planetroll

planetdrive®

Planetary Gearheads

DIEQUA Corporation

www.diequa.com
630-980-1133

Planetary Servo Gearheads by Planetroll

German Engineered - Economically Priced

The Planetdrive series of precision planetary servo gearheads provide an economical solution for motion control applications requiring high reliability and superior performance.

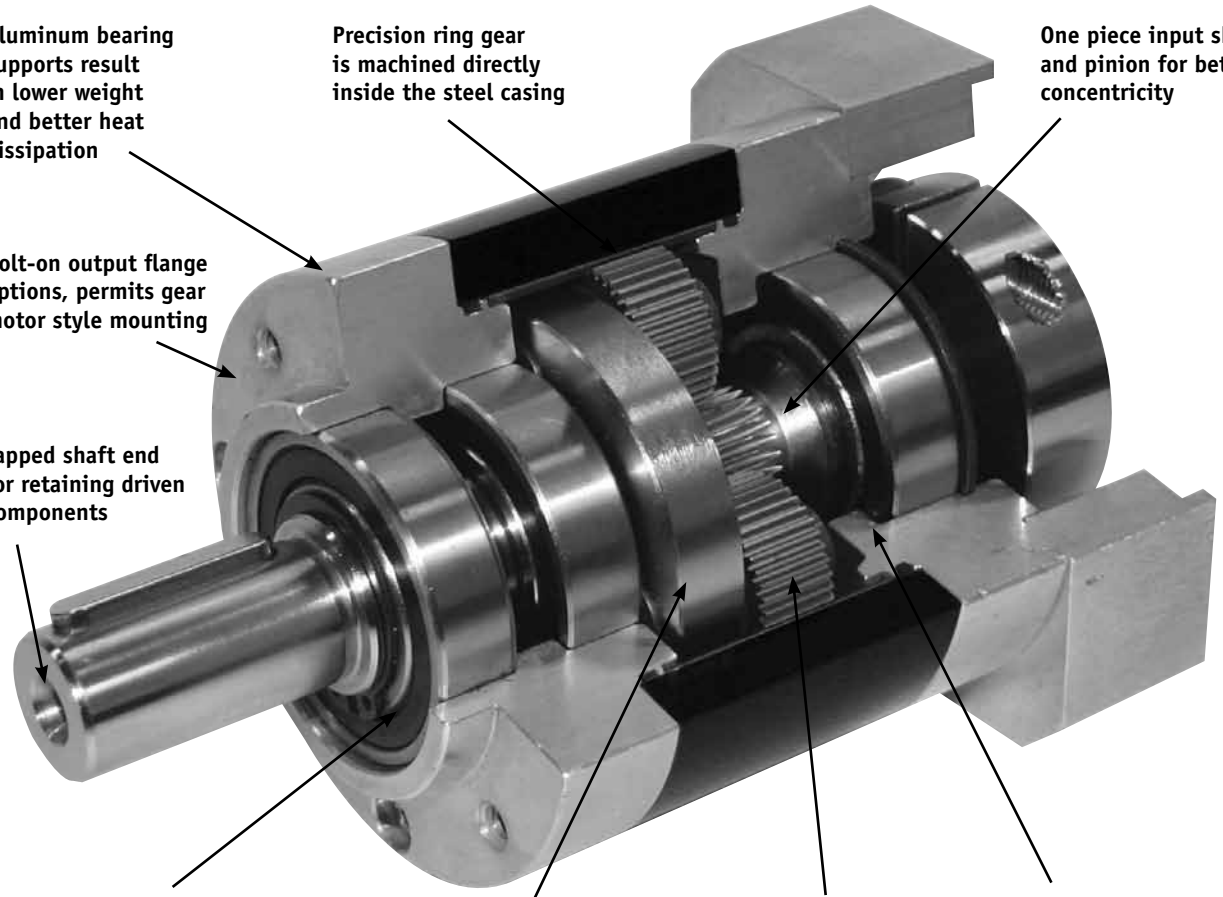
A wide variety of features, benefits, and special options are incorporated to maximize design versatility and satisfy the most demanding application requirements.

