



Pump & Motor Catalog

Aluminum Bushing Series

Catalog HY09-1000/US



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- Consistent quality
- Technical innovation
- Premier customer service

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- Refuse/dump truck
- Material handling
- Forestry
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- Industrial



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All units shown in this catalog are of aluminum construction to provide superior performance, while affording excellent horsepower-to-weight ratio.

P16 SERIES

- Flows to 37 GPM per section
- Tandem & triple section units available
- Pressures to 3000 PSI
- Speeds to 3600 RPM
- Also available as motor
- Priority flow available
- Dry valve option
- Clutch pump available

20 SERIES

- Flows to 98 GPM per section
- Tandem & triple section units available
- Pressures to 2500 PSI
- Speeds to 2500 RPM
- Pressure & flow sensing valves available
- Dry valve option
- Piggy back option available
- Also available as motor
- Cast iron versions available

25 SERIES

- Flows to 208 GPM per section
- Tandem section units available
- Pressures to 3000 PSI
- Speeds to 2500 PSI
- Piggy back option available
- Dry Valve option
- Also available as motor
- Cast irons versions available

HP 7 SERIES

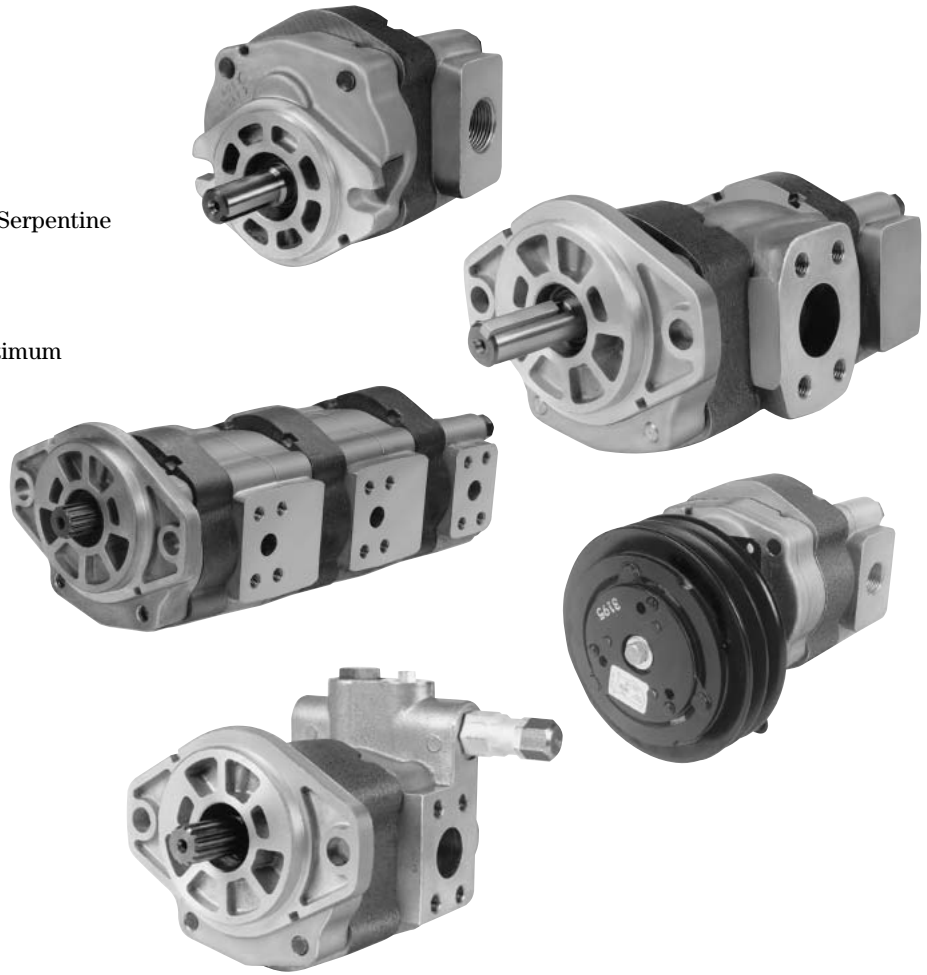
- Flows to 116 GPM per section
- Tandem section units available
- Pressures to 4000 PSI
- Speeds to 2500 RPM

HP 8 SERIES

- Flows to 177 GPM per section
- Tandem section units available
- Pressures to 4000 PSI
- Speeds to 2500 RPM

**General Information
for P16 Series**

- Available in various configurations
 - P16 — Single Section
 - TP16 — Tandem, 2 & 3 Place
 - PVP16 — Priority Valve
 - CP16 — Clutch Pump 'V' Belt and Serpentine
- Cast iron pumping sections for durability
- Aluminum flanges and covers for optimum power to weight ratio.
- Journal bearings for long life and good over-hung load capability
- Buna-N Seals are standard for petroleum and glycol based fluids. "Viton®E" seals are optional.
- Pressure balanced plates for greater efficiency.



How to Order P16 Series:

Select the desired symbol (in the correct position) to construct a model code.

Assembly Example:

Options

Code	Description
V	Viton®

Model

Code	Description
P	Pump (single)
TP	Tandem Pump
PVP	Priority Valve Pump
CP	Clutch Pump

Section Size

Code	Cu. In./ Rev.	CC's/ Rev.
45	.878	14.388
65	1.270	20.812
85	1.663	27.252
100	1.964	32.184
115	2.241	36.723
150	2.934	48.080
180	3.511	57.535
200	3.902	63.942

Rotation

Code	Direction
A	C'C' Wise
C	C' Wise

Shaft

Code	Description
1	5/8" 9-Tooth Spline
2	7/8" 13-Tooth Spline
3	7/8" Straight Keyed
5	7/8" Straight Keyed Long
6	3/4" Straight Keyed
8	7/8" Straight Keyed w/ 5/8" Thread
9	7/8" Tapered

Clutch

Code	Drive Type
0	None
1	V-Belt - Light Duty
2	V-Belt - Heavy Duty
3	Direct Drive
4	6-Rib Flat Belt

Cover Plate (For Model CP)

Code	Port	Inlet	Outlet
1	Rear	#20 SAE (1-5/8"-12UN-2B)	#16 SAE (1-5/16"-12UN-2B)
2	Rear	1" NPT	3/4" NPT
3	Side	1-1/4" 4-Bolt	3/4" 4-Bolt
4	Side	1" NPT	3/4" NPT
5	Side	#20 SAE (1-5/8"-12UN-2B)	#12 SAE (1-1/16"-12UN-2B)
6	Rear	#16 SAE (1-5/16"-12UN-2B)	#12 SAE (1-1/16"-12UN-2B)
7	Rear	1" BSPT	3/4" BSPT
8	Side	1" BSPT	3/4" BSPT
9	Side	#20 SAE (1-5/8"-12UN-2B)	#16 SAE (1-1/16"-12UN-2B)
10	Side/Rear	1-1/4" 4-Bolt	#12 SAE (1-1/16"-12UN-2B)
11	Side	1-1/4" 4-Bolt	#12 SAE (1-1/16"-12UN-2B)

Flange

Code	Mounting
D	SAE 'A' 2-Bolt
E	6-Bolt Round
F	Pad (Foot) Mount
G	SAE 'C' 4-Bolt
J	SAE 'B' 4-Bolt
N	SAE 'B' 2-Bolt
S	PTO Direct
T	PTO Direct (Chelsea SPL.)
NONE	Omit For Clutch Pumps

Priority PVP Only

Code	Flow
1	1-2
2	2-3
3	3-4
4	4-5
5	5-6
6	6-7
7	7-8
8	8-9
9	9-10

Pressure Setting

Code	Setting
5	500 PSI
10	1000 PSI
12	1200 PSI

Use 2 digit maximum to indicate pressure setting

Consult Factory For Flows Greater than 10 GPM

Cover Plate (For Model P, TP, & PVP)

