5	636.8	22,145	2,500	37,647	4,250	75,293	8,500
PH912F0160 KX801VF0020 MF	32.00	1,100	1,100	2,500	48	53.94	4617.2	521.2	22,145	2,500	36,247	4,092	65,904	7,440
PH912F0180 KX801VF0020 MF	36.00	1,100	1,100	2,500	48	59.94	5256.3	593.4	22,145	2,500	37,647	4,250	74,141	8,370
PH912F0200 KX801VF0020 MF	40.00	1,100	1,100	2,500	48	52.03	4808.9	542.9	22,145	2,500	37,647	4,250	75,293	8,500
PH912F0420 KX801VF0010 MF	42.00	1,000	750	1,750	48	82.59	5720.9	645.8	22,145	2,500	37,647	4,250	75,293	8,500
PH912F0240 KX801VF0020 MF	48.00	1,100	1,100	2,500	48	53.09	5521.0	623.3	22,145	2,500	37,647	4,250	75,293	8,500
PH912F0180 KX801VF0030 MF	54.00	1,300	1,300	3,000	48	48.14	5256.3	593.4	22,145	2,500	37,647	4,250	74,141	8,370
PH912F0300 KX801VF0020 MF	60.00	1,100	1,100	2,500	48	51.48	5640.5	636.8	22,145	2,500	37,647	4,250	75,293	8,500
PH912F0240 KX801VF0030 MF	72.00	1,300	1,300	3,000	48	45.09	5521.0	623.3	22,145	2,500	37,647	4,250	75,293	8,500
PH912F0400 KX801VF0020 MF	80.00	1,100	1,100	2,500	48	49.63	4912.0	554.5	22,145	2,500	37,647	4,250	75,293	8,500
PH912F0420 KX801VF0020 MF	84.00	1,100	1,100	2,500	48	50.23	5720.9	645.8	22,145	2,500	37,647	4,250	75,293	8,500
PH912F0300 KX801VF0030 MF	90.00	1,300	1,300	3,000	48	44.38	5640.5	636.8	22,145	2,500	37,647	4,250	75,293	8,500
PH912F0480 KX801VF0020 MF	96.00	1,100	1,100	2,500	48	49.97	5717.6	645.5	22,145	2,500	37,647	4,250	75,293	8,500
PH912F0600 KX801VF0020 MF	120.0	1,100	1,100	2,500	48	49.50	5702.9	643.8	22,145	2,500	37,647	4,250	75,293	8,500
PH912F0420 KX801VF0030 MF	126.0	1,300	1,300	3,000	48	43.82	5720.9	645.8	22,145	2,500	37,647	4,250	75,293	8,500
PH912F0480 KX801VF0030 MF	144.0	1,300	1,300	3,000	48	43.71	5717.6	645.5	22,145	2,500	37,647	4,250	75,293	8,500
PH912F0600 KX801VF0030 MF	180.0	1,300	1,300	3,000	48	43.50	5702.9	643.8	22,145	2,500	37,647	4,250	75,293	8,500
PH1012_KX8 with Motor Mounting Plate														
PH1012F0180 KX801VF0010 MF	18.00	1,000	750	1,750	48	124.59	8133.9	918.3	29,657	3,348	40,778	4,604	62,279	7,031
PH1012F0240 KX801VF0010 MF	24.00	1,000	750	1,750	48	95.79	8785.6	991.8	35,432	4,000	54,370	6,138	83,038	9,374
PH1012F0300 KX801VF0010 MF	30.00	1,000	750	1,750	48	88.74	9092.0	1026.4	35,432	4,000	66,435	7,500	103,798	11,718
PH1012F0180 KX801VF0020 MF	36.00	1,100	1,100	2,500	48	60.73	8133.9	918.3	29,657	3,348	40,778	4,604	74,141	8,370
PH1012F0420 KX801VF0010 MF	42.00	1,000	750	1,750	48	83.16	9302.9	1050.2	35,432	4,000	66,435	7,500	132,870	15,000
PH1012F0240 KX801VF0020 MF	48.00	1,100	1,100	2,500	48	53.53	8785.6	991.8	35,432	4,000	54,370	6,138	98,855	11,160
PH1012F0180 KX801VF0030 MF	54.00	1,300	1,300	3,000	48	48.49	8133.9	918.3	29,657	3,348	40,778	4,604	74,141	8,370
PH1012F0300 KX801VF0020 MF	60.00	1,100	1,100	2,500	48	51.77	9092.0	1026.4	35,432	4,000	66,435	7,500	123,569	13,950
PH1012F0240 KX801VF0030 MF	72.00	1,300	1,300	3,000	48	45.29	8785.6	991.8	35,432	4,000	54,370	6,138	98,855	11,160
PH1012F0420 KX801VF0020 MF	84.00	1,100	1,100	2,500	48	50.37	9302.9	1050.2	35,432	4,000	66,435	7,500	132,870	15,000
PH1012F0300 KX801VF0030 MF	90.00	1,300	1,300	3,000	48	44.51	9092.0	1026.4	35,432	4,000	66,435	7,500	123,569	13,950
PH1012F0480 KX801VF0020 MF	96.00	1,100	1,100	2,500	48	50.08	9294.2	1049.2	35,432	4,000	61,226	6,912	132,870	15,000
PH1012F0600 KX801VF0020 MF	120.0	1,100	1,100	2,500	48	49.57	9255.3	1044.9	35,432	4,000	61,226	6,912	132,870	15,000
PH1012F0420 KX801VF0030 MF	126.0	1,300	1,300	3,000	48	43.89	9302.9	1050.2	35,432	4,000	66,435	7,500	132,870	15,000
PH1012F0480 KX801VF0030 MF	144.0	1,300	1,300	3,000	48	43.76	9294.2	1049.2	35,432	4,000	61,226	6,912	132,870	15,000
PH1012F0600 KX801VF0030 MF	180.0	1,300	1,300	3,000	48	43.53	9255.3	1044.9	35,432	4,000	61,226	6,912	132,870	15,000