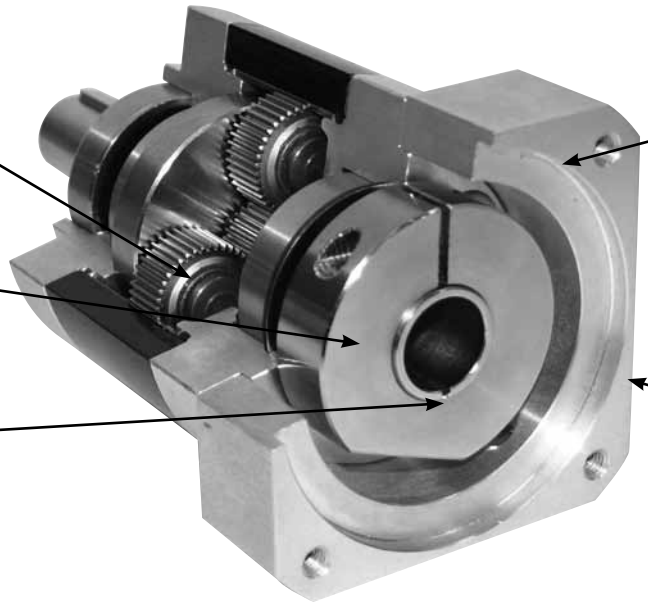
Program Benefits

- Economical price for cost effective system integration.
- Self-centering design for easy servo or stepper motor mounting.
- Maintenance-free operation with lifetime grease lubrication.
- Mounting in any direction for design versatility
- High strength integral steel ring gear for maximum performance.
- Aluminum input and output flanges for low weight.
- Thermal expansion compensation system to accommodate temperature variations.
- Input adapter plates for mounting all Servo, Step, NEMA, and Metric motors.
- Explosion proof options with ATEX certification
- Optional output adapter flanges for alternate mounting dimensions.

Selection Guide Contents

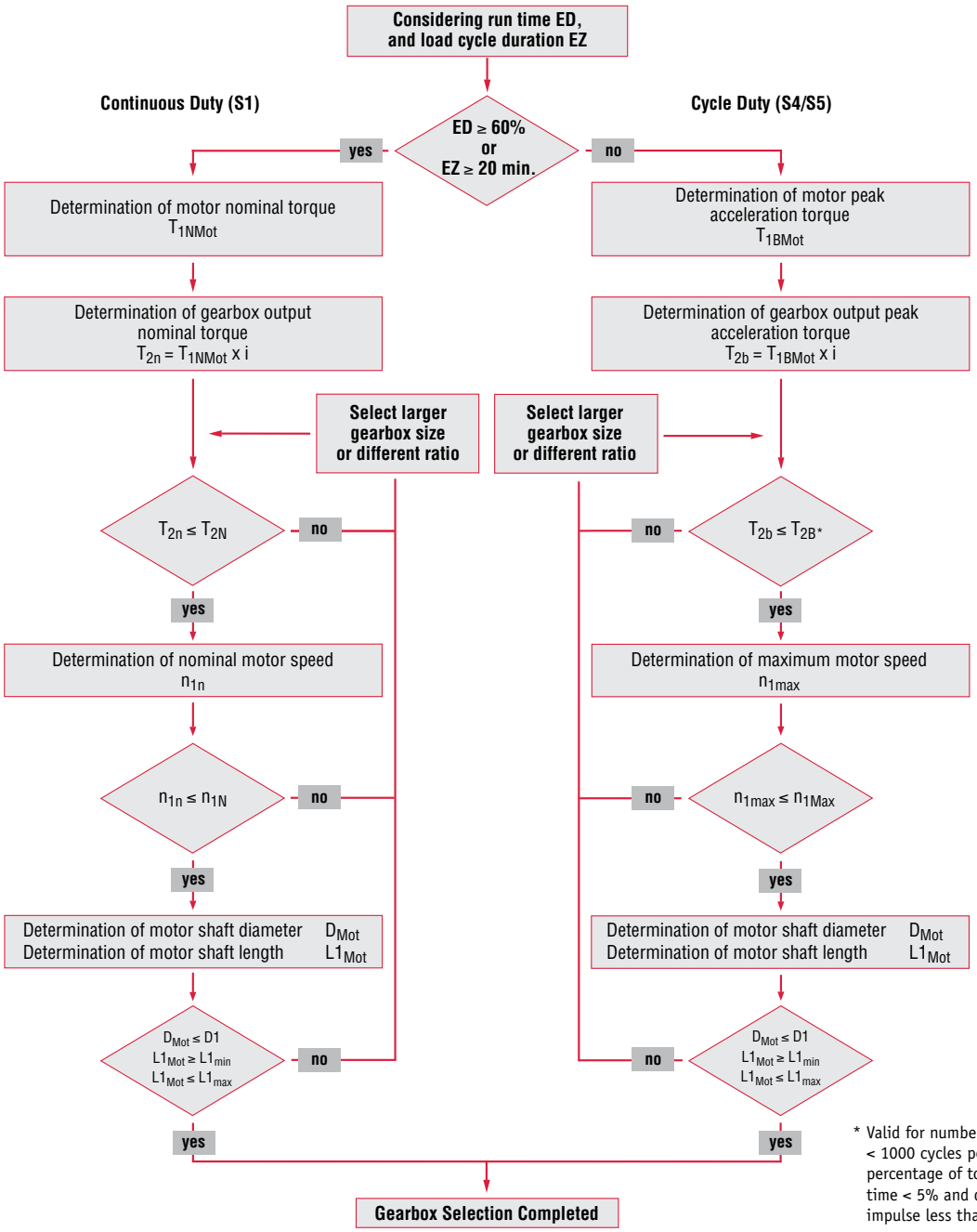
Planetdrive incorporates many of the advanced design features used in more expensive planetary gearheads.





