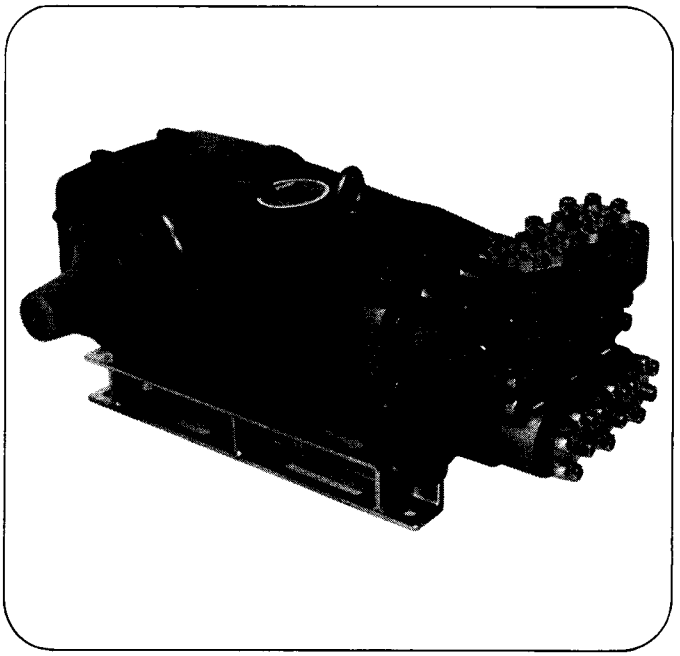
CAT® PUMPS



Plunger Pump Model 3510

SPECIFICATIONS

	U.S. Measure	Metric Measure
Volume	9 G.P.M.	(33 L/M)
Discharge Pressure	5000 P.S.I.	(350 BAR)
Max. Inlet Pressure	Flooded to 70 P.S.I.	(to 4.9 BAR)
RPM	800 RPM	(800 RPM)
Bore	0.787"	(20 mm)
Stroke	1.890"	(48 mm)
Crankcase Capacity	4.2 Qts.	(4 L)
Maximum Fluid Temperature	160°F	(71°C)
Inlet Ports (2)	1-1/2" NPT	(1-1/2" NPT)
Discharge Ports (2)	3/4" NPT	(3/4" NPT)
Pulley Mounting	Either side	(Either side)
Shaft Diameter	1.378"	(35 mm)
Weight	152 lbs.	(69 kg)
Dimensions	24.33" × 18.11" × 9.33"	(618 × 460 × 237 mm)

FEATURES

SUPERIOR DESIGN

- Triplex plunger design gives smoother fluid flow.
- Wetted seal port keeps high pressure seals completely lubricated and cooled.
- Inlet and discharge valve and seat assemblies interchange for easier maintenance.
- Lubricated low pressure seal provides double protection against external leakage.
- Oil bath crankcase assures proper lubrication.
- Plunger design results in extra quiet operation.
- The close tolerance concentricity of the ceramic plunger maximizes seal life.

QUALITY MATERIALS

- Special 316 stainless steel valve and seat for extended life.
- Heavy duty Nickel Aluminum Bronze inlet and discharge manifold for strength and corrosion resistance.
- Polished surface of solid ceramic plungers results in extended seal life.
- Extra hard finish of ceramic plunger is durable and abrasion resistant.
- Die cast aluminum crankcase provides lightweight strength and precision tolerance control.
- Forged, nitrited chrome-moly crankshaft gives unmatched strength and surface hardness.
- Oversized crankshaft bearings mean longer bearing life.

EASY MAINTENANCE

- Wet end is easily serviced without entering crankcase, requiring less time and effort.
- Valve assemblies are accessible without disturbing piping, for quick service.
- Preset packings mean no packing gland adjustment is necessary, reducing maintenance costs.