Code	Port	Inlet	Outlet
1	Side	#20 SAE (1-5/8"-12UN-2B)	#16 SAE (1-5/16"-12UN-2B)
2	Rear	1" NPT	3/4" NPT
3	Side	1-1/4" 4-Bolt	3/4" 4-Bolt
4	Side	1" NPT	3/4" NPT
5	Side	#20 SAE (1-5/8"-12UN-2B)	#12 SAE (1-1/16"-12UN-2B)
6	Rear	#16 SAE (1-5/16"-12UN-2B)	#12 SAE (1-1/16"-12UN-2B)
7	Rear	1" BSPT	3/4" BSPT
8	Side	1" BSPT	3/4" BSPT
9	Side	#20 SAE (1-5/8"-12UN-2B)	#16 SAE (1-1/16"-12UN-2B)
10	Side/Rear	1-1/4" 4-Bolt	#12 SAE (1-1/16"-12UN-2B)
11	Side	1-1/4" 4-Bolt	#12 SAE (1-1/16"-12UN-2B)

Switch Kit

Code	Switch Kit
S	With Switch Kit
O	Without Switch Kit

*Consult factory for priority flows over 10 GPM.
 Note: Add prefix 'V' to pump model number (VP16) when ordering pumps with Viton® Seals.

**Specifications
for P16 Series**

Description Gear Pumps
Flow Range TO 38 GPM (143.8 LTR)
Displacements TO 3.902 C.I.R. (63.94 CC's/REV.)
Maximum Pressure to 3000 PSI (207 BAR)
Maximum Speed to 3600 RPM
Rotation A or C
Bearings Journal
Construction Cast Iron Gear Plate with
Aluminum Flange and Cover Plate



Performance Data

Pump Model	Section Size	Displacement/Revolution (Theoretical)					Maximum Pressure		Maximum Speed RPM
		US Gallons	Cubic Inches	Liters	Cubic Centimeters	Imperial Gallons	PSI	BAR	
P16	45	.0038	.878	.0144	14.388	.0031	3000	207	3600
P16	65	.0055	1.270	.0208	20.812	.0045	3000	207	3600
P16	85	.0072	1.663	.0273	27.252	.0059	3000	207	3400
P16	100	.0085	1.964	.0321	32.184	.0070	3000	207	3300
P16	115	.0097	2.241	.0367	36.723	.0080	3000	207	3100
P16	150	.0127	2.934	.0481	48.080	.0105	3000	207	2800
P16	180	.0152	3.511	.0575	57.535	.0126	2200	152	2500
P16	200	.0169	3.902	.0639	63.942	.0140	2000	138	2200

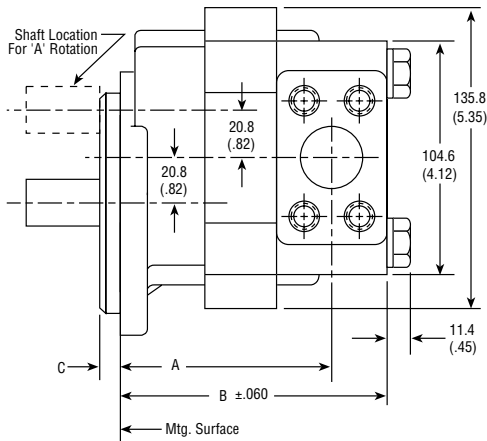
All data based on SAE 10W oil at 150°F.
Available with Viton® Seals.

CAUTION: "Inlet vacuum" should not exceed 5" Hg at normal operating speed and temperature.
Operation of pumps in excess of 5" Hg requires factory approval.

Dimensional Data

Pump Models	Flange Type						Shipping Weights (Approx.)	
	D		E		F		lbs.	kgs.
	A	B	A	B	A	B		
P16 - 45	89.9 (3.54)	115.6 (4.55)	118.4 (4.66)	144.1 (5.67)	92.9 (3.66)	118.6 (4.67)	12	5.5
P16 - 65	95.3 (3.75)	121.2 (4.77)	123.6 (4.88)	149.6 (5.89)	98.6 (3.88)	124.2 (4.89)	13	5.9
P16 - 85	100.9 (3.97)	126.5 (4.98)	129.3 (5.09)	154.9 (6.10)	103.6 (4.09)	129.5 (5.10)	14	6.4
P16 - 100	104.9 (4.13)	130.6 (5.14)	133.3 (5.25)	159.0 (6.26)	107.9 (4.25)	133.6 (5.26)	15	6.8
P16 - 115	108.9 (4.29)	134.6 (5.30)	137.4 (5.41)	163.1 (6.42)	112.0 (4.41)	137.7 (5.42)	16	7.3
P16 - 150	118.4 (4.66)	144.1 (5.67)	146.8 (5.78)	172.5 (6.79)	121.4 (4.78)	147.1 (5.79)	17	7.7
P16 - 180	126.5 (4.98)	152.2 (5.99)	154.9 (6.10)	180.6 (7.11)	129.5 (5.10)	155.2 (6.11)	19	8.6
P16 - 200	131.8 (5.19)	157.5 (6.20)	160.3 (6.31)	185.9 (7.32)	134.9 (5.31)	160.5 (6.32)	20	9.1

Pump Models	Flange Type						Shipping Weights (Approx.)	
	G&J		N		S&T		lbs.	kgs.
	A	B	A	B	A	B		
P16 - 45	118.4 (4.66)	144.1 (5.67)	88.1 (3.47)	113.8 (4.48)	132.6 (5.22)	158.2 (6.23)	12	5.5
P16 - 65	123.6 (4.88)	149.6 (5.89)	93.7 (3.69)	119.4 (4.70)	138.2 (5.44)	163.8 (6.45)	13	5.9
P16 - 85	129.3 (5.09)	154.9 (6.10)	99.1 (3.90)	124.7 (4.91)	143.5 (5.65)	169.2 (6.66)	14	6.4
P16 - 100	133.3 (5.25)	159.0 (6.26)	103.1 (4.06)	128.8 (5.07)	147.6 (5.81)	173.2 (6.82)	15	6.8
P16 - 115	137.4 (5.41)	163.1 (6.42)	107.2 (4.22)	132.8 (5.23)	151.6 (5.97)	177.3 (6.98)	16	7.3
P16 - 150	146.8 (5.78)	172.5 (6.79)	116.6 (4.59)	142.2 (5.60)	161.0 (6.34)	186.7 (7.35)	17	7.7
P16 - 180	154.9 (6.10)	180.6 (7.11)	124.7 (4.91)	150.4 (5.92)	169.2 (6.66)	194.8 (7.67)	19	8.6
P16 - 200	160.3 (6.31)	185.9 (7.32)	130.1 (5.12)	155.7 (6.13)	174.5 (6.87)	200.1 (7.88)	20	9.1



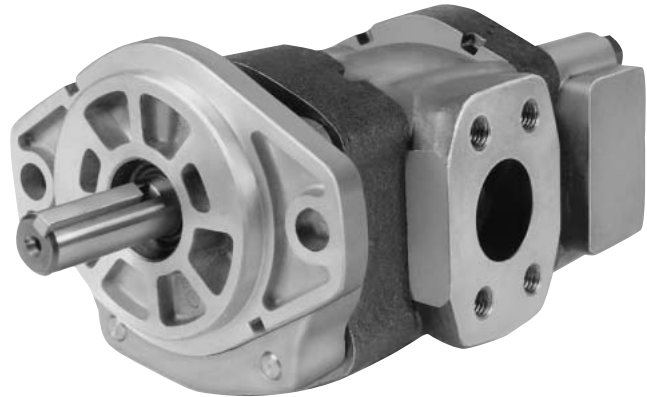
C Dimensions

FLANGE TYPE	MM	IN
D	6.35	(.250)
E	4.74	(.187)
F	—	—
G	6.35	(.250)
J	6.35	(.250)
N	9.52	(.375)
S	5.08	(.200)
T	5.08	(.200)

Inch equivalents for millimeter dimensions are shown (**).