Lifetime Lubrication

The quickest and most reliable method to determine the appropriate gearbox size for a specific application is a comparison of motor peak torque with gearbox data. In case the motor peak torque exceeds the permitted gearbox values, a calculation based on the actual application specific torque is required.



* Valid for numbers of cycles < 1000 cycles per hour, percentage of total running time < 5% and duration of impulse less than 0.3 sec.

T_{1NMot}	nominal torque (from motor data)	n_{1n}	rated speed of motor (from motor data)	D_{Mot}	motor shaft diameter (from motor data)
T_{1BMot}	acceleration torque (from motor data)	n_{1N}	rated input speed (from catalog)	D_1	motor shaft diameter (from catalog)
T_{2n}	nominal torque on gearbox output side	n_{1max}	maximum motor speed (from motor data)	L_{1Mot}	motor shaft length (from catalog)
T_{2b}	acceleration torque on gearbox output side	n_{1Max}	maximum perm. input speed (from catalog)	L_{1min}	minimum length of motor shaft (from catalog)
T_{2N}	nominal output torque (from catalog)	i	ratio	L_{1max}	maximum length of motor shaft (from catalog)
T_{2B*}	acceleration torque (from catalog)				

Ratio	Stages	Size PD040			Size PD065			Size PD085			Size PD120			Size PD155		
		T_{2N}	T_{2B}	T_{2E}	T_{2N}	T_{2B}	T_{2E}	T_{2N}	T_{2B}	T_{2E}	T_{2N}	T_{2B}	T_{2E}	T_{2N}	T_{2B}	T_{2E}
		Nm			Nm			Nm			Nm			Nm		
3	1	---	---	---	13	25	39	35	70	105	85	160	255	160	290	480
4	1	4	8	12	14	28	42	45	88	135	90	180	270	250	375	750
5	1	4.5	8	13	16	32	48	45	90	135	110	210	330	270	405	810
7	1	4.5	8	13	15	28	45	43	86	129	90	160	270	270	405	810
9	1	4	7	12	---	---	---	---	---	---	---	---	---	---	---	---
10	1	---	---	---	14	25	42	35	70	105	80	160	240	160	290	480
16	2	5	10	15	19	34	57	55	98	165	100	180	300	270	405	810
20	2	5	10	15	19	34	57	55	98	165	100	180	300	270	405	810
25	2	5	10	15	21	40	63	58	105	174	100	210	330	290	435	870
28	2	5	10	15	21	40	63	55	98	165	100	180	300	270	405	810
35	2	5	10	15	21	40	63	58	105	174	110	210	330	290	435	870
40	2	---	---	---	21	40	63	55	98	165	100	180	300	270	405	810
49	2	5	10	15	---	---	---	---	---	---	---	---	---	---	---	---
50	2	---	---	---	21	40	63	58	105	174	110	210	330	290	435	870
70	2	---	---	---	17	32	51	50	90	150	95	175	285	290	435	870
100	2	---	---	---	16	29	48	35	70	105	85	160	255	170	310	510

Torque Ratings

T_{2N} = Nominal Torque (continuous operation)

T_{2B} = Acceleration Torque (1000 cycles per hour, duty < 5% of run time)

T_{2E} = E-Stop Torque (1000 times per lifetime)

Inertia Conversions

1 kgcm^2 = 0.0001 kgm^2

1 kgcm^2 = 0.0009 lbinsec^2

1 kgm^2 = 10000 kgcm^2

1 kgm^2 = 8.85 lbinsec^2

1 lbinsec^2 = 1130 kgcm^2

1 lbinsec^2 = 0.113 kgm^2

Moment of Inertia kgcm^2						
Ratio	Stages	PD040	PD065	PD085	PD120	PD155
3	1	---	0.367	1.62	3.66	10.6
4	1	0.060	0.324	1.44	2.97	7.8
5	1	0.058	0.314	1.36	2.68	6.8
7	1	0.057	0.304	1.30	2.48	6.1
9	1	0.056	---	---	---	---
10	1	---	0.299	1.27	2.39	5.8
16	2	0.060	0.321	1.42	2.96	7.0
20	2	0.058	0.312	1.35	2.68	6.4
25	2	0.058	0.311	1.35	2.67	6.3
28	2	0.058	0.303	1.29	2.48	6.1
35	2	0.057	0.303	1.29	2.47	6.0
40	2	0.057	0.299	1.26	2.40	5.8
49	2	---	---	---	---	---
50	2	---	0.299	1.26	2.39	5.8
70	2	---	0.298	1.26	2.39	5.8
100	2	---	0.298	1.20	2.39	5.8

