



## Pump & Motor Division

Roller Bearing Series – 020, 031, 051, 076 Frame Sizes



ENGINEERING YOUR SUCCESS.



### **WARNING — User Responsibility**

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**Commercial  
Hydraulics**

**Parker Hannifin Corporation** | Pump & Motor Division | Kings Mountain, NC

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**Commercial**  
**Hydraulics**

Parker Hannifin Corporation | Pump & Motor Division | Kings Mountain, NC



- Original Commerical pump design
- Three-piece cast iron construction for assembly flexibility
- Durable high-strength cast iron body for excellent power to weight ratio
- Balanced thrust plates optimize pump efficiency
- Roller bearings for durability and resistance to fluid contamination
- Multiple sections available



Product Features	Description
<b>Pump Type</b>	Cast iron roller bearing, external gear
<b>Mounting</b>	SAE, Pad, 6-Bolt
<b>Ports</b>	SAE Straight Thread, Split Flange, NPT
<b>Shaft Style</b>	SAE splined, keyed or tapered
<b>Pump Speed</b>	900 to 2400 RPM
<b>Motor Speed</b>	800 to 2000 RPM
<b>Maximum Displ.</b>	3.9 in <sup>3</sup> /rev
<b>Maximum Operating Pressure</b>	3000 PSI

Product Features	Description
<b>Fluids</b>	Mineral oil
<b>Fluid Temperature</b>	Range of Operating Temperature -20 to 80°C (0 to 180°F)
<b>Fluid Viscosity</b>	50-7500 SUS
<b>Direction of Rotation (looking at the driveshaft)</b>	Clockwise, Counter Clockwise, Bi-Direction

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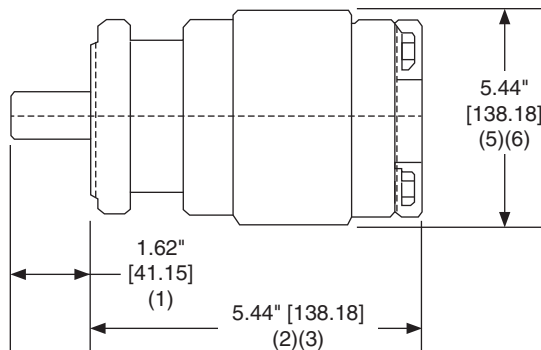
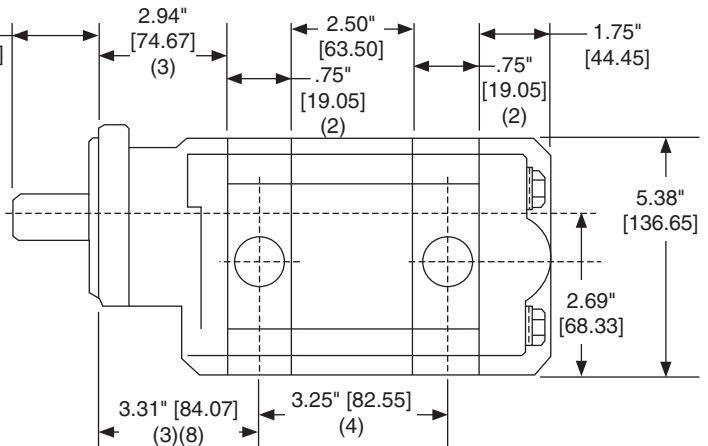
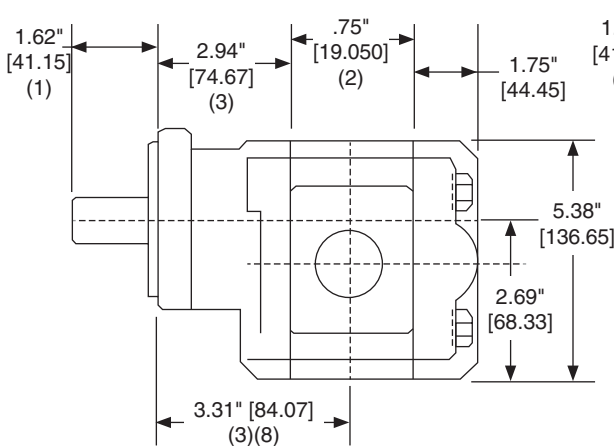
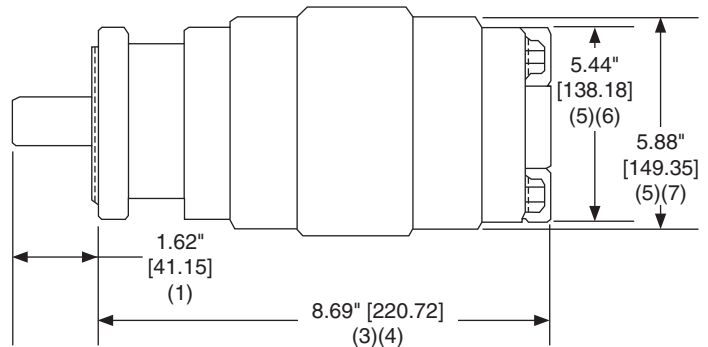
**PGP/PGM031 Specifications**

PGP031 Frame Size	05	07	10	12	15	17	20
Displacement – cm <sup>3</sup> /rev (in <sup>3</sup> /rev)	16.1 (0.99)	24.2 (1.48)	32.3 (1.97)	40.4 (2.46)	48.4 (2.96)	56.5 (3.45)	64.6 (3.94)
Max continuous pressure – bar (PSI)	207 (3,000)	207 (3,000)	207 (3,000)	207 (3,000)	207 (3,000)	172 (2,500)	172 (2,500)
Max Speed – RPM	2,400	2,400	2,400	2,400	2,400	2,400	2,400
Approximate Weight – Lbs. [kg]	30 [13.5]	31 [14]	33 [15]	34 [15.5]	35 [16]	36 [16.5]	37 [17]

PGM031 Frame Size	05	07	10	12	15	17	20
Displacement – cm <sup>3</sup> /rev (in <sup>3</sup> /rev)	16.1 (0.99)	24.2 (1.48)	32.3 (1.97)	40.4 (2.46)	48.4 (2.96)	56.5 (3.45)	64.6 (3.94)
Max continuous pressure – bar (PSI)	207 (3,000)	207 (3,000)	207 (3,000)	207 (3,000)	207 (3,000)	172 (2,500)	172 (2,500)
Max Speed – RPM	2,000	2,000	2,000	2,000	2,000	2,000	2,000
Approximate Weight – Lbs. [kg]	30 [13.5]	31 [14]	33 [15]	34 [15.5]	35 [16]	36 [16.5]	37 [17.0]

**PGP/PGM031 Dimensions****NOTES**

1. Dimension will vary with shaft type
2. Dimension + gear width
3. Dimension is for Type 1 SEC. For Type 2: subtract 1.12" (28.4 mm) for 031
4. Dimension + total gear width
5. Dimension will vary with port type. Subtract 0.25" (6.4 mm) for S.F. ports.
6. Dimension is for wide B-C. Narrow B-C dimensions: 5.00" (127 mm) for 031
7. Dimension + ½ front section gear width

**Single Units****Multiple Units**

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## PGP031

Flow data at 2500 PSI (172 bar) unless noted

Speed RPM	Gear Width Output (gpm/lpm)				
	1"	1 1/4"	1 1/2"	1 3/4"	2"
900	6.5	8	10	12	13.5
	24.5	30	38	45.5	51
1200	9	11.5	14	16	18.5
	34	43.5	53	60.5	70
1500	11.5	14.5	17.5	20.5	23.5
	43.5	55	66	77.5	89
1800	14	18	21.5	25	29
	53	68	81.5	94.5	110
2100	16.5	21	25	29.5	34
	62.5	79.5	94.5	112	129
2400	19	24	29	34	39
	72	91	110	129	148

\*Flow data at 2000 PSI (138 bar) rated pressure.

