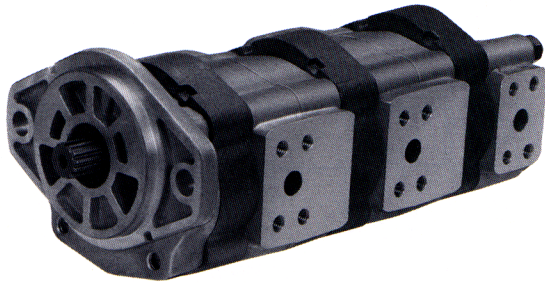# Model **TP16**

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

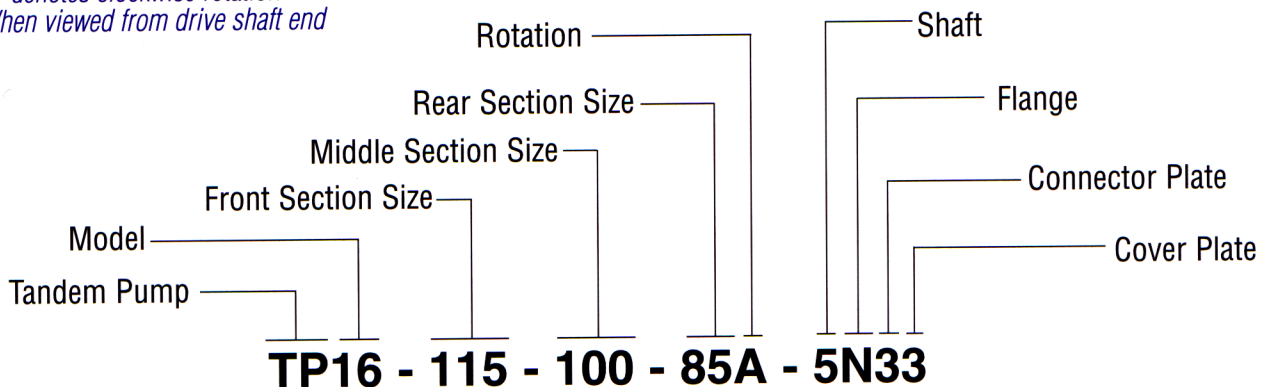| PUMP MODEL	SECTION SIZE	DISPLACEMENT/REVOLUTION (Theoretical)					MAXIMUM PRESSURE		MAXIMUM SPEED
		US Gallons	Cubic Inches	Liters	Cubic Centimeters	Imperial Gallons	PSI	BAR	RPM
P16	45	.0038	.878	.0144	14.388	.0031	3000	207	3100
P16	65	.0055	1.270	.0208	20.812	.0045	3000	207	3000
P16	85	.0072	1.663	.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 for use with phosphate ester base fluids.

⚠ **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.

When sizing pumps, refer to the performance charts in the back of the catalog to determine the volumetric efficiency and input horsepower requirements.
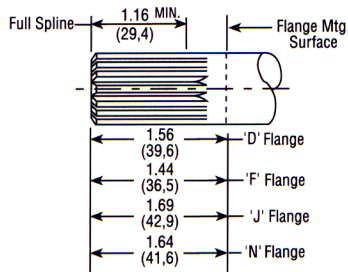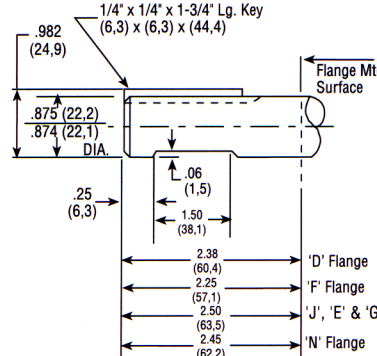
How To Order

'A' denotes counterclockwise rotation
'C' denotes clockwise rotation
When viewed from drive shaft end

