

# PV Series Gearheads

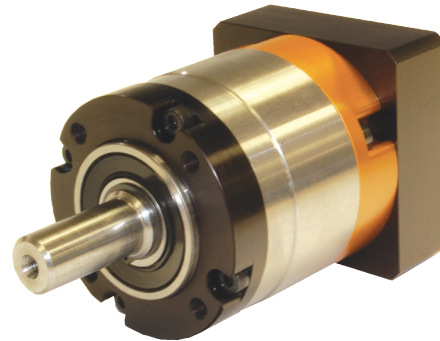
PV Series: Value Alternative Precision Planetary Gearheads

## PV = Power + Versatility

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

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

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

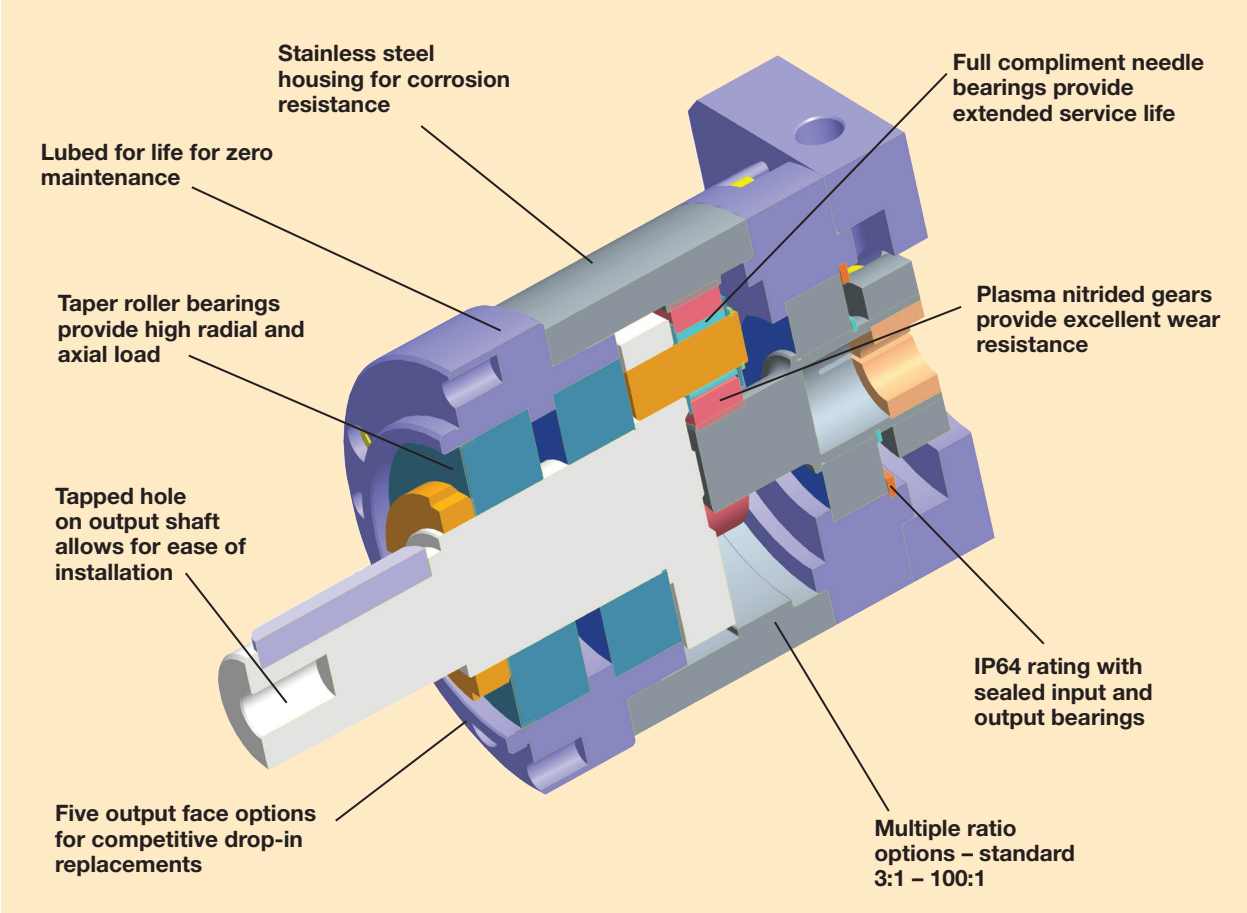


- **Higher radial load capacity: Taper roller output bearings**
- **Competitive Alternatives: Five Drop-In Output Face Options**
- **Universal mounting kits: Quicker deliveries and easier mounting**
- **Higher gear wear resistance: Plasma Nitriding heat treating**

### PV Series Precision Gearheads

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

# PV Series Gearhead Features and Benefits



# PV Series Gearheads

## Performance Specifications

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

1) Parker MotionSizer sizing software available for free download at parkermotion.com.  $t_{acc} + t_{dec} = 0.2 (t_{acc} + t_{cont} + t_{dec})$   $T_{cont} = 0.25 T_{acc}$

2) Maximum of 1000 stops.

3) Measured at 2% of rated torque.

4) Measure at 1m.

## Inertia

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

Ratio	Units*	PV40/PV17	PV60/PV23	PV90/PV34	PV115/PV42
3	kg-cm <sup>2</sup>	–	0.1400	0.7400	1.9700
