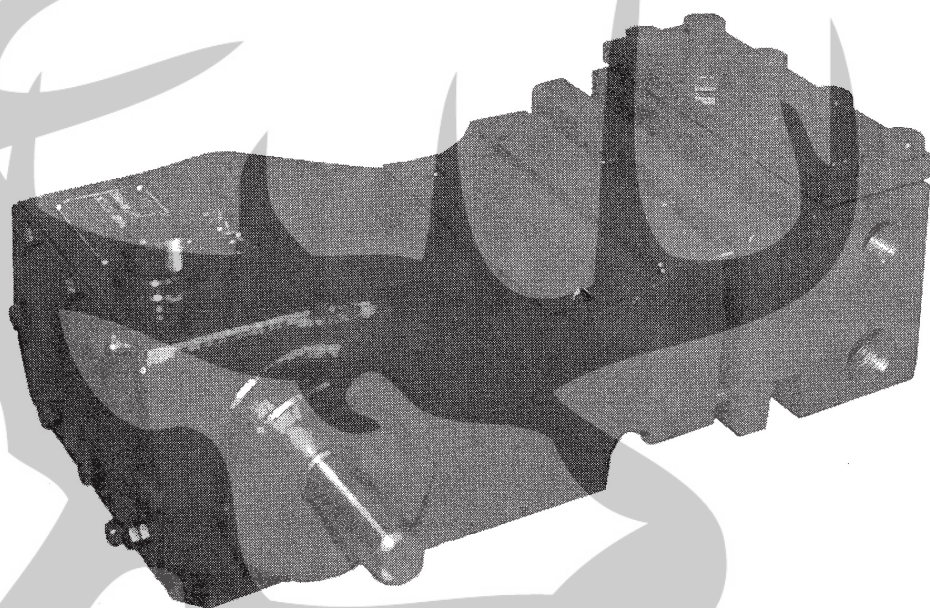




MYERS®



CXPM SERIES

INDUSTRIAL PUMPS

INSTRUCTIONS AND SERVICE MANUAL

NOTE! To the installer: Please make sure you provide this manual to the owner of the equipment or to the responsible party who maintains the system.

SPECIFICATIONS

TYPE	Triplex – Single Acting
	CXPM8-15
Rated Capacity G.P.M. @ 450 R.P.M.	8
Pressure Rating (PSI)	1,500
Required B.H.P. @ 450 R.P.M. and Rated Pressure	10
Temperature Rating (Max.)	160°F
Plunger Size (Inch)	1-1/4
Stroke	1-1/4"
Suction Size	1" N.P.T. (Sides)
Discharge	3/4 N.P.T. (Sides)
Crankshaft Diameter	1-1/8"
Keyway	1/4 x 1/8
Plunger Material	SST Carbide Coated
Fluid End Material	1018 Steel
Plunger Seal Material	Nitrile w/Cotton Fabric
Valve Material	Hardened Stainless Steel
Seat Material	Hardened Stainless Steel
Approx. Shipping Weight	130#
Suggested Drive For 1750 R.P.M. Motor	Drive Sheave 3V Section 3 Groove 5" O.D. • Driven Sheave 3V Section 3 Groove 19" O.D. 1-1/8 Bore 1/4 x 1/8 K.W. • Belts – Matched Sets of (3) 3VX750 (75" Outside Circumference) Approx. Center Distance is 17.2"

BUCKHORN
PUMPS, INC.

Reciprocating pumps of both the plunger and piston type are positive displacement in principle. Due to positive displacement characteristics, problems may arise through improper installation or application. When new or unusual installations are planned, or the material to be pumped is a liquid other than cold water, the customer should consult the "Myers Reciprocating Pump Manual" or factory for additional information.

CAUTION: Positive Displacement Pumps must have a proper size and operable type of pressure regulating valve or pressure relief valve piped into the discharge line. This is mandatory to prevent damage to pump and piping or possible injury to personnel. Do not install any valves or shutoff devices in the bypass line from pressure regulator to tank or supply.

CAUTION: All pumps should be installed level. For mobile applications the maximum angle of intermittent operation should be no more than 5 degrees in any one direction.

CALIFORNIA PROPOSITION 65 WARNING:

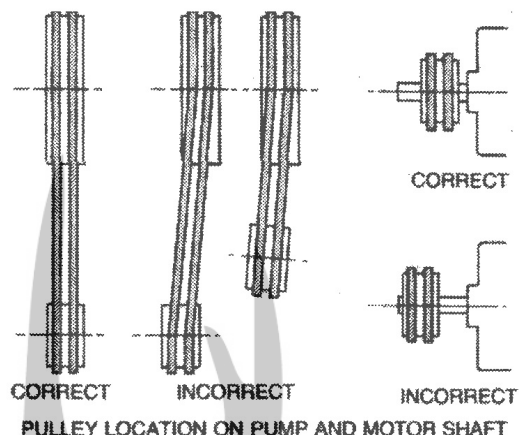
⚠ WARNING This product and related accessories contain chemicals known to the State of California to cause cancer, birth defects or other reproductive harm.

I – INSTALLATION (Customer mounted pump)

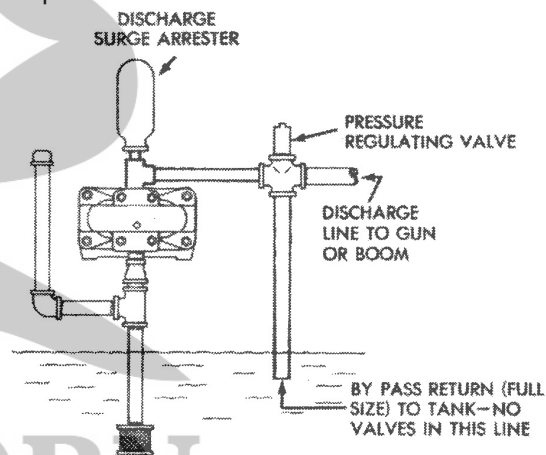
- A. If possible, install suction piping one pipe size larger than suction tapping in pump. Reduce piping size at pump with a reducer coupling as shown on installation drawings. A suction surge arrester, also shown, will assure smoother operation.
- B. Pump performs best under +20 psi suction pressure. Suction piping must not have any air leaks. Check suction piping assembly for leaks by using 20–80 psi air pressure and soap bubbles or submerging assembly under water.
- C. Use suction strainer and screen of adequate size to avoid restriction of pump suction. Strainer mesh should be sufficiently small to prevent passage of trash which may lodge under pump valves. Keep screen clean with a regular maintenance schedule to avoid starving of pump suction. A starved suction condition is usually indicated by excessive pump shock and noise. Many pump problems and most plunger seal failures are directly traceable to a starved suction condition.
- D. When pumping liquids that are heated, reduce pump speed to avoid suction problems. Consult "Myers Reciprocating Pump Manual" or factory for temperature and speed limitations.

- E. Make sure that drive is adequate for horsepower required and that drive is properly aligned and tensioned. With belt drives, pulley on both motor and pump should be located as closely as possible to bearing to reduce bearing and shaft bending loads.

CAUTION: Be sure that pump belts and pulleys are properly protected by guards according to industrial code within state of application.



- F. Make sure that all bolts, nuts, set screws, and keys are properly tightened.
- G. Be sure that discharge line is properly protected by means of a pressure regulating valve and a discharge surge arrester of proper size, capacity, and pressure rating. The discharge line should be of comparable size to discharge tapping in pump.