HORSEPOWER REQUIREMENTS

Flow		PRESSURE PSI 4000	PSI 4500	PSI 5000	Pump RPM
GPM	L/M	BAR 275	BAR 310	BAR 350	
9	34	24.7	27.8	30.9	800
8	30	22.0	24.7	27.5	711
7	27	19.2	21.7	24.1	622

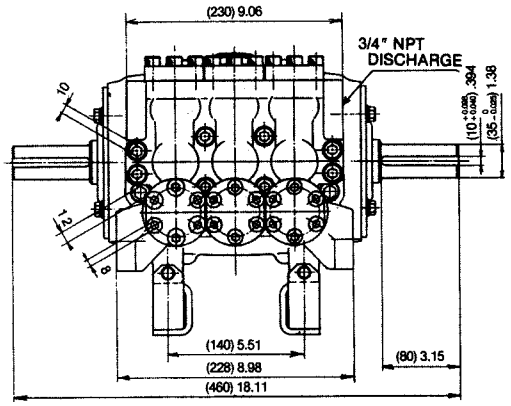
DETERMINING THE PUMP R.P.M. $\frac{\text{Rated G.P.M.}}{\text{Rated R.P.M.}} = \frac{\text{"Desired" G.P.M.}}{\text{"Desired" R.P.M.}}$

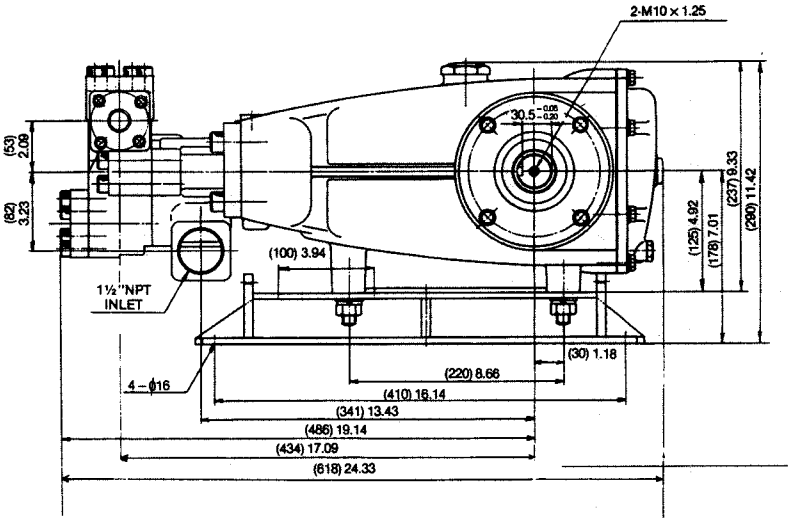
DETERMINING THE REQUIRED H.P. $\frac{\text{GPM} \times \text{PSI}}{1460} = \text{Electric Brake H.P. Required}$

