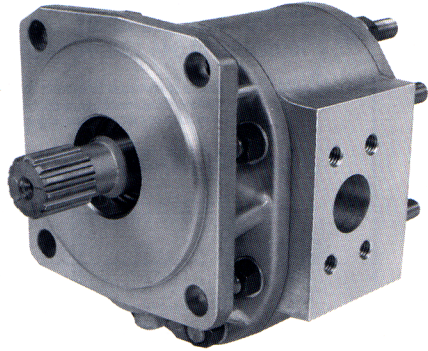


Model NP20-NTP20*



Description Gear Pumps (Single, Tandem, Triple)
 Flow Range To 98 GPM Per Section (370.9 LTR.)
 Displacements To 9.10 C.I.R. Per Section (149.12 CC's/REV.)
 Maximum Pressure to 3000 PSI (207 BAR)
 Maximum Speed to 2500 RPM
 Rotation A or C
 Bearing Journal
 Construction Aluminum
 *The 'N' represents the New Modular Construction.

Performance Data

PUMP SERIES	SECTION SIZE	DISPLACEMENT/REVOLUTION (Theoretical)					MAXIMUM PRESSURE		MAXIMUM SPEED
		US Gallons	Cubic Inches	Liters	Cubic Centimeters	Imperial Gallons	PSI	BAR	RPM
P6	060*	.0052	1.20	.0197	19.665	.0043	3000	207	2500
P6	080*	.0070	1.62	.0265	26.547	.0058	3000	207	2500
NP-NTP20	100	.0087	2.01	.0330	32.938	.0072	2500	172	2500
NP-NTP20	150	.0131	3.02	.0496	49.498	.0108	2500	172	2500
NP-NTP20	200	.0175	4.04	.0662	66.204	.0146	2500	172	2500
NP-NTP20	250	.0219	5.06	.0829	82.919	.0182	2500	172	2500
NP-NTP20	300	.0262	6.05	.0992	99.142	.0218	2500	172	2500
NP-NTP20	350	.0306	7.07	.1158	115.857	.0255	2500	172	2500
NP-NTP20	400	.0350	8.08	.1325	132.408	.0292	2500	172	2500
NP-NTP20	450	.0394	9.10	.1491	149.123	.0328	2500	172	2500

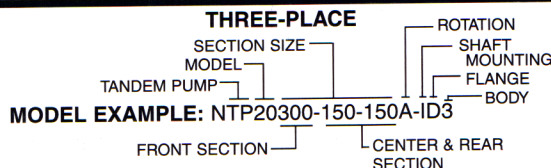
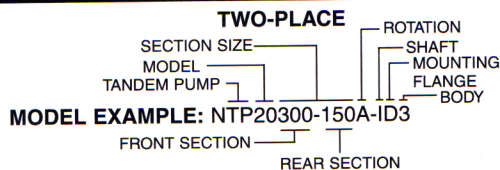
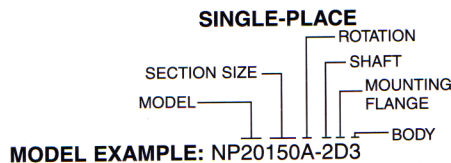
All data based on SAE 10W oil at 150°F.
 Available with Viton Seals for use with phosphate ester base fluids.
 *P6 Pumps have 10-tooth gears instead of 8-tooth gears.

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



Note: Add prefix 'V' to pump model number (VNP20) or (VNTP20) when ordering with Viton Seals for use with phosphate ester based fluids.

Shafts Available

<p>1 SAE 'C' 1-1/4" 14 Tooth Spline Flat Root Side Fit Torque limit 655 Lbs. Ft. (888, Nm) "Tandem" Pumps only</p> <p>Spline Data Diametral Pitch 12/24 Pressure Angle 30° No. Of Teeth 14</p>	<p>1* SAE 'C' 1-1/4" 14 Tooth Spline Flat Root Side Fit Torque Limit 655 Lbs. Ft. (888, Nm) "Single" Pumps only</p> <p>Spline Data Diametral Pitch 12/24 Pressure Angle 30° No. Of Teeth 14</p>	<p>2 1" Dia. Straight Shaft Torque Limit 341 Lbs. Ft. (462,3 Nm)</p> <p>CAUTION: Due to shaft torque limitations, Consult the Factory for approval <u>before</u> applying this shaft in models of -350 size and larger pumps.</p>
<p>3 SAE 'C' 1-1/4" Straight Shaft Torque Limit 655 Lbs. Ft. (888, Nm) Available on all sizes.</p>	<p>4 7/8" Dia. 13 Tooth Spline Flat Root Side Fit Torque Limit 184 Lbs. Ft. (249,4 Nm)</p> <p>CAUTION: Due to shaft torque limitations, Consult the Factory for approval <u>before</u> applying this shaft in models of -300 size and larger pumps.</p> <p>Spline Data Diametral Pitch 16/32 Pressure Angle 30° No. Of Teeth 13</p>	