Rotation ⎯⎯⎯⎯⎯

Shaft

Rear Section Size ⎯⎯⎯

Flange

Middle Section Size ⎯⎯

Connector Plate

Front Section Size ⎯⎯

Model ⎯⎯⎯⎯⎯

Cover Plate

Tandem Pump ⎯⎯⎯

TP16 - 115 - 100 - 85A - 5N33
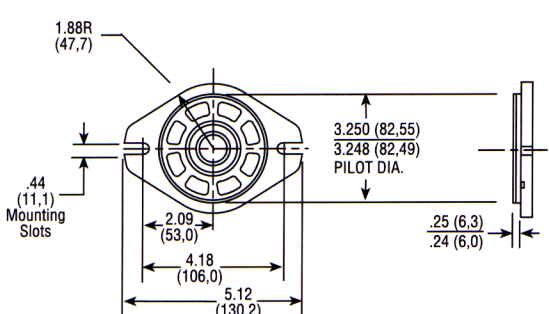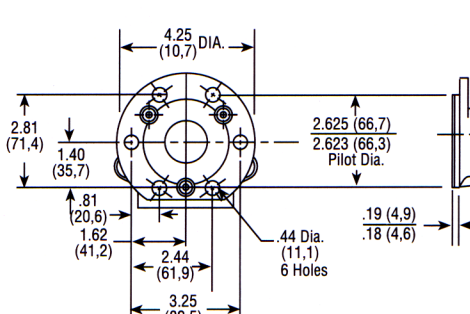
Note: The average shipping weight will range between 40 and 80 pounds (18.1-36.3 kgs.).
Note: Add prefix 'V' to pump model number (VTP16) when ordering pumps with Viton Seals for use with phosphate ester base fluids.

Shafts Available

2 — 7/8" Dia. 13 Tooth Spline Flat Root Side Fit
Torque Limit 184 Lbs./Ft. (70,5 Nm)
Available with 'D', 'F' & 'N' Flanges only

Full Spline

1.16 MIN.
(29,4)

Flange Mtg. Surface

1.56 (39,6) 'D' Flange
1.44 (36,5) 'F' Flange
1.69 (42,9) 'J' Flange
1.64 (41,6) 'N' Flange

Spline Data

Diametral Pitch 16/32
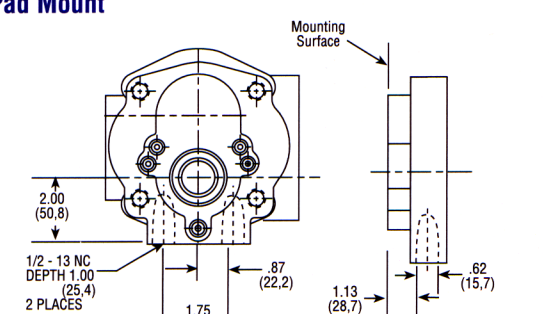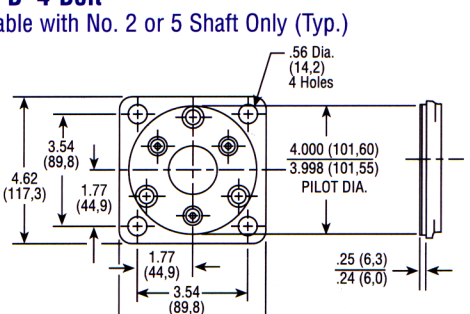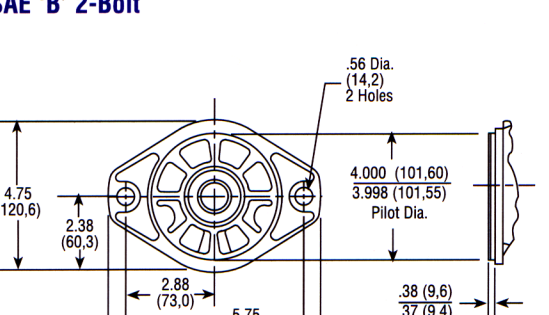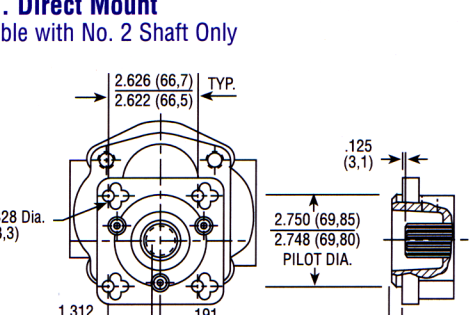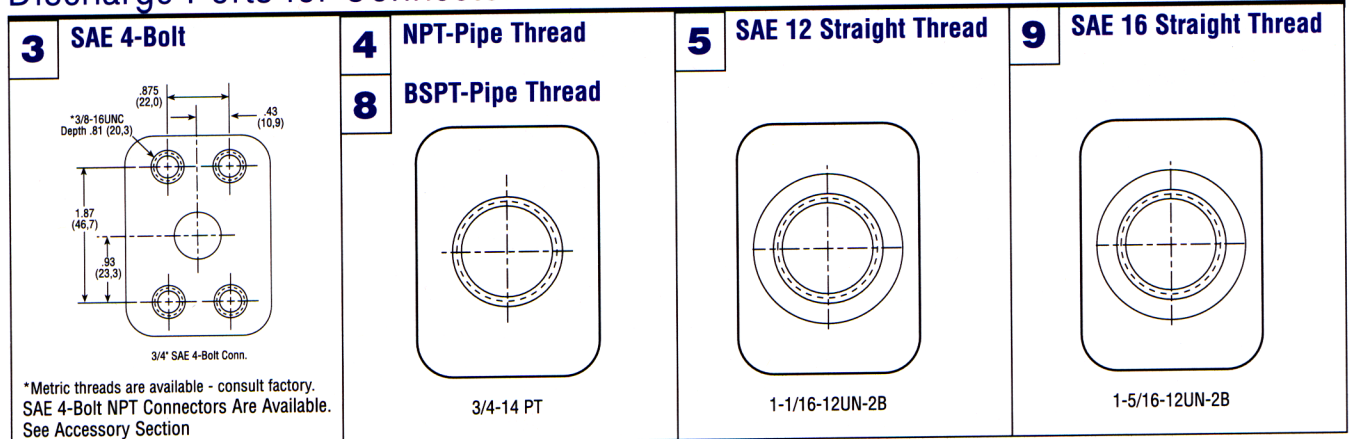Pressure Angle . . . . 30°
No. Of Teeth 13