CORRECT LOCATION OF DISCHARGE SURGE ARRESTER WHEN USING PRESSURE REGULATING VALVE.

- H. Nozzle capacity or demand should not exceed 90% of pump capacity for satisfactory regulating valve operation. Nozzling in excess of this capacity may cause unstable pressure regulator operation.

It is also preferred to nozzle in excess of 50% of pump capacity to reduce rate of erosion or wear on regulating valve and seat.

When lower system demands (than rated pump capacity) are required in an installation, the pump speed should be reduced by changing drive ratios. This will reflect savings in power consumption, reduce regulating valve wear, and extend pump life.

- I. Where line shock or water hammer is encountered a second surge arrester should be installed in the discharge line adjacent to spray gun or nozzles. Under some conditions it may also be desirable to isolate pump from piping with a suitable high pressure hose. This will eliminate transmission of line vibration to pump, with a resulting possible failure of piping, pipe threads, and/or pump casting.
- J. Never pipe the bypass from a pressure regulating valve back into the pump suction. When discharge line is shut off, the complete bypass is circulated back into pump suction with a resulting rapid temperature rise which will destroy the plunger seal.

It is permissible to pipe the bypass from an unloader valve into the suction because the pump pressure is unloaded when discharge is shut off.

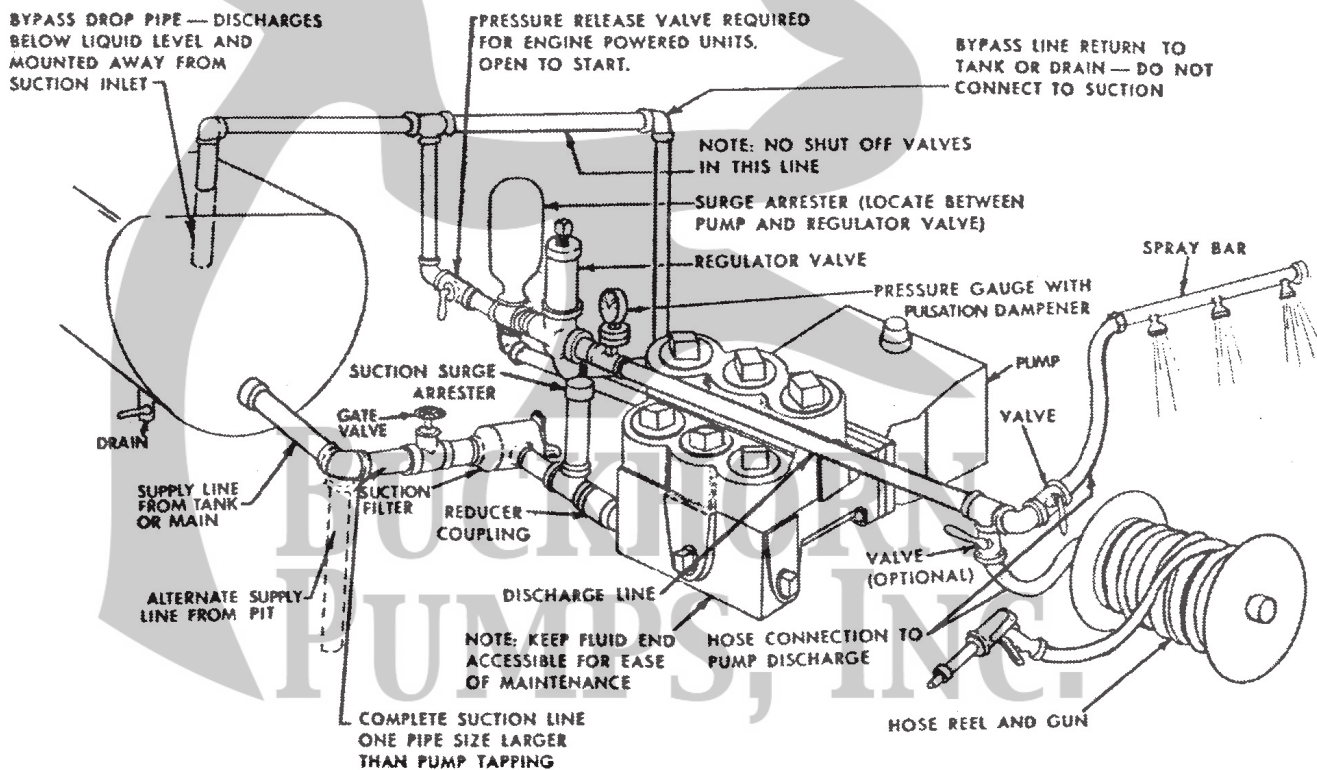
- K. It is mandatory to shield the complete customer mounted pump to prevent possible injury to personnel due to high pressure leak.

II – STARTING PUMP

A. Before starting:

1. Read all instructions carefully.
2. Fill pump crankcase with recommended oil to level mark on oil sabb. Oil recommendations are covered in lubrication section of pump instructions.
3. Replace all drain plugs in pump and piping.
4. Inspect tank to be sure that no foreign material is in tank or suction line.
5. Fill tank at least half full or connect suction to water supply. Open valve (if present) in suction line. If priming from a pit, make sure that suction line is completely submerged.
6. Make sure all valves, including spray gun or nozzles, are open in discharge line. Spray gun may be anchored to discharge back into tank.
7. Completely back off pressure adjusting screw on pressure regulating valve.