## PGP031

Input power at 2500 PSI (172 bar) unless noted

Speed RPM	Gear Width Inches (HP/kW)				
	1"	1 1/4"	1 1/2"	1 3/4"	2"
900	14	17	20	23	25
	11	13	15	17	19
1200	19	22	26	30	33
	14	17	20	22	25
1500	23	28	33	37	42
	17	21	24	27	31
1800	27	33	39	44	50
	20	25	29	33	37
2100	32	38	45	51	58
	24	29	34	38	43
2400	36	44	51	58	66
	26	33	38	43	49

\*Input power at 2000 PSI (138 bar)

## PGM031

Motor performance data at 2500 PSI (172 bar) unless noted.

Speed RPM	1" Gear			1 1/2" Gear			2" Gear		
	Output		Input	Output		Input	Output		Input
	Torque	Power	Flow	Torque	Power	Flow	Torque	Power	Flow
800	675	8.5	9	1035	13	13	1385	17.5	17
	76.5	6.5	34	117	9.5	49	156.5	13	64.5
1200	685	13	13	1055	20	18	1410	27	23.5
	77.5	9.5	49	119	15	68	159.5	20	89
1600	680	17.5	16	1030	26	23	1390	35	30.5
	77	13	60.5	116.5	19.5	87	157	26	115
2000	660	21	19.5	1010	32	28	1370	43.5	37
	74.5	15.5	74	114	24	106	155	32.5	140

U.S./Metric

Torque:

In.-lbs.  
NmFlow: GPM  
LPMPower: HP  
kW

\*Motor performance data at 2000 PSI (138 bar).



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**No Porting ≤ 2500 PSI**

Order Code		Port Size		Gear Width Availability	
CW	CCW	In	Out	17	20
AB	AB	None	None	X	X

CW = Clockwise CCW = Counter Clockwise

**No Porting ≤ 3000 PSI**

Order Code		Port Size		Gear Width Availability		
CW	CCW	In	Out	10	12	15
AB	AB	None	None	X	X	X



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### ODT Tube Ports ≤ 2500 PSI

Order Code		ODT Tube Porting Port Size		Gear Width Availability	
CW	CCW	In	Out	17	20
EC	ED	3/4"	-	X	X
ED	EC	-	3/4"	X	X
EF	EF	3/4"	3/4"	X	X
EK	EH	1-1/4"	3/4"	X*	
IP	IN	1-1/2"	3/4"	X*	
AC	AD	1"	-	X	X
AD	AC	-	1"	X	X
AF	AF	1"	1"	X	X
AJ	AG	1-1/4"	1"	X*	X*
AK	AH	1-1/2"	1"	X*	X*
AA	AO	1-1/4"	-	X*	
AL	AL	1-1/4"	1-1/4"		X
AP	AM	1-1/2"	1-1/4"		X*
AE	AU	1-1/2"	-		X*

### ODT Tube Ports ≤ 3000 PSI

Order Code		ODT Tube Porting Port Size		Gear Width Availability		
CW	CCW	In	Out	10	12	15
EC	ED	3/4"	-	X*	X	X
ED	EC	-	3/4"		X	X
EF	EF	3/4"	3/4"		X	X
EJ	EG	1"	3/4"		X*	X*
EK	EH	1-1/4"	3/4"			X*
AC	AD	1"	-	X*	X*	2500
AD	AC	-	1"			2500
AF	AF	1"	1"			2500
AJ	AG	1-1/4"	1"			2500
AA	AO	1-1/4"	-			X*

\* Ports designated by an asterisk \* are for use as the low-pressure inlet port only.

#### NOTES

- Shaded cells are acceptable for motor codes.
- X means both codes are available.
- 2500 indicates maximum pressure rating on port.
- CW = Clockwise; CWW = Counter Clockwise.

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**Split Flange Porting ≤ 3000 PSI**


Order Code		Split Flange Porting Port Size		Gear Width Availability		
CW	CCW	In	Out	10	12	15
UC	UD	3/4"	-	X	X	X
UD	UC	-	3/4"	X	X	X
UF	UF	3/4"	3/4"	X	X	X
UJ	UG	1"*	3/4"	X*	X	
UK	UH	1-1/4"*	3/4"		X*	X*
OC	OD	1"*	-	2500	X	X
OD	OC	-	1"	2500	X	X
OF	OF	1"	1"	2500	X	X
OJ	OG	1-1/4"*	1"		X*	X*
OA	OB	1-1/4"*	-		X*	2500
OB	OA	-	1-1/4"			2500

**Split Flange Porting ≤ 2500 PSI**

Order Code		Split Flange Porting Port Size		Gear Width Availability	
CW	CCW	In	Out	17	20
UC	UD	3/4"	-	X	
UD	UC	-	3/4"	X	
OF	OF	1"	1"	X	X
OJ	OG	1-1/4"*	1"	X	X
OK	OH	1-1/2"*	1"	X*	X*
OL	OL	1-1/4"	1-1/4"	X	X
OP	OM	1-1/2"*	1-1/4"	X*	X*
OE	OU	1-1/2"*	-	X*	X
OU	OE	-	1-1/2"		X

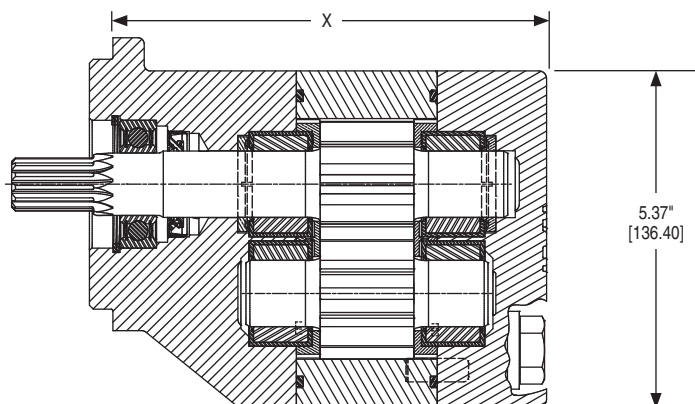
\* Ports designated by an asterisk \* are for use as the low-pressure inlet port only.

**NOTES**

1.  Shaded cells are acceptable for motor codes.
2. X means both codes are available.
3. 2500 indicates maximum pressure rating on port.
4. CW = Clockwise; CWW = Counter Clockwise.