Maximum Backlash in Arc Minutes		
Size	Stages	
	1	2
PD040	15	25
PD065	12	15
PD085	10	15
PD120	10	12
PD155	8	10

Efficiency % - Full Load		
Size	Stages	
	1	2
PD040	96	94
PD065	97	94
PD085	96	94
PD120	96	94
PD155	96	94

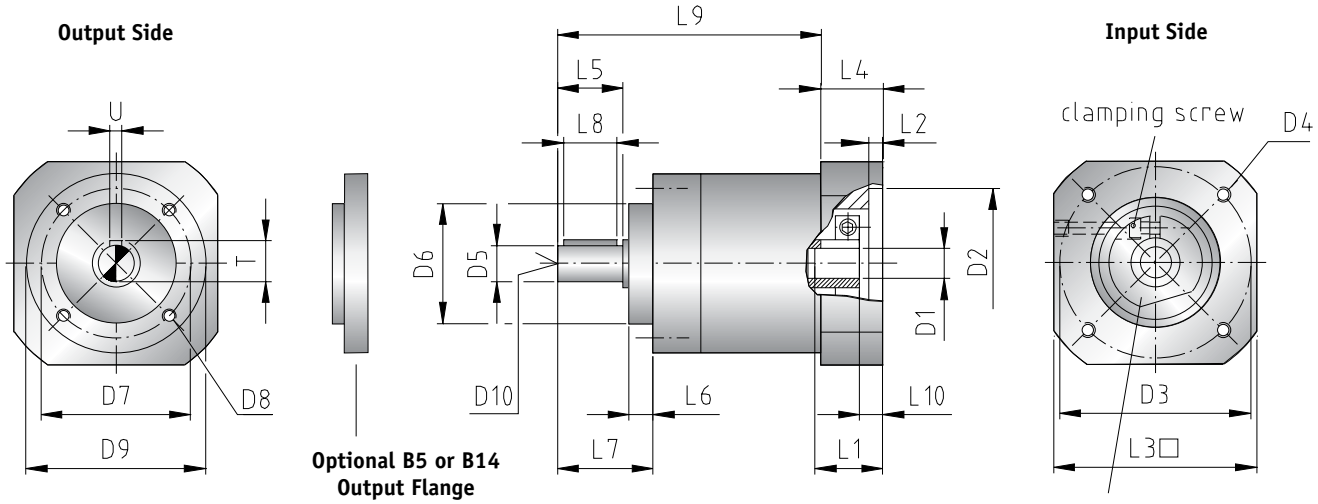
Rated Input Speed in RPM		
Size	Continuous	Intermittent
PD040	3000	6000
PD065	3000	6000
PD085	3000	5000
PD120	3000	5000
PD155	2600	3600

Other Data	
Lubrication	Lifetime Grease
Operating Temperature	-25C to +90C
Mounting Position	Any
Protection	IP64
Running Noise	70 dB(A)
Life Rating	20,000 hours

Torsional Rigidity Nm/arc min		
Size	Stages	
	1	2
PD040	0.4	0.5
PD065	1.6	2
PD085	4.8	6
PD120	10	13
PD155	34	37

Approximate Weight in kg		
Size	Stages	
	1	2
PD040	0.3	0.4
PD065	1.3	1.7
PD085	2.6	3.5
PD120	6	8.6
PD155	12.6	17

--- For axial and radial load capacities, please see page 10 ---



Dimension	Description	PD040	PD065	PD085	PD120	PD155
D1	Max. Motor Shaft Diameter	11	14	19	24	32
D2	Motor Pilot*	22 - 60	22 - 80	50 - 110	50 - 180	70 - 230
D3	Bolt Circle*	32 - 75	40 - 100	60 - 130	65 - 215	85 - 265
D4	Bore/Thread*	M3 - M5	M3 - M6	M4 - M8	M4 - M10	M5 - M12
D5	Output Shaft	10 k6	14 k6	20 k6	25 k6	40 k6
D6	Output Pilot	25 h7	40 h7	55 h7	80 h7	110 h7
D7	Output Bolt Circle	33	52	70	100	130
D8	Bore/Thread	M4 x 8	M5 x 10	M6 x 12	M8 x 16	M10 x 20
D9	Housing	40	65	85	120	155
D10	Shaft End Thread	M4 x 10	M5 x 12.5	M6 x 16	M10 x 22	M16 x 36
L1	Input Shaft Length*	14 - 30	19 - 40	24 - 45	27 - 69	30 - 79
L2	Pilot Depth*	3 - 5	3.5 - 7	3.5 - 7	4 - 7	4 - 10
L3	Flange Diameter*	40 - 85	65 - 100	85 - 120	120 - 180	155 - 220
L4	Flange Width*	22 - 31	20 - 35	26 - 40	31 - 50	37 - 54
L5	Output Shaft Length	23	30	40	50	80
L6	Pilot Depth	5	8	8	10	14
L7	Install. Dimension	29	39	49	61	95
L8	Key Length	18	25	32	40	70
L9	Length - 1 Stage	68	105	133	165	223
L9	Length - 2 Stage	84	129	164	201	267
U	Key Width	3	5	6	8	12
T	Height Over Key	11.2	16	22.5	28	43
	B5 Output Flange**	Ø 80, 90	Ø 90, 105, 120, 160	Ø 120, 160	Ø 200	Ø 250
	B14 Output Flange**				Ø 160, 200	Ø 200, 250

All dimensions are in mm

* Actual dimensions depend on motor selected. See pages 8-9 for details.

