

## Inline Servo Gearboxes



**SPH Helical Inline**  
High performance inline planetary helical gearbox for demanding applications

- Lowest backlash <1 arcmin
- Torque capacity up to 900 Nm
- Frame sizes from 50-180 mm



**EPL Inline**  
Performance inline planetary gearbox for general applications

- Lowest backlash <8 arcmin
- Torque capacity up to 340 Nm
- Frame sizes from 50-150 mm



**PE Inline**  
Basic performance inline planetary gearbox for general applications

- Lowest backlash <8 arcmin
- Torque capacity up to 210 Nm
- Frame sizes from 50-118 mm



**SSP Stainless Steel Inline**  
Performance stainless steel inline planetary gearbox

- Lowest backlash <8 arcmin
- Torque capacity up to 340 Nm
- Frame sizes from 70-120 mm

## Right Angle Servo Gearboxes



**DYNA (DS) Right Angle**  
High performance right angle hypoid gearbox for demanding applications

- Lowest backlash <2 arcmin
- Torque capacity up to 1400 Nm
- Frame sizes from 55-190 mm



**Dyna-Lite (DL) Right Angle**  
Performance right angle hypoid gearbox for general applications

- Lowest backlash <6 arcmin
- Torque capacity up to 140 Nm
- Frame sizes from 55-90 mm



**EPR Right Angle**  
Performance right angle bevel planetary gearbox for general applications

- Lowest backlash <8 arcmin
- Torque capacity up to 340 Nm
- Frame sizes from 64-118 mm



**PER Right Angle**  
Basic performance right angle bevel planetary gearbox for general applications

- Lowest backlash <8 arcmin
- Torque capacity up to 210 Nm
- Frame sizes from 64-118 mm

# ▶ SERVO GEARBOX SELECTION GUIDE



		Inline Planetary Gear Reducers			
		Highest Performance	High Performance	Performance	Specialty
		SPH	EPL	PE	SSP (Stainless)
Gear Technology		Helical	Straight Tooth	Straight Tooth	Straight Tooth
Ratios	min	3	3	3	3
	max	100	1000	1000	100
Frame Sizes		6	5	4	3
Max. Nominal Torque (Nm)		900	340	210	210
Lowest Backlash (arcmin)		<1	<8	<8	<8
Max. Radial Loading (N)		20,000	7500	2500	3000
Service Life (hrs)		20,000	30,000	20,000	30,000
Output Style	Shaft (Metric)				
	Shaft (NEMA)				
	Hollow				
	Flange				
		Right Angle Gear Reducers			
		Highest Performance	High Performance	Performance	Specialty
		DYNA (DS)*	DL	EPR	PER
Gear Technology		Hypoid	Hypoid	Right Angle Bevel Planetary	Right Angle Bevel Planetary
Ratios	min	3	5	3	3
	max	100	150	1000	1000
Frame Sizes		6	3	3	3
Max. Nominal Torque (Nm)		1400	140	149	149
Lowest Backlash (arcmin)		<2*	<6	<10	<10
Max. Radial Loading (N)		15,000	7200	5000	2500
Service Life (hrs)		30,000	15,000	30,000	20,000
Output Style	Shaft (Metric)				
	Shaft (NEMA)				
	Hollow				
	Flange				

\*DSX option - Ground Gears / Improved Performance / Lowest Backlash

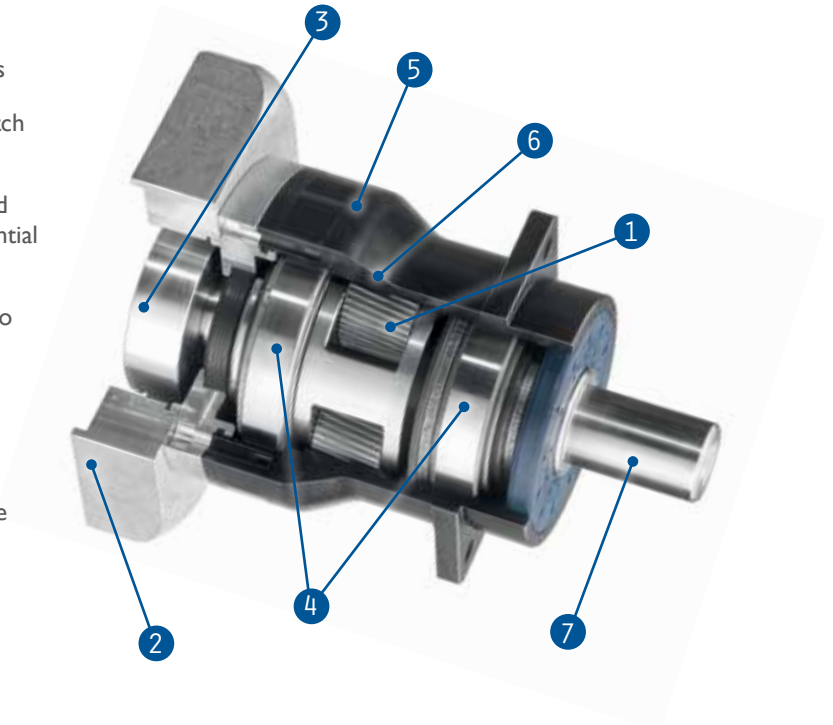


## ▶ HIGHEST PERFORMANCE: SPH SERIES

The SPH series features helical gearing which brings a whole new level of power and precision to GAM's already extensive portfolio of gear reducer technology. With special attention paid to every aspect during development, the SPH gracefully combines design and engineering, to deliver our best inline planetary gear reducer yet.

For dynamic and demanding servo applications where performance is critical, the SPH is highly powerful and efficient, yet smooth and quiet.

1. **Helical Gears** Precision cut and ground to quietly deliver higher torques and accuracies
2. **Adapter Flange** Custom machined to match any motor for easy installation
3. **Input Clamping Element** Low inertia and balanced for high speeds with a single tangential screw ensures a secure motor connection
4. **Bearings** Optimized taper roller bearings to accommodate high radial and axial loads
5. **Housing** Sleek and contoured steel housing with black oxide treatment for maximum durability
6. **Ring Gear** Machined directly into the single piece housing for maximum stiffness
7. **Output Shaft** Offered smooth or keyed and can be easily shortened if required

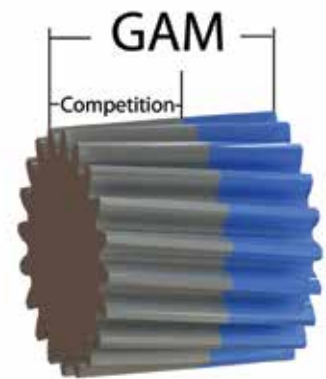


### Helical gears make the difference

The helical gear profile is cut at an angle that allows for gradual tooth engagement allowing for smooth, accurate, and quiet transmission. GAM's SPH gears are cut at the optimal helix angle to minimize resultant axial forces and they have a larger tooth width to maximize torque carrying capacity compared to the competition.

### It all starts with the gears

The SPH's helical gears are produced to an extremely high level of quality and ground for further precision. With state of the art testing and measuring instruments and qualified personnel, we assure that the SPH will meet and exceed your requirements. With the SPH, every detail counts.



The SPH is GAM's highest performing inline gear reducer

Designed for **dynamic**  
& **cyclic** applications

Can be optimized for **high speed**  
and **continuous** applications



# ▶ HIGHEST PERFORMANCE: SPH SERIES

Available configurations for simple and compact machine integration



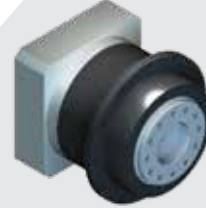
**SPH-W**  
Shaft output design for mounting to pulleys and rack and pinion systems. Available with a smooth or keyed output shaft.



**SPH-K**  
Features a bellows coupling on the output for maximum stiffness and the best results in highly dynamic applications. An output housing comes standard with custom housings available.



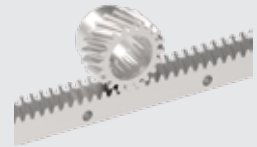
**SPH-C**  
Same benefits as the SPH-K models without the housing on the output. Plug the gearbox directly into your machine and achieve a more compact design.



**SPH-F**  
Flange output design for direct mounting of pinions and other machine elements. The latest addition to the SPH product line.



**SPH-SP**  
Splined-Shaft output with GAM Helical Pinion. Use with GAM Helical Rack for a complete linear system

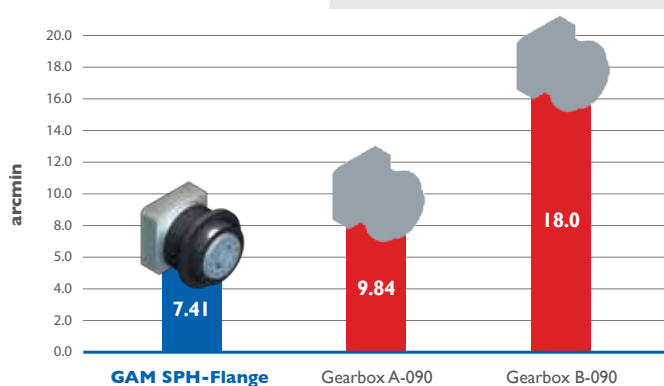


SPH

## When your application is demanding...demand GAM's SPH

	LOW	HIGH	SUPERIOR	WHY GAM SPH?
<b>Flexibility</b>	Competition A		<b>SPH</b>	Configured to meet the application, not the other way around!
	Competition B			
<b>Modifications &amp; Customizations</b>	Competition A		<b>SPH</b>	Flexible manufacturing and experienced engineering
	Competition B			
<b>Performance</b>			<b>SPH</b>	95 years of gear manufacturing experience
			Competition A	
			Competition B	
<b>Quality</b>			<b>SPH</b>	State of the art testing and measuring machines. ISO 9001 Certified
			Competition A	
			Competition B	

## Limit Lost Motion with the SPH Flange



Lost Motion (LM) in arcmin, was calculated using the following formula:  $LM = (1/Ct)^j \cdot Ta + j$

Where: Ct= Torsional Rigidity (Nm/arcmin)  
Ta= Application Torque (Nm)  
j= Output Backlash - Standard (arcmin)

Backlash and Torsional Rigidity are both important values to consider when selecting a high precision gearbox as they both affect lost motion.

In this example, the SPH Flange (size 75, 5:1 ratio, standard backlash <3 arcmin, rigidity 34 Nm/arcmin) was compared to two equivalent standard backlash flange gearboxes available on the market.

Using an application torque value of 150Nm, gearbox A-090 and gearbox B-090 exhibit 33% and 143% more lost motion respectively than the SPH Flange.

### SPH-F Low Backlash

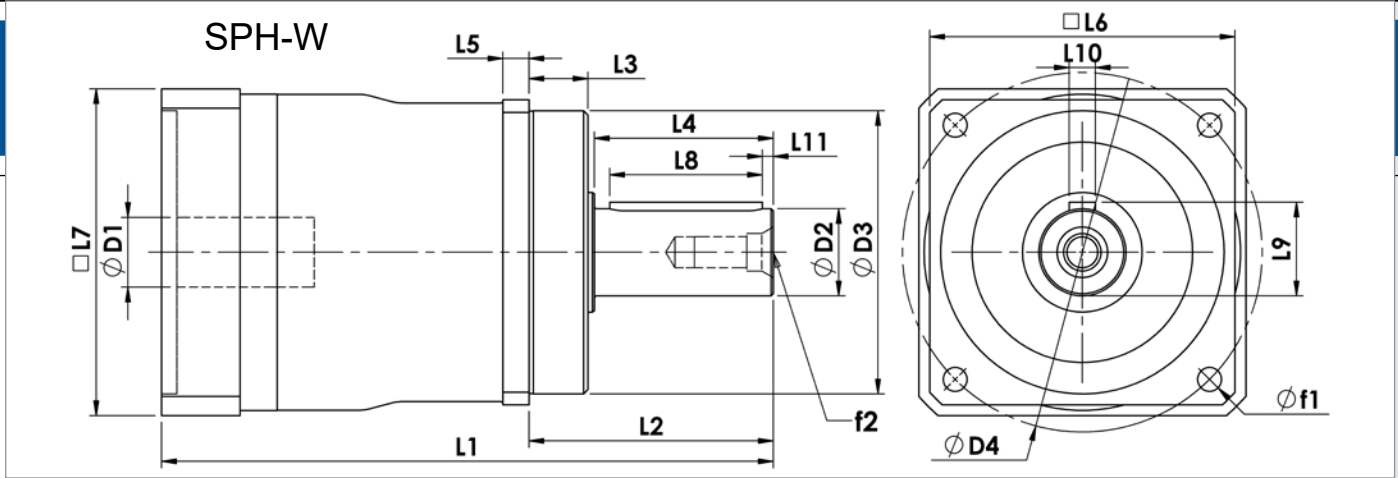
<3 arc-min standard  
<1 arc-min reduced



# ▶ HIGHEST PERFORMANCE: SPH SERIES - SPH-W

SPH-W		60	75	100	140	180			
All Ratios Available									
Nominal Output Torque ( $T_{2n}$ )	Nm (lb-in)	3:1-5:1	60 (531)	100 (885)	250 (2213)	450 (3983)	900 (7966)		
		7:1	40 (354)	80 (708)	180 (1593)	420 (3717)	800 (7081)		
		10:1	30 (266)	65 (575)	110 (974)	240 (2124)	450 (3983)		
		12:1-40:1	60 (531)	100 (885)	250 (2213)	450 (3983)	900 (7966)		
		50:1	40 (354)	80 (708)	250 (2213)	450 (3983)	900 (7966)		
		70:1	40 (354)	80 (708)	180 (1593)	420 (3717)	800 (7081)		
		100:1	30 (266)	65 (575)	110 (974)	240 (2124)	450 (3983)		
Max Acceleration Output Torque ( $T_{2B}$ )	Nm (lb-in)	1.5 x Nominal ( $T_{2n}$ )							
Emergency Output Torque ( $T_{2not}$ )	Nm (lb-in)	3.5 x Nominal ( $T_{2n}$ )							
Nominal Input Speed ( $n_{1n}$ )	RPM	-	4500	4500	4000	3800	2000		
Max Input Speed ( $n_{1max}$ )		-	6000						
Standard Output Backlash (j)	arcmin	1-stage	<4	<4	<4	<4	<4		
		2-stage	<6	<6	<6	<6	<6		
Reduced Output Backlash (j)	arcmin	1-stage	<2	<2	<2	<2	<2		
		2-stage	<4	<4	<4	<4	<4		
Allowable Radial Load ( $F_{rad}$ )1	N (lbf)	-	3,500 (787)	4,500 (1012)	8,000 (1798)	12,000 (2698)	20,000 (4496)		
Allowable Axial Load ( $F_{axial}$ )	N (lbf)	-	1,600 (360)	2,400 (540)	2,400 (540)	6,000 (1349)	10,000 (2248)		
Torsional Stiffness ( $C_{t2}$ )	Nm/arcmin (lb-in/arcmin)	1-stage	4.0 (35)	12 (106)	32 (283)	54 (478)	168 (1487)		
		2-stage	4.0 (35)	12 (106)	32 (283)	54 (478)	168 (1487)		
Mass Moment of Inertia ( $J_1$ )	kg-cm <sup>2</sup> (lb-in <sup>2</sup> )	3:1	0.42 (0.144)	1.26 (0.431)	4.00 (1.367)	12.90 (4.408)	62.30 (21.29)		
		4:1	0.29 (0.099)	0.95 (0.325)	2.90 (0.991)	8.45 (2.888)	38.90 (13.29)		
		5:1	0.22 (0.075)	0.79 (0.270)	2.20 (0.752)	6.20 (2.119)	25.90 (8.850)		
		7:1	0.17 (0.058)	0.68 (0.232)	1.81 (0.619)	4.66 (1.592)	18.40 (6.288)		
		10:1	0.15 (0.051)	0.62 (0.212)	1.60 (0.547)	3.86 (1.319)	13.60 (4.647)		
		12-16:1	0.18 (0.062)	0.62 (0.212)	1.46 (0.499)	3.40 (1.162)	12.90 (4.408)		
		20-25:1	0.14 (0.048)	0.53 (0.181)	1.20 (0.410)	2.45 (0.837)	8.69 (2.970)		
		28-40:1	0.13 (0.044)	0.50 (0.171)	1.10 (0.376)	2.10 (0.718)	6.99 (2.389)		
Weight (m)	kg (lbs)	1-stage	(2.2) (4.9)	3.6 (7.9)	7.3 (16)	17.4 (38)	38 (84)		
		2-stage	(2.9) (6.4)	4.9 (11)	9.1 (20)	23.3 (51)	48 (106)		
Noise Level ( $L_{pA}$ )	dB(A)	1-stage	<60	<63	<64	<65	<65		
		2-stage	<60	<61	<62	<63	<64		
Efficiency at Load	1-stage: 98% 2-stage: 96%								
Service Life	>20,000 hours								
Lubrication	Lifetime lubrication with synthetic oil								
Protection Rating	IP64 (IP65/IP66 available on request)								
Operating Temperature Range	-25°C to +80°C (short term: 100°C)								

1) Load applied at center of output shaft @ 100 RPM

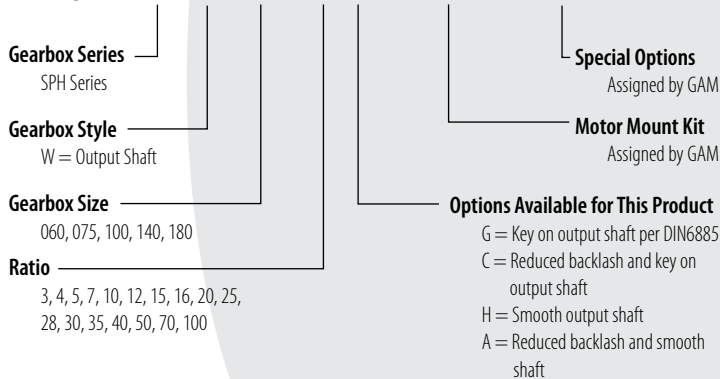


SPH-W		60		75		100		140		180	
		mm	(in)	mm	(in)	mm	(in)	mm	(in)	mm	(in)
D1 <sub>max</sub> Standard	Motor Shaft Diameter	14	(0.551)	19	(0.748)	24	(0.945)	32	(1.260)	38	(1.496)
D1 <sub>max</sub> Available <sup>1</sup>		19	(0.748)	24	(0.945)	32	(1.260)	38	(1.496)	48	(1.890)
D1 <sub>max</sub> 2-stage	Output Shaft Diameter	14	(0.551)	19	(0.748)	24	(0.945)	32	(1.260)	38	(1.496)
D2 k6		16	(0.630)	22	(0.866)	32	(1.260)	40	(1.575)	55	(2.165)
D3 g6	Pilot Diameter	60	(2.362)	70	(2.756)	90	(3.543)	130	(5.118)	160	(6.299)
D4	Output Bolt Circle	68	(2.677)	85	(3.346)	120	(4.724)	165	(6.496)	215	(8.465)
f1	Mounting Holes	6	(0.236)	6.6	(0.260)	9	(0.354)	11	(0.433)	13	(0.512)
f2	Shaft End Thread	M5		M8		M12		M16		M20	
L1 <sup>2</sup>	Overall Gearbox Length	150	(5.906)	165	(6.496)	220	(8.661)	280	(11.024)	330	(12.992)
L1 <sub>2-stage</sub> <sup>2</sup>		190	(7.480)	210	(8.268)	270	(10.630)	345	(13.583)	420	(16.535)
L2	Shaft Length	48	(1.890)	56	(2.205)	88	(3.465)	112	(4.409)	112	(4.409)
L3	Pilot Height	18	(0.709)	18	(0.709)	28	(1.102)	27	(1.063)	27	(1.063)
L4	Usable Shaft Length	28	(1.102)	36	(1.417)	58	(2.283)	82	(3.228)	82	(3.228)
L5	Flange Thickness	6	(0.236)	7	(0.276)	10	(0.394)	12	(0.472)	18	(0.709)
L6	Output Square	61	(2.402)	75	(2.953)	100	(3.937)	140	(5.512)	180	(7.087)
L7 <sup>2</sup>	Input Square	75	(2.953)	90	(3.543)	120	(4.724)	150	(5.906)	210	(8.268)
L8	Key Length	25	(0.984)	32	(1.260)	50	(1.969)	70	(2.756)	70	(2.756)
L9	Key Height	18	(0.709)	24.5	(0.965)	35	(1.378)	43	(1.693)	59	(2.323)
L10	Key Width	5	(0.197)	6	(0.236)	10	(0.394)	12	(0.472)	16	(0.630)
L11	Key End	1.5	(0.059)	2	(0.079)	4	(0.157)	5	(0.197)	6	(0.236)

- 1) For larger motor shaft diameters, please contact GAM.
- 2) Depending on the motor, value can vary.

### TYPE CODES FOR SPH SERIES (SPH-W)

**Example: SPH - W - 075 - 005 G - [115 - A01] - S111**



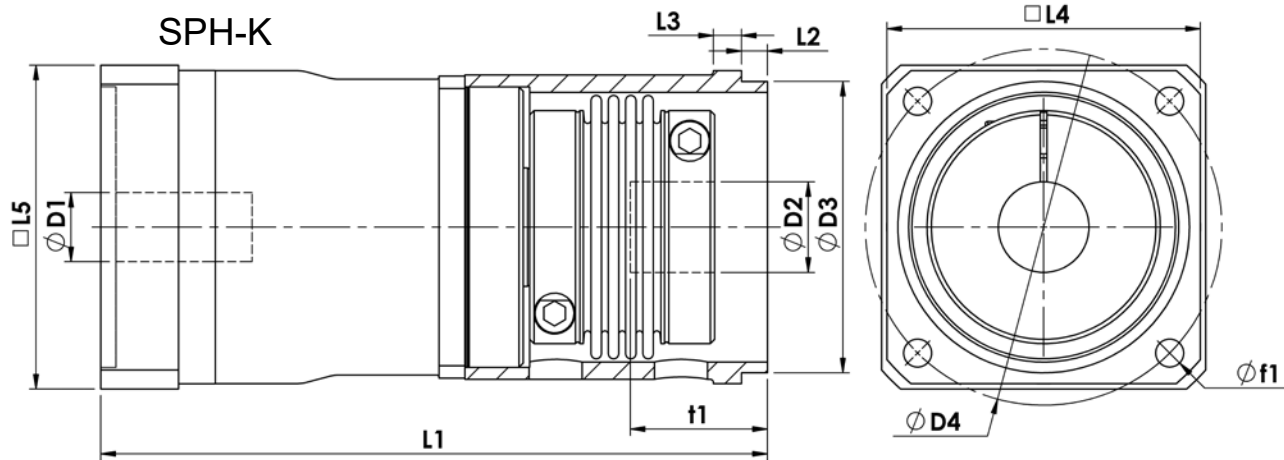
Tolerance (mm)		
Size	k6	g6
Over 6	+0.010	-0.005
Thru 10	+0.001	-0.014
Over 10	+0.012	-0.006
Thru 18	+0.001	-0.017
Over 18	+0.015	-0.007
Thru 30	+0.002	-0.020
Over 30	+0.018	-0.009
Thru 50	+0.002	-0.025
Over 50	+0.021	-0.010
Thru 80	+0.002	-0.029
Over 80	+0.025	-0.012
Thru 120	+0.003	-0.034
Over 120	+0.028	-0.014
Thru 180	+0.003	-0.037



# ▶ HIGHEST PERFORMANCE: SPH SERIES - SPH-K

SPH-K		60	75	100	140	180	
All Ratios Available							
Nominal Output Torque ( $T_{2n}$ )	Nm (lb-in)	3:1-5:1	60 <sub>1</sub> (531)	100 (885)	250 (2213)	450 (3983)	900 (7966)
		7:1	40 (354)	80 (708)	180 (1593)	420 (3717)	800 (7081)
		10:1	30 (266)	65 (575)	110 (974)	240 (2124)	450 (3983)
		12:1-40:1	60 <sub>1</sub> (531)	100 (885)	250 (2213)	450 (3983)	900 (7966)
		50:1	40 (354)	80 (708)	250 (2213)	450 (3983)	900 (7966)
		70:1	40 (354)	80 (708)	180 (1593)	420 (3717)	800 (7081)
		100:1	30 (266)	65 (575)	110 (974)	240 (2124)	450 (3983)
Max Acceleration Output Torque ( $T_{2B}$ )	Nm (lb-in)	1.5 x Nominal ( $T_{2n}$ )					
Emergency Output Torque ( $T_{2not}$ )	Nm (lb-in)	3.5 x Nominal ( $T_{2n}$ )					
Nominal Input Speed ( $n_{1n}$ )	RPM	-	4500	4500	4000	3800	2000
Max Input Speed ( $n_{1max}$ )		-	6000				
Standard Output Backlash (j)	arcmin	1-stage	<4	<4	<4	<4	<4
		2-stage	<6	<6	<6	<6	<6
Reduced Output Backlash (j)	arcmin	1-stage	<2	<2	<2	<2	<2
		2-stage	<4	<4	<4	<4	<4
Torsional Stiffness ( $C_{21}$ )	Nm/arcmin (lb-in/arcmin)	1-stage	2.8 (25)	7.5 (66)	20 (175)	36 (317)	96 (851)
		2-stage	2.8 (25)	7.5 (66)	20 (175)	36 (317)	96 (851)
Mass Moment of Inertia ( $J_1$ )	kg-cm <sup>2</sup> (lb-in <sup>2</sup> )	3:1	0.62 (0.212)	1.65 (0.563)	6.89 (2.354)	18.90 (6.458)	89.86 (30.705)
		4:1	0.40 (0.138)	1.17 (0.399)	4.53 (1.546)	11.83 (4.041)	54.40 (18.589)
		5:1	0.29 (0.100)	0.93 (0.318)	3.24 (1.107)	8.36 (2.857)	35.82 (12.240)
		7:1	0.21 (0.071)	0.75 (0.257)	2.34 (0.800)	5.76 (1.969)	23.46 (8.017)
		10:1	0.17 (0.057)	0.66 (0.224)	1.86 (0.636)	4.40 (1.504)	16.08 (5.495)
		12-16:1	0.19 (0.064)	0.63 (0.217)	1.56 (0.534)	3.61 (1.234)	13.87 (4.739)
		20-25:1	0.14 (0.049)	0.54 (0.183)	1.24 (0.424)	2.54 (0.867)	9.09 (3.105)
		28-40:1	0.13 (0.045)	0.50 (0.172)	1.12 (0.383)	2.14 (0.733)	7.19 (2.458)
Weight (m)	kg (lbs)	1-stage	3.0 (6.5)	4.5 (10)	11 (24)	23 (50)	52 (115)
		2-stage	3.7 (8.0)	5.8 (12.8)	13 (28)	29 (63)	62 (137)
Noise Level ( $L_{pA}$ )	dB(A)	1-stage	<60	<63	<64	<65	<65
		2-stage	<60	<61	<62	<63	<64
Efficiency at Load	1-stage: 98% 2-stage: 96%						
Service Life	>20,000 hours						
Lubrication	Lifetime lubrication with synthetic oil						
Protection Rating	IP64 (IP65/IP66 available on request)						
Operating Temperature Range	-25°C to +80°C (short term: 100°C)						

1) Limited to 40 Nm(354 lb-in) for SPH-C and SPH-K. For higher torques, please contact GAM.



SPH-K		60		75		100		140		180	
		mm	(in)	mm	(in)	mm	(in)	mm	(in)	mm	(in)
D1 <sub>max</sub> Standard	Motor Shaft Diameter	14	(0.551)	19	(0.748)	24	(0.945)	32	(1.260)	38	(1.496)
D1 <sub>max</sub> Available <sup>1</sup>		19	(0.748)	24	(0.945)	32	(1.260)	38	(1.496)	48	(1.890)
D1 <sub>max</sub> 2-stage		14	(0.551)	19	(0.748)	24	(0.945)	32	(1.260)	38	(1.496)
D2 <sub>FB min</sub>	Minimum Output Bore	12	(0.472)	22	(0.866)	22	(0.866)	42	(1.654)	50	(1.969)
D2 <sub>FB max</sub>	Maximum Output Bore	28	(1.102)	38	(1.496)	50	(1.969)	64	(2.520)	90	(3.543)
D3 g6	Pilot Diameter	70	(2.756)	85	(3.346)	115	(4.528)	135	(5.315)	180	(7.087)
D4	Output Bolt Circle	85	(3.346)	105	(4.134)	140	(5.512)	165	(6.496)	215	(8.465)
f1	Mounting Holes	6.6	(0.260)	9	(0.354)	11	(0.433)	13	(0.512)	17	(0.669)
L1 <sup>2</sup>	Overall Gearbox Length	189	(7.441)	214	(8.425)	262	(10.315)	308	(12.126)	386	(15.197)
L1 <sub>2-stage</sub> <sup>2</sup>		229	(9.016)	259	(10.197)	312	(12.283)	373	(14.685)	476	(18.740)
L2	Pilot Height	6	(0.236)	8	(0.315)	10	(0.394)	12	(0.472)	15	(0.591)
L3	Flange Thickness	7	(0.276)	9	(0.354)	11	(0.433)	13	(0.512)	15	(0.591)
L4	Output Square	70	(2.756)	95	(3.740)	120	(4.724)	145	(5.709)	190	(7.480)
L5 <sup>2</sup>	Input Square	75	(2.953)	90	(3.543)	120	(4.724)	150	(5.906)	210	(8.268)
t1 <sub>FB min</sub>	Minimum Shaft Engagement	27	(1.063)	39.5	(1.555)	44	(1.732)	49	(1.929)	65.5	(2.579)
t1 <sub>FB max</sub>	Maximum Shaft Engagement	51	(2.008)	62	(2.441)	74	(2.913)	86	(3.386)	105	(4.134)

1) For larger motor shaft diameters, please contact GAM.

2) Depending on the motor, value can vary.

### TYPE CODES FOR SPH-K SERIES

**Example: SPH - K - 060 - 005 G - [115 - 201] - S111**

**Gearbox Series**

SPH Series

**Gearbox Style**

K = Bellows coupling output with housing

**Gearbox Size**

060, 075, 100, 140, 180

**Ratio**

3, 4, 5, 7, 10, 12, 15, 16, 20, 25, 28, 30, 35, 40, 50, 70, 100

**Special Options**

Assigned by GAM

**Motor Mount Kit**

Assigned by GAM

**Options Available for This Product**

- G = Standard backlash and keyway in output coupling
- C = Reduced backlash and keyway in output coupling
- H = Standard backlash and no keyway in output coupling
- A = Reduced backlash and no keyway in output coupling

Tolerance (mm)		
Size	k6	g6
Over 6	+0.010	-0.005
Thru 10	+0.001	-0.014
Over 10	+0.012	-0.006
Thru 18	+0.001	-0.017
Over 18	+0.015	-0.007
Thru 30	+0.002	-0.020
Over 30	+0.018	-0.009
Thru 50	+0.002	-0.025
Over 50	+0.021	-0.010
Thru 80	+0.002	-0.029
Over 80	+0.025	-0.012
Thru 120	+0.003	-0.034
Over 120	+0.028	-0.014
Thru 180	+0.003	-0.037

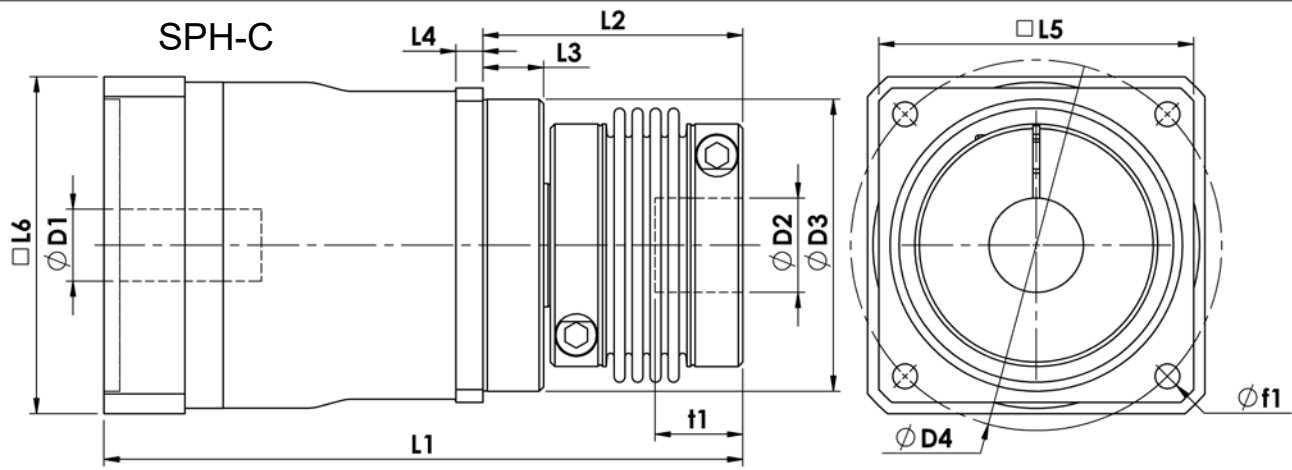




# ▶ HIGHEST PERFORMANCE: SPH SERIES - SPH-C

SPH-C		60	75	100	140	180	
All Ratios Available							
Nominal Output Torque ( $T_{2n}$ )	Nm (lb-in)	3:1-5:1	60 <sub>1</sub> (531)	100 (885)	250 (2213)	450 (3983)	900 (7966)
		7:1	40 (354)	80 (708)	180 (1593)	420 (3717)	800 (7081)
		10:1	30 (266)	65 (575)	110 (974)	240 (2124)	450 (3983)
		12:1-40:1	60 <sub>1</sub> (531)	100 (885)	250 (2213)	450 (3983)	900 (7966)
		50:1	40 (354)	80 (708)	250 (2213)	450 (3983)	900 (7966)
		70:1	40 (354)	80 (708)	180 (1593)	420 (3717)	800 (7081)
100:1	30 (266)	65 (575)	110 (974)	240 (2124)	450 (3983)		
Max Acceleration Output Torque ( $T_{2B}$ )	Nm (lb-in)	1.5 x Nominal ( $T_{2n}$ )					
Emergency Output Torque ( $T_{2not}$ )	Nm (lb-in)	3.5 x Nominal ( $T_{2n}$ )					
Nominal Input Speed ( $n_{1n}$ )	RPM	-	4500	4500	4000	3800	2000
Max Input Speed ( $n_{1max}$ )		-	6000				
Standard Output Backlash (j)	arcmin	1-stage	<4	<4	<4	<4	<4
		2-stage	<6	<6	<6	<6	<6
Reduced Output Backlash (j)	arcmin	1-stage	<2	<2	<2	<2	<2
		2-stage	<4	<4	<4	<4	<4
Torsional Stiffness ( $C_{221}$ )	Nm/arcmin (lb-in/arcmin)	1-stage	2.8 (25)	7.5 (66)	20 (175)	36 (317)	96 (851)
		2-stage	2.8 (25)	7.5 (66)	20 (175)	36 (317)	96 (851)
Mass Moment of Inertia ( $J_1$ )	kg-cm <sup>2</sup> (lb-in <sup>2</sup> )	3:1	0.62 (0.212)	1.65 (0.563)	6.89 (2.354)	18.90 (6.458)	89.86 (30.71)
		4:1	0.40 (0.138)	1.17 (0.399)	4.53 (1.546)	11.83 (4.041)	54.40 (18.59)
		5:1	0.29 (0.100)	0.93 (0.318)	3.24 (1.107)	8.36 (2.857)	35.82 (12.240)
		7:1	0.21 (0.071)	0.75 (0.257)	2.34 (0.800)	5.76 (1.969)	23.46 (8.017)
		10:1	0.17 (0.057)	0.66 (0.224)	1.86 (0.636)	4.40 (1.504)	16.08 (5.495)
		12-16:1	0.19 (0.064)	0.63 (0.217)	1.56 (0.534)	3.61 (1.234)	13.87 (4.739)
		20-25:1	0.14 (0.049)	0.54 (0.183)	1.24 (0.424)	2.54 (0.867)	9.09 (3.105)
		28-40:1	0.13 (0.045)	0.50 (0.172)	1.12 (0.383)	2.14 (0.733)	7.19 (2.458)
Weight (m) With Bellows Coupling	kg (lbs)	1-stage	2.7 (6.0)	4.1 (9)	9.7 (21)	21 (46)	47 (103)
		2-stage	3.4 (7.5)	5.4 (11.9)	12 (25)	27 (59)	57 (125)
Noise Level ( $L_{pA}$ )	dB(A)	1-stage	<60	<63	<64	<65	<65
		2-stage	<60	<61	<62	<63	<64
Efficiency at Load	1-stage: 98% 2-stage: 96%						
Service Life	>20,000 hours						
Lubrication	Lifetime lubrication with synthetic oil						
Protection Rating	IP64 (IP65/IP66 available on request)						
Operating Temperature Range	-25°C to +80°C (short term: 100°C)						

1) Limited to 40 Nm(354 lb-in) for SPH-C and SPH-K. For higher torques, please contact GAM.