**Specifications
 for TP16 Series**

Description Gear Pumps (Two-place)
 Flow Range To 32 GPM (121.1 LTR) Per Section
 Displacements To 3.904 C.I.R. (63.94 CC's/REV.)
 Maximum Pressure to 3000 PSI (207 BAR)
 Maximum Speed to 3100 RPM
 Rotation A or C
 Bearings Journal
 Construction Cast Iron Gear Plates with
 Aluminum Flange, Connector and Cover Plates



Performance Data Per Section

Pump Model	Section Size	Displacement/Revolution (Theoretical)					Maximum Pressure		Maximum Speed
		US Gallons	Cubic In	Liters	Cubic Cm	Imperial Gallons	PSI	BAR	RPM Tandem
TP16	45	.0038	.878	.0144	14.388	.0031	3000	207	3100
TP16	65	.0055	1.270	.0208	20.812	.0045	3000	207	3000
TP16	85	.0072	1.663	.0273	27.252	.0059	3000	207	2900
TP16	100	.0085	1.964	.0321	32.184	.0070	3000	207	2800
TP16	115	.0097	2.241	.0367	36.723	.0080	3000	207	2600
TP16	150	.0127	2.934	.0481	48.080	.0105	3000	207	2400
TP16	180	.0152	3.511	.0575	57.535	.0126	2200	152	2100
TP16	200	.0169	3.904	.0639	63.942	.0140	2000	138	1900

Note: For best inlet conditions, place largest displacement section in the rear position and use both inlet ports.
 All data based on SAE 10W oil at 150°F.
 Available with Viton® Seals.

CAUTION: "Inlet vacuum" should not exceed 5" Hg at normal operating speed and temperature.
 Operation of pumps in excess of 5" Hg requires factory approval.

Dimensional Data

PD Factors

The maximum size and number of sections of a tandem pump for a given application is limited to the torque capability of the input drive shaft and the spline coupling between the sections. To determine this capability, a "PD Factor" is used:

Maximum allowable PD for the 7/8" drive shaft is 53.
 Maximum allowable PD for a coupling is also 53.

When: P = PSI (The relief valve setting of each individual section).

D = Displacement (In U.S. gallons per revolution of each individual section).

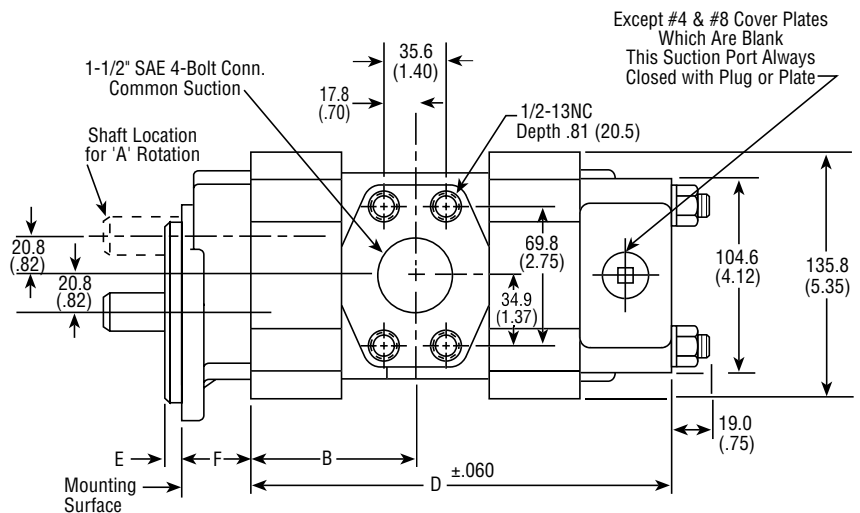
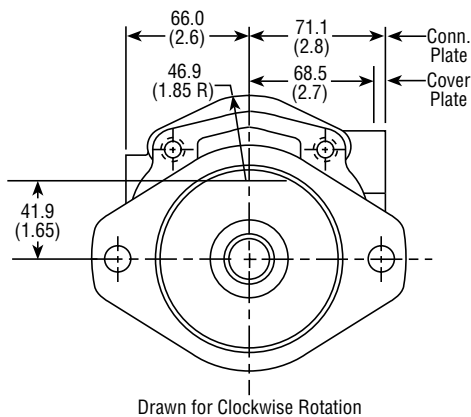
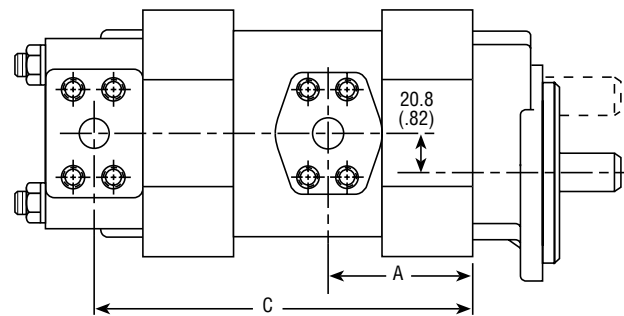
Example: Assume a two-place pump TP16-150 — 150 with front and rear sections on pressure at the same time at 2000 PSI:

- A. Drive Shaft:
 $PD = (2000) (.0127) + (2000) (.0127) = 50.8$ vs. 53. Capability is OK
- B. Coupling between front and center sections:
 $PD = (2000) (.0127) = 25.4$ vs. 53. Capability is OK.

Flange Dimensions

FLANGE TYPE	E		F	
D	6.35	(.250)	41.15	(1.62)
E	4.75	(.187)	69.85	(2.75)
F	—	—	44.45	(1.75)
J	6.35	(.250)	69.85	(2.75)
N	9.52	(.375)	38.10	(1.55)
S	5.08	(.200)	84.07	(3.31)

Inch equivalents for millimeter dimensions are shown in (**).