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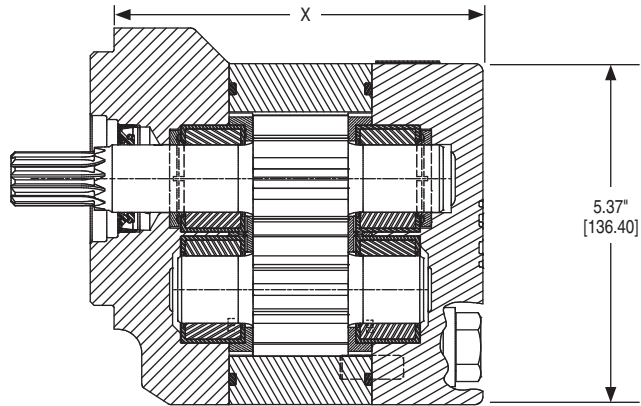
**X DIMENSION – Type 1**

SEC CODE	05	07	10	12	15	17	20
00	5.94" [150.88]	6.19" [157.23]	6.44" [163.58]	6.69" [169.93]	6.94" [176.28]	7.19" [182.63]	7.44" [188.98]
05	5.94" [150.88]	6.19" [157.23]	6.44" [163.58]	6.69" [169.93]	6.94" [176.28]	7.19" [182.63]	7.44" [188.98]
42	5.94" [150.88]	6.19" [157.23]	6.44" [163.58]	6.69" [169.93]	6.94" [176.28]	7.19" [182.63]	7.44" [188.98]
78	5.94" [150.88]	6.19" [157.23]	6.44" [163.58]	6.69" [169.93]	6.94" [176.28]	7.19" [182.63]	7.44" [188.98]
94	5.94" [150.88]	6.19" [157.23]	6.44" [163.58]	6.69" [169.93]	6.94" [176.28]	7.19" [182.63]	7.44" [188.98]
97	5.94" [150.88]	6.19" [157.23]	6.44" [163.58]	6.69" [169.93]	6.94" [176.28]	7.19" [182.63]	7.44" [188.98]

**X DIMENSION – Type 1 (w/Extra Wide PEC 312 3420 100)**

SEC CODE	05	07	10	12	15	17	20
00	6.44" [163.58]	6.69" [169.93]	6.94" [176.28]	7.19" [182.63]	7.44" [188.98]	7.69" [195.33]	7.94" [201.68]
05	6.44" [163.58]	6.69" [169.93]	6.94" [176.28]	7.19" [182.63]	7.44" [188.98]	7.69" [195.33]	7.94" [201.68]
42	6.44" [163.58]	6.69" [169.93]	6.94" [176.28]	7.19" [182.63]	7.44" [188.98]	7.69" [195.33]	7.94" [201.68]
78	6.44" [163.58]	6.69" [169.93]	6.94" [176.28]	7.19" [182.63]	7.44" [188.98]	7.69" [195.33]	7.94" [201.68]
94	6.44" [163.58]	6.69" [169.93]	6.94" [176.28]	7.19" [182.63]	7.44" [188.98]	7.69" [195.33]	7.94" [201.68]
97	6.44" [163.58]	6.69" [169.93]	6.94" [176.28]	7.19" [182.63]	7.44" [188.98]	7.69" [195.33]	7.94" [201.68]

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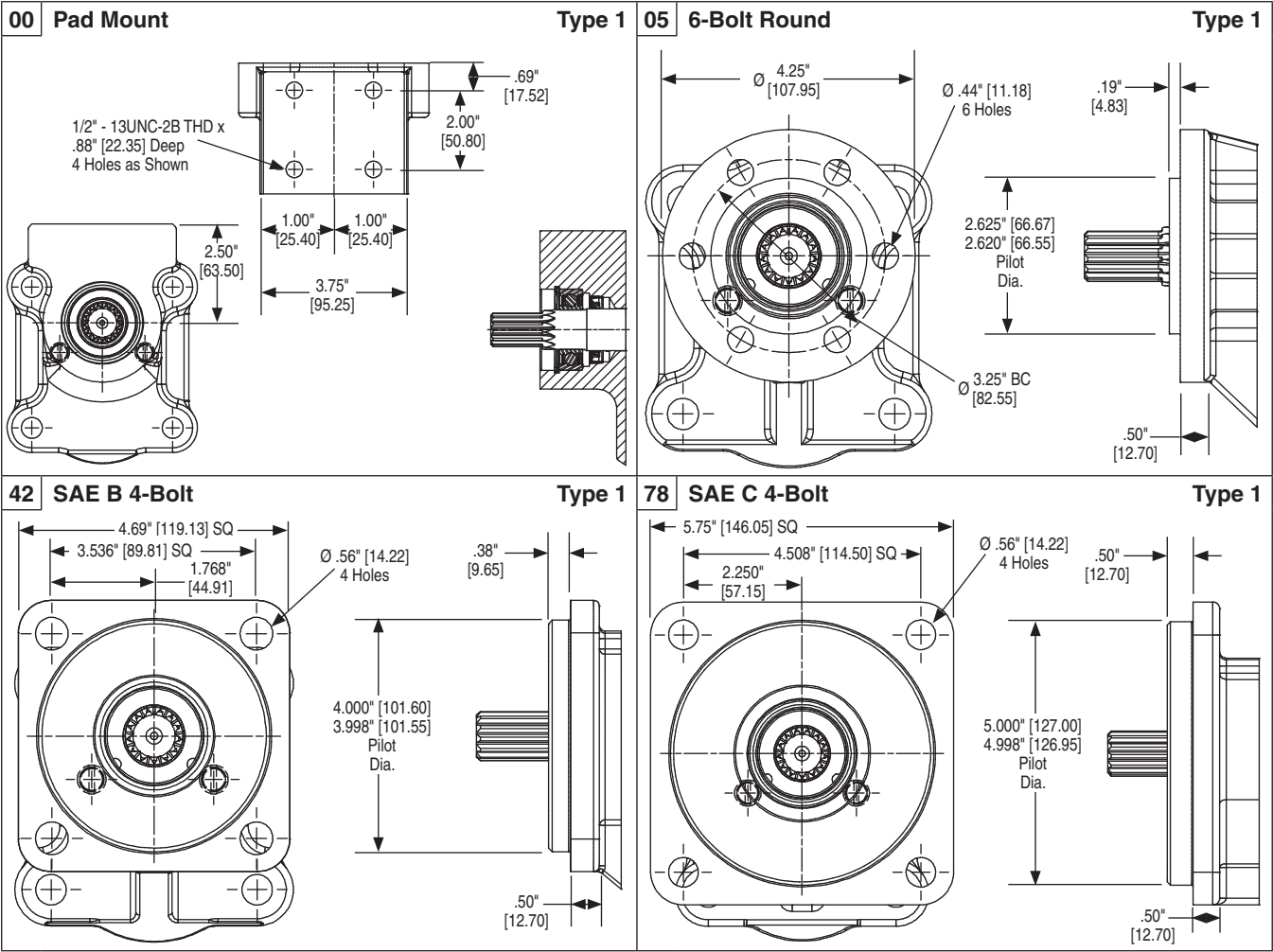
**X DIMENSION – Type 2**

SEC CODE	05	07	10	12	15	17	20
96	4.81" [122.17]	5.06" [128.52]	5.31" [134.87]	5.56" [141.22]	5.81" [147.57]	6.06" [153.92]	6.31" [160.27]