5 — 7/8" Straight Shaft
Torque Limit 184 Lbs./Ft. (249,4 Nm)

1/4" x 1/4" x 1-3/4" Lg. Key
(6,3) x (6,3) x (44,4)

.982 (24,9)

Flange Mtg. Surface

.875 (22,2)
.874 (22,1)
DIA.

.06 (1,5)

.25 (6,3)

1.50 (38,1)

2.38 (60,4) 'D' Flange
2.25 (57,1) 'F' Flange
2.50 (63,5) 'J', 'E' & 'G'
2.45 (62,2) 'N' Flange

Mounting Flanges Available

D — SAE 'A' 2-Bolt

1.88R (47,7)

3.250 (82,55)
3.248 (82,49)
PILOT DIA.

.44 (11,1) Mounting Slots

2.09 (53,0)

4.18 (106,0)

5.12 (130,2)

.25 (6,3)
.24 (6,0)

E — 6-Bolt Round

4.25 DIA. (10,7)

2.81 (71,4)

1.40 (35,7)

.81 (20,6)

1.62 (41,2)

2.44 (61,9)

3.25 (82,5)

2.625 (66,7)
2.623 (66,3)
Pilot Dia.

.44 Dia. (11,1) 6 Holes

.19 (4,9)
.18 (4,6)

F — Pad Mount

Mounting Surface

2.00 (50,8)

1/2 - 13 NC DEPTH 1.00 (25,4) 2 PLACES

.87 (22,2)

1.75 (44,4)

1.13 (28,7)

.62 (15,7)

J — SAE 'B' 4-Bolt
Available with No. 2 or 5 Shaft Only (Typ.)

.56 Dia. (14,2) 4 Holes

3.54 (89,8)

4.62 (117,3)

1.77 (44,9)

1.77 (44,9)

3.54 (89,8)

4.62 (117,3)

4.000 (101,60)
3.998 (101,55)
PILOT DIA.

.25 (6,3)
.24 (6,0)

N — SAE 'B' 2-Bolt

.56 Dia. (14,2) 2 Holes

4.75 (120,6)

2.38 (60,3)

2.88 (73,0)

5.75 (146,0)

6.88 (174,7)

4.000 (101,60)
3.998 (101,55)
Pilot Dia.

.38 (9,6)
.37 (9,4)

S — P.T.O. Direct Mount
Available with No. 2 Shaft Only

2.626 (66,7) TYP.
2.622 (66,5)

.328 Dia. (8,3)

1.312 (33,3)

.191 (4,8)

CL PTO Pilot

CL Shaft

.125 (3,1)

2.750 (69,85)
2.748 (69,80)
PILOT DIA.

.17 (4,3)
.15 (3,8)

Mounting Surface

Discharge Ports for Connector Plate and Cover Plate

3	**SAE 4-Bolt**	**4**	**NPT-Pipe Thread**	**5**	**SAE 12 Straight Thread**	**9**	**SAE 16 Straight Thread**

8 **BSPT-Pipe Thread**

.875
(22,0)

*3/8-16UNC
Depth .81 (20,3)

.43
(10,9)

1.87
(46,7)

.93
(23,3)

3/4" SAE 4-Bolt Conn.

