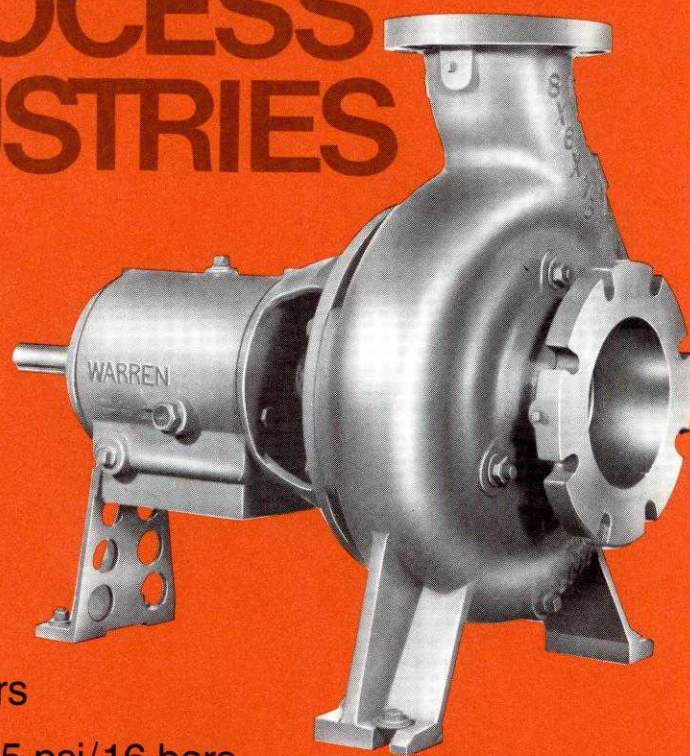


3202 SERIES END SUCTION CENTRIFUGAL PUMPS FOR PAPER STOCK & PROCESS INDUSTRIES



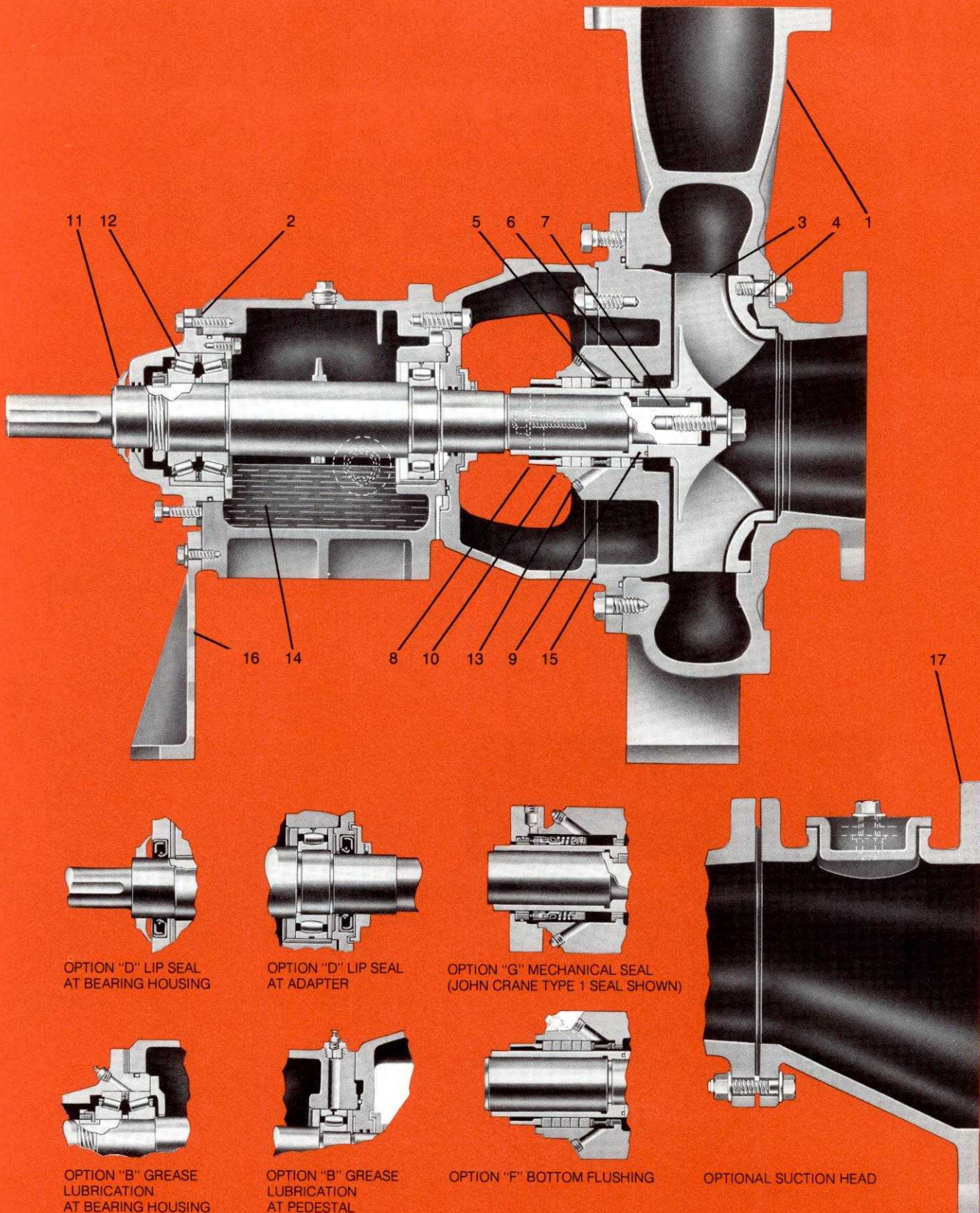
Capacities
to 20,000 gpm/
4560m³/hr

Heads to
400 ft/122 meters

Pressures to 235 psi/16 bars

Temperatures to 475°F/246°C

WARREN END SUCTION CENTRIFUGAL PUMPS 3202 SERIES



Features

Long Reliable Service . . . Low Maintenance Costs . . . High Efficiency

- 1 Top centerline discharge case simplifies piping — handles entrained air. Casing has heavy walls for high working pressures. Large internal areas.
- 2 Adjustable rotor maintains original high efficiency.
- 3 Warren's original high efficiency open impeller. Excellent NPSH capabilities. Over 50 years of experience. Impeller keyed and locked to shaft. Full length wide educator vanes reduce bearing loads and stuffing box pressure.
- 4 Replaceable casing liner helps prevent casing wear.
- 5 V-cut glass filled Teflon water seal ring. Easy replacement and automatic realignment.
- 6 Replaceable stainless steel stuffing box bushing helps prevent wear.
- 7 Impeller and shaft sleeve key driven.
- 8 Stainless steel split gland and gland hardware.
- 9 Hook-type key-driven replaceable shaft sleeve is free to expand with temperature changes. Sleeve has heavy wall thickness for long life. O-ring seal prevents leakage.
- 10 Exceptional stuffing box design allows for accessibility even with minimum shaft overhang.
- 11 Deflector protects thrust bearing from outside environment.
- 12 Thrust bearing is roller type. High thrust capacity. Minimum 50,000 hours B-10 life.
- 13 In-and-out water seal.
- 14 Bottom venting bearing pedestal has high capacity oil sump. Oil return drains are under bearings.
- 15 Adaptor has machined rabbet fits for positive alignment.
- 16 Pedestal foot can be removed for vertical mounting or high temperature service.

Options:

- 17 Optional oversize suction head for low entrance velocities. Large hand-hole access. Hand hole cover interior surface is flush to permit smooth suction flow.

Stuffing boxes suitable for optional mechanical seals
Shaft designed for less than .002" deflection at optional mechanical seal faces.

Applications

For applications in Pulp & Paper and the Process Industries

Industries	Applications
Pulp & Paper	Cleaners Blow Tank Filtrate Dry End Pulper Screen Rejects High Density Towers Digester Circulation Couch Pit Liquor — Black, Green, White Starch Slurry Coatings
Chemical Petrochemical Food Processing Pollution Control Mining Mineral Processing Petroleum Refining Steel Mills Marine & Offshore Utilities Municipal	Slurries Pulp Mash Fines Waste Scrubbers Hydrocarbons Bottoms Evaporators Cane Juices Chlorine Food Products Acid Aromatics Caustic Descaling Raw Water Tailings

Standard Construction:

Cast Iron, Stainless Steel Fitted
All #316 Stainless Steel
All #317 Stainless Steel
Available in most machinable metals

WARREN END SUCTION
CENTRIFUGAL PUMPS
3202 SERIES

Design & Construction

Series 3202 end suction centrifugal pumps are a totally integrated series of open impeller pumps covering the capacity range to 20,000 gpm and heads to 400 feet. Their high efficiencies result in power savings to help meet today's need for energy conservation. The series 3202 pumps are arranged into three rotor groups for maximum interchangeability and inventory reduction. (See page 3202.9)

The basic design is end suction with Warren's unique open impeller and top centerline discharge. For ease of maintenance they are equipped with back pull-out rotating element. A variety of options are available to meet specific requirements. (See page 3202.8)

They are ideal for pumping paper stock and other slurries in the process industries.