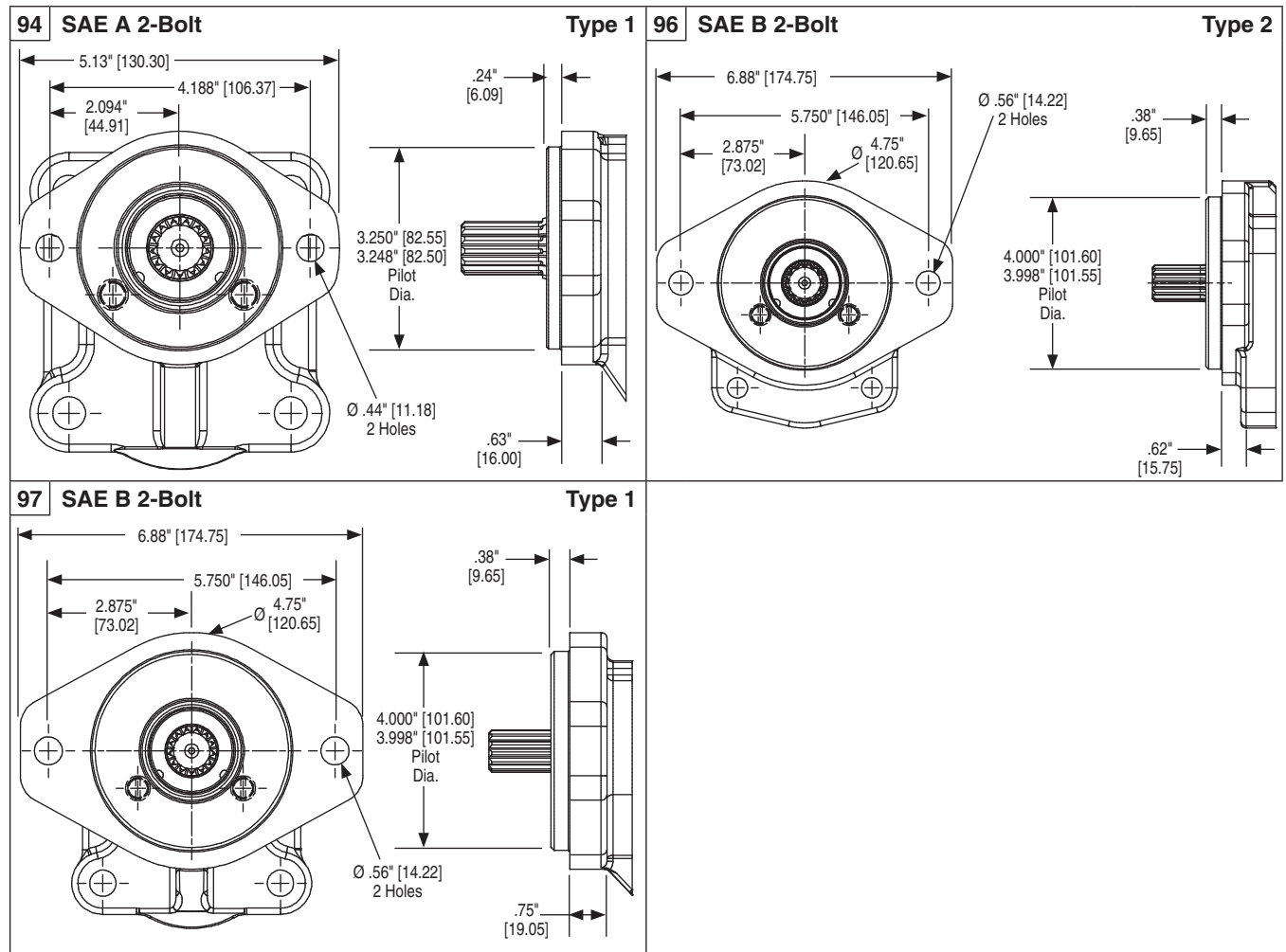
**X DIMENSION – Type 2 (w/Extra Wide PEC 312 3420 100)**

SEC CODE	05	07	10	12	15	17	20
96	5.31" [134.87]	5.56" [141.22]	5.81" [147.57]	6.06" [153.92]	6.31" [160.27]	6.56" [166.62]	6.81" [172.97]

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<p><b>25 SAE B Spline / ANSI 22-4</b> <span style="float: right;"><b>Type 1</b></span></p> <p>1.62" [41.15]  1.25" [31.75] Full Spline</p> <p>SAE Involute Spline  16/32 Pitch - 13 Teeth  Flat Root Side Fit  Major Dia. .853"-858" [21.67-21.79]  Minor Dia. .7335" [18.63] Max.</p>	<p><b>30 SAE B Keyed / ANSI 22-1</b> <span style="float: right;"><b>Type 1</b></span></p> <p>#15 P&amp;W Key  .25" x .38" x 1.00" [6.35 x 9.65 x 25.40]</p> <p>1.62" [41.15]</p> <p>Ø .875" [22.23]  Ø .874" [22.20]</p> <p>.987" [25.07]  .977" [24.82]</p>
<p><b>32 Clutch Pump Shaft</b> <span style="float: right;"><b>Type 1</b></span></p> <p>2.28" [57.91]</p> <p>#6 Woodruff Key  .156" x Ø.625" [3.96 x 15.87]</p> <p>5/16"-24 UNF-2B THD  x 1.00" [25.40] Deep</p> <p>.839" [21.31] Gauge</p> <p>.574" [14.58]</p> <p>Ø.841" [21.36] Gauge</p> <p>3.006" ± .005" [76.35 ± .127] Taper Per Foot</p> <p>Ø.640" [16.26]</p> <p>Ø.875" [22.22]</p>	<p><b>43 SAE BB Keyed / ANSI 25-1</b> <span style="float: right;"><b>Type 1</b></span></p> <p>#21 P&amp;W Key  .25" x .38" x 1.25" [6.35 x 9.65 x 31.75]</p> <p>1.94" [49.27]</p> <p>Ø .9989" [25.37]  Ø .9980" [25.35]</p> <p>1.112" [28.24]  1.102" [27.99]</p>
<p><b>65 SAE B Spline / ANSI 22-4</b> <span style="float: right;"><b>Type 2</b></span></p> <p>1.62" [41.15]  1.11" [28.19] Full Spline</p> <p>SAE Involute Spline  16/32 Pitch - 13 Teeth  Flat Root Side Fit  Major Dia. .853"-858" [21.67-21.79]  Minor Dia. .7335" [18.63] Max.</p>	<p><b>66 SAE B Keyed,</b> <span style="float: right;"><b>Type 2</b></span></p> <p>#15 P&amp;W Key  .25" x .38" x 1.00" [6.35 x 9.65 x 25.40]</p> <p>1.62" [41.15]</p> <p>Ø .875" [22.22]  Ø .874" [22.20]</p> <p>.987" [25.07]  .977" [24.82]</p>



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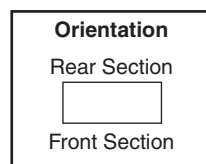
<p><b>67 SAE BB Keyed / ANSI 25-1 Modified,, Type 2</b></p> <p>#21 P&amp;W Key .25" x .38" x 1.25" [6.35 x 9.65 x 31.75]</p> <p>1.94" [49.27]</p> <p>1.112" [28.24] 1.102" [27.99]</p> <p>Ø.9988" [25.37] Ø.9984" [25.36]</p>	<p><b>68 1.00" Dia. 6 Tooth Spline Shaft Type 1</b></p> <p>1.62" [41.15]</p> <p>1.625" [41.27] Full Spline</p> <p>6 Tooth Spline Major Dia. .995"-.997" [25.27-25.32] Minor Dia. .820"-.824" [20.87-20.93] Tooth THK: .244"-.245" [6.20-6.22]</p>
<p><b>90 SAE B Keyed / ANSI 22-2 Modified Type 1</b></p> <p>#15 Woodruff Key .25" x Ø1.00" [6.35 x 25.40]</p> <p>2.44" [61.98]</p> <p>1.34" [34.04]</p> <p>.987" [25.07] .977" [24.82]</p> <p>Ø.875" [22.24] Ø.874" [22.20]</p> <p>5/8"-18 UNF-2A THD</p> <p>Ø.16" [4.06]</p>	<p><b>95 SAE A Spline / ANSI 16-4 Type 1</b></p> <p>1.25" [31.75]</p> <p>.94" [23.88] Full Spline</p> <p>SAE Involute Spline 9 Teeth - 16/32 Pitch Flat Root Side Fit Major Dia. .603"-.609" [15.32-15.47] Minor Dia. .4835 Max [12.28]</p>
<p><b>98 SAE BB Spline / ANSI 25-4 Type 1</b></p> <p>1.81" [45.97]</p> <p>1.44" [36.58] Full Spline</p> <p>SAE Involute Spline 15 Teeth - 16/32 Pitch Flat Root Side Fit Major Dia. .978"-.983" [24.84-24.97] Minor Dia. .8585 Max [21.80]</p>	

**WARNING:** This product can expose you to chemicals including lead or DEHP which are known to the state of California to cause cancer, birth defects, and other reproductive harm. [www.p65warnings.ca.gov](http://www.p65warnings.ca.gov)



## Pumps

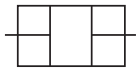
Common Inlet Passage			
			
-	-	C	D
-	-	A	U



Used when only one adjacent gear housing has an inlet port.