SPH-C		60	75	100	140	180
		mm (in)	mm (in)	mm (in)	mm (in)	mm (in)
D1 <sub>max</sub> Standard	Motor Shaft Diameter	14 (0.551)	19 (0.748)	24 (0.945)	32 (1.260)	38 (1.496)
D1 <sub>max</sub> Available <sup>1</sup>		19 (0.748)	24 (0.945)	32 (1.260)	38 (1.496)	48 (1.890)
D1 <sub>max</sub> 2-stage		14 (0.551)	19 (0.748)	24 (0.945)	32 (1.260)	38 (1.496)
D2 <sub>FB min</sub>	Minimum Output Bore	12 (0.472)	22 (0.866)	22 (0.866)	42 (1.654)	50 (1.969)
D2 <sub>FB max</sub>	Maximum Output Bore	28 (1.102)	38 (1.496)	50 (1.969)	64 (2.520)	90 (3.543)
D3 g6	Pilot Diameter	60 (2.362)	70 (2.756)	90 (3.543)	130 (5.118)	160 (6.299)
D4	Output Bolt Circle	68 (2.677)	85 (3.346)	120 (4.724)	165 (6.496)	215 (8.465)
f1	Mounting Holes	6 (0.236)	6.6 (0.260)	9 (0.354)	11 (0.433)	13 (0.512)
L1FB <sup>2</sup>	Overall Gearbox Length	177 (6.969)	197 (7.756)	244 (9.606)	283 (11.142)	356 (14.016)
L1FB <sub>2-stage</sub> <sup>2</sup>		217 (8.543)	242 (9.528)	294 (11.575)	348 (13.701)	446 (17.559)
L2FB	Coupling Length	75 (2.953)	88 (3.465)	112 (4.409)	115 (4.528)	138 (5.433)
L2FE		78 (3.071)	93 (3.661)	116 (4.567)	124 (4.882)	136 (5.354)
L3	Pilot Height	18 (0.709)	18 (0.709)	28 (1.102)	27 (1.063)	27 (1.063)
L4	Flange Thickness	6 (0.236)	7 (0.276)	10 (0.394)	12 (0.472)	18 (0.709)
L5	Output Square	61 (2.402)	75 (2.953)	100 (3.937)	140 (5.512)	180 (7.087)
L6 <sup>2</sup>	Input Square	75 (2.953)	90 (3.543)	120 (4.724)	150 (5.906)	210 (8.268)
t1 <sub>FB min</sub>	Minimum Shaft Engagement	16 (0.630)	22 (0.866)	26 (1.024)	24 (0.945)	35.5 (1.398)
t1 <sub>FB max</sub>	Maximum Shaft Engagement	39 (1.535)	45 (1.772)	56 (2.205)	61 (2.402)	75.5 (2.972)

1) For larger motor shaft diameters, please contact GAM.

2) Depending on the motor, value can vary.

### TYPE CODES FOR SPH-C SERIES

**Example: SPH - C - 060 - 005 G - [115 - 201] - S111**

**Gearbox Series**

SPH Series

**Gearbox Style**

C = Bellows coupling output

**Gearbox Size**

060, 075, 100, 140, 180

**Ratio**

3, 4, 5, 7, 10, 12, 15, 16, 20, 25, 28, 30, 35, 40, 50, 70, 100

**Special Options**

Assigned by GAM

**Motor Mount Kit**

Assigned by GAM

**Options Available for This Product**

G = Standard backlash and keyway in output coupling  
 C = Reduced backlash and keyway in output coupling  
 H = Standard backlash and no keyway in output coupling  
 A = Reduced backlash and no keyway in output coupling

Tolerance (mm)		
Size	k6	g6
Over 6	+0.010	-0.005
Thru 10	+0.001	-0.014
Over 10	+0.012	-0.006
Thru 18	+0.001	-0.017
Over 18	+0.015	-0.007
Thru 30	+0.002	-0.020
Over 30	+0.018	-0.009
Thru 50	+0.002	-0.025
Over 50	+0.021	-0.010
Thru 80	+0.002	-0.029
Over 80	+0.025	-0.012
Thru 120	+0.003	-0.034
Over 120	+0.028	-0.014
Thru 180	+0.003	-0.037



# HIGHEST PERFORMANCE: SPH SERIES - SPH-F

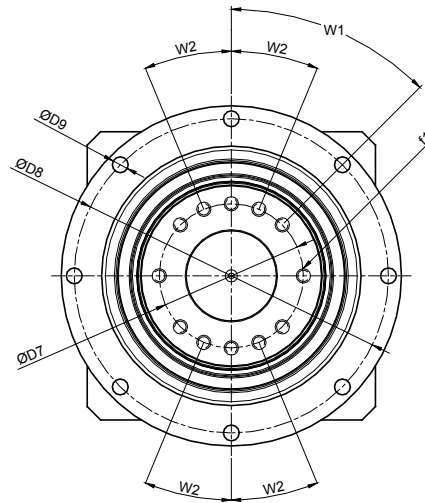
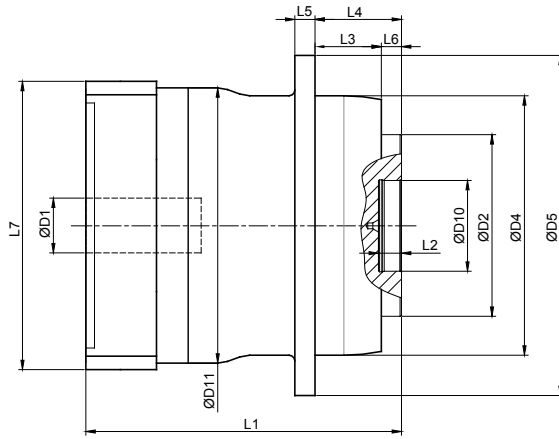
SPH-F		75		100		140	
Ratios Available		1 Stage: 4, 5, 7, 10					
		2 Stage: 16, 20, 25, 28, 35, 40, 50, 70, 100					
Nominal Output Torque ( $T_{2n}$ ) <sup>1</sup>	Nm (lb-in)	4:1-5:1	100 (885)	250 (2213)	450 (3983)		
		7:1	80 (708)	180 (1593)	420 (3717)		
		10:1	65 (575)	110 (974)	210 (1859)		
		16:1-50:1	100 (885)	250 (2213)	450 (3983)		
		70:1	80 (708)	180 (1593)	420 (3717)		
		100:1	65 (575)	110 (974)	210 (1859)		
Max Acceleration Output Torque ( $T_{2a}$ )	Nm (lb-in)	1.5 x Nominal ( $T_{2n}$ )					
Emergency Output Torque ( $T_{2not}$ )	Nm (lb-in)	3.5 x Nominal ( $T_{2n}$ )					
Nominal Input Speed ( $n_{n1n}$ ) <sup>1</sup>	RPM	-	4500	4000	3800		
Max Input Speed ( $n_{n1max}$ )		-		6000			
Standard Output Backlash (j)	arcmin	1-stage	<3	<3	<3		
		2-stage	<5	<5	<5		
Reduced Output Backlash (j)	arcmin	1-stage	<1	<1	<1		
		2-stage	<1	<1	<1		
Allowable Radial Load ( $F_{radial}$ ) <sup>2</sup>	N (lbf)	-	3150 (708)	4000 (899)	9800 (2203)		
Allowable Axial Load ( $F_{axial}$ ) <sup>3</sup>	N (lbf)	-	5900 (1326)	6850 (1540)	6200 (1394)		
Maximum Tilting Moment	Nm (lb-in)	-	290 (2567)	425 (3762)	1100 (9736)		
Torsional Stiffness ( $C_{t21}$ )	Nm/arcmin (lb-in/arcmin)	1-stage	34 (301)	82 (726)	195 (1726)		
		2-stage	30 (266)	74 (655)	175 (1549)		
Mass Moment of Inertia ( $J_1$ )	kg-cm <sup>2</sup> (lb-in <sup>2</sup> )	4:1	1.160 (0.396)	3.170 (1.083)	8.490 (2.901)		
		5:1	0.942 (0.322)	2.510 (0.858)	6.210 (2.122)		
		7:1	0.753 (0.257)	1.960 (0.670)	4.280 (1.463)		
		10:1	0.658 (0.225)	1.680 (0.574)	3.310 (1.131)		
		16:1	0.599 (0.205)	1.370 (0.468)	2.320 (0.793)		
		20:1	0.563 (0.192)	1.280 (0.437)	2.010 (0.687)		
		25:1	0.519 (0.177)	1.160 (0.396)	1.620 (0.554)		
		28:1	0.513 (0.175)	1.140 (0.390)	1.580 (0.540)		
		35:1	0.500 (0.171)	1.100 (0.376)	1.490 (0.509)		
		40:1	0.490 (0.167)	1.070 (0.366)	1.430 (0.489)		
		50:1	0.471 (0.161)	1.010 (0.345)	1.310 (0.448)		
		70:1	0.462 (0.158)	0.981 (0.335)	1.150 (0.393)		
100:1	0.447 (0.153)	0.940 (0.321)	0.906 (0.310)				
Weight (m)	kg (lbs)	1-stage	4.0 (8.8)	6.0 (13.5)	14.1 (31.1)		
		2-stage	6.1 (13.5)	9.6 (22.2)	18.0 (39.7)		
Noise Level ( $L_{pA}$ )	dB(A)	1-stage	<59	<63	<65		
		2-stage	<59	<63	<65		
Efficiency at Load	>97						
Service Life	>20,000 hours						
Lubrication	Lifetime lubrication with synthetic oil						
Protection Rating	IP64 (IP65 available on request)						
Operating Temperature Range	-25°C to +80°C (short term: 100°C)						

1) For S1 continuous operation, consult with GAM. Permissible torques/speed varies with ratio.

2) Load applied to flange end @ 300 RPM

3) Load applied to flange center @ 300 RPM

# SPH-F

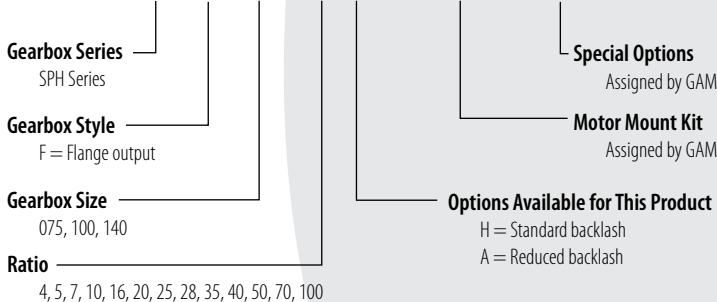


SPH-F		75		100		140	
		mm	(in)	mm	(in)	mm	(in)
D1 <sub>max</sub> Standard	Motor Shaft Diameter	19	(0.748)	24	(0.945)	32	(1.260)
D1 <sub>max</sub> Available <sup>1</sup>		24	(0.945)	32	(1.260)	38	(1.496)
D1 <sub>max</sub> 2-stage		19	(0.748)	24	(0.945)	32	(1.260)
D2 h6	Output Flange Diameter	63	(2.480)	80	(3.150)	100	(3.937)
D4 g6	Output Pilot Diameter	90	(3.543)	110	(4.331)	140	(5.512)
D5	Output Housing Diameter	118	(4.646)	145	(5.709)	179	(7.047)
D7 <sup>3</sup>	Output Flange Bolt Circle	50	(1.969)	63	(2.480)	80	(3.150)
D8	Output Housing Bolt Circle	109	(4.291)	135	(5.315)	168	(6.614)
D9	Output Housing Hole Diameter	(8) x 5.5		(8) x 5.5		(12) x 6.6	
D10 H7	Output Flange Pilot Diameter	31.5	(1.240)	40	(1.575)	50	(1.969)
D11	Input Housing Diameter	95.5	(3.760)	119	(4.685)	145	(5.709)
f1	Output Flange Thread Size	(8) M6 x 10		(12) M6 x 12		(12) M8 x 15	
L1 1-Stage <sup>2</sup>	Overall Gearbox Length	109.5	(4.311)	123.5	(4.862)	155.5	(6.122)
L1 2-Stage <sup>2</sup>	Overall Gearbox Length	161	(6.339)	186	(7.323)	221.5	(8.720)
L2	Output Flange Pilot Depth	8	(0.315)	8	(0.315)	15	(0.591)
L3	Output Pilot Height	23	(0.906)	23	(0.906)	30.5	(1.201)
L4	Output Length	30	(1.181)	29	(1.142)	38	(1.496)
L5	Output Housing Flange Thickness	7	(0.276)	8	(0.315)	10	(0.394)
L6	Output Flange Height	7	(0.276)	6	(0.236)	7.5	(0.295)
L7 <sup>2</sup>	Motor Adapter Square	115	(4.528)	120	(4.724)	130	(5.118)
W1	Output Flange Thread Angle 1	8 x 45°		8 x 45°		12 x 30°	
W2	Output Flange Thread Angle 2	-		22.5°		-	

- 1) For larger motor shaft diameters, please contact GAM.
- 2) Depending on the motor, value may vary
- 3) Output flange dimensions per ISO 9409

## TYPE CODES FOR SPH-F SERIES

**Example: SPH - F - 075 - 005 H - [115 - 201] - S111**



Size	Tolerance (mm)			
	k6	g6	h6	H7
Over 6	+0.010	-0.005	0	+0.015
Thru 10	+0.001	-0.014	-0.009	0
Over 10	+0.012	-0.006	0	+0.018
Thru 18	+0.001	-0.017	-0.011	0
Over 18	+0.015	-0.007	0	+0.021
Thru 30	+0.002	-0.020	-0.013	0
Over 30	+0.018	-0.009	0	+0.025
Thru 50	+0.002	-0.025	-0.016	0
Over 50	+0.021	-0.010	0	+0.030
Thru 80	+0.002	-0.029	-0.019	0
Over 80	+0.025	-0.012	0	+0.035
Thru 120	+0.003	-0.034	-0.022	0
Over 120	+0.028	-0.014	0	+0.040
Thru 180	+0.003	-0.037	-0.025	0



## ▶ HIGH PERFORMANCE: EPL SERIES

### GAM can.

If you don't see exactly what you need, let us know. We can modify the EPL Series gearboxes to meet your needs. Page 4 provides a list of commonly requested modifications to give you a feel for our capabilities.

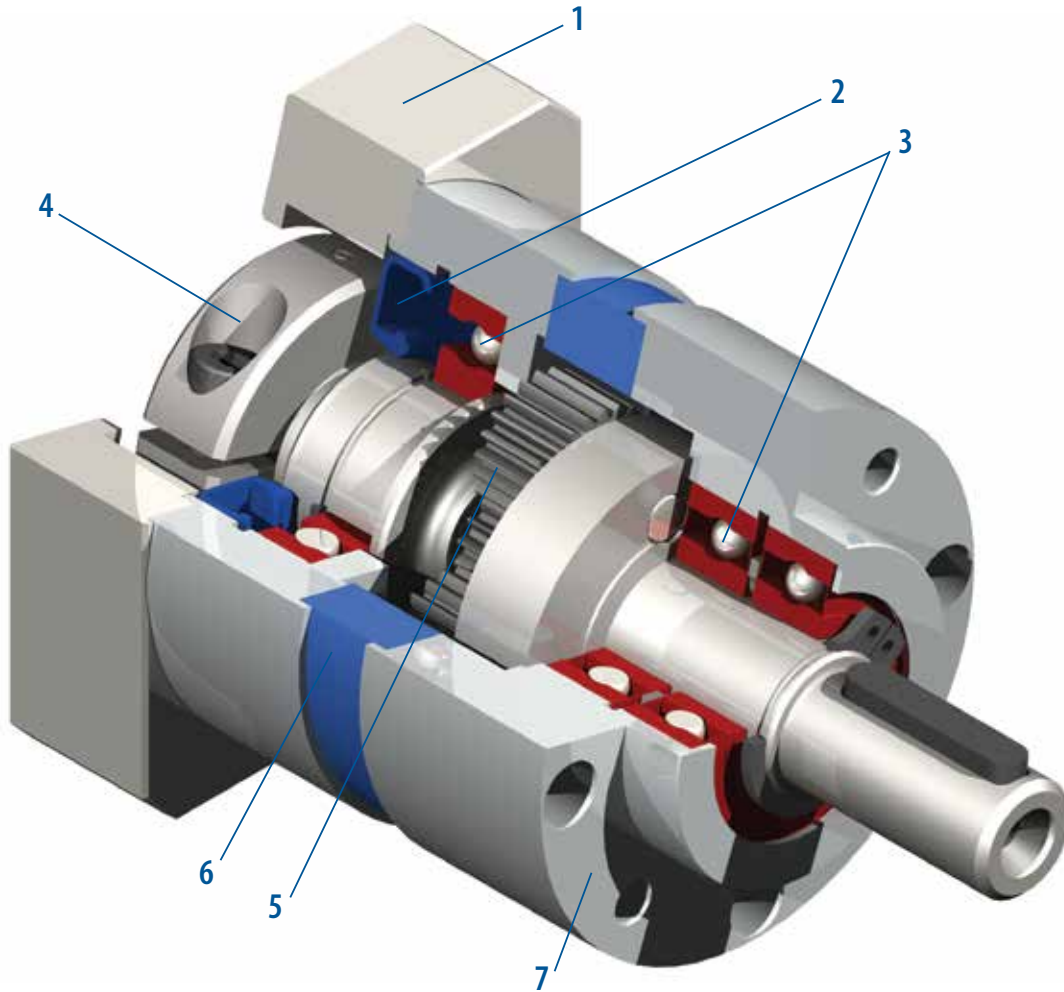
Our EPL Series is widely known as the best value on the market- tens of thousands of EPL's installed since 1998 in North America alone. That's because it offers the best quality available for the price point. We've added some features that make it unequalled in its class and ideal for most servo applications.

### EPL Series enhancements include:

- A 50 mm frame size in our standard shaft version (-V) that is a drop-in for many gearboxes
- NEMA output version with oversized english shaft for improved performance
- Option for larger motor shafts

### New output configurations include:

- EPL-A dimensions that drop in for popular planetary gearboxes on the market.
- EPL-F that features a flange output for a compact design and allows for easy connecting of mechanical elements such as pulleys and pinions.



1. Adapter Plate

(Customized adapter plates for quick and easy motor mounting)

2. Seals

(Protective seals to isolate the gearbox)

3. Angular Contact Bearings

(for high radial and axial loading)

4. Input Clamping Element

5. Planet Gears

(Precision ground gears)

6. Ring Gear

(Ring gear incorporated into housing)

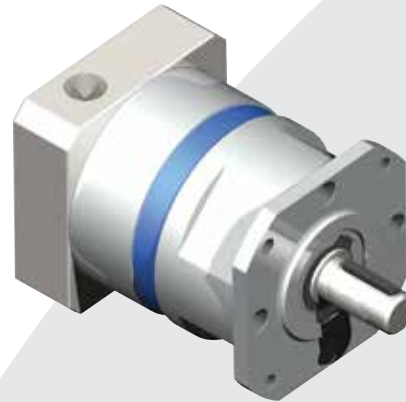
7. Output Face

# ▶ HIGH PERFORMANCE: EPL SERIES



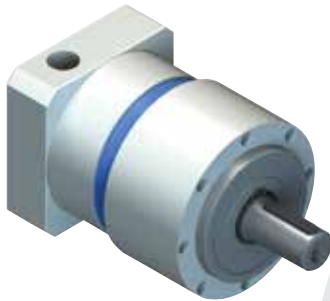
## EPL-W

- GAM Metric Output Face
- Heavy Duty Output Bearings
- Ratios 3:1 to 1000:1
- Frame sizes from 50 mm to 150 mm
- Ready to mount to your motor



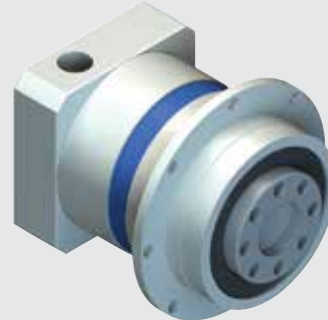
## EPL-X (NEMA)

- NEMA output face with oversized english shaft
- Ratios 3:1 to 1000:1
- Frame sizes from NEMA 17 to 56
- Ready to mount to your motor



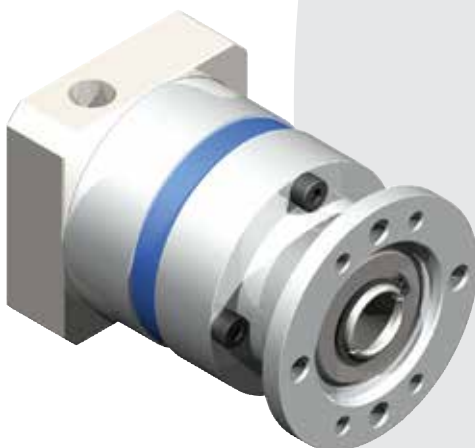
## EPL-A

- Metric output dimensions match many other popular inline planetary gear reducers on the market.
- Ratios 3:1 to 1000:1
- Frame sizes from 50mm to 155mm
- Ready to mount to your motor



## EPL-F

- Flange output
- Compact design
- Ratios 3:1 to 1000:1
- Ready to mount to your motor



## EPL-H Linear Mount

- Hollow output with zero backlash clamping ring
- A quick, simple, low cost solution used to mount onto any “off the shelf” linear belt or ball screw module.
- Ready to mount to your motor on the input
- Ready to mount to your module on the output
- For more information on **Linear Mounts**, refer to [page 186](#).



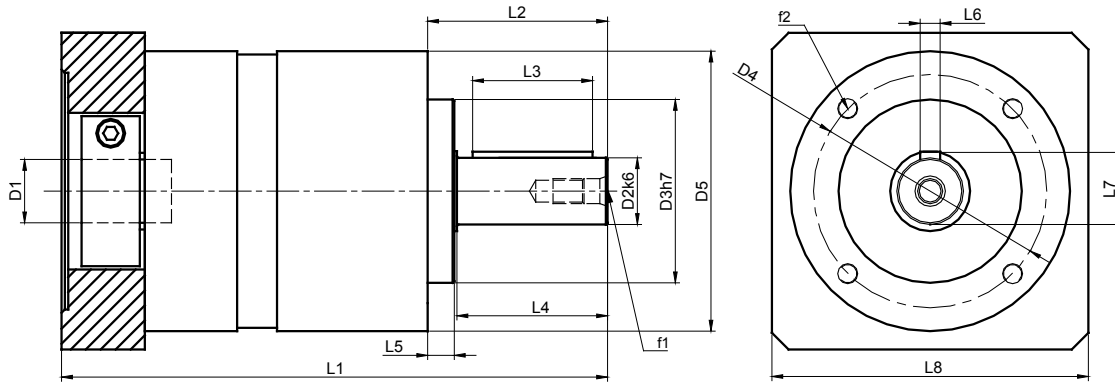
# EPL SERIES - EPL-W



EPL Series		50	64	84	118	150	
Stock Ratios		3, 5, 7, 10, 25, 50, 100 (Standard Input)					N/A
All Ratios Available		1-stage: 3, 4, 5, 7, 10 2-stage: 12, 16, 20, 25, 35, 40, 50, 70, 100 3-stage: 120, 160, 200, 250, 350, 490, 700, 1000 (Consult GAM for other ratios)					
Nominal Output Torque ( $T_{2n}$ )	Nm (lb-in)	3:1	5 (44)	20 (177)	40 (354)	100 (885)	230 (2036)
		4, 5, 7:1	6.5 (58)	26 (230)	54 (478)	120 (1062)	310 (2744)
		10, 100, 1000:1	5 (44)	16 (142)	40 (354)	105 (929)	180 (1593)
		12:1	14 (124)	36 (319)	80 (708)	170 (1505)	272 (2407)
		all other ratios	16 (142)	42 (372)	100 (885)	210 (1859)	340 (3009)
Max Acceleration Output Torque ( $T_{2B}$ )	Nm (lb-in)	3:1	10 (89)	36 (319)	70 (620)	180 (1593)	360 (3186)
		4, 5, 7:1	13 (115)	44 (389)	100 (885)	200 (1770)	460 (4071)
		10, 100, 1000:1	10 (89)	24 (212)	75 (664)	180 (1593)	340 (3009)
		12:1	17.5 (155)	45 (398)	100 (885)	215 (1903)	360 (3186)
		all other ratios	20 (177)	52 (460)	125 (1106)	255 (2257)	460 (4071)
Emergency Output Torque ( $T_{2not}$ )	Nm (lb-in)	3:1	20 (177)	72 (637)	160 (1416)	200 (1770)	860 (7612)
		4, 5, 7:1	26 (230)	84 (743)	216 (1912)	480 (4248)	1000 (8851)
		10, 100, 1000:1	20 (177)	62 (549)	160 (1416)	410 (3629)	800 (7081)
		12:1	28 (248)	72 (637)	160 (1416)	400 (3540)	860 (7612)
		all other ratios	32 (283)	84 (743)	216 (1912)	480 (4248)	1000 (8851)
Nominal Speed ( $n_{1n}$ )	RPM	-	3500	3500	3000	2500	2500
Max Speed ( $n_{1max}$ )	RPM	-	6000	6000	6000	5000	4500
Standard Output Backlash (j)	arcmin	1-stage	<16	<10	<10	<8	<8
		2-stage	<20	<14	<14	<12	<12
		3-stage	-	<18	<18	<16	<16
Allowable Radial Load ( $F_{rad}$ ) 1	N (lbs)	-	650 (146)	1900 (428)	2800 (630)	5000 (1125)	7500 (1688)
Allowable Axial Load ( $F_{axial}$ )	N (lbs)	-	700 (158)	1500 (338)	2500 (563)	4500 (1013)	6000 (1350)
Torsional Stiffness ( $C_{t21}$ )	Nm/arcmin (lb-in/arcmin)	10,100,1000	0.60 (5.3)	1.3 (11.5)	3.4 (30.1)	8.3 (73.5)	22 (194.7)
		7,70,700	0.78 (6.9)	1.7 (15)	4.8 (42.5)	13.6 (120.4)	27 (239)
		all other ratios	0.90 (8.0)	2.4 (21.2)	7.1 (62.8)	17.2 (152.2)	33 (292.1)
Weight (m)	kg (lbs)	1-stage	0.4 (0.9)	1.0 (2.2)	2.3 (5.1)	5.8 (12.8)	10.0 (22.1)
		2-stage	0.5 (1.1)	1.3 (2.9)	3.1 (6.8)	7.9 (17.4)	12.5 (27.6)
		3-stage	-	1.6 (3.5)	3.9 (8.6)	10.0 (22.1)	15.0 (33.1)
Noise Level ( $L_{pk}$ )	dB(A)	-	<64	<66	<68	<70	<72
Mass Moment of Inertia ( $J_1$ )	kg cm <sup>2</sup> (lb-in <sup>2</sup> )	3:1	0.06 (0.021)	0.45 (0.154)	1.37 (0.468)	6.54 (2.235)	12.23 (4.179)
		4:1, 12:1, 16:1	0.04 (0.014)	0.38 (0.130)	1.14 (0.390)	4.8 (1.640)	7.65 (2.614)
		5:1, 20:1, 25:1	0.04 (0.014)	0.36 (0.123)	1.05 (0.359)	4.05 (1.384)	6.24 (2.132)
		7:1, 35:1	0.04 (0.014)	0.35 (0.120)	0.97 (0.331)	3.4 (1.162)	4.7 (1.606)
		10:1, 40:1 - 100:1	0.04 (0.014)	0.34 (0.116)	0.93 (0.318)	3.1 (1.059)	3.8 (1.299)
		120:1 - 1000:1	(0.000)	0.34 (0.116)	0.93 (0.318)	3.12 (1.066)	3.9 (1.333)
Efficiency at Load	1-stage: 94% 2-stage: 92% 3-stage: 90%						
Service Life	> 30,000 hours						
Lubrication	Mineral Grease EPO						
Protection Rating	IP 64						
Operating Temperature Range	-20°C to 90°C						

1) Load applied at center of output shaft @100 RPM

# EPL-W



EPL-W Series		50		64		84		118		150	
		mm	(in)	mm	(in)	mm	(in)	mm	(in)	mm	(in)
D1 <sup>max standard*</sup>	motor shaft diameter	11	(0.433)	14	(0.551)	19	(0.748)	24	(0.945)	28	(1.102)
D1 <sup>max available*</sup>	motor shaft diameter	14	(0.551)	16	(0.63)	24	(0.945)	32	(1.26)	38	(1.496)
D2 <sup>k6</sup>	output shaft diameter	12	(0.472)	14	(0.551)	20	(0.787)	25	(0.984)	40	(1.575)
D3 <sup>h7</sup>	pilot diameter	35	(1.378)	40	(1.575)	55	(2.165)	80	(3.15)	110	(4.331)
D4	bolt circle	44	(1.732)	52	(2.047)	70	(2.756)	100	(3.937)	130	(5.118)
D5	housing diameter	50	(1.969)	64	(2.52)	84	(3.307)	118	(4.646)	150	(5.906)
f1	shaft thread	M4x8		M5x12		M6x16		M10x22		M10x30	
f2	mounting holes	M4x6		M5x12		M6x14		M8x18		M10x20	
L1 1-STAGE**	gearbox total length	93 (3.661)		117 (4.606)		162 (6.378)		199 (7.835)		265 (10.433)	
L1 2-STAGE**		109 (4.291)		139 (5.472)		195 (7.677)		239 (9.409)		305 (12.008)	
L1 3-STAGE**		-		161 (6.339)		228 (8.976)		280 (11.024)		346 (13.622)	
L2	shaft length	24.5	(0.965)	39	(1.535)	54	(2.126)	61	(2.402)	81	(3.189)
L3	key length	16	(0.63)	25	(0.984)	36	(1.417)	45	(1.772)	60	(2.362)
L4	usable shaft length	18	(0.709)	30	(1.181)	45	(1.772)	50	(1.969)	70	(2.756)
L5	pilot height	4	(0.157)	8	(0.315)	8	(0.315)	10	(0.394)	10	(0.394)
L6	key width	4	(0.157)	5	(0.197)	6	(0.236)	8	(0.315)	12	(0.472)
L7	key height	13.5	(0.531)	16	(0.63)	22.5	(0.886)	28	(1.102)	43	(1.693)
L8**	adapter size	50	(1.969)	70	(2.756)	90	(3.543)	120	(4.724)	150	(5.906)

\* for larger motor shaft diameters, please contact GAM \*\* depending on the motor, value can vary

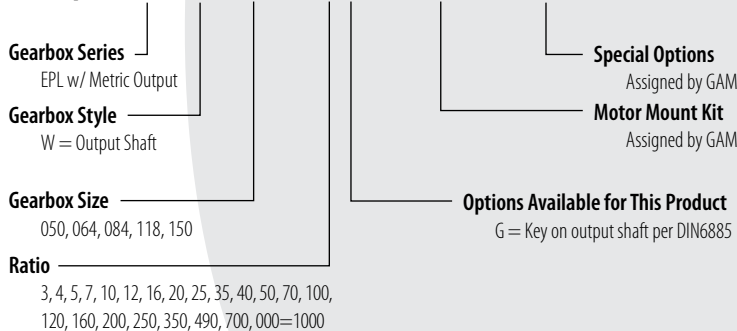


### Recommended Output Coupling (if necessary)

	metal bellows	KLC-25	KLC-50	KLC-125	KM-270	KM-400
elastomer	EKM-45	EKM-60	EKM-150	EKM-300	EKM-400	

### TYPE CODES FOR EPL SERIES (EPL-W)

**Example: EPL - W - 084 - 005 G - [115 - A01] - S111**



Tolerances (mm)		
Size	k6	h7
Over 10	+0.012	0
Thru 18	+0.001	-0.018
Over 18	+0.015	0
Thru 30	+0.002	-0.021
Over 30	+0.018	0
Thru 50	+0.002	-0.025
Over 50	+0.021	0
Thru 80	+0.002	-0.030
Over 80	+0.025	0
Thru 120	+0.003	-0.035





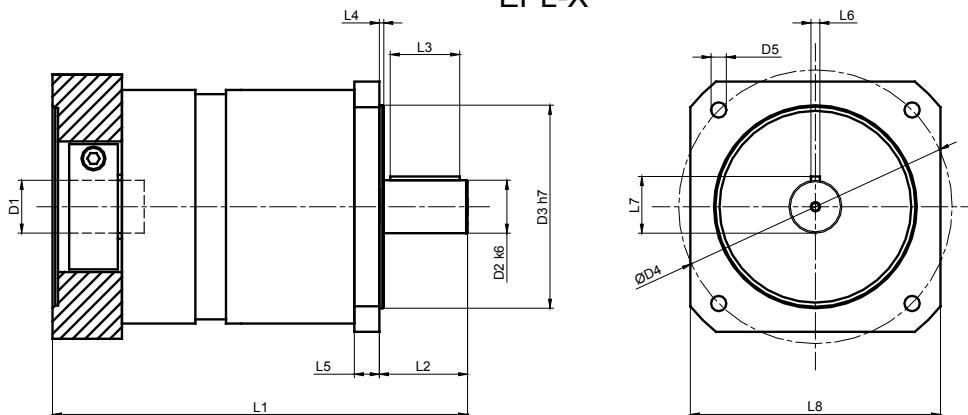
# EPL SERIES - EPL-X (NEMA)