Casing — Volute-type or modified concentric-type casing has top centerline discharge with cut-water at top of casing.

This design simplifies and strengthens piping and offers better handling of entrained air. Twelve sizes have dual volutes to minimize radial loads at all points of operation, particularly near shut-off. Warren's unique high efficiency modified concentric casings are used on the smaller sizes to eliminate the possibility of plugging. All casings have cast-on rotation arrows. Casing foot cast integrally under casing carries full pipe loads.

Optional oversize, eccentric suction heads allow low entrance velocities and help prevent clogging and dewatering. Suction heads have hand hole access. Interior surfaces of the hand hole cover are flush and smooth and do not interfere with suction flow.

Impeller — Warren pioneered in the design and use of open impellers. For over 50 years Warren open impellers have proven themselves in the original SOD pump line and the more recent PL-PH line. The series 3202 open impeller has been designed for increased efficiency while maintaining the ability to handle difficult slurries. Impeller vanes are designed to prevent stock build-up. Full length eductor vanes continuously clean area behind impeller to reduce stuffing box pressure and help increase bearing, shaft sleeve and packing life. Impeller is keyed to shaft and held with a locked and sealed bolt.

Liner (Side Plate) — One piece suction liner prevents casing wear where it is most likely to occur. Liner is easily replaceable without disturbing piping. Gasket-sealed studs secure liner to casing and prevent leakage. Liner has same contour as the Warren open impeller for top efficiency.

Shaft and Shaft Sleeves — Shaft diameters are more than ample to handle power requirements. Minimum span and overhang help reduce shaft deflection and vibration. Hook-type shaft sleeve is held with impeller key and is sealed against leakage at impeller nut with o-ring. Shaft sleeve extends completely through stuffing box and beyond the gland and is free to expand with temperature variations.

Stuffing Box — Five rings of graphite-free asbestos packing, Teflon water seal ring and metal stuffing box bushing are standard. Water seal ring can be positioned for bottom flushing. Gland is split-type for easy removal and to provide additional repacking space. In-and-out water sealing is standard. Large drip hole in frame adaptor prevents water from collecting and corroding frame. Stuffing box is designed to accommodate (optional) inside mechanical seals with four bolt glands.

Bearings — Both the thrust bearing and the radial bearing are roller-type. Roller bearings offer longer life, higher load capacities and high radial rigidity. They also tend to be self-aligning and self-cleaning. The thrust bearing is steep-angle, tapered double roller type capable of carrying both thrust and radial loads. It is held with locknut and lockwasher. Radial bearing is heavy duty spherical roller type sized to handle any anticipated maximum load.

Both bearings are protected from dirt and wash-down water by deflectors. Oil lubrication is standard. Grease lubrication is available as an option. Bearing B-10 life ratings are shown on page 3202.5.

Bearing Pedestal — Only three sizes are needed for all sizes. Heavy cast iron construction with large oil reservoir. Ingenious venting system eliminates need for vent cap which can be subject to water and dirt. Optional water cooling is available. Thrust bearing housing are fitted to pedestal and sealed with o-rings. Frame adaptor is fitted to backhead with machined rabbet fit. Separate pedestal foot can be removed for vertical mounting or high temperature service.

Adjustment for Wear — External shim-adjustable rotor compensates for normal wear between impeller and liner. Shims permit accurate adjustments and positive alignment.

**WARREN END SUCTION
CENTRIFUGAL PUMPS
3202 SERIES**

**Section 3202
Page 3202.5
Issue B**

Design Data

PUMP SIZE	6 x 3 x 13	6 x 4 x 13	8 x 6 x 13	6 x 4 x 16	8 x 6 x 16	10 x 8 x 16	12 x 10 x 16L	12 x 10 x 16H	14 x 12 x 16	14 x 14 x 16	6 x 4 x 20	8 x 6 x 20	10 x 8 x 20	12 x 10 x 20	14 x 12 x 20	14 x 14 x 22	16 x 16 x 22	18 x 18 x 22		
	#5 POWER FRAME						#7 POWER FRAME									#9 POWER FRAME				
SHAFT DIAMETERS																				
AT IMPELLER	50 1.97						65 2.56									80 3.15				
AT SHAFT SLEEVE	62 2.44						80 3.15									100 3.94				
BETWEEN BEARINGS	90 3.54						100 3.94									127 5.00				
AT COUPLING	45 1.77						60 2.36									85 3.35				
BEARINGS																				
RADIAL	MCGILL SB-22215						MCGILL SB-22218									MCGILL SB-22222				
THRUST	TIMKEN JM 515649 ASS'Y 90N01						TIMKEN JM 515649 ASS'Y 90N01									TIMKEN HM 926740 ASS'Y 9-12				
RADIAL-BRG. LIFE (HRS. x 10 ³)	200+	200+	200+	200+	200+	200+	200+	200+	200+	200+	200+	200+	200+	200+	200+	200+	200+	200+		
THRUST-BRG. LIFE (HRS. x 10 ³)	200+	200+	200+	180	120	200+	200+	200+	200+	200+	56	50	130	120	100	200+	200+	140		
BEARING SPAN	250 9.84						246 9.68									284 11.18				
SHAFT OVERHANG	317 12.48	320 12.60	323 12.72	288 11.34	291 11.46	298 11.73	309 12.16	315 12.40	331 13.03	336 13.23	293 11.54	302 11.89	306 12.05	310 12.20	317 12.48	357 14.06	368 14.49	392 15.43		
STUFFING BOX																				
BORE	103 4.06						123 4.84									143 5.63				
DEPTH (TO BUSHING)	95 3.74						95 3.74									97 3.82				
SHAFT SLEEVE DIA.	75 2.95						95 3.74									115 4.53				
PACKING SIZE	14 SQ. 55 SQ.						14 SQ. 55 SQ.									14 SQ. 55 SQ.				
NO. OF RINGS	5						5									5				
LANTERN RING WIDTH	20 .79						20 .79									20 .79				
NOMINAL DIAMETRAL THROAT RING CLEARANCE	81 .032						81 .032									81 .032				
DISTANCE TO NEAREST OBSTRUCTION	85 3.35						85 3.35									85 3.35				
NOMINAL IMPELLER CLEARANCE — FRONT	56 .022						56 .022									56 .022				
NOMINAL IMPELLER CLEARANCE — BACK	81 .032						81 .032									81 .032				
IMPELLER EYE AREA	MM ² x 10 ² IN ²	137 21.2	182 28.3	285 44.2	182 28.3	269 41.7	346 53.7	531 82.3	531 82.3	683 105.9	755 117.0	182 28.3	314 48.7	452 70.1	531 82.3	707 109.6	983 152.3	1076 166.7	1574 243.9	
MAX. DIAMETER SOLIDS		28 1.10	37 1.46	46 1.81	43 1.69	43 1.69	47 1.85	64 2.52	70 2.76	77 3.03	80 3.15	32 1.26	50 1.97	58 2.28	66 2.60	79 3.11	67 2.64	70 2.76	76 2.99	
MAX. SHAFT DEFLECTION @ 50% BEP AT IMPELLER		.122 0048	.142 0056	.091 0036	.081 0032	.102 0040	.112 0044	.061 0024	.036 0014	.058 0023	.066 0026	.081 0032	.046 0018	.053 0021	.061 0024	.079 0031	.074 0029	.094 0037	.130 0051	
MAX. SHAFT DEFLECTION @ 50% BEP AT STUFFING BOX		.056 0022	.066 0026	.041 0016	.043 0017	.051 0020	.056 0022	.030 0012	.018 0007	.028 0011	.030 0012	.043 0017	.023 0009	.025 0010	.030 0012	.038 0015	.033 0013	.041 0016	.053 0021	
NUMBER OF VANES		3 2	4 2	3	4 3	4	4	4	4	4	4	3	4	4	4	4	4	5	4	
TYPE OF CASE		SV	SV	MC	MC	MC	DV	DV	DV	DV	DV	MC	DV	DV	DV	DV	DV	DV	DV	
MIN. CASING THICKNESS-IRON		11.5 .45	13.0 .51	14.5 .57	15.5 .61	15.5 .61	15.5 .61	15.5 .61	15.5 .61	16.5 .65	16.5 .65	16.0 .63	15.5 .61	16.0 .63	16.5 .65	17.0 .67	20.7 .82	19.0 .75	20.7 .82	
MIN. CASING THICKNESS-STEEL		9.5 .37	10.5 .41	12.5 .49	13.5 .53	13.5 .53	13.5 .53	13.5 .53	13.5 .53	14.5 .57	14.5 .57	14.0 .55	13.5 .53	14.0 .55	14.5 .57	15.0 .59	20.7 .82	19.0 .75	20.7 .82	
MAX. WORKING PRESSURE	SEE PRESSURE VS TEMPERATURE LIMITS CHART																			
TEST PRESSURE	1.5 x MAXIMUM WORKING PRESSURE																			
PUMP WEIGHT	KGS LBS.	263 580	281 620	304 670	336 740	354 780	415 915	633 1395	633 1395	655 1445	730 1610	451 995	581 1280	633 1395	642 1415	778 1715	1148 2530	1300 2865	1402 3090	
POWER FRAME WEIGHT	KGS LBS.	172 380			195 430			254 560			313 690						490 1080			
WR ² (DRY)	KGS-M ² LB-FT ²	50 12						1.60 38						4.51 107						
WR ² (WET)	KGS-M ² LB-FT ²	59 14						1.85 44						5.06 120						
HP. PER 100 RPM		17						31						82						
MAX. OPERATING SPEED (RPM)	OIL GREASE	1780 1780						1780	1180			1780			1180			1180		880