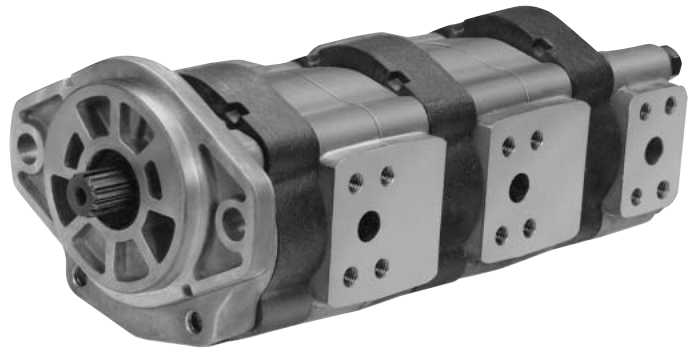


Dimensional Data

PUMP SIZES	A		B		C		D		Shipping Weights (Approx.)	
	lbs.	kgs.	lbs.	kgs.	lbs.	kgs.	lbs.	kgs.	lbs.	kgs.
TP16-45-45	48.01	(1.89)	61.47	(2.42)	149.9	(5.90)	175.5	(6.91)	26	11.8
TP16-65-45	53.59	(2.11)	67.06	(2.64)	155.2	(6.11)	180.9	(7.12)	28	12.7
TP16-65-65	53.59	(2.11)	67.06	(2.64)	160.8	(6.33)	186.4	(7.34)	30	13.6
TP16-85-45	58.93	(2.32)	72.39	(2.85)	160.8	(6.33)	186.4	(7.34)	31	14.1
TP16-85-65	58.93	(2.32)	72.39	(2.85)	166.1	(6.54)	191.8	(7.55)	33	15.0
TP16-85-85	58.93	(2.32)	72.39	(2.85)	171.7	(6.76)	197.4	(7.77)	35	15.9
TP16-100-45	62.99	(2.48)	76.45	(3.01)	164.9	(6.49)	190.5	(7.50)	34	15.4
TP16-100-65	62.99	(2.48)	76.45	(3.01)	170.2	(6.70)	195.8	(7.71)	36	16.3
TP16-100-85	62.99	(2.48)	76.45	(3.01)	175.8	(6.92)	201.4	(7.93)	38	17.2
TP16-100-100	62.99	(2.48)	76.45	(3.01)	179.8	(7.08)	205.5	(8.09)	39	17.7
TP16-115-45	67.06	(2.64)	80.52	(3.17)	168.9	(6.65)	194.6	(7.66)	39	17.7
TP16-115-65	67.06	(2.64)	80.52	(3.1)	174.2	(6.86)	199.9	(7.87)	41	18.6
TP16-115-85	67.06	(2.64)	80.52	(3.17)	179.8	(7.08)	205.5	(8.09)	43	19.5
TP16-115-100	67.06	(2.64)	80.52	(3.17)	183.9	(7.24)	209.6	(8.25)	44	20.0
TP16-115-115	67.06	(2.64)	80.52	(3.17)	188	(7.40)	213.6	(8.41)	46	20.9
TP16-150-45	76.45	(3.01)	89.92	(3.54)	178.3	(7.02)	204	(8.03)	44	20.0
TP16-150-65	76.45	(3.01)	89.92	(3.54)	183.6	(7.23)	209.3	(8.24)	47	21.3
TP16-150-85	76.45	(3.01)	89.92	(3.54)	189.2	(7.45)	214.9	(8.46)	49	22.2
TP16-150-100	76.45	(3.01)	89.92	(3.54)	193.3	(7.61)	219	(8.62)	50	22.7
TP16-150-115	76.45	(3.01)	89.92	(3.54)	197.4	(7.77)	223	(8.78)	52	23.6
TP16-150-150	76.45	(3.01)	89.92	(3.54)	206.8	(8.14)	232.4	(9.15)	54	24.5
TP16-180-45	84.58	(3.33)	98.04	(3.86)	186.4	(7.34)	212.1	(8.35)	52	23.6
TP16-180-65	84.58	(3.33)	98.04	(3.86)	191.8	(7.55)	217.4	(8.56)	54	24.5
TP16-180-85	84.58	(3.33)	98.04	(3.86)	197.4	(7.77)	223	(8.78)	56	25.4
TP16-180-100	84.58	(3.33)	98.04	(3.86)	201.4	(7.93)	227.1	(8.94)	57	25.9
TP16-180-115	84.58	(3.33)	98.04	(3.86)	205.5	(8.09)	231.1	(9.10)	59	26.8
TP16-180-150	84.58	(3.33)	98.04	(3.86)	214.9	(8.46)	240.5	(9.47)	61	27.7
TP16-180-180	84.58	(3.33)	98.04	(3.86)	223	(8.78)	248.7	(9.79)	63	28.6
TP16-200-45	90.17	(3.55)	103.6	(4.08)	191.8	(7.55)	217.7	(8.57)	60	27.2
TP16-200-65	90.17	(3.55)	103.6	(4.08)	197.1	(7.76)	222.8	(8.77)	62	28.1
TP16-200-85	90.17	(3.55)	103.6	(4.08)	202.7	(7.98)	228.4	(8.99)	64	29.0
TP16-200-100	90.17	(3.55)	103.6	(4.08)	206.8	(8.14)	232.4	(9.15)	65	29.5
TP16-200-115	90.17	(3.55)	103.6	(4.08)	210.8	(8.30)	236.5	(9.31)	67	30.4
TP16-200-150	90.17	(3.55)	103.6	(4.08)	220.2	(8.67)	245.9	(9.68)	69	31.3
TP16-200-180	90.17	(3.55)	103.6	(4.08)	228.4	(8.99)	254	(10.00)	71	32.2
TP16-200-200	90.17	(3.55)	103.6	(4.08)	233.7	(9.20)	259.3	(10.21)	73	33.1

**Specifications
for TP16 Series**

Description Gear Pumps (Three-place)
Flow Range To 32 GPM (121.1 LTR.) Per Section
Displacements To 3.904 C.I.R. (63.94 CC's/REV.)
Maximum Pressure to 3000 PSI (207 BAR)
Maximum Speed to 3100 RPM
Rotation A or C
Bearings Journal
Construction Cast Iron Gear Plates with
Aluminum Flange, Connector and Cover Plates



Performance Data Per Section

Pump Model	Section Size	Displacement/Revolution (Theoretical)					Maximum Pressure		Maximum Speed RPM
		US Gallons	Cubic Inches	Liters	Cubic Centimeters	Imperial Gallons	PSI	BAR	
P16	45	.0038	.878	.0144	14.388	.0031	3000	207	3100
P16	65	.0055	1.270	.0208	20.812	.0045	3000	207	3000
P16	85	.0072	1.663	.0273	27.252	.0059	3000	207	2900
P16	100	.0085	1.964	.0321	32.184	.0070	3000	207	2800
P16	115	.0097	2.241	.0367	36.723	.0080	3000	207	2600
P16	150	.0127	2.934	.0481	48.080	.0105	3000	207	2400
P16	180	.0152	3.511	.0575	57.535	.0126	2200	152	2100
P16	200	.0169	3.904	.0639	63.942	.0140	2000	138	1900

Note: Three-place pumps assembled from maximum displacement size sections should be checked for operating inlet conditions.
If "PD Factor" is not exceeded, place the largest displacement section in the rear position and use all inlet ports.
All data based on SAE 10W oil at 150°F.
Available with Viton® Seals.

CAUTION: "Inlet vacuum" should not exceed 5" Hg at normal operating speed and temperature.
Operation of pumps in excess of 5" Hg requires factory approval.

Dimensional Data

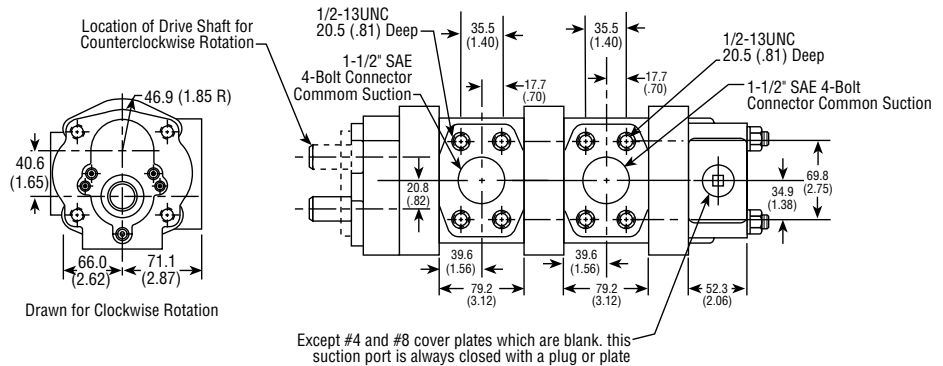
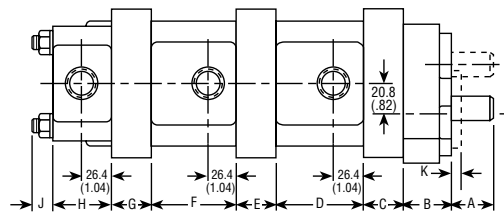
To determine overall pump length
 Add together the dimensions that apply to the pump you
 are considering.