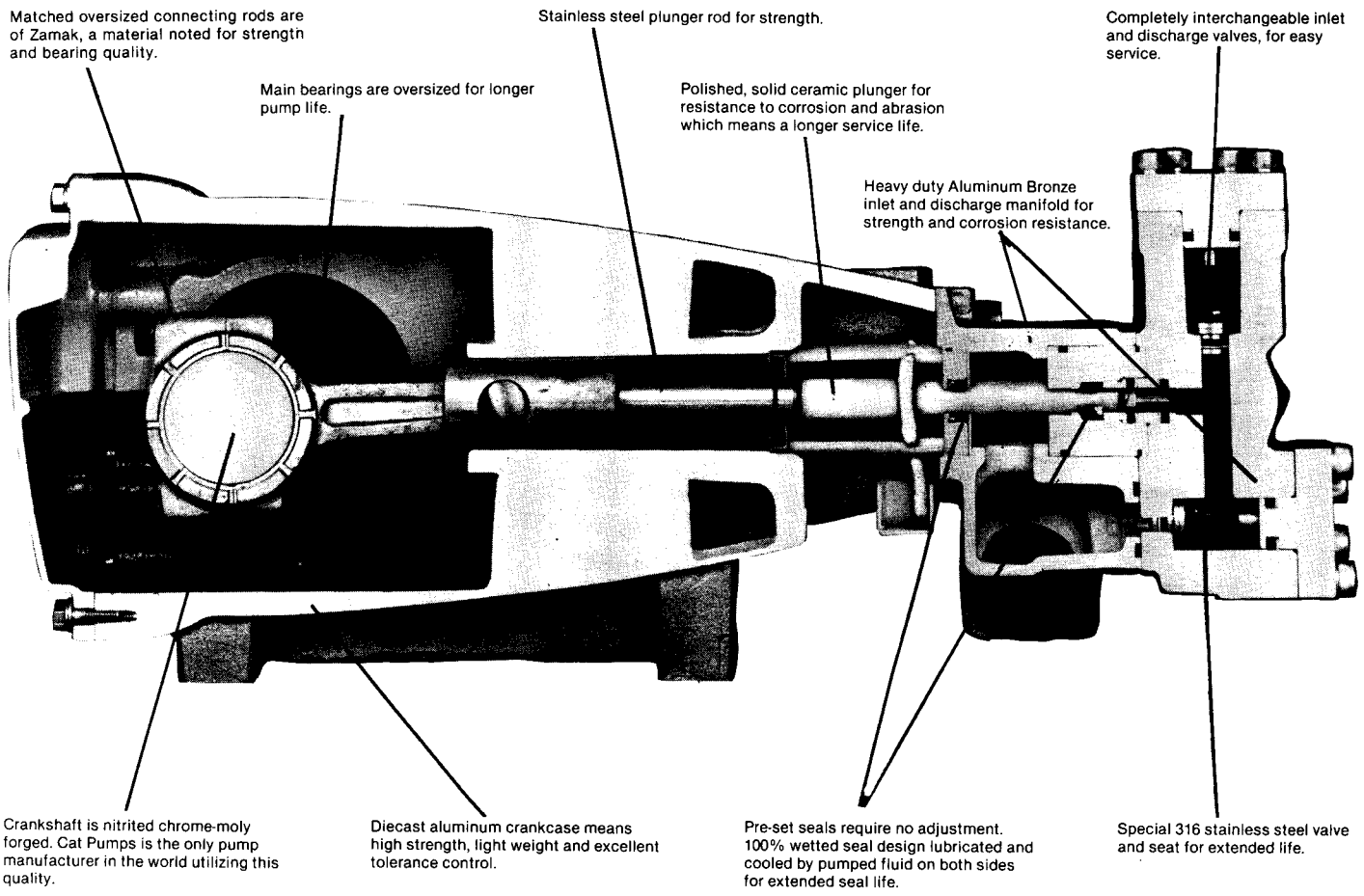
DETERMINING MOTOR PULLEY SIZE $\frac{\text{Motor Pulley O.D.}}{\text{Pump R.P.M.}} = \frac{\text{Pump Pulley O.D.}}{\text{Motor R.P.M.}}$

Note: Consult engine manufacturer when using gas or diesel engine

WORLD LEADER IN TRIPLEX HIGH PRESSURE PUMPS







3510-S-685 5M

Products described hereon are covered by one or more of the following U.S. patents 3558244, 3652188, 3809508, 3920356, and 3930756