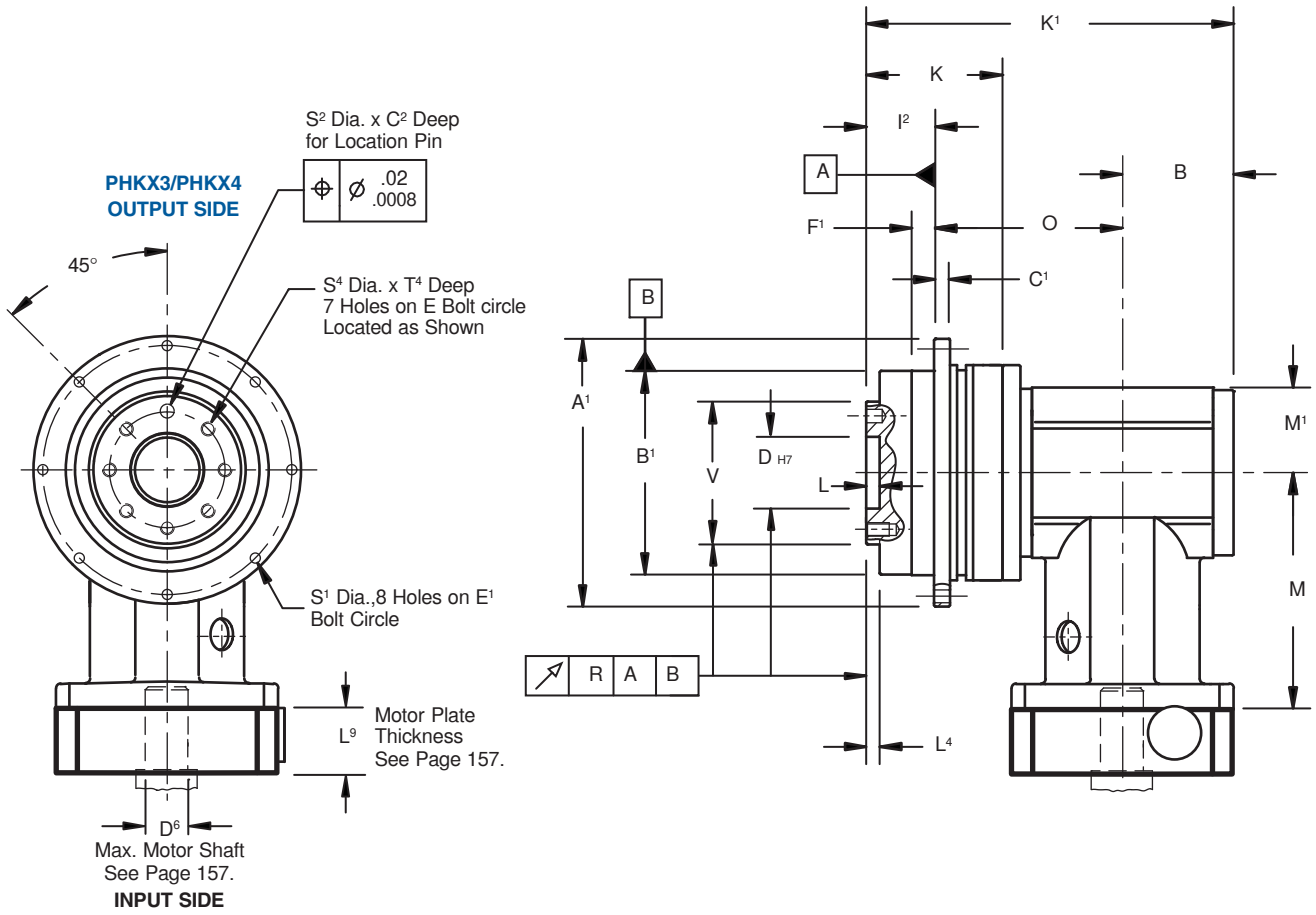
Index of Symbols

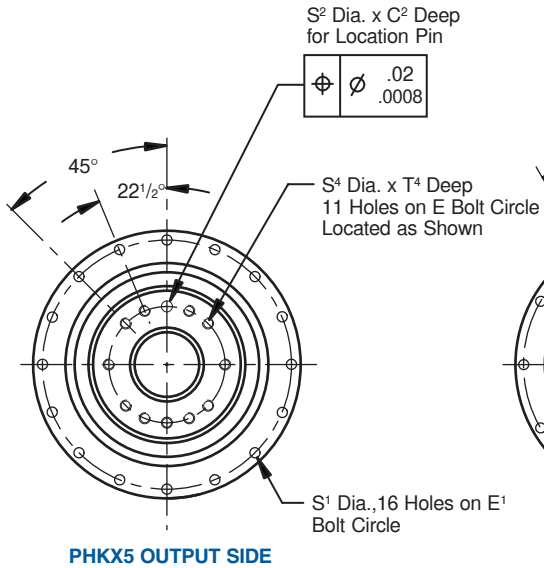
MT ..... Motor adapter with TriAdapt® coupling MF ..... Motor adapter with FlexiAdapt® coupling L ..... Large Input C ..... ServoCool	i ..... Ratio - Exact n_1 ..... Maximum input speed RPM J_1 ..... Mass moment of inertia (input) C_2 ..... Torsional Stiffness	T_{2N} ..... Nominal Torque T_{2B} ..... Acceleration Torque Maximum T_{2PEAK} ..... Peak Torque