NEMA-X Series		17	23	34	42	56	
Stock Ratios		N/A		3, 5, 7, 10, 25, 50, 100		N/A	
All Ratios Available		1-stage: 3, 4, 5, 7, 10 2-stage: 12, 16, 20, 25, 35, 40, 50, 70, 100 3-stage: 120, 160, 200, 250, 350, 490, 700, 1000					
Nominal Output Torque ( $T_{2n}$ )	Nm (lb-in)	3:1	5 (44)	20 (177)	40 (354)	100 (885)	100 (885)
		4, 5, 7:1	6.5 (58)	26 (230)	54 (478)	120 (1062)	120 (1062)
		10, 100, 1000:1	5 (44)	16 (142)	40 (354)	105 (929)	105 (929)
		12:1	14 (124)	36 (319)	80 (708)	170 (1505)	170 (1505)
		all other ratios	16 (142)	42 (372)	100 (885)	210 (1859)	210 (1859)
Max Accel. Torque ( $T_{2B}$ )	Nm (lb-in)	3:1	10 (89)	36 (319)	70 (620)	180 (1593)	180 (1593)
		4, 5, 7:1	13 (115)	44 (389)	100 (885)	200 (1770)	200 (1770)
		10, 100, 1000:1	10 (89)	24 (212)	75 (664)	180 (1593)	180 (1593)
		12:1	17.5 (155)	45 (398)	100 (885)	215 (1903)	215 (1903)
		all other ratios	20 (177)	52 (460)	125 (1106)	255 (2257)	255 (2257)
Emergency Output Torque ( $T_{2not}$ )	Nm (lb-in)	3:1	20 (177)	72 (637)	160 (1416)	200 (1770)	200 (1770)
		4, 5, 7:1	26 (230)	84 (743)	216 (1912)	480 (4248)	480 (4248)
		10, 100, 1000:1	20 (177)	62 (549)	160 (1416)	410 (3629)	410 (3629)
		12:1	28 (248)	72 (637)	160 (1416)	400 (3540)	400 (3540)
		all other ratios	32 (283)	84 (743)	216 (1912)	480 (4248)	480 (4248)
Nominal Speed ( $n_{1n}$ )	RPM	-	3500	3500	3000	2500	2500
Max Input Speed ( $n_{1max}$ )		6000	6000	6000	5000	5000	
Standard Output Backlash (j)	arcmin	1-stage	< 20	< 10	< 10	< 8	< 8
		2-stage	< 24	< 14	< 14	< 12	< 12
		3-stage	< 30	< 18	< 18	< 16	< 16
Allowable Radial Load ( $F_{rad}$ ) <sup>1)</sup>	N (lbs)	-	375 (84)	450 (101)	900 (203)	2175 (489)	2175 (489)
Allowable Axial Load ( $F_{axial}$ )	N (lbs)	-	300 (68)	420 (95)	650 (146)	1375 (309)	1375 (309)
Torsional Stiffness ( $C_{217}$ )	Nm/arcmin (lb-in/arcmin)	10,100,1000	Contact GAM	1.3 (11.5)	3.4 (30.1)	8.3 (73.5)	8.3 (73.5)
		7,70,700	Contact GAM	1.7 (15)	4.8 (42.5)	13.6 (120.4)	13.6 (120.4)
		all other ratios	Contact GAM	2.4 (21.2)	7.1 (62.8)	17.2 (152.2)	17.2 (152.2)
Weight (m)	kg (lbs)	1-stage	0.4 (0.88)	1.0 (2.2)	2.3 (5.1)	5.8 (12.8)	5.8 (12.8)
		2-stage	0.5 (1.1)	1.3 (2.9)	3.1 (6.8)	7.9 (17.4)	7.9 (17.4)
		3-stage	0.6 (1.32)	1.6 (3.5)	3.9 (8.6)	10.0 (22.1)	10.0 (22.1)
Noise Level ( $L_{pA}$ )	dB(A)	-	< 60	< 66	< 68	< 70	< 70
Mass Moment of Inertia ( $J_1$ )	kg cm <sup>2</sup> (lb-in <sup>2</sup> )	3:1	0.0144 (0.005)	0.45 (0.154)	1.37 (0.468)	6.54 (2.235)	6.54 (2.235)
		4:1, 12:1, 16:1	0.0096 (0.003)	0.38 (0.130)	1.14 (0.390)	4.8 (1.640)	4.8 (1.640)
		5:1, 20:1, 25:1	0.0096 (0.003)	0.36 (0.123)	1.05 (0.359)	4.05 (1.384)	4.05 (1.384)
		7:1, 35:1	0.0152 (0.005)	0.35 (0.120)	0.97 (0.331)	3.4 (1.162)	3.4 (1.162)
		10:1, 40:1 - 100:1	0.0078 (0.003)	0.34 (0.116)	0.93 (0.318)	3.1 (1.059)	3.1 (1.059)
		120:1 - 1000:1	0.0078 (0.003)	0.34 (0.116)	0.93 (0.318)	3.12 (1.066)	3.12 (1.066)
Efficiency at Load	1-stage: 94% 2-stage: 92% 3-stage: 90%						
Service Life	> 30,000 hours						
Lubrication	Mineral Grease EPO						
Protection Rating	IP 64						
Operating Temperature Range	-20°C to 90°C						

1) Load applied at center of output shaft @100 RPM

# EPL-X



NEMA-X Series		17		23		34		42		56	
		mm	(in)	mm	(in)	mm	(in)	mm	(in)	mm	(in)
D1 <sub>max standard</sub> *	motor shaft diameter	11	(0.433)	14	(0.551)	19	(0.748)	24	(0.945)	24	(0.945)
D1 <sub>max available</sub> *	motor shaft diameter	-	(-)	16	(0.63)	24	(0.945)	32	(1.26)	32	(1.26)
D2 k6	output shaft diameter	9.525	(0.375)	12.7	(0.5)	19.050	(0.75)	25	(0.984)	25	(0.984)
D3 h7	pilot diameter	21.97	(0.865)	38.1	(1.5)	73	(2.874)	55.55	(2.187)	114.300	(4.50)
D4	bolt circle	43.8	(1.724)	66.7	(2.626)	98.400	(3.874)	125.7	(4.949)	177.800	(7.000)
D5	mounting holes	3.25	(0.128)	5	(0.197)	5.5	(0.217)	7.1	(0.28)	10.200	(0.402)
L1 1-STAGE**	gearbox total length	108	(4.252)	111	(4.37)	147	(5.787)	199	(7.835)	199	(7.835)
L1 2-STAGE**		124	(4.882)	133	(5.236)	180	(7.087)	239	(9.409)	239	(9.409)
L1 3-STAGE**		139.5	(5.492)	155	(6.102)	213	(8.386)	280	(11.024)	280	(11.024)
L2	shaft length	25.4	(1.000)	25.4	(1.000)	31.8	(1.252)	42	(1.654)	41	(1.614)
L3	key length	-	(-)	19.05	(0.75)	25.4	(1)	38	(1.496)	32	(1.26)
L4	pilot height	1.6	(0.063)	1.6	(0.063)	1.7	(0.067)	2.4	(0.094)	4	(0.157)
L5	flange thickness	4.9	(0.193)	5	(0.197)	10	(0.394)	19	(0.748)	20	(0.7874)
L6	key width	-	(-)	3.175	(0.125)	4.78	(0.188)	8	(0.315)	8	(0.315)
L7	key height / flat height	9.14	(0.36)	14.22	(0.56)	21.290	(0.838)	28	(1.102)	28	(1.102)
L8	flange size	40	(1.575)	65	(2.559)	90	(3.543)	120	(4.724)	145	(5.709)

\* for larger motor shaft diameters, please contact GAM \*\*depending on the motor, value can vary \*\*\* long motor shafts can be accommodated, but overall gearbox length will grow



### Recommended Output Coupling (if necessary)

	KLC-25	KLC-50	KLC-125	KM-270	KM-400
metal bellows	KLC-25	KLC-50	KLC-125	KM-270	KM-400
elastomer	EKM-20	EKM-60	EKM-150	EKM-300	EKM-400

### TYPE CODES FOR EPL SERIES (EPL-X (NEMA))

**Example: EPL - X23 - 005 G - [115 - A01] - S111**

**Gearbox Series**  
EPL w/ NEMA output

**Gearbox Style**

- X17 = NEMA17
- X23 = NEMA23
- X34 = NEMA34
- X42 = NEMA42
- X56 = NEMA56

**Ratio**

- 3, 4, 5, 7, 10, 12, 16, 20, 25, 35, 40, 50, 70, 100,
- 120, 160, 200, 250, 350, 490, 700, 000=1000

**Special Options**

Assigned by GAM

**Motor Mount Kit**

Assigned by GAM

**Options Available for This Product**

G = Key on output shaft per DIN6885

### Tolerances (mm)

Size	k6	h7
Over 10	+0.012	0
Thru 18	+0.001	-0.018
Over 18	+0.015	0
Thru 30	+0.002	-0.021
Over 30	+0.018	0
Thru 50	+0.002	-0.025
Over 50	+0.021	0
Thru 80	+0.002	-0.030
Over 80	+0.025	0
Thru 120	+0.003	-0.035

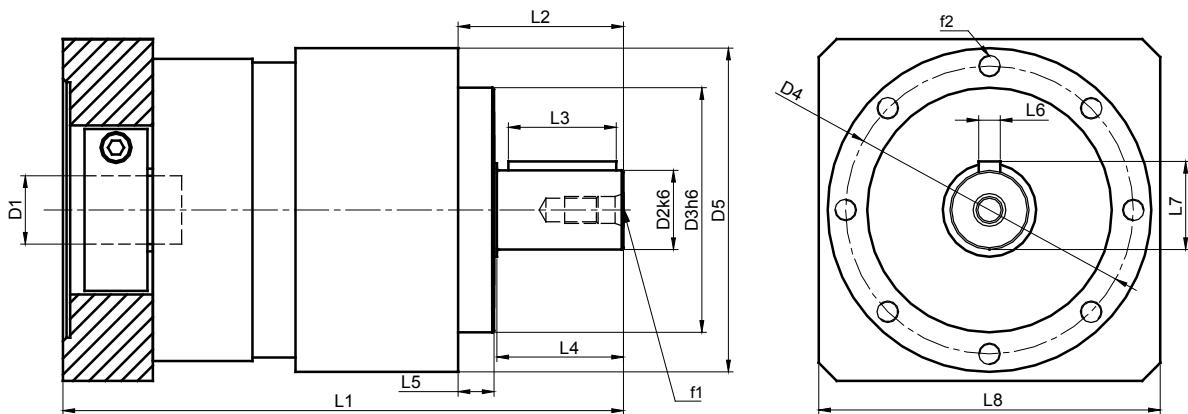


# EPL SERIES - EPL-A



EPL-A Series		50		70		90		120		155	
All Ratios Available		1stage: 3, 4, 5, 7, 10 2stage: 12,16, 20, 25, 35, 40, 50, 70, 100 3stage: 120, 160, 200, 250, 350, 490, 700, 1000 (Consult GAM for other ratios)									
Nominal Output Torque ( $T_{2n}$ )	Nm (lb-in)	3:1	5 (44)	20 (177)	40 (354)	100 (885)	230 (2036)				
		4, 5, 7:1	6.5 (58)	26 (230)	54 (478)	120 (1062)	310 (2744)				
		10, 100, 1000:1	5 (44)	16 (142)	40 (354)	105 (929)	180 (1593)				
		12:1	14 (124)	36 (319)	80 (708)	170 (1505)	272 (2407)				
		all other ratios	16 (142)	42 (372)	100 (885)	210 (1859)	340 (3009)				
Max Acceleration Output Torque ( $T_{2B}$ )	Nm (lb-in)	3:1	10 (89)	36 (319)	70 (620)	180 (1593)	360 (3186)				
		4, 5, 7:1	13 (115)	44 (389)	100 (885)	200 (1770)	460 (4071)				
		10, 100, 1000:1	10 (89)	24 (212)	75 (664)	180 (1593)	340 (3009)				
		12:1	17.5 (155)	45 (398)	100 (885)	215 (1903)	360 (3186)				
		all other ratios	20 (177)	52 (460)	125 (1106)	255 (2257)	460 (4071)				
Emergency Output Torque ( $T_{2not}$ )	Nm (lb-in)	3:1	20 (177)	72 (637)	160 (1416)	200 (1770)	860 (7612)				
		4, 5, 7:1	26 (230)	84 (743)	216 (1912)	480 (4248)	1000 (8851)				
		10, 100, 1000:1	20 (177)	62 (549)	160 (1416)	410 (3629)	800 (7081)				
		12:1	28 (248)	72 (637)	160 (1416)	400 (3540)	860 (7612)				
		all other ratios	32 (283)	84 (743)	216 (1912)	480 (4248)	1000 (8851)				
Nominal Speed ( $n_{1n}$ )	RPM	-	3500	3500	3000	2500	2500				
Max Speed ( $n_{1max}$ )	RPM	-	6000	6000	6000	5000	4500				
Standard Output Backlash (j)	arcmin	1stage	<16	<10	<10	<8	<8				
		2stage	<20	<14	<14	<12	<12				
		3stage	-	<18	<18	<16	<16				
Allowable Radial Load ( $F_{rad} 1$ )	N (lbs)	-	650 (146)	1550 (348)	2400 (540)	4600 (1034)	7500 (1686)				
Allowable Axial Load ( $F_{axial}$ )	N (lbs)	-	700 (158)	1450 (326)	1900 (427)	4000 (899)	6000 (1349)				
Torsional Stiffness ( $C_{21}$ )	Nm/arcmin (lbin/arcmin)	10,100,1000	0.60 (5.3)	1.3 (11.5)	3.4 (30.1)	8.3 (73.5)	22 (194.7)				
		7,70,700	0.78 (6.9)	1.7 (15)	4.8 (42.5)	13.6 (120.4)	27 (239)				
		all other ratios	0.90 (8.0)	2.4 (21.2)	7.1 (62.8)	17.2 (152.2)	33 (292.1)				
Weight (m)	kg (lbs)	1stage	0.4 (0.9)	1 (2.2)	2.3 (5.1)	5.8 (12.8)	10 (22.1)				
		2stage	0.5 (1.1)	1.3 (2.9)	3.1 (6.8)	7.9 (17.4)	12.5 (27.6)				
		3stage	-	1.6 (3.5)	3.9 (8.6)	10.0 (22.1)	15 (33.1)				
Noise Level ( $L_{pk}$ )	dB(A)	-	<64	<66	<68	<70	<72				
Mass Moment of Inertia ( $J_1$ )	kg cm <sup>2</sup> (lb-in <sup>2</sup> )	3:1	0.06 (0.021)	0.45 (0.154)	1.37 (0.468)	6.54 (2.235)	12.23 (4.179)				
		4:1, 12:1, 16:1	0.04 (0.014)	0.38 (0.13)	1.14 (0.390)	4.8 (1.640)	7.65 (2.614)				
		5:1, 20:1, 25:1	0.04 (0.014)	0.36 (0.123)	1.05 (0.359)	4.05 (1.384)	6.24 (2.132)				
		7:1, 35:1	0.04 (0.014)	0.35 (0.12)	0.97 (0.331)	3.4 (1.162)	4.7 (1.606)				
		10:1, 40:1 - 100:1	0.04 (0.014)	0.34 (0.116)	0.93 (0.318)	3.1 (1.059)	3.8 (1.299)				
		120:1 - 1000:1	0 0	0.34 (0.116)	0.93 (0.318)	3.12 (1.066)	3.9 (1.333)				
Efficiency at Load	1stage: 94% 2stage: 92% 3stage: 90%										
Service Life	> 30,000 hours										
Lubrication	Mineral Grease EP0										
Protection Rating	IP 64										
Operating Temperature Range	-20°C to 90°C										

# EPL-A



EPL-A Series		50		70		90		120		155	
		mm	(in)	mm	(in)	mm	(in)	mm	(in)	mm	(in)
D1 <sub>max standard</sub> *	motor shaft diameter	11	(0.433)	14	(0.551)	19	(0.748)	24	(0.945)	28	(1.102)
D1 <sub>max available</sub> *	motor shaft diameter	14	(0.551)	16	(0.630)	24	(0.945)	32	(1.260)	38	(1.496)
D2 k6	output shaft diameter	12	(0.472)	16	(0.630)	22	(0.866)	32	(1.260)	40	(1.575)
D3h7	pilot diameter	35	(1.378)	52	(2.047)	68	(2.677)	90	(3.543)	120	(4.724)
D4	Bolt Circle	44	(1.732)	62	(2.441)	80	(3.150)	108	(4.252)	140	(5.512)
D5	Housing Diameter	50	(1.968)	70	(2.756)	90	(3.543)	118	(4.646)	155	(6.102)
f1	Shaft Thread	M4x8		M5x17		M8x25		M12x37		M16x26	
f2	Mounting Holes	(8x) M4x6		(8x) M5x12		(8x) M6x14		(8x) M8x18		(8x) M10x24	
L1 1-STAGE**	gearbox total length	93	(3.661)	130	(5.118)	164	(6.457)	222	(8.740)	300	(11.811)
L1 2-STAGE**		109	(4.291)	152	(5.984)	196	(7.717)	263	(10.354)	341	(13.425)
L1 3-STAGE**		-	-	174	(6.850)	229	(9.016)	304	(11.968)	382	(15.039)
L2	Shaft length	24.5	(0.965)	36	(1.417)	46	(1.811)	70	(2.756)	94	(3.701)
L3	Key Length	16	(0.630)	25	(0.984)	30	(1.181)	50	(1.968)	70	(2.756)
L4	Useable Shaft Length	18	(0.709)	28	(1.102)	35	(1.378)	58	(2.283)	82	(3.228)
L5	Pilot Height	4	(0.157)	5.5	(0.217)	9	(0.354)	7	(0.276)	5.5	(0.217)
L6	Key Width	4	(0.157)	5	(0.197)	6	(0.236)	10	(0.394)	12	(0.472)
L7	Key Height	13.5	(0.531)	18	(0.709)	24.5	(0.965)	35	(1.378)	43	(1.693)
L8**	Adapter Size	50	(1.968)	70	(2.756)	90	(3.543)	120	(4.724)	150	(5.905)

\* for larger motor shaft diameters, please contact GAM \*\*depending on the motor, value can vary \*\*\* longer motor shafts can be accommodated, but overall gearbox length will grow



### Recommended Output Coupling (if necessary)

	KLC-25	KLC-50	KLC-125	KM-270	KM-400
metal bellows	KLC-25	KLC-50	KLC-125	KM-270	KM-400
elastomer	EKM-20	EKM-60	EKM-150	EKM-300	EKM-400

### TYPE CODES FOR EPL SERIES (EPL-A)

**Example: EPL - A - 090 - 005 G - [115 - A01] - S111**

#### Gearbox Series

EPL w/ Popular Metric Output Dimensions

#### Gearbox Style

A= Output Shaft

#### Gearbox Size

050, 070, 090, 120, 155

#### Ratio

3, 4, 5, 7, 10, 12, 16, 20, 25, 35, 40, 50, 70, 100, 120, 160, 200, 250, 350, 490, 700, 000=1000

#### Special Options

Assigned by GAM

#### Motor Mount Kit

Assigned by GAM

#### Options Available for This Product

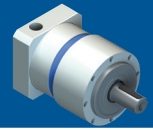
G = Key on output shaft per DIN6885

### Tolerances (mm)

Size	k6	h6
Over 10	+0.012	0
Thru 18	+0.001	-0.011
Over 18	+0.015	0
Thru 30	+0.002	-0.013
Over 30	+0.018	0
Thru 50	+0.002	-0.016
Over 50	+0.021	0
Thru 80	+0.002	-0.019
Over 80	+0.025	0
Thru 120	+0.003	-0.022

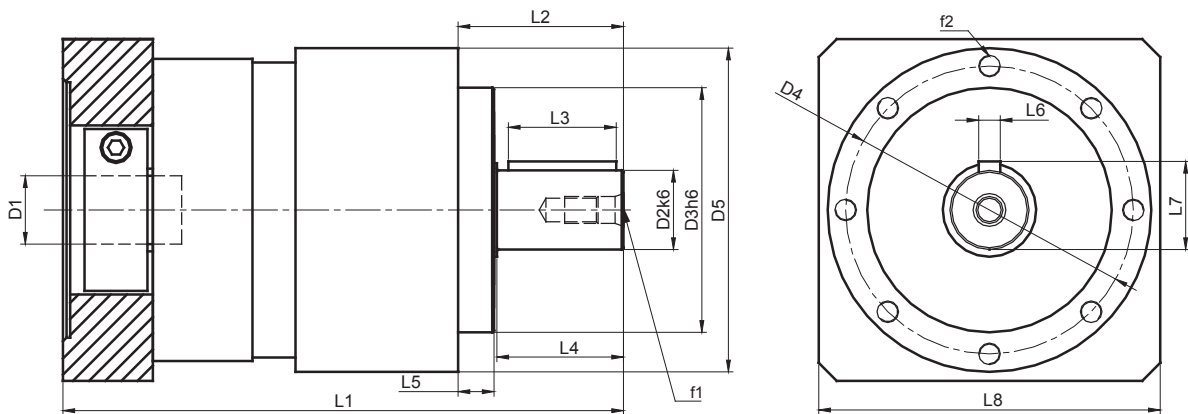


# EPL SERIES - EPL-A



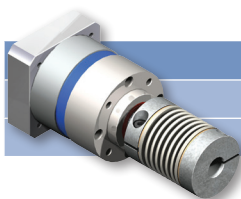
EPL-A Series		50		70		90		120		155	
All Ratios Available		1stage: 3, 4, 5, 7, 10 2stage: 12, 16, 20, 25, 35, 40, 50, 70, 100 3stage: 120, 160, 200, 250, 350, 490, 700, 1000 (Consult GAM for other ratios)									
Nominal Output Torque ( $T_{2n}$ )	Nm (lb-in)	3:1	5 (44)	20 (177)	40 (354)	100 (885)	230 (2036)				
		4, 5, 7:1	6.5 (58)	26 (230)	54 (478)	120 (1062)	310 (2744)				
		10, 100, 1000:1	5 (44)	16 (142)	40 (354)	105 (929)	180 (1593)				
		12:1	14 (124)	36 (319)	80 (708)	170 (1505)	272 (2407)				
		all other ratios	16 (142)	42 (372)	100 (885)	210 (1859)	340 (3009)				
Max Acceleration Output Torque ( $T_{2B}$ )	Nm (lb-in)	3:1	10 (89)	36 (319)	70 (620)	180 (1593)	360 (3186)				
		4, 5, 7:1	13 (115)	44 (389)	100 (885)	200 (1770)	460 (4071)				
		10, 100, 1000:1	10 (89)	24 (212)	75 (664)	180 (1593)	340 (3009)				
		12:1	17.5 (155)	45 (398)	100 (885)	215 (1903)	360 (3186)				
		all other ratios	20 (177)	52 (460)	125 (1106)	255 (2257)	460 (4071)				
Emergency Output Torque ( $T_{2not}$ )	Nm (lb-in)	3:1	20 (177)	72 (637)	160 (1416)	200 (1770)	860 (7612)				
		4, 5, 7:1	26 (230)	84 (743)	216 (1912)	480 (4248)	1000 (8851)				
		10, 100, 1000:1	20 (177)	62 (549)	160 (1416)	410 (3629)	800 (7081)				
		12:1	28 (248)	72 (637)	160 (1416)	400 (3540)	860 (7612)				
		all other ratios	32 (283)	84 (743)	216 (1912)	480 (4248)	1000 (8851)				
Nominal Speed ( $n_{1n}$ )	RPM	-	3500	3500	3000	2500	2500				
Max Speed ( $n_{1max}$ )	RPM	-	6000	6000	6000	5000	4500				
Standard Output Backlash (j)	arcmin	1stage	<16	<10	<10	<8	<8				
		2stage	<20	<14	<14	<12	<12				
		3stage	-	<18	<18	<16	<16				
Allowable Radial Load ( $F_{rad} / 1$ )	N (lbs)	-	650 (146)	1550 (348)	2400 (540)	4600 (1034)	7500 (1686)				
Allowable Axial Load ( $F_{axial}$ )	N (lbs)	-	700 (158)	1450 (326)	1900 (427)	4000 (899)	6000 (1349)				
Torsional Stiffness ( $C_{21}$ )	Nm/arcmin (lbin/arcmin)	10,100,1000	0.60 (5.3)	1.3 (11.5)	3.4 (30.1)	8.3 (73.5)	22 (194.7)				
		7,70,700	0.78 (6.9)	1.7 (15)	4.8 (42.5)	13.6 (120.4)	27 (239)				
		all other ratios	0.90 (8.0)	2.4 (21.2)	7.1 (62.8)	17.2 (152.2)	33 (292.1)				
Weight (m)	kg (lbs)	1stage	0.4 (0.9)	1 (2.2)	2.3 (5.1)	5.8 (12.8)	10 (22.1)				
		2stage	0.5 (1.1)	1.3 (2.9)	3.1 (6.8)	7.9 (17.4)	12.5 (27.6)				
		3stage	-	1.6 (3.5)	3.9 (8.6)	10.0 (22.1)	15 (33.1)				
Noise Level ( $L_{pk}$ )	dB(A)	-	<64	<66	<68	<70	<72				
Mass Moment of Inertia ( $J_1$ )	kg cm <sup>2</sup> (lb-in <sup>2</sup> )	3:1	0.06 (0.021)	0.45 (0.154)	1.37 (0.468)	6.54 (2.235)	12.23 (4.179)				
		4:1, 12:1, 16:1	0.04 (0.014)	0.38 (0.13)	1.14 (0.390)	4.8 (1.640)	7.65 (2.614)				
		5:1, 20:1, 25:1	0.04 (0.014)	0.36 (0.123)	1.05 (0.359)	4.05 (1.384)	6.24 (2.132)				
		7:1, 35:1	0.04 (0.014)	0.35 (0.12)	0.97 (0.331)	3.4 (1.162)	4.7 (1.606)				
		10:1, 40:1 - 100:1	0.04 (0.014)	0.34 (0.116)	0.93 (0.318)	3.1 (1.059)	3.8 (1.299)				
		120:1 - 1000:1	0 0	0.34 (0.116)	0.93 (0.318)	3.12 (1.066)	3.9 (1.333)				
Efficiency at Load	1stage: 94% 2stage: 92% 3stage: 90%										
Service Life	> 30,000 hours										
Lubrication	Mineral Grease EP0										
Protection Rating	IP 64										
Operating Temperature Range	-20°C to 90°C										

# EPL-A



EPL-A Series		50		70		90		120		155	
		mm	(in)	mm	(in)	mm	(in)	mm	(in)	mm	(in)
D1 <sub>max standard</sub> *	motor shaft diameter	11	(0.433)	14	(0.551)	19	(0.748)	24	(0.945)	28	(1.102)
D1 <sub>max available</sub> *	motor shaft diameter	14	(0.551)	16	(0.630)	24	(0.945)	32	(1.260)	38	(1.496)
D2 k6	output shaft diameter	12	(0.472)	16	(0.630)	22	(0.866)	32	(1.260)	40	(1.575)
D3h7	pilot diameter	35	(1.378)	52	(2.047)	68	(2.677)	90	(3.543)	120	(4.724)
D4	Bolt Circle	44	(1.732)	62	(2.441)	80	(3.150)	108	(4.252)	140	(5.512)
D5	Housing Diameter	50	(1.968)	70	(2.756)	90	(3.543)	118	(4.646)	155	(6.102)
f1	Shaft Thread	M4x8		M5x17		M8x25		M12x37		M16x26	
f2	Mounting Holes	(8x) M4x8		(8x) M5x12		(8x) M6x14		(8x) M8x18		(8x) M10x24	
L1 1-STAGE**	gearbox total length	93	(3.661)	130	(5.118)	164	(6.457)	222	(8.740)	300	(11.811)
L1 2-STAGE**		109	(4.291)	152	(5.984)	196	(7.717)	263	(10.354)	341	(13.425)
L1 3-STAGE**		-	-	174	(6.850)	229	(9.016)	304	(11.968)	382	(15.039)
L2	Shaft length	24.5	(0.965)	36	(1.417)	46	(1.811)	70	(2.756)	94	(3.701)
L3	Key Length	16	(0.630)	25	(0.984)	30	(1.181)	50	(1.968)	70	(2.756)
L4	Useable Shaft Length	18	(0.709)	28	(1.102)	35	(1.378)	58	(2.283)	82	(3.228)
L5	Pilot Height	4	(0.157)	5.5	(0.217)	9	(0.354)	7	(0.276)	5.5	(0.217)
L6	Key Width	4	(0.157)	5	(0.197)	6	(0.236)	10	(0.394)	12	(0.472)
L7	Key Height	13.5	(0.531)	18	(0.709)	24.5	(0.965)	35	(1.378)	43	(1.693)
L8**	Adapter Size	50	(1.968)	70	(2.756)	90	(3.543)	120	(4.724)	150	(5.905)

\* for larger motor shaft diameters, please contact GAM    \*\*depending on the motor, value can vary    \*\*\* longer motor shafts can be accommodated, but overall gearbox length will grow



### Recommended Output Coupling (if necessary)

	KLC-25	KLC-50	KLC-125	KM-270	KM-400
metal bellows	KLC-25	KLC-50	KLC-125	KM-270	KM-400
elastomer	EKM-20	EKM-60	EKM-150	EKM-300	EKM-400

### TYPE CODES FOR EPL SERIES (EPL-A)

**Example: EPL - A - 090 - 005 G - [115 - A01] - S111**

**Gearbox Series**

EPL w/ Popular Metric Output Dimensions

**Gearbox Style**

A= Output Shaft

**Gearbox Size**

050, 070, 090, 120, 155

**Ratio**

3, 4, 5, 7, 10, 12, 16, 20, 25, 35, 40, 50, 70, 100, 120, 160, 200, 250, 350, 490, 700, 000=1000

**Special Options**

Assigned by GAM

**Motor Mount Kit**

Assigned by GAM

**Options Available for This Product**

G = Key on output shaft per DIN6885

### Tolerances (mm)

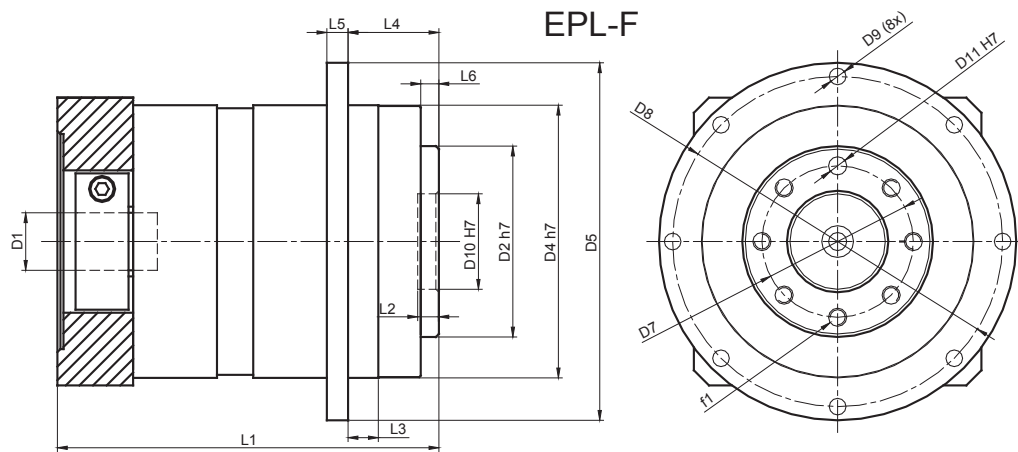
Size	k6	h6
Over 10	+0.012	0
Thru 18	+0.001	-0.011
Over 18	+0.015	0
Thru 30	+0.002	-0.013
Over 30	+0.018	0
Thru 50	+0.002	-0.016
Over 50	+0.021	0
Thru 80	+0.002	-0.019
Over 80	+0.025	0
Thru 120	+0.003	-0.022



# EPL SERIES - EPL-F

EPL-F Series		47	64	90	110	150	
All Ratios Available		1-Stage: 3, 4, 5, 7, 10 2-Stage: 12, 16, 20, 25, 35, 40, 50, 70, 100 3-Stage: 120, 160, 200, 250, 350, 490, 700, 1000					
Nominal Output Torque ( $T_{2n}$ )	Nm (lb-in)	3:1	5 (44)	20 (177)	40 (354)	100 (885)	230 (2036)
		4, 5, 7:1	6.5 (58)	26 (230)	54 (478)	120 (1062)	310 (2744)
		10, 100, 1000:1	5 (44)	16 (142)	40 (354)	105 (929)	180 (1593)
		12:1	14 (124)	36 (319)	80 (708)	170 (1505)	272 (2407)
		all other ratios	16 (142)	42 (372)	100 (885)	210 (1859)	340 (3009)
Max Acceleration Output Torque ( $T_{2B}$ )	Nm (lb-in)	3:1	10 (89)	36 (319)	70 (620)	180 (1593)	360 (3186)
		4, 5, 7:1	13 (115)	44 (389)	100 (885)	200 (1770)	460 (4071)
		10, 100, 1000:1	10 (89)	24 (212)	75 (664)	180 (1593)	340 (3009)
		12:1	17.5 (155)	45 (398)	100 (885)	215 (1903)	360 (3186)
		all other ratios	20 (177)	52 (460)	125 (1106)	255 (2257)	460 (4071)
Emergency Output Torque ( $T_{2not}$ )	Nm (lb-in)	3:1	20 (177)	72 (637)	160 (1416)	200 (1770)	860 (7612)
		4, 5, 7:1	26 (230)	84 (743)	216 (1912)	480 (4248)	1000 (8851)
		10, 100, 1000:1	20 (177)	62 (549)	160 (1416)	410 (3629)	800 (7081)
		12:1	28 (248)	72 (637)	160 (1416)	400 (3540)	860 (7612)
		all other ratios	32 (283)	84 (743)	216 (1912)	480 (4248)	1000 (8851)
Nominal Speed ( $n_{1n}$ )	RPM	-	3500	3500	3000	2500	2500
Max Speed ( $n_{1max}$ )	RPM	-	6000	6000	6000	5000	4500
Standard Output Backlash ( $j$ )	arcmin	1stage	< 16	< 10	< 10	< 8	< 8
		2stage	< 20	< 14	< 14	< 12	< 12
		3stage	-	< 18	< 18	< 16	< 16
Allowable Radial Load ( $F_{rad}$ ) 1	N (lbs)	-	750 (169)	1200 (270)	2000 (450)	3100 (697)	8500 (1911)
Allowable Axial Load ( $F_{axial}$ )	N (lbs)	-	1000 (225)	1100 (247)	2500 (562)	3900 (877)	11200 (2518)
Torsional Stiffness ( $C_{t21}$ )	Nm/arcmin (lbin/arc-min)	10,100,1000	0.60 (5.3)	1.3 (11.5)	3.4 (30.1)	8.3 (73.5)	22 (194.7)
		7,70,700	0.78 (6.9)	1.7 (15)	4.8 (42.5)	13.6 (120.4)	27 (194.7)
		all other ratios	0.90 (8.0)	2.4 (21.2)	7.1 (62.8)	17.2 (152.2)	33 (292.1)
Weight ( $m$ )	kg (lbs)	1stage	0.4 (0.9)	1 (2.2)	2.3 (5.1)	5.8 (12.8)	10.0 (22.1)
		2stage	0.5 (1.1)	1.3 (2.9)	3.1 (6.8)	7.9 (17.4)	12.5 (27.6)
		3stage	- -	1.96 (3.5)	3.9 (8.6)	10.0 (22.1)	15.0 (33.1)
Noise Level ( $L_{pa}$ )	dB(A)	-	< 64	< 66	< 68	< 70	< 72
Mass Moment of Inertia ( $J_1$ )	kg cm <sup>2</sup> (lb-in <sup>2</sup> )	3:1	0.06 (0.021)	0.61 (0.208)	1.79 (0.612)	8.53 (2.915)	12.23 (4.179)
		4:1, 12:1, 16:1	0.04 (0.014)	0.5 (0.171)	1.47 (0.502)	6.11 (2.088)	7.65 (2.614)
		5:1, 20:1, 25:1	0.04 (0.014)	0.48 (0.164)	1.23 (0.420)	4.87 (1.664)	6.24 (2.132)
		7:1, 35:1	0.04 (0.014)	0.39 (0.133)	1.14 (0.390)	3.71 (1.268)	4.7 (1.606)
		10:1, 40:1 - 100:1	0.04 (0.014)	0.38 (0.130)	1.1 (0.376)	3.38 (1.155)	3.8 (1.299)
		120:1 - 1000:1	- -	0.38 (0.130)	1.1 (0.376)	3.39 (1.158)	3.9 (1.333)
Efficiency at Load	1stage: 94% 2stage: 92% 3stage: 90%						
Service Life	> 30,000 hours						
Lubrication	Mineral Grease EPO						
Protection Rating	IP 64						
Operating Temperature Range	-20°C to 90°C						