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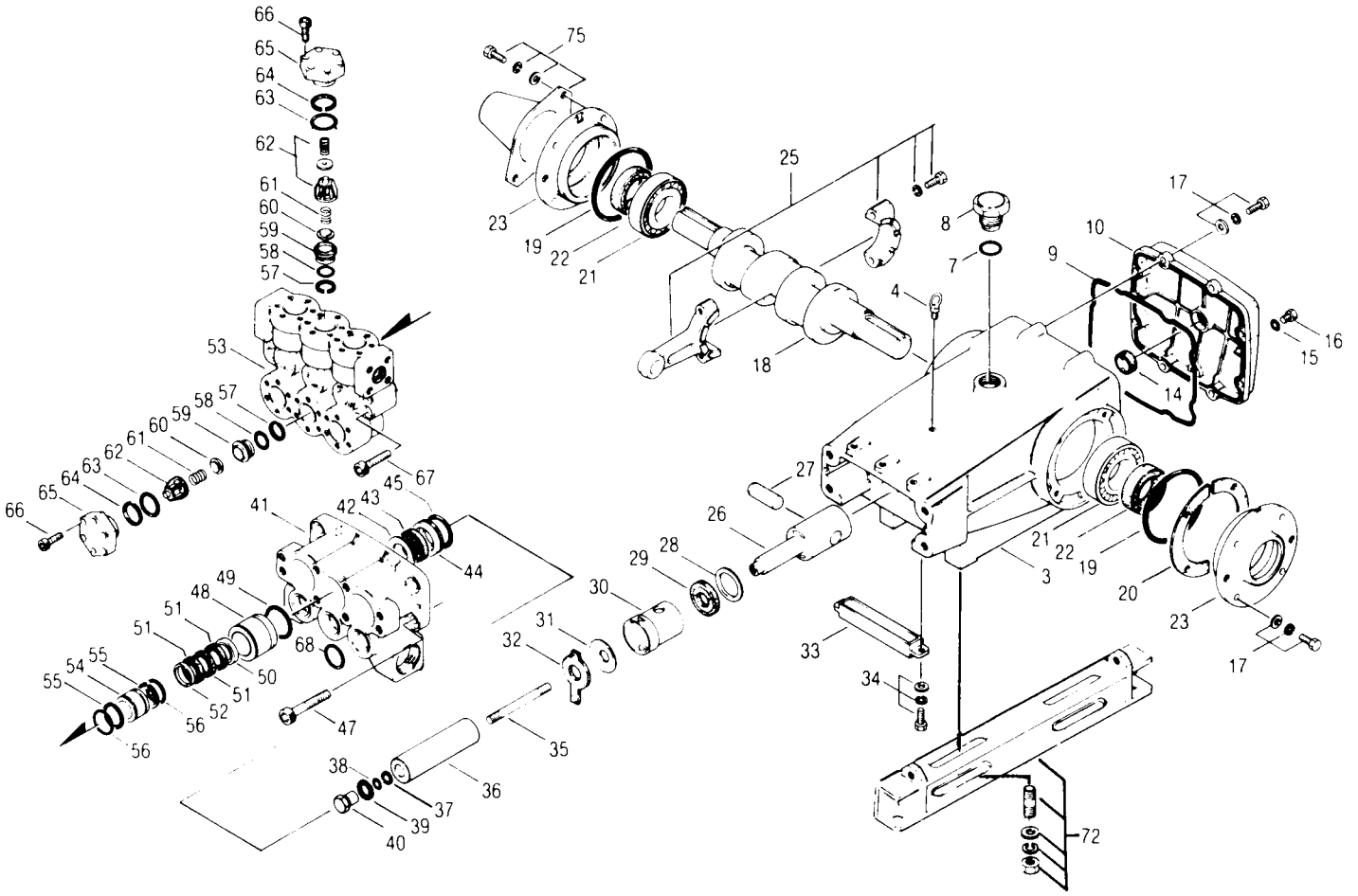
EXPLODED VIEW
July 1988

PLUNGER
Model 3510
Corrosion Resistant
Model 3507



PARTS LIST

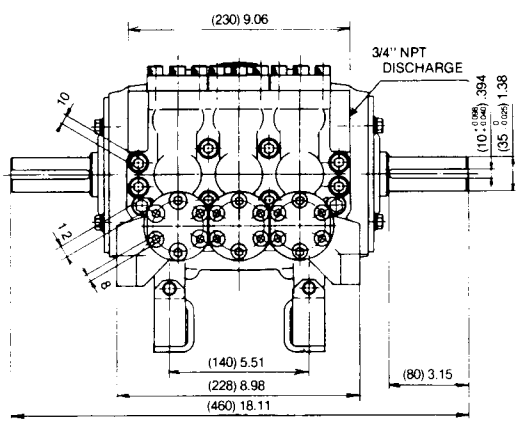
ITEM	PART NO.	DESCRIPTION	QTY.
3	44559	Crankcase	1
4	44319	Eyebolt	1
7	14177	O-Ring, Oil Filler Cap (Buna-N)	1
8	43211	Oil Filler Cap	1
9	16612	O-Ring, Crankcase Cover (Buna-N)	1
10	44493	Crankcase Cover	1
14	22289	Oil Gauge	1
15	23170	O-Ring, Drain Plug (Buna-N)	1
16	25625	Drain Plug	1
17	92508	Sems Hex Head Screw ZP (M8 x 25)	16
	89277	**Hex Head Screw-S.S. (M8 x 25)**	**16**
	13534	**Washer-S.S. (M8)**	**16**
	15848	**Spring Washer-S.S. (M8)**	**16**
18	29325	Crankshaft	1
19	12398	O-Ring, Oil Seal Case (Buna-N)	2
20	44543	Shim, 1/2 Circle	0-2
21	29326	Bearing	2
22	13296	Oil Seal, Crankshaft (Buna-N)	2
23	44542	Oil Seal Case	2
25	43859	Connecting Rod	3
26	43943	Plunger Rod	3
27	43864	Plunger Pin	3
28	29338	Washer	3
29	100488	Oil Seal, Plunger Rod (Buna-N)	3
30	44119	Seal Retainer-2 Pc.	3
31	43506	Barrier Slinger	3
32	44095	Wick	3
33	27790	Oil Pan	1
34	92519	Sems Comb Head Screw (M6 x 16)	2
	89618	**Comb. Head Screw-S.S. (M6 x 16)**	**2**
	19933	**Washer-S.S. (M6)**	**2**
	15849	**Spring Washer (M6)**	**2**
35	89581	Stud (M7 x 123)	3