▲ SV = SINGLE VOLUTE MC = MODIFIED CONCENTRIC DV = DUAL VOLUTE

■ MIN. B-10 LIFE CALCULATED @ ALLOWABLE OPERATING RANGE.
FULL DIA., MAX. SPEED, CONTINUOUS OPERATION WHEN DIRECT COUPLED

UNIT IDENTIFICATION = MILLIMETERS
INCHES

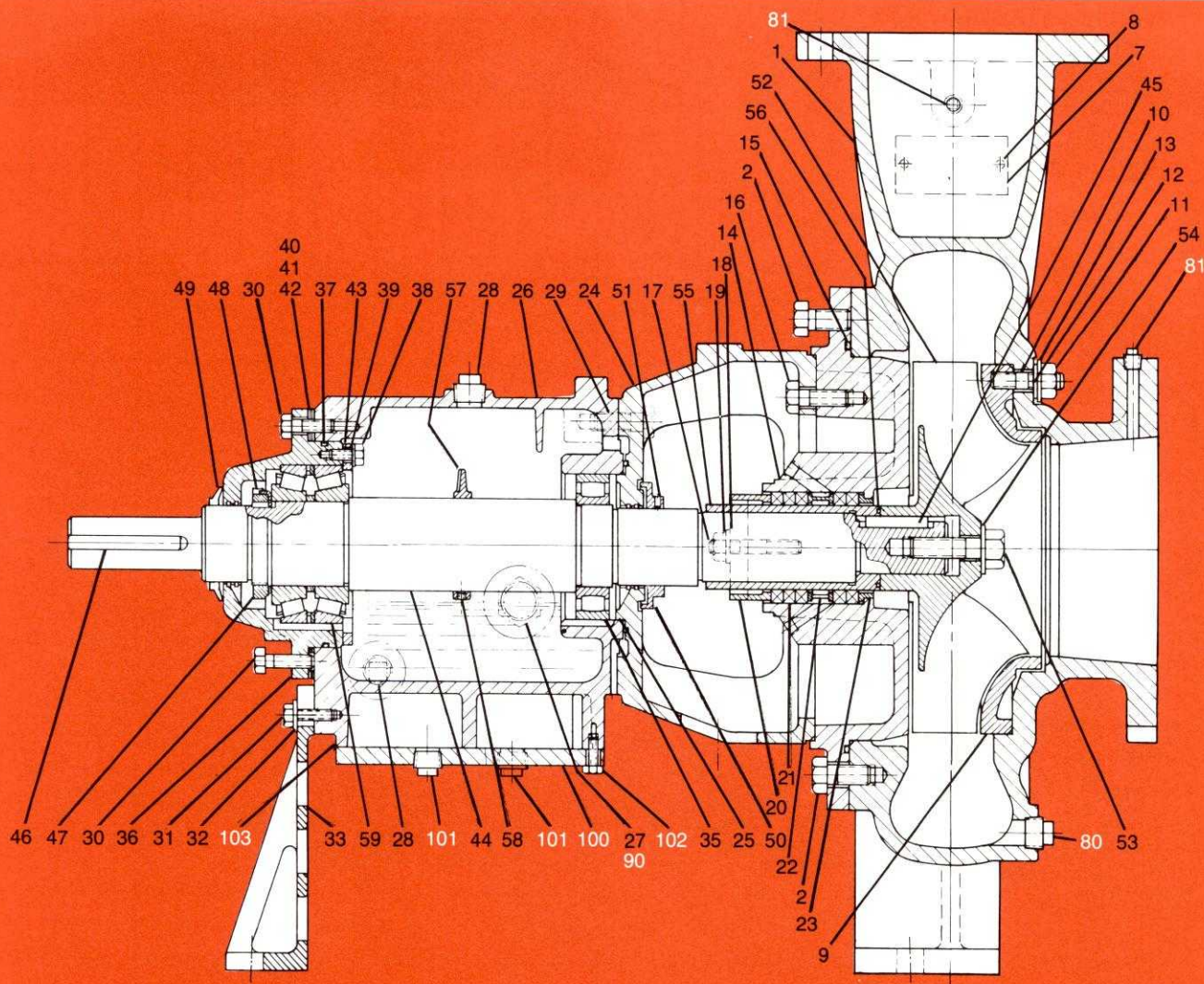


Warren Pumps Division
Warren, Massachusetts
Peace Dale, Rhode Island
Rockaway, New Jersey

Viking Pump Division
Cedar Falls, Iowa

Houdaille International, Inc.
Alphen a/d Rijn
The Netherlands

WARREN END SUCTION CENTRIFUGAL PUMPS 3202 SERIES



Material Conversion Chart

OPTIONAL PARTS NUMBERS APPEAR IN WHITE
SEE PAGE 3202.8 FOR OPTIONAL PARTS LIST

WARREN SPEC.	EQUIV. ASTM	MATERIAL
A010A	A48 CL. 35	Cast Iron
A011A	A48 CL. 35 (Stress Relieved)	Cast Iron (Stress Relieved)
B407A	A296 GR. CF-8M	#316 Stainless Steel
B407U	A296 GR. CF-8M (Hard Surfaced)	#316 Stainless Steel (Hard Surfaced)
B427A	A296 GR. CG-8M	#317 Stainless Steel
F060A	Type 1144	Carbon Steel
G240A	A276 Type 317	#317 Stainless Steel

**WARREN END SUCTION
CENTRIFUGAL PUMPS
3202 SERIES**

**Section 3202
Page 3202.7
Issue B**

Parts List & Interchangeability Chart

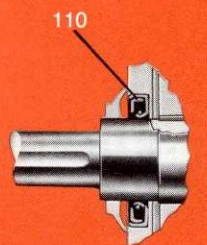
ITEM NO.	NO. REQD PER PUMP	PART NAME	MATERIAL			INTERCHANGEABILITY BY GROUP																	
			CAST IRON ST. STL. F.T.D.	ALL 317SS	ALL 316SS	5 PF									7 PF								
						6 x 3 x 13	6 x 4 x 13	8 x 6 x 13	6 x 4 x 16	8 x 6 x 16	10 x 8 x 16	12 x 10 x 16H	12 x 10 x 16L	14 x 12 x 16	14 x 14 x 16	6 x 4 x 20	8 x 6 x 20	10 x 8 x 20	12 x 10 x 20	14 x 12 x 20	14 x 14 x 22	16 x 16 x 22	18 x 18 x 22
1	1	CASE	A010A	B427A	B407A	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	R	
2	8-20	HEX HD. BOLT — BACKHEAD TO CASE	STEEL					5							7							9	
7	1	NAMEPLATE	ST. STEEL					5							5							5	
8	2	DRIVESCREW	ST. STEEL					5							5							5	
9	1	LINER	A010A	B427A	B407A	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	R	S
10	3	STUD-CASE TO LINER	ST. STEEL			A	A	A	A	A	A	B	B	B	B	A	A	A	A	A	C	C	C
11	3	HEX NUT-LINER STUD	ST. STEEL					5							5							5	
12	3	SEALING WASHER — LINER STUD						5							5							5	
13	3	PLAINWASHER — LINER STUD	ST. STEEL					5							5							5	
14	1	BACKHEAD	A010A	B427A	B407A	A	A	A	B	B	B	C	C	C	C	D	D	D	D	D	E	E	E
15	1	O-RING — BACKHEAD	BUNA-N			A	A	A	B	B	B	B	B	B	B	C	C	C	C	C	D	D	D
16	4	HEX HD. BOLT — ADAPTER TO BACKHEAD	STEEL					5							5							9	
17	2	STUDS — GLAND TO BACKHEAD	304 S/S					5							5							9	
18	2	PLAIN WASHER — GLAND STUD	ST. STEEL					5							5							9	
19	2	HEX NUT — GLAND STUD	304 S/S					5							5							9	
20	2	HALF GLAND	B407A					5							7							9	
21	5 RGS	PACKING	ASBESTOS					5							7							9	
22	1	WATER SEAL RING	GLASS FILLED TEFLON					5							7							9	
23	1	THROAT BUSHING	B407A					5							7							9	
24	1	ADAPTER	A010A					5							7							9	
25	1	O-RING — ADAPTER	BUNA-N					5							7							9	
26	1	PEDESTAL	A011A					5							7							9	
27	1	OIL LEVEL GAGE						5							5							5	
28	2	PIPE PLUG — PEDESTAL	IRON					5							5							5	
29	4	HEX HD. BOLT — ADAPTER TO PEDESTAL	STEEL					5							5							9	
30	4	HEX HD. BOLT — BRG. HSG. TO PEDESTAL	STEEL					5							5							9	
31	2-3	HEX HD. BOLT — FOOT TO PEDESTAL	STEEL					5							5							5	
32	2-3	PLAIN WASHER — FOOT BOLT	STEEL					5							5							5	
33	1	FOOT	A010A			A	A	B	B	B	B	C	C	C	C	C	C	C	C	C	D	D	D
35	1	PLAIN BEARING	STEEL					5							7							9	
36	1	BEARING HOUSING	A011A					5							5							9	
37	1	O-RING — BRG. HSG.	BUNA-N					5							5							9	
38	6	HEX HD BOLT-BRG. RETAINER TO BRG. HSG.	STEEL					5							5							9	
39	6	STAR WASHER — BRG. RETAINER BOLT	STEEL					5							5							9	
40		SHIM — BRG. HSG. — 1/64 THK.	STEEL					5							5							9	
41		SHIM — BRG. HSG. — 1/16 THK.	STEEL					5							5							9	
42		SHIM — BRG. HSG. — 1/32 THK.	STEEL					5							5							9	
43	1	BEARING RETAINER	A010A					5							7							9	
44	1	SHAFT	F060A					5							7							9	
45	1	KEY-IMPELLER TO SHAFT	ST. STEEL					5							7							9	
46	1	KEY-COUPPLING TO SHAFT	STEEL					5							7							9	
47	1	SHAFT NUT	STEEL					5							5							9	
48	1	SHAFT LOCKWASHER	STEEL					5							5							9	
49	1	DEFLECTOR — COUPLING END	BUNA-N					5							5							9	
50	1	DEFLECTOR — PUMP END	BRONZE					5							7							9	
51	1	SOC. HD. CUP PT. SETSCREW — DEFLECTOR	316SS					5							5							5	
52	1	IMPELLER	B407A	B427A	B407A	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	R	S
53	1	HEX HD BOLT — IMPELLER TO SHAFT	316SS					5							5							9	
54	1	SEALING WASHER — IMPELLER BOLT						5							5							9	
55	1	SHAFT SLEEVE	B407A					5							7							9	
56	1	O-RING — SHAFT SLEEVE	BUNA-N					5							7							9	
57	1	SLINGER	ALUMINUM												7								
58	2	SOC. HD. CUP PT. SETSCREW — SLINGER	STEEL												7								
59	1	THRUST BEARING	STEEL					5							5							9	