	in-lb-sec <sup>2</sup>	–	0.000124	0.000655	0.001743
4	kg-cm <sup>2</sup>	0.0200	0.1000	0.5000	1.3400
	in-lb-sec <sup>2</sup>	0.000018	0.000089	0.000443	0.001186
5	kg-cm <sup>2</sup>	0.0180	0.0840	0.3900	1.1300
	in-lb-sec <sup>2</sup>	0.000016	0.000074	0.000345	0.001000
7	kg-cm <sup>2</sup>	0.0160	0.0750	0.3400	0.9300
	in-lb-sec <sup>2</sup>	0.000014	0.000066	0.000301	0.000823
10	kg-cm <sup>2</sup>	0.0160	0.0700	0.3000	0.8500
	in-lb-sec <sup>2</sup>	0.000014	0.000062	0.000266	0.000752
12	kg-cm <sup>2</sup>	–	0.0970	0.4900	1.2300
	in-lb-sec <sup>2</sup>	–	0.000086	0.000434	0.001089
15	kg-cm <sup>2</sup>	–	0.0830	0.3900	1.0400
	in-lb-sec <sup>2</sup>	–	0.000073	0.000345	0.000920
16	kg-cm <sup>2</sup>	0.0190	–	–	–
	in-lb-sec <sup>2</sup>	0.000017	–	–	–
20	kg-cm <sup>2</sup>	0.0170	0.0830	0.3900	1.0400
	in-lb-sec <sup>2</sup>	0.000015	0.000073	0.000345	0.000920
25	kg-cm <sup>2</sup>	0.0170	0.0830	0.3900	1.0400
	in-lb-sec <sup>2</sup>	0.000015	0.000073	0.000345	0.000920
30	kg-cm <sup>2</sup>	–	0.0700	0.3000	0.8400
	in-lb-sec <sup>2</sup>	–	0.000062	0.000266	0.000743
35	kg-cm <sup>2</sup>	0.0160	–	–	–
	in-lb-sec <sup>2</sup>	0.000014	–	–	–
40, 50, 70, 100	kg-cm <sup>2</sup>	0.0160	0.0700	0.3000	0.8400
	in-lb-sec <sup>2</sup>	0.000014	0.000062	0.000266	0.000743