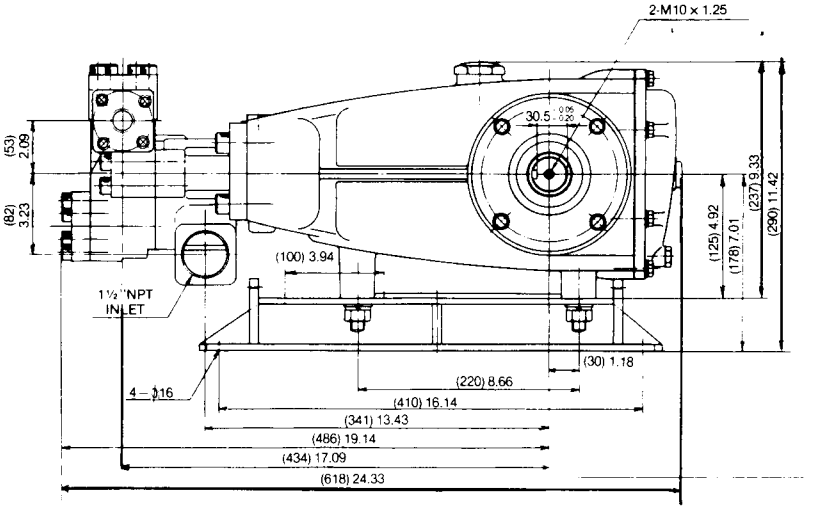
ITEM	PART NO.	DESCRIPTION	QTY.
36	43945	Ceramic Plunger	3
37	20184	Back-Up Ring (Teflon)	3
38	14190	O-Ring, Plunger Retainer (Buna-N)	3
	14161	O-Ring, Plunger Retainer (Viton)	3
39	44069	Gasket (316SS)	3
40	44068	Plunger Retainer (316SS)	3
41	44206	Inlet Manifold (Aluminum Bronze)	1
42	44074	Washer (316SS)	3
43	44071	Lo-Pres. U-Pack. (316SS) (Buna-N)	3
	45255	Lo-Pressure Seal (Viton)	3
44	44073	Adapter (Aluminum Bronze)	3
45	43875	O-Ring, Adapter (Buna-N)	3
	44826	O-Ring, Adapter (Viton)	3
47	44606	Hex Socket Screw (M14) (40) Course	4
	44585	**Hex Socket Screw-S.S. (M14 x 40)**	**4**
48	44075	V-Packing Case (Aluminum Bronze)	3
49	12391	O-Ring, V-Packing Case (Buna-N)	3
	13266	O-Ring, V-Packing Case (Viton)	3
50	44076	Female Adapter (Alum.-Bronze)	3
51	44607	V-Packing (Teflon)	9
52	44077	Male Adapter (Aluminum Bronze)	3
53	44079	Discharge Manifold (Alum.-Bronze)	1
54	44078	Disch. Valve Spacer (Alum.-Bronze)	3
55	28675	Back-Up Ring (Teflon)	6
56	14200	O-Ring (Buna-N)	6
	11719	O-Ring (Viton)	6
57	•21985	Back-Up Ring (Teflon)	6
58	•23172	O-Ring (Buna-N)	6
	11377	O-Ring (Viton)	6
59	•44080	Valve Seat (316SS)	6
60	•44081	Valve (316SS)	6
61	•44082	Valve Spring (316SS)	6
62	43886	Valve Spring Retainer (Nylon)	6