** Contact factory for ordering instructions.

Ordering Example

P	D	1	2	0	–	C	A	B	0	2	8	–	1	A	A	1
1	2	3	4	5		6	7	8	9	10	11		12	13	14	15

Box	Description	Code
1 - 5	Planetary Gear Size	PD120
6	Motor Shaft	C
7 - 8	Flange Code	AB
9 - 11	Ratio	028
12	Keyed Output Shaft	1
13 - 14	Standard Output Shaft	AA
15	Black Finish	1

Note:
Boxes 12-15 represent standard design. Special design codes are available upon request.

Box 1-5, Gearhead Size Codes

PD040	PD065	PD085	PD120	PD155

Box 6, Motor Shaft Code

Size PD040	
Motor Shaft Code	D1 (mm)
A	3
B	4
C	5
D	6
E	7
F	8
G	9
H	10
I	11
J*	6.35
K*	9.53

Size PD065	
Motor Shaft Code	D1 (mm)
A	6
B	7
C	8
D	9
E	10
F	11
G	12
H	14
I*	6.35
J*	9.53
K*	12.71

Size PD085	
Motor Shaft Code	D1 (mm)
A	9
B	10
C	11
D	12
E	14
F	15
G	16
H	19
J*	9.53
K*	12.71
L*	15.89

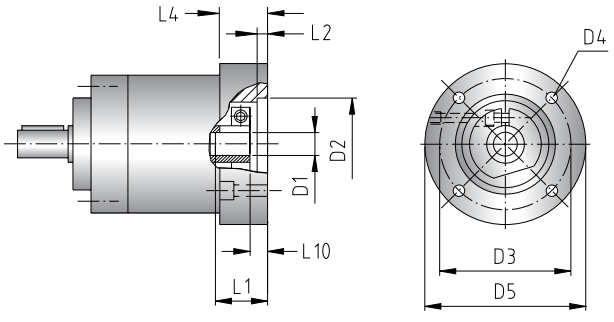
Size PD120	
Motor Shaft Code	D1 (mm)
A	14
B	15
C	16
D	19
E	22
F	24
G	11
H	12
L*	12.71
M*	15.89
N*	19.07

Size PD155	
Motor Shaft Code	D1 (mm)
A	19
B	22
C	24
D	28
E	32
F	14
G	15
H	16
K*	12.71
L*	15.89
M*	19.07

* NEMA Dimensions

Box 7-8, Motor Adapter Flange Codes

Additional flange codes available upon request.



Input Side

Size PD040								
Flange Code	D2 (mm)	D3 (mm)	D4 (mm)	L1 min. (mm)	L1 max. (mm)	L2 (mm)	L4 (mm)	L10 (mm)
AA	25	32	M3	15	27	3	28	4.5
AB	25	63	M5	14	26	3	27	3.5
AC	30	46	M4	14	26	3	27	3.5
AD	35	65.5	M5	14	26	3	27	3.5
AE	30	46	M5	14	26	3	27	3.5
AH	30	45	M3	15	27	3.5	28	4.5
AI	50	70	M4	18	30	3.5	31	7.5
AJ	22	43.8	3.5	14	26	2.5	27	3.5
AK	22	48	M3	14	26	3	27	3.5
AQ*	38.3	66.7	M4	14	26	3	27	3.5

* NEMA Dimensions

Box 7-8, Motor Adapter Flange Codes, cont'd

Size PD065								
Flange Code	D2 (mm)	D3 (mm)	D4 (mm)	L1 min. (mm)	L1 max. (mm)	L2 (mm)	L4 (mm)	L10 (mm)
AA	30	45	M3	19	30.5	4	23	5
AC	36	70.7	M4	19	30.5	4	23	5
AD	40	63	M4	19	30.5	4	23	5
AE	40	63	M5	19	30.5	4	23	5
AF	40	70	M4	19	30.5	4	23	5
AG	50	60	M4	19	30.5	4	23	5
AH	50	65	M5	19	30.5	4	23	5
AI	50	70	M4	19	30.5	4	23	5
AJ	50	70	M5	19	30.5	4	23	5
AK	50	80	M5	19	30.5	4	23	5
AL	50	95	M6	19	30.5	4	23	5
AM	50	100	M6	19	30.5	4	23	5
AN	60	75	M5	19	30.5	4	23	5
AO	60	90	M5	19	30.5	4	23	5
AP	70	90	M5	21	32.5	4	25	7
AQ	70	90	M5	23	34.5	5.5	27	9
AR	70	90	M6	19	30.5	4	23	5
AS*	73.1	98.5	M5	19	30.5	4	23	5
AT	80	100	M6	19	30.5	4	23	5
AU	22	48	M3	19	30.5	4	23	5
AV	45	65.5	M5	19	30.5	4	23	5
AW	73.1	99	M6	22	33.5	4	26	8
AX	80	100	M6	29	40.5	7	23	15
BA*	38.3	66.6	M4	19	30.5	3.5	23	5
BI*	73	98.5	M5	27	38.5	4	31	13

