

A RUTHMAN COMPANY

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SELF PRIMING SERIES

Installation, Operation & Maintenance Manual

MAINTENANCE • INSTALLATION • OPERATIONS

Installation Manual

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WARRANTY

Gusher Pumps, Inc. will replace or repair at our discretion, within one year of shipment from our plant, any pump in our judgment that has failed due to defects in materials or workmanship, provided the pump has been properly installed and maintained and has not been subjected to abuse. These pumps must be returned to Gusher Pumps, Inc. with complete history of service for inspection and warranty consideration. Gusher Pumps, Inc. does not accept the responsibility for transportation to and from our plant. Furthermore, we do not assume any responsibility for consequential damage or loss of production.

RECEIVING and INSPECTION

Gusher Pumps, Inc. has taken great care in preparing your pump for shipment, however, due to circumstances beyond our control, your shipment may be received damaged. Therefore, we strongly recommend that you take a few minutes to inspect your pump upon receipt. Check for cracked, bent, severely misaligned (minor misalignments most always occur during shipment) or even missing parts. If any such damage has occurred, you must report it to the delivering carrier and Gusher Pumps, Inc. immediately.

We also recommend you check the model number, horse power, current characteristics, g.p.m. and ft. head of pump received to assure that you have received the pump you ordered for your specific operating conditions. If you should find some discrepancy, report it to Gusher at once.

If your pump is not going to be installed in the near future and storage is necessary, several precautions must be taken;

1. Ball bearing grease cavities must be filled with a high grade ball bearing grease to protect against moisture. (Chevron SRI #2 or equivalent)
2. Remove packing on pumps with packed stuffing box, the stuffing box and shaft sleeve must be oil lubricated to also protect against moisture.
3. Units equipped with mechanical seals must also be oil lubricated with an oil can through the 1/8" NPT port while rotating the shaft by hand.
4. Pump suction and discharge ports must be covered to prevent foreign material getting into the pump and causing damage when pump is started at a later date.
5. Pump must be stored in a dry location.

INSTALLATION

If your pump has just been taken out of storage all the grease must be removed from ball bearing housing and thoroughly cleaned with kerosene or carbon tetrachloride and regreased. On packed pumps it will be necessary to clean shaft sleeve and stuffing box with kerosene or carbon tetrachloride and repack. When preparing your pump for installation, the discharge and suction ports must be clean and free of anything that might prohibit a tight connection. This is especially important on the suction — air leaks can cause a pump to operate poorly or to lose prime completely.

LOCATION — Whenever possible locate pump far enough below the minimum liquid level in the reservoir so there will be a positive head on the suction at all times. Where this is not possible, the pump should be located as near the source of supply as possible. Allow ample room for inspection and maintenance.

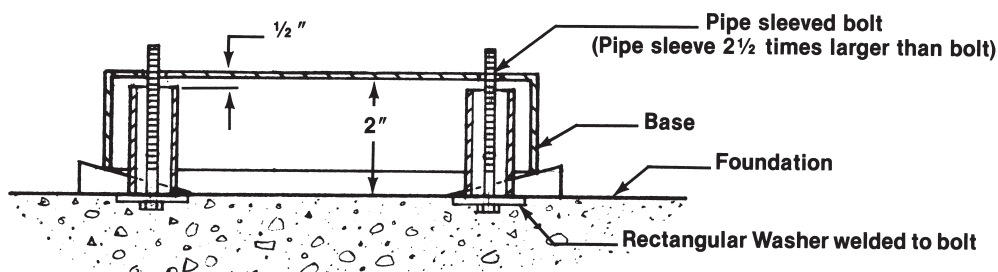
FOUNDATION — The foundation should be of heavy construction to reduce vibration and must be rigid enough to

resist the torque it may be subjected to. The foundation should be 2" to 6" larger than the base depending upon the size of the base. For style 'CBM' a space of approximately 2" should be left between the foundation and bottom of base for grouting. Use a pipe sleeved bolt (Fig. 1) to within 1/2" of the base for a foundation bolt. DO NOT grout until pipe connections and alignment has been established.