\* Note: 1 kg-cm<sup>2</sup> = 0.000885 in-lb-sec<sup>2</sup>

## Maximum Output Shaft Load Rating

See load rating charts on pages 42-43

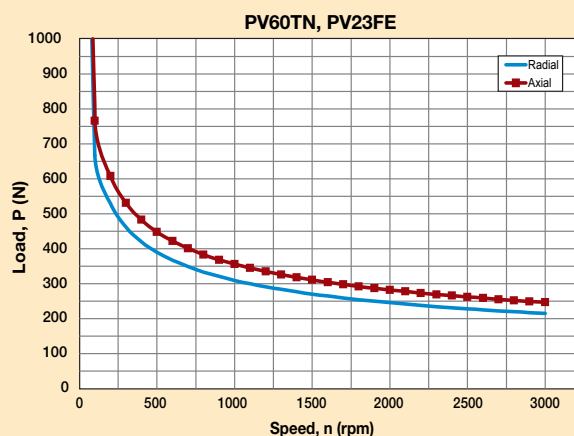
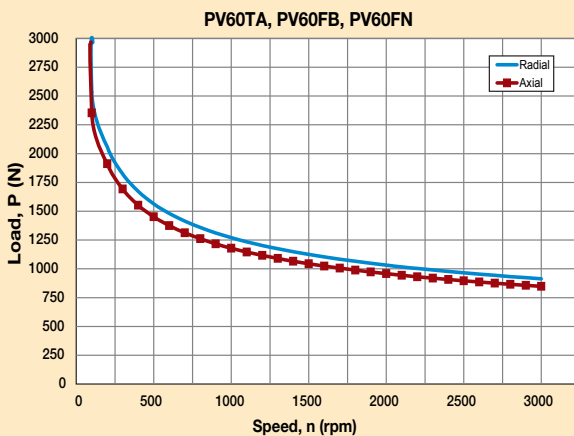
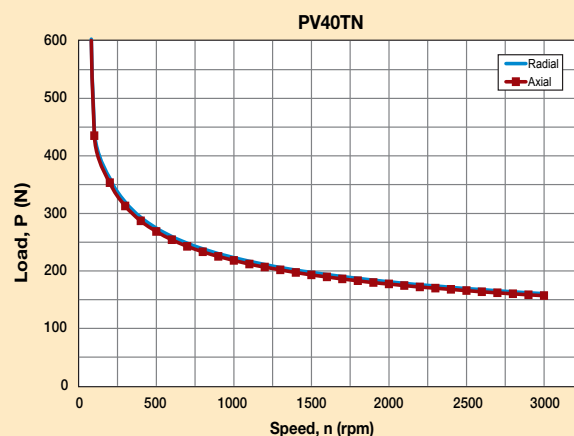
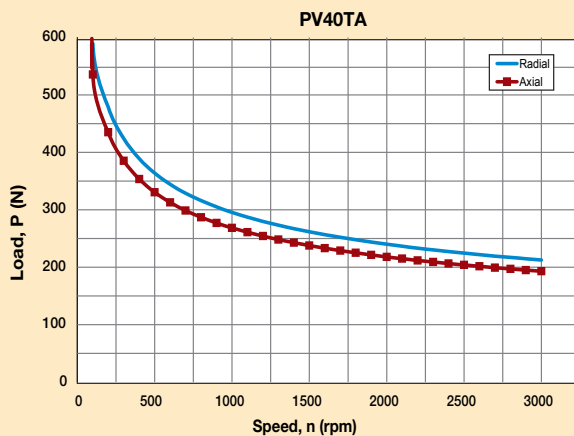
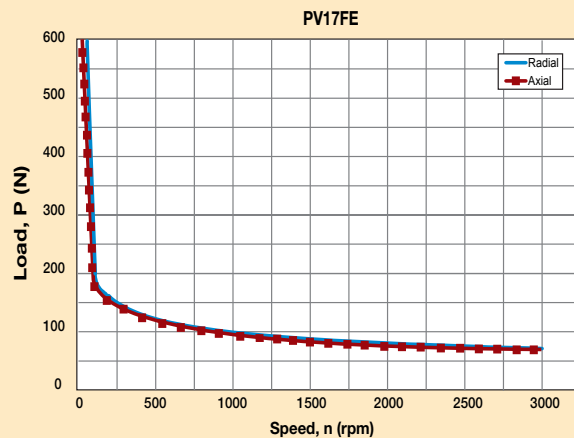
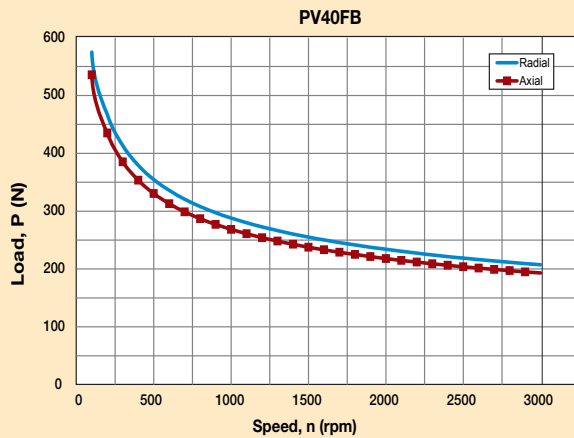
	Output Face Option*	PV40/PV17	PV60/PV23	PV90/PV34	PV115/PV42
Maximum Radial Load Pr, N ** (3-100 ratios)	FE	200	665	1040	1235
	TN	440	665	1040	2100
	FB, FN, TA	590	2535	4270	8550
Maximum Axial Load Pr, N ** (3-100 ratios)	FE	190	765	1140	1300
	TN	430	765	1140	2380
	FB, FN, TA	530	2350	4670	10550