ITEM	PART NO.	DESCRIPTION	QTY.
	•44735	**Valve Spring Retainer-PVDF**	**6**
	44793	**Coil Spring-316 S.S.**	**6**
	44794	**Washer-316 S.S.**	**6**
63	•15853	O-Ring (Buna-N)	6
	11720	O-Ring (Viton)	6
64	•20224	Back-Up Ring (Teflon)	6
65	44199	Valve Plug-Aluminum Bronze	6
	44795	**Valve Plug-Alum. Bronze-Coil Spring**	**6**
66	87934	Hex Socket Screw (M10 x 30)	36
	87951	**Hex Socket Screw-S.S. (M10 x 30)**	**56**
67	89573	Hex Socket Screw (M12 x 65)	8
	89628	**Hex Socket Screw-S.S. (M12 x 65)**	**8**
68	11379	O-Ring, Inlet Manifold (Buna-N)	3
72	92674	Box Mounting Asbly.-Course	1
	43888	Box Rail	2
	34018	Stud Mount Kit-Course	1
	30149	Hub & Key Assembly (H Series)	1
	30148	Hub (M35) (H Series)	1
	30055	Key (M10 x 6 x 32)	1
	34039	**Stud Mount - S.S.**	**1**
	34049	Hub & Key Assembly (R Series)	1
	34020	Hub (M35) (R Series)	1
	34021	Key (M. 10 x 7 x 70)	1
75	44516	Shaft Protector w/2 Screws (89283)	1
	31035	Valve Kit	2
	•34151	**Valve Kit (316 SS) (•Incld. In Kit)**	**2**
	31037	Seal Kit	1
	30278	Oiler (1/4" NPT - 1 Oz.)	3
	30967	Oiler Glass only	

ALL BOLD PRINTED ITEMS are necessary for servicing and conversion to Corrosion Resistant Model. All other items are interchangeable. Effective with SN 285110.

Before you begin servicing your pump, **Please carefully read OPERATOR'S MANUAL and separate SERVICE MANUAL** for special lubrication, disassembly and reassembly information.





HORSEPOWER REQUIREMENTS

Flow		PRESSURE PSI 4000	PSI 4500	PSI 5000	Pump RPM
GPM	L/M	BAR 275	BAR 310	BAR 350	
9	34	24.7	27.8	30.9	800
8	30	22.0	24.7	27.5	711
7	27	19.2	21.7	24.1	622

DETERMINING THE PUMP R.P.M. — Rated G.P.M. / Rated R.P.M. = "Desired" G.P.M. / "Desired" R.P.M.

DETERMINING THE REQUIRED H.P. — GPM × PSI / 1460 = Electric Brake H.P. Required

DETERMINING MOTOR PULLEY SIZE — Motor Pulley O.D. / Pump R.P.M. = Pump Pulley O.D. / Motor R.P.M.

Note: Consult engine manufacturer when using gas or diesel engine

SPECIFICATIONS

	U.S. Measure	Metric Measure
Volume	9 G.P.M.	(34 L/M)
Discharge Pressure	5000 P.S.I.	(350 BAR)
Max. Inlet Pressure	Flooded to 70 P.S.I.	(to 4.9 BAR)
RPM	800 RPM	(800 RPM)
Bore	0.787"	(20 mm)
Stroke	1.890"	(48 mm)
Crankcase Capacity	4.2 Qts.	(4 L)
Maximum Fluid Temperature	160° F	(71° C)
Inlet Ports (2)	1½" NPT	(1½" NPT)
Discharge Ports (2)	¾" NPT	(¾" NPT)
Pulley Mounting	Either side	(Either side)
Shaft Diameter	1.378"	(35 mm)
Weight	152 lbs.	(69 kg)
Dimensions	24.3"x 18.11"x 9.33"	(618 x 460 x 237 mm)

LUBRICATION — Before starting pump, fill crankcase per specification with **Cat Pump Crankcase Oil, 10W40 multi-viscosity petroleum-based HYDRAULIC lubrication** with antiwear and rust inhibitor additives. Change initial fill after 50 hours running period. Change oil every 3 months or at 500 hour intervals thereafter.