Rotation Flow Path	ODT Porting		Split Flange Porting		Port Size	
	CW	CCW	CW	CCW	In	Out
	CB	BC	LB	BL	1"	-
	DB	BD	MB	BM	1-1/4"	-
	FB	BF	NB	BN	1-1/2"	-
	-	-	BR	RB	-	3/4"
	CJ	JC	LR	RL	1"	3/4"
	DJ	JD	MR	RM	1-1/4"	3/4"
	FJ	JF	NR	RN	1-1/2"	3/4"
	DK	KD	MS	SM	1-1/4"	1"
	FK	KF	NS	SN	1-1/2"	1"
	CR	RC	LX	XL	1"	3/4"
	DR	RD	MX	XM	1-1/4"	3/4"
	DS	SD	MZ	ZM	1-1/4"	1"
	FS	SF	NZ	ZN	1-1/2"	1"
	KJ	JK	SR	RS	1"	3/4"
	KX	XK	RZ	ZR	1"	3/4"

CW = Clockwise CCW = Counter Clockwise

Rotation Flow Path	ODT Porting	Split Flange Porting	Port Size	
	DUAL	DUAL	In	Out
	CC	LL	1"	1"
	BB	MM	1-1/4"	1-1/4"
	FF	NN	1-1/2"	1-1/2"

**WARNING:** This product can expose you to chemicals including lead or DEHP which are known to the state of California to cause cancer, birth defects, and other reproductive harm. [www.p65warnings.ca.gov](http://www.p65warnings.ca.gov)

**Multiple Units:  
Repeat if Necessary**

PG	1	031	2	3	3	4	4	5	5	6	6	7	7	8	8	9	9	6	6	7	7	10	10
----	---	-----	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	----	----

1 – Description	
<b>P</b>	Pump
<b>M</b>	Motor

2 – Unit	
<b>A</b>	Single
<b>B</b>	Tandem
<b>C</b>	Single or Tandem w/2-pc Shaft (O.B. bearing required)

3 – Rotation / Shaft	
<b>1</b>	Pump, cw w/o O.B. bearing
<b>2</b>	Pump, ccw w/o O.B. bearing
<b>4</b>	Pump, cw with O.B. bearing
<b>5</b>	Pump, ccw with O.B. bearing
<b>8</b>	Motor, bi-rot. with O.B. bearing; 1/4" NPT drain
<b>9</b>	Motor, bi-rot. w/o O.B. bearing; 1/4" NPT drain

4 – Mount	
<b>00</b>	Pad mount
<b>05</b>	6-Bolt Flange - 3.25" dia. bolt circle: Port Dia. 2-5/8"
<b>42</b>	SAE 4-Bolt B ANSI 101-4: Port Dia. 4"
<b>78</b>	SAE 4-Bolt C ANSI 127-4: Port Dia. 5"
<b>94</b>	SAE 2-Bolt A ANSI 82-2: Port Dia. 3-1/4"
<b>96*</b>	SAE 2-Bolt B ANSI 101-2, <b>type 2</b> : Port Dia. 4"
<b>97</b>	SAE 2-Bolt B ANSI 101-2: Port Dia. 4"


\*(not available with O.B. bearing)

5 – Port Options					
Single Units		Tandem Units		Port Size	
w/o ST	w/ST	w/o ST	w/ST	Left	Right
Unported					
BE	BY	BI	BY	-	-
ODT Rear Ported					
CE	CY	CI	CY	3/4"	-
DE	DY	DI	DY	-	3/4"
FE	FY	FI	FY	3/4"	3/4"
GE	GY	GI	GY	1"	3/4"
HE	HY	HI	HY	3/4"	1"
ODT Rear Ported - Modified Casting*					
CA	CO	CU	CO	3/4"	-
DA	DO	DU	DO	-	3/4"
JA	BO	JU	BO	3/4"	3/4"
KA	-	KU	-	1"	3/4"
LA	-	LU	-	3/4"	1"
MA	YO	MU	YO	1"	-
RA	RO	SU	RO	-	1"
ZA	ZO	ZU	ZO	1"	1"
GU	-	GU	-	1-1/4"	1"
HU	-	HU	-	1"	1-1/4"
ODT Side Ported - Modified Casting*					
TU	-	TU	-	1-1/4"	1"
XU	-	XU	-	1	1-1/4"
Piggyback Port End - Pump Only					
Type 031-031			CW	CCW	Double
			KO	LO	MO
NOTE: w/o ST columns denote units without support studs; w/ST columns denote units with support studs					
*Modified PEC casting is for higher pressure/larger port applications.					

**FOR ALL UNITS**

To determine direction of shaft rotation, view the unit with the shaft pointing toward you, and the idler (driven) gear beneath the shaft. With clockwise rotation, flow will be left to right. The inlet pump port will be on the left, outlet on the right. The flow is in the opposite direction with counter-clockwise rotation. Inverting the pump will reverse the inlet and outlet ports but not the direction of rotation.

Continued on Next Page

 **WARNING:** This product can expose you to chemicals including lead or DEHP which are known to the state of California to cause cancer, birth defects, and other reproductive harm. [www.p65warnings.ca.gov](http://www.p65warnings.ca.gov)

Multiple Units:  
Repeat if Necessary

PG	1	031	2	3	3	4	4	5	5	6	6	7	7	8	8	9	9	6	6	7	7	10	10
----	---	-----	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	----	----

6 – Gear Housing			
Order Code		Port Size	
CW	CCW	In	Out
No Porting ≤ 3000 PSI			
AB	AB	None	None
No Porting ≤ 2500 PSI			
AB	AB	None	None


See chart on [page 24](#)

6 – Gear Housing			
Order Code		Port Size	
CW	CCW	In	Out
ODT Tube Porting ≤ 3000 PSI			
EC	ED	3/4"	-
ED	EC	-	3/4"
EF	EF	3/4"	3/4"
EJ	EG	1"	3/4"
EK	EH	1-1/4"	3/4"
AC	AD	1"	-
AD	AC	-	1"
AF	AF	1"	1"
AJ	AG	1-1/4"	1"
AA	AO	1-1/4"	-
ODT Tube Porting ≤ 2500 PSI			
EC	ED	3/4"	-
ED	EC	-	3/4"
EF	EF	3/4"	3/4"
EK	EH	1-1/4"	3/4"
IP	IN	1-1/2"	3/4"
AC	AD	1"	-
AD	AC	-	1"
AF	AF	1"	1"
AJ	AG	1-1/4"	1"
AK	AH	1-1/2"	1"
AA	AO	1-1/4"	-
AL	AL	1-1/4"	1-1/4"
AP	AM	1-1/2"	1-1/4"
AE	AU	1-1/2"	-