\* See How to Order page 46, items 3 & 4 for front face/output face code definitions.

\*\* @100 rpm, radial load applied at center of shaft

# PV Series Gearheads

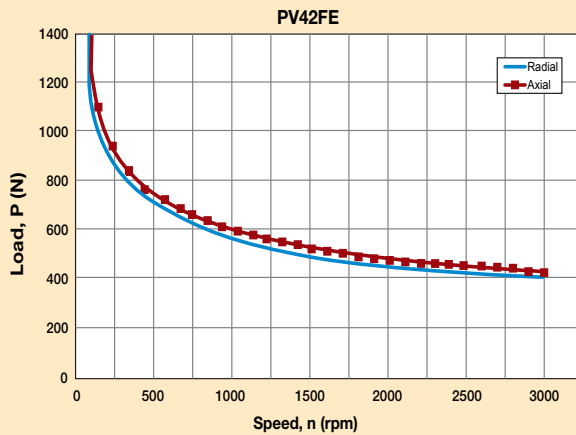
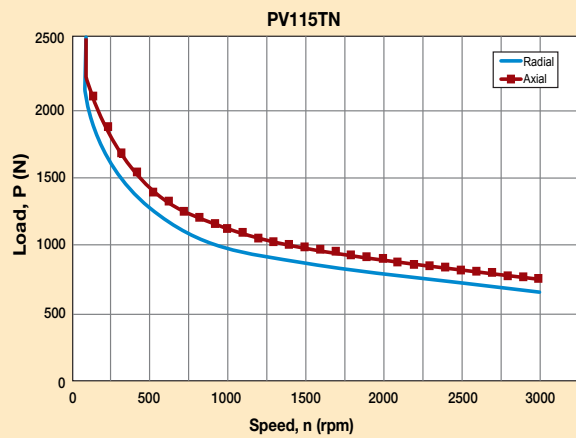
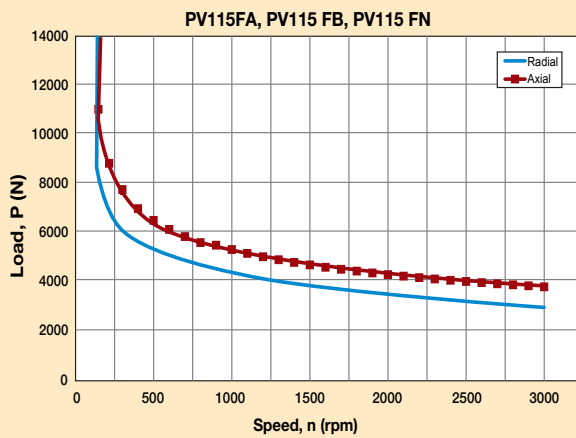
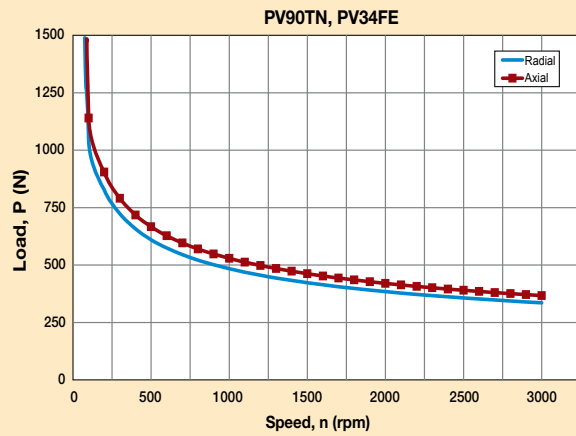
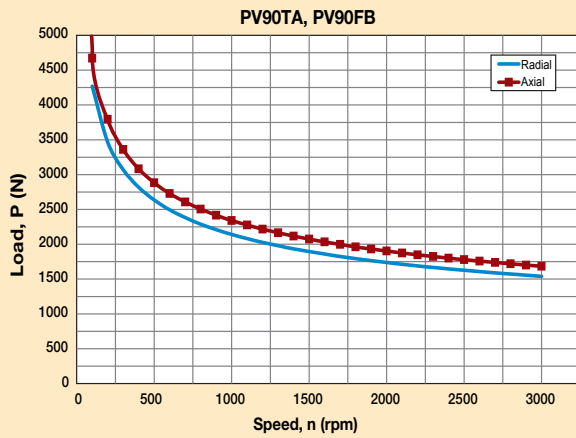
## Output Shaft Load Ratings – PV40/PV17 & PV60/PV23