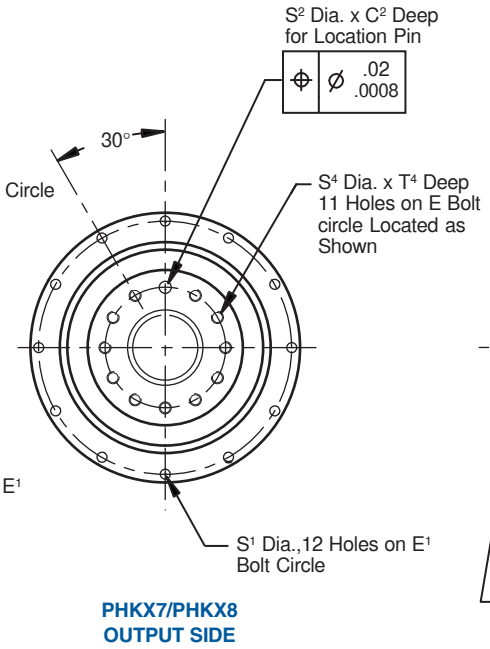
See web site for drawings.

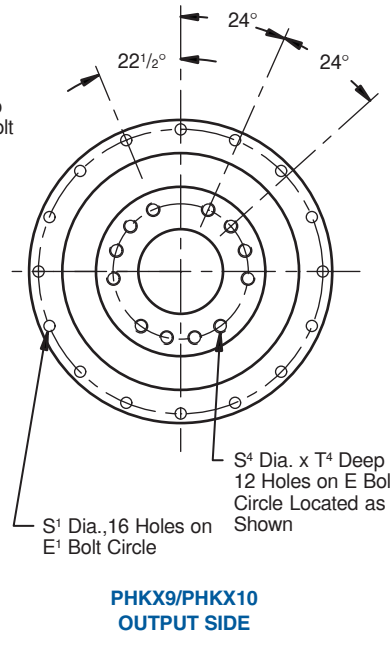


"PHKX" Series–Right Angle ServoFit® Precision Planetary Gearhead Dimensional Data









See web site for drawings.

"PHKX" Series–Right Angle ServoFit® Precision Planetary Gearhead Dimensional Data



Table No. 1 **"PHKX" Series – Gearhead with Motor Plate – Dimensions (mm/inches)**