- A = _____ Shaft Extension
- B = _____ Flange Length
- C = _____ Front Gear Plate Length
- D = $\frac{79.2 \text{ mm}}{3.12 \text{ in.}}$ Connector Plate Length
- E = _____ Center Gear Plate Length
- F = $\frac{79.2 \text{ mm}}{3.12 \text{ in.}}$ Connector Plate Length
- G = _____ Rear Gear Plate Length
- H = $\frac{52.3 \text{ mm}}{2.06 \text{ in.}}$ Cover Plate Length
- J = $\frac{19.0 \text{ mm}}{.75 \text{ in.}}$ Stud Extension
- _____ Total = Overall Length

PUMP SIZE	C, E & G
-45	21.84 (.86)
-65	27.18 (1.07)
-85	32.77 (1.29)
-100	36.83 (1.45)
-115	40.89 (1.61)
-150	50.29 (1.98)
-180	58.42 (2.30)
-200	63.75 (2.51)

Flange Dimensions

FLANGE TYPE	B	K
D	41.1 (1.62)	6.3 (.250)
E	69.8 (2.75)	4.7 (.187)
F	44.4 (1.75)	—
J	69.8 (2.75)	6.3 (.250)
N	39.3 (1.55)	9.5 (.375)
S	84.0 (3.31)	5.0 (.200)



**Inch equivalents for millimeter
 dimensions are shown in (**).**

PD Factors

The maximum size and number of sections of a tandem pump for a given application is limited to the torque capability of the input drive shaft and the spline coupling between the sections. To determine this capability, a "PD Factor" is used:

Maximum allowable PD for the 7/8" drive shaft is 53.
 Maximum allowable PD for a coupling is also 53.

When: P = PSI (The relief valve setting of each individual section).
 D = Displacement (In U.S. gallons per revolution of each individual section).

Example: Assume a three-place pump TP16-150-150-100 with front and center sections on pressure at the same time at 2000 PSI, and with the rear section on pressure at 1500 PSI, but not at the same time as the front and center sections:

- A. Drive Shaft:
 - (1) PD = (2000) (.0127) + (2000) (.0127) = 50.8 vs. 53. Capability is OK
 - (2) PD = (1500) (.0085) = 12.7 vs. 53. Capability is OK.
- B. Coupling between front and center sections:
 - PD = (2000) (.0127) = 25.4 vs. 53. Capability is OK.
- C. Coupling between center and rear sections:
 - PD = (1500) (.0085) = 12.7 vs. 53. Capability is OK.

Note: For purpose of illustration, assume all three pump sections to be on pressure at the same time.
 A. Drive Shaft:
 PD = (2000) (.0127) + (2000) (.0127) + (1500) (.0085) = 63.5 vs. 53. Capability is not OK

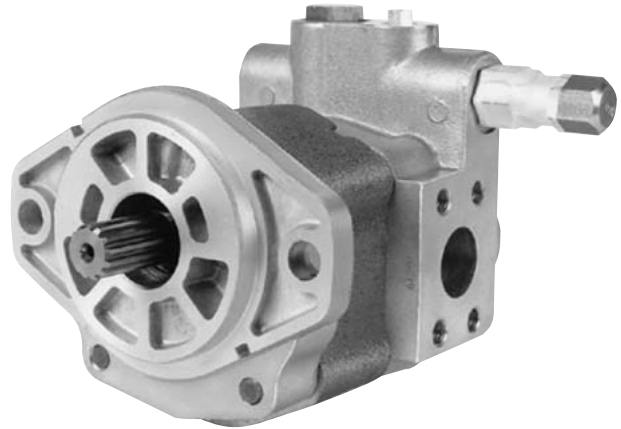
Because the PD Factor for the shaft is 53, operating all three sections at the same time (to relief valve pressure) would exceed the torque capability of the drive shaft.

- B. Coupling between front and center sections:
 - PD = (2000) (.0127) + (1500) (.0085) = 35.1 vs. 53. Capability is OK

Remember also that the PD factor for the coupling is 53. If the center and rear sections are on pressure at the same time, the coupling between the front and center sections must transmit the torque for the center and rear sections.

**Specifications
for PVP16 Series**

Description Priority Valve Gear Pumps
Pump Flow Range To 38 GPM (143.8 LTR.)
Priority Flow Range 2 to 10 GPM Standard (7.6 to 37.8 LTR.)
Displacements To 3.904 C.I.R. (63.94 CC's/REV.)
Maximum Pressure to 3000 PSI (207 BAR)
Maximum Speed to 3600 RPM
Rotation A or C
Bearings Journal
Construction Cast Iron Gear Plate with
Aluminum Flange and Cover (Valve) Plate



Performance Data

Pump Model	Section Size	Displacement/Revolution (Theoretical)					Maximum Pressure		Maximum Speed
		US Gallons	Cubic Inches	Liters	Cubic Centimeters	Imperial Gallons	PSI	BAR	RPM
PVP16	45	.0038	.878	.0144	14.388	.0031	3000	207	3600
PVP16	65	.0055	1.270	.0208	20.812	.0045	3000	207	3600
PVP16	85	.0072	1.663	.0273	27.252	.0060	3000	207	3400
PVP16	100	.0085	1.964	.0321	32.184	.0070	3000	207	3300
PVP16	115	.0097	2.241	.0367	36.723	.0080	3000	207	3100
PVP16	150	.0127	2.934	.0481	48.080	.0105	3000	207	2800
PVP16	180	.0152	3.511	.0575	57.535	.0125	2200	152	2500
PVP16	200	.0169	3.904	.0639	63.942	.0140	2000	138	2500

All data based on SAE 10W oil at 150°F.
Available with Viton® Seals.

CAUTION: "Inlet vacuum" should not exceed 5" Hg at normal operating speed and temperature.
Operation of pumps in excess of 5" Hg requires factory approval.

Priority Flow

CAT. NO 1	CAT. NO 2	CAT. NO 3	CAT. NO 4	CAT. NO 5	CAT. NO 6	CAT. NO 7	CAT. NO 8	CAT. NO 9
1 to 3 GPM	2 to 3 GPM	3 to 4 GPM	4 to 5 GPM	5 to 6 GPM	6 to 7 GPM	7 to 8 GPM	8 to 9 GPM	9 to 10 GPM
3.8 to 7.6 LPM	7.6 to 11.4 LPM	11.4 to 15.1 LPM	15.1 to 18.9 LPM	18.9 to 22.7 LPM	22.7 to 26.5 LPM	26.5 to 30.3 LPM	30.3 to 34.0 LPM	34.0 to 37.8 LPM

Consult factory for priority flow over 10 GPM.