See How to Order page 46, items 3 & 4 for front face/output face code definitions.

- 1) Maximum axial load,  $F_a$ .
- 2) Maximum radial load applied to the center of the shaft,  $F_r$ .
- 3) Radial load curves can be used to combine (radial + axial) load if  $F_a/F_r < 0.22$ .
- 4) If  $F_a/F_r > 0.22$  consult factory.

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



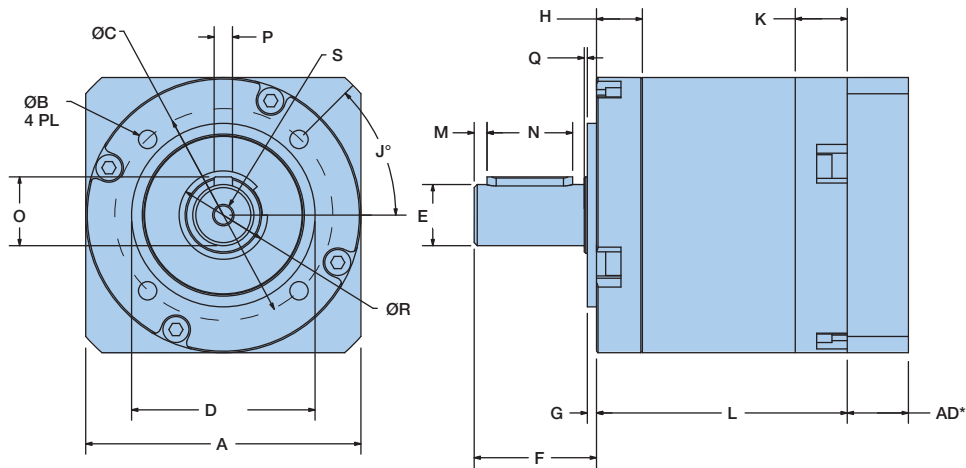
See How to Order page 46, items 3 & 4 for front face/output face code definitions.