Size PD085								
Flange Code	D2 (mm)	D3 (mm)	D4 (mm)	L1 min. (mm)	L1 max. (mm)	L2 (mm)	L4 (mm)	L10 (mm)
AA	50	60	M4	24	41	4.5	28	5.5
AB	50	65	M5	24	41	4.5	28	5.5
AC	50	70	M4	24	41	4.5	28	5.5
AD	50	70	M5	24	41	4.5	28	5.5
AE	50	80	M5	24	41	4.5	28	5.5
AF	50	95	M6	24	41	4.5	28	5.5
AG	50	100	M6	24	41	4.5	28	5.5
AH	60	75	M5	24	41	4.5	28	5.5
AI	60	90	M5	24	41	4.5	28	5.5
AJ	70	90	M5	26	43	5.5	30	7.5
AK	70	90	M5	28	45	5.5	32	9.5
AM*	73.1	98.5	M5	24	41	4.5	28	5.5
AO	50	95	M6	25	42	5.5	29	6.5
AP	50	100	M6	25	42	5.5	29	6.5
AR	60	99	M6	24	41	4.5	28	5.5
AS	70	90	M5	24	41	4.5	28	5.5
AT	70	90	M6	24	41	4.5	28	5.5
AU	80	100	M6	24	41	4.5	28	5.5
AV	95	115	M8	24	41	4.5	28	5.5

Size PD120								
Flange Code	D2 (mm)	D3 (mm)	D4 (mm)	L1 min. (mm)	L1 max. (mm)	L2 (mm)	L4 (mm)	L10 (mm)
AA	50	95	M6	28	52	6.5	32	7.5
AB	50	100	M6	28	52	6.5	32	7.5
AC	60	75	M5	27	51	5.5	31	6.5
AD	60	99	M6	27	51	5.5	31	6.5
AE	70	90	M5	27	51	5.5	31	6.5
AF	70	90	M6	27	51	5.5	31	6.5
AG	80	100	M6	27	51	5.5	31	6.5
AH	95	115	M8	27	51	5.5	31	6.5
AI	95	130	M8	27	51	5.5	31	6.5
AJ	110	130	M8	27	51	5.5	31	6.5
AK	110	130	M8	38	62	7	42	17.5
AL	110	145	M8	45	69	7	49	24.5
AM	110	165	M10	38	62	7	42	17.5
AN	80	100	M6	45	69	7	49	24.5
AO	95	115	M8	45	69	7	49	24.5
AP	95	115	M8	31	55	7	35	10.5
AQ	95	115	M6	27	51	5.5	31	6.5
AR	50	70	M4	27	51	5.5	32	6.5

Size PD155								
Flange Code	D2 (mm)	D3 (mm)	D4 (mm)	L1 min. (mm)	L1 max. (mm)	L2 (mm)	L4 (mm)	L10 (mm)
AA	95	115	M8	30	64	6.5	39	8.5
AB	95	130	M8	30	64	6.5	39	8.5
AC	110	130	M8	30	64	6.5	39	8.5
AD	110	145	M8	30	64	6.5	39	8.5
AE	110	145	M8	40	74	10	49	18.5
AF	110	145	M8	45	79	10	54	23.5
AG	110	165	M10	30	64	6.5	39	8.5
AH	130	165	M10	40	74	10	49	18.5
AI	80	100	M6	30	64	6.5	39	8.5
AJ	130	215	M12	30	64	6.5	39	8.5
AK	70	90	M5	30	64	6.5	39	8.5