TYPICAL INSTALLATION OF INDUSTRIAL PUMP EQUIPPED WITH PRESSURE REGULATOR VALVE

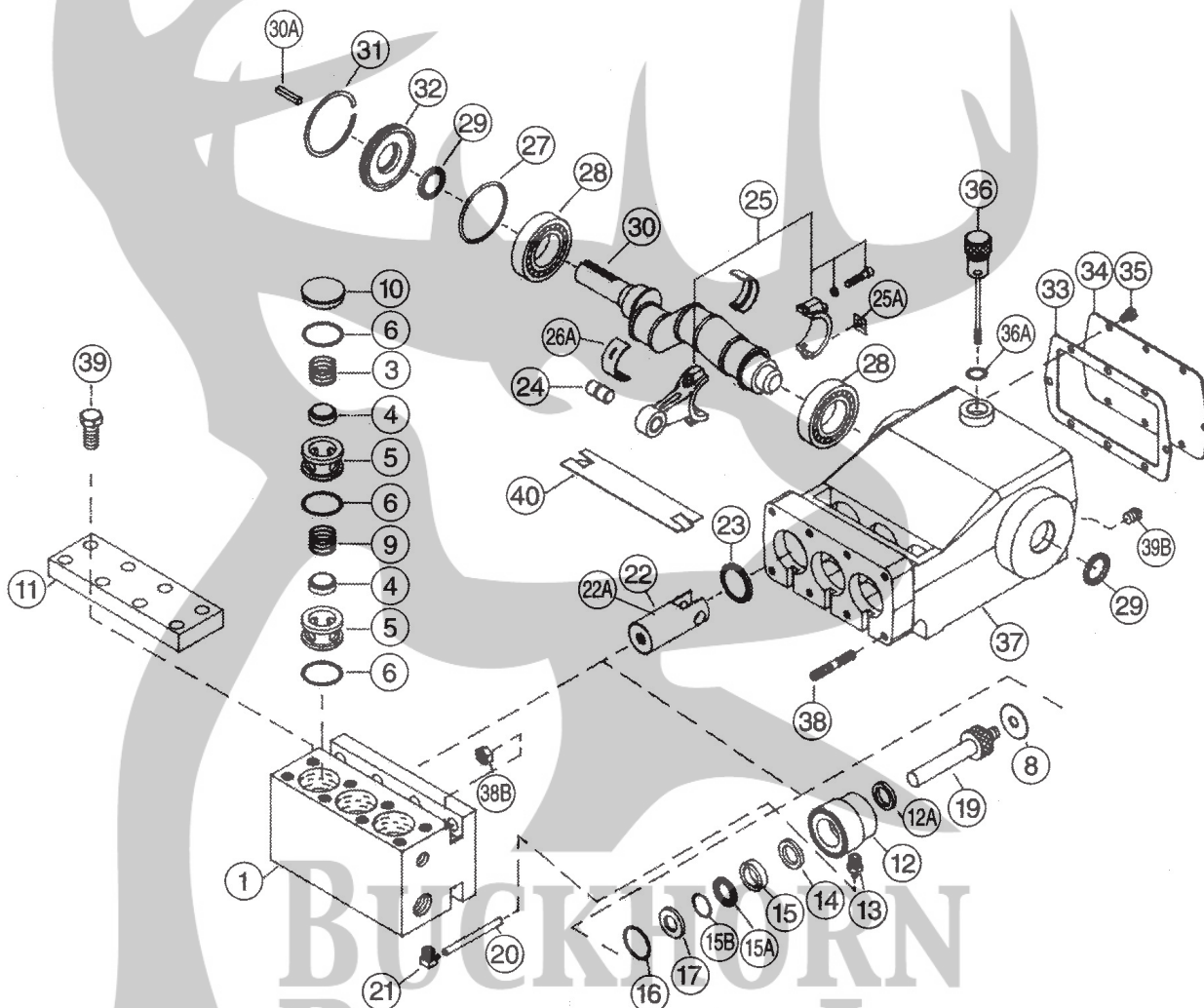


CAUTION: When pumping from a pit or under a suction lift condition, if pump does not prime in a short period, see paragraph 1B and fill the discharge side of fluid end with water to seal discharge valves. If pump still does not prime remove suction hose and fill pump with water. Dry operation will cause heating and wear on plunger seal. Be sure that an operating pressure gauge is located on discharge line.

B. Starting the Unit:

1. After starting, close discharge valve or gun slowly while watching pressure gauge to make sure relief valve or unloader is operating properly.
2. Adjust relief valve to desired pressure. See regulator instructions.
3. Cycle nozzles or gun on and off to be sure that pressure adjustment and regulator operation is satisfactory.

CXPM Series Industrial Pumps Parts



CXPM8-15 26011D000

Type Ref.	Part Number	Description	Qty.
1	25940E002	Body, Cylinder	1
3	25930A001	Spring, Discharge	3
4	26172A000	Valve	6
5	25931A002	Seat, Valve	6
6	05876A204	Ring, O	9
8	05030A141	Washer	3
9	25930A000	Spring, Suction	3
10	25932A000	Cap	3
11	25943B000	Clamp	1
12	25928B002	Plate, Seal	3
12A	24899A004	Seal	3
13	10519A002	Fitting	3
14	25935A000	Ring, Bottom Adapter	3
15	25929A002	Packing	3
15A	24793A005	Male Adapter	3
15B	05876A159	Ring, O	3
16	05876A158	Ring, O	3
17	24894A003	Washer	3
19	25939B004	Plunger	3
20	23265161275	Tube	1.5 ft.
21	23188A002	Fitting	3
22	18449B001	Crosshead	3
22A	05030A198	Washer	3
23	14383A003	Seal	3
24	18448A000	Pin, Crank & Wrist	3

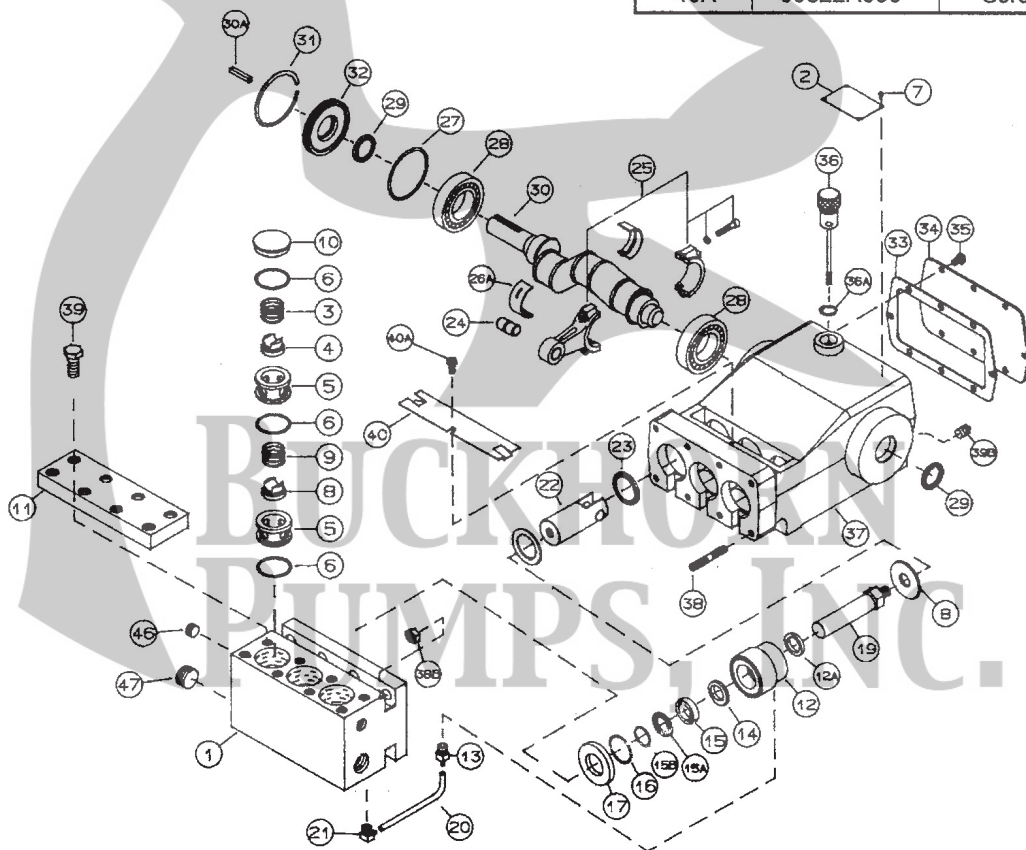
Type Ref.	Part Number	Description	Qty.
25	18836B000	Link	3
	27877A000	Bushing, Wrist Pin	1/link
	06106A016	Screw	2/link
	05030A092	Washer	2/link
25A	26173A000	Slinger	3
26A	18837A100	Bearing	3
27	05876A035	Ring, O	1
28	06114A003	Bearing	2
29	14383A004	Seal	2
30	18451C002	Crankshaft	1
30A	05818A003	Key	1
31	10848A016	Ring	1
32	18452A000	Cap, Bearing	1
33	19314B000	Gasket	1
34	19315B000	Cover, Case	1
35	19100A001	Screw	8
36	20360A000	Gauge, Oil	1
36A	05876A074	Ring, O	1
37	19313E012	Case, Gear	1
38	05659A116	Stud	8
38B	19109A026	Nut	8
39	19105A040	Screw	8
39B	05022A009	Plug	1
40	19324A000	Cover, Plunger	1