Unit	A[1]	B[1] h7	C[1]	C[2]	D H7	E	E[1]	F[1]	I[2]	L	L[2]	L[4]	R	S[1]	S[2] H7	S[4]	T[4]	V h7
PH3_KX	86 3.39	64 +.000/-.030 2.520 +.0000/-.0012	4 .16	3 .12	20 +.021/-.0 .787 +.0008/-.0000	31.5 1.24	79 3.11	7 .28	19.5 .77	4 .16	3 .12	3.5 .14	.020 .0008	4.5 .18	5 +.012/-.000 .20 +.0005/-.0000	M5	7 .28	40 +.000/-.025 1.575 +.000/-.0010
PH4_KX	118 4.65	90 +.000/-.035 3.543 +.0000/-.0014	7 .28	7 .28	31.5 +.025/-.0 1.240 +.0010/-.0000	50 1.97	109 4.29	10 .39	30 1.18	6 .24	6 .24	6 .24	.020 .0008	5.5 .22	6 +.012/-.000 .236 +.0005/-.0000	M6	10 .39	63 +.000/-.030 2.480 +.000/-.0012
PH5_KX	145 5.71	110 +.000/-.035 4.331 +.0000/-.0014	8 .32	7 .28	40 +.025/-.0 1.575 +.0010/-.0000	63 2.48	135 5.31	10 .39	29 1.14	6 .24	6 .24	6 .24	.020 .0008	5.5 .22	6 +.012/-.000 .236 +.0005/-.0000	M6	11 .43	80 +.000/-.030 3.150 +.000/-.0012
PH7_KX	179 7.05	140 +.000/-.040 5.513 +.0000/-.0016	10 .39	7 .28	50 +.025/-.0 1.969 +.0010/-.0000	80 3.15	168 6.61	12 .47	38 1.50	6 .24	6 .24	6 .24	.025 .0010	6.6 .26	8 +.015/-.000 .315 +.0006/-.0000	M8	14 .55	100 +.000/-.035 3.937 +.000/-.0014
PH8_KX	247 9.72	200 +.000/-.046 7.874 +.0000/-.0018	12 .47	10 .39	80 +.030/-.0 3.150 +.0012/-.0000	125 4.92	233 9.17	15 .59	50 1.97	8 .31	8 .31	8 .31	.030 .0012	9 .35	10 +.015/-.000 .393 +.0006/-.0000	M10	18 .71	160 +.000/-.040 6.299 +.000/-.0016
PH9_KX	300 11.81	255 +.000/-.052 10.039 +.000/-.0020	18 .71	—	90 +.035/-.0 3.543 +.0014/-.0000	140 5.51	280 11.02	20 .79	66 2.60	12 .47	11 .43	12 .47	.030 .0012	13.5 .53	—	M16	24 .94	180 +.000/-.046 7.087 +.000/-.0018
PH10_KX	330 12.99	285 +.000/-.052 11.220 +.000/-.0020	20 .78	—	95 +.035/-.0 3.740 +.0014/-.0000	160 6.30	310 12.20	20 .79	75 2.95	10 .39	15 .59	15 .59	.040 .0016	13.5 .53	—	M20	30 1.18	200 +.000/-.046 7.874 +.000/-.0018

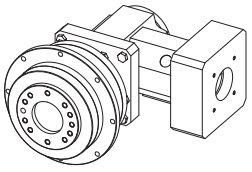
Table No. 2 **"PHKX" Series Dimensions (mm/inches)**

Unit	B	K	K[1]	M	M[1]	O
PH321_KX3	40 1.57	50 1.97	133.5 5.26	95.5 3.76	31 1.22	74 2.91
PH322_KX3	40 1.57	87 3.43	169.5 6.67	95.5 3.76	31 1.22	110 4.33
PH421_KX4	50 1.97	66 2.60	167 6.57	104 4.09	37.5 1.48	87 3.43
PH422_KX3	40 1.57	113 4.45	195.5 7.70	95.5 3.76	31 1.22	125.5 4.94
PH521_KX5	59 2.32	70 2.76	193 7.60	132 5.20	45 1.77	105 4.13
PH522_KX4	50 1.97	124.5 4.90	227.5 8.96	104 4.09	37.5 1.48	148.5 5.85
PH721_KX7	74 2.91	88 3.46	239 9.41	172.5 6.79	60 2.39	127 5.00
PH722_KX5	59 2.32	150 5.91	273 10.75	132 5.20	45 1.77	176 6.93
PH821_KX8	92 3.62	126 4.96	317.5 12.50	210 8.27	75 2.95	175.5 6.91
PH822_KX7	74 2.91	201 7.91	352 13.86	172.5 6.79	60 2.39	228 8.98
PH912_KX8	92 3.62	277.5 10.93	470.5 18.52	210 8.27	75 2.95	312.5 12.30
PH1012_KX8	92 3.62	307 12.09	500 19.69	210 8.27	75 2.95	333 13.11

Part No. Explanation

PH 4 2 1 F 0050 KX401VF 0020 MF

- PH — "PH" Series ServoFit Precision Planetary Gearhead
- 4 — Unit No.
- 2 — Generation No.
- 1 — No. of Stages (**1** = 1 Stage, **2** = 2 Stage)
- F — Output Flange
- 0050 — Ratio (**0050** = 5:1, Total Ratio 5 x 2 = 10:1)
- KX401VF — Right Angle Unit, Size 4 with Shaft and Flange
- 0020 — Ratio (0020 = 2:1)
- MF — Motor Plate with FlexiAdapt Coupling



Typical 2 Stage Configuration

When ordering a planetary gearhead, specify the motor manufacturer and part number, provide the motor drawing with dimensions, or specify the motor mounting dimensions.
(See Page 157.)