\*Ports designated by an asterisk \* are for use as the low-pressure inlet port only.  
See chart on [page 24](#)

6 – Gear Housing			
Order Code		Port Size	
CW	CCW	In	Out
Split Flange Porting ≤ 3000 PSI			
UC	UD	3/4"	-
UD	UC	-	3/4"
UF	UF	3/4"	3/4"
UJ	UG	1"	3/4"
UK	UH	1-1/4"	3/4"
OC	OD	1"	-
OD	OC	-	1"
OF	OF	1"	1"
OJ	OG	1-1/4"	1"
OA	OB	1-1/4"	-
OB	OA	-	3/4"
Split Flange Porting ≤ 2500 PSI			
UC	UD	3/4"	-
UD	UC	-	3/4"
OF	OF	1"	1"
OJ	OG	1-1/4"	1"
OK	OH	1-1/2"	1"
OL	OL	1-1/4"	1-1/4"
OP	OM	1-1/2"	1-1/4"
OE	OU	1-1/2"	-
OU	OE	-	1-1/2"

\*Ports designated by an asterisk \* are for use as the low-pressure inlet port only.  
See chart on [page 25](#)

 **WARNING:** This product can expose you to chemicals including lead or DEHP which are known to the state of California to cause cancer, birth defects, and other reproductive harm. [www.p65warnings.ca.gov](http://www.p65warnings.ca.gov)

Multiple Units:  
Repeat if Necessary

PG	1	031	2	3	3	4	4	5	5	6	6	7	7	8	8	9	9	6	6	7	7	10	10
----	---	-----	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	----	----

7 – Gear Width					
Order Code	Gear Width	in. <sup>3</sup> /rev.	cm <sup>3</sup> /rev.	Max Pressure	
				PSI	bar
ODT Tube Ports ≤ 2500 and ≤ 3000 PSI Split Flange Ports ≤ 2500 and ≤ 3000 PSI					
05	1/2"	0.99	16.1	3000	207
07	3/4"	1.48	24.2	3000	207
10	1"	1.97	32.3	3000	207
12	1-1/4"	2.46	40.4	3000	207
15	1-1/2"	2.96	48.4	3000	207
17	1-3/4"	3.45	56.5	2500	172
20	2"	3.94	64.6	2500	172


8 – Drive Shafts (type 1 unless noted) For single, tandem, or two-piece shaft unless noted.	
25	SAE B 13 tooth spline .88" dia., ANSI 22-4
30	SAE B keyed .88" dia., 1/4" x 3/8" x 1" key, ANSI 22-1
32	Clutch pump shaft, tapered & keyed, 1:4 taper (single & two piece), #6 woodruff key
43	SAE BB keyed 1.00" dia., 1/4" x 3/8" x 1-1/4" key, ANSI 25-1 modified length
65	SAE B 13 tooth spline .875" dia., ANSI 22-4, <b>type 2</b> (single & tandem)
66	SAE B keyed .88" dia., 1/4"x3/8"x1" key, <b>type 2</b> (single & tandem)
67	SAE BB keyed 1.00" dia., 1/4" x 3/8" x 1-1/4" key, ANSI 25-1 modified length, <b>type 2</b> (single & tandem)
68	6 tooth spline 1.00" dia.
90	SAE B keyed w/ 5/8"-18 thread, .875" dia., ANSI 22-2 modified length (single & tandem)
95	SAE A 9 tooth spline, .62" dia., ANSI 16-4 (single only)
98	SAE BB 15 tooth spline, 1.00" dia., ANSI 25-4 (single & tandem)
See drawings on <a href="#">pages 30-31</a>	

9 – Bearing Carrier / Pumps			
CW	CCW	Port Size	
		In	Out
ODT Porting			
CB	BC	1"	-
DB	BD	1-1/4"	-
FB	BF	1-1/2"	-
CJ	JC	1"	3/4"
DJ	JD	1-1/4"	3/4"
FJ	JF	1-1/2"	3/4"
DK	KD	1-1/4"	1"
FK	KF	1-1/2"	1"
CR	RC	1"	3/4"
DR	RD	1-1/4"	3/4"
DS	SD	1-1/4"	1"
FS	SF	1-1/2"	1"
KJ	JK	1"	3/4"
KX	XK	1"	3/4"
Split Flange Porting			
LB	BL	1"	-
MB	BM	1-1/4"	-
NB	BN	1-1/2"	-
BR	RB	-	3/4"
LR	RL	1"	3/4"
MR	RM	1-1/4"	3/4"
NR	RN	1-1/2"	3/4"
MS	SM	1-1/4"	1"
NS	SN	1-1/2"	1"
LX	XL	1"	3/4"
MX	XM	1-1/4"	3/4"
MZ	ZM	1-1/4"	1"
NZ	ZN	1-1/2"	1"
SR	RS	1"	3/4"
RZ	ZR	1"	3/4"
See chart on <a href="#">page 32</a>			

9 – Bearing Carrier / Motors		
DUAL	Port Size	
	In	Out
ODT Porting		
CC	1"	1"
BB	1-1/4"	1-1/4"
FF	1-1/2"	1-1/2"
Split Flange Porting		
LL	1"	1"
MM	1-1/4"	1-1/4"
NN	1-1/2"	1-1/2"
See chart on <a href="#">page 32</a>		

10 – Connecting Shaft	
For connecting tandem units.	
01	Connecting Shaft - Multiple Units
14	Piggyback Pump Connecting Shaft 031 to 031
22	Piggyback Pump Connecting Shaft 051 to 031
23	Piggyback Pump Connecting Shaft 076 to 031

**NOTE:** Split flange thread depths may be more shallow than SAE standard. Contact Product Support Department for actual dimensions.

 **WARNING:** This product can expose you to chemicals including lead or DEHP which are known to the state of California to cause cancer, birth defects, and other reproductive harm. [www.p65warnings.ca.gov](http://www.p65warnings.ca.gov)

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**OFFER OF SALE**

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"Buyer" means any customer receiving a Quote for Products.

"Buyer's Property" means any tools, patterns, plans, drawings, designs, specifications materials, equipment, or information furnished by Buyer, or which are or become Buyer's property.

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**3. Price; Payment.** The Products set forth in the Quote are offered for sale at the prices indicated in the Quote. Unless otherwise specifically stated in the Quote, prices are valid for thirty (30) days and do not include any sales, use, or other taxes or duties. Seller reserves the right to modify prices for any reason and at any time by giving ten (10) days prior written notice. Unless otherwise specified by Seller, all prices are F.C.A. Seller's facility (INCOTERMS 2020). All sales are contingent upon credit approval and full payment for all purchases is due thirty (30) days from the date of invoice (or such date as may be specified in the Quote). Under any circumstances, Buyer may not withhold or suspend payment of any amounts due and payable as a deduction, set-off or recoupment of any amount, claim or dispute with Seller. Unpaid invoices beyond the specified payment date incur interest at the rate of 1.5% per month or the maximum allowable rate under applicable law. Seller reserves the right to require advance payment or provision of securities for first and subsequent deliveries if there is any doubt, in Seller's sole determination, regarding the Buyer's creditworthiness or for other business reasons. If the requested advance payment or securities are not provided to Seller's satisfaction, Seller reserves the right to suspend performance or reject the purchase order, in whole or in part, without prejudice to Seller's other rights or remedies, including the right to full compensation. Seller may revoke or shorten any payment periods previously granted in Seller's sole determination. The rights and remedies herein reserved to Seller are cumulative and in