**BUCKHORN
PUMPS, INC.**

CXPM10-30 26011D004

Type Ref.	Part Number	Description	Qty
1	25940E002	Body, Cylinder	1
3	25930A001	Spring, Discharge	3
4	25936A000	Valve	6
5	25931A000	Seat, Valve	6
6	05876A204	Ring, O	9
8	05030A141	Washer	3
9	25930A000	Spring, Suction	3
10	25932A000	Cp	3
11	25934B000	Clamp	1
12	25928B002	Plate, Seal	3
12A	24899A004	Seal	3
13	10519A002	Fitting	3
14	25935A000	Ring, Bottom Adapter	3
15	25929A000	Packing	3
15A	24793A005	Male Adapter	3
15B	05876A159	Ring, O	3
16	05876A158	Ring, O	3
17	24894A003	Washer	3
19	25939B004	Plunger	3
20	23265161275	Tube	1.5 ft.
21	23188A002	Fitting	3
22	18449B001	Crosshead	3
22A	05030A198	Washer	3
23	14383A003	Seal	3
24	18448A000	Pin, Crk & Wr	3

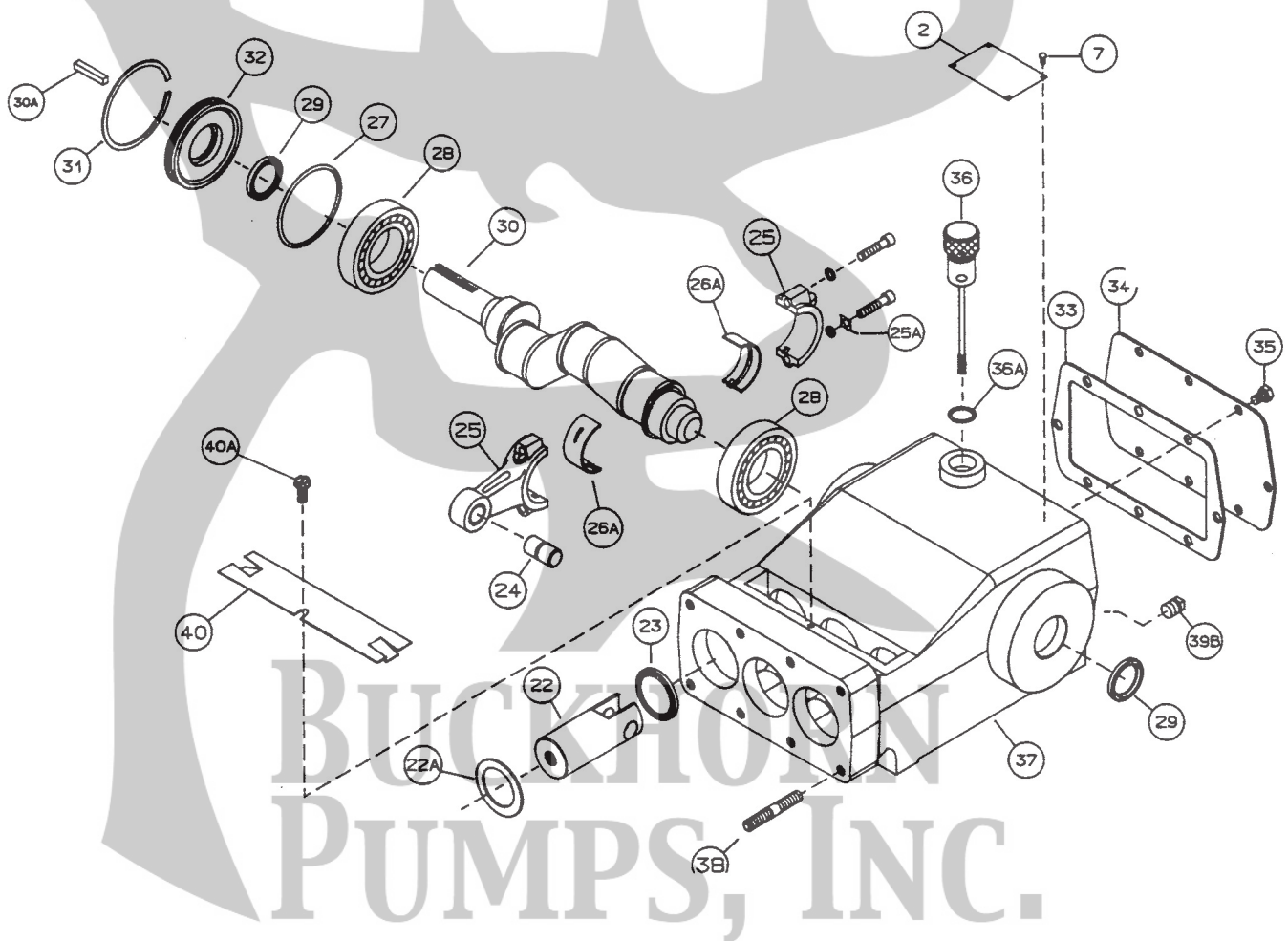
Type Ref.	Part Number	Description	Qty
25	18836B000	Link	3
	27877A000	Bushing, Wrist Pin	1/link
	06106A016	Screw	2/link
	05030A092	Washer	2/link
25A	26173A000	Slinger	3
26A	18837A100	Bearing	3
27	05876A035	Ring, O	1
28	06114A003	Bearing	2
29	14383A004	Seal	2
30	18451C002	Crankshaft	1
30A	05818A003	Key	1
31	10848A016	Ring	1
32	18452A000	Cap, Bearing	1
33	19314B000	Gasket	1
34	19315B000	Cover, Case	1
35	19100A001	Screw	8
36	20360A000	Gauge, Oil	1
36A	05876A074	Ring, O	1
37	19313E012	Case, Crank	1
38	05659A116	Stud	8
38B	19109A026	Nut	8
39	19105A040	Screw	8
39B	05022A009	Plug	1
40	19324A000	Cover, Plunger	1
40A	09822A006	Screw	1



CXPM-PE 26011D110

Type Ref.	Part Number	Description	Qty
22	18449B001	Crosshead	3
22A	05030A198	Washer	3
23	14383A003	Seal	3
24	18448A000	Pin, Crank & Wrist	3
25	18836B000	Link	3
	27877A000	Bushing, Wrist Pin	1/link
	06106A016	Screw	2/link
	05030A092	Washer	2/link
25A	26173A000	Slinger	3
26A	18837A100	Bearing	3
27	05876A035	Ring, O	1
28	06114A003	Bearing	2
29	14383A004	Seal	2

Type Ref.	Part Number	Description	Qty
30	18451C002	Crankshaft	1
30A	05818A003	Key	1
31	10848A016	Ring	1
32	18452A000	Cap, Bearing	1
33	19314B000	Gasket	1
34	19315B000	Cover, Case	1
35	19100A001	Screw	8
36	20360A000	Gauge, Oil	1
36A	05876A074	Ring, O	1
37	19313E012	Case, Crank	1
38	05659A116	Stud	8
39B	05022A009	Plug	1
40	19324A000	Cover, Plunger	1
40A	09822A006	Screw	1



LUBRICATION AND SERVICE

CXPM SERIES INDUSTRIAL PUMPS

LUBRICATION

Pump – Crankcase must be filled with 2 to 2-1/2 pints of S.A.E. 30 oil unless ambient temperature exceeds 90°F. when S.A.E. 40 should be used. Use only quality oils with S.A.E. designation MS, SC, or SD; maintain level at mark on dipstick. Foaming and yellow discoloration of oil is an indication of water; oil should be changed immediately to preclude possible damage to power and components.