WARREN END SUCTION
CENTRIFUGAL PUMPS
3202 SERIES

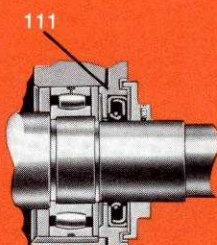
Options & Interchangeability Chart

ITEM NO.	NO. REQ'D PER PUMP	PART NAME	MATERIAL			INTERCHANGEABILITY BY GROUP																		
			CAST IRON ST STL F.T.D.	ALL 317SS	ALL 316SS	5 PF					7 PF									9 PF				
						6 x 3 x 13	6 x 4 x 13	8 x 6 x 13	6 x 4 x 16	8 x 6 x 16	10 x 8 x 16	12 x 10 x 16H	12 x 10 x 16L	14 x 12 x 16	14 x 14 x 16	6 x 4 x 20	8 x 6 x 20	10 x 8 x 20	12 x 10 x 20	14 x 12 x 20	14 x 14 x 22	16 x 16 x 22	18 x 18 x 22	
9	1	LINER	B407A			A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	R	S	
21	5 RGS	PACKING		TEFLON						5						7							9	
44	1	SHAFT		G240A						5						7							9	
55	1	SHAFT SLEEVE		B407U						5						7							9	
80	1	PIPE PLUG — CASE DRAIN		IRON						5						5							5	
81	2	PIPE PLUG — GAGE CONN.		IRON						5						5							5	
90	1	PIPE PLUG — SIGHT GAGE		IRON						5						5							5	
91	1	GREASE FITTING — PEDESTAL		STEEL						5						5							5	
92	1	BUSHING — GREASE FITTING		STEEL						5						5							5	
93	1	GREASE FITTING — BEARING HOUSING		STEEL						5						5							5	
100	1	COVER — PEDESTAL		STEEL PLATE						5						5							9	
101	2	PIPE PLUG — COVER		IRON						5						5							5	
102	8	HEX HD BOLT — COVER TO PEDESTAL		STEEL						5						5							9	
103	1	GASKET COVER		ASBESTOS						5						5							9	
110	1	LIP SEAL — BRG. HSG.								5						5							9	
111	1	LIP SEAL — ADAPTER								5						7							9	
120	1	SUCTION HEAD	A010A	317SS	316SS	A	A	B	A	B	C	D	D	E	E	A	B	C	D	E	E			
121	1	GASKET		ASBESTOS		A	A	B	A	B	C	D	D	E	E	A	B	C	D	E	E			
122	8-12	HEX HD. BOLT — SUCTION HEAD TO CASE		STEEL		A	A	B	A	B	C	D	D	E	E	A	B	C	D	E	E			
123	8-12	HEX NUT — SUCTION HEAD BOLT		STEEL		A	A	B	A	B	C	D	D	E	E	A	B	C	D	E	E			
124	16-24	WASHER — SUCTION HEAD BOLT		STEEL		A	A	B	A	B	C	D	D	E	E	A	B	C	D	E	E			
▲ 125	1	HAND HOLE COVER — SUCTION HEAD	A010A	317SS	316SS					5						5							5	
▲ 126	2	HEX HD. BOLT — HAND HOLE COVER TO SUCTION HEAD		STEEL						5						5							5	
▲ 127	4	PLAIN WASHER — HAND HOLE COVER BOLT		STEEL						5						5							5	
▲ 128	2	HEX NUT-HAND HOLE COVER BOLT		STEEL						5						5							5	
▲ 129	1	GASKET — HAND HOLE COVER		RUBBER						5						5							5	
130	2	PIPE PLUG — STUFFING BOX		IRON						5						5							5	

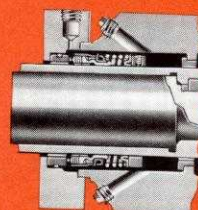
▲ NOT APPLICABLE ON FABRICATED SUCTION HEADS
▲ E TWO SIZES AVAILABLE



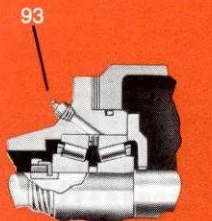
OPTION "D" LIP SEAL
AT BEARING HOUSING



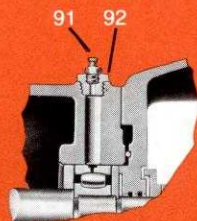
OPTION "D" LIP SEAL
AT ADAPTER



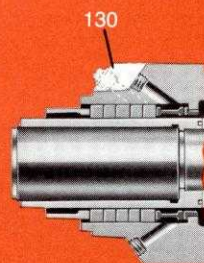
OPTION "G" MECHANICAL SEAL
(JOHN CRANE TYPE 1 SEAL SHOWN)



OPTION "B" GREASE
LUBRICATION
AT BEARING HOUSING



OPTION "B" GREASE
LUBRICATION
AT PEDESTAL



OPTION "F" BOTTOM FLUSHING

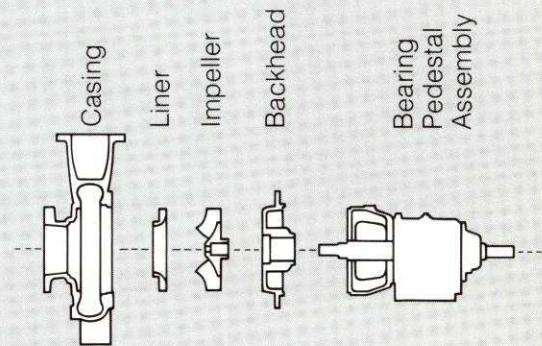
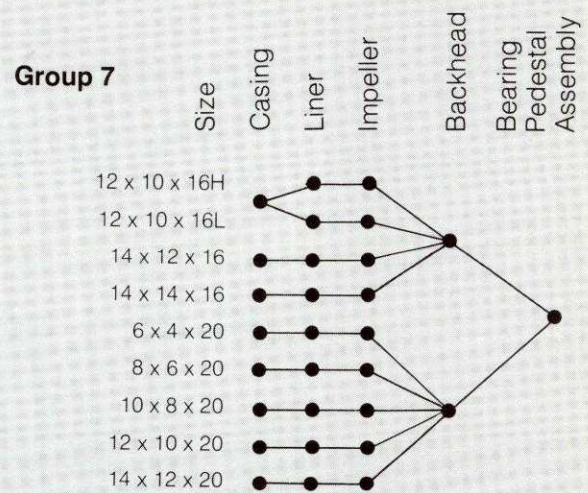
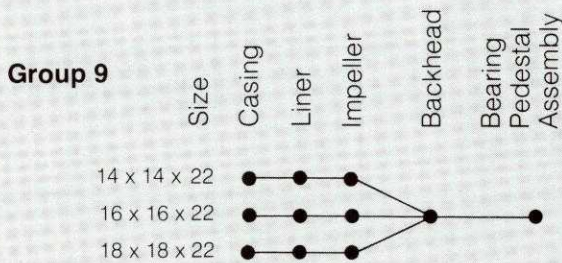
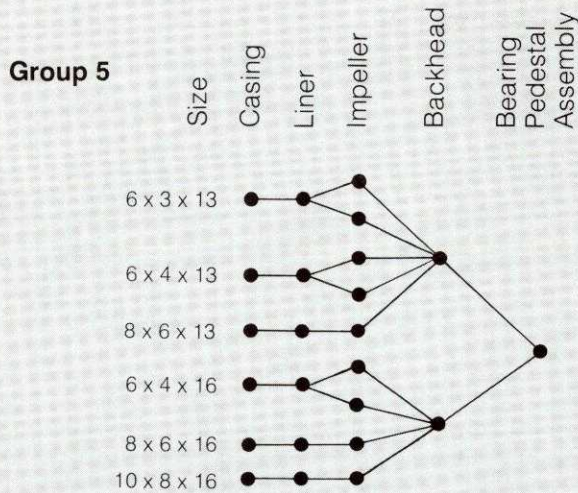