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**5. Warranty.** The warranty for the Products is as follows:

(i) Goods are warranted against defects in material or workmanship for a period of twelve (12) months from the date of delivery or 2,000 hours of use, whichever occurs first; (ii) Services shall be performed in accordance with generally accepted practices and using the degree of care and skill that is ordinarily exercised and customary in the field to which the Services pertain and are warranted for a period of six (6) months from the date of completion of the Services; and (iii) Software is only warranted to perform in accordance with applicable specifications provided by Seller to Buyer for ninety (90) days from the date of delivery or, when downloaded by a Buyer or end-user, from the date of the initial download. All prices are based upon the exclusive limited warranty stated above, and upon the following disclaimer: **EXEMPTION CLAUSE; DISCLAIMER OF WARRANTY, CONDITIONS, REPRESENTATIONS: THIS WARRANTY IS THE SOLE AND ENTIRE WARRANTY, CONDITION, AND REPRESENTATION, PERTAINING TO PRODUCTS. SELLER DISCLAIMS ALL OTHER WARRANTIES, CONDITIONS, AND REPRESENTATIONS, WHETHER STATUTORY, EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO THOSE RELATING TO DESIGN, NONINFRINGEMENT, MERCHANTABILITY, AND FITNESS FOR A PARTICULAR PURPOSE. SELLER DOES NOT WARRANT THAT THE SOFTWARE IS ERROR-FREE OR FAULT-TOLERANT, OR THAT BUYER'S USE THEREOF WILL BE SECURE OR UNINTERRUPTED, UNLESS OTHERWISE AUTHORIZED IN WRITING BY SELLER, THE SOFTWARE SHALL NOT BE USED IN CONNECTION WITH HAZARDOUS OR HIGH-RISK ACTIVITIES OR ENVIRONMENTS. EXCEPT AS EXPRESSLY STATED HEREIN, ALL PRODUCTS ARE PROVIDED "AS IS".**

**6. Claims; Commencement of Actions.** Buyer shall promptly inspect all Products upon receipt. No claims for shortages will be allowed unless reported to Seller within ten (10) days of delivery. Buyer shall notify Seller of any alleged breach of warranty within thirty (30) days after the date the non-conformance is or should have been discovered by Buyer. Any claim or action against Seller based upon breach of contract or any other theory, including tort, negligence, or otherwise must be commenced within twelve (12) months from the date of the alleged breach or other alleged event, without regard to the date of discovery.

**7. LIMITATION OF LIABILITY. IN THE EVENT OF A BREACH OF WARRANTY, SELLER WILL, AT ITS OPTION, REPAIR OR REPLACE THE NON-CONFORMING PRODUCTS, RE-PERFORM THE SERVICES, OR REFUND THE PURCHASE PRICE PAID WITHIN A REASONABLE PERIOD OF TIME. IN NO EVENT IS SELLER LIABLE FOR ANY SPECIAL, INDIRECT, INCIDENTAL OR CONSEQUENTIAL DAMAGES INCLUDING ANY LOSS OF REVENUE OR PROFITS, WHETHER BASED IN CONTRACT, TORT OR OTHER LEGAL THEORY. IN NO EVENT SHALL SELLER'S LIABILITY UNDER ANY CLAIM MADE BY BUYER EXCEED THE PURCHASE PRICE PAID FOR THE PRODUCTS.**

**8. Confidential Information.** Buyer acknowledges and agrees that Confidential Information has been and will be received in confidence and will remain the property of Seller. Buyer further agrees that it will not use Seller's Confidential Information for any purpose other than for the benefit of Seller and shall return all such Confidential Information to Seller within thirty (30) days upon request.

**9. Loss to Buyer's Property.** Buyer's Property will be considered obsolete and may be destroyed by Seller after two (2) consecutive years have elapsed without Buyer ordering the Products manufactured using Buyer's Property.

Also, Seller shall not be responsible for any loss or damage to Buyer's Property while it is in Seller's possession or control.

**10. Special Tooling.** Seller may impose a tooling charge for any Special Tooling. Special Tooling shall be and remain Seller's property. In no event will Buyer acquire any interest in the Special Tooling, even if such Special Tooling has been specially converted or adapted for manufacture of Goods for Buyer and notwithstanding any charges paid by Buyer. Unless otherwise agreed, Seller has the right to alter, discard or otherwise dispose of any Special Tooling or other property owned by Seller in its sole determination at any time.

**11. Security Interest.** To secure payment of all sums due from Buyer, Seller retains a security interest in all Products delivered to Buyer and, Buyer's acceptance of these Terms is deemed to be a Security Agreement under the Uniform Commercial Code. Buyer authorizes Seller as its attorney to execute and file on Buyer's behalf all documents Seller deems necessary to perfect Seller's security interest.

**12. User Responsibility.** Buyer, through its own analysis and testing, is solely responsible for making the final selection of the Products and assuring that all performance, endurance, maintenance, safety and warning requirements of the application of the Products are met. Buyer must analyze all aspects of the application and follow applicable industry standards, specifications, and any technical information provided with the Quote or the Products, such as Seller's instructions, guides and specifications. If Seller provides options of or for Products based upon data or specifications provided by Buyer, Buyer is responsible for determining that such data and specifications are suitable and sufficient for all applications and reasonably foreseeable uses of the Products. In the event Buyer is not the end-user of the Products, Buyer will ensure such end-user complies with this paragraph.

**13. Use of Products, Indemnity by Buyer.** Buyer shall comply with all instructions, guides and specifications provided by Seller with the Quote or the Products. If Buyer uses or resells the Products in any way prohibited by Seller's instructions, guides or specifications, or Buyer otherwise fails to comply with Seller's instructions, guides and specifications, Buyer acknowledges that any such use, resale, or non-compliance is at Buyer's sole risk. Further, Buyer shall indemnify, defend, and hold Seller harmless from any losses, claims, liabilities, damages, lawsuits, judgments and costs (including attorney fees and defense costs), whether for personal injury, property damage, intellectual property infringement or any other claim, arising out of or in connection with: (a) improper selection, design, specification, application, or any misuse of Products; (b) any act or omission, negligent or otherwise, of Buyer; (c) Seller's use of Buyer's Property; (d) damage to the Products from an external cause, repair or attempted repair by anyone other than Seller, failure to follow instructions, guides and specifications provided by Seller, use with goods not provided by Seller, or opening, modifying, deconstructing, tampering with or repackaging the Products; or (e) Buyer's failure to comply with these Terms, including any legal or administrative proceedings, collection efforts, or other actions arising from or relating to such failure to comply. Seller shall not indemnify Buyer under any circumstance except as otherwise provided in these Terms.

**14. Cancellations and Changes.** Buyer may not cancel or modify, including but not limited to movement of delivery dates for the Products, any order for any reason except with Seller's written consent and upon terms that will indemnify, defend and hold Seller harmless against all direct, incidental and consequential loss or damage and any additional expense. Seller, at any time, may change features, specifications, designs and availability of Products.