- 1) Maximum axial load,  $F_a$ .
- 2) Maximum radial load applied to the center of the shaft,  $F_r$ .
- 3) Radial load curves can be used to combine (radial + axial) load if  $F_a/F_r < 0.22$ .
- 4) If  $F_a/F_r > 0.22$  consult factory.

# PV Series Gearheads

## Dimensions – Tapped Face (TA & TN)

Free 3D Solid Models and drawings available at [parkermotion.com](http://parkermotion.com)



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

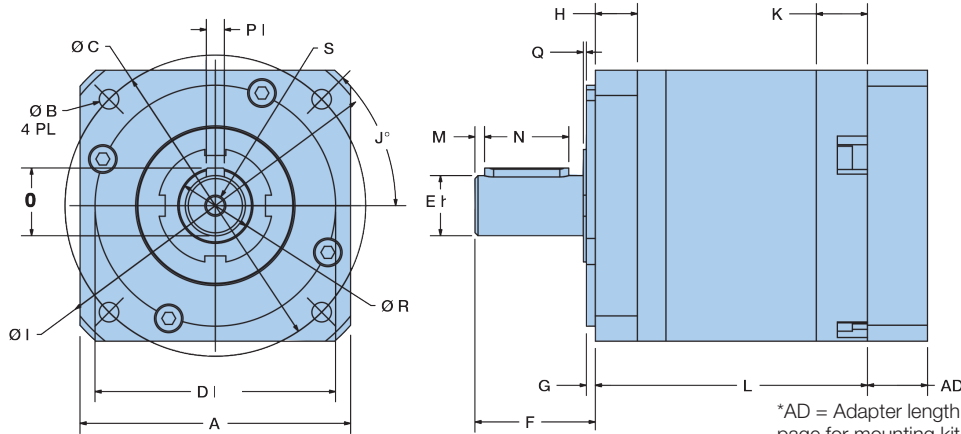
### Metric Frame Sizes

Frame Size	A		B		C		D		E		F		G		H		J		K	
	Body Diameter		Tap x Depth		Bolt Circle		Pilot Diameter		Output Shaft Diameter		Output Shaft Length		Pilot Thickness		Flange Thickness		Lead Angle		Rear Thickness	
	mm	in			mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	°	mm	in	
PV40TN	43	1.693	M4x7	34	1.339	26	1.024	10	0.394	26	1.024	1.5	0.059	10	0.394	45	11	0.433		
PV40TA	50	1.969	M4x10	44	1.732	35	1.378	12	0.472	25	0.984	3	0.118	10	0.394	90	11	0.433		
PV60TN	62	2.441	M5x10	52	2.047	40	1.575	14	0.551	35	1.378	2.5	0.098	12	0.472	45	16	0.630		
PV60TA	70	2.756	M5x10	62	2.441	52	2.047	16	0.630	36	1.417	5	0.197	16	0.630	90	16	0.630		
PV90TN	90	3.543	M6x11	70	2.756	60	2.362	20	0.787	40	1.575	3	0.118	15	0.591	45	17	0.670		
PV90TA	90	3.543	M6x12	80	3.150	68	2.677	22	0.866	46	1.811	5	0.197	18.5	0.728	90	17	0.670		
PV115TN	115	4.528	M10x16	100	3.937	80	3.150	25	0.984	55	2.165	4	0.157	20	0.787	45	23	0.906		
PV115TA	120	4.724	M8x20	108	4.252	90	3.543	32	1.260	70	2.756	6	0.236	28	1.102	90	23	0.906		