Mounting Flanges Available

<p>D SAE 'C' 4-Bolt</p>	<p>E SAE 'B' 4-Bolt</p>
<p>F SAE 'C' 2-Bolt</p>	<p>N SAE 'B' 2-Bolt</p>

Accessories

SAE 4-Bolt Connector Ports

Pump Model	Conn. Size	Hole Dia.	Inlet Connector Data				
			K	J	M	L	N
P6-060	1-1/4"	1.25 (31,7)	.59 (14,9)	1.188 (30,1)	1.15 (29,2)	2.313 (58,7)	7/16-14NC
P6-080	1-1/4"	1.25 (31,7)	.59 (14,9)	1.188 (30,1)	1.15 (29,2)	2.313 (58,7)	7/16-14NC
20100	1-1/4"	1.25 (31,7)	.59 (14,9)	1.188 (30,1)	1.15 (29,2)	2.313 (58,7)	7/16-14NC
20150	1-1/4"	1.25 (31,7)	.59 (14,9)	1.188 (30,1)	1.15 (29,2)	2.313 (58,7)	7/16-14NC
20200	1-1/4"	1.25 (31,7)	.59 (14,9)	1.188 (30,1)	1.15 (29,2)	2.313 (58,7)	7/16-14NC
20250	1-1/2"	1.50 (38,1)	.70 (17,7)	1.406 (35,7)	1.37 (34,7)	2.750 (69,8)	1/2-13NC
20300	1-1/2"	1.50 (38,1)	.70 (17,7)	1.406 (35,7)	1.37 (34,7)	2.750 (69,8)	1/2-13NC
20350	1-1/2"	1.50 (38,1)	.70 (17,7)	1.406 (35,7)	1.37 (34,7)	2.750 (69,8)	1/2-13NC
20400	2"	2.00 (50,8)	.84 (21,3)	1.688 (42,8)	1.53 (38,8)	3.062 (77,7)	1/2-13NC
20450	2"	2.00 (50,8)	.84 (21,3)	1.688 (42,8)	1.53 (38,8)	3.062 (77,7)	1/2-13NC

SAE 4-Bolt Connector Ports

Pump Model	Conn. Size	Hole Dia.	Outlet Connector Data				
			P	Q	R	S	T
P6-060	3/4"	.75 (19,0)	.43 (10,9)	.875 (22,2)	.93 (23,6)	1.875 (47,6)	3/8-16NC
P6-080	3/4"	.75 (19,0)	.43 (10,9)	.875 (22,2)	.93 (23,6)	1.875 (47,6)	3/8-16NC
20100	3/4"	.75 (19,0)	.43 (10,9)	.875 (22,2)	.93 (23,6)	1.875 (47,6)	3/8-16NC
20150	3/4"	.75 (19,0)	.43 (10,9)	.875 (22,2)	.93 (23,6)	1.875 (47,6)	3/8-16NC
20200	1"	1.00 (25,4)	.51 (12,9)	1.031 (26,1)	1.03 (26,1)	2.062 (52,3)	3/8-16NC
20250	1-1/4"	1.19 (30,2)	.59 (14,9)	1.188 (30,1)	1.15 (29,2)	2.313 (58,7)	7/16-14NC
20300	1-1/4"	1.19 (30,2)	.59 (14,9)	1.188 (30,1)	1.15 (29,2)	2.313 (58,7)	7/16-14NC
20350	1-1/4"	1.19 (30,2)	.59 (14,9)	1.188 (30,1)	1.15 (29,2)	2.313 (58,7)	7/16-14NC
20400	1-1/2"	1.25 (31,7)	.70 (17,7)	1.406 (35,7)	1.37 (34,7)	2.750 (69,8)	1/2-13NC
20450	1-1/2"	1.25 (31,7)	.70 (17,7)	1.406 (35,7)	1.37 (34,7)	2.750 (69,8)	1/2-13NC