OPTIONAL SUCTION HEAD

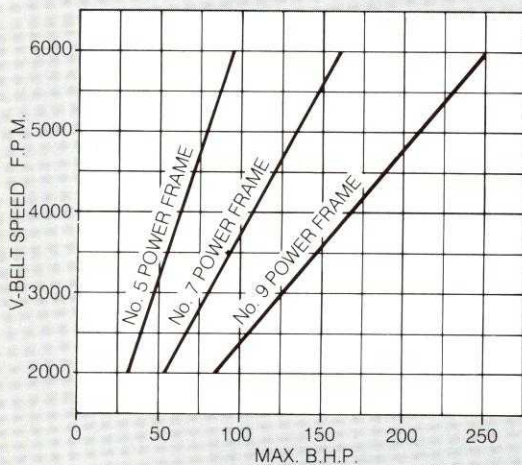
**WARREN END SUCTION
CENTRIFUGAL PUMPS
3202 SERIES**

**Section 3202
Page 3202.9
Issue B**

Maximum Interchangeability — Only Eighteen Pump Sizes



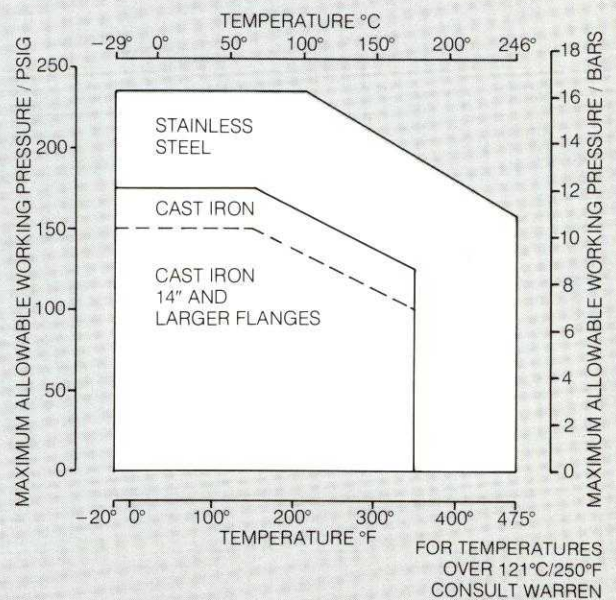
Overhung V-Belt Limitations



BELT SPEED (F.P.M.)
 $= \frac{DN}{3.82}$
 D = PITCH DIAMETER OF V-BELT SHEAVE
 N = R.P.M.

NOTES:
 MINIMUM B-10 LIFE OF 25,000 HRS. WITH PROPER V-BELT INSTALLATION TENSION. DYNAMIC BALANCING OF SHEAVES MAY BE REQUIRED FOR BELT SPEEDS OF 5,000 F.P.M. AND OVER, CONSULT SHEAVE SUPPLIER.

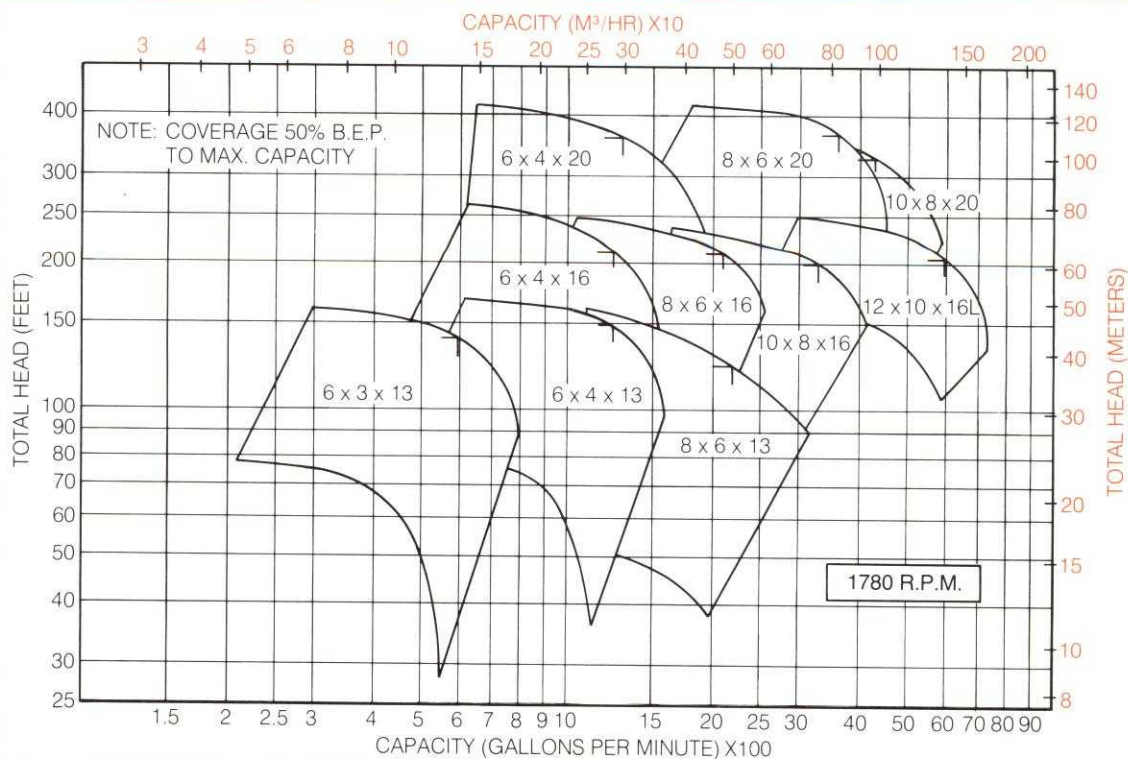
Pressure - Temperature Limits



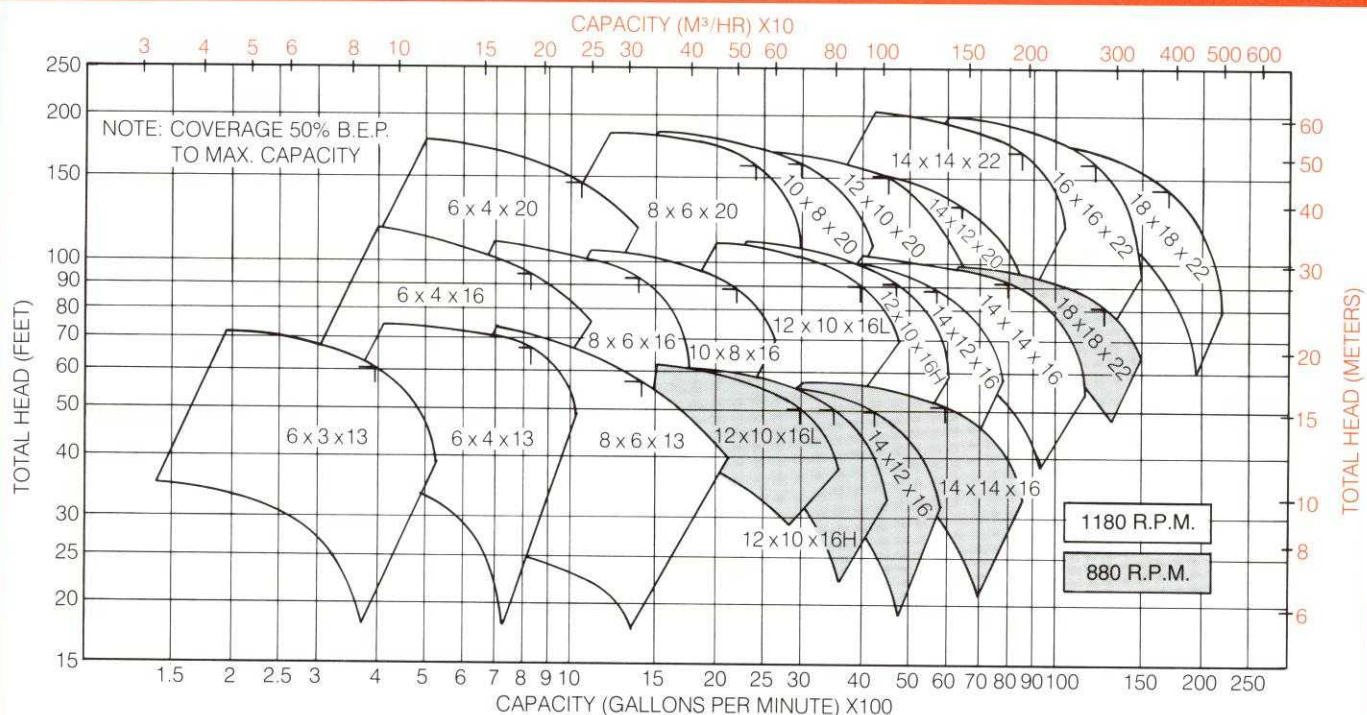
WARREN END SUCTION CENTRIFUGAL PUMPS 3202 SERIES