NOTE – Drain oil from crankcase after first 30 hours of operation. It is best to always drain the oil when it is still hot. Refill with new oil as mentioned above. Run pump at full speed under no pressure for 2 or 3 minutes before returning to operation. Thereafter change oil every 300 hours or immediately if water droplets are found on dip stick. Check oil level regularly and add oil as needed.

Avoid freezing by draining all water from pump and system in cold weather. This can be done by breaking suction connections and turning crankshaft over 4 or 5 times, or the fluid end can be removed to completely drain cylinders and fluid end.

SERVICE

(Caution – Disconnect electrical leads to motor or remove spark plug leads on engine before proceeding)

PLUNGER SEAL SERVICE

Removal: Remove three (3) seal lubricating lines. Remove 8 nuts holding fluid end to power end and pull straight forward. Use care with ceramic plunger pumps. Unscrew plunger from top opening and pull plunger out. Use screwdriver to pry the seal housing out. May take use of the crosshead to push seal housing out by inserting a block between cross-head and seal housing.

When replacing plunger seal, clean all plungers, replace and lubricate “O” rings. Ceramic plungers should be cleaned by soaking in muriatic acid to remove all build-up of packing material. **Caution! Avoid direct contact with muriatic acid. Wear protective gloves and eye protection. If exposed, flush exposed area with water. Consult a physician for treatment of muriatic acid burns.** Clean bore and lubricate “O” rings and plunger seal with a quality waterproof grease before replacing seal housing and plunger. The plunger should be inserted into crosshead. Hand turn all the way until it stops. Use wrench to finish. Torque to 45 ft.-lb. With the seal housing seated properly, and the plunger fastened to crosshead, all internal parts in place in fluid end, the fluid end can be replaced. Insert all nuts and lock washers in place and pull fluid end down tight. Do not cock fluid end while tightening, pull down evenly by alternately tightening to final torque 25-30 ft.-lb.

VALVE SERVICE

When servicing valves always renew “O” rings. Remove 8 bolts and valve clamp. Remove valve cover on top of fluid end for access to valve components. Suction and discharge valves will show a wear pattern on seating surface but need not be replaced unless extreme wear, cracks or erosion is present on valve. All valves and seats are interchangeable but it is recommended to put them back in the same order as taken out if not renewing the components. To replace valve components first clean bores to remove corrosion or burrs. Lubricate and replace “O” ring in bottom of bore. Then the valve seat. Lubricate and replace “O” ring. On the valve make sure the spring is inserted squarely inside the valve and fitted snug on the bottom of the valve seat before putting assembly into fluid end. Repeat for the discharge valve. Insert valve cover and secure. Torque bolts 80 ft.-lb.

SERVICING CRANKCASE PARTS

To remove crankshaft (30) the plungers and fluid end must first be removed, as explained earlier. Drain oil from crankcase and remove rear cover (34). Remove retainer ring (31) from bearing bore. The connecting link caps should be taken off and the free links pushed toward the water end as far as possible. **BEFORE REMOVAL, BE SURE TO NOTE THE MARKINGS ON THE CONNECTING LINKS AND CAPS. THESE PARTS ARE NOT INTERCHANGEABLE AND MUST BE REASSEMBLED IN THEIR ORIGINAL POSITIONS.** The crankshaft (30), bearings (28) and bearing cap (32) can now be removed by tapping with a hammer against a block of wood on one end of the crankshaft. The crankshaft should be supported so that as the bearings leave the bores the crank does not drop and damage a crank pin. See Fig. 3. Do not remove bearing (28) from crankshaft (30) unless replacement is necessary. After removing crankshaft, the links and crosshead can be pulled out the crankcase opening.

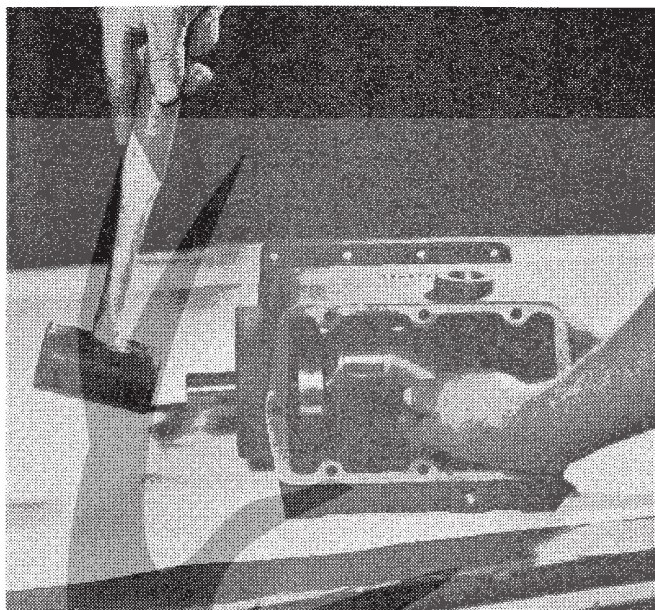


Fig. 3

SERVICING CONNECTING LINKS

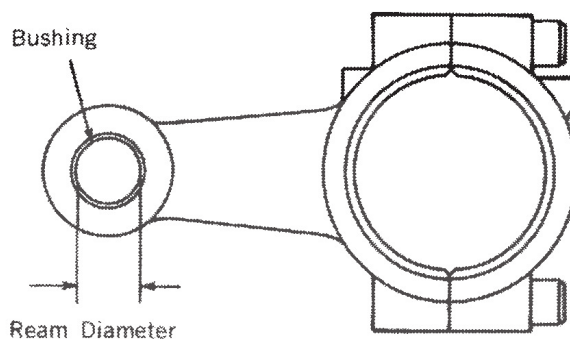
The connecting rod link is furnished with replaceable split sleeve bearing inserts at the crank throw and a steel backed bushing at the crosshead end. When new replacement links are obtained, these bushings are reamed to the proper size for immediate installation. If the bushing only is removed from an old link, it may be necessary to ream the replaced bushing to the proper inside diameter after it is pressed into the link. When placing the bushing in the link be sure that the oil holes in the bushing and link will be in line after the bushing is pressed into position. Fig. 4 shows the proper diameter to which the bushing must be reamed for proper seating of the crosshead pin.

The connecting links should be checked for bearing wear only if the pump shows signs which might be due to a failing link or during a general overhaul.

Unnecessary inspections may upset smooth operation and ultimately cause failure. If it becomes necessary to replace a link or crosshead, this can be done by driving out the link pin (24). When replacing the pin an arbor press should be used and care should be taken so that the link is not bent. As the pin is pressed in occasionally the two sides of the crosshead will give enough to grip the link so that it will not operate freely. If this occurs, rotate the link and crosshead 180° and rap the pin sharply in the opposite direction.

Always be sure that the proper side of the link is placed upward when attaching it to the crankshaft. The upper side contains three oil holes. These oil holes must be up to allow proper oil feeding.