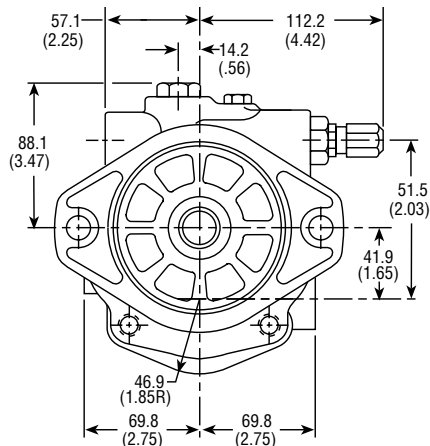
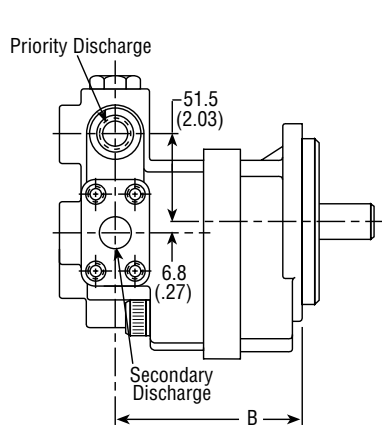
Dimensional Data

Pump Models	Flange Type									Shipping Weights (Approx.)	
	D			E&J			F				
	A	B	C	A	B	C	A	B	C	lbs.	kgs.
PVP16 - 45	96.2 (3.79)	116.8 (4.60)	150.3 (5.92)	124.9 (4.92)	145.5 (5.73)	179.0 (7.05)	99.5 (3.92)	120.1 (4.73)	153.6 (6.05)	13	5.9
PVP16 - 65	101.6 (4.00)	122.1 (4.81)	155.7 (6.13)	130.3 (5.13)	150.8 (5.94)	184.4 (7.26)	104.9 (4.13)	125.4 (4.94)	159.0 (6.26)	14	6.4
PVP16 - 85	107.1 (4.22)	127.7 (5.03)	161.2 (6.35)	135.8 (5.35)	156.4 (6.16)	189.9 (7.48)	110.4 (4.35)	131.0 (5.16)	164.5 (6.48)	15	6.8
PVP16 - 100	111.2 (4.38)	131.8 (5.19)	165.3 (6.51)	139.9 (5.51)	160.5 (6.32)	194.0 (7.64)	114.5 (4.51)	135.1 (5.32)	168.6 (6.64)	16	7.3
PVP16 - 115	115.3 (4.54)	135.8 (5.35)	169.4 (6.67)	144.0 (5.67)	164.5 (6.48)	198.1 (7.80)	118.6 (4.67)	139.1 (5.48)	172.7 (6.80)	17	7.7
PVP16 - 150	124.7 (4.91)	145.2 (5.72)	178.8 (7.04)	153.4 (6.04)	173.9 (6.85)	207.5 (8.17)	128.0 (5.04)	148.5 (5.85)	182.1 (7.17)	18	8.2
PVP16 - 180	132.8 (5.23)	153.4 (6.04)	186.9 (7.36)	161.5 (6.36)	182.1 (7.17)	215.6 (8.49)	136.1 (5.36)	156.7 (6.17)	190.2 (7.49)	20	9.1
PVP16 - 200	138.1 (5.44)	158.7 (6.25)	192.2 (7.57)	166.8 (6.57)	187.4 (7.38)	220.9 (8.70)	144.4 (5.57)	162.0 (6.38)	195.5 (7.70)	21	9.5

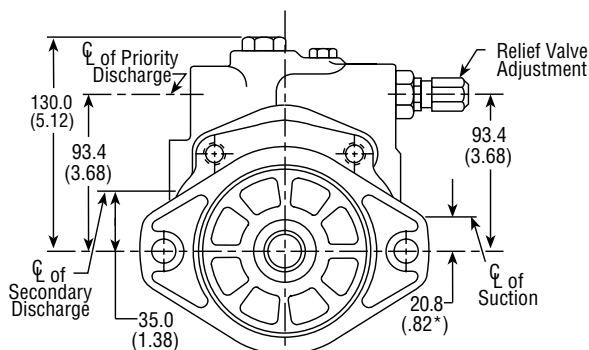
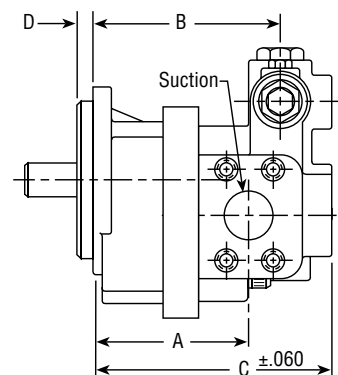
Pump Models	Flange Type						Shipping Weights (Approx.)	
	N			S				
	A	B	C	A	B	C	lbs.	kgs.
PVP16 - 45	93.2 (3.67)	113.7 (4.48)	147.3 (5.80)	139.1 (5.48)	159.7 (6.29)	193.2 (7.61)	13	5.9
PVP16 - 65	98.5 (3.88)	119.1 (4.69)	152.6 (6.01)	144.5 (5.69)	165.1 (6.50)	198.6 (7.82)	14	6.4
PVP16 - 85	104.1 (4.10)	124.7 (4.91)	158.2 (6.23)	150.1 (5.91)	170.6 (6.72)	204.2 (8.04)	15	6.8
PVP16 - 100	108.20 (4.26)	128.7 (5.07)	162.3 (6.39)	154.1 (6.07)	174.7 (6.88)	208.2 (8.20)	16	7.3
PVP16 - 115	112.2 (4.42)	132.8 (5.23)	166.3 (6.55)	158.2 (6.23)	178.8 (7.04)	212.3 (8.36)	17	7.7
PVP16 - 150	121.6 (4.79)	142.2 (5.60)	175.7 (6.92)	167.6 (6.60)	188.2 (7.41)	221.7 (8.73)	18	8.2
PVP16 - 180	129.7 (5.11)	150.3 (5.92)	183.8 (7.24)	175.7 (6.92)	196.3 (7.73)	229.8 (9.05)	20	9.1
PVP16 - 200	135.1 (5.32)	155.7 (6.13)	189.2 (7.45)	181.1 (7.13)	201.6 (7.94)	235.2 (9.26)	21	9.5

D Dimensions

Flange Type	
D	6.3 (.250)
E	4.7 (.187)
F	
J	6.3 (.250)
N	9.5 (.375)
S	6.3 (.250)



Drawn for Counterclockwise Rotation



Drawn for Clockwise Rotation

Inch equivalents for millimeter dimensions are shown in (**).

**Specifications
for CP16 Series**

Description Clutch Pumps
Flow Range To 38 GPM (143.8 LTR)
Displacements To 3.904 C.I.R. (63.74 CC's/REV.)
Maximum Pressure to 3000 PSI (207 BAR)
Maximum Speed to 3600 RPM
Rotation A or C
Bearings Journal
Construction Cast Iron Gear Plates with
Aluminum Flange and Cover Plate



Performance Data

Pump Model	Section Size	US Gallons	Displacement/Revolution (Theoretical)				Maximum Pressure								Max. Speed RPM
											'V' Belt Drive				
			Cubic Inches	Liters	Cubic CM	Imperial Gallons	Clutch #1		Clutch #2		Clutch #3		Clutch #4		
							PSI	BAR	PSI	BAR	PSI	BAR	PSI	BAR	
P16	45	.0038	.878	.0144	14.39	.0031	3000	207	3000	207	3000	207	3000	207	3600
P16	65	.0055	1.270	.0208	20.83	.0045	3000	207	3000	207	3000	207	3000	207	3600
P16	85	.0072	1.663	.0273	27.27	.0060	2800	193	3000	207	3000	207	3000	207	3400
P16	100	.0085	1.964	.0321	32.21	.0070	2400	165	3000	207	3000	207	3000	207	3300
P16	115	.0097	2.241	.0367	36.75	.0080	2000	138	2900	200	3000	207	2900	200	3100
P16	150	.0127	2.934	.0481	48.11	.0105	1500	103	2600	179	3000	207	2600	179	2800
P16	180	.0152	3.511	.0575	57.57	.0125	1200	83	2100	145	2200	152	2100	145	2500
P16	200	.0169	3.904	.0639	63.94	.0140	1100	76	1900	131	2000	138	1900	131	2200

All data based on SAE 10W oil at 150°F.
Available with Viton® Seals.