Frame Size	L1		L2		M		N		O		P		Q		R		S
	Length (3 – 10 Ratios)		Length (12 – 100 Ratios)		Distance from Shaft End		Keyway Length		Key Height		Keyway Width		Shoulder Height		Shoulder Diameter		
	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	
PV40TN	48.5	1.909	63	2.480	3.1	0.122	16	0.630	10.2	0.402	3	0.118	0.6	0.024	11.633	0.458	M3x6
PV40TA	48.5	1.909	63	2.480	1.3	0.051	16	0.630	13.5	0.531	4	0.157	3.5	0.138	17.831	0.702	M4x8
PV60TN	63	2.480	83	3.268	2.71	0.107	25	0.984	16		5	0.197	2.5	0.098	19.939	0.785	M5x12
PV60TA	67	2.638	87	3.425	2.21	0.087	25	0.984	18	0.709	5	0.197	3	0.118	28	1.102	M5x12
PV90TN	82	3.228	105.5	4.154	4.197	0.165	28	1.102	22.5	0.886	6	0.236	1	0.039	25	0.984	M6x12
PV90TA	85.5	3.366	109	4.291	3.197	0.126	28	1.102	24.5	0.965	6	0.236	5	0.197	38	1.496	M8x13
PV115TN	102	4.016	136	5.354	5.2	0.205	40	1.575	28	1.102	8	0.315	1	0.039	35	1.378	M10x20
PV115TA	110	4.331	144	5.669	4	0.157	50	1.969	35	1.378	10	0.394	1.8	0.071	40	1.575	M12x22

# Dimensions – Flange Face (FB, FE & FN)

Free 3D Solid Models and drawings available at [parker-motion.com](http://parker-motion.com)



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

## Metric & NEMA Frame Sizes

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

Frame Size	K		L1		L2		M		N		O		P		Q		R		S	
	Rear Thickness		Length (3 – 10 Ratios)		Length (12 – 100 Ratios)		Distance from Shaft End		Keyway Length		Key Height		Keyway Width		Shoulder Height		Shoulder Diameter		Tap & Depth	
	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in		
NEMA	PV17FE	1.693	43	0.138	3.5	1.724	43.8	0.866	22	0.250	6.35	0.984	25	0.059	1.5	0.236	6	2.165	55	45
	PV23FE	2.441	62	0.195	4.95	2.625	66.675	1.500	38.1	0.375	9.525	1.000	25.4	0.062	1.6	0.449	11.4	3.150	80	45
	PV34FE	3.543	90	0.217	5.52	3.875	98.43	2.875	73.025	0.500	12.7	1.250	31.75	0.065	1.65	0.591	15	4.567	116	45
	PV42FE	4.528	115	0.281	7.14	4.949	125.7	2.187	55.55	0.625	15.875	1.500	38.1	0.094	2.4	0.787	20	5.984	152	45

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

Frame Size	K		L1		L2		M		N		O		P		Q		R		S	
	Rear Thickness		Length (3 – 10 Ratios)		Length (12 – 100 Ratios)		Distance from Shaft End		Keyway Length		Key Height		Keyway Width		Shoulder Height		Shoulder Diameter		Tap & Depth	
	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in		
NEMA	PV17FE	0.433	11	1.909	48.5	2.480	63	-	-	-	-	-	-	-	-	0.091	2.3	0.458	11.633	-
	PV23FE	0.630	16	2.382	60.5	3.169	80.5	-	-	0.748	19	0.36	9.144	Flat	0.039	1	0.785	19.939	M5x12	
	PV34FE	0.670	17	3.32	84.35	4.154	105.5	-	-	1.063	27	0.553	14.045	0.125	3.175	0.039	1	0.984	25	M6x12
	PV42FE	0.906	23	4.016	102	5.354	136	0.016	0.4	1.120	28.45	0.705	17.91	0.188	4.775	-	-	-	-	M6x20



# PV Series Gearheads

## How to Order

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

	①	②	③	④	⑤
<b>Order Example:</b>	PV	40	T	N	- 004

### Sizing/Selection Design Assistance

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

The 9 step procedure on pages 60-61 provides a straightforward method of selecting the correct gearhead for your application.

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