It is never practical to attempt to re-fit connecting links to the crankshaft by filing or grinding the face of the link cap where it contacts the link. Torque for link bolts not to exceed 65-75 in.-lbs. or 6 ft.-lbs. Under normal conditions a crosshead will not wear nor will the bore of the crankcase wear to the extent that oversize crossheads will be



Bushing Ream Dia. .6890 to .6894

Fig. 4

required. If extreme wear does occur, it will be due to severe damage from the lack of oil or a fairly large metal object scoring the crosshead bore. A clearance of .002" to .004" is standard for the crosshead. The parts can wear until considerably more clearance than this exists before harmful operation will occur.

RECONDITIONING CRANKSHAFTS

When only a very small amount of damage has occurred on the crank pins, such as small surface grooves cut part way around the bearing surface, the crank pins can sometimes be reconditioned for further use. This can be done with emery cloth and polishing until all ridges are completely removed. The final polishing operation should be performed by using a very fine emery cloth. This procedure can only be followed where the amount of sanding does not reduce the normal diameter of the crank pin.

If the crankshaft cannot be refinished by hand in this manner, it will be necessary to regrind and polish the bearing surfaces for special undersize bearings.

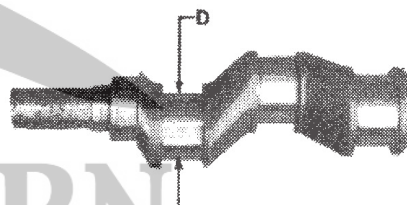


Fig. 5

Crank Pin Size "D" Standard – Use Standard Link Bearing 18837A100 (2 req'd. per link)	1.873 to 1.874
Size "D" for Reconditioned Shaft. Use Undersize Link Bearing 18837A020 (2 req'd. per link)	1.843 to 1.844

Fig. 5 shows the crankshaft with the crank pin sizes tabulated for both standard diameter and the undersize diameter that should be maintained. Worn or corroded crank pins can be ground and polished down to .030" under the size when the cranks were new. When this is done the surface should be polished to a good smooth finish. The undersize connecting links are made especially for turned down crankshafts. If the crankshaft has been reground to dimension "D" for reconditioned shafts, the undersize links can be used and will fit properly and operate as well as the original equipment.

If the surface is badly damaged, the crankshaft can often be salvaged by "metallizing" the crank pins and then regrounding and polishing to the original diameter.

REPLACING CROSSHEAD SEALS

With the crankshaft and crossheads removed, the worn seals (27) can be pried out. When installing new seals be sure to place them with the lip facing the power end and the metal face toward the water end. After cleaning the cavity and wiping with oil, the seal can be pressed into place with an arbor press or by tapping lightly with a hammer against



Fig. 6

a block of wood. The seals should be pressed in (27) as shown in cutaway pump view. When returning crossheads through new seals care should be taken not to turn back or damage the lip of the seal. An assembly thimble can be very helpful in this operation. Fig. 6 illustrates an assembly thimble being placed on the end of the crosshead. Fig. 7 shows a recommended thimble for installation of oil seals.

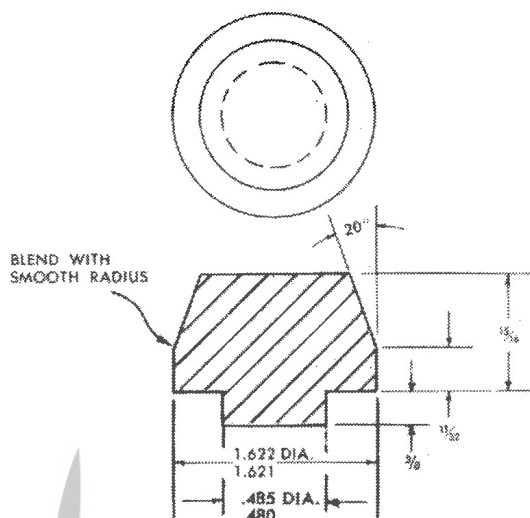


Fig. 7

After replacing the crossheads and links, they should be pushed all the way forward; then the crankshaft can be replaced just as it was removed. All link caps should be tightened in place and free operation of the crank assured before replacing bearing cap and retainer ring. When replacing bearing cap, assembly thimble as shown in Fig. 8 is helpful. The thimble should be machined from high carbon steel and polished on the exterior to reduce possibility of seal lip damage. Clean and lubricate all seals and "O" rings before replacing.

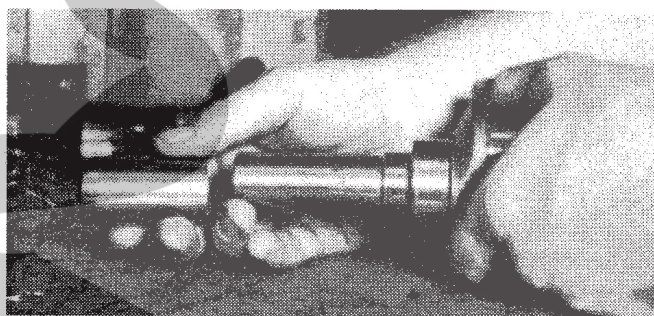
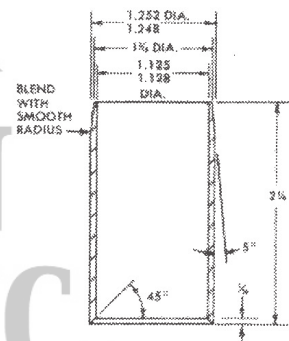


Fig. 8



SERVICE CHART/TROUBLE SHOOTING GUIDE

A	Failure of pump to build pressure with discharge closed						
B	Failure to hold pressure with discharge open						
C	Pump is noisy						
D	Pump gets hot						
E	Pressure gauge shows abnormal fluctuation						
F	Water in crankcase						
POSSIBLE CAUSE OF PROBLEM		F	E	D	C	B	A
1.	Pump not primed						X
2.	Valve closed in suction line				X		X
3.	Suction line or sediment chamber clogged				X	X	X
4.	Air leaks in suction line				X	X	X
5.	Badly worn packing material	X				X	
6.	Pump cylinder cracked						X
7.	Nozzle hole too large or worn regulator					X	
8.	Air chamber waterlogged		X		X		
9.	Need vacuum chamber in suction line				X		
10.	Moisture or water in crankcase			X			
11.	Worn connecting links			X	X		
12.	Foaming spray mixture		X		X		X
13.	Regulator plunger stem sticks		X				
14.	Pressure regulator badly worn					X	X
15.	Foreign matter under pump valve					X	
16.	Badly worn or loose belts					X	X

WARNING – THIS PUMP MUST BE INSTALLED WITH A PRESSURE RELIEF VALVE IN DISCHARGE LINE.

Explanation of the Service Chart

1. Pump priming is usually not necessary when the pump is installed correctly. However, there are certain unusual conditions which may make it necessary to prime the pump to get the pumping action started. Priming will be required under conditions where it is impossible for the plunger to displace the air in the pump and replace it with water. This could be caused by a high suction lift (high from the water supply to the pump), the valves being stuck on the seat, such as after pumping a sticky fluid, or it might be caused by valves sticking due to extreme corrosion of the valves and seats. A pump will not prime readily if someone has tampered with the valve springs causing them to exert undue pressure of the valve plates against the valve seats. When the pump appears to need priming this condition can be checked by pouring water into the cylinder body through one of the valve cap openings or into the pump discharge opening at the same time operating the pump to work the water into the cylinder and valve passages.