1) Load applied at center of output shaft @100 RPM

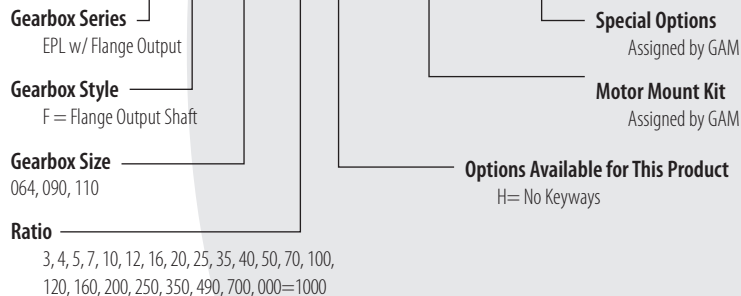


EPL-F Series		47		64		90		110		140	
		mm	(in)	mm	(in)	mm	(in)	mm	(in)	mm	(in)
D1 <sub>max standard</sub> *	motor shaft diameter	11	(0.433)	14	(0.551)	19	(0.748)	24	(0.945)	32	(1.260)
D1 <sub>max available</sub> *	motor shaft diameter	14	(0.551)	16	(0.630)	24	(0.945)	32	(1.260)	38	(1.496)
D2 h7	output flange diameter	28	(1.102)	40	(1.575)	63	(2.480)	80	(3.150)	100	(3.937)
D4 h7	pilot diameter	47	(1.850)	64	(2.520)	90	(3.543)	110	(4.331)	140	(5.512)
D5	flange diameter	72	(2.835)	86	(3.386)	118	(4.646)	145	(5.709)	179	(7.047)
D7	inner bolt circle	20	(0.787)	31.5	(1.240)	50	(1.968)	63	(2.480)	80	(3.150)
D8	outer bolt circle	67	(2.638)	79	(3.110)	109	(4.291)	135	(5.315)	168	(6.614)
D9	mounting hole diameter (8x)	(8) 3.5	(0.138)	(8) 4.5	(0.177)	(8) 5.5	(0.217)	(8) 5.5	(0.217)	(12) 7.3	(0.287)
D10 H7	flange pilot	12	(0.472)	20	(0.787)	31.5	(1.240)	40	(1.575)	50	(1.968)
D11 H7	dowel diameter	3	(0.118)	5	(0.197)	6	(0.236)	6	(0.236)	8	(0.315)
f1	flange tap	(7) M4x8		(7) M5x7		(7) M6x10		(15) M6x12		(11) M8x16	
L1 1-STAGE**	gearbox total length	84	(3.307)	93	(3.661)	126	(4.961)	150	(5.905)	189	(7.441)
L1 2-STAGE**		102	(4.106)	113	(4.490)	158	(6.220)	190	(7.480)	230	(9.055)
L1 3-STAGE**		120	(4.724)	129	(5.08)	191	(7.520)	231	(9.094)	270	(10.63)
L2	flange pilot depth	4	(0.157)	4	(0.157)	6	(0.236)	6	(0.236)	6	(0.236)
L3	pilot height	-	-	7	(0.276)	10	(0.394)	10	(0.394)	12	(0.472)
L4	output length	19.5	(0.768)	19.5	(0.768)	30	(1.181)	29	(1.142)	38	(1.496)
L5	flange thickness	4	(0.157)	4	(0.157)	7	(0.276)	8	(0.315)	10	(0.394)
L6	output flange length	3	(0.118)	3	(0.118)	6	(0.236)	6	(0.236)	6	(0.236)

\* for larger motor shaft diameters, please contact GAM \*\* depending on the motor, value can vary

### TYPE CODES FOR EPL SERIES (EPL-F)

**Example: EPL - F - 090 - 005 H - [115 - A01] - S111**



Size	Tolerances (mm)	
	h7	H7
Over 10	0	0.018
Thru 18	-0.018	0
Over 18	0	0.021
Thru 30	-0.021	0
Over 30	0	+0.025
Thru 50	-0.025	0
Over 50	0	+0.030
Thru 80	-0.030	0
Over 80	0	+0.035
Thru 120	-0.035	0





## ▶ HIGH PERFORMANCE: SSP SERIES

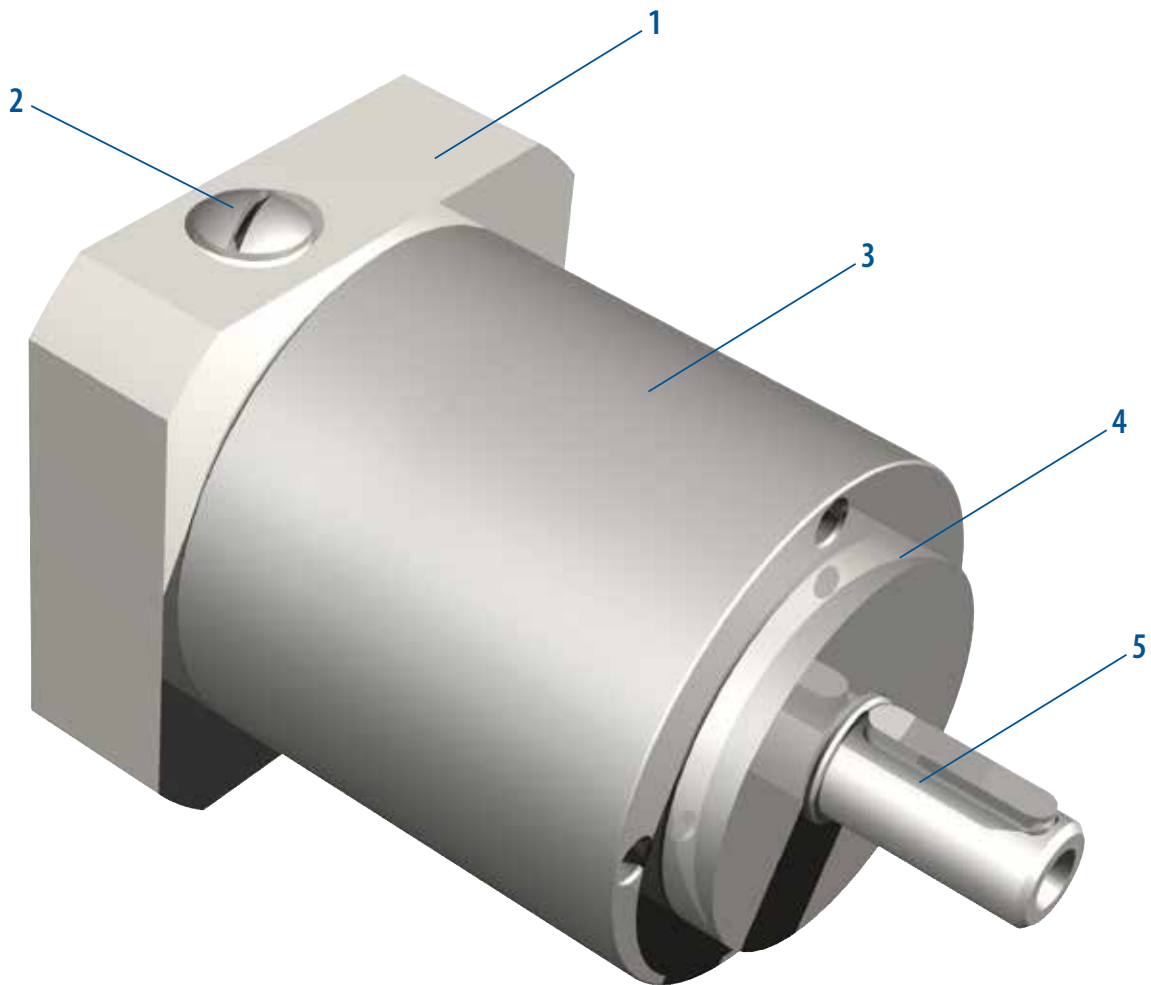
### GAM can.

If you don't see exactly what you need, let us know. We can modify the SSP Series gearboxes to meet your needs. Page 4 provides a list of commonly requested modifications to give you a feel for our capabilities.

Our Stainless Steel Planetary (SSP) Series is an innovative washdown servo gearbox solution designed for food, medical or sanitary applications. It is a precision planetary gearbox outwardly constructed of 300-series stainless steel. The motor adapter plate, housing and shaft are all stainless steel. Viton® seals, stainless steel hardware and sealed interfaces provide outstanding corrosion resistance in all types of wet and caustic washdown environments. Ideal for any light or demanding servo application where corrosion resistance is a requirement, the SSP Series offers economy, high precision, and long lasting performance.

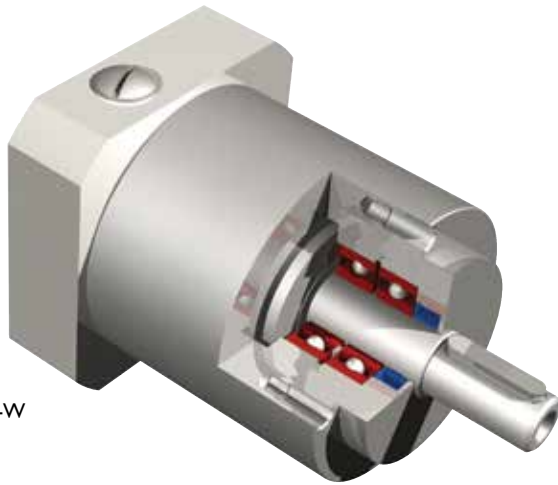
### SSP Series benefits:

- All exposed surfaces stainless steel
- Frame sizes from 70 to 120 mm
- Ratios from 3:1 to 100:1



### Suitable for food or medical applications!

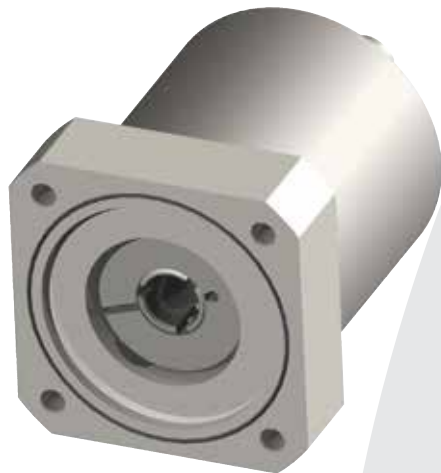
- |  |  |  |
|--|--|--|
| 1. Adapter Flange<br>(Stainless steel adapter for quick and easy motor mounting) | 3. Lubrication (internal)<br>(Standard with food grade grease)   | 5. Shaft<br>(Stainless steel keyed output shaft) |
| 2. Hole Plug<br>(Threaded stainless steel plug)                                  | 4. Seals (internal)<br>(Viton® seals keep contaminants out and lubricant in and achieves an IP66 rating) |  |



SSP-W

## SSP-W

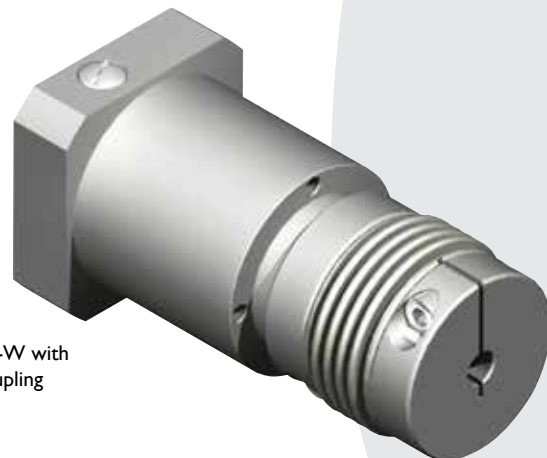
- Dual output bearings for high radial and axial loading
- Frame sizes from 70 mm to 120 mm
- Ratios from 3:1 to 100:1



SSP-W Rear View

## SSP-W

- Input clamping element for fast and easy mounting
- Optional input O-ring to keep contaminants out custom designed for your motor. (Special request at time of order)



SSP-W with Coupling

## SSP-W

- Optional stainless steel output coupling KG-VA for corrosion resistant connections to other shafts
- Contact GAM for more information on these couplings



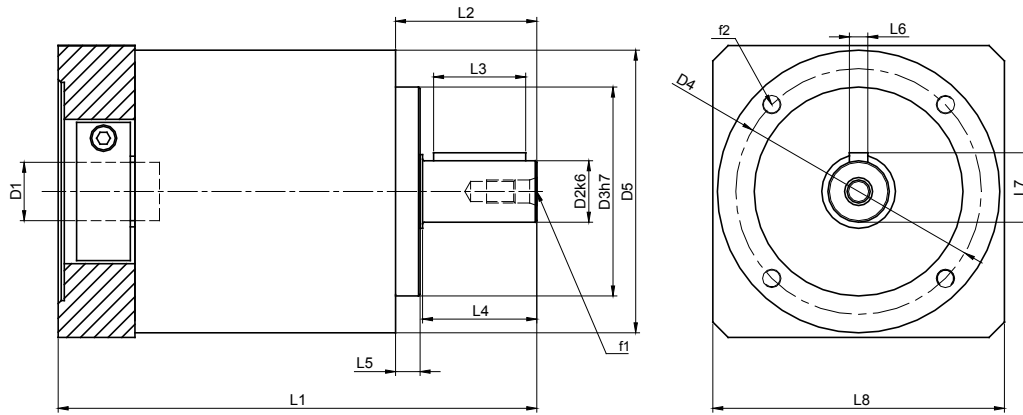
# ▶ SSP-SERIES - SSP



SSP Series		70	90	120	
Stock Ratios		5,10			
All Ratios Available		1-stage: 3, 4, 5, 7, 10 2-stage: 12, 16, 20, 25, 35, 40, 50, 70, 100 For other ratios, consult GAM			
Nominal Output Torque ( $T_{2n}$ )	Nm (lb-in)	3:1	20 (177)	40 (354)	100 (885)
		4, 5, 7:1	26 (230)	54 (478)	120 (1062)
		10, 100, 1000:1	16 (142)	40 (354)	105 (929)
		12:1	36 (319)	80 (708)	170 (1505)
		all other ratios	42 (372)	100 (885)	210 (1859)
Max Acceleration Output Torque ( $T_{2B}$ )	Nm (lb-in)	3:1	36 (319)	70 (620)	180 (1593)
		4, 5, 7:1	44 (389)	100 (885)	200 (1770)
		10, 100, 1000:1	24 (212)	75 (664)	180 (1593)
		12:1	45 (398)	100 (885)	215 (1903)
		all other ratios	52 (460)	125 (1106)	255 (2257)
Emergency Output Torque ( $T_{2not}$ )	Nm (lb-in)	3:1	72 (637)	160 (1416)	200 (1770)
		4, 5, 7:1	84 (743)	216 (1912)	480 (4248)
		10, 100, 1000:1	62 (549)	160 (1416)	410 (3629)
		12:1	72 (637)	160 (1416)	400 (3540)
		all other ratios	84 (743)	216 (1912)	480 (4248)
Nominal Input Speed ( $n_{1n}$ )	RPM	-	3500	3000	2500
Max Speed ( $n_{1max}$ )		-	6000	6000	5000
Standard Output Backlash (j)	arcmin	3:1 - 10:1	< 10	< 10	< 8
		12:1 - 100:1	< 14	< 14	< 12
Allowable Radial Load ( $F_{rad}$ ) <sup>1)</sup>	N (lbs)	-	910 (205)	1500 (338)	3000 (675)
Allowable Axial Load ( $F_{axial}$ )	N (lbs)	-	500 (113)	1000 (225)	1500 (338)
Torsional Stiffness ( $C_{t21}$ )	Nm/arcmin (lb-in/rcmin)	10:1, 100:1	1.3 (11.5)	3.4 (30.1)	8.3 (73.5)
		7:1, 70:1	1.7 (15)	4.8 (42.5)	13.6 (120.4)
		all other ratios	2.4 (21.2)	7.1 (62.8)	17.2 (152.2)
Weight (m)	kg (lbs)	1-stage	2 (4.4)	3.9 (8.6)	8.8 (19.4)
		2-stage	2.3 (5.1)	4.7 (10.4)	10.9 (24)
Noise Level ( $L_{pk}$ )	dB(A)	-	< 64	< 66	< 68
Mass Moment of Inertia ( $J_1$ )	kg cm <sup>2</sup> (lb-in <sup>2</sup> )	3:1	0.45 (0.154)	1.37 (0.468)	6.54 (2.235)
		4:1, 12:1, 16:1	0.38 (0.130)	1.14 (0.390)	4.8 (1.640)
		5:1, 20:1, 25:1	0.36 (0.123)	1.05 (0.359)	4.05 (1.384)
		7:1, 35:1	0.35 (0.120)	0.97 (0.331)	3.4 (1.162)
		10:1, 40:1 - 100:1	0.34 (0.116)	0.93 (0.318)	3.1 (1.059)
Efficiency at Load	1-stage: 94% 2-stage: 92%				
Service Life	> 30,000 hours				
Lubrication	Food Grade Grease: Note 1. Meets FDA 21 CFR 178.3570 requirements Note 2. USDA H1 authorized (authorized for use in federally inspected meat and poultry plants)				
Protection Rating	IP 66				
Operating Temperature Range	-20°C to 90°C				

1) Load applied at center of output shaft @100 RPM

# SSP-W



SSP Series		70		90		120	
		mm	(in)	mm	(in)	mm	(in)
D1 max standard	motor shaft diameter	14	(0.551)	19	(0.748)	24	(0.945)
D1 max available*	motor shaft diameter	16	(0.63)	24	(0.945)	32	(1.26)
D2 k6	output shaft diameter	16	(0.63)	22	(0.866)	32	(1.26)
D3 h7	pilot diameter	52	(2.047)	68	(2.677)	90	(3.543)
D4	bolt circle	62	(2.441)	80	(3.15)	108	(4.252)
D5	housing diameter	70	(2.756)	92	(3.622)	122	(4.803)
f1	shaft thread	M5x12		M6x16		M10x22	
f2	mounting holes	(4) M6x12		(4) M6x14		(8) M8x18	
L1 1-STAGE***	gearbox total length	131 (5.157)		174 (6.85)		232 (9.134)	
L1 2-STAGE***		153 (6.024)		207 (8.15)		271 (10.669)	
L2	shaft length	36 (1.417)		46 (1.811)		70 (2.756)	
L3	key length	25 (0.984)		30 (1.181)		50 (1.969)	
L4	usable shaft length	28 (1.102)		36 (1.417)		58 (2.283)	
L5	pilot height	7 (0.276)		9 (0.354)		11 (0.433)	
L6	key width	5 (0.197)		6 (0.236)		10 (0.394)	
L7	key height	18 (0.709)		24.600 (0.969)		34.8 (1.37)	

\* for these larger motor shaft diameters, please contact GAM

\*\* depending on the motor, value can vary



### Recommended Output Coupling (if necessary)

all stainless bellows	KG-VA-80	KG-VA-220	KG-VA-350
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### TYPE CODES FOR SSP SERIES (SSP-W)

**Example: SSP - W - 090 - 005 G - [115 - A01] - S111**

**Gearbox Series**

Stainless Steel  
Planetary Series

**Gearbox Style**

W = Output Shaft

**Gearbox Size**

070, 090, 120

**Ratio**

3, 4, 5, 7, 10, 12, 16, 20, 25, 35, 40, 50, 70, 100

**Special Options**

Assigned by GAM

**Motor Mount Kit**

Assigned by GAM

**Options Available for This Product**

G = Key on output DIN688

### Tolerances (mm)

Size	k6	h7
Over 10	+0.012	0
Thru 18	+0.001	-0.018
Over 18	+0.015	0
Thru 30	+0.002	-0.021
Over 30	+0.018	0
Thru 50	+0.002	-0.025
Over 50	+0.021	0
Thru 80	+0.002	-0.030
Over 80	+0.025	0
Thru 120	+0.003	-0.035



## ▶ PERFORMANCE: PE SERIES

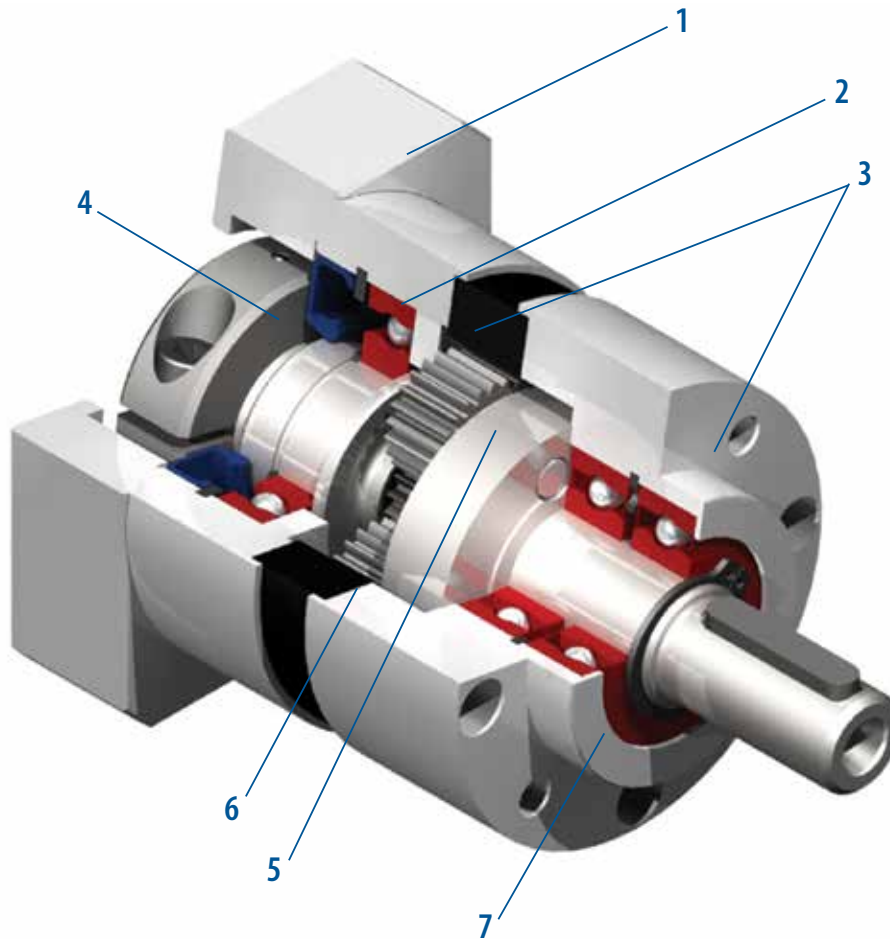
### GAM can.

If you don't see exactly what you need, let us know. We can modify the PE Series gearboxes to meet your needs. Page 4 provides a list of commonly requested modifications to give you a feel for our capabilities.

The GAM PE series is a great gearbox value for servo, stepper, and other motion control applications. It offers the best quality available for the price point. Based on the design of the popular EPL series, the PE series is a reliable alternative when radial or axial loadings are minimized.

### PE Series offers:

- Metric output (4 sizes)
- NEMA output (4 sizes)
- Wide range of ratios (3:1 to 1000:1)
- Available to purchase online!



1. Adapter Plate  
(Customized adapter plates for quick and easy motor mounting)

2. Seals  
(Protective seals to isolate the gearbox)

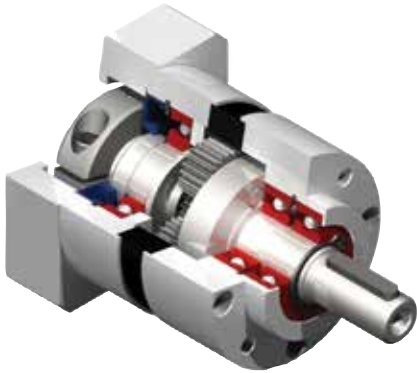
3. Ball Bearings  
(dual ball bearings)

4. Input Clamping Element

5. Planet Gears  
(Precision ground gears)

6. Ring Gear  
(Ring gear incorporated into housing)

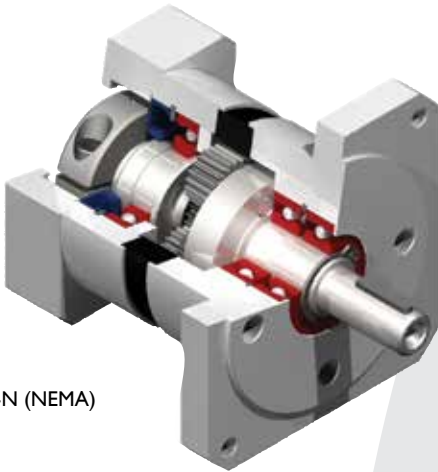
7. Output Face



PE-W

**PE-W**

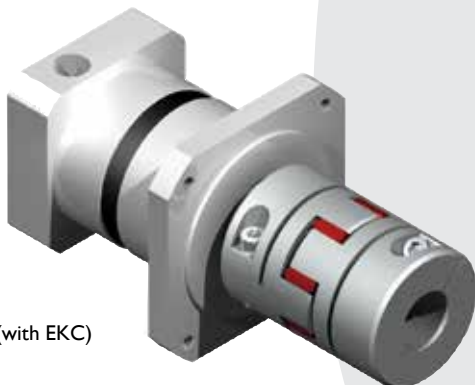
- Metric output face
- Ratios 3:1 to 1000:1
- Frame sizes from 50 mm to 118 mm
- Ready to mount to your motor



PE-N (NEMA)

**PE-N (NEMA)**

- NEMA output face
- Ratios 3:1 to 1000:1
- Frame sizes from NEMA 17 to 42
- Ready to mount to your motor



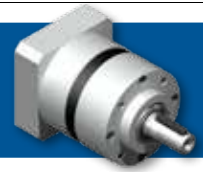
PE-N (with EKC)

**PE-N (shown with GAM's EKC elastomer coupling)**

- Use the PE Series gearbox with the EKC coupling for the most cost-effective solution!



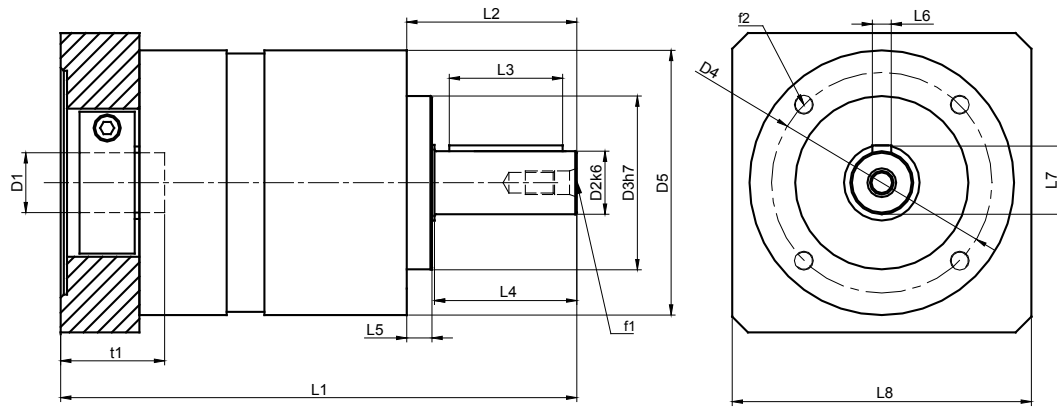
# ▶ PE-W SERIES - (METRIC)



PE-W Series		50	64	84	118	
Stock Ratios		5, 10, 50				
All Ratios Available		1-stage: 3, 4, 5, 7, 10 2-stage: 12, 16, 20, 25, 35, 40, 50, 70, 100 3-stage: 120, 160, 200, 250, 350, 490, 700, 1000				
Nominal Output Torque ( $T_{2n}$ )	Nm (lb-in)	3:1	5 (44)	20 (177)	40 (354)	100 (885)
		4, 5, 7:1	6.5 (58)	26 (230)	54 (478)	120 (1062)
		10, 100, 1000:1	5 (44)	16 (142)	40 (354)	105 (929)
		12:1	14 (124)	36 (319)	80 (708)	170 (1505)
		all other ratios	16 (142)	42 (372)	100 (885)	210 (1859)
Max Acceleration Output Torque ( $T_{2B}$ )	Nm (lb-in)	3:1	10 (89)	36 (319)	70 (620)	180 (1593)
		4, 5, 7:1	13 (115)	44 (389)	100 (885)	200 (1770)
		10, 100, 1000:1	10 (89)	24 (212)	75 (664)	180 (1593)
		12:1	17.5 (155)	45 (398)	100 (885)	215 (1903)
		all other ratios	20 (177)	52 (460)	125 (1106)	255 (2257)
Emergency Output Torque ( $T_{2not}$ )	Nm (lb-in)	3:1	20 (177)	72 (637)	160 (1416)	200 (1770)
		4, 5, 7:1	26 (230)	84 (743)	216 (1912)	480 (4248)
		10, 100, 1000:1	20 (177)	62 (549)	160 (1416)	410 (3629)
		12:1	28 (248)	72 (637)	160 (1416)	400 (3540)
		all other ratios	32 (283)	84 (743)	216 (1912)	480 (4248)
Nominal Speed ( $n_{1n}$ )	RPM	-	3500	3500	3000	2500
Max Speed ( $n_{1max}$ )		-	6000	6000	6000	5000
Standard Output Backlash ( $j$ )	arcmin	3:1 - 10:1	<16	<10	<10	<8
		12:1 - 100:1	<20	<14	<14	<12
		120:1 - 1000:1	-	<18	<18	<16
Allowable Radial Load ( $F_{rad}$ ) <sup>1)</sup>	N (lbs)	-	425 (96)	560 (126)	1300 (293)	2500 (563)
Allowable Axial Load ( $F_{axial}$ )	N (lbs)	-	350 (79)	500 (113)	1000 (225)	1500 (338)
Torsional Stiffness ( $C_{t21}$ )	Nm/arcmin (lb-in/arcmin)	10, 100, 1000	0.60 (5.3)	1.3 (11.5)	3.4 (30.1)	8.3 (73.5)
		7, 70, 700	0.78 (6.9)	1.7 (15)	4.8 (42.5)	13.6 (120.4)
		all other ratios	0.9 (8.0)	2.4 (21.2)	7.1 (62.8)	17.2 (152.2)
Weight (m)	kg (lbs)	1-stage	0.4 (0.9)	1.0 (2.2)	2.3 (5.1)	5.8 (12.8)
		2-stage	0.5 (1.1)	1.3 (2.9)	3.1 (6.8)	7.9 (17.4)
		3-stage	- (-)	1.6 (3.5)	3.9 (8.6)	10.0 (22.1)
Noise Level ( $L_{pA}$ )	dB(A)	-	< 64	< 66	< 68	< 70
Mass Moment of Inertia ( $J_1$ )	kg cm <sup>2</sup> (lb-in <sup>2</sup> )	3:1	0.06 (0.021)	0.45 (0.154)	1.37 (0.468)	6.54 (2.235)
		4:1, 12:1, 16:1	0.04 (0.014)	0.38 (0.130)	1.14 (0.390)	4.8 (1.640)
		5:1, 20:1, 25:1	0.04 (0.014)	0.36 (0.123)	1.05 (0.359)	4.05 (1.384)
		7:1, 35:1	0.04 (0.014)	0.35 (0.120)	0.97 (0.331)	3.4 (1.162)
		10:1, 40:1 - 100:1	0.04 (0.014)	0.34 (0.116)	0.93 (0.318)	3.1 (1.059)
		120:1 - 1000:1	(0.000)	0.34 (0.116)	0.93 (0.318)	3.12 (1.066)
Efficiency at Load	1-stage: 94% 2-stage: 92% 3-stage: 90%					
Service Life	>20,000					
Lubrication	Mineral Grease EP0					
Protection Rating	IP 64					
Operating Temperature Range	-20°C to 90°C					


1) Load applied at center of output shaft @100 RPM

# PE-W



PE-W Series		50		64		84		118	
		mm	(in)	mm	(in)	mm	(in)	mm	(in)
D1 <sub>max standard*</sub>	motor shaft diameter	11	(0.433)	14	(0.551)	19	(0.748)	24	(0.945)
D1 <sub>max available*</sub>	motor shaft diameter	14	(0.551)	16	(0.630)	24	(0.945)	32	(1.260)
D2 <sub>k6</sub>	output shaft diameter	12	(0.472)	14	(0.551)	20	(0.787)	25	(0.984)
D3 <sub>h7</sub>	pilot diameter	35	(1.378)	40	(1.575)	55	(2.165)	80	(3.15)
D4	bolt circle	44	(1.732)	52	(2.047)	70	(2.756)	100	(3.937)
D5	housing diameter	50	(1.969)	64	(2.52)	84	(3.307)	118	(4.646)
f1	shaft thread	M4x8		M5x12		M6x16		M10x22	
f2	mounting holes	M4x6		M5x12		M6x14		M8x18	
L1 1-STAGE**	gearbox total length	93 (3.661)		117 (4.606)		162 (6.378)		199 (7.835)	
L1 2-STAGE**		108 (4.252)		139 (5.472)		195 (7.677)		239 (9.409)	
L1 3-STAGE**		- (-)		161 (6.339)		228 (8.976)		280 (11.024)	
L2	shaft length	24.5 (0.965)		39 (1.535)		54 (2.126)		61 (2.402)	
L3	key length	16 (0.63)		25 (0.984)		36 (1.417)		45 (1.772)	
L4	usable shaft length	18 (0.709)		30 (1.181)		45 (1.772)		50 (1.969)	
L5	pilot height	4 (0.157)		8 (0.315)		8 (0.315)		10 (0.394)	
L6	key width	4 (0.157)		5 (0.197)		6 (0.236)		8 (0.315)	
L7	key height	13.5 (0.531)		16 (0.63)		22.5 (0.886)		28 (1.102)	
L8**	adapter size	50 (1.969)		70 (2.756)		90 (3.543)		120 (4.724)	
t1***	allowable shaft length	23 (0.87)		23 (0.906)		30 (1.181)		40 (1.575)	

\* for larger motor shaft diameters, please contact GAM \*\* depending on the motor, value can vary \*\*\* long motor shafts can be accommodated, but overall gearbox length will grow  
 \*\*\*\*The PE-W-050 may have a blue ring gear

Recommended Output Coupling (if necessary)					
	metal bellows	KLC-25	KLC-50	KLC-125	KM-270
	elastomer	EKC-25	EKC-35	EKC-80 or 110	EKM-300

## TYPE CODES FOR PE-W SERIES (METRIC)

**Example: PE - W - 084 - 005 G - [115 - A01] - S111**

**Gearbox Series**  
PE w/ Metric Output

**Gearbox Style**  
W = Output Shaft

**Gearbox Size**  
050, 064, 084, 118

**Ratio**  
3, 4, 5, 7, 10, 12, 16, 20, 25, 35, 40, 50, 70, 100,  
120, 160, 200, 250, 350, 490, 700, 000=1000

**Special Options**  
Assigned by GAM

**Motor Mount Kit**  
Assigned by GAM

**Options Available for This Product**  
G = Key on output shaft per DIN6885

Tolerances (mm)		
Size	k6	h7
Over 6	+0.010	0
Thru 10	+0.001	-0.015
Over 10	+0.012	0
Thru 18	+0.001	-0.018
Over 18	+0.015	0
Thru 30	+0.002	-0.021
Over 30	+0.018	0
Thru 50	+0.002	-0.025
Over 50	+0.021	0
Thru 80	+0.002	-0.030