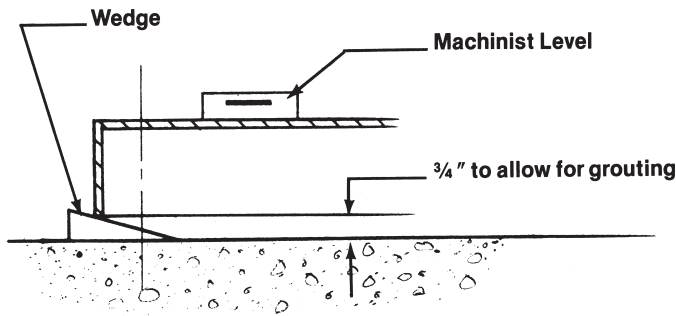
To mount Gusher's style 'C' (pedestal mount) the mounting holes for both driver and pump must be located, drilled and tapped in the field.

As in Gusher's style 'C' mounting, when mounting style 'CC' (close coupled) the mounting holes must be located, drilled and tapped in the field.

It should be noted at this time that SPECIAL CARE must be taken when locating your pump for alignment, it is of utmost importance. Once the pump is set, the only means of adjusting is by shimming.



When mounting Gusher's style 'CBM' (base mounted) the complete unit is lowered into position, being sure the lifting straps are NOT attached to pump or motor, while aligning foundation bolts with mounting holes in base. Locate leveling wedges as close to foundation bolts as possible (Fig. 2), adjust unit to desired position, plumb and level pump suction and discharge with leveling wedges, snug foundation bolts down hand tight — DO NOT TIGHTEN at this point.

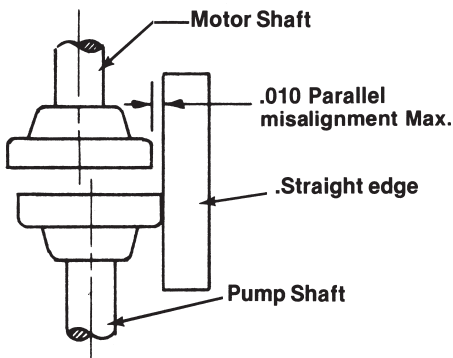


Note:
Wedge Should be 2"
taper per ft.

Fig. 2

COUPLING ALIGNMENT — Must be checked before and after start-up. Check parallel alignment by placing a straight edge across the two coupling flanges and measure the offset at various points around the periph-

ery of the coupling. DO NOT rotate the coupling. *If offset exceeds .010" re-align the coupling. See Fig. 3.*



Check angular alignment with micrometer or caliper. Measure from the outside of the one flange to the outside of the other flange at intervals around the periphery of the coupling, DO NOT rotate the coupling. The difference between the maximum and minimum must not exceed .010". If a correction is necessary, be sure to recheck parallel alignment. See Fig. 4.

GROUTING — Build a form around the base as illustrated in Fig. #5. Pour grout into form being sure it flows under the base. Fill to within 3/4" to 1" of top of base. Allow to set 48 hours, recheck coupling alignment, make any adjustment that may be necessary and tighten foundation bolts securely.