INLET CONDITION CHECK-LIST FOR LARGE CAPACITY SYSTEMS

Inadequate inlet conditions can cause serious malfunctions in the best designed pump. Suprisingly, the simplest of things can cause the most severe problems. Some of these conditions can go unnoticed to the unfamiliar or untrained eye. To help eliminate some of these costly headaches, we have put together a check list of probable cause areas which should be evaluated before operation of any system. Remember, no two systems are alike, so there can be no **ONE** best way to set-up a system. All factors must be carefully considered.

INLET SUPPLY should be adequate to accommodate the maximum flow being delivered by the pump.

- ☐ Avoid closed loop systems, especially at higher temperatures and larger volumes. By-pass should be returned to a holding tank.
- ☐ Low vapor pressure fluids, such as solvents, require a booster pump for adequate inlet supply.
- ☐ Higher viscosity fluids require a positive NPSH for adequate inlet supply.
- ☐ Higher temperature fluids tend to vaporize and require a positive NPSH for adequate supply.
- ☐ When using an inlet holding tank, size it to provide adequate fluid to accommodate the maximum output of the pump, generally a minimum of five times the GPM (however, a combination of system factors can change this requirement significantly); provide adequate baffling in the tank to eliminate air bubbles and turbulence; install diffusers on all return lines to the tank.

INLET LINE SIZE should be adequate to avoid starving the pump.

- ☐ The line should generally be 1-1/2 to 2 times the specified pump inlet port size.
- ☐ The line MUST be a FLEXIBLE hose, NOT a rigid pipe, and reinforced on SUCTION systems to avoid collapsing.
- ☐ The simpler the inlet plumbing the less the potential for the problems. Keep the length to a minimum, the number of elbows and joints to a minimum (ideally no elbows) and the inlet accessories to a minimum.
- ☐ Use pipe sealant to assure air-tight, positive sealing pipe joints.

INLET PRESSURE should fall within the specifications of the pump. These conditions vary slightly from the plunger to the piston pumps.

- ☐ Higher temperatures require pressurized inlet.
- ☐ Higher pump RPM's can increase the acceleration loss of the pumped fluid and may require pressurized inlet. This acceleration loss is also increased by higher temperatures, low vapor pressures and higher viscosity.
- ☐ Optimum pump performance is achieved with a flooded or pressurized inlet, however, negative feed is possible under ideal conditions.

INLET ACCESSORIES are designed to protect against overpressurization, monitor inlet flow, control contamination, control temperature and provide ease of servicing.

- ☐ All accessories should be sized to avoid restricting the inlet flow.
- ☐ A pressure gauge is recommended to monitor the inlet pressure and should be mounted AS CLOSE TO THE PUMP INLET as possible.
- ☐ All accessories should be compatible with the solution being pumped to avoid malfunction.

BY-PASS TO INLET Care should be exercised when deciding the method of by-pass. It is recommended the by-pass be directed to a baffled reservoir tank, with at least one baffle between the by-pass line and the inlet line to the pump. Although not recommended, by-pass fluid may be returned to the inlet line of the pump if the system is properly designed to protect your pump. When using this method a PRESSURE REDUCING VALVE should be installed on the inlet line to avoid excessive pressure to the inlet of the pump. (**REDUCING VALVE** SHOULD BE INSTALLED **BETWEEN** THE BY-PASS CONNECTION AND THE INLET TO THE PUMP) It is also recommended that a TEMPERATURE SENSING VALVE be used to monitor the temperature build-up in the by-pass loop to avoid premature seal failure.

- ☐ A low-pressure, flexible cloth braid (not metal braid) hose should be used from the by-pass connection to the inlet of the pump.
- ☐ It is recommended to use a minimum 24" by-pass hose.
- ☐ On any new installation or during periodic maintenance or troubleshooting, it is recommended that the pressure in the by-pass line be checked to avoid overpressurizing the inlet.