Approximate Performance

1780 R.P.M.



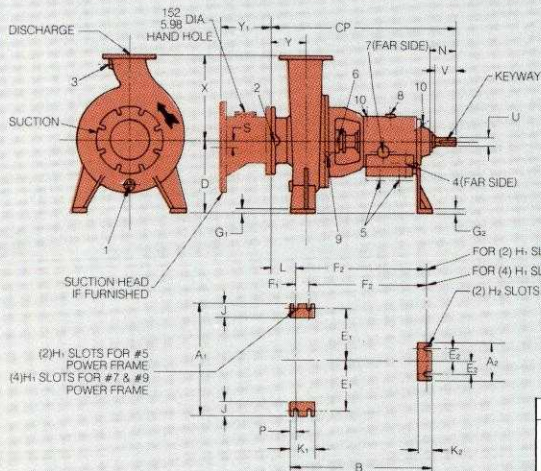
1180 R.P.M.
880 R.P.M.



WARREN END SUCTION CENTRIFUGAL PUMPS 3202 SERIES

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Issue B

Approximate Dimensions — Pumps Only



SHAFT EXTENSIONS						
POWER FRAME	KEYWAY SIZE		KEY SIZE		U DIA.	N V
5	14.55	WIDE x 22 DEEP	14.55	9.35 x 100.394	45.000 / 1.7716 44.983 / 1.7710	140 5.51 114 4.49
7	18.71	WIDE x 28 DEEP	18.71	11.43 x 120.472	60.000 / 2.3622 59.984 / 2.3616	160 6.30 137 5.39
9	22.87	WIDE x 35 DEEP	22.87	14.55 x 140.551	85.000 / 3.3464 84.975 / 3.3455	197 7.76 173 6.81

ROTATION OF PUMP IS CLOCKWISE
VIEWED FROM DRIVER END

FLANGE DIMENSIONS — FLAT FACE — USA STANDARD 125 LB. CAST IRON/150 LB. STEEL					
NOM. PIPE SIZE	O.D.	B.C.	NO. SLOTS OR HOLES	SIZE HOLES	THICKNESS
76.2 3	190.5 7.50	152.4 6	4	19.05 .75	26 1.02
101.6 4	228.6 9	190.5 7.50	8	19.05 .75	26 1.02
152.4 6	279.4 11	241.3 9.50	8	22.22 .875	28 1.10
203.2 8	342.9 13.50	298.45 11.75	8	22.22 .875	31 1.22
254 10	406.4 16	361.95 14.25	12	25.4 1	33 1.30
304.8 12	482.6 19	431.8 17	12	25.4 1	34 1.34
355.6 14	533.4 21	476.25 18.75	12	28.58 1.125	37 1.46
406.4 16	596.9 23.50	539.75 21.25	16	28.58 1.125	38.5 1.52
457.2 18	635 25	577.85 22.75	16	31.75 1.25	42 1.65
508 20	698.5 27.5	635 25	20	31.75 1.25	45 1.77

LIST OF CONNECTIONS			
NO.	NPT SIZE	NO. OF TAPS	CONNECTION
1	3/4-14	1	CASE DRAIN
2	1/4-18	1	SUCTION GAGE
3	1/4-18	1	DISCHARGE GAGE
4	3/4-14	1	OIL DRAIN
5	3/4-14	2	OIL COOLING
6	1/4-18	2	IN & OUT WATER SEAL
7	1"-11 1/2	1	OIL SIGHT GLASS
8	3/4-14	1	OIL FILL
9	1/4-18	2	BOTTOM BOX IN & OUT WATER SEAL
10	1/8-27	2	GREASE FITTING

SUCTION HEAD			
FLANGE SIZES	S	Y ₁	EST. WT. LBS.
203.2 x 152.4 8 x 6	25.4 1	279.4 11	32 71
254 x 152.4 10 x 6	52.4 2.06	304.8 12	38 85
304.8 x 203.2 12 x 8	52.4 2.06	355.6 14	59 130
355.6 x 254 14 x 10	41.3 1.62	406.4 16	80 177
406.4 x 304.8 16 x 12	41.3 1.62	457.2 18	113 250
457.2 x 355.6 18 x 14	50.8 2	482.6 19	140 308
508 x 355.6 20 x 14	76.2 3	508 20	158 348

CAST IRON — FLAT FACE
STAINLESS STEEL — RAISED FACE

PUMP	POWER FRAME	SUCT.	DISCH.	Y	CP	L	D	X	A ₁	A ₂	B	P	K ₁	K ₂	J	E ₁	E ₂	F ₁	F ₂	G ₁	G ₂	H ₁	H ₂	EST. WT. LBS.
6 x 3 x 13	#5	152.4 6	76.2 3	175 6.89	960 37.78	118 4.65	280 11.02	290 11.42	440 17.32															263 580
6 x 4 x 13		152.4 6	101.6 4	175 6.89	962 37.86	120 4.72		330 12.99			740 29.13					190 7.48			680 26.77	19 .75		19 .75		281 620
8 x 6 x 13		203.2 8	152.4 6	185 7.28	982 38.65	140 5.51		450 17.72		200 7.87		35 1.38	130 5.12	80 3.15	75 2.95	275 10.83	75 2.95				16 .63		15 .59	304 670
6 x 4 x 16		152.4 6	101.6 4	185 7.28	939 36.98	123 4.84	370 14.57	410 16.14	600 23.62															336 740
8 x 6 x 16		203.2 8	152.4 6	185 7.28	943 37.13	127 5		490 19.29			714 28.11								654 25.75	22 .87		22 .87		354 780
10 x 8 x 16	#7	254 10	203.2 8	200 7.87	964 37.96	148 5.83		520 20.47																415 915
12 x 10 x 16H		304.8 12	254 10	220 8.66	1026 40.40	159 6.26		550 21.65																633 1395
12 x 10 x 16L		304.8 12	254 10	220 8.66	1026 40.40	159 6.26		550 21.65																633 1395
14 x 12 x 16		355.6 14	304.8 12	290 11.42	1102 43.39	235 9.25		600 23.62																655 1445
14 x 14 x 16		355.6 14	355.6 14	300 11.81	1117 43.98	250 9.84		700 27.56																730 1610
6 x 4 x 20	#9	152.4 6	101.6 4	210 8.27	984 38.75	117 4.61	530 20.87	505 19.88	720 28.35	260 10.24	760 29.92	50 1.97	250 9.84	80 3.15	90 3.54	330 12.99	105 4.13	150 5.91	535 21.06	32 1.26	16 .63	22 .87	15 .59	451 995
8 x 6 x 20		203.2 8	152.4 6	210 8.27	993 39.10	126 4.96		510 20.08																581 1280
10 x 8 x 20		254 10	203.2 8	220 8.66	1008 39.69	141 5.55		560 22.05																633 1395
12 x 10 x 20		304.8 12	254 10	230 9.06	1021 40.20	154 6.06		600 23.62																642 1415
14 x 12 x 20		355.6 14	304.8 12	260 10.24	1058 41.66	191 7.52		690 27.17																778 1715
14 x 14 x 22	#9	355.6 14	355.6 14	254 10	1209 47.61	114 4.49		813 32																1148 2530
16 x 16 x 22		406.4 16	406.4 16	270 10.63	1235 48.63	140 5.51	660 25.98	840 33.07	914 35.98	350 13.78	936 36.85	57 2.24	457 17.99	80 3.15	114 4.49	419 16.50	150 5.91	324 12.76	530 20.87	38 1.5	16 .63	34 1.34	15 .59	1300 2865
18 x 18 x 22		457.2 18	457.2 18	305 12.01	1295 51.00	200 7.87		864 34.02																1402 3090

▲ OPTIONAL

UNIT IDENTIFICATION = MILLIMETERS KG.
INCHES LBS.