SAE 4-Bolt NPT connectors are available. See Accessory Section

SEE PAGE 95 FOR DETAIL



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



Dimensional Data

Mounting Dimensions

Single or 3-Place Front Section	2-Place	3-Place Center Rear	A	B	C	D	E	F	G	H
P6-060	060-060	-060-060	3.75 (95,2)	5.77 (146,5)	10.85 (275,5)	8.83 (224,2)	5.15 (130,8)	8.77 (222,7)	10.78 (273,8)	3.69 (93,7)
P6-080	080-060	-080-060	3.75 (95,2)	5.94 (150,8)	11.02 (279,9)	9.00 (228,6)	5.32 (135,1)	8.94 (227,0)	10.95 (278,1)	3.69 (93,7)
	080-080	-080-080	3.75 (95,2)	5.94 (150,8)	11.19 (284,2)	9.00 (228,6)	5.32 (135,1)	8.94 (227,0)	11.12 (282,4)	3.69 (93,7)
20100	100-060	-100-060	3.60 (91,4)	5.86 (148,8)	10.95 (278,1)	8.93 (226,8)	5.24 (133,0)	8.88 (225,5)	10.88 (276,3)	3.54 (89,9)
	100-080	-100-080	3.60 (91,4)	5.86 (148,8)	11.11 (282,1)	8.93 (226,8)	5.24 (133,0)	8.88 (225,5)	11.05 (280,6)	3.54 (89,9)
	100-100	-100-100	3.60 (91,4)	5.86 (148,8)	11.04 (280,4)	8.78 (223,0)	5.24 (133,0)	8.73 (221,7)	10.99 (279,1)	3.54 (89,9)
20150	150-060	-150-060	3.60 (91,4)	6.15 (156,2)	11.23 (285,2)	9.21 (233,9)	5.53 (140,4)	9.16 (232,6)	11.16 (283,4)	3.54 (89,9)
	150-080	-150-080	3.60 (91,4)	6.15 (156,2)	11.40 (289,5)	9.21 (233,9)	5.53 (140,4)	9.16 (232,6)	11.33 (287,7)	3.54 (89,9)
	150-100	-150-100	3.60 (91,4)	6.15 (156,2)	11.32 (287,5)	9.06 (230,1)	5.53 (140,4)	9.01 (228,8)	11.26 (286,0)	3.54 (89,9)
	150-150	-150-150	3.60 (91,4)	6.15 (156,2)	11.61 (294,8)	9.06 (230,1)	5.53 (140,4)	9.01 (228,8)	11.54 (293,1)	3.54 (89,9)
20200	200-060	-200-060	3.75 (95,2)	6.43 (166,3)	11.51 (292,3)	9.50 (241,3)	5.81 (147,5)	9.45 (240,0)	11.45 (290,8)	3.69 (93,7)
	200-080	-200-080	3.75 (95,2)	6.43 (166,3)	11.68 (296,6)	9.50 (241,3)	5.81 (147,5)	9.45 (240,0)	11.62 (295,1)	3.69 (93,7)
	200-100	-200-100	3.75 (95,2)	6.43 (166,3)	11.61 (294,8)	9.35 (237,4)	5.81 (147,5)	9.30 (236,2)	11.56 (293,6)	3.69 (93,7)
	200-150	-200-150	3.75 (95,2)	6.43 (166,3)	11.89 (302,0)	9.35 (237,4)	5.81 (147,5)	9.30 (236,2)	11.84 (300,7)	3.69 (93,7)
	200-200	-200-200	3.75 (95,2)	6.43 (166,3)	12.18 (309,3)	9.50 (241,3)	5.81 (147,5)	9.45 (240,0)	12.13 (308,1)	3.69 (93,7)
20250	250-060	-250-060	4.00 (101,6)	6.71 (170,4)	11.80 (299,7)	9.78 (248,4)	6.09 (154,6)	9.73 (247,1)	11.73 (297,9)	3.94 (100,0)
	250-080	-250-080	4.00 (101,6)	6.71 (170,4)	11.97 (304,0)	9.78 (248,4)	6.09 (154,6)	9.73 (247,1)	11.90 (302,2)	3.94 (100,0)
	250-100	-250-100	4.00 (101,6)	6.71 (170,4)	11.89 (302,0)	9.63 (244,6)	6.09 (154,6)	9.58 (243,3)	11.84 (300,7)	3.94 (100,0)
	250-150	-250-150	4.00 (101,6)	6.71 (170,4)	12.18 (309,3)	9.63 (244,6)	6.09 (154,6)	9.58 (243,3)	12.11 (307,5)	3.94 (100,0)
	250-200	-250-200	4.00 (101,6)	6.71 (170,4)	12.46 (316,4)	9.78 (248,4)	6.09 (154,6)	9.73 (247,1)	12.41 (315,2)	3.94 (100,0)
	250-250	-250-250	4.00 (101,6)	6.71 (170,4)	12.74 (323,5)	10.03 (254,7)	6.09 (154,6)	9.98 (253,4)	12.68 (322,0)	3.94 (100,0)
20300	300-060	-300-060	4.14 (105,1)	7.00 (177,8)	12.08 (306,8)	10.06 (255,5)	6.38 (162,0)	10.00 (254,0)	12.01 (305,0)	4.08 (103,6)
	300-080	-300-080	4.14 (105,1)	7.00 (177,8)	12.24 (310,8)	10.06 (255,5)	6.38 (162,0)	10.00 (254,0)	12.18 (309,3)	4.08 (103,6)
	300-100	-300-100	4.14 (105,1)	7.00 (177,8)	12.18 (309,3)	9.91 (251,7)	6.38 (162,0)	9.85 (250,1)	12.11 (307,5)	4.08 (103,6)
	300-150	-300-150	4.14 (105,1)	7.00 (177,8)	12.46 (316,4)	9.91 (251,7)	6.38 (162,0)	9.85 (250,1)	12.39 (314,7)	4.08 (103,6)
	300-200	-300-200	4.14 (105,1)	7.00 (177,8)	12.74 (323,5)	10.06 (255,5)	6.38 (162,0)	10.00 (254,0)	12.68 (322,0)	4.08 (103,6)
	300-250	-300-250	4.14 (105,1)	7.00 (177,8)	13.02 (330,7)	10.31 (261,8)	6.38 (162,0)	10.25 (260,3)	12.96 (329,1)	4.08 (103,6)