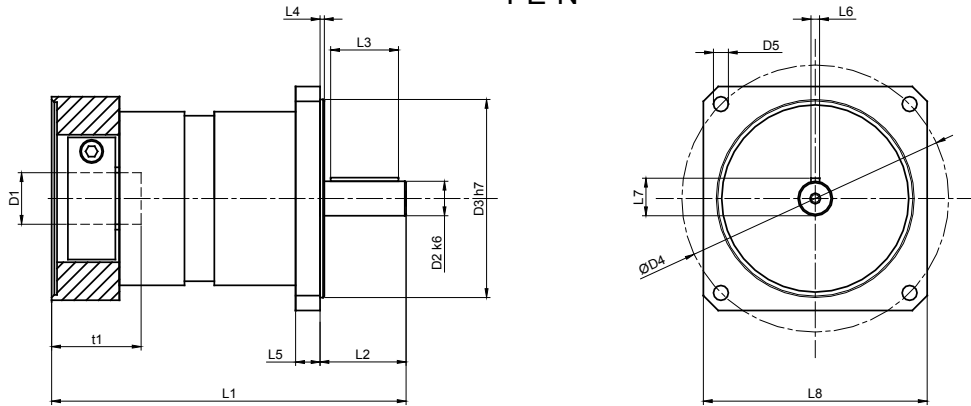
# ▶ PE-N SERIES - (NEMA)



PE-N Series		17	23	34	42	
Stock Ratios		5, 10, 50				
All Ratios Available		1-stage: 3, 4, 5, 7, 10 2-stage: 12, 16, 20, 25, 35, 40, 50, 70, 100 3-stage: 120, 160, 200, 250, 350, 490, 700, 1000				
Nominal Output Torque (T <sub>2n</sub> )	Nm (lb-in)	3:1	5 (44)	5 (44)	20 (177)	40 (354)
		4, 5, 7:1	6.5 (58)	6.5 (58)	26 (230)	54 (478)
		10, 100, 1000:1	5 (44)	5 (44)	16 (142)	40 (354)
		12:1	14 (124)	14 (124)	36 (319)	80 (708)
		all other ratios	16 (142)	16 (142)	42 (372)	100 (885)
Max Accel. Torque (T <sub>2B</sub> )	Nm (lb-in)	3:1	10 (89)	10 (89)	36 (319)	70 (620)
		4, 5, 7:1	13 (115)	13 (115)	44 (389)	100 (885)
		10, 100, 1000:1	10 (89)	10 (89)	24 (212)	75 (664)
		12:1	17.5 (155)	17.5 (155)	45 (398)	100 (885)
		all other ratios	20 (177)	20 (177)	52 (460)	125 (1106)
Emergency Output Torque (T <sub>2not</sub> )	Nm (lb-in)	3:1	20 (177)	20 (177)	72 (637)	160 (1416)
		4, 5, 7:1	26 (230)	26 (230)	84 (743)	216 (1912)
		10, 100, 1000:1	20 (177)	20 (177)	62 (549)	160 (1416)
		12:1	28 (248)	28 (248)	72 (637)	160 (1416)
		all other ratios	32 (283)	32 (283)	84 (743)	216 (1912)
Nominal Speed (n <sub>1n</sub> )	RPM	-	3500	3500	3500	3000
Max Input Speed (n <sub>1max</sub> )		-	6000	6000	6000	6000
Standard Output Backlash (j)	arcmin	3:1 - 10:1	<20	<16	< 10	< 10
		12:1 - 100:1	<24	<20	< 14	< 14
		120:1 - 1000:1	-	-	< 18	< 18
Allowable Radial Load (F <sub>rad</sub> ) <sup>1)</sup>	N (lbs)	-	361 (81)	361 (81)	476 (107)	1105 (249)
Allowable Axial Load (F <sub>axial</sub> )	N (lbs)	-	298 (67)	298 (67)	425 (96)	850 (191)
Torsional Stiffness (C <sub>t21</sub> )	Nm/arcmin (lb-in/arcmin)	10, 100, 1000	0.50 (4.4)	0.60 (5.3)	1.3 (11.5)	3.4 (30.1)
		7, 70, 700	0.65 (5.8)	0.78 (6.9)	1.7 (15)	4.8 (42.5)
		all other ratios	0.8 (7.5)	0.9 (8.0)	2.4 (21.2)	7.1 (62.8)
Weight (m)	kg (lbs)	1-stage	0.45 (1.0)	0.45 (1.0)	1.1 (2.4)	2.4 (5.3)
		2-stage	0.55 (1.2)	0.55 (1.2)	1.4 (3.1)	3.2 (7.1)
		3-stage	- (-)	- (-)	1.7 (3.7)	4.0 (8.8)
Noise Level (L <sub>PA</sub> )	dB(A)	-	<60	<64	< 66	< 68
Mass Moment of Inertia (J <sub>1</sub> )	kg cm <sup>2</sup> (lb-in <sup>2</sup> )	3:1	0.0144 (0.005)	0.06 (0.021)	0.45 (0.154)	1.37 (0.468)
		4:1, 12:1, 16:1	0.0096 (0.003)	0.04 (0.014)	0.38 (0.130)	1.14 (0.390)
		5:1, 20:1, 25:1	0.0096 (0.003)	0.04 (0.014)	0.36 (0.123)	1.05 (0.359)
		7:1, 35:1	0.0152 (0.005)	0.04 (0.014)	0.35 (0.120)	0.97 (0.331)
		10:1, 40:1 - 100:1	0.0078 (0.003)	0.04 (0.014)	0.34 (0.116)	0.93 (0.318)
120:1 - 1000:1	- (-)	- (-)	0.34 (0.116)	0.93 (0.318)		
Efficiency at Load	1-stage: 94% 2-stage: 92% 3-stage: 90%					
Service Life	>20,000					
Lubrication	Mineral Grease EPO					
Protection Rating	IP 64					
Operating Temperature Range	-20°C to 90°C					

1) Load applied at center of output shaft @100 RPM

# PE-N



PE-N Series		17		23		34		42	
		mm	(in)	mm	(in)	mm	(in)	mm	(in)
D1 <sub>max standard*</sub>	motor shaft diameter	11	(0.433)	11	(0.433)	14	(0.551)	19	(0.748)
D1 <sub>max available*</sub>	motor shaft diameter	11	(0.433)	14	(0.551)	16	(0.630)	24	(0.945)
D2 <sub>k6</sub>	output shaft diameter	9.525	(0.375)	9.525	(0.375)	12.70	(0.500)	19.05	(0.750)
D3 <sub>h7</sub>	pilot diameter	21.97	(0.865)	38.10	(1.500)	73.025	(2.875)	55.55	(2.187)
D4	bolt circle	43.8	(1.725)	66.7	(2.625)	98.4	(3.875)	125.7	(4.95)
D5	mounting holes	3.25	(0.128)	5	(0.2)	5.5	(0.22)	7.1	(0.28)
L1 1-STAGE**	gearbox total length	108	(4.252)	102	(4.016)	125	(4.921)	162	(6.378)
L1 2-STAGE**		124	(4.882)	122.5	(4.823)	147	(5.787)	194.5	(7.657)
L1 3-STAGE**		-	(-)	-	(-)	169	(6.654)	227	(8.937)
L2	shaft length	25.4	(1.00)	25.4	(1.00)	31.8	(1.25)	31.8	(1.25)
L3	key length	-	(-)	-	(-)	27	(1.06)	29	(1.14)
L4	pilot height	1.6	(0.063)	1.6	(0.06)	1.7	(0.07)	2.4	(0.09)
L5	flange thickness	4.9	(0.193)	5	(0.2)	10	(0.39)	13	(0.51)
L6	key width	-	(-)	-	(-)	3.2	(0.13)	4.8	(0.19)
L7	flat height	9.14	(0.36)	9.14	(0.36)	-	-	-	-
	key height	-	-	-	-	14.3	(0.56)	18.260	(0.72)
L8	output flange size	40	(1.575)	57.14	(2.25)	82.55	(3.25)	106.68	(4.20)
t1***	allowable motor shaft	25	(0.984)	23	(0.87)	32	(1.26)	40	(1.575)

\* for larger motor shaft diameters, please contact GAM \*\*depending on the motor, value can vary \*\*\* longer motor shafts can be accommodated, but overall gearbox length will grow



### Recommended Output Coupling (if necessary)

	17	23	34	42
metal bellows	KLC-25	KLC-25	KLC-50	KLC-125
elastomer	EKC-25	EKC-25	EKC-35	EKC-110

### TYPE CODES FOR PE-N SERIES (NEMA)

**Example: PE - N23 - 005 G - [115 - A01] - S111**

**Gearbox Series**  
PE w/ NEMA output

**Gearbox Style**  
N17 = NEMA17  
N23 = NEMA23  
N34 = NEMA34  
N42 = NEMA42

**Ratio**  
3, 4, 5, 7, 10, 12, 16, 20, 25, 35, 40, 50, 70, 100,  
120, 160, 200, 250, 350, 490, 700, 000=1000

**Special Options**  
Assigned by GAM  
**Motor Mount Kit**  
Assigned by GAM

**Options Available for This Product**  
G = Key on output shaft per DIN6885  
flat on NEMA 17 and NEMA 23

Tolerances (mm)		
Size	k6	h7
Over 6	+0.010	0
Thru 10	+0.001	-0.015
Over 10	+0.012	0
Thru 18	+0.001	-0.018
Over 18	+0.015	0
Thru 30	+0.002	-0.021
Over 30	+0.018	0
Thru 50	+0.002	-0.025
Over 50	+0.021	0
Thru 80	+0.002	-0.030



## ▶ HIGHEST PERFORMANCE: DYNA SERIES

### GAM can.

If you don't see exactly what you need, let us know. We can modify the Dyna Series gearboxes to meet your needs. Page 4 provides a list of commonly requested modifications to give you a feel for our capabilities.

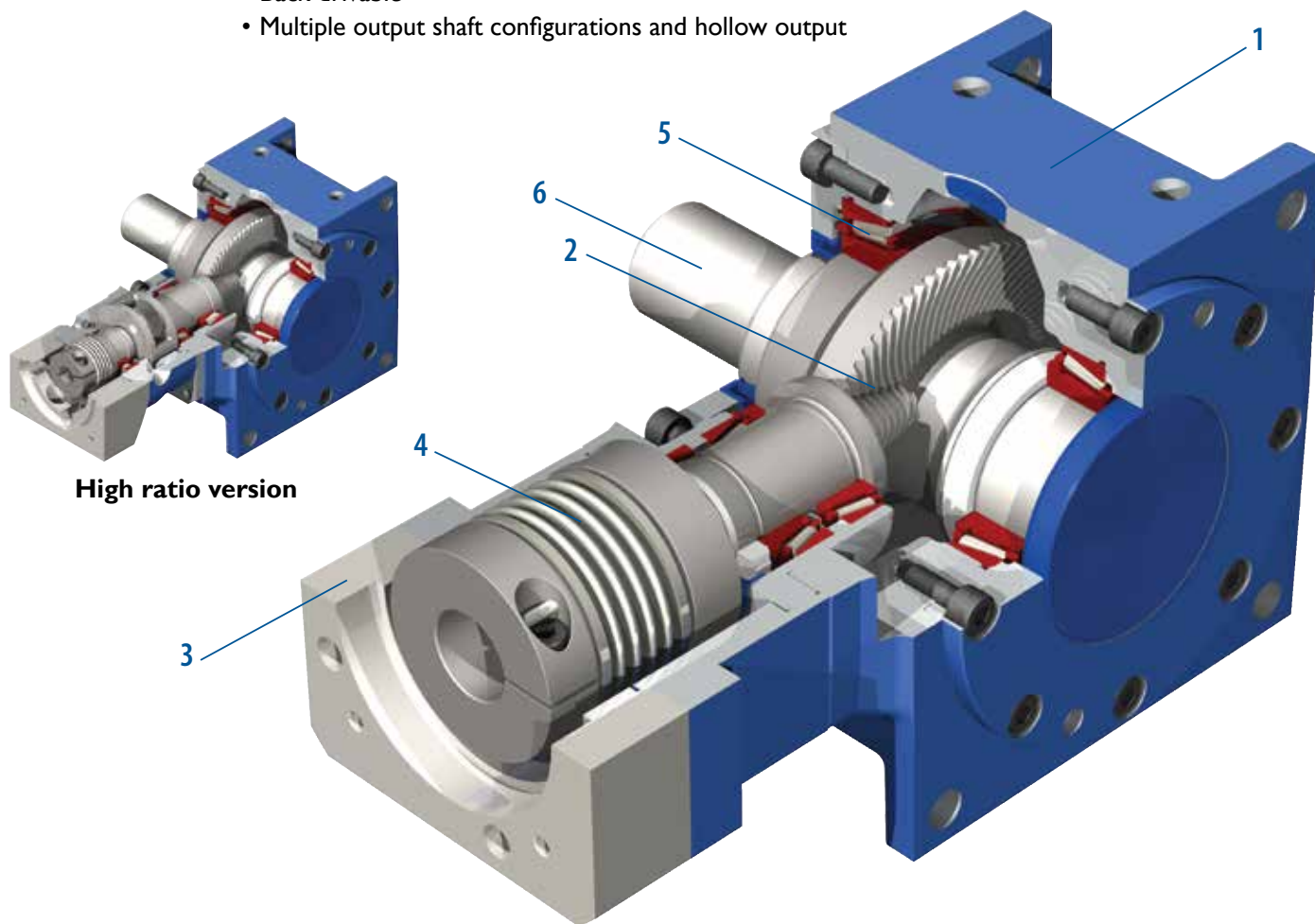
The Dyna Series is our highest performance right-angle gear reducer utilizing sophisticated hypoid gearing. The benefit of hypoid gearing is that it combines the space and configuration advantages of worm gearing with the high efficiencies of bevel gearing. The result is that the Dyna Series is able to achieve ratios up to 15:1 in a single stage and ratios up to 100:1 in 2 stages.

### ✳ **DSX version for the highest performance available!**

The DSX is our flagship right angle hypoid gearbox that has been optimized for the most demanding motion control applications that require high angular accuracy. Featuring hypoid gears that have been ground, the DSX has the smoothest torque transmission and extremely low backlash and noise levels. Contact GAM for further information on the DSX.

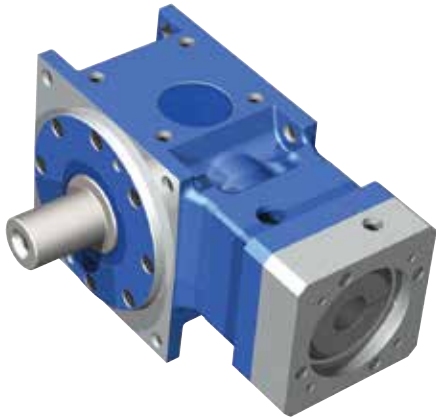
### Dyna Series benefits include:

- Ratios up to 15:1 in a single stage – the highest in the market – and 100:1 in just two gear stages
- High efficiencies
- High allowable axial and radial loading
- Ultra low backlash
- Back drivable
- Multiple output shaft configurations and hollow output




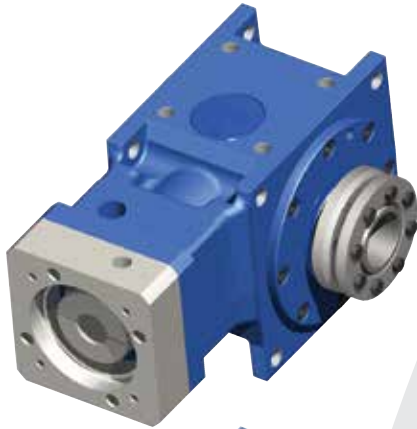
High ratio version

1. Aluminum Housing  
(Aluminum housing significantly reduces the weight of the gearbox)
2. Hypoid Gearing  
(Optimized gearing allows ratios up to 15:1 in a single stage; 100:1 in two stages. DSX gears are ground for improved performance.)
3. Adapter Flange  
(Customized adapter flanges for quick and easy mounting to any motor)
4. Coupling  
(Gearbox can be supplied with either a bellows or elastomer coupling)
5. Tapered Roller Bearings  
(Roller bearings for high radial and axial loading)
6. Output Shaft  
(Gearbox can be supplied with one or two solid shafts or hollow shafts)




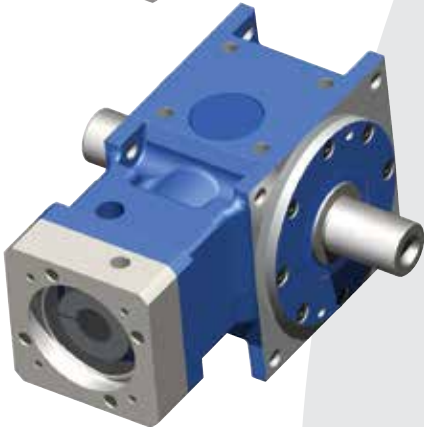
## DS-W

- Single output shaft configuration with our high performance bellow coupling input and machined motor flange to mount to any servo motor
- Frame sizes from 55 mm to 190 mm
-  DSX option available




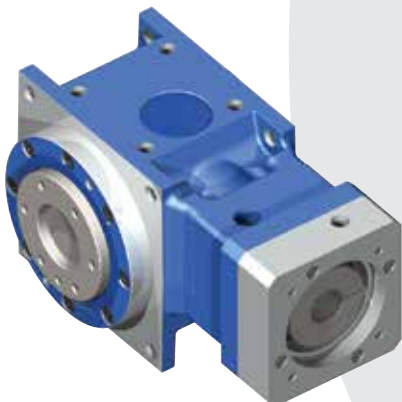
## DS-H

- Hollow bore output configuration with our high performance bellow coupling input and machined motor flange to mount to any servo motor
- Zero-backlash shrink disk coupling on the output included with the gearbox
- Frame sizes from 55 mm to 190 mm
-  DSX option available




## DS-T

- Dual output shaft configuration with our high performance bellow coupling input and machined motor flange to mount to any servo motor
- Frame sizes from 55 mm to 190 mm
-  DSX option available



## DS-F

- Flange output allows connection of pinion gears, pulleys, rotary index tables, and transmission shafting directly to the output for a more compact and stiffer solution
- Frame sizes from 55 mm to 190 mm
-  DSX option available



## ▶ HIGHEST PERFORMANCE: DYNA SERIES

### The Advantage of Hypoid Gearing

The GAM Hypoid offers significant advantages over other conventional right-angle gears.

Conventional spiral bevel gearing, meshing in the position shown at the bottom of the drawing, has a purely rolling meshing action that is mechanically very efficient. Its drawback is that it offers the smallest total tooth contact area, so its torque throughput capacity is lower. Single-stage spiral bevel gearing is limited to about a 6:1 reduction ratio. It's easy to get higher ratios with multiple-stage configurations, but the additional gear stage lowers mechanical efficiency, increases backlash, consumes space and weight and reduces reliability.

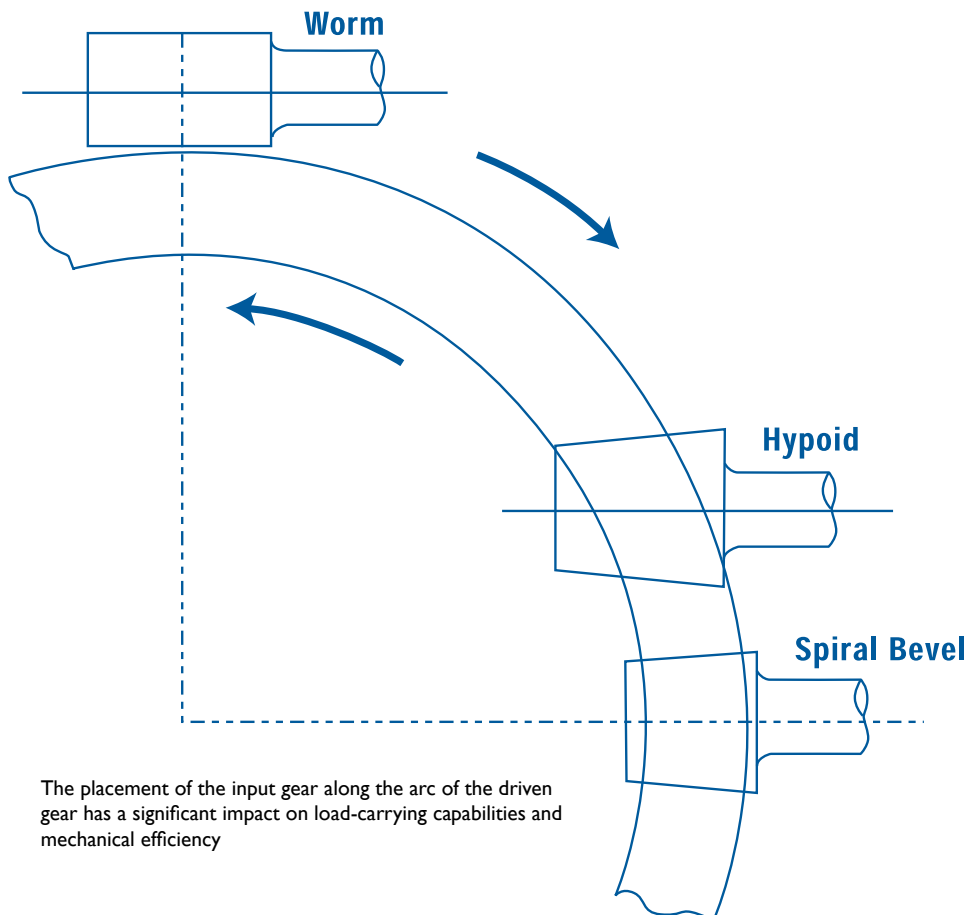
Conventional worm gearing, meshing in the position shown at the top of the drawing, has a very high total tooth contact area. While it offers high torque throughput and high ratio reduction, worm gearing has the lowest mechanical efficiency, due to the friction generated by its high component of sliding action. Worm gearing is also subject to the kind of wear that demands adjustment in order to maintain accuracy.

Hypoid gearing, meshing at the intermediate position, offers mostly rolling action with a small component of sliding action. It has a greater tooth contact area than bevel gearing, so its load-carrying capability is greater. The GAM Hypoid offers further advantages by going up to a 15:1 gear ratio in a single stage with efficiencies between 93% and 96%, depending upon ratio throughout the speed range. Another important design criterion for precision servo applications is, of course, low backlash in the gear box.

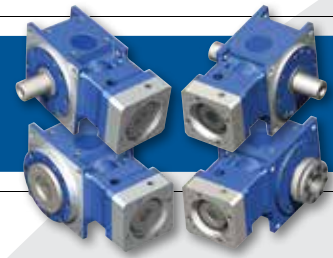
#### The GAM Hypoid offers two important advantages:

- Single-stage design eliminates backlash from a second set of meshing gears
- Accurate machining and assembly alignment – high-accuracy models offer backlash of  $\leq 2$  arcminutes.

GAM Hypoid gearing is available in two product ranges, our highest precision Dyna Series, and high precision, Dyna-Lite Series.



# ▶ HIGHEST PERFORMANCE: DYNA SERIES



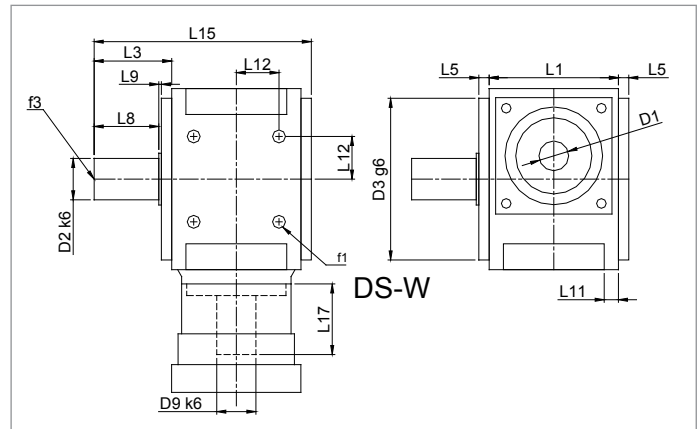
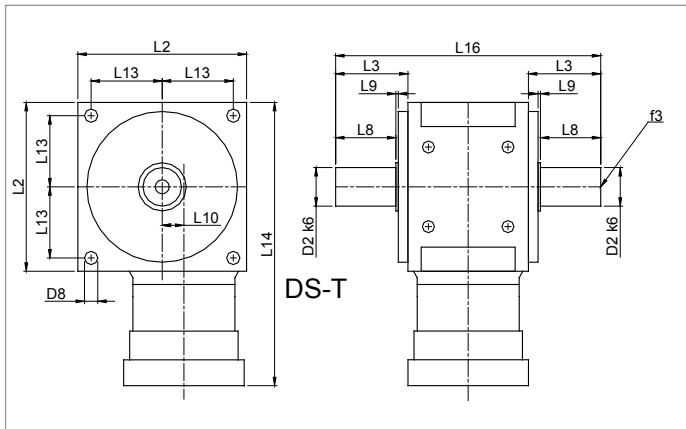
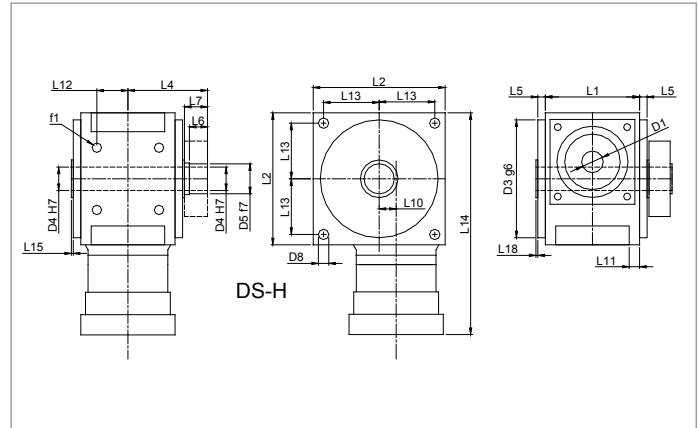
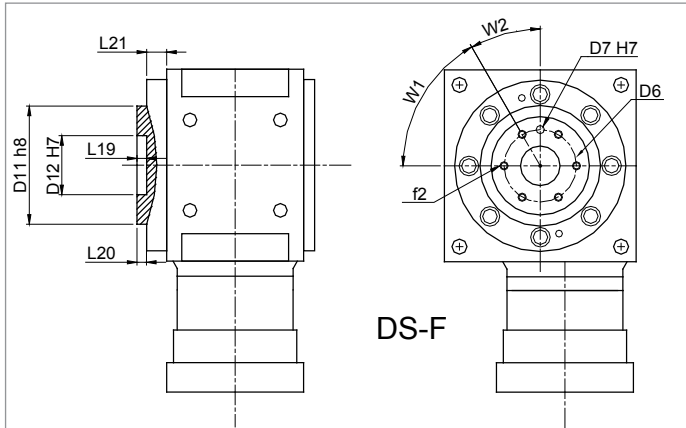
Dyna Series			55	75	90	115	140	190	
Stock Ratios <sup>1)</sup>			3, 5, 10, 15, 30, 50, 100			3, 5, 10, 15			N/A
All Ratios Available			1-stage: 3, 4, 5, 6, 8, 10, 12, 15			2-stage: 25, 30, 40, 50, 70, 100		3-stage: consult GAM	
Nominal Output Torque ( $T_{2n}$ )	Nm (lb-in)	3:1-10:1	35 (310)	70 (620)	140 (1239)	260 (2301)	720 (6372)	1440 (12744)	
		12:1-15:1	25 (221)	50 (443)	95 (841)	180 (1593)	510 (4514)	1020 (9027)	
		All 2-Stage Ratios	35 (310)	70 (620)	140 (1239)	260 (2301)	720 (6372)	1440 (12744)	
Max Acceleration Output Torque ( $T_{2B}$ )	Nm (lb-in)	-	1.5 x Nominal	1.5 x Nominal	1.5 x Nominal	1.5 x Nominal	1.5 x Nominal	1.5 x Nominal	
Emergency Output Torque ( $T_{2not}$ )	Nm (lb-in)	3:1-10:1	70 (620)	140 (1239)	280 (2478)	520 (4602)	1440 (12744)	2880 (25488)	
		12:1-15:1	50 (443)	100 (885)	190 (1682)	360 (3186)	1020 (9027)	2040 (18054)	
		All 2-Stage Ratios	70 (620)	140 (1239)	280 (2478)	520 (4602)	1440 (12744)	2880 (25488)	
Nominal Input Speed <sup>6)</sup> ( $n_{1n}$ )	RPM	3:1-5:1	2100	1800	1500	1150	700	550	
		6:1-10:1	3200	2700	2200	1800	1200	1000	
		12:1-15:1	3900	3300	2800	2300	1600	1300	
		2 Stage	3500	3000	3000	2500	2500	2500	
Max Input Speed <sup>6)</sup> ( $n_{1max}$ )	RPM	1 stage	8000	8000	7000	6000	5000	4500	
		2 Stage	6000	6000	6000	6000	6000	4500	
Standard Output Backlash (j)	arcmin	1 Stage	<5	<5	<4	<4	<4	<4	
		2 Stage	<7	<7	<6	<6	<6	<6	
Reduced Output Backlash (j)	arcmin	1 Stage	<3	<3	<2	<2	<2	<2	
		2 Stage	<5	<5	<3	<3	<3	<3	
Noise Level ( $L_{pA}$ )	dB	-	<66	<66	<68	<68	<70	<72	
Allowable Radial Load <sup>4)</sup> ( $F_{rad}$ )	N (lbs)	-	3300 (742)	4900 (1102)	7200 (1619)	10000 (2248)	15000 (3372)	22500 (5058)	
Allowable Axial Load ( $F_{axial}$ )	N (lbs)	-	1650 (371)	2450 (551)	3600 (809)	5000 (1124)	7500 (1686)	11250 (2529)	
Torsional Stiffness ( $C_{27}$ ) <sup>5)</sup>	Nm/arcmin (lb-in/arcmin)	1 Stage	2.1 (18.6)	4.2 (37.2)	10.5 (92.9)	23.4 (207.1)	61.8 (547.0)	126 (1115.2)	
		2 Stage	2.1 (18.6)	4.2 (37.2)	10.2 (90.3)	22.8 (201.8)	60.1 (531.9)	119.2 (1055.0)	
Weight (m)	kg (lbs)	1 Stage	3.5 (7.7)	5.5 (12.1)	9.5 (20.9)	15.5 (34.2)	32.5 (71.6)	60 (132.3)	
		2 Stage	4 (8.8)	6.5 (14.3)	12.5 (27.6)	19.5 (43)	36 (79.4)	61.5 (135.6)	
Mass Moment of Inertia	kg cm <sup>2</sup> (lb-in <sup>2</sup> )	3:1	0.584 (0.200)	1.32 (0.451)	3.41 (1.165)	8.49 (2.901)	29.7 (10.149)	91.3 (31.199)	
		4:1	0.439 (0.150)	0.993 (0.339)	2.46 (0.841)	6.03 (2.061)	20 (6.834)	61.2 (20.913)	
		5:1	0.357 (0.122)	0.834 (0.285)	1.98 (0.677)	4.79 (1.637)	14.7 (5.023)	45.1 (15.412)	
		6:1	0.258 (0.088)	0.747 (0.255)	1.24 (0.424)	4.04 (1.381)	11.7 (3.998)	34.9 (11.926)	
		8:1	0.214 (0.073)	0.654 (0.223)	0.958 (0.327)	3.36 (1.148)	9.08 (3.103)	25.8 (8.816)	
		10:1	0.192 (0.066)	0.612 (0.209)	0.842 (0.288)	3.04 (1.039)	7.85 (2.683)	21.8 (7.449)	
		12:1	0.181 (0.062)	0.592 (0.202)	0.78 (0.267)	2.87 (0.981)	7.14 (2.440)	19.6 (6.698)	
		15:1	0.17 (0.058)	0.568 (0.194)	0.715 (0.244)	2.72 (0.929)	6.55 (2.238)	19.5 (6.664)	
		30:1	0.405 (0.138)	0.487 (0.166)	1.309 (0.447)	4.043 (1.382)	7.100 (2.426)	13.944 (4.765)	
		40:1	0.367 (0.126)	0.402 (0.137)	1.084 (0.370)	3.477 (1.188)	5.050 (1.726)	7.625 (2.606)	
		50:1	0.354 (0.121)	0.373 (0.128)	1.009 (0.345)	3.292 (1.125)	4.388 (1.499)	5.604 (1.915)	
70:1	0.352 (0.120)	0.356 (0.122)	0.978 (0.334)	3.430 (1.172)	4.779 (1.633)	4.918 (1.681)			
100:1	0.342 (0.117)	0.346 (0.118)	0.938 (0.321)	3.130 (1.070)	3.879 (1.325)	4.018 (1.373)			
Efficiency at Load			3:1-8:1 > 96%		10:1-15:1 > 93%		30:1-100:1 > 92%		
Service Life			>30,000 hours						
Lubrication			Synthetic Oil: ISO VG 100						
Protection Rating			IP 64						
Operating Temperature Range			-10°C to 90°C						

DS

1) Stock ratios listed are available in Standard AND Reduced Backlash. 2) Nominal torque and speed values listed are for gear tooth ratings. Use thermal limit for continuous operation. 3) DSX Precision ground gearing for quieter and smoother operation, improved accuracy, and repeatability. 4) Load applied at center of output shaft @400 RPM. 5) Stiffness values relate to DS-W version only. Stiffness for DS-H,F may vary slightly- contact GAM for values. 6) Higher input speeds may be possible – consult GAM.



# ▶ DYNA SERIES - DS-W, DS-H, DS-T, DS-F



### Recommended Output Coupling (if necessary)

metal bellows	KM-60	KM-170	KM-270	KM-400	KM-1300	KSD-2500
elastomer	EKM-60	EKM-150	EKM-300	EKM-500	EKM-1000	-

### TYPE CODES FOR DYNA SERIES

**Example: DS - W B - 090 - 005 G - [115-201] - S111**

**Gearbox Series**  
 DS = Dyna Series  
 DSX = Dyna Series Extreme

**Gearbox Style**  
 W = Single output shaft  
 T = Dual output shaft  
 H = Hollow output shaft  
 F = Flange output

**Input Type**  
 B = Bellows coupling input  
 E = Elastomer coupling input  
 L = Shaft input

**Gearbox Size**  
 055, 075, 090, 115, 130, 140, 160, 190

**Ratio**  
 003, 004, 005, 006, 008, 010,  
 012, 015, 030, 040, 050, 070, 100

**Special Options**  
 Assigned by GAM

**Motor Mount Kit**  
 Assigned by GAM

#### Options Available for This Product

	LOW	OUTPUT
OPTION	BACKLASH	KEYWAY
A=	Y	N
C=	Y	Y
G=	N	Y
H=	N	N

Options C and G N/A for DS-F/H models.