"PE" Series
ServoFit® Precision Planetary Gearhead
Performance Specifications

		Size	Ratio	PE201 PE202	PE301 PE302	PE401 PE402	PE501 PE502
Permissible Acceleration Torque	T_{2B}	in.lbs. Nm	5, 25, 50	132 15	292 33	725 82	1,858 210
		in.lbs. Nm	10, 100	106 12	265 30	637 72	1,593 180
Nominal Output Torque [1]	T_{2N}	in.lbs. Nm		58 6.5	159 18	398 45	1,062 120
Input Speed Maximum	n_{1MAX}	Continuous Cyclic		4,000 8,000	3,700 6,000	3,400 6,000	2,600 5,000
Torsional Stiffness	C_2	in.lbs./arcmin Nm/arcmin		9 1	31 3.5	89 10	221 25
Axial Load Max.	F_{2AMAX}	lbs. N		56 250	93 412	146 650	270 1,200
Radial Load Max. [2]	F_{2RMAX}	lbs. N		190 850	370 1,650	585 2,600	1,080 4,800
Tilting Moment Max. [2]	T_{2K}	in.lbs. Nm		221 25	451 51	991 112	2,973 336
Weight	m	pounds kg		1.8 2.2 0.8 1.0	4.4 5.5 2.0 2.5	9.4 11.6 4.3 5.3	20.2 25.1 9.2 11.4
Noise Level [3]	L_{PA}	dB(A)		≤60	≤62	≤62	≤64
Torsional Backlash	$\Delta\varphi$	arcmin		1 Stage (5, 10:1) = ≤12; 2 Stage (25, 50, 100:1) = ≤15			
Efficiency (at Nominal Torque)	η	%		1 Stage (5, 10:1) = ≥96; 2 Stage (25, 50, 100:1) = ≥94			
Lubrication				Synthetic Grease (NLGI 2) Lubricated for Life			
Mounting Position				Unrestricted			
Ambient Temperature				0°C to +40°C (104° F) Other temperatures, contact STOBER Drives.			
Finish				Black (RAL 9005)			
Lifetime [4]	L_h	hours		L_h > 10,000 hours if T_{2K}/T_{2A} < 1.25 L_h > 20,000 hours if T_{2K}/T_{2A} > 1.25			
Warranty				5 Year Limited (2 Years on normal wear items: bearings, seals, etc.)			

1) Ratings based on input speed (n_1) of 2000 RPM.
For torque at higher input speeds (T_{2NX}) solve the formula, where n1 = Actual Input Speed.

$$T_{2NX} = \frac{T_{2N}}{\sqrt[3]{\frac{n_1}{2000}}}$$

2) Rating based on output speed (n2) of 100 RPM. For values at other speeds see Page 168.

3) Measurement at one (1) meter distance with input speed (n1) of 3000 RPM.

4) T_{2A} equals actual tilting moment of the application. See Page 168 for overhung loads.

See web site for drawings.

"PE" Series
ServoFit® Precision Planetary Gearhead
Features

The "PE" Series ServoFit Precision Planetary Gearheads are available for applications where very low backlash is not a criteria. They are an economical straight tooth planetary, comparable in quality to other STOBER units. "PE" Series units are shipped with a motor adapter to fit your specific motor, can be supplied with NEMA output adapters, and have a five year warranty. All units are lubricated for life with synthetic grease and enclosed to IP65 standards to prevent lubricant contamination for long life.

Some features of these units are:

- Readily Attaches to Any Servo Motor
- Quiet Running ≤64 dB(A)
- Readily Available
- Wide Selection of IEC, NEMA, or Customized* Motor Plates
- 94 to 96% Efficiency
- NEMA Output Available
- 5 Year Limited Warranty (2 Years bearings, seals, etc.)

* Maximum 10 working days for custom motor plates.

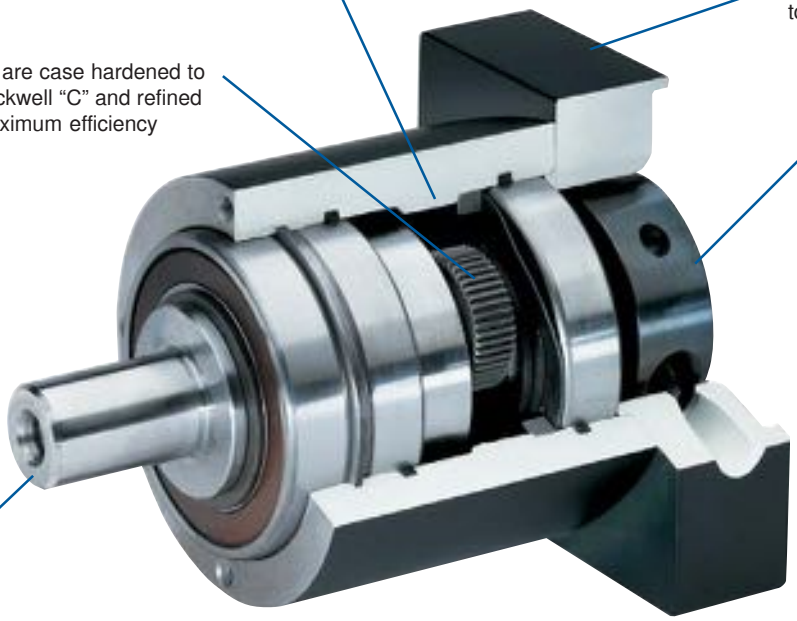


Motor plate pilot toleranced to fit your motor for precise concentricity

Ring gear machined integral to the housing — not welded or pressed in

Motor plate can easily be changed to fit your choice of motors

Gears are case hardened to 61 Rockwell "C" and refined for maximum efficiency



The integrated motor coupling is designed to allow thermal expansion of the motor shaft– ensuring long motor life by preventing thrust load on the motor bearings.