Box 9-11, Ratio Codes

1 Stage	
Code	Ratio
003	3
004	4
005	5
007	7
009	9
010	10

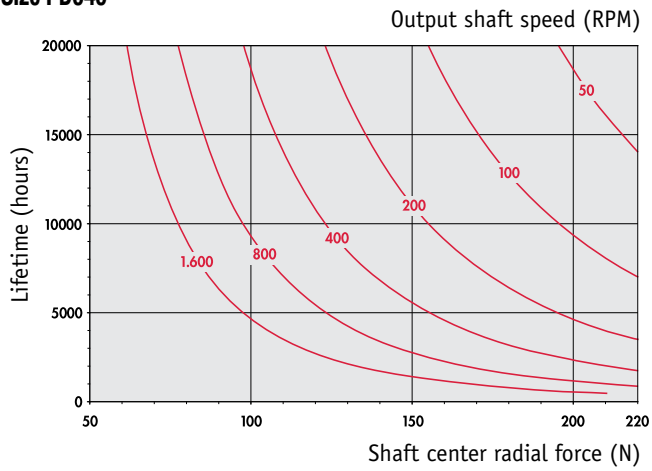
2 Stages			
Code	Ratio	Code	Ratio
016	16	040	40
020	20	049	49
025	25	050	50
028	28	070	70
035	35	100	100

* NEMA Dimensions

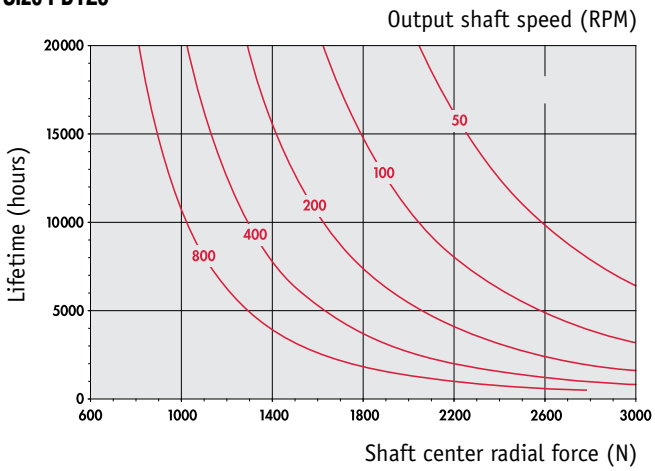
Radial Load Ratings

The radial load ratings are a function of speed and required life.

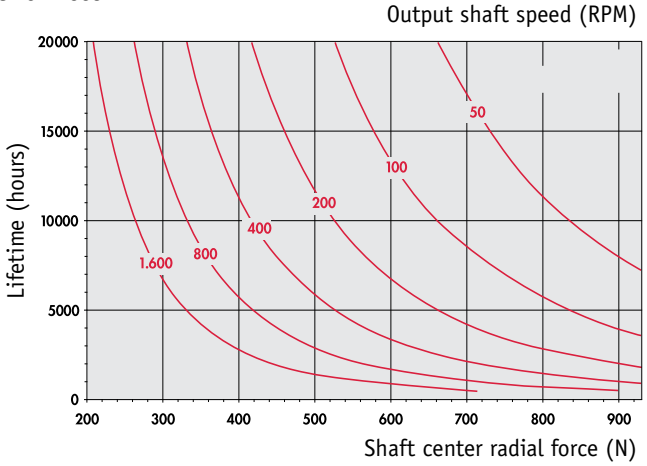
Size PD040



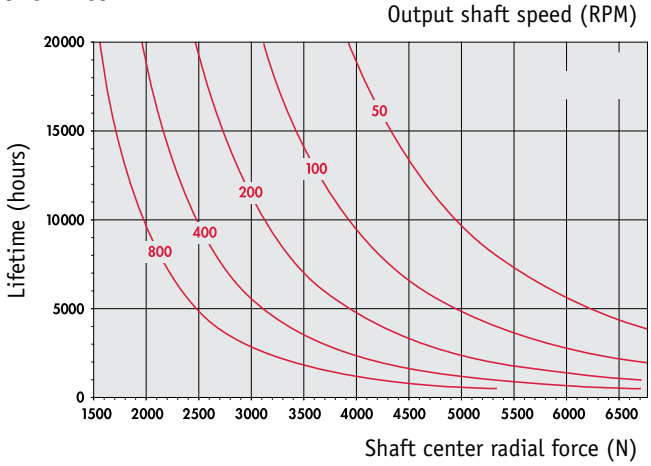
Size PD120



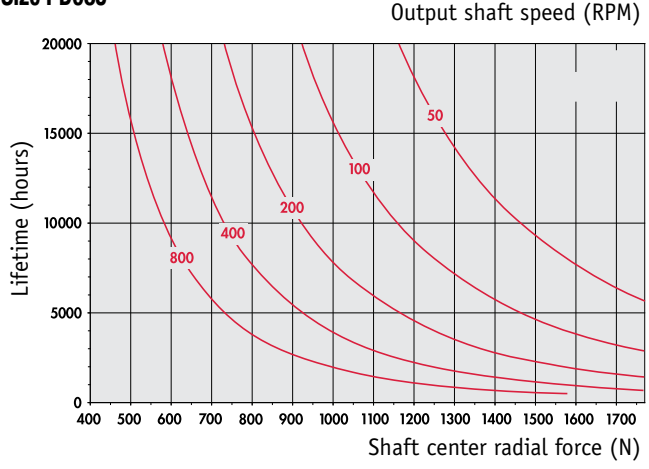
Size PD065



Size PD155



Size PD085



Axial Load Ratings

Size	Rating
PD040	330 N
PD065	1080 N
PD085	2180 N
PD120	3730 N
PD155	7730 N

1 Newton (N) = 0.22 Pounds
1 Pound = 4.54 Newtons (N)

General Instructions

Mounting of the Planetdrive servo gearhead to the servo motor is easy and trouble free when following these simple instructions. The motor is connected to the gear drive via a rigid hollow pinion. Reduction bushings may be used to accommodate various shaft sizes. It is important to use motors with shafts that are concentric and perpendicular to the flange centering ring and mounting surface.