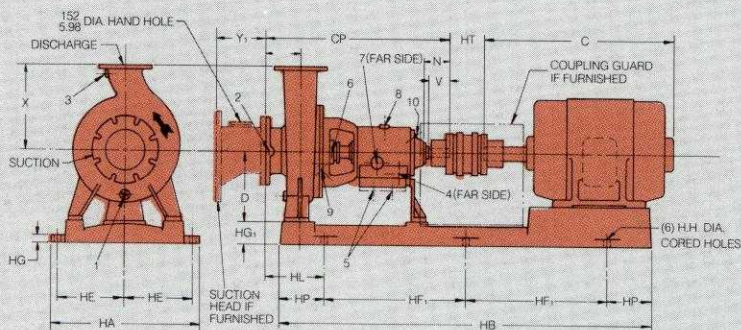
Warren Pumps Division
Warren, Massachusetts
Peace Dale, Rhode Island
Rockaway, New Jersey

Viking Pump Division
Cedar Falls, Iowa

Houdaille International, Inc.
Alphen a/d Rijn
The Netherlands

WARREN END SUCTION CENTRIFUGAL PUMPS 3202 SERIES

Approximate Dimensions — Pump, Base and Coupling



ROTATION OF
PUMP IS
CLOCKWISE
VIEWED FROM
DRIVER END

LIST OF CONNECTIONS			
NO.	NPT SIZE	NO. OF TAPS	CONNECTION
1 ▲	¾-14	1	CASE DRAIN
2 ▲	¼-18	1	SUCTION GAGE
3 ▲	¼-18	1	DISCHARGE GAGE
4	¾-14	1	OIL DRAIN
5 ▲	¾-14	2	OIL COOLING
6	¼-18	2	IN & OUT WATER SEAL
7	1"-11½	1	OIL SIGHT GLASS
8	¾-14	1	OIL FILL
9 ▲	¼-18	2	BOTTOM BOX IN & OUT WATER SEAL
10 ▲	½-27	2	GREASE FITTING

▲ OPTIONAL

FLANGE DIMENSIONS — FLAT FACE — USA STANDARD 125 LB. CAST IRON/150 LB. STEEL					
NOM. PIPE SIZE	O.D.	B.C.	NO. SLOTS OR HOLES	SIZE HOLES	THICK- NESS
76.2 3	190.5 7.50	152.4 6	4	19.05 .75	26 1.02
101.6 4	228.6 9	190.5 7.50	8	19.05 .75	26 1.02
152.4 6	279.4 11	241.3 9.50	8	22.22 .875	28 1.10
203.2 8	342.9 13.50	298.45 11.75	8	22.22 .875	31 1.22
254 10	406.4 16	361.95 14.25	12	25.4 1	33 1.30
304.8 12	482.6 19	431.8 17	12	25.4 1	34 1.34
355.6 14	533.4 21	476.25 18.75	12	28.58 1.125	37 1.46
406.4 16	596.9 23.50	539.75 21.25	16	28.58 1.125	38.5 1.52
457.2 18	635 25	577.85 22.75	16	31.75 1.25	42 1.65
508 20	698.5 27.5	635 25	20	31.75 1.25	45 1.77

SHAFT EXTENSIONS							
POWER FRAME	KEYWAY SIZE	KEY SIZE		"U" DIA.	N	V	
5	14 WIDE x 5.5 DEEP 55	14 x 35 x 100 55 x 9 x 3.94	LONG	45 000 / 44 983	1 7716 1 7710	140 5.51	114 4.49
7	18 WIDE x 7 DEEP 71	18 x 11 x 120 71 x 43 x 4.72	LONG	60 000 / 59 984	2 3622 2 3616	160 6.30	137 5.39
9	22 WIDE x 9 DEEP 87	22 x 14 x 140 87 x 55 x 5.51	LONG	85 000 / 84 975	3 3464 3 3455	197 7.76	173 6.81

SUCTION HEAD			
FLANGE SIZES	S	Y _I	EST. WT. KG LBS
203 x 152 8 x 6	254 1	2794 11	32 71
254 x 152 10 x 6	524 2.06	3048 12	38 85
304.8 x 203.2 12 x 8	524 2.06	355.6 14	59 130
355.6 x 254 14 x 10	41.3 1.62	406.4 16	80 177
406.4 x 304.8 16 x 12	41.3 1.62	457.2 18	113 250
457.2 x 355.6 18 x 14	50.8 2	482.6 19	140 308
508 x 355.6 20 x 14	76.2 3	508 20	158 348

CAST IRON — FLAT FACE
STAINLESS STEEL — RAISED FACE

CAST IRON — FLAT FACE
STAINLESS STEEL — RAISED FACE

PUMP	PUMP CODE	POWER FRAME	SUCT.	DISCH.	Y	CP	D	X	HL	HT ☆		PUMP EST. WT. KG LBS
6 x 3 x 13	1	5	152.4 6	76.2 3	175 6.89	960 37.78	280 11.02	290 11.42	276 10.87	152.4 6	155.6 6.13	263 580
6 x 4 x 13	2		152.4 6	101.6 4	175 6.89	962 37.86		330 12.99	278 10.94			281 620
8 x 6 x 13	3		203.2 8	152.4 6	185 7.28	982 38.65	370 14.57	450 17.72	318 12.52	184.2 7.25	354 780	
6 x 4 x 16	4		152.4 6	101.6 4	185 7.28	939 36.98		410 16.14	275 10.83			336 740
8 x 6 x 16	5		203.2 8	152.4 6	185 7.28	943 37.13		490 19.29	279 10.98			354 780
10 x 8 x 16	6		254 10	203.2 8	200 7.87	964 37.96		520 20.47	300 11.81			415 915
12 x 10 x 16H	7	304.8 12	254 10	220 8.66	1026 40.40	550 21.65		427 16.81	633 1395			
12 x 10 x 16L	8	304.8 12	254 10	220 8.66	1026 40.40	550 21.65		427 16.81	633 1395			
14 x 12 x 16	9	7	355.6 14	304.8 12	290 11.42	1102 43.39	530 20.87	600 23.62	503 19.80	177.8 7	247.6 9.75	655 1445
14 x 14 x 16	10		355.6 14	355.6 14	300 11.81	1117 43.98		700 27.56	518 20.39			730 1610
6 x 4 x 20	11		152.4 6	101.6 4	210 8.27	984 38.75		505 19.88	385 15.16			451 995
8 x 6 x 20	12		203.2 8	152.4 6	210 8.27	993 39.10		510 20.08	394 15.51			581 1280
10 x 8 x 20	13		254 10	203.2 8	220 8.66	1008 39.69		560 22.05	409 16.10			633 1395
12 x 10 x 20	14		304.8 12	254 10	230 9.06	1021 40.20		600 23.62	422 16.61			642 1415
14 x 12 x 20	15		355.6 14	304.8 12	260 10.24	1058 41.66		690 27.17	459 18.07			778 1715
14 x 14 x 22	16		9	355.6 14	355.6 14	254 10		1209 47.61	660 25.98			813 32
16 x 16 x 22	17	406.4 16		406.4 16	270 10.63	1235 48.63	840 33.07			1300 2865		
18 x 18 x 22	18	457.2 18		457.2 18	305 12.01	1295 51.00	864 34.02			1402 3090		