CAUTION: "Inlet vacuum" should not exceed 5" Hg at normal operating speed and temperature.
Operation of pumps in excess of 5" Hg requires factory approval.

Operating Notes

- Detailed installation and operating instructions are included in each clutch-pump package. Consult those instructions before installation and/or operation.
- Clutch Data:
 - Clutch No. 1 - 12 V.D.C.; 4.26 amps; 2.82 ohms @ 20°C; 75 Lb. Ft.
 - Clutch No. 2 - 12 V.D.C.; 4.36 amps; 2.75 ohms @ 20°C; 125 Lb. Ft.
 - Clutch No. 3 - 12 V.D.C.; 4.58 amps; 2.62 ohms @ 20°C; 200 Lb. Ft.
 - Clutch No. 4 - 12 V.D.C.; 4.36 amps; 2.75 ohms @ 20°C; 125 Lb. Ft.
- Burnishing: If full rated torque (or system pressure) is required at start-up, burnishing or cycling of the clutch will be necessary. Burnishing of the clutch can be accomplished by running the engine between 2500 and 3000 RPM and cycling the clutch on and off against the system relief valve. The relief valve should be set at 75% of the maximum pressure rating as shown in the chart above. The clutch should be cycled 50 times at a rate of 10 to 15 cycles per minute.
- Voltage: The torque capability of the clutch varies with the actual voltage measured at the clutch. Do not operate at less than 11.5 volts.
- For maximum clutch life: #1 #2 & #4 should be mounted to run in 'C' rotation. #3 should be mounted to run in 'A' rotation, (looking at the front of the clutch).

Electric Clutch Switch: Order Kit No. 33520

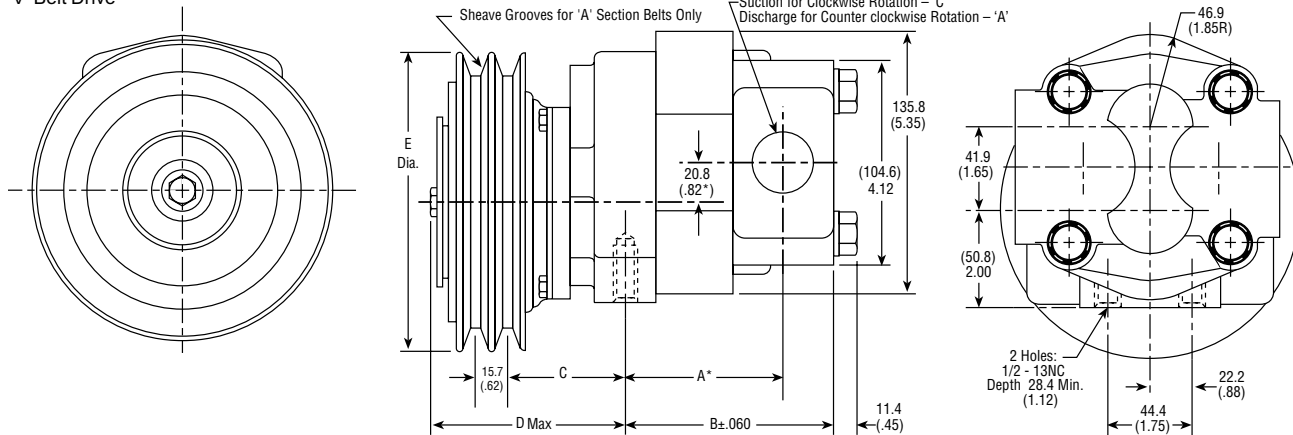
Dimensional Data

Pump Models			With Clutch #1			With Clutch #2		
	A	B	C	D	E	C	D	E
P16-45	64.3 (2.53)	89.9 (3.54)	61.2 (2.41)	100.6 (3.96)	155.5 (6.12)	60.5 (2.38)	103.4 (4.07)	170.4 (6.71)
P16-65	69.6 (2.74)	95.3 (3.75)	61.2 (2.41)	100.6 (3.96)	155.5 (6.12)	60.5 (2.38)	103.4 (4.07)	170.4 (6.71)
P16-85	75.2 (2.96)	100.8 (3.97)	61.2 (2.41)	100.6 (3.96)	155.5 (6.12)	60.5 (2.38)	103.4 (4.07)	170.4 (6.71)
P16-100	79.3 (3.12)	104.9 (4.13)	61.2 (2.41)	100.6 (3.96)	155.5 (6.12)	60.5 (2.38)	103.4 (4.07)	170.4 (6.71)
P16-115	83.3 (3.28)	109.0 (4.29)	61.2 (2.41)	100.6 (3.96)	155.5 (6.12)	60.5 (2.38)	103.4 (4.07)	170.4 (6.71)
P16-150	92.7 (3.65)	118.4 (4.66)	61.2 (2.41)	100.6 (3.96)	155.5 (6.12)	60.5 (2.38)	103.4 (4.07)	170.4 (6.71)
P16-180	100.8 (3.97)	126.5 (4.98)	61.2 (2.41)	100.6 (3.96)	155.5 (6.12)	60.5 (2.38)	103.4 (4.07)	170.4 (6.71)
P16-200	106.2 (4.18)	131.8 (5.19)	61.2 (2.41)	100.6 (3.96)	155.5 (6.12)	60.5 (2.38)	103.4 (4.07)	170.4 (6.71)

Pump Models			With Clutch #4			Shipping Weights (Approx.)							
	A	B	C	D	E	Clutch #1		Clutch #2		Clutch #3		Clutch #4	
						lbs.	kgs.	lbs.	kgs.	lbs.	kgs.	lbs.	kgs.
P16-45	64.3 (2.53)	89.9 (3.54)	77.5 (3.05)	103.4 (4.07)	146.0 (5.75)	18.5	8.4	22.5	10.2	28.6	13.0	22.5	10.2
P16-65	69.6 (2.74)	95.3 (3.75)	77.5 (3.05)	103.4 (4.07)	146.0 (5.75)	19.5	8.8	23.5	10.7	29.6	13.4	23.5	10.7
P16-85	75.2 (2.96)	100.8 (3.97)	77.5 (3.05)	103.4 (4.07)	146.0 (5.75)	20.5	9.3	24.5	11.1	30.6	13.9	24.5	11.1
P16-100	79.3 (3.12)	104.9 (4.13)	77.5 (3.05)	103.4 (4.07)	146.0 (5.75)	21.5	9.8	25.5	11.6	31.6	14.3	25.5	11.6
P16-115	83.3 (3.28)	109.0 (4.29)	77.5 (3.05)	103.4 (4.07)	146.0 (5.75)	22.5	10.2	26.5	12.0	32.6	14.8	26.5	12.0
P16-150	92.7 (3.65)	118.4 (4.66)	77.5 (3.05)	103.4 (4.07)	146.0 (5.75)	23.5	10.7	27.5	12.5	33.6	15.2	27.5	12.5
P16-180	100.8 (3.97)	126.5 (4.98)	77.5 (3.05)	103.4 (4.07)	146.0 (5.75)	25.5	11.6	29.5	13.4	35.6	16.1	29.5	13.4
P16-200	106.2 (4.18)	131.8 (5.19)	77.5 (3.05)	103.4 (4.07)	146.0 (5.75)	26.5	12.0	30.5	13.8	36.6	16.6	30.5	13.8