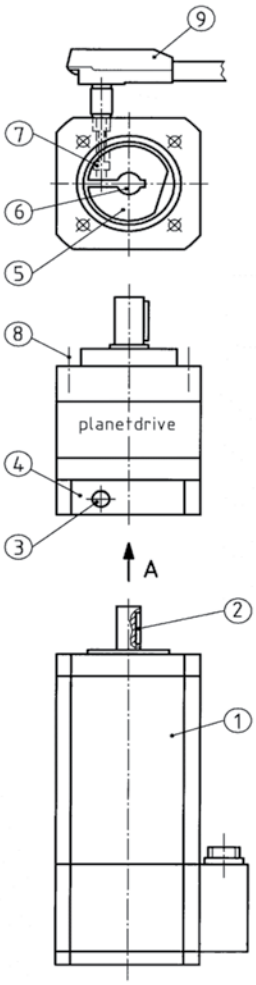
To avoid motor misalignments the motor adapter centering ring has been manufactured with an open tolerance. This reduces problems with motors that have shaft to pilot concentricity inaccuracies. It is therefore important to note that the gear drive and motor should be assembled in a vertical orientation and the connection clamp should be tightened prior to tightening the flange bolts. More detailed instructions follow.

The Planetdrive planetary gears are provided with lifetime lubrication and are maintenance free.

Tightening Torque of the Clamping Screw		
PD040	M4	4.2 Nm
PD065	M5	8.3 Nm
PD085	M8	43 Nm
PD120	M8	43 Nm
PD155	M8	43 Nm

Motor Mounting Instructions

1. If a key (2) exists in the motor shaft, it should be removed. With motor speeds over 3000 rpm there may be a possibility of motor shaft imbalance. The motor key seat should then be filled with a modified key which must not extend beyond the key way surface.
2. Remove the shaft clamp access hole plug (3) located in the motor adapter plate.
3. Turn the clamping element (5) until the head of the clamping screw (7) is visible through the access hole.
4. Examine the adapter flange (4), hollow bore(6), motor flange, and motor shaft for any scoring, nicks, or burrs. Clean all surfaces.
5. With some flange sizes, the adapter flange may have to be mounted on the motor first before attaching the gearbox.
6. Place the motor (1) in a vertical position with the shaft up. If the motor has a key way, it should be aligned opposite the split in the clamping element.
7. If a bore reduction bushing is used, the bushing split and clamping element split should be aligned.
8. Slide the gear drive carefully and evenly onto the motor shaft. Do not press or strike to aid assembly. If the gear drive is too heavy use a lifting device. The motor adapter face should seat completely on to the motor flange surface.
9. Tighten the clamping element screw (7) first to guaranty proper alignment. Use a torque wrench to assure the proper tightening torque.
10. Insert and tighten the (4) flange bolts.
11. Replace the shaft clamp access hole plug (3).



Note:
Inappropriate assembly can lead to damage and invalidate the warranty.

Other Servo Gearhead Products

ServoFoxx

Precision Planetary
& Bevel Gearheads

Varvel

Economy Right Angle
Worm Gearheads

Dynabox

Right Angle
Precision Gearheads

WATT Drive

Helical Gearing
Servo Gearheads

The DieQua Advantage

DieQua Corporation has been a manufacturer and supplier of precision motion control components for over 30 years. We offer the widest range of servo gearhead and speed reducing solutions available from a single source. Featuring right angle and inline designs with multiple backlash precision levels, the largest number of ratios, and several mounting and output options, we have the drive that meets your needs.

Engineering Support

DieQua Corporation has several decades of combined experience specifying power transmission and motion control components. This assures the proper selection of components and systems for your unique requirements.

Assembly

DieQua Corporation has a team of factory trained technicians that assemble the majority of the drives we provide. This allows prompt delivery of your production requirements or service repairs.

Warehousing

DieQua Corporation maintains an extensive inventory of common speed reducer and motor components for quick delivery of small orders, prototypes and spare parts.

Manufacturing

DieQua Corporation's manufacturing capabilities allow production of many of the components used in the drives we provide. Mounting components and design modifications are also available from our full service machine shop.

DIEQUA Corporation
Motion Components and Engineering Services

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072014/3M