Adapter bushings fit all motor shafts — no key required

Single piece planet carrier and shaft for greater concentricity and more precise alignment

Available with NEMA Output Adapters (shaft remains metric). See Page 73.



See web site for drawings.



"PE" Series
ServoFit® Planetary Gearhead
Selection Data

Part Number (Gearhead + Input)	Exact Ratio	Maximum Input Speed		Maximum Motor Shaft	Mass Moment of Inertia	Torsional Stiffness per arcmin		Output Torque					
								Nominal [1]		Acceleration		Peak [2]	
Gearhead	i	Continuous RPM (n_1)	Cyclic RPM (n_1)	øD6 mm	J_1 kgcm²	C_2 in.lbs.	C_2 Nm	T_{2N} in.lbs.	T_{2N} Nm	T_{2B} in.lbs.	T_{2B} Nm	T_{2PEAK} in.lbs.	T_{2PEAK} Nm
PE201 with Motor Mounting Plate													
PE201SP0050M	5.000	4,000	8,000	11	.063	8.9	1.0	58	6.5	133	15	248	28
PE201SP0100M	10.00	4,000	8,000	11	.063	8.9	1.0	49	5.5	106	12	248	28
PE202 with Motor Mounting Plate													
PE202SP0250M	25.00	4,000	8,000	11	.052	8.9	1.0	58	6.5	133	15	248	28
PE202SP0500M	50.00	4,000	8,000	11	.052	8.9	1.0	58	6.5	133	15	248	28
PE202SP1000M	100.0	4,000	8,000	11	.052	8.9	1.0	49	5.5	106	12	248	28
PE301 with Motor Mounting Plate													
PE301SP0050M	5.000	3,700	6,000	14	.31	31	3.5	159	18	292	33	664	75
PE301SP0100M	10.00	3,700	6,000	14	.31	31	3.5	150	17	266	30	664	75
PE302 with Motor Mounting Plate													
PE302SP0250M	25.00	3,700	6,000	14	.25	31	3.5	159	18	292	33	664	75
PE302SP0500M	50.00	3,700	6,000	14	.25	31	3.5	159	18	292	33	664	75
PE302SP1000M	100.0	3,700	6,000	14	.25	31	3.5	150	17	266	30	664	75
PE401 with Motor Mounting Plate													
PE401SP0050M	5.000	3,400	6,000	19	1.72	88.5	10	398	45	726	82	1,770	200
PE401SP0100M	10.00	3,400	6,000	19	1.72	88.5	10	354	40	637	72	1,770	200
PE402 with Motor Mounting Plate													
PE402SP0250M	25.00	3,400	6,000	19	1.47	88.5	10	398	45	726	82	1,770	200
PE402SP0500M	50.00	3,400	6,000	19	1.47	88.5	10	398	45	726	82	1,770	200
PE402SP1000M	100.0	3,400	6,000	19	1.47	88.5	10	354	40	637	72	1,770	200
PE501 with Motor Mounting Plate													
PE501SP0050M	5.000	2,600	5,000	24	5.50	221.3	25	1,062	120	1,859	210	4,248	480
PE501SP0100M	10.00	2,600	5,000	24	5.50	221.3	25	885	100	1,593	180	4,248	480
PE502 with Motor Mounting Plate													
PE502SP0250M	25.00	2,600	5,000	24	4.45	221.3	25	1,062	120	1,859	210	4,248	480
PE502SP0500M	50.00	2,600	5,000	24	4.45	221.3	25	1,062	120	1,859	210	4,248	480
PE502SP1000M	100.0	2,600	5,000	24	4.45	221.3	25	885	100	1,593	180	4,248	480

Part No. Explanation

PE 4 0 1 SP 0050 M

- M – Motor Plate
- 0050 – Ratio (**0050** = 5.0:1)
- SP – Output shaft with key
- 1 – No. of Gear Stages (**1** = 1 Stage, **2** = 2 Stages)
- 0 – Generation Number
- 4 – Unit No.
- PE – "PE" Series ServoFit Planetary Gearhead

When ordering a planetary gearhead, specify the motor manufacturer and part number, provide the motor drawing with dimensions, or specify the motor mounting dimensions. (See Page 157.)

[1] Based on input speed: n1 = 2000 RPM
For torque at higher input speeds (T_{2NX}) solve the formula, where n1 = Actual Input Speed. $T_{2NX} = \frac{T_{2N}}{\sqrt[3]{\frac{n_1}{2000}}}$

[2] Maximum momentary torque for emergency stops or heavy shock load. Admissible stops per life of gearhead = 1,000 stops maximum.

"PE" Series
ServoFit® Planetary Gearhead
Dimensional Data



Dimension shown in millimeters (inches).