*Metric threads are available - consult factory.
SAE 4-Bolt NPT Connectors Are Available.
See Accessory Section

3/4-14 PT

1-1/16-12UN-2B

1-5/16-12UN-2B

★These dimensions locate ₵ of bolt pattern only.

Dimensional Data

To Determine Overall Pump Length

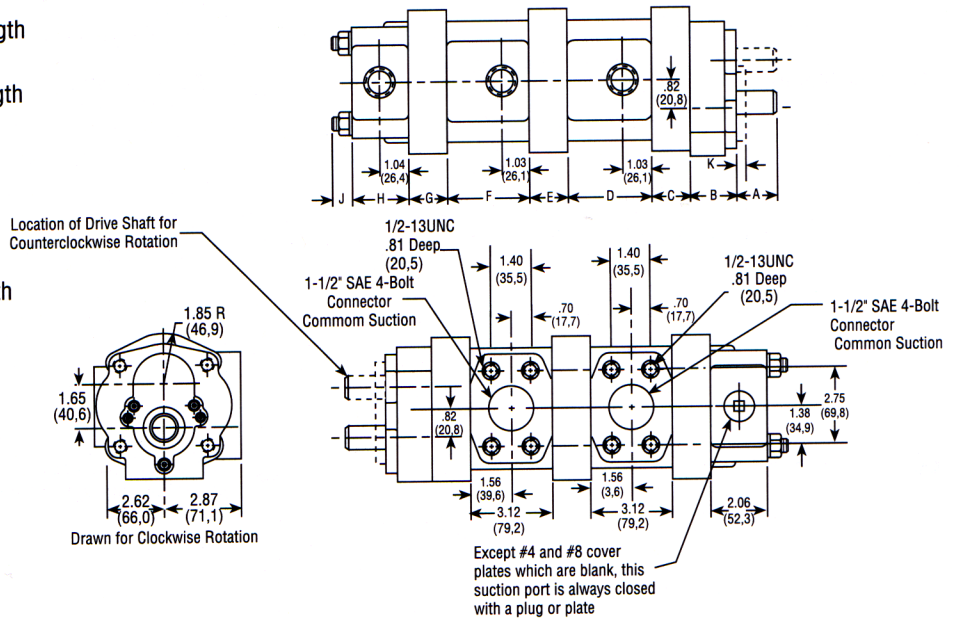Add together the dimensions that apply to the pump you are considering

A = _____ Shaft Extension

B = _____ Flange Length

C = _____ Front Gear Plate Length

D = 3.12 in. / 79,2 mm Connector Plate Length

E = _____ Center Gear Plate Length

F = 3.12 in. / 79,2 mm Connector Plate Length

G = _____ Rear Gear Plate Length

H = 2.06 in. / 52,3 mm Cover Plate Length

J = .75 in. / 19,0 mm Stud Extension

_____ Total = Overall Length

Flange Dimensions

FLANGE TYPE	'B'	'K'
D	1.62 (41,1)	.250 (6,3)
E	2.75 (69,8)	.187 (4,7)
F	1.75 (44,4)	— —
J	2.75 (69,8)	.250 (6,3)
N	1.55 (39,3)	.375 (9,5)
S	3.31 (84,0)	.200 (5,0)

.82
(20,8)

1.04
(26,4)

1.03
(26,1)

1.03
(26,1)

K

J H G F E D C B A

1/2-13UNC
.81 Deep
(20,5)

1.40
(35,5)

1.40
(35,5)

1/2-13UNC
.81 Deep
(20,5)

1-1/2" SAE 4-Bolt
Connector
Commom Suction

1-1/2" SAE 4-Bolt
Connector
Common Suction

.70
(17,7)

.70
(17,7)

2.75
(69,8)

1.38
(34,9)

.82
(20,8)

1.56
(39,6)

1.56
(3,6)

2.06
(52,3)

3.12
(79,2)

3.12
(79,2)

Except #4 and #8 cover
plates which are blank, this
suction port is always closed
with a plug or plate

Location of Drive Shaft for
Counterclockwise Rotation

1.85 R
(46,9)

1.65
(40,6)

2.62
(66,0)

2.87
(71,1)

Drawn for Clockwise Rotation

Gear Plate Length

PUMP SIZE	C, E & G	
-45	.86	(21,84)
-65	1.07	(27,18)
-85	1.29	(32,77)
-100	1.45	(36,83)
-115	1.61	(40,89)
-150	1.98	(50,29)
-180	2.30	(58,42)
-200	2.51	(63,75)

★These dimensions locate ₵ of bolt pattern only.

See **"General Product & Safety Information"** on inside front cover of this catalog

CAUTION

WARNING

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 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.