	300-300	-300-300	4.14 (105,1)	7.00 (177,8)	13.30 (337,8)	10.45 (265,4)	6.38 (162,0)	10.39 (263,9)	13.24 (336,2)	4.08 (103,6)
20350	350-060	-350-060	4.35 (110,4)	7.28 (184,9)	12.37 (314,1)	10.35 (262,8)	6.66 (169,1)	10.30 (261,6)	12.30 (312,4)	4.29 (108,9)
	350-080	-350-080	4.35 (110,4)	7.28 (184,9)	12.54 (318,5)	10.35 (262,8)	6.66 (169,1)	10.30 (261,6)	12.47 (316,7)	4.29 (108,9)
	350-100	-350-100	4.35 (110,4)	7.28 (184,9)	12.46 (316,4)	10.20 (259,0)	6.66 (169,1)	10.15 (257,8)	12.41 (315,2)	4.29 (108,9)
	350-150	-350-150	4.35 (110,4)	7.28 (184,9)	12.74 (323,5)	10.20 (259,0)	6.66 (169,1)	10.15 (257,8)	12.68 (322,0)	4.29 (108,9)
	350-200	-350-200	4.35 (110,4)	7.28 (184,9)	13.03 (330,9)	10.35 (262,8)	6.66 (169,1)	10.30 (261,6)	12.98 (329,6)	4.29 (108,9)
	350-250	-350-250	4.35 (110,4)	7.28 (184,9)	13.31 (338,0)	10.60 (269,2)	6.66 (169,1)	10.55 (267,9)	13.26 (336,8)	4.29 (108,9)
	350-300	-350-300	4.35 (110,4)	7.28 (184,9)	13.60 (345,4)	10.74 (272,7)	6.66 (169,1)	10.69 (271,5)	13.53 (343,6)	4.29 (108,9)
	350-350	-350-350	4.35 (110,4)	7.28 (184,9)	13.88 (352,5)	10.95 (278,1)	6.66 (169,1)	10.90 (276,8)	13.83 (351,2)	4.29 (108,9)
20400	400-060	-400-060	4.35 (110,4)	7.57 (192,2)	12.65 (321,3)	10.63 (270,0)	6.95 (176,5)	10.57 (268,4)	12.58 (319,5)	4.29 (108,9)
	400-080	-400-080	4.35 (110,4)	7.57 (192,2)	12.82 (325,6)	10.63 (270,0)	6.95 (176,5)	10.57 (268,4)	12.75 (323,8)	4.29 (108,9)
	400-100	-400-100	4.35 (110,4)	7.57 (192,2)	12.74 (323,5)	10.48 (266,1)	6.95 (176,5)	10.42 (264,6)	12.68 (322,0)	4.29 (108,9)
	400-150	-400-150	4.35 (110,4)	7.57 (192,2)	13.03 (330,9)	10.48 (266,1)	6.95 (176,5)	10.42 (264,6)	12.96 (329,1)	4.29 (108,9)
	400-200	-400-200	4.35 (110,4)	7.57 (192,2)	13.31 (338,0)	10.63 (270,0)	6.95 (176,5)	10.57 (268,4)	13.26 (336,8)	4.29 (108,9)
	400-250	-400-250	4.35 (110,4)	7.57 (192,2)	13.60 (345,4)	10.88 (276,3)	6.95 (176,5)	10.82 (274,8)	13.53 (343,6)	4.29 (108,9)
	400-300	-400-300	4.35 (110,4)	7.57 (192,2)	13.88 (352,5)	11.02 (279,9)	6.95 (176,5)	10.96 (278,3)	13.81 (350,7)	4.29 (108,9)
	400-350	-400-350	4.35 (110,4)	7.57 (192,2)	14.17 (359,9)	11.23 (285,2)	6.95 (176,5)	11.17 (283,7)	14.10 (358,1)	4.29 (108,9)
	400-400	-400-400	4.35 (110,4)	7.57 (192,2)	14.45 (369,0)	11.23 (285,2)	6.95 (176,5)	11.17 (283,7)	14.38 (365,2)	4.29 (108,9)
20450	450-060	-450-060	4.66 (118,3)	7.85 (199,3)	12.93 (328,4)	10.92 (277,3)	7.23 (183,6)	10.87 (276,0)	12.87 (326,8)	4.60 (116,8)
	450-080	-450-080	4.66 (118,3)	7.85 (199,3)	13.10 (332,7)	10.92 (277,3)	7.23 (183,6)	10.87 (276,0)	13.04 (331,2)	4.60 (116,8)
	450-100	-450-100	4.66 (118,3)	7.85 (199,3)	13.03 (330,9)	10.77 (273,5)	7.23 (183,6)	10.72 (272,2)	12.98 (329,6)	4.60 (116,8)
	450-150	-450-150	4.66 (118,3)	7.85 (199,3)	13.31 (338,0)	10.77 (273,5)	7.23 (183,6)	10.72 (272,2)	13.26 (336,8)	4.60 (116,8)
	450-200	-450-200	4.66 (118,3)	7.85 (199,3)	13.60 (345,4)	10.92 (277,3)	7.23 (183,6)	10.87 (276,0)	13.55 (344,1)	4.60 (116,8)
	450-250	-450-250	4.66 (118,3)	7.85 (199,3)	13.88 (352,5)	11.17 (283,7)	7.23 (183,6)	11.12 (282,4)	13.83 (351,2)	4.60 (116,8)
	450-300	-450-300	4.66 (118,3)	7.85 (199,3)	14.16 (359,9)	11.31 (287,2)	7.23 (183,6)	11.26 (286,0)	14.10 (358,1)	4.60 (116,8)
	450-350	-450-350	4.66 (118,3)	7.85 (199,3)	14.45 (367,0)	11.52 (292,6)	7.23 (183,6)	11.47 (291,3)	14.40 (365,7)	4.60 (116,8)
	450-400	-450-400	4.66 (118,3)	7.85 (199,3)	14.73 (374,1)	11.52 (292,6)	7.23 (183,6)	11.47 (291,3)	14.67 (372,6)	4.60 (116,8)
	450-450	-450-450	4.66 (118,3)	7.85 (199,3)	15.02 (381,5)	11.83 (300,4)	7.23 (183,6)	11.78 (299,2)	14.97 (380,2)	4.60 (116,8)