2. Frequently a gate valve is installed in the suction line between a tank or pressure line and pump sediment chamber. This valve is usually installed in the line to shut off the supply source for cleaning sediment chamber or for pump repairs.

If this valve is closed or even partially closed it will interfere with the flow of water to the pump suction to such an extent that the pump will not perform to full capacity. If the valve is partially closed it may cause severe knocking and vibration of the pump because the water cannot flow into the cylinder cavities fast enough.

3. A sediment chamber should be installed in the suction line between the gate valve and the pump suction.

The strainers in these sediment chambers are of more than adequate capacity to allow a free flow of the liquid to the pump. However, because of its normal function of collecting sediment the strainer may become severely clogged and in some cases, it will completely stop the flow of liquid to the pump. The length of time the pump may operate before it is necessary to clean the strainer will depend upon the type of liquid pumped. After the pump has been used a short period the operator will soon become familiar with the amount of running time between strainer cleanings.

4. Any plunger pump, when operated at high pressure will not operate satisfactorily or quietly if a mixture of air and water is allowed to enter the pump suction. For this reason, a small air leak in the suction line will cause the pump to

knock and vibrate excessively. This holds true only for a small air leak which allows the pump to draw a certain amount of water mixed with air on each stroke of the plunger. A large air leak will cause the pump to lose prime after which it cannot be reprimed until the air leak is stopped. Air leaks may occur at the joints of the suction line piping, at the gate valve in the suction line, at the gasket sealing the cap on the sediment chamber or by a crack in the suction wall of the cylinder body, such as might be caused by freezing if the pump is not properly drained in freezing weather. There is also a remote possibility of air drawing past the piston on the suction stroke if the packing is badly worn.

5. Badly worn packing or valves and valve seats will cause a serious drop in pump capacity. This will be indicated by a drop in pressure when guns are turned on. Worn packing is very easy to detect because of the water leakage. The packing should be replaced just as soon as this leakage is noticed. If it is allowed to continue some of the material may work past the oil seals into the pump crankcase. Water in the pump crankcase will cause severe corrosion of the bearings causing them to fail. Worn valves can only be detected by visual examination of each valve assembly. The most prevalent cause of valve wear is the use of highly abrasive liquids. This will cause the valves and valve seat to wire cut. The cut starts as a very small groove but increases very rapidly once the valve starts to leak through this groove. Cutting will usually be much more evident on the valve plate in flat valve pumps. If the valve plates are replaced as soon as they start to show this cutting action it will prevent the valve seat from becoming cut in a similar manner and keep the cost of replacement parts to a minimum.

6. Pump fluid end body must withstand an extreme amount of shock and pulsation while the pump is in operation. If the pump is allowed to freeze, due to not being drained, the freezing may crack the fluid end body in almost any location. If the crack should occur on the suction valve or fluid end body it may allow a small amount of air to enter on the suction stroke and cause noisy operation or a decrease in pumping capacity. If the crack develops in the walls between the compression chamber it may allow the water to flow from one cavity to the adjacent cavity and rob the pump of its effective displacement. This will not cause noisy operation but will reduce the pump capacity and may show up as a drop in pressure when the discharge is open.

7. The holes in gun or nozzle discs are continually subject to wear because of the high velocity of the liquid through the holes. Naturally they wear much faster if there is any abrasive or solid material in the liquid. If the holes become worn too much they may allow a higher rate of discharge than the pump is able to provide and a drop in pressure will be noticed. This can quickly be checked by reducing the number of nozzles or guns and at the same time watching the amount of overflow from the pressure regulator. If there is considerable overflow, even though a drop in pressure has been noticed, it is an indication that the regulator valve is worn rather than the gun or nozzle discs.

8. When a pump is used for a long period of time without the source of supply being completely exhausted so that air can enter the pump we sometimes encounter a water-logged air chamber. This decreases the effectiveness of the air chamber causing undue pulsation at the discharge. If this should happen the suction should be open to atmosphere at some point to allow air to be drawn through the pump to recharge the air chamber. This should be done with the pressure release valve open so the pump operates at no pressure, otherwise it will not pump air into the air chamber.

9. Suction surge arresters should be installed on the suction line of reciprocating pumps. A rubber bag type of suction surge arrester is preferred but a suitable vacuum chamber can be made by attaching a piece of vertical pipe as close to the pump suction as possible. One and one-half to two inch pipe can be used. A standing height of 12" to 15" will be sufficient with the top end closed by an ordinary pipe cap.

10. Water may accumulate in the pump crankcase from two sources; the most prevalent being leakage of the packing as explained in Paragraph 5. The other means of accumulation being a condensation of moisture inside the crankcase due to changes in weather or the repeated heating and cooling of the pump due to its normal usage. Pumps that are used rather consistently and run for a considerable period of time to heat the oil and other working parts will not normally accumulate water by condensation. If the packing is replaced as soon as it starts to leak it will be impossible for water to enter the crankcase from this cause. In localities or conditions where extremely abrasive liquids must be used, it is advisable to replace the plungers at the same time the worn packing is replaced. New packing will not give satisfactory service if it is placed in a badly worn and roughened plunger surface.

11. Worn connecting link bearings will only develop because of unusual or adverse operating conditions. They will, however, be seriously affected by corrosion if water is present in the crankcase and they will wear out from overheating if adequate oil is not provided in the crankcase. For this reason we recommend thorough draining, cleaning and refilling with new oil prior to any storage period. Replace bearings as soon as any damage is discovered to avoid possible damage to crankshaft. (See Lubrication instructions.)

12. A foaming mixture will sometimes have the same effect as a small air leak in the suction line. This is because various quantities of the foam is drawn through the suction line into the pump disrupting the normal flow of water.

13. Pressure regulators that are operated by plunger action may become sluggish in action due to the plunger sticking or fitting too tightly in its cylinder. This condition may be caused by an accumulation of chemicals collecting in and around the plunger, or may be due to excessive corrosion of the plunger parts. To check this condition, remove and clean the plunger. After cleaning the plunger, parts should be covered with a waterproof grease before assembling.

14. In some cases there is a tendency for the pressure regulator valves to chatter or vibrate excessively. This is an indication of unstable operation due to nozzling in the high or low capacity range of the regulator. On systems using pressure regulator valves, the nozzling requirements should be at least 50% and not exceed 90% of pump capacity.

Due to nozzle disc wear, the system requirements may exceed the 90% limit, resulting in cycling or hammering of the regulator. This can readily be checked by replacing the worn discs with new discs.