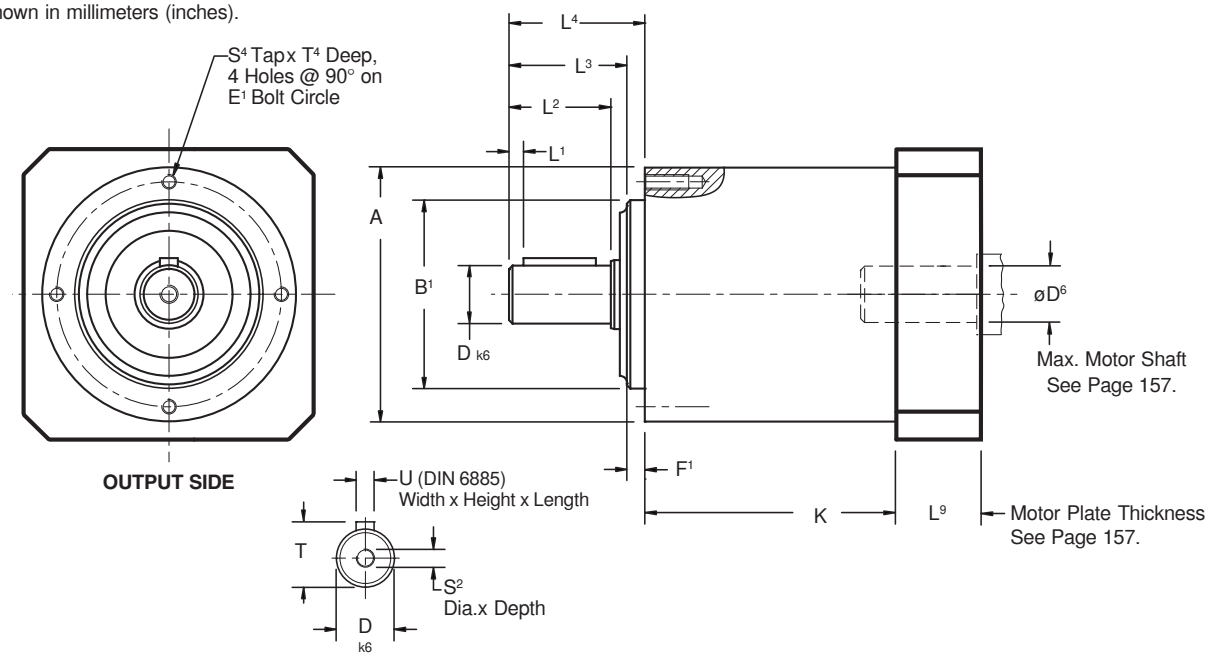


Table No. 1 **"PE" Series – Planetary Gearhead Dimensions (mm/inches)**

Unit	A	B1 h6	D k6	E1	F1	L1	L2	L3	L4	S2	S4	T	T4	U
PE201/P202	50 1.97	35 +.000/-.016 1.378 +.0000/-.0006	12 +.012/+.001	44 1.73	4 .16	2 .08	18 .71	20.5 .81	24.5 .96	M4	M4	13.5 .53	10 .39	A4x4x14
PE301/PE302	70 2.76	52 +.000/-.019 2.047 +.0000/-.0007	16 +.012/+.001	62 2.44	5 .20	2 .08	28 1.10	31 1.22	36 1.42	M5	M5	18 .71	12 .47	A5x5x25
PE401/PE402	90 3.54	68 +.000/-.019 2.677 +.0000/-.0007	22 +.015/+.002	80 3.15	5 .20	3 .12	36 1.42	41 1.61	46 1.81	M8	M6	24.5 .96	15 .59	A6x6x32
PE501/PE502	120 4.72	90 +.000/-.022 3.543 +.0000/-.0009	32 +.018/+.002	108 4.25	6 .24	3 .12	58 2.28	64 2.52	70 2.76	M12	M8	35 1.38	20 .79	A10x8x50

Table No. 2

Unit	K	
	mm	inches
PE201	53	2.09
PE202	74.5	2.93
PE301	69	2.72
PE302	91.5	3.60
PE401	80	3.15
PE402	109	4.29
PE501	106.5	4.19
PE502	142	5.59

Table No. 3 **NEMA Output Flange (mm/inches)**

NEMA	N1	N2	N3	N5	N6	N7	N8
23	58 2.28	66.67 2.625	38.10 +.000/-.025 1.500 +.000/-.001	7 .28	1.6 .063	5.0 .20	76 2.99
34	83 3.27	98.43 3.875	73.03 +.000/-.030 2.875 +.000/-.001	8 .31	1.6 .063	5.5 .22	111 4.37
42	107 4.21	125.73 4.950	55.52 +.000/-.030 2.186 +.000/-.001	7.6 .30	2.4 .094	7.1 .28	143 5.63
56	146 5.75	149.23 5.875	114.30 +.000/-.035 4.500 +.000/-.001	15 .59	3.2 .125	10 .39	200 7.87