Contact GAM for DSX Drawings

### Tolerances (mm)

Size	k6	g6	h8	f7	H7	h6
Over 6	+0.010	-0.005	0	-0.013	+0.015	0
Thru 10	+0.001	-0.014	-0.022	-0.028	0	-0.009
Over 10	+0.012	-0.006	0	-0.016	+0.018	0
Thru 18	+0.001	-0.017	-0.027	-0.034	0	-0.011
Over 18	+0.015	-0.007	0	-0.02	+0.021	0
Thru 30	+0.002	-0.020	-0.033	-0.041	0	-0.013
Over 30	+0.018	-0.009	0	-0.025	+0.025	0
Thru 50	+0.002	-0.025	-0.039	-0.05	0	-0.016
Over 50	+0.021	-0.010	0	-0.03	+0.030	0
Thru 80	+0.002	-0.029	-0.046	-0.06	0	-0.019
Over 80	+0.025	-0.012	0	-0.036	+0.035	0
Thru 120	+0.003	-0.034	-0.054	-0.021	0	-0.022
Over 120	+0.028	-0.014	0	-0.043	+0.040	0
Thru 180	+0.003	-0.039	-0.063	-0.083	0	-0.025

Dyna Series		55		75		90		115		140		190	
		mm	(in)	mm	(in)	mm	(in)	mm	(in)	mm	(in)	mm	(in)
D1 <sub>max 1-stage*</sub>	input shaft diameter	21	(0.827)	28	(1.102)	35	(1.378)	43	(1.693)	55	(2.165)	55	(2.165)
D1 <sub>max 2-stage*</sub>		14	(0.551)	14	(0.551)	24	(0.945)	24	(0.945)	38	(1.496)	38	(1.496)
D3 g6	pilot diameter	89	(3.504)	105	(4.134)	125	(4.921)	150	(5.906)	195	(7.677)	245	(9.646)
D8	mounting hole diameter	6.6	(0.26)	9	(0.354)	11	(0.433)	14	(0.551)	17.5	(0.689)	17.5	(0.689)
D9 k6	gearbox input shaft dia	14	(0.551)	18	(0.709)	22	(0.866)	28	(1.102)	32	(1.26)	40	(1.575)
f1	mounting hole thread	M6		M8		M10		M12		M16		M16	
L1	housing width	60	(2.362)	80	(3.15)	100	(3.937)	120	(4.724)	146	(5.748)	196	(7.717)
L2	housing size	90	(3.543)	115	(4.528)	140	(5.512)	170	(6.693)	215	(8.465)	260	(10.236)
L5	pilot height	13.5	(0.531)	8.5	(0.335)	8	(0.315)	8	(0.315)	10	(0.394)	10	(0.394)
L10	hypoid offset	9	(0.354)	14	(0.551)	18	(0.709)	23	(0.906)	32	(1.26)	42	(1.654)
L11	flange thickness	8	(0.315)	10	(0.394)	11	(0.433)	13	(0.512)	15	(0.591)	17	(0.669)
L12	hole location	22	(0.866)	27	(1.063)	33	(1.299)	40	(1.575)	52	(2.047)	70	(2.756)
L13	hole location	39	(1.535)	49	(1.929)	59	(2.323)	72	(2.835)	91	(3.583)	112	(4.409)
L14 1-stage**	input length	181	(7.126)	219	(8.622)	250.5	(9.862)	286.5	(11.28)	363.5	(14.311)	439	(17.283)
L14 2-stage**		229.5	(9.035)	262	(10.315)	247.5	(9.744)	280	(11.024)	372	(14.646)	591	(23.268)
L17	input shaft length	20	(0.787)	26	(1.024)	43	(1.693)	48	(1.89)	55	(2.165)	62	(2.441)

\* for larger shaft diameters consult GAM \*\* depending on motor, length may vary

DS-F & DS-H		55		75		90		115		140		190	
		mm	(in)	mm	(in)	mm	(in)	mm	(in)	mm	(in)	mm	(in)
D4 H7**	hollow bore	20	(0.787)	25	(0.984)	30	(1.181)	40	(1.575)	55	(2.165)	70	(2.756)
D5 f7	hollow outer diameter	24	(0.945)	30	(1.181)	36	(1.417)	50	(1.969)	68	(2.677)	80	(3.15)
D6	flange bolt circle	40	(1.575)	50	(1.969)	63	(2.48)	80	(3.15)	100	(3.937)	125	(4.921)
D7 H7	locating hole diameter	6	(0.236)	6	(0.236)	6	(0.236)	8	(0.315)	8	(0.315)	10	(0.394)
D11 h8	flange pilot (OD)	50	(1.969)	63	(2.48)	80	(3.15)	100	(3.937)	125	(4.921)	160	(6.299)
D12 H7	flange pilot (ID)	25	(0.984)	31.5	(1.24)	40	(1.575)	50	(1.969)	63	(2.48)	80	(3.15)
f2	flange tapped holes	7 x M6x9		7 x M6x9		7 x M6x9		11 x M8x12		11 x M8x12		11 x M10x15	
L4	hollow hub length	73	(2.874)	81	(3.189)	95	(3.74)	109	(4.291)	129	(5.079)	161	(6.339)
L6	hub length	20	(0.787)	22	(0.866)	26	(1.024)	29	(1.142)	32	(1.26)	34	(1.339)
L7	shoulder + hub length	23	(0.906)	25	(0.984)	29	(1.142)	33	(1.299)	37	(1.457)	40	(1.575)
L18	shoulder height	1.5	(0.059)	1.5	(0.059)	2	(0.079)	2	(0.079)	2	(0.079)	2	(0.079)
L19	inner flange pilot depth	6.5	(0.256)	6.5	(0.256)	6.5	(0.256)	8.5	(0.335)	8.5	(0.335)	10.5	(0.413)
L20	outer flange pilot height	6.5	(0.256)	6.5	(0.256)	6.5	(0.256)	8.5	(0.335)	8.5	(0.335)	8.5	(0.335)
L21	pilot height	20	(0.787)	15.5	(0.61)	17	(0.669)	20	(0.787)	17.5	(0.689)	22.5	(0.886)
W1	hole angle 1	45°		45°		45°		30°		30°		30°	
W2	hole angle 2	45°		45°		45°		30°		30°		30°	

\* for larger shaft diameters, consult GAM \*\* mating shaft should have h6 tolerance \*\*\* depending on motor, length may vary

DS-W & DS-T		55		75		90		115		140		190	
		mm	(in)	mm	(in)	mm	(in)	mm	(in)	mm	(in)	mm	(in)
D2 k6	output shaft diameter	20	(0.787)	24	(0.945)	32	(1.26)	40	(1.575)	55	(2.165)	70	(2.756)
f3	shaft thread per DIN332/1	M6x16		M8x19		M12x28		M16x36		M20x42		M20x42	
L3	output shaft length	50	(1.969)	50	(1.969)	60	(2.362)	70	(2.756)	102	(4.016)	122	(4.803)
L8	usable shaft length	35	(1.378)	40	(1.575)	50	(1.969)	60	(2.362)	90	(3.543)	110	(4.331)
L9	shoulder height	1.5	(0.059)	1.5	(0.059)	2	(0.079)	2	(0.079)	2	(0.079)	2	(0.079)
L15	gearbox width	123.5	(4.862)	138.5	(5.453)	168	(6.614)	198	(7.795)	258	(10.157)	328	(12.913)
L16	gearbox width	160	(6.299)	180	(7.087)	220	(8.661)	260	(10.236)	350	(13.78)	440	(17.323)

\* for larger shaft diameters consult GAM \*\* depending on motor, length may vary





## ▶ HIGH PERFORMANCE: DYNA-LITE SERIES

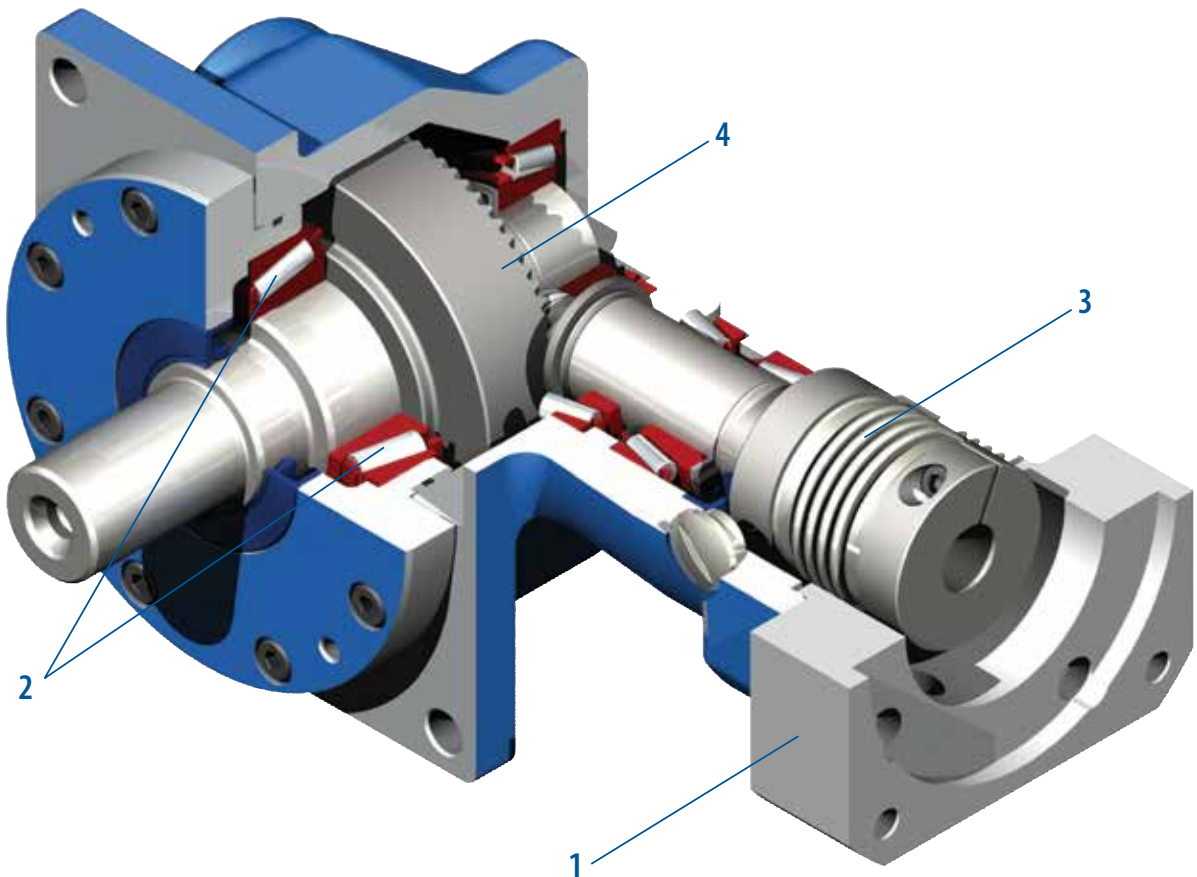
### GAM can.

If you don't see exactly what you need, let us know. We can modify the Dyna-Lite Series gearboxes to meet your needs. Page 4 provides a list of commonly requested modifications to give you a feel for our capabilities.

Now there's a right-angle gearbox that has the performance and price point of a precision in-line gearbox. Our redesigned Dyna-Lite Series use hypoid gearing that combines the space and configuration advantages of worm gearing with the high efficiency of bevel gearing. It is drop-in replacement for many right-angle and in-line planetary gear reducers.

### Dyna-Lite Series benefits include:

- High efficiency – 96%
- Standard backlash < 6 arcmin
- Back drivable
- High radial loading
- Available in shaft output and hollow output

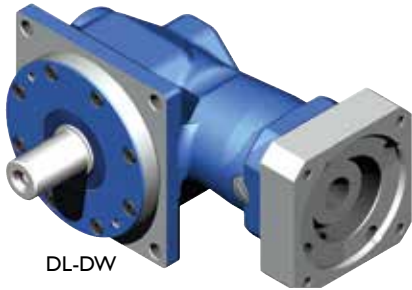


1. Adapter Plate  
(Allows for quick and easy motor mounting)
2. Bearings  
(Taper roller bearings allows high radial loading of output shaft)

3. Bellows Coupling  
(Bellows coupling for quick motor mounting)
4. Hypoid Gearing  
(Optimized gearing allows ratios up to 15:1 in a single stage; 150:1 in two stages)



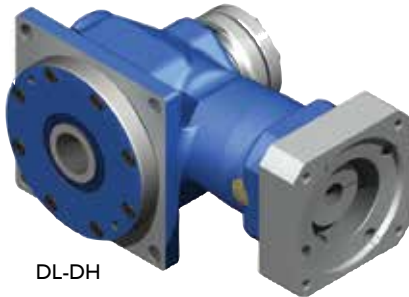
DL-DW 2-Stage Ratio  
(2-Stage Ratio available on all versions)



DL-DW

### DL-DW

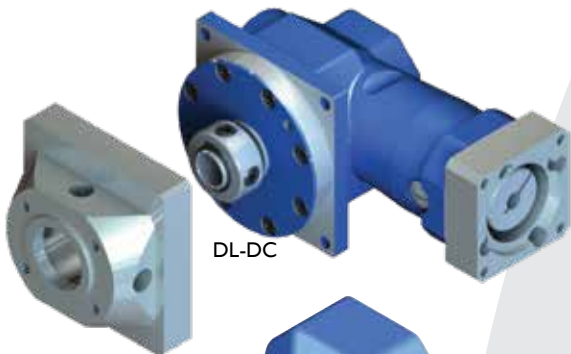
- Single output shaft configuration with our high performance bellow coupling
- Input and housing to mount to any servo motor
- Ratios up to 15:1 in a single stage and 150:1 in two stages
- Frame sizes: 55, 75 and 90 mm
- Drop-in for our highest precision Dyna Series



DL-DH

### DL-DH

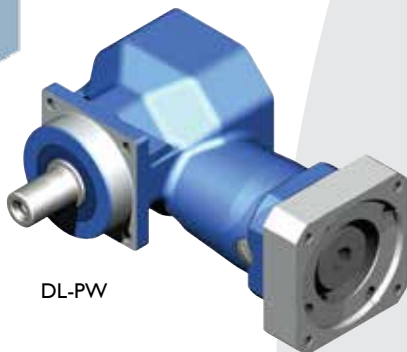
- Smooth hollow output shaft configuration (includes shrink disc)
- Input and housing to mount to any servo motor
- Ratios up to 15:1 in a single stage and 150:1 in two stages
- Frame sizes: 55, 75 and 90 mm
- Drop-in for our highest precision Dyna Series



DL-DC

### DL-DC

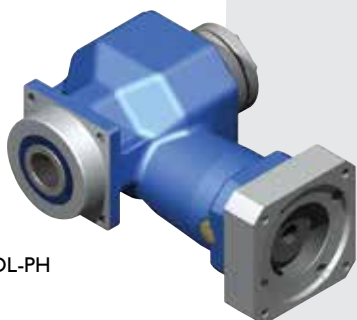
- Right angle hypoid gearbox with unique hollow output and zero-backlash clamping ring
- Mount directly to any linear belt or ball screw module for a compact design
- Ratios from 3:1 up to 150:1
- Frame sizes from 55mm to 90mm



DL-PW

### DL-PW

- Single output shaft configuration with our high performance bellow coupling
- Input and housing to mount to any servo motor
- Ratios up to 15:1 in a single stage and 150:1 in two stages
- Frame sizes: 55, 75 and 90 mm
- Drop-in for many right-angle and in-line planetary gear reducers
- Rotation direction is opposite for DW and PW models.



DL-PH

### DL-PH

- Smooth hollow output shaft configuration (includes shrink disc)



# ▶ DYNA-LITE SERIES - DL-D

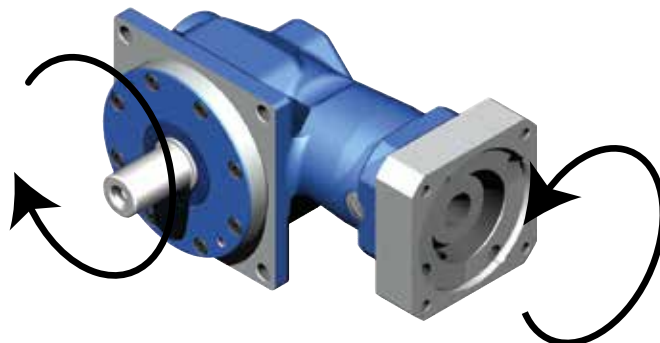


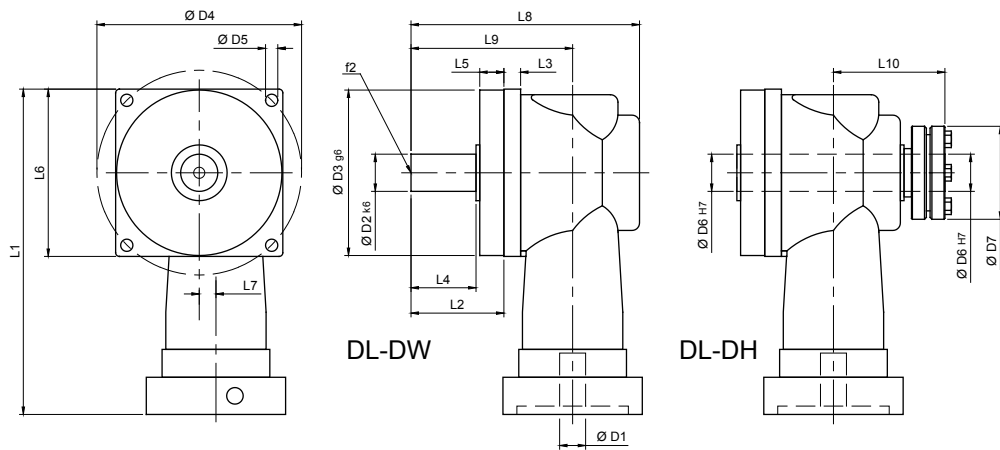
Dyna-Lite Series			55	75	90
Stock Ratios			5, 10, 25, 50, 100		
All Ratios Available*			1-stage: 5, 10, 15** 2-stage: 15**, 25, 50, 100, 150* For other ratios, consult GAM.		
Nominal Output Torque ( $T_{2n}$ )	Nm (lb-in)	5:1, 10:1, 15:1 <sub>(2)</sub> , 25:1, 50:1, 100:1	35 (310)	70 (620)	140 (1239)
		15:1 <sub>(1)</sub> , 150:1	25 (221)	50 (443)	90 (797)
Max Acceleration Output Torque ( $T_{2B}$ )	Nm (lb-in)	5:1, 10:1, 15:1 <sub>(2)</sub> , 25:1, 50:1, 100:1	53 (469)	105 (929)	210 (1859)
		15:1 <sub>(1)</sub> , 150:1	38 (336)	75 (664)	143 (1266)
Emergency Output Torque ( $T_{2not}$ )	Nm (lb-in)	5:1, 10:1, 15:1 <sub>(2)</sub> , 25:1, 50:1, 100:1	70 (620)	140 (1239)	280 (2478)
		15:1 <sub>(1)</sub> , 150:1	50 (443)	100 (885)	190 (1682)
Nominal Input Speed ( $n_{1n}$ )	RPM	5:1	3700	3100	2700
		10:1, 15:1 <sub>(1)</sub>	4200	3500	3000
		2-stage	3500	3000	3000
Max Input Speed ( $n_{1max}$ )	RPM		6000	6000	5000
Standard Output Backlash ( $j$ )	arcmin	1-stage	< 7	< 7	< 6
		2-stage	< 9	< 9	< 8
Allowable Radial Load ( $F_{rad}$ ) <sup>1</sup>	N (lbs)		3300 (743)	4900 (1103)	7200 (1620)
Allowable Axial Load ( $F_{axial}$ )	N (lbs)		1650 (371)	2450 (551)	3600 (810)
Torsional Stiffness ( $C_{t21}$ )	Nm/arcmin		1.5	4.0	10.0
	(lb-in/arcmin)		(13.28)	(35.40)	(88.51)
Weight (m)	kg (lbs)	1-stage	2.6 (5.7)	4.5 (9.9)	9 (19.8)
		2-stage	3.6 (7.9)	6.8 (15)	14.8 (32.6)
Noise Level ( $L_{pA}$ )	dB(A)	1-stage	< 66	< 66	< 68
		2-stage	< 69	< 70	< 72
Mass Moment of Inertia ( $J_1$ )	kg cm <sup>2</sup> (lb-in <sup>2</sup> )	5:1	0.44 (0.15)	1.06 (0.36)	3.6 (1.224)
		10:1, 15:1 <sub>(1)</sub>	0.35 (0.119)	0.84 (0.286)	2.9 (0.986)
		15:1 <sub>(2)</sub> , 25:1	0.17 (0.058)	0.45 (0.153)	1.65 (0.561)
		50:1, 100:1	0.14 (0.048)	0.34 (0.116)	1.1 (0.374)
Efficiency at Load		5,10: 96%	15:1 <sub>(1)</sub> 93%	15 <sub>(2)</sub> , 25, 50, 100, 150 87%	
Service Life		>15000 hours			
Lubrication		Life Time Lubrication			
Protection Rating		IP 64			
Operating Temperature Range		-10°C to 100°C (14°F to 212°F)			

1) Load applied at center of output shaft @100 RPM

\* other ratios available

\*\*15:1 ratio available in 1-stage and 2-stage variations





DL - DW and DL - DH		55		75		90	
		mm	(in)	mm	(in)	mm	(in)
D1 <sub>max (1 stage)*</sub>	motor shaft diameter	16	(0.63)	20	(0.787)	35	(1.378)
D1 <sub>max (2 stage standard)*</sub>	motor shaft diameter	14	(0.551)	19	(0.748)	19	(0.748)
D1 <sub>max (2 stage available)*</sub>	motor shaft diameter	16	(0.63)	24	(0.945)	24	(0.945)
D2 k6	output shaft diameter	20	(0.787)	24	(0.945)	32	(1.26)
D3 g6	pilot diameter	89	(3.504)	105	(4.134)	125	(4.921)
D4	bolt circle	110.3	(4.343)	138.6	(5.457)	166.8	(6.567)
D5	mounting holes	6.6	(0.26)	9	(0.354)	11	(0.433)
D6 H7**	hollow bore diameter	20	(0.787)	25	(0.984)	30	(1.181)
D7	shrink disc OD (included)	50	(1.97)	60	(2.36)	72	(2.83)
L1 1-stage***	gearbox length	175	(6.89)	213.5	(8.406)	257	(10.118)
L1 2-stage***		236	(9.291)	304.5	(11.99)	336	(13.23)
L2	shaft length	50.0	(1.969)	55	(2.165)	68	(2.677)
L3	flange thickness	9	(0.354)	11	(0.433)	14	(0.551)
L4	usable shaft length	35	(1.378)	40	(1.575)	50	(1.969)
L5	pilot height	13	(0.512)	13	(0.512)	16	(0.63)
L6	flange size	90	(3.543)	115	(4.528)	140	(5.512)
L7	gear offset	9	(0.354)	14	(0.551)	18	(0.709)
L8	gearbox width	123	(4.843)	142	(5.591)	175	(6.89)
L9	shaft to centerline	87	(3.425)	100	(3.937)	126	(4.961)
L10	shrink disc to centerline	64.5	(2.539)	73.5	(2.894)	87	(3.425)
f2	shaft thread per DIN332/1	M6 x 16		M8 x 19		M12 x 28	

\* for larger motor shaft diameters, please contact GAM \*\*mating shaft should have h6 tolerance \*\*\*depending on motor, length may vary



#### Recommended Output Coupling (if necessary)

metal bellows	KLC-50	KLC-125	KM-270
elastomer	EKC-80	EKC-110	EKM-300

#### TYPE CODES FOR DYNA-LITE SERIES (DL-D)

**Example: DL - DW - 075 - 005 H - [090 - 15A] - S111**

**Gearbox Series**

DL = Dyna-Lite

**Gearbox Style**

DW = shaft output

DH = hollow output

**Gearbox Size**

055, 075, 090

**Ratio**

5, 10, 15, 25, 50, 100, 150

**Special Options**

Assigned by GAM

**Motor Mount Kit**

Assigned by GAM

**Options Available for This Product**

G = Keyed output shaft

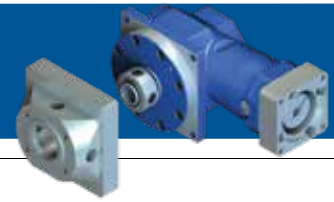
H = Smooth output shaft

#### Tolerances (mm)

Size	k6	g6	H7
Over 18	+0.015	-0.007	+0.021
Thru 30	+0.002	-0.020	0
Over 30	+0.018	-0.009	+0.025
Thru 50	+0.002	-0.025	0
Over 50	+0.021	-0.010	+0.030
Thru 80	+0.002	-0.029	0
Over 80	+0.025	-0.012	+0.035
Thru 120	+0.003	-0.034	0
Over 120	+0.028	-0.014	+0.040
Thru 180	+0.003	-0.039	0



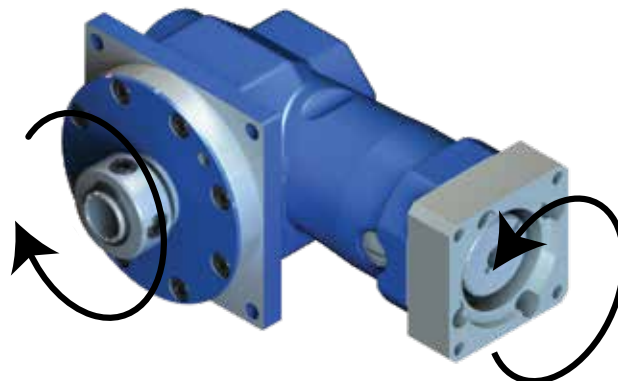
# DYNA-LITE SERIES - DL-DC

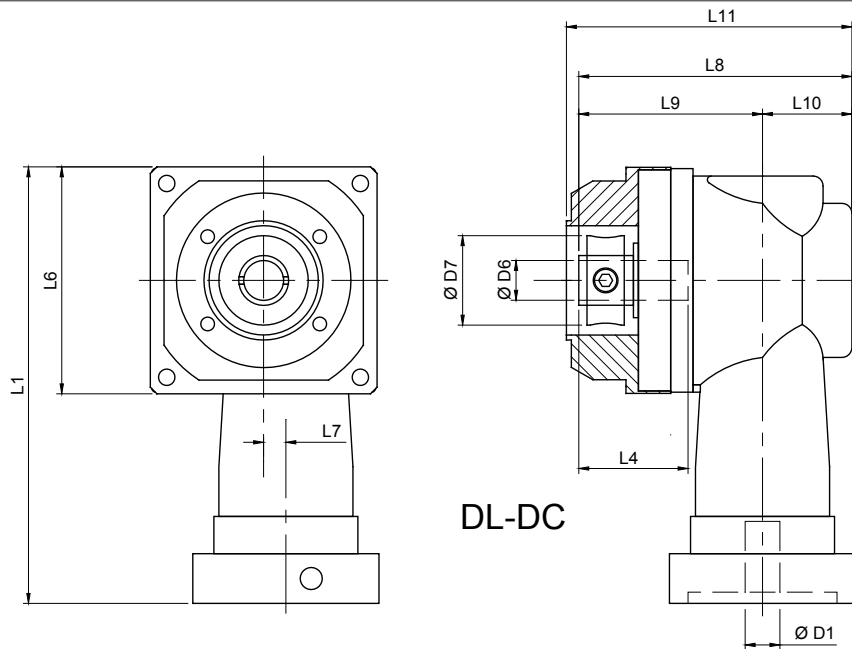


Dyna-Lite Series			55	75	90
Stock Ratios			5, 10, 25, 50, 100		
All Ratios Available*			1-stage: 5, 10, 15** 2-stage: 15**, 25, 50, 100, 150* For other ratios, consult GAM.		
Nominal Output Torque ( $T_{2n}$ )	Nm (lb-in)	5:1, 10:1, 15:1 <sub>(2)</sub> , 25:1, 50:1, 100:1	35 (310)	70 (620)	140 (1239)
		15:1 <sub>(1)</sub> , 150:1	25 (221)	50 (443)	90 (797)
Max Acceleration Output Torque ( $T_{2B}$ )	Nm (lb-in)	5:1, 10:1, 15:1 <sub>(2)</sub> , 25:1, 50:1, 100:1	53 (469)	105 (929)	210 (1859)
		15:1 <sub>(1)</sub> , 150:1	38 (336)	75 (664)	143 (1266)
Nominal Input Speed ( $n_{1n}$ )	RPM	5:1	3700	3100	2700
		10:1, 15:1 <sub>(1)</sub>	4200	3500	3000
		2-stage	3500	3000	3000
Max Input Speed ( $n_{1max}$ )	RPM		6000	6000	5000
Standard Output Backlash (j)	arcmin	1-stage	< 7	< 7	< 6
		2-stage	< 9	< 9	< 8
Torsional Stiffness ( $C_{t21}$ )	Nm/arcmin		1.5	4.0	10.0
	(lb-in/arcmin)		(13.28)	(35.40)	(88.51)
Weight (m)	kg (lbs)	1-stage	2.6 (5.7)	4.5 (9.9)	9 (19.8)
		2-stage	3.6 (7.9)	6.8 (15)	14.8 (32.6)
Noise Level ( $L_{pA}$ )	dB(A)	1-stage	< 66	< 66	< 68
		2-stage	< 69	< 70	< 72
Mass Moment of Inertia ( $J_1$ )	kg cm <sup>2</sup> (lb-in <sup>2</sup> )	5:1	0.44 (0.15)	1.06 (0.36)	3.6 (1.224)
		10:1, 15:1 <sub>(1)</sub>	0.35 (0.119)	0.84 (0.286)	2.9 (0.986)
		15:1 <sub>(2)</sub> , 25:1	0.17 (0.058)	0.45 (0.153)	1.65 (0.561)
		50:1, 100:1	0.14 (0.048)	0.34 (0.116)	1.1 (0.374)
Efficiency at Load		5,10: 96%	15:1 <sub>(1)</sub> 93%	15 <sub>(2)</sub> , 25, 50, 100, 150 87%	
Service Life		>15000 hours			
Lubrication		Life Time Lubrication			
Protection Rating		IP 64			
Operating Temperature Range		-10°C to 100°C (14°F to 212°F)			

\* other ratios available

\*\*15:1 ratio available in 1-stage and 2-stage variations





DL-DC		55		75		90	
		mm	(in)	mm	(in)	mm	(in)
D1 <sub>max</sub> (1 stage)*	motor shaft diameter	16	(0.63)	20	(0.787)	35	(1.378)
D1 <sub>max</sub> (2 stage standard)*	motor shaft diameter	14	(0.551)	19	(0.748)	19	(0.748)
D1 <sub>max</sub> (2 stage available)*	motor shaft diameter	16	(0.63)	24	(0.945)	24	(0.945)
D6 <sub>max</sub>	hollow bore diameter	16	(0.63)	20	(0.787)	30	(1.181)
D7	clamping ring diameter	36	(1.417)	46	(1.811)	56	(2.205)
L1 1-stage***	gearbox length	175	(6.89)	213.5	(8.406)	257	(10.118)
L1 2-stage***		236	(9.291)	304.5	(11.99)	336	(13.23)
L4	allowable shaft length	44	(1.732)	50	(1.968)	50	(1.968)
L6	flange size	90	(3.543)	115	(4.528)	140	(5.512)
L7	gear offset	9	(0.354)	14	(0.551)	18	(0.709)
L8	gearbox width	109.5	(4.311)	126.2	(4.968)	152	(5.984)
L9	hollow shaft to centerline	73.5	(2.894)	84	(3.307)	100	(3.937)
L10	housing to centerline	36	(1.417)	42.2	(1.661)	52	(2.047)
L11**	overall width w/ adapter	115	(4.528)	131	(5.157)	154	(6.063)

\* for larger motor shaft diameters, please contact GAM \*\*depending on actuator, width may vary \*\*\*depending on motor, length may vary



### TYPE CODES FOR DYNA-LITE SERIES (DL-DC)

**Example: DL - DC - 075 - 005 H - [090 - 15A] - S111**

**Gearbox Series**

DL = Dyna-Lite

**Gearbox Style**

DC = hollow clamp output  
(Dyna Series Style Output)

**Gearbox Size**

055, 075, 090

**Ratio**

5, 10, 15, 25, 50, 100, 150

**Special Options**

Assigned by GAM

**Motor Mount Kit**

Assigned by GAM

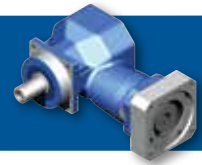
**Options Available for This Product**

H = Smooth output shaft

Size	Tolerances (mm)		
	k6	g6	H7
Over 18	+0.015	-0.007	+0.021
Thru 30	+0.002	-0.020	0
Over 30	+0.018	-0.009	+0.025
Thru 50	+0.002	-0.025	0
Over 50	+0.021	-0.010	+0.030
Thru 80	+0.002	-0.029	0
Over 80	+0.025	-0.012	+0.035
Thru 120	+0.003	-0.034	0
Over 120	+0.028	-0.014	+0.040
Thru 180	+0.003	-0.039	0



# ▶ DYNA-LITE SERIES - DL-P

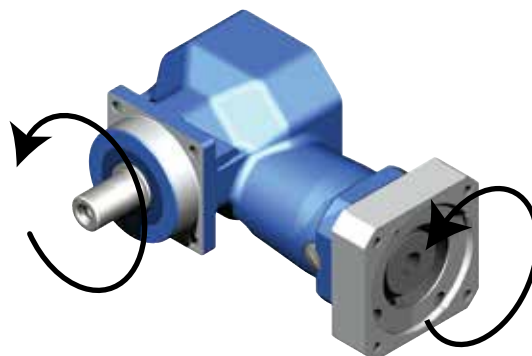


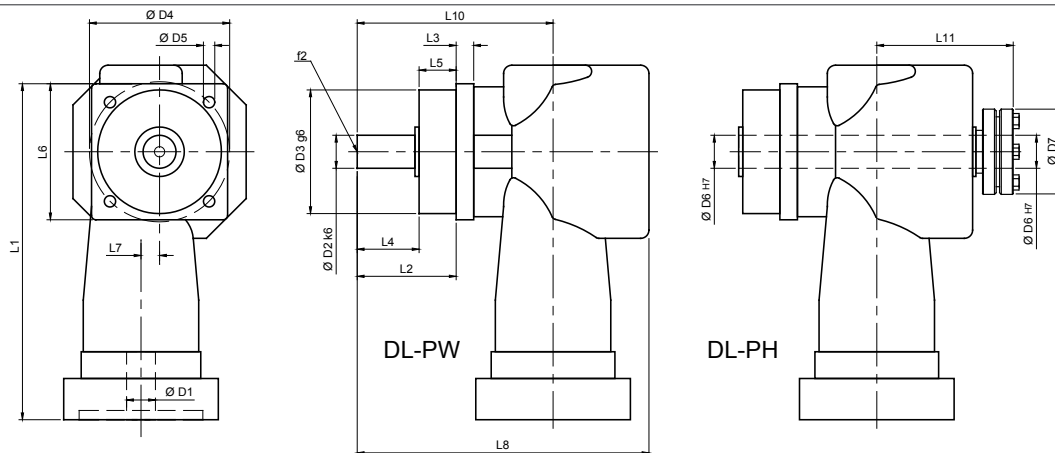
Dyna-Lite Series			55	75	90
Stock Ratios			5, 10, 25, 50, 100		
All Ratios Available*			1-stage: 5, 10, 15** 2-stage: 15**, 25, 50, 100, 150* For other ratios, consult GAM.		
Nominal Output Torque ( $T_{2n}$ )	Nm (lb-in)	5:1, 10:1, 15:1 <sub>(2)</sub> , 25:1, 50:1, 100:1	35 (310)	70 (620)	140 (1239)
		15:1 <sub>(1)</sub> , 150:1	25 (221)	50 (443)	90 (797)
Max Acceleration Output Torque ( $T_{2B}$ )	Nm (lb-in)	5:1, 10:1, 15:1 <sub>(2)</sub> , 25:1, 50:1, 100:1	53 (469)	105 (929)	210 (1859)
		15:1 <sub>(1)</sub> , 150:1	38 (336)	75 (664)	143 (1266)
Emergency Output Torque ( $T_{2not}$ )	Nm (lb-in)	5:1, 10:1, 15:1 <sub>(2)</sub> , 25:1, 50:1, 100:1	70 (620)	140 (1239)	280 (2478)
		15:1 <sub>(1)</sub> , 150:1	50 (443)	100 (885)	190 (1682)
Nominal Input Speed ( $n_{1n}$ )	RPM	5:1	3700	3100	2700
		10:1, 15:1 <sub>(1)</sub>	4200	3500	3000
		2-stage	3500	3000	3000
Max Input Speed ( $n_{1max}$ )	RPM		6000	6000	5000
Standard Output Backlash (j)	arcmin	1-stage	< 7	< 7	< 6
		2-stage	< 9	< 9	< 8
Allowable Radial Load ( $F_{rad}$ ) <sup>1)</sup>	N (lbs)		2200 (495)	4050 (911)	6200 (1395)
Allowable Axial Load ( $F_{axial}$ )	N (lbs)		1100 (248)	2025 (456)	3100 (698)
Torsional Stiffness ( $C_{271}$ )	Nm/arcmin		1.5	4.0	10.0
	(lb-in/arcmin)		(13.28)	(35.40)	(88.51)
Weight (m)	kg (lbs)	1-stage	2.6 (5.7)	4.5 (9.9)	9 (19.8)
		2-stage	3.6 (7.9)	6.8 (15)	14.8 (32.6)
Noise Level ( $L_{pA}$ )	dB(A)	1-stage	< 66	< 66	< 68
		2-stage	< 69	< 70	< 72
Mass Moment of Inertia ( $J_1$ )	kg cm <sup>2</sup> (lb-in <sup>2</sup> )	5:1	0.44 (0.15)	1.08 (0.37)	3.7 (1.258)
		10:1, 15:1 <sub>(1)</sub>	0.35 (0.119)	0.84 (0.286)	2.9 (0.986)
		15:1 <sub>(2)</sub> , 25:1	0.17 (0.058)	0.45 (0.153)	1.65 (0.561)
		50:1, 100:1	0.14 (0.048)	0.34 (0.116)	1.1 (0.374)
Efficiency at Load		5,10: 96%	15:1 <sub>(1)</sub> 93%	15 <sub>(2)</sub> , 25, 50, 100, 150 87%	
Service Life		>15000 hours			
Lubrication		Life Time Lubrication			
Protection Rating		IP 64			
Operating Temperature Range		-10°C to 100°C (14°F to 212°F)			