**15. Assignment.** Buyer may not assign its rights or obligations without the prior written consent of Seller.

**16. Force Majeure.** Seller is not liable for delay or failure to perform any of its obligations by reason of any events or circumstances beyond its reasonable control. Such circumstances include without limitation: accidents, labor disputes or stoppages, government acts or orders, acts of nature, pandemics, epidemics, other widespread illness, or public health emergency, cyber related disruptions, cyber-attacks, ransomware sabotage, delays or failures in delivery from carriers or suppliers, shortages of materials, sudden increases in the price of raw material or components, shutdowns or slowdowns affecting the supply of raw materials or components, or the transportation thereof, oil shortages or oil price increases, energy crisis, energy or fuel interruption, war (whether declared or not) or the serious threat of same, riots, rebellions, acts of terrorism, embargoes, fire or any reason whether similar to the foregoing or otherwise. Seller will resume performance as soon as practicable after the event of force majeure has been removed. All delivery dates affected by an event of force majeure shall be tolled for the duration of such event of force majeure and rescheduled for mutually agreed dates as soon as practicable after the event of force majeure ceases to exist. The right to allocate capacity is in the Seller's sole discretion. An event of force majeure shall not include

financial distress, insolvency, bankruptcy, or other similar conditions affecting one of the parties, affiliates and/or subcontractors. An event of force majeure in the meaning of these Terms means any circumstances beyond Seller's control that permanently or temporarily hinders performance, even where that circumstance was already foreseen. Buyer shall not be entitled to cancel any orders following its claim of an event of force majeure.

**17. Waiver and Severability.** Failure to enforce any provision of these Terms will not invalidate that provision; nor will any such failure prejudice either party's right to enforce that provision in the future. Invalidity of any provision of these Terms shall not invalidate any other provision herein and, the remaining provisions will remain in full force and effect.

**18. Duration.** Unless otherwise stated in the Quote, any agreement governed by or arising from these Terms shall: (a) be for an initial duration of one (1) year; and (b) shall automatically renew for successive one-year terms unless terminated by Buyer with at least 180-days written notice to Seller or if Seller terminates the agreement pursuant to Section 19 of these Terms.

**19. Termination.** Seller may, without liability to Buyer, terminate any agreement governed by or arising from these Terms for any reason and at any time by giving Buyer thirty (30) days prior written notice. Seller may immediately terminate, in writing, if Buyer: (a) breaches any provision of these Terms, (b) becomes or is deemed insolvent, (c) appoints or has appointed a trustee, receiver or custodian for all or any part of Buyer's property, (d) files a petition for relief in bankruptcy on its own behalf, or one is filed against Buyer by a third party, (e) makes an assignment for the benefit of creditors; or (f) dissolves its business or liquidates all or a majority of its assets.

**20. Ownership of Rights.** Buyer agrees that (a) Seller (and/or its affiliates) owns or is the valid licensee of Seller's IP and (b) the furnishing of information, related documents or other materials by Seller to Buyer does not grant or transfer any ownership interest or license in or to Seller's IP to Buyer, unless expressly agreed in writing. Without limiting the foregoing, Seller retains ownership of all Software supplied to Buyer. In no event shall Buyer obtain any greater right in and to the Software than a right in a license limited to the use thereof and subject to compliance with any other terms provided with the Software. Buyer further agrees that it will not, directly or through intermediaries, reverse engineer, decompile, or disassemble any Software (including firmware) comprising or contained within a Product, except and only to the extent that such activity may be expressly permitted, either by applicable law or, in the case of open source software, the applicable open source license.

**21. Indemnity for Infringement of Intellectual Property Rights.** Seller is not liable for infringement of any Intellectual Property Rights except as provided in this Section. Seller will defend at its expense and will pay the cost of any settlement or damages awarded in an action brought against Buyer based on a third-party claim that one or more of the Products infringes the Intellectual Property Rights of a third party in the country of delivery of the Products by Seller to Buyer. Seller's obligation to defend and indemnify Buyer is contingent on Buyer notifying Seller within ten (10) days after Buyer becomes aware of any such claim, and Seller having sole control over the defense of the claim including all negotiations for settlement or compromise. If one or more Products is subject to such a claim, Seller may, at its sole expense and option, procure for Buyer the right to continue using the Products, replace or modify the Products to render them non-infringing, or offer to accept return of the Products and refund the purchase price less a reasonable allowance for depreciation. Seller has no obligation or liability for any claim of infringement: (i) arising from information provided by Buyer (including Seller's use of Buyer's Property); or (ii) directed to any Products for which the designs are specified in whole or part by Buyer; or (iii) resulting from the modification, combination or use in a system of any Products. The foregoing provisions of this Section constitute Seller's sole and exclusive liability and Buyer's sole and exclusive remedy for claims of infringement of Intellectual Property Rights.

**22. Governing Law.** These Terms, the terms of any Quote, and the sale and delivery of all Products are deemed to have taken place in, and shall be governed and construed in accordance with, the laws of the State of Ohio, as applicable to contracts executed and wholly performed therein and without regard to conflicts of laws principles. Buyer irrevocably agrees and consents to the exclusive jurisdiction and venue of the courts of Cuyahoga County, Ohio with respect to any dispute, controversy or claim arising out of or relating to the sale and delivery of the Products.

**23. Entire Agreement.** These Terms, along with the terms set forth in the Quote, forms the entire agreement between the Buyer and Seller and constitutes the final, complete and exclusive expression of the terms of sale and purchase. In the event of a conflict between any term set forth in the Quote and these Terms, the terms set forth in the Quote shall prevail. All prior or contemporaneous written or oral agreements or negotiations with

respect to the subject matter shall have no effect. No modification to these Terms will be binding on Seller unless agreed to in a writing that is signed by an authorized representative of Seller, excluding email correspondence, 'clickwrap' or other purported electronic assent to different or additional terms. Sections 2-25 of these Terms shall survive termination or cancellation of any agreement governed by or arising from these Terms.

**24. No 'Wrap' Agreements/No Authority to Bind.** Seller's clicking any buttons or any similar action, such as clicking "I Agree" or "Confirm," to utilize Buyer's software or webpage for the placement of orders, is NOT an agreement to Buyer's Terms and Conditions. **NO EMPLOYEE, AGENT OR REPRESENTATIVE OF SELLER HAS THE AUTHORITY TO BIND SELLER BY THE ACT OF CLICKING ANY BUTTON OR SIMILAR ACTION ON BUYER'S WEBSITE OR PORTAL.**

**25. Compliance with Laws.** Buyer agrees to comply with all applicable laws, regulations, and industry and professional standards, including those of the United States of America, and the country or countries in which Buyer may operate, including without limitation the U.S. Foreign Corrupt Practices Act ("FCPA"), the U.S. Anti-Kickback Act ("Anti-Kickback Act"), U.S. and E.U. export control and sanctions laws ("Export Laws"), the U.S. Food Drug and Cosmetic Act ("FDCA"), and the rules and regulations promulgated by the U.S. Food and Drug Administration ("FDA"), each as currently amended. Buyer agrees to indemnify, defend, and hold harmless Seller from the consequences of any violation of such laws, regulations and standards by Buyer, its employees or agents. Buyer represents that it is familiar with all applicable provisions of the FCPA, the Anti-Kickback Act, Export Laws, the FDCA and the FDA and certifies that Buyer will adhere to the requirements thereof and not take any action that would make Seller violate such requirements. Buyer represents and agrees that Buyer will not make any payment or give anything of value, directly or indirectly, to any governmental official, foreign political party or official thereof, candidate for foreign political office, or commercial entity or person, for any improper purpose, including the purpose of influencing such person to purchase Products or otherwise benefit the business of Seller. Buyer further represents and agrees that it will not receive, use, service, transfer or ship any Products from Seller in a manner or for a purpose that violates Export Laws or would cause Seller to be in violation of Export Laws. Buyer agrees to promptly and reliably provide Seller all requested information or documents, including end-user statements and other written assurances, concerning Buyer's ongoing compliance with Export Law.

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Supersedes HY13-PMDCRB1/US August 2021 BLI 6 HY13-PMDCRB1/US October 2022



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