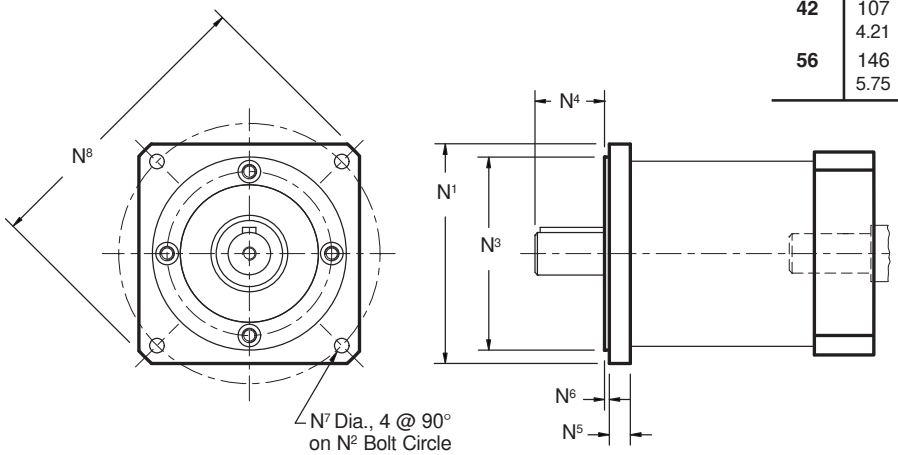


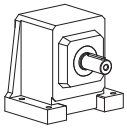
Table No. 4 **N4 Dimension**

NEMA	PE2	PE3	PE4	PE5
23	15.9 .63	—	—	—
34	—	26.6 1.05	36.8 1.45	—
42	—	25.6 1.01	36 1.42	—
56	—	—	—	51.8 2.04

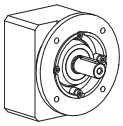
See web site for drawings.

"C" Series–Concentric Helical ServoFit® SMS Gearhead Overview

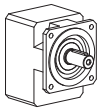
Housing Styles + TriAdapt® Motor Adapter Input = Gearhead Configurations



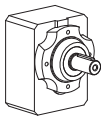
Style N
Foot Mount



Style F
Round Flange



Style Q,
Square Flange

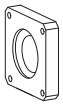


Style G
Tapped Holes

+

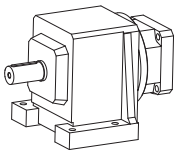


MT
Motor Adapter

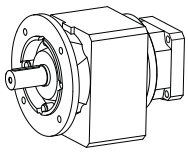


Motor Plate
to fit any servo motor

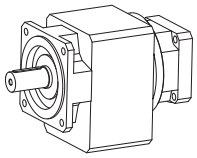
Gearhead Configurations



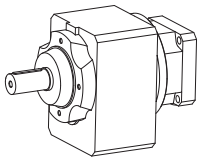
Style N, Foot Mount



Style F, Round Flange



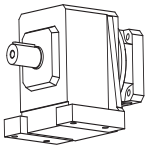
Style Q, Square Flange



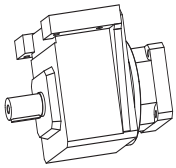
Style G, Tapped Holes

Mounting Positions

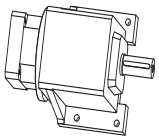
EL1



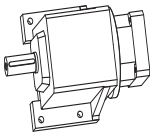
EL2



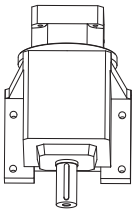
EL3



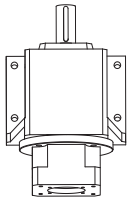
EL4



EL5



EL6



Part No. Explanation with OPTIONS and REQUIRED INFORMATION

C 4 0 2 N 0135 MT20 B

- **C** — Concentric Helical
- **4** — Unit Size No.
- **0** — Design Generation
- **2** — No. of Stages (**02** = 2 Stage, determined by ratio)
- **N** — HOUSING STYLE
  - "**N**" Housing Style — Foot Mounting
  - "**F**" Housing Style — Flange Mounting
  - "**Q**" Housing Style — Square Output Flange
  - "**G**" Housing Style — Tapped Holes
- **0135** — Nominal Ratio: **0135** = 13.5:1
- **MT20** — TriAdapt® Motor Adapter Size: **MT10**, **MT20**, **MT30**, **MT40**, **MT50**
- **B** — This designation is only required when ordering a:
  - **B** — Beverage Duty
  - **F** — Food Duty

THE FOLLOWING INFORMATION IS REQUIRED FOR ANY UNIT:

Mounting Position — EL1 EL2 EL3 EL4 EL5 EL6
Motor — Motor Manufacturer and Model Number
Paint — Black (Standard) ..... White ..... Stainless
Option — Imperial or Metric Shaft[1)]
Package Options — Beverge Duty ..... Food Duty .....

[1)] Not available in all sizes. Contact STOBER.

See web site for drawings.

Artisan Technology Group is an independent supplier of quality pre-owned equipment

Gold-standard solutions

Extend the life of your critical industrial, commercial, and military systems with our superior service and support.

We buy equipment

Planning to upgrade your current equipment? Have surplus equipment taking up shelf space? We'll give it a new home.

Learn more!

Visit us at **artisantg.com** for more info on price quotes, drivers, technical specifications, manuals, and documentation.

Artisan Scientific Corporation dba Artisan Technology Group is not an affiliate, representative, or authorized distributor for any manufacturer listed herein.

We're here to make your life easier. How can we help you today?

(217) 352-9330 | sales@artisantg.com | artisantg.com

ARTISAN® TECHNOLOGY GROUP