1) Load applied at center of output shaft @100 RPM

\* other ratios available

\*\*15:1 ratio available in 1-stage and 2-stage variations





DL - PW and DL - PH		55		75		90	
		mm	(in)	mm	(in)	mm	(in)
D1 <sub>max</sub> (1 stage)*	motor shaft diameter	16	(0.63)	20	(0.787)	35	(1.378)
D1 <sub>max</sub> (2 stage standard)*	motor shaft diameter	14	(0.551)	19	(0.748)	19	(0.748)
D1 <sub>max</sub> (2 stage available)*	motor shaft diameter	16	(0.63)	24	(0.945)	24	(0.945)
D2 k6	output shaft diameter	16	(0.63)	22	(0.866)	32	(1.26)
D3 g6	pilot diameter	60	(2.362)	70	(2.756)	90	(3.543)
D4	bolt circle	68	(2.677)	85	(3.346)	120	(4.724)
D5	mounting holes	5.5	(0.217)	6.6	(0.26)	9	(0.354)
D6 H7**	hollow bore diameter	15	(0.591)	20	(0.787)	30	(1.181)
D7	shrink disc OD (included)	44	(1.732)	50	(1.969)	72	(2.835)
L1 1-stage***	gearbox length	172	(6.772)	206	(8.11)	249.5	(9.823)
L1 2-stage***		236	(9.291)	304.5	(11.99)	336	(13.23)
L2	shaft length	48.0	(1.89)	56	(2.205)	80	(3.15)
L3	flange thickness	8.5	(0.335)	10	(0.394)	13	(0.512)
L4	usable shaft length	28	(1.102)	36	(1.417)	58	(2.283)
L5	pilot height	18	(0.709)	18	(0.709)	20	(0.787)
L6	flange size	66	(2.598)	76	(2.992)	101	(3.976)
L7	gear offset	9	(0.354)	14	(0.551)	18	(0.709)
L8	gearbox width	141.5	(5.571)	166	(6.535)	216	(8.504)
L10	shaft to centerline	95	(3.740)	110	(4.331)	148	(5.827)
L11	shrink disc to centerline	estimated 70	(2.756)	estimated 86	(3.386)	estimated 108	(4.252)
F2	shaft thread per DIN332/1	M6 x 16		M8 x 19		M12x28	

\* for larger motor shaft diameters, please contact GAM \*\*mating shaft should have h6 tolerance \*\*\*depending on motor, length may vary



#### Recommended Output Coupling (if necessary)

metal bellows	KLC-50	KLC-125	KM-270
elastomer	EKC-80	EKC-110	EKM-300

#### TYPE CODES FOR DYNA-LITE SERIES (DL-P)

**Example: DL - PW - 075 - 005 H - [090 - 15A] - S111**

##### Gearbox Series

DL = Dyna-Lite

##### Gearbox Style

PW = shaft output

PH = hollow output

##### Gearbox Size

055, 075, 090

##### Ratio

5, 10, 15, 25, 50, 100, 150

##### Special Options

Assigned by GAM

##### Motor Mount Kit

Assigned by GAM

##### Options Available for This Product

G = Keyed output shaft

H = Smooth output shaft

#### Tolerances (mm)

Size	k6	g6	H7
Over 18	+0.015	-0.007	+0.021
Thru 30	+0.002	-0.020	0
Over 30	+0.018	-0.009	+0.025
Thru 50	+0.002	-0.025	0
Over 50	+0.021	-0.010	+0.030
Thru 80	+0.002	-0.029	0
Over 80	+0.025	-0.012	+0.035
Thru 120	+0.003	-0.034	0
Over 120	+0.028	-0.014	+0.040
Thru 180	+0.003	-0.039	0





## ▶ HIGH PERFORMANCE: EPR SERIES

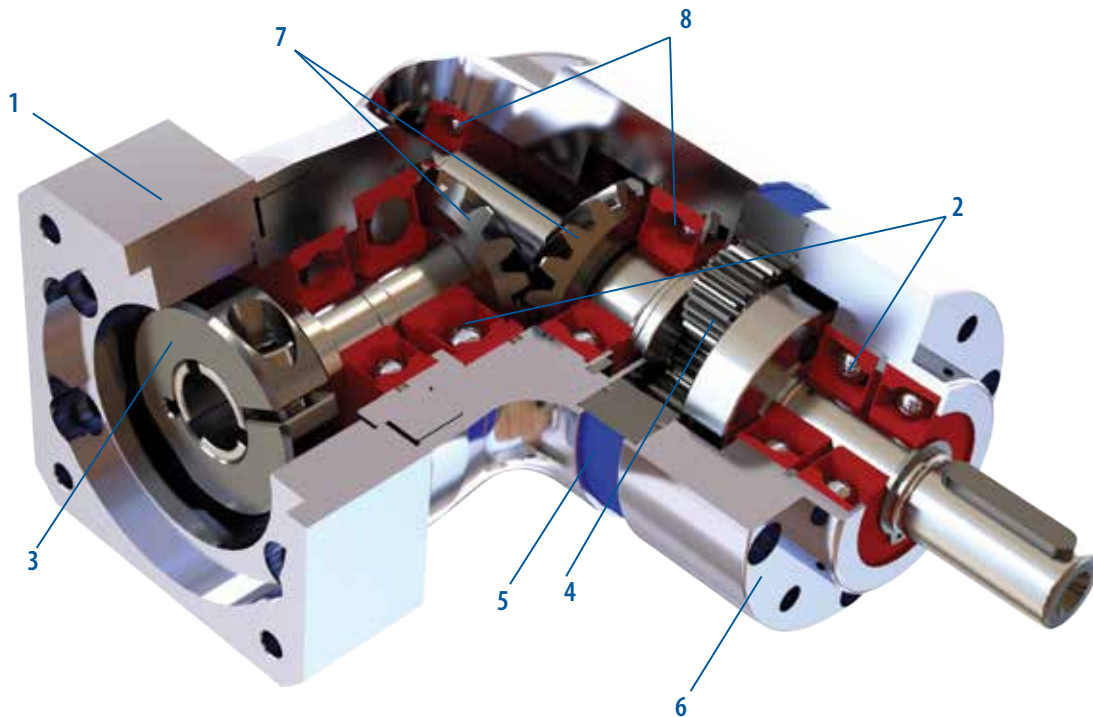
### GAM can.

If you don't see exactly what you need, let us know. We can modify the EPR Series gearboxes to meet your needs. Page 4 provides a list of commonly requested modifications to give you a feel for our capabilities.

The EPR Series Right Angle Bevel Planetary Gearboxes provide all the advantages of our popular EPL inline gearboxes in a right angle configuration. Offering the best quality available for the price point, the EPR is ideal for most servo, stepper and other motion control applications. With the same selection of outputs as the EPL, there is an EPR to fit your application.

### EPR Features

- Easy to configure with 5 outputs matching the EPL
- 30,000 hours of service life for most models
- Ratios from 3:1 to 1000:1
- Ready to mount to your motor



1. Adapter Plate  
(Customized adapter plates for quick and easy motor mounting)

2. Angular Contact Bearings  
(for high radial and axial loading)

3. Input Clamping Element

4. Planet Gears  
(precision ground gears)

5. Ring Gear  
(Ring gear incorporated into housing)

6. Output face

7. Precision ground spiral bevel gears

8. Bevel gear supported at both ends  
(input to planetary)



### **EPR-W**

- GAM metric output face with heavy-duty output bearings
- Frame sizes from 50 mm to 150 mm



### **EPR-X**

- NEMA output face with oversized English shaft
- Frame sizes from NEMA 17 to 56



### **EPR-A**

- Metric output dimensions match popular gearboxes
- Frame sizes from 50 mm to 155 mm



### **EPR-F**

- Flange output
- Sizes from 110 mm to 140 mm



### **EPR-H**

- Hollow output with zero-backlash clamping ring for direct connection to any linear actuator
- Sizes from 64 mm to 118 mm

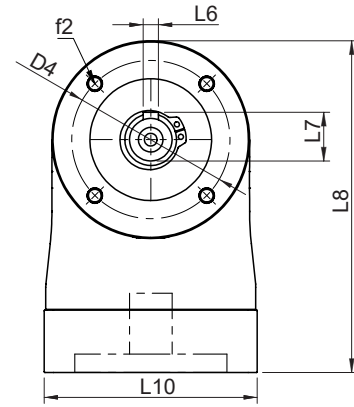
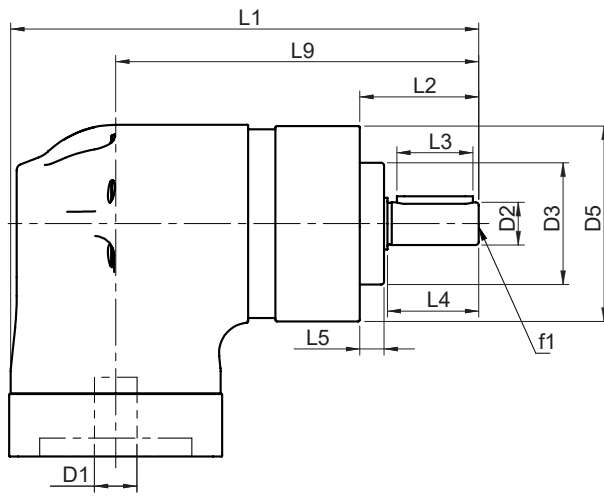


# EPR SERIES - EPR-W



EPR-W Series		64	84	118	
Stock Ratios		3, 5, 7, 10, 25, 50, 100 (Standard Input)			
All Ratios Available		1-Stage Planetary: 3, 4, 5, 7, 10 2-Stage Planetary: 12, 16, 20, 25, 35, 40, 50, 70, 100 3-Stage Planetary: 120, 160, 200, 250, 350, 490, 700, 1000 (Consult GAM for other ratios)			
Nominal Output Torque ( $T_{2n}$ )	Nm (lb-in)	3:1	16 (142)	33 (292)	82 (726)
		4, 5, 7:1	22 (195)	45 (398)	101 (894)
		10, 100, 1000:1	14 (124)	34 (301)	90 (797)
		all other ratios	30 (266)	71 (628)	149 (1319)
Max Acceleration Output Torque ( $T_{2B}$ )	Nm (lb-in)	3:1	30 (266)	57 (504)	148 (1310)
		4, 5, 7:1	37 (327)	84 (743)	168 (1487)
		10, 100, 1000:1	21 (186)	65 (575)	155 (1372)
		all other ratios	37 (327)	89 (788)	181 (1602)
Emergency Output Torque ( $T_{2not}$ )	Nm (lb-in)	3:1	72 (637)	160 (1416)	200 (1770)
		4, 5, 7:1	84 (743)	216 (1912)	480 (4248)
		10, 100, 1000:1	62 (549)	160 (1416)	410 (3629)
		all other ratios	84 (743)	216 (1912)	480 (4248)
Nominal Speed ( $n_{1n}$ )	RPM	-	3500	3000	2500
Max Speed ( $n_{1max}$ )		-	6000	6000	5000
Standard Output Backlash (j)	arcmin	1-stage	≤12	≤12	≤10
		2-stage	≤14	≤14	≤12
		3-stage	≤15	≤15	≤12
Allowable Radial Load ( $F_{rad}$ ) <sup>1)</sup>	N (lbs)	-	1900 (427)	2800 (629)	5000 (1124)
Allowable Axial Load ( $F_{axial}$ )	N (lbs)	-	1500 (337)	2500 (562)	4500 (1012)
Torsional Stiffness ( $C_{221}$ )	Nm/arcmin (lb-in/arcmin)	10,100,1000	2.8 (25)	5.4 (48)	10 (89)
		7,70,700	3.2 (28)	6.8 (60)	16 (142)
		all other ratios	3.9 (35)	9.1 (81)	19 (168)
Weight (m)	kg (lbs)	1-stage	3.0 (6.6)	5.6 (12)	15 (33)
		2-stage	3.3 (7.3)	6.4 (14)	17 (37)
		3-stage	3.6 (7.9)	7.2 (16)	19 (42)
Noise Level ( $L_{pk}$ )	dB(A)	-	≤75	≤78	≤78
Mass Moment of Inertia ( $J_1$ )	kg cm <sup>2</sup> (lb-in <sup>2</sup> )	3:1	0.95 (0.32)	5.4 (1.8)	22 (7.5)
		4:1, 12:1, 16:1	0.88 (0.30)	5.1 (1.7)	20 (6.8)
		5:1, 20:1, 25:1	0.86 (0.29)	5.1 (1.7)	20 (6.8)
		7:1, 35:1	0.85 (0.29)	5.0 (1.7)	19 (6.5)
		10:1, 40:1 - 100:1	0.84 (0.29)	4.9 (1.7)	19 (6.5)
		120:1 - 1000:1	0.84 (0.29)	4.9 (1.7)	19 (6.5)
Efficiency at Load	1-stage: 92% 2-stage: 90% 3-stage: 88%				
Service Life	> 30,000 hours				
Lubrication	Mineral Grease EPO				
Protection Rating	IP 64				
Operating Temperature Range	-20°C to 90°C				

1) Load applied at center of output shaft @100 RPM

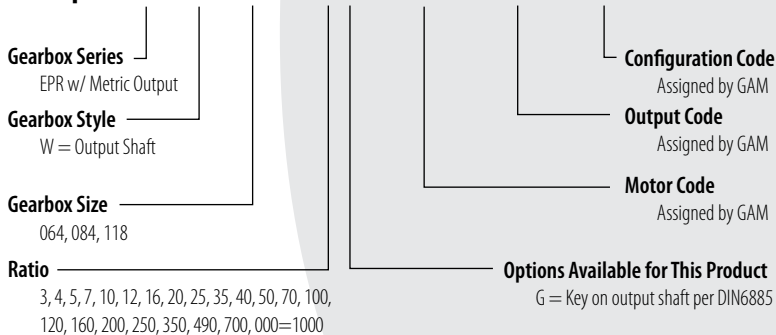


EPR-W Series		64		84		118	
		mm	(in)	mm	(in)	mm	(in)
D1 <sub>max standard</sub>	motor shaft diameter	14	(0.551)	19	(0.748)	24	(0.945)
D2 <sub>k6</sub>	output shaft diameter	14	(0.551)	20	(0.787)	25	(0.984)
D3 <sub>h7</sub>	pilot diameter	40	(1.575)	55	(2.165)	80	(3.15)
D4	bolt circle	52	(2.047)	70	(2.756)	100	(3.937)
D5	housing diameter	64	(2.52)	84	(3.307)	118	(4.646)
f1	shaft thread	M5x12		M6x16		M10x22	
f2	mounting holes	M5x12		M6x14		M8x18	
L1 (1-stage)*	gearbox length	154	(6.063)	217.5	(8.563)	276.5	(10.886)
L1 (2-stage)*		176	(6.929)	250.5	(9.862)	316.5	(12.461)
L1 (3-stage)*		198	(7.795)	283.5	(11.161)	357.5	(14.075)
L2	shaft length	39	(1.535)	54	(2.126)	61	(2.402)
L3	key length	25	(0.984)	36	(1.417)	45	(1.772)
L4	usable shaft length	30	(1.181)	45	(1.772)	50	(1.969)
L5	pilot height	8	(0.315)	8	(0.315)	10	(0.394)
L6	key width	5	(0.197)	6	(0.236)	8	(0.315)
L7	key height	16	(0.63)	22.5	(0.886)	28	(1.102)
L8**	gearbox height	108.6	(4.276)	153	(6.024)	183.5	(7.224)
L9 (1-stage)	length to input centerline	119.3	(4.697)	171	(6.732)	216.5	(8.524)
L9 (2-stage)		141.3	(5.563)	204	(8.031)	256.5	(10.098)
L9 (3-stage)		163.3	(6.429)	237	(9.331)	297.5	(11.713)
L10**	adapter size	70	(2.756)	90	(3.543)	120	(4.724)

\* depending on the motor, value can vary

### TYPE CODES FOR EPR SERIES (EPR-W)

**Example: EPR - W - 084 - 005 G - M0000 - H0000 - C0000**



Tolerances (mm)		
Size	k6	h7
Over 10	+0.012	0
Thru 18	+0.001	-0.018
Over 18	+0.015	0
Thru 30	+0.002	-0.021
Over 30	+0.018	0
Thru 50	+0.002	-0.025
Over 50	+0.021	0
Thru 80	+0.002	-0.030
Over 80	+0.025	0
Thru 120	+0.003	-0.035

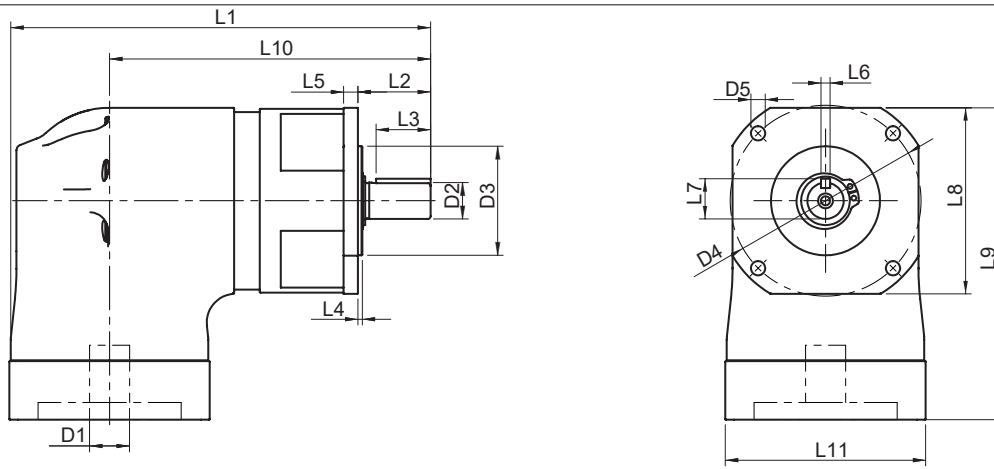


# EPR SERIES - EPR-X (NEMA)



EPR-X (NEMA) Series		23	34	42	56	
Stock Ratios		3, 5, 7, 10, 25, 50, 100		N/A		
All Ratios Available		1-Stage Planetary: 3, 4, 5, 7, 10 2-Stage Planetary: 12, 16, 20, 25, 35, 40, 50, 70, 100 3-Stage Planetary: 120, 160, 200, 250, 350, 490, 700, 1000				
Nominal Output Torque ( $T_{2n}$ )	Nm (lb-in)	3:1	16 (142)	33 (292)	82 (726)	82 (726)
		4, 5, 7:1	22 (195)	45 (398)	101 (894)	101 (894)
		10, 100, 1000:1	14 (124)	34 (301)	90 (797)	90 (797)
		all other ratios	30 (266)	71 (628)	149 (1319)	149 (1319)
Max Accel. Torque ( $T_{2B}$ )	Nm (lb-in)	3:1	30 (266)	57 (504)	148 (1310)	148 (1310)
		4, 5, 7:1	37 (327)	84 (743)	168 (1487)	168 (1487)
		10, 100, 1000:1	21 (186)	65 (575)	155 (1372)	155 (1372)
		all other ratios	37 (327)	89 (788)	181 (1602)	181 (1602)
Emergency Output Torque ( $T_{2not}$ )	Nm (lb-in)	3:1	72 (637)	160 (1416)	200 (1770)	200 (1770)
		4, 5, 7:1	84 (743)	216 (1912)	480 (4248)	480 (4248)
		10, 100, 1000:1	62 (549)	160 (1416)	410 (3629)	410 (3629)
		all other ratios	84 (743)	216 (1912)	480 (4248)	480 (4248)
Nominal Speed ( $n_{1n}$ )	RPM	-	3300	2900	2400	2400
Max Input Speed ( $n_{1max}$ )		6000	6000	5000	5000	
Standard Output Backlash (j)	arcmin	1-stage	< 12	< 12	< 10	< 10
		2-stage	< 14	< 14	< 12	< 12
		3-stage	< 15	< 15	< 12	< 12
Allowable Radial Load ( $F_{rad}$ ) <sup>1)</sup>	N (lbs)	-	450 (101)	900 (203)	2175 (489)	2175 (489)
Allowable Axial Load ( $F_{axial}$ )	N (lbs)	-	420 (95)	650 (146)	1375 (309)	1375 (309)
Torsional Stiffness ( $C_{t21}$ )	Nm/arcmin (lb-in/ arcmin)	10,100,1000	2.8 (25)	5.4 (48)	10 (89)	10 (89)
		7,70,700	3.2 (28)	6.8 (60)	16 (142)	16 (142)
		all other ratios	3.9 (35)	9.1 (81)	19 (168)	19 (168)
Weight (m)	kg (lbs)	1-stage	3.0 (6.6)	5.6 (12)	15 (33)	15 (33)
		2-stage	3.3 (7.3)	6.4 (14)	17 (37)	17 (37)
		3-stage	3.6 (7.9)	7.2 (16)	19 (42)	19 (42)
Noise Level ( $L_{pA}$ )	dB(A)	-	< 75	< 78	< 78	< 78
Mass Moment of Inertia ( $J_1$ )	kg cm <sup>2</sup> (lb-in <sup>2</sup> )	3:1	0.95 (0.32)	5.4 (1.8)	22 (7.5)	22 (7.5)
		4:1, 12:1, 16:1	0.88 (0.30)	5.1 (1.7)	20 (6.8)	20 (6.8)
		5:1, 20:1, 25:1	0.86 (0.29)	5.1 (1.7)	20 (6.8)	20 (6.8)
		7:1, 35:1	0.85 (0.29)	5.0 (1.7)	19 (6.5)	19 (6.5)
		10:1, 40:1 - 100:1	0.84 (0.29)	4.9 (1.7)	19 (6.5)	19 (6.5)
		120:1 - 1000:1	0.84 (0.29)	4.9 (1.7)	19 (6.5)	19 (6.5)
Efficiency at Load	1-stage: 92% 2-stage: 90% 3-stage: 88%					
Service Life	> 30,000 hours					
Lubrication	Mineral Grease EP0					
Protection Rating	IP 64					
Operating Temperature Range	-20°C to 90°C					

1) Load applied at center of output shaft @100 RPM

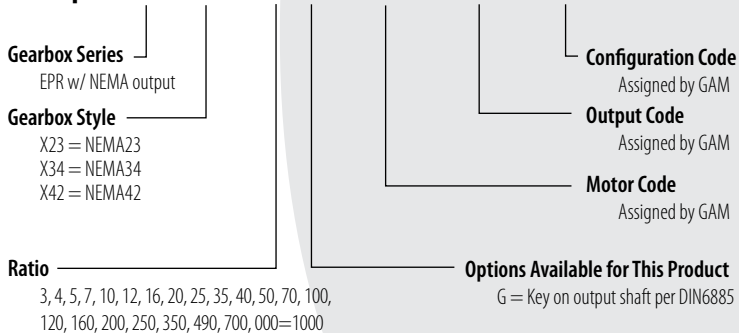


EPR-X Series		23		34		42	
		mm	(in)	mm	(in)	mm	(in)
D1 <sub>max standard</sub>	motor shaft diameter	14	(0.55)	19	(0.748)	24	(0.945)
D2 k6	output shaft diameter	12.7	(0.50)	19.1	(0.75)	25	(0.984)
D3 h7	pilot diameter	38.1	(1.50)	73.0	(2.875)	55.55	(2.187)
D4	bolt circle	66.7	(2.625)	98.4	(3.875)	125.7	(4.95)
D5	mounting holes	5	(0.197)	5.5	(0.217)	7.1	(0.28)
f1	shaft thread						
L1 (1-stage)*	gearbox length	147.2	(5.795)	203	(7.992)	276.5	(10.886)
L1 (2-stage)*		169.2	(6.661)	236	(9.291)	316.5	(12.461)
L1 (3-stage)*		191.2	(7.528)	269	(10.591)	357.5	(14.075)
L2	shaft length	25.4	(1.000)	31.8	(1.25)	42	(1.654)
L3	key length	19.1	(0.75)	25.4	(1.00)	38	(1.496)
L4	pilot height	1.6	(0.063)	1.7	(0.067)	2.4	(0.094)
L5	flange thickness	5	(0.197)	10	(0.394)	19	(0.748)
L6	key width	3.18	(0.125)	4.78	(0.188)	8	(0.315)
L7	key height / flat height	14.22	(0.56)	21.29	(0.838)	28	(1.102)
L8	flange size	65	(2.559)	90	(3.543)	120	(4.724)
L9**	gearbox height	109	(4.291)	154.7	(6.091)	184.5	(7.264)
L10 (1-stage)	length to input centerline	112.2	(4.417)	156	(6.142)	216.5	(8.524)
L10 (2-stage)		134.2	(5.283)	189	(7.441)	256.5	(10.098)
L10 (3-stage)		156.2	(6.150)	222	(8.740)	297.5	(11.713)
L11**	adapter size	70	(2.756)	90	(3.543)	120	(4.724)

\*depending on the motor, value can vary

### TYPE CODES FOR EPR SERIES (EPR-X (NEMA))

**Example: EPR - X23 - 005 G - M0000 - H0000 - C0000**



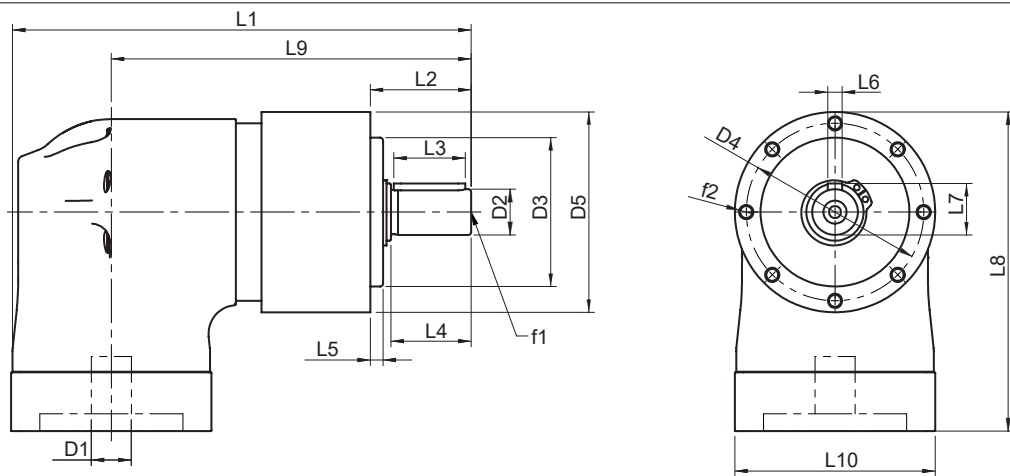
Tolerances (mm)		
Size	k6	h7
Over 10	+0.012	0
Thru 18	+0.001	-0.018
Over 18	+0.015	0
Thru 30	+0.002	-0.021
Over 30	+0.018	0
Thru 50	+0.002	-0.025
Over 50	+0.021	0
Thru 80	+0.002	-0.030
Over 80	+0.025	0
Thru 120	+0.003	-0.035



# EPR SERIES - EPR-A



EPR-A Series		70	90	120	
All Ratios Available		1-Stage Planetary: 3, 4, 5, 7, 10			
		2-Stage Planetary: 12, 16, 20, 25, 35, 40, 50, 70, 100			
		3-Stage Planetary: 120, 160, 200, 250, 350, 490, 700, 1000 (Consult GAM for other ratios)			
Nominal Output Torque ( $T_{2n}$ )	Nm (lb-in)	3:1	16 (142)	33 (292)	82 (726)
		4, 5, 7:1	22 (195)	45 (398)	101 (894)
		10, 100, 1000:1	14 (124)	34 (301)	90 (797)
		all other ratios	30 (266)	71 (628)	149 (1319)
Max Acceleration Output Torque ( $T_{2B}$ )	Nm (lb-in)	3:1	30 (266)	57 (504)	148 (1310)
		4, 5, 7:1	37 (327)	84 (743)	168 (1487)
		10, 100, 1000:1	21 (186)	65 (575)	155 (1372)
		all other ratios	37 (327)	89 (788)	181 (1602)
Emergency Output Torque ( $T_{2not}$ )	Nm (lb-in)	3:1	72 (637)	160 (1416)	200 (1770)
		4, 5, 7:1	84 (743)	216 (1912)	480 (4248)
		10, 100, 1000:1	62 (549)	160 (1416)	410 (3629)
		all other ratios	84 (743)	216 (1912)	480 (4248)
Nominal Speed ( $n_{1n}$ )	RPM	-	3300	2900	2400
Max Speed ( $n_{1max}$ )	RPM	-	6000	6000	5000
Standard Output Backlash ( $j$ )	arcmin	1-stage	< 12	< 12	< 10
		2-stage	< 14	< 14	< 12
		3-stage	< 15	< 15	< 12
Allowable Radial Load ( $F_{rad}$ ) <sup>1)</sup>	N (lbs)	-	1550 (348)	2400 (540)	4600 (1034)
Allowable Axial Load ( $F_{axial}$ )	N (lbs)	-	1450 (326)	1900 (427)	4000 (899)
Torsional Stiffness ( $C_{t21}$ )	Nm/arcmin (lbin/arcmin)	10,100,1000	2.8 (25)	5.4 (48)	10 (89)
		7,70,700	3.2 (28)	6.8 (60)	16 (142)
		all other ratios	3.9 (35)	9.1 (81)	19 (168)
Weight (m)	kg (lbs)	1-stage	3.0 (6.6)	5.6 (12)	15 (33)
		2-stage	3.3 (7.3)	6.4 (14)	17 (37)
		3-stage	3.6 (7.9)	7.2 (16)	19 (42)
Noise Level ( $L_{pA}$ )	dB(A)	-	< 75	< 78	< 78
Mass Moment of Inertia ( $J_1$ )	kg cm <sup>2</sup> (lb-in <sup>2</sup> )	3:1	0.95 (0.32)	5.4 (1.8)	22 (7.5)
		4:1, 12:1, 16:1	0.88 (0.30)	5.1 (1.7)	20 (6.8)
		5:1, 20:1, 25:1	0.86 (0.29)	5.1 (1.7)	20 (6.8)
		7:1, 35:1	0.85 (0.29)	5.0 (1.7)	19 (6.5)
		10:1, 40:1 - 100:1	0.84 (0.29)	4.9 (1.7)	19 (6.5)
		120:1 - 1000:1	0.84 (0.29)	4.9 (1.7)	19 (6.5)
Efficiency at Load	1-stage: 92% 2-stage: 90% 3-stage: 88%				
Service Life	> 30,000 hours				
Lubrication	Mineral Grease EPO				
Protection Rating	IP 64				
Operating Temperature Range	-20°C to 90°C				



EPR-A Series		70		90		120	
		mm	(in)	mm	(in)	mm	(in)
D1 <sup>max standard</sup>	motor shaft diameter	14	(0.551)	19	(0.748)	24	(0.945)
D2 k6	output shaft diameter	16	(0.630)	22	(0.866)	32	(1.260)
D3 h7	pilot diameter	52	(2.047)	68	(2.677)	90	(3.543)
D4	bolt circle	62	(2.441)	80	(3.150)	108	(4.252)
D5	housing diameter	70	(2.756)	90	(3.543)	118	(4.646)
f1	shaft thread	M5x17		M8x25		M12x37	
f2	mounting holes	(8x) M5x12		(8x) M6x14		(8x) M8x18	
L1 (1-stage)*	gearbox total length	161	(6.339)	212	(8.346)	300.5	(11.831)
L1 (2-stage)*		183	(7.205)	244	(9.606)	341.5	(13.445)
L1 (3-stage)*		205	(8.071)	277	(10.906)	382.5	(15.059)
L2	shaft length	36	(1.417)	46	(1.811)	70	(2.756)
L3	key length	25	(0.984)	30	(1.181)	50	(1.968)
L4	useable shaft length	28	(1.102)	35	(1.378)	58	(2.283)
L5	pilot height	5.5	(0.217)	9	(0.354)	7	(0.276)
L6	key width	5	(0.197)	6	(0.236)	10	(0.394)
L7	key height	18	(0.709)	24.5	(0.965)	35	(1.378)
L8**	gearbox height	111.5	(4.390)	156	(6.142)	184.5	(7.264)
L9 (1-stage)	length to input centerline	126	(4.961)	166	(6.535)	240.5	(9.469)
L9 (2-stage)		148	(5.827)	198	(7.795)	281.5	(11.083)
L9 (3-stage)		170	(6.693)	231	(9.094)	322.5	(12.697)
L10**	adapter size	70	(2.756)	90	(3.543)	120	(4.724)

\*depending on the motor, value can vary

### TYPE CODES FOR EPR SERIES (EPR-A)

**Example: EPR - A - 090 - 005 G - M0000 - H0000 - C0000**

**Gearbox Series**

EPR w/ Popular Metric Output Dimensions

**Gearbox Style**

A= Output Shaft

**Gearbox Size**

070, 090, 120

**Ratio**

3, 4, 5, 7, 10, 12, 16, 20, 25, 35, 40, 50, 70, 100, 120, 160, 200, 250, 350, 490, 700, 000=1000

**Configuration Code**

Assigned by GAM

**Output Code**

Assigned by GAM

**Motor Code**

Assigned by GAM

**Options Available for This Product**

G = Key on output shaft per DIN6885

### Tolerances (mm)

Size	k6	h6
Over 10	+0.012	0
Thru 18	+0.001	-0.011
Over 18	+0.015	0
Thru 30	+0.002	-0.013
Over 30	+0.018	0
Thru 50	+0.002	-0.016
Over 50	+0.021	0
Thru 80	+0.002	-0.019
Over 80	+0.025	0
Thru 120	+0.003	-0.022