15. If a large piece of foreign matter becomes lodged between a pump valve and valve seat or if something of this kind becomes wedged in so that it prevents the valve from operating normally we can expect drastic drop in capacity and considerable surge or pulsation will be noticed in the discharge line. To correct a condition of this kind it is

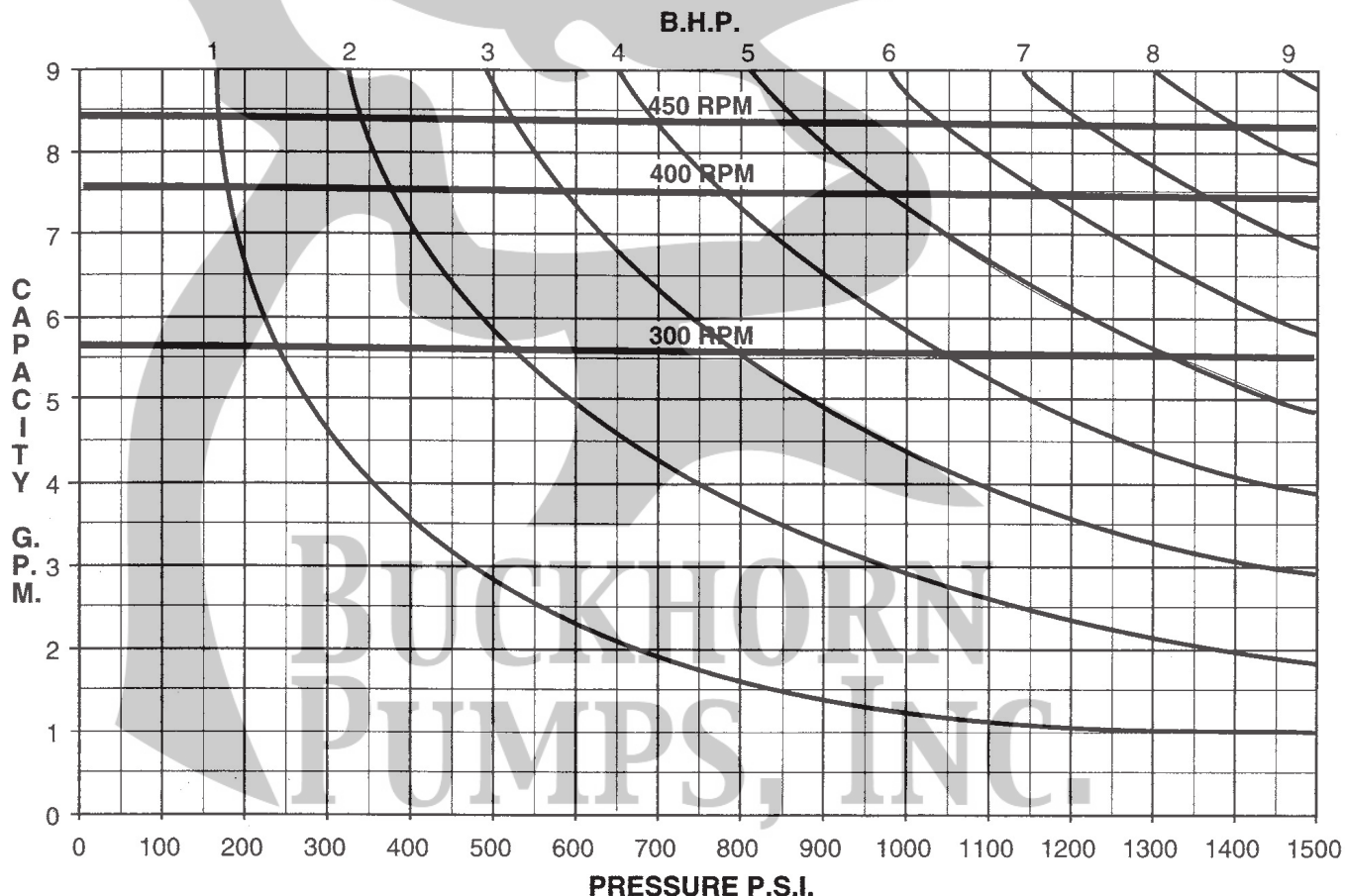
usually necessary to examine each valve in the pump until the offending condition is located. The use of clean liquid and seeing that the suction strainer is in proper condition will prevent trouble of this kind.

16. If the V-belts have a tendency to wear rapidly, it may be due to having the belt tightener pulley adjusted too far into the belt, throwing a reverse bend in the belt where it passes over the pulley. If very much reverse angle seems necessary to keep the belt tight, other provisions should be made for tightening, such as placing shims under the pump base or otherwise spreading the drive centers enough to take up the belt length. On multiple V-belt drives, a complete set of belts should be installed when making a replacement. Further, all the belts in one set should be checked for length and accurately matched to avoid placing an undue load on any one belt.

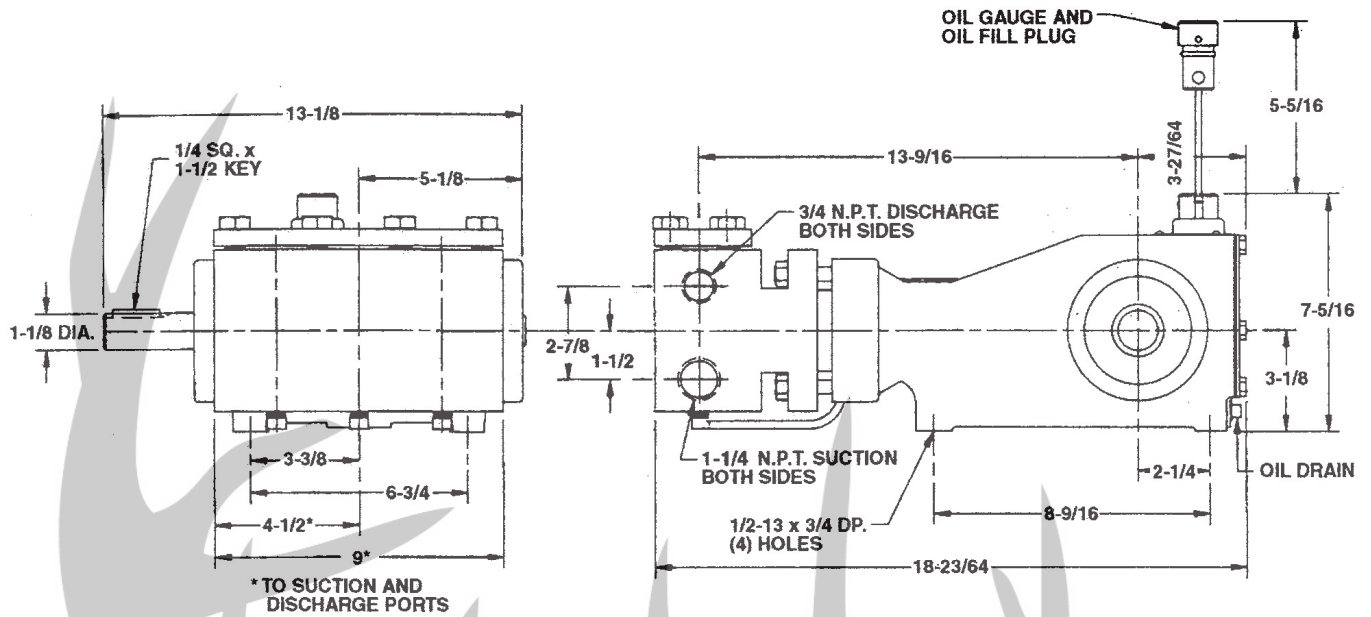
PERFORMANCE CURVE

TRIPLEX RECIPROCATING PLUNGER PUMP
CXPM8-15
PLUNGER SIZE – 1-1/4" STROKE – 1-1/4"

NOTE: Horsepower requirements for an internal combustion engine (gas or diesel) may be obtained by multiplying the figures listed by 1.3. Do not exceed 80% of the engine manufacturers advertised horsepower at operating RPM.



DIMENSIONAL DRAWING



BUCKHORN
PUMPS, INC.

STANDARD LIMITED WARRANTY CENTRIFUGAL & RECIPROCATING PUMPS

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1101 MYERS PARKWAY
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419-289-1144

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