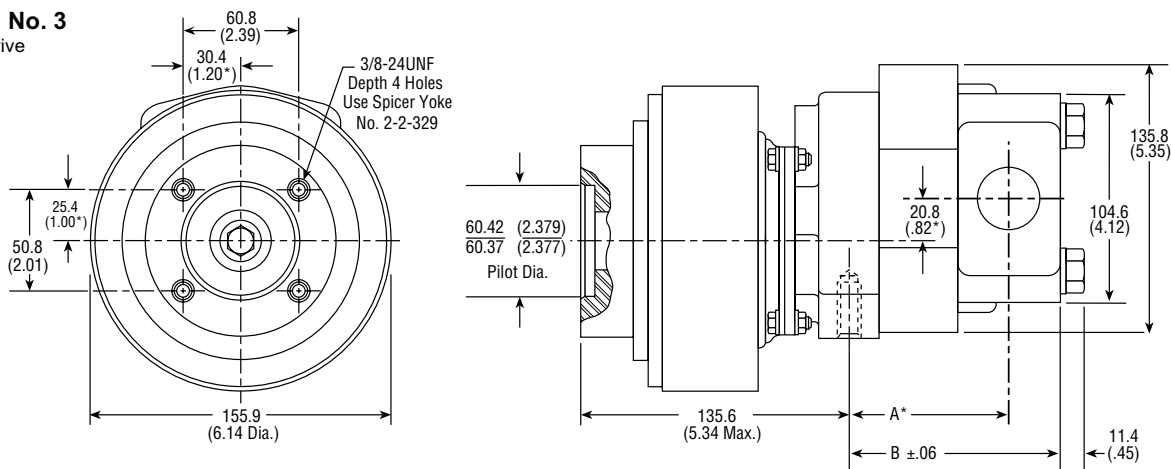
Clutch No. 1 & 2

'V' Belt Drive



Clutch No. 3

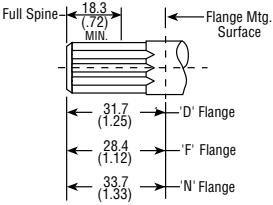
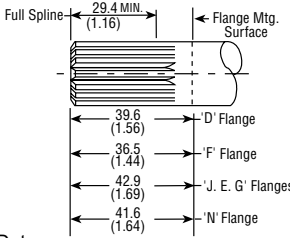
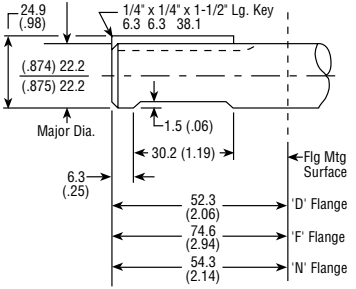
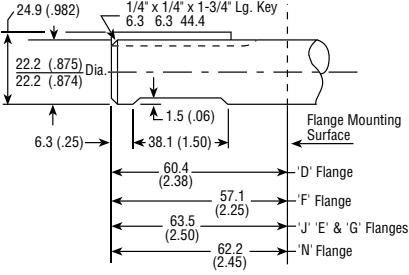
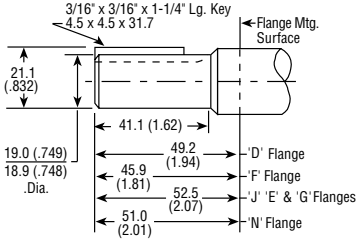
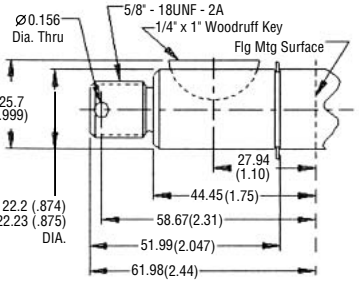
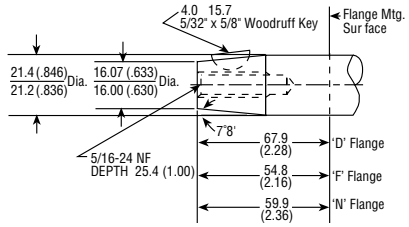
Direct Drive



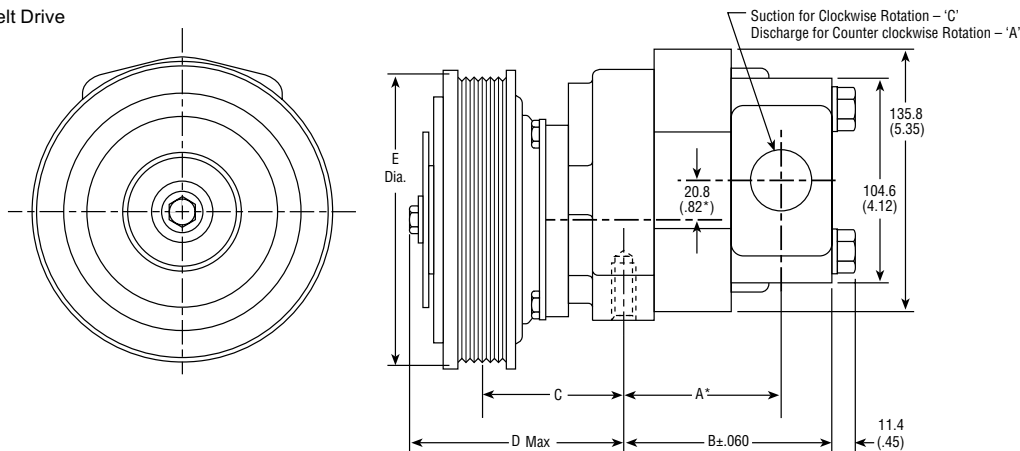
Inch equivalents for millimeter dimensions are shown in (**).

Shafts Available for P16 Series

Inch equivalents for millimeter dimensions are shown in (**).

<p>1 5/8" Dia. 9 Tooth Spline Flat Root Side Fit Torque Limit 52 Lbs. Ft. (70.5 Nm) Available with 'D' 'F' & 'N' Flanges and in sizes P16-45 thru P16-100 only</p>  <p>Spline Data Diametral Pitch 16/32 Pressure Angle 30° No. Of Teeth 9</p>	<p>2 7/8" Dia. 13 Tooth Spline Flat Root Side Fit Torque Limit 184 Lbs. Ft. (249.4 Nm) Available in all sizes and flanges.</p>  <p>Spline Data Diametral Pitch 16/32 Pressure Angle 30° No. Of Teeth 13</p>	<p>3 7/8" Straight Shaft Torque Limit 184 Lbs. Ft. (249.4 Nm) Available in all sizes and D, F and N Flanges Only</p> 
<p>5 7/8" Straight Shaft Torque Limit 184 Lbs. Ft. (249.4 Nm) Available in all sizes and flanges.</p> 	<p>6 3/4" Straight Shaft Torque Limit 105 Lbs. Ft. (142.3 Nm) Available in sizes P16-45 thru P16-115 only and all flanges</p> 	<p>8 7/8" Straight Shaft Torque Limit 184 Lbs. Ft. (249.4 Nm) Available with N flange and sizes P16-65, P16-85 and P16-100 only.</p> 
<p>9 7/8" Tapered Shaft Torque Limit 184 Lbs. Ft. (249.4 Nm) Available in all sizes and D, F and N flanges only</p> 		

Clutch No.4
 Flat Ribbed Belt Drive



Mounting Flanges Available

Inch equivalents for millimeter dimensions are shown in (**).

<p>D SAE 'A' 2-Bolt</p>	<p>E 6-Bolt Round Available with No. 2, 5 or 6 Shafts Only</p>	<p>F Pad Mount</p>
<p>G SAE 'C' 4-Bolt Available for No. 2 or 5 Shaft Only</p>	<p>J SAE 'B' 4-Bolt Available for No. 2, 5 or 6 Shaft Only</p>	<p>N SAE 'B' 2-Bolt</p>
<p>S P.T.O. Direct Mount Available with No. 2 Shaft Only</p>	<p>T P.T.O. Direct Mount T19C Trans Available with No. 2 Shaft Only</p>	<p>Blank</p>