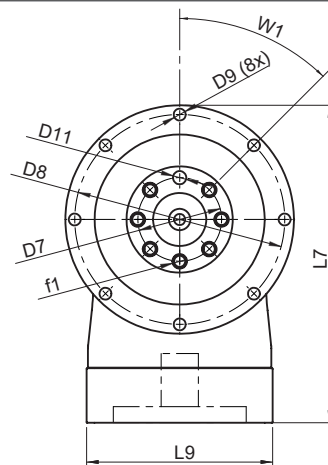
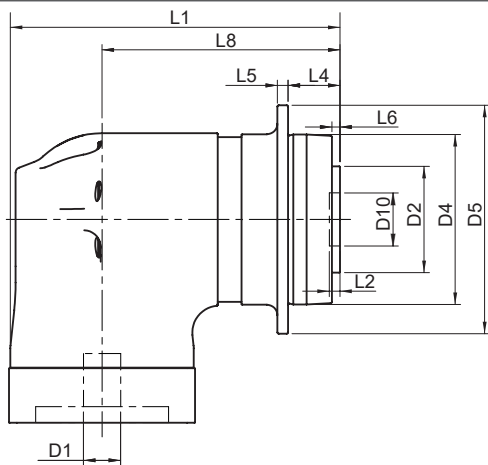




# EPR SERIES - EPR-F



EPR-F Series		64		90		110	
All Ratios Available		1-Stage Planetary: 3, 4, 5, 7, 10 2-Stage Planetary: 12, 16, 20, 25, 35, 40, 50, 70, 100 3-Stage Planetary: 120, 160, 200, 250, 350, 490, 700, 1000					
Nominal Output Torque ( $T_{2n}$ )	Nm (lb-in)	3:1	16 (142)	33 (292)	82 (726)		
		4, 5, 7:1	22 (195)	45 (398)	101 (894)		
		10, 100, 1000:1	14 (124)	34 (301)	90 (797)		
		all other ratios	30 (266)	71 (628)	149 (1319)		
Max Acceleration Output Torque ( $T_{2B}$ )	Nm (lb-in)	3:1	30 (266)	57 (504)	148 (1310)		
		4, 5, 7:1	37 (327)	84 (743)	168 (1487)		
		10, 100, 1000:1	21 (186)	65 (575)	155 (1372)		
		all other ratios	37 (327)	89 (788)	181 (1602)		
Emergency Output Torque ( $T_{2not}$ )	Nm (lb-in)	3:1	72 (637)	160 (1416)	200 (1770)		
		4, 5, 7:1	84 (743)	216 (1912)	480 (4248)		
		10, 100, 1000:1	62 (549)	160 (1416)	410 (3629)		
		all other ratios	84 (743)	216 (1912)	480 (4248)		
Nominal Speed ( $n_{1n}$ )	RPM	-	3300	2900	2400		
Max Speed ( $n_{1max}$ )	RPM	-	6000	6000	5000		
Standard Output Backlash ( $j$ )	arcmin	1-stage	$\leq 12$	$\leq 12$	$\leq 10$		
		2-stage	$\leq 14$	$\leq 14$	$\leq 12$		
		3-stage	$\leq 15$	$\leq 15$	$\leq 12$		
Allowable Radial Load ( $F_{rad}$ ) <sup>1)</sup>	N (lbs)	-	1200 (270)	2000 (450)	3100 (697)		
Allowable Axial Load ( $F_{axial}$ )	N (lbs)	-	1100 (247)	2500 (562)	3900 (877)		
Torsional Stiffness ( $C_{t21}$ )	Nm/arcmin (lbin/arcmin)	10,100,1000	2.8 (25)	5.4 (48)	10 (89)		
		7,70,700	3.2 (28)	6.8 (60)	16 (142)		
		all other ratios	3.9 (35)	9.1 (81)	19 (168)		
Weight (m)	kg (lbs)	1-stage	3.0 (6.6)	5.6 (12)	15 (33)		
		2-stage	3.3 (7.3)	6.4 (14)	17 (37)		
		3-stage	3.6 (7.9)	7.2 (16)	19 (42)		
Noise Level ( $L_{pA}$ )	dB(A)	-	< 75	< 78	< 78		
Mass Moment of Inertia ( $J_1$ )	kg cm <sup>2</sup> (lb-in <sup>2</sup> )	3:1	1.11 (0.38)	5.8 (2.0)	24 (8.2)		
		4:1, 12:1, 16:1	1.00 (0.34)	5.5 (1.9)	22 (7.5)		
		5:1, 20:1, 25:1	0.98 (0.33)	5.2 (1.8)	20 (6.8)		
		7:1, 35:1	0.89 (0.30)	5.1 (1.7)	19 (6.5)		
		10:1, 40:1 - 100:1	0.88 (0.30)	5.1 (1.7)	19 (6.5)		
		120:1 - 1000:1	0.88 (0.30)	5.1 (1.7)	19 (6.5)		
Efficiency at Load	1-stage: 92% 2-stage: 90% 3-stage: 88%						
Service Life	> 30,000 hours						
Lubrication	Mineral Grease EPO						
Protection Rating	IP 64						
Operating Temperature Range	-20°C to 90°C						

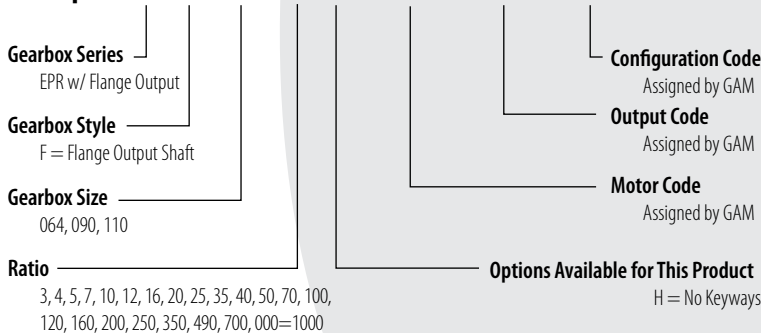


EPR-F Series		64		90		110	
		mm	(in)	mm	(in)	mm	(in)
D1 <sub>max standard</sub>	motor shaft diameter	14	(0.551)	19	(0.748)	24	(0.945)
D2 h7	output flange diameter	40	(1.575)	63	(2.480)	80	(3.150)
D4 h7	pilot diameter	64	(2.520)	90	(3.543)	110	(4.331)
D5	flange diameter	86	(3.386)	118	(4.646)	145	(5.709)
D7	inner bolt circle	31.5	(1.240)	50	(1.968)	63	(2.480)
D8	outer bolt circle	79	(3.110)	109	(4.291)	135	(5.315)
D9	mounting hole diameter (8x)	4.5	(0.177)	5.5	(0.217)	5.5	(0.217)
D10 H7	flange pilot	20	(0.787)	31.5	(1.240)	40	(1.575)
D11 H7	dowel diameter	5	(0.197)	6	(0.236)	6	(0.236)
f1	flange tap	(7) M5x10		(7) M6x12		(15) M6x12	
L1 (1-stage)*	gearbox Length	124.5	(4.902)	169	(6.654)	238.5	(9.390)
L1 (2-stage)*		146.5	(5.768)	202	(7.953)	279.5	(11.004)
L1 (3-stage)*		168.5	(6.634)	235	(9.252)	320.5	(12.618)
L2	flange pilot depth	4	(0.157)	6	(0.236)	6	(0.236)
L4	output length	19.5	(0.768)	30	(1.181)	29	(1.142)
L5	flange thickness	4	(0.157)	7	(0.276)	8	(0.315)
L6	output flange length	3	(0.118)	6	(0.236)	6	(0.236)
W1	output flange thread angle	45°		45°		22.5°	
L7**	gearbox height	119.5	(4.705)	170	(6.693)	197	(7.756)
L8 (1-stage)	length to input centerline	89.5	(3.524)	122	(4.803)	178.5	(7.028)
L8 (2-stage)		111.5	(4.390)	155	(6.102)	219.5	(8.642)
L8 (3-stage)		133.5	(5.256)	188	(7.402)	260.5	(10.256)
L9**	adapter size	70	(2.756)	90	(3.543)	120	(4.724)

\* depending on the motor, value can vary

### TYPE CODES FOR EPR SERIES (EPR-F)

**Example: EPR - F - 090 - 005 H - M0000 - H0000 - C0000**



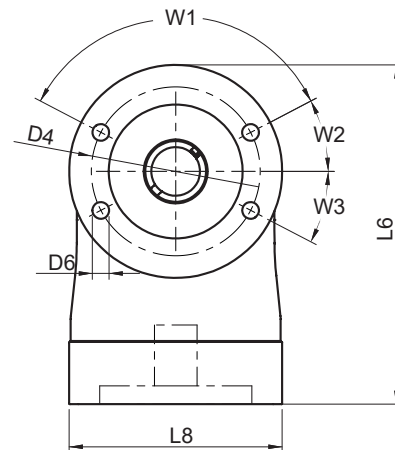
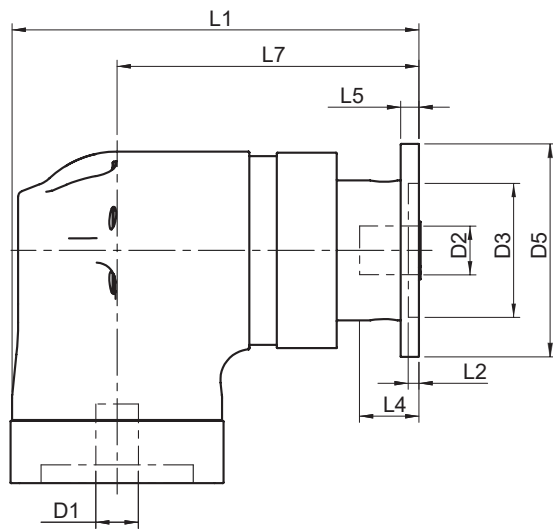
Tolerances (mm)		
Size	h7	H7
Over 10	0	0.018
Thru 18	-0.018	0
Over 18	0	0.021
Thru 30	-0.021	0
Over 30	0	+0.025
Thru 50	-0.025	0
Over 50	0	+0.030
Thru 80	-0.030	0
Over 80	0	+0.035
Thru 120	-0.035	0



# EPR SERIES: EPR-H



EPR-H Series		64	84	118	
Stock Ratios		3, 5, 7, 10, 25, 50, 100 (Standard Input)			
All Ratios Available		1-Stage Planetary: 3, 4, 5, 7, 10 2-Stage Planetary: 12, 16, 20, 25, 35, 40, 50, 70, 100 3-Stage Planetary: 120, 160, 200, 250, 350, 490, 700, 1000			
Nominal Output Torque ( $T_{2n}$ )	Nm (lb-in)	3:1	14 (124)	33 (292)	82 (726)
		4:1, 5:1, 7:1	22 (195)	45 (398)	101 (894)
		10:1, 100:1, 1000:1	14 (124)	34 (301)	90 (797)
		all other ratios	30 (266)	64 (566)	149 (1319)
Max Accel Output Torque ( $T_{2B}$ )	Nm (lb-in)	3:1	25 (221)	57 (504)	148 (1310)
		4:1, 5:1, 7:1	37 (327)	75 (664)	168 (1487)
		10:1, 100:1, 1000:1	21 (186)	65 (575)	155 (1372)
		all other ratios	37 (327)	75 (664)	180 (1593)
Nominal Input Speed ( $n_{1n}$ )	RPM	-	3300	2900	2400
Max Input Speed ( $n_{1max}$ )	RPM	-	6000	6000	5000
Standard Output Backlash (j)	arcmin	1-stage	≤12	≤12	≤10
		2-stage	≤14	≤14	≤12
		3-stage	≤15	≤15	≤12
Weight (m)	kg (lb)	1-stage	3.0 (6.6)	5.6 (12)	15 (33)
		2-stage	3.3 (7.3)	6.4 (14)	17 (37)
		3-stage	3.6 (7.9)	7.2 (16)	19 (42)
Noise Level ( $L_{pA}$ )	dB (A)	-	< 75	< 78	< 78
Mass Moment of Inertia ( $J_1$ )	kg cm <sup>2</sup> (lb-in <sup>2</sup> )	3:1	0.95 (0.32)	5.4 (1.8)	22 (7.5)
		4:1, 12:1, 16:1	0.88 (0.30)	5.1 (1.7)	20 (6.8)
		5:1, 20:1, 25:1	0.86 (0.29)	5.1 (1.7)	20 (6.8)
		7:1, 35:1	0.85 (0.29)	5.0 (1.7)	19 (6.5)
		10:1, 40:1 - 100:1	0.84 (0.29)	4.9 (1.7)	19 (6.5)
		120:1 - 1000:1	0.84 (0.29)	4.9 (1.7)	19 (6.5)
Efficiency at Load	1-stage: 92% 2-stage: 90% 3-stage: 88%				
Service Life	> 20,000 hours				
Lubrication	Mineral Grease EPO				
Protection Rating	IP 64				
Operating Temperature Range	-20°C to 90°C				



EPR-H Series		64		84		118	
		mm	(in)	mm	(in)	mm	(in)
D1 <sub>max standard</sub>	motor shaft diameter	14	(0.551)	19	(0.748)	24	(0.945)
D2 <sub>max</sub>	output shaft diameter	16	(0.630)	20	(0.787)	30	(1.181)
D3 <sub>H7</sub>	pilot diameter	44	(1.732)	60	(2.362)	80	(3.150)
D4	bolt circle	55.5	(2.185)	73	(2.874)	105	(4.134)
D5	flange diameter	70	(2.756)	84	(3.307)	118	(4.646)
D6	mounting holes	5.5	(0.217)	5.5	(0.217)	6.6	(0.260)
L1 (1-stage)*	gearbox length	134.2	(5.283)	177	(6.969)	234	(9.213)
L1 (2-stage)*		156.2	(6.150)	210	(8.268)	275	(10.827)
L1 (3-stage)*		178.2	(7.016)	243	(9.567)	316	(12.441)
L2	pilot depth	3.5	(0.138)	3.5	(0.138)	3.5	(0.138)
L4	allowable shaft depth	28	(1.102)	30	(1.181)	27	(1.063)
L5	flange thickness	6	(0.236)	6	(0.236)	10	(0.394)
W1	bolt hole spacing	125°		4x 90°		4x 90°	
W2	hole angle 1	27.5°		67.5°		67.5°	
W3	hole angle 2	27.5°		22.5°		22.5°	
L6**	gearbox height	111.5	(4.390)	153	(6.024)	183.5	(7.224)
L7 (1-stage)	length to input centerline	99.2	(3.906)	130.5	(5.138)	173.7	(6.839)
L7 (2-stage)		121.2	(4.772)	163.5	(6.437)	214.7	(8.453)
L7 (3-stage)		143.2	(5.638)	196.5	(7.736)	255.7	(10.067)
L8**	adapter size	50	(1.969)	70	(2.756)	90	(3.543)

\* depending on the motor, value can vary

### TYPE CODES FOR EPR SERIES (EPR-H)

**Example: EPR - H - 084 - 005 H - M0000 - H0000 - C0000**

**Gearbox Series**

EPR w/ Linear Mount  
Output

**Gearbox Style**

H = Hollow Output Shaft

**Gearbox Size**

064, 084, 118

**Ratio**

3, 4, 5, 7, 10, 12, 16, 20, 25, 35, 40, 50, 70, 100,  
120, 160, 200, 250, 350, 490, 700, 000 = 1000

**Configuration Code**

Assigned by GAM

**Output Code**

Assigned by GAM

**Motor Code**

Assigned by GAM

**Options Available for This Product**

H = No Keyways

### Tolerances (mm)

Size	H7
Over 6	+0.015
Thru 10	0
Over 10	+0.018
Thru 18	0
Over 18	+0.021
Thru 30	0
Over 30	+0.025
Thru 50	0
Over 50	+0.030
Thru 80	0



## ▶ PERFORMANCE: PER SERIES

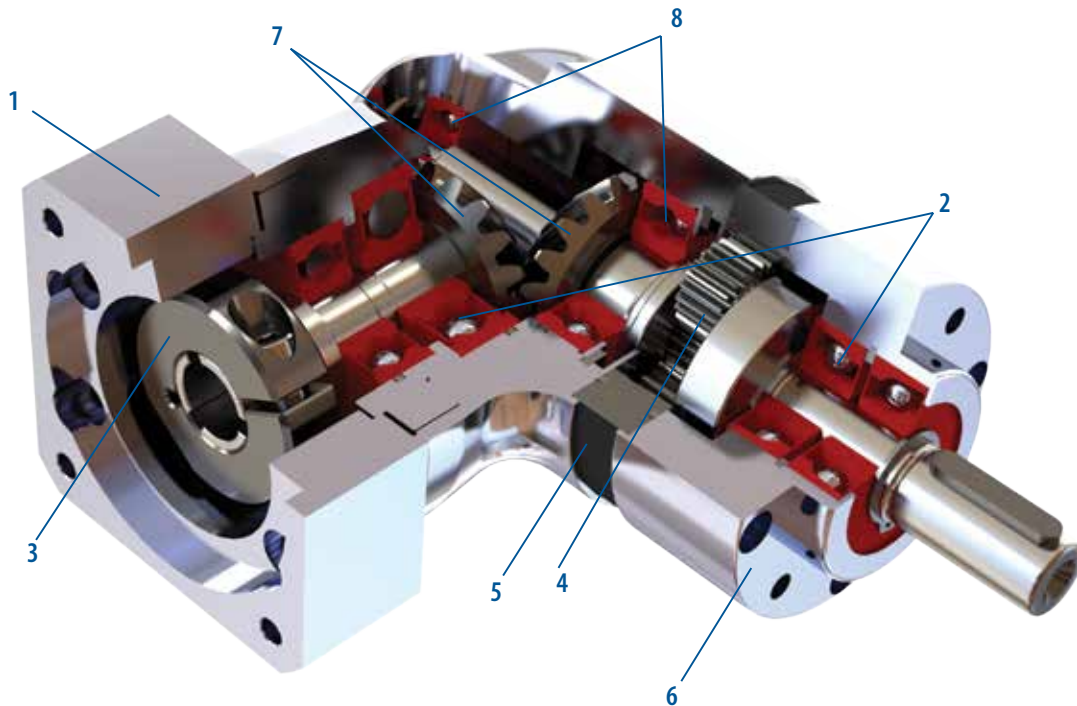
### GAM can.

If you don't see exactly what you need, let us know. We can modify the PE Series gearboxes to meet your needs. Page 4 provides a list of commonly requested modifications to give you a feel for our capabilities.

The GAM PER series is a great gearbox value for servo, stepper, and other motion control applications. It offers the best quality available for the price point. Offering the advantages of the popular EPL in a right angle configuration, the PER series is a reliable alternative when radial or axial loadings are minimized.

### PER Series offers:

- PER-W with a metric output
- PER-N with a NEMA output
- Ratios from 3:1 to 1000:1
- Ready to mount to your motor



1. Adapter Plate  
(Customized adapter plates for quick and easy motor mounting)

2. Deep Groove Ball Bearings  
(dual ball bearings)

3. Input Clamping Element

4. Planet Gears  
(precision ground gears)

5. Ring Gear  
(Ring gear incorporated into housing)

6. Output face

7. Precision ground spiral bevel gears

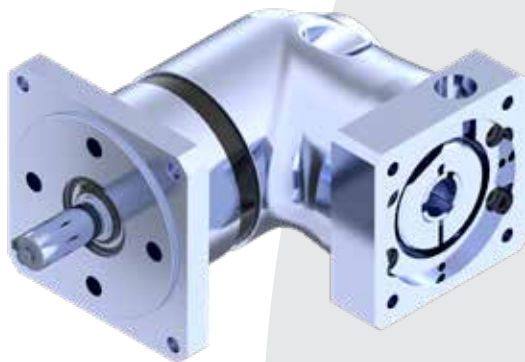
8. Bevel gear supported at both ends  
(input to planetary)



PER-W

**PER-W**

- GAM Metric output face
- Frame sizes from 50 mm to 118 mm



PER-N (NEMA)

**PER-N**

- NEMA output face
- Frame sizes from NEMA 17 to 42

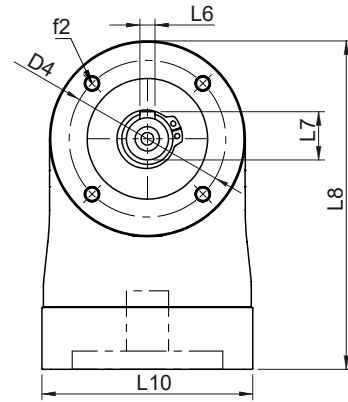
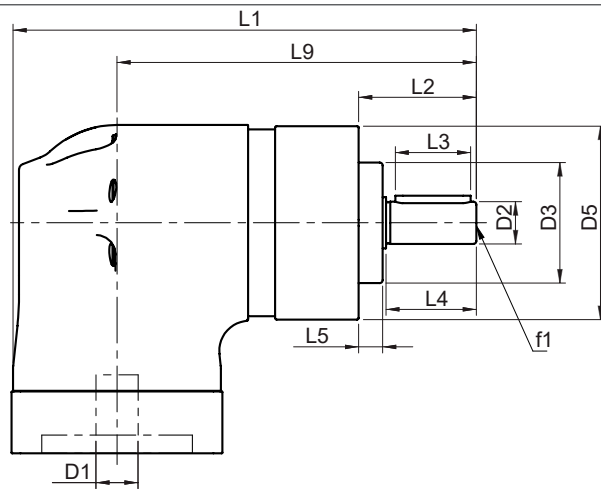


# PER-W SERIES - (METRIC)



PER-W Series		64	84	118	
Stock Ratios		5, 10, 50			
All Ratios Available		1-Stage Planetary: 3, 4, 5, 7, 10 2-Stage Planetary: 12, 16, 20, 25, 35, 40, 50, 70, 100 3-Stage Planetary: 120, 160, 200, 250, 350, 490, 700, 1000			
Nominal Output Torque ( $T_{2n}$ )	Nm (lb-in)	3:1	16 (142)	33 (292)	82 (726)
		4, 5, 7:1	22 (195)	45 (398)	101 (894)
		10, 100, 1000:1	14 (124)	34 (301)	90 (797)
		all other ratios	30 (266)	71 (628)	149 (1319)
Max Acceleration Output Torque ( $T_{2a}$ )	Nm (lb-in)	3:1	30 (266)	57 (504)	148 (1310)
		4, 5, 7:1	37 (327)	84 (743)	168 (1487)
		10, 100, 1000:1	21 (186)	65 (575)	155 (1372)
		all other ratios	37 (327)	89 (788)	181 (1602)
Emergency Output Torque ( $T_{2not}$ )	Nm (lb-in)	3:1	72 (637)	160 (1416)	200 (1770)
		4, 5, 7:1	84 (743)	216 (1912)	480 (4248)
		10, 100, 1000:1	62 (549)	160 (1416)	410 (3629)
		all other ratios	84 (743)	216 (1912)	480 (4248)
Nominal Speed ( $n_{1n}$ )	RPM	-	3300	2900	2400
Max Speed ( $n_{1max}$ )		-	6000	6000	5000
Standard Output Backlash (j)	arcmin	3:1 - 10:1	<12	<12	<10
		12:1 - 100:1	<14	<14	<12
		120:1 - 1000:1	<15	<15	<12
Allowable Radial Load ( $F_{rad}$ ) <sup>1)</sup>	N (lbs)	-	560 (126)	1300 (293)	2500 (563)
Allowable Axial Load ( $F_{axial}$ )	N (lbs)	-	500 (113)	1000 (225)	1500 (338)
Torsional Stiffness ( $C_{21}$ )	Nm/arcmin (lb-in/arcmin)	10, 100, 1000	2.8 (25)	5.4 (48)	10 (89)
		7, 70, 700	3.2 (28)	6.8 (60)	16 (142)
		all other ratios	3.9 (35)	9.1 (81)	19 (168)
Weight (m)	kg (lbs)	1-stage	3.0 (6.6)	5.6 (12)	15 (33)
		2-stage	3.3 (7.3)	6.4 (14)	17 (37)
		3-stage	3.6 (7.9)	7.2 (16)	19 (42)
Noise Level ( $L_{pa}$ )	dB(A)	-	< 75	< 78	< 78
Mass Moment of Inertia ( $J_1$ )	kg cm <sup>2</sup> (lb-in <sup>2</sup> )	3:1	0.95 (0.32)	5.4 (1.8)	22 (7.5)
		4:1, 12:1, 16:1	0.88 (0.30)	5.1 (1.7)	20 (6.8)
		5:1, 20:1, 25:1	0.86 (0.29)	5.1 (1.7)	20 (6.8)
		7:1, 35:1	0.85 (0.29)	5.0 (1.7)	19 (6.5)
		10:1, 40:1 - 100:1	0.84 (0.29)	4.9 (1.7)	19 (6.5)
		120:1 - 1000:1	0.84 (0.29)	4.9 (1.7)	19 (6.5)
Efficiency at Load	1-stage: 92% 2-stage: 90% 3-stage: 88%				
Service Life	>20,000				
Lubrication	Mineral Grease EPO				
Protection Rating	IP 64				
Operating Temperature Range	-20°C to 90°C				

1) Load applied at center of output shaft @100 RPM



PER-W Series		64		84		118	
		mm	(in)	mm	(in)	mm	(in)
D1 <sub>max standard</sub>	motor shaft diameter	14	(0.551)	19	(0.748)	24	(0.945)
D2 k6	output shaft diameter	14	(0.551)	20	(0.787)	25	(0.984)
D3 h7	pilot diameter	40	(1.575)	55	(2.165)	80	(3.150)
D4	bolt circle	52	(2.047)	70	(2.756)	100	(3.937)
D5	housing diameter	64	(2.520)	84	(3.307)	118	(4.646)
f1	shaft thread	M5x12		M6x16		M10x22	
f2	mounting holes	M5x12		M6x14		M8x18	
L1 (1-stage)*	gearbox length	154	(6.063)	217.5	(8.563)	276.5	(10.886)
L1 (2-stage)*		176	(6.929)	250.5	(9.862)	316.5	(12.461)
L1 (3-stage)*		198	(7.795)	283.5	(11.161)	357.5	(14.075)
L2	shaft length	39	(1.535)	54	(2.126)	61	(2.402)
L3	key length	25	(0.984)	36	(1.417)	45	(1.772)
L4	usable shaft length	30	(1.181)	45	(1.772)	50	(1.969)
L5	pilot height	8	(0.315)	8	(0.315)	10	(0.394)
L6	key width	5	(0.197)	6	(0.236)	8	(0.315)
L7	key height	16	(0.630)	22.5	(0.886)	28	(1.102)
L8**	gearbox height	108.6	(4.276)	153	(6.024)	183.5	(7.224)
L9 (1-stage)	length to input centerline	119.3	(4.697)	171	(6.732)	216.5	(8.524)
L9 (2-stage)		141.3	(5.563)	204	(8.031)	256.5	(10.098)
L9 (3-stage)		163.3	(6.429)	237	(9.331)	297.5	(11.713)
L10	adapter size	70	(2.756)	90	(3.543)	120	(4.724)

\* depending on the motor, value can vary

### TYPE CODES FOR PER-W SERIES (METRIC)

**Example: PER - W - 084 - 005 G - M0000 - H0000 - C00000**

**Gearbox Series**

PER w/ Metric Output

**Gearbox Style**

W = Output Shaft

**Gearbox Size**

064, 084, 118

**Ratio**

3, 4, 5, 7, 10, 12, 16, 20, 25, 35, 40, 50, 70, 100,  
120, 160, 200, 250, 350, 490, 700, 000=1000

**Configuration Code**

Assigned by GAM

**Output Code**

Assigned by GAM

**Motor Code**

Assigned by GAM

**Options Available for This Product**

G = Key on output shaft per DIN6885

### Tolerances (mm)

Size	k6	h7
Over 6	+0.010	0
Thru 10	+0.001	-0.015
Over 10	+0.012	0
Thru 18	+0.001	-0.018
Over 18	+0.015	0
Thru 30	+0.002	-0.021
Over 30	+0.018	0
Thru 50	+0.002	-0.025
Over 50	+0.021	0
Thru 80	+0.002	-0.030



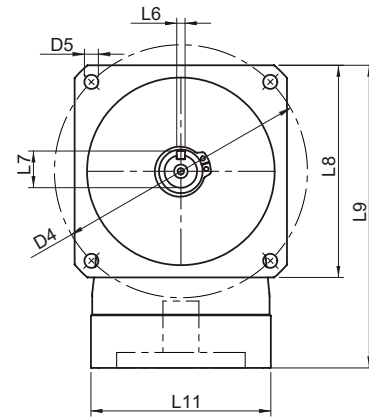
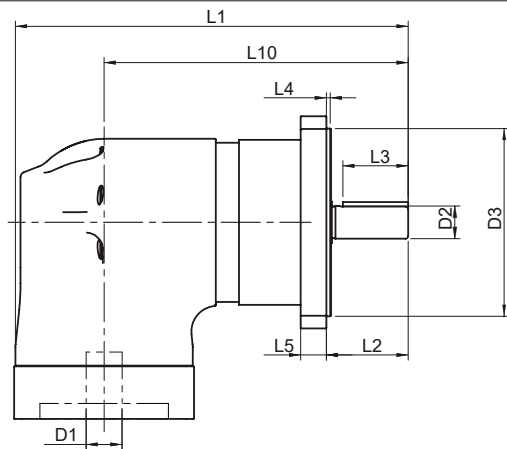


# PER-N SERIES - (NEMA)



PER-N Series		34		42	
Stock Ratios		5, 10, 50			
All Ratios Available		1-Stage Planetary: 3, 4, 5, 7, 10 2-Stage Planetary: 12, 16, 20, 25, 35, 40, 50, 70, 100 3-Stage Planetary: 120, 160, 200, 250, 350, 490, 700, 1000			
Nominal Output Torque ( $T_{2n}$ )	Nm (lb-in)	3:1	16 (142)	33 (292)	
		4, 5, 7:1	22 (195)	45 (398)	
		10, 100, 1000:1	14 (124)	34 (301)	
		all other ratios	30 (266)	71 (628)	
Max Accel. Torque ( $T_{2B}$ )	Nm (lb-in)	3:1	30 (266)	57 (504)	
		4, 5, 7:1	37 (327)	84 (743)	
		10, 100, 1000:1	21 (186)	65 (575)	
		all other ratios	37 (327)	89 (788)	
Emergency Output Torque ( $T_{2not}$ )	Nm (lb-in)	3:1	72 (637)	160 (1416)	
		4, 5, 7:1	84 (743)	216 (1912)	
		10, 100, 1000:1	62 (549)	160 (1416)	
		all other ratios	84 (743)	216 (1912)	
Nominal Speed ( $n_{1n}$ )	RPM	-	3300	2900	
Max Input Speed ( $n_{1max}$ )		-	6000	6000	
Standard Output Backlash (j)	arcmin	3:1 - 10:1	< 12	< 12	
		12:1 - 100:1	< 14	< 14	
		120:1 - 1000:1	< 15	< 15	
Allowable Radial Load ( $F_{rad}$ ) <sup>1)</sup>	N (lbs)	-	476 (107)	1105 (249)	
Allowable Axial Load ( $F_{axial}$ )	N (lbs)	-	425 (96)	850 (191)	
Torsional Stiffness ( $C_{t21}$ )	Nm/arcmin (lb-in/arcmin)	10, 100, 1000	2.8 (25)	5.4 (48)	
		7, 70, 700	3.2 (28)	6.8 (60)	
		all other ratios	3.9 (35)	9.1 (81)	
Weight (m)	kg (lbs)	1-stage	3.0 (6.6)	5.6 (12)	
		2-stage	3.3 (7.3)	6.4 (14)	
		3-stage	3.6 (7.9)	7.2 (16)	
Noise Level ( $L_{pk}$ )	dB(A)	-	< 75	< 78	
Mass Moment of Inertia ( $J_1$ )	kg cm <sup>2</sup> (lb-in <sup>2</sup> )	3:1	0.95 (0.32)	5.4 (1.8)	
		4:1, 12:1, 16:1	0.88 (0.30)	5.1 (1.7)	
		5:1, 20:1, 25:1	0.86 (0.29)	5.1 (1.7)	
		7:1, 35:1	0.85 (0.29)	5.0 (1.7)	
		10:1, 40:1 - 100:1	0.84 (0.29)	4.9 (1.7)	
		120:1 - 1000:1	0.84 (0.29)	4.9 (1.7)	
Efficiency at Load	1-stage: 92% 2-stage: 90% 3-stage: 88%				
Service Life	>20,000				
Lubrication	Mineral Grease EPO				
Protection Rating	IP 64				
Operating Temperature Range	-20°C to 90°C				

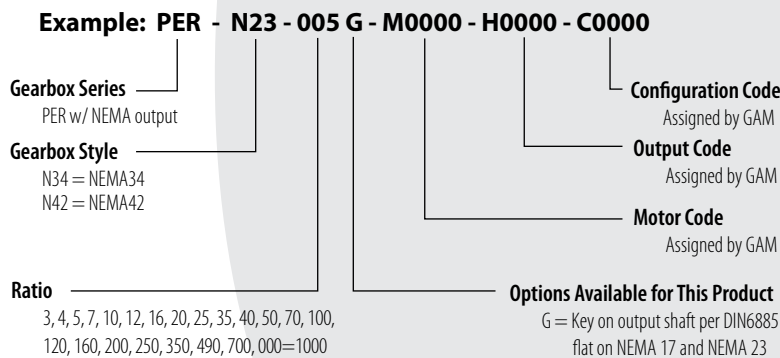
1) Load applied at center of output shaft @100 RPM



PER-N Series		34		42	
		mm	(in)	mm	(in)
D1 max standard	motor shaft diameter	14	(0.551)	19	(0.748)
D2 k6	output shaft diameter	12.70	(0.500)	19.05	(0.750)
D3 h7	pilot diameter	73.03	(2.875)	55.55	(2.187)
D4	bolt circle	98.43	(3.875)	125.72	(4.950)
D5	mounting holes	5.5	(0.217)	7.1	(0.280)
L1 (1-stage)*	gearbox length	153	(6.024)	203	(7.992)
L1 (2-stage)*		175	(6.890)	236	(9.291)
L1 (3-stage)*		197	(7.756)	268	(10.551)
L2	shaft length	31.80	(1.252)	31.80	(1.252)
L3	key length	27	(1.063)	29	(1.142)
L4	pilot height	1.7	(0.067)	2.4	(0.094)
L5	flange thickness	10	(0.394)	13	(0.512)
L6	key width	3.18	(0.125)	4.76	(0.187)
L7	key height / flat height	14.30	(0.563)	18.26	(0.719)
L8	output flange size	82.55	(3.250)	106.68	(4.200)
L9 <sup>2)</sup>	gearbox height	117.8	(4.638)	164.3	(6.469)
L10 (1-stage)	length to input centerline	118.3	(4.657)	156.2	(6.150)
L10 (2-stage)		140.3	(5.524)	189.2	(7.449)
L10 (3-stage)		162.3	(6.390)	221.2	(8.709)
L11	adapter size	70	(2.756)	90	(3.543)

\*depending on the motor, value can vary

### TYPE CODES FOR PER-N SERIES (NEMA)



Tolerances (mm)		
Size	k6	h7
Over 6	+0.010	0
Thru 10	+0.001	-0.015
Over 10	+0.012	0
Thru 18	+0.001	-0.018
Over 18	+0.015	0
Thru 30	+0.002	-0.021
Over 30	+0.018	0
Thru 50	+0.002	-0.025
Over 50	+0.021	0
Thru 80	+0.002	-0.030