☆ "HT" DIMENSION DEPENDS UPON COUPLING MANUFACTURER

UNIT IDENTIFICATION = MILLIMETERS KG
INCHES LBS

**WARREN END SUCTION
CENTRIFUGAL PUMPS
3202 SERIES**

**Section 3202
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Issue B**

Approximate Dimensions — “T” Frame Bases

NEMA FRAME	MOTOR DIMENSIONS			BASE CODE SELECTOR																	
	C ▲	SHAFT DIA.	KEYWAY	FOR PUMP CODES																	
				1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
182T	349.2 13.75	28.58 1.125	6.35 x 3.18 250 x 125	A1																	
184T	374.6 14.75	28.58 1.125	6.35 x 3.18 250 x 125	A1																	
213T	404.9 15.94	34.92 1.375	7.94 x 3.96 312 x 156	A2	A2	C1															
215T	443 17.44	34.92 1.375	7.94 x 3.96 312 x 156	A2	A2	C1															
254T	522.2 20.56	41.28 1.625	9.52 x 4.78 375 x 188	A3	A3	C2	C2														
256T	566.7 22.31	41.28 1.625	9.52 x 4.78 375 x 188	A3	A3	C2	C2	C2													
284TS	560.3 22.06	41.28 1.625	9.52 x 4.78 375 x 188	A4	A4	C3	C3	C3													
284T	595.3 23.44	47.62 1.875	12.70 x 6.35 500 x 250	A4	A4	C3	C3	C3													
286TS	598.4 23.56	41.28 1.625	9.52 x 4.78 375 x 188	A4	A4	C3	C3	C3													
286T	633.5 24.94	47.62 1.875	12.70 x 6.35 500 x 250	A4	A4	C3	C3	C3													
324TS	623.8 24.56	47.62 1.875	12.70 x 6.35 500 x 250	B1	B1	D1	D1	D1							F1	F1					
324T	661.9 26.06	53.98 2.125	12.70 x 6.35 500 x 250	B1	B1	D1	D1	D1							F1	F1					
326TS	661.9 26.06	47.62 1.875	12.70 x 6.35 500 x 250	B1	B1	D1	D1	D1	D1					F1	F1	F1					
326T	700 27.56	53.98 2.125	12.70 x 6.35 500 x 250	B1	B1	D1	D1	D1	D1					F1	F1	F1					
364TS	674.6 26.56	47.62 1.875	12.70 x 6.35 500 x 250	B2	B2	D2	D2	D2	D2	F2	F2	F2		F2	F2	F2					
364T	728.7 28.69	60.32 2.375	15.88 x 7.94 625 x 312	B2	B2	D2	D2	D2	D2	F2	F2	F2		F2	F2	F2					
365TS	700 27.56	47.62 1.875	12.70 x 6.35 500 x 250	B2	B2	D2	D2	D2	D2	F2	F2	F2	F2	F2	F2	F2					
365T	754.1 29.69	60.32 2.375	15.88 x 7.94 625 x 312	B2	B2	D2	D2	D2	D2	F2	F2	F2	F2	F2	F2	F2					
404TS	750.9 29.56	53.98 2.125	12.70 x 6.35 500 x 250		B3	E1	E1	E1	E1	G1	G1	G1	G1	G1	G1	G1	G1	G1			
404T	827 32.56	73.02 2.875	19.05 x 9.52 750 x 375		B3	E1	E1	E1	E1	G1	G1	G1	G1	G1	G1	G1	G1	G1			
405TS	788.9 31.06	53.98 2.125	12.70 x 6.35 500 x 250			E1	E1	E1	E1	G1	G1	G1	G1	G1	G1	G1	G1	G1			
405T	865.1 34.06	73.02 2.875	19.05 x 9.52 750 x 375			E1	E1	E1	E1	G1	G1	G1	G1	G1	G1	G1	G1	G1			
444TS	865.1 34.06	60.32 2.375	15.88 x 7.94 625 x 312			E2	E2	E2	E2	G2	G2	G2	G2	G2	G2	G2	G2	G2			
444T	960.4 37.81	85.72 3.375	22.22 x 11.12 875 x 438			E2	E2	E2	E2	G2	G2	G2	G2	G2	G2	G2	G2	G2			
445TS	915.9 36.06	60.32 2.375	15.88 x 7.94 625 x 312			E2	E2	E2	E2	G2	G2	G2	G2	G2	G2	G2	G2	G2			
445T	1011.1 39.81	85.72 3.375	22.22 x 11.12 875 x 438			E2	E2	E2	E2	G2	G2	G2	G2	G2	G2	G2	G2	G2			

FOR MOTOR AND BASE DIMENSIONS
CONSULT WARREN PUMPS INC.

▲ VARIES WITH TYPE OF ENCLOSURE AND MOTOR MANUFACTURER.

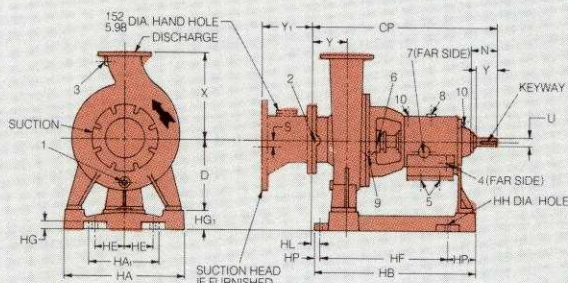
BASE CODE	BASE DIMENSIONS								BASE EST. WT. KG LBS
	HB	HF* ◇	HP*	HA	HE*	HG _I	HG	HH	
A1-A4	1817 63.66	◇	210 8.27	540 21.26	240 9.45	100 3.94	40 1.58	25 .98	138 305
B1-B3	1887 74.29	◇	210 8.27	740 29.13	340 13.38	120 4.72	40 1.58	25 .98	181 400
C1-C3	1652 65.04	◇	230 9.06	630 24.80	250 9.84	100 3.94	40 1.58	25 .98	159 350
D1-D2	1758 69.21	◇	230 9.06	650 25.59	295 11.61	100 3.94	40 1.58	25 .98	172 380
E1-E2	1972 77.64	756 29.76	230 9.06	770 30.31	355 13.98	120 4.72	40 1.58	25 .98	222 490
F1-F2	1914 75.35	◇	335 13.19	750 29.53	300 11.81	100 3.94	40 1.58	25 .98	245 540
G1-G2	2083 82.01	707 27.82	335 13.19	760 29.92	350 13.78	110 4.33	40 1.58	25 .98	254 560

* LOCATION OF FOUNDATION BOLT HOLES ARE SUBJECT TO VARIATION OF ± .6
◇ BASES MARKED THUS HAVE (4) FOUNDATION BOLT HOLES.

UNIT IDENTIFICATION =
MILLIMETERS
INCHES
KILOGRAMS
POUNDS

WARREN END SUCTION CENTRIFUGAL PUMPS 3202 SERIES

Approximate Dimensions — Pump and Short Base



ROTATION OF PUMP IS CLOCKWISE
VIEWED FROM DRIVER END

#5 POWER FRAME SHAFT EXT.		
KEY-WAY	$\frac{14}{.55}$ WIDE x $\frac{5.2}{.55}$ DEEP	
KEY SIZE	$\frac{14}{.55} \times \frac{9}{.35} \times \frac{100}{3.94}$ LONG	
U DIA.	$\frac{45.000}{44.983}$ /	$\frac{1.7716}{1.7710}$
N	$\frac{140}{5.51}$	
V	$\frac{114}{4.49}$	
#7 POWER FRAME SHAFT EXT.		
KEY-WAY	$\frac{18}{.71}$ WIDE x $\frac{7}{.28}$ DEEP	
KEY SIZE	$\frac{18}{.71} \times \frac{11}{.43} \times \frac{120}{4.72}$ LONG	
U DIA.	$\frac{60.000}{59.984}$ /	$\frac{2.3622}{2.3616}$
N	$\frac{160}{6.30}$	
V	$\frac{137}{5.39}$	

SUCTION HEAD			
FLANGE SIZE	S	Y _I	EST. WT. KG LBS
203.2 x 152.4 8 x 6	25.4 1	279.4 11	32 71
254 x 152.4 10 x 6	52.4 2.06	304.8 12	38 85
304.8 x 203.2 12 x 8	52.4 2.06	355.6 14	59 130
355.6 x 254 14 x 10	41.3 1.62	406.4 16	80 177
406.4 x 304.8 16 x 12	41.3 1.62	457.2 18	113 250
457.2 x 355.6 18 x 14	50.8 2	482.6 19	140 308
508 x 355.6 18 x 14	76.2 3	508 20	158 348

CAST IRON — FLAT FACE
STAINLESS STEEL — RAISED FACE

CAST IRON — FLAT FACE
STAINLESS STEEL — RAISED FACE

NOM. PIPE SIZE	O.D.	B.C.	NO. SLOTS OR HOLES	SIZE HOLES	THICK- NESS
76.2 3	190.5 7.50	152.4 6	4	19.05 .75	26 1.02
101.6 4	228.6 9	190.5 7.50	8	19.05 .75	26 1.02
152.4 6	279.4 11	241.3 9.50	8	22.22 .875	28 1.10
203.2 8	342.9 13.50	298.45 11.75	8	22.22 .875	31 1.22
254 10	406.4 16	361.95 14.25	12	25.4 1	33 1.30
304.8 12	482.6 19	431.8 17	12	25.4 1	34 1.34
355.6 14	533.4 21	476.25 18.75	12	28.58 1.125	37 1.46
406.4 16	596.9 23.50	539.75 21.25	16	28.58 1.125	38.5 1.52
457.2 18	635 25	577.85 22.75	16	31.75 1.25	42 1.65
508 20	698.5 27.5	635 25	20	31.75 1.25	45 1.77

LIST OF CONNECTIONS			
NO.	NPT SIZE	NO. OF TAPS	CONNECTION
1	3/4-14	1	CASE DRAIN
2	1/4-18	1	SUCTION GAGE
3	1/4-18	1	DISCHARGE GAGE
4	3/4-14	1	OIL DRAIN
5	3/4-14	2	OIL COOLING
6	1/4-18		IN & OUT WATER SEAL
7	1-11 1/2	1	OIL SIGHT GAGE
8	3/4-14	1	OIL FILL
9	1/4-18	2	BOTTOM BOX IN & OUT WATER SEAL
10	1/8-27	2	GREASE FITTING

▲ OPTIONAL

[illegible]

FOR #9 POWER FRAME DIMENSIONS,
CONSULT WARREN PUMPS INC.

* LOCATION OF FOUNDATION BOLT HOLES ARE SUBJECT TO VARIATION OF $\pm \frac{6}{24}$

UNIT IDENTIFICATION = MILLIMETERS KG
INCHES LBS