Dimensional Data

PD Factors

Drive Shaft	Factors
1-1 1/4"	187
2 - 1"	97
3-1 1/4"	187
4- 7/8"	53
Coupling	110

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:

$$P = \text{PSI}$$

(The relief valve setting of each individual section).

$$D = \text{Displacement}$$

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

Example: Assume a triple pump TP20450-450-450 A-3D 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) $PD = (2000) (.0394) + (2000) (.0394) = 157.6$ vs. 187. Capability is OK
 (2) $PD = (1500) (.0394) = 59.1$ vs. 187. Capability is OK.
- B. Coupling between front and center sections:
 (1) $PD = (2000) (.0394) = 78.8$ vs. 110. Capability is OK.
- C. Coupling between center and rear sections:
 (1) $PD = (1500) (.0394) = 59.1$ vs. 110. Capability is OK.

Note: For purpose of illustration, assume all three pump sections to be on pressure at the same time.

- A. Drive Shaft:
 $PD = (2000) (.0394) + (2000) (.0394) = (1500) (.0394) = 216.7$. Capability is not OK

The "PD Factor" for a No. 3 shaft is 187. Therefore, to operate all three sections at once (to relief valve pressure) would exceed the torque capability of the drive shaft.

- B. Coupling between front and center sections:
 (1) $PD = (2000) (.0394) + (1500) (.0394) = 137.9$. Capability is not OK.

The "PD Factor" for the coupling is 110. 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.