Fig. 3

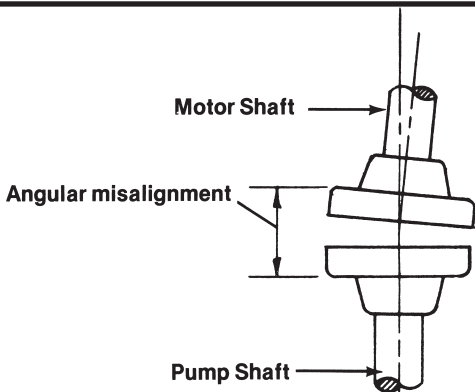


Fig. 4

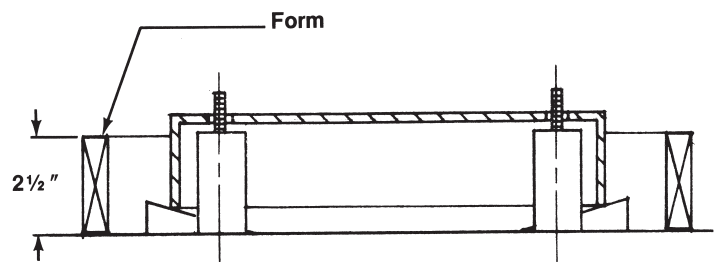


Fig. 5

PIPE — can now be installed being sure to support the pipe *independent* of the pump. Never use pipe smaller than pump discharge and suction sizes, and preferably larger especially on the suction (one or two sizes larger). The suction line should be laid horizontally or with a gradual slope upward toward the pump. There must not be any high spots where air can collect and cause pump to lose prime. Use eccentric reducers from larger suction pipe to pump inlet to prevent formation of air pockets in the pipe (Fig. 6). Run pipe as direct as possible with a minimum of elbows and fitting. Never place a pipe line elbow in the horizontal plane directly at the pump suction (Fig. 7). Between the elbow and the pump suction use a straight pipe four to six pipe diameters long. Suction pipe reducers should be connected directly to the pump suction whenever possible. When installing suction pipe make sure all suction pipe connections are tight and that gaskets are free from defects and tears. Discharge pipe increasers should be connected directly to the pump discharge whenever possible. Whenever possible avoid dynamic suction lifts of more than 25'. Suction line must be tight for proper operation of the pump. Install a gate valve in discharge line as close to the pump as possible, see Fig. 6. It is good practice to bell out suction pipe to lower the entrance velocities at the inlet (Fig. 8). Whenever possible the end of the suction should be a minimum of 3' below the low liquid level (Fig. 8). The liquid near the pump suction should be free from agitation to prevent air entering the suction line. Liquid coming back into the reservoir should not enter the reservoir near the pump suction pipe and the liquid should not drop from a high level (Fig. 8). NEVER throttle the pump on the suction side, always control flow by throttling on the discharge side of the pump. When using a strainer on the suction install it as close to the pump as possible and select a strainer with a net area of at least four times that of the suction pipe. It must be inspected and cleaned regularly. NEVER force piping into position by pulling it in place with the pump suction and discharge flange bolts.

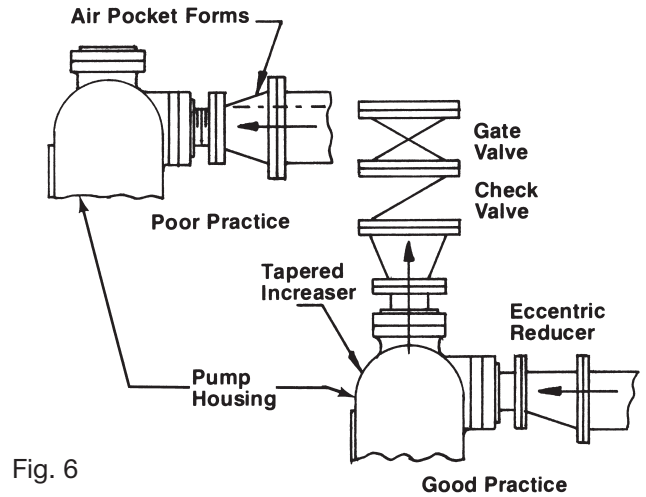


Fig. 6

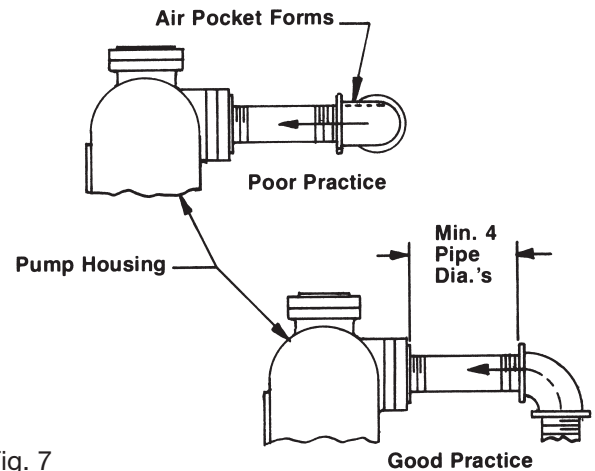


Fig. 7

OPERATION

Wire motor according to motor manufacturer's specifications and according to state and local regulations. Disconnect motor/pump shaft coupling to prevent dry operation of the pump when checking direction of rotation. Operating pump dry will cause damage to mechanical seal and may cause rotating parts to seize. To check direction of rotation jog motor starter, pump must rotate clockwise when viewing from the driving end looking over the motor. Direction arrows are cast in impeller housings.

Priming

1. **Priming** — No centrifugal pump will operate satisfactorily until it has been properly primed. To prime Gushers 8000 series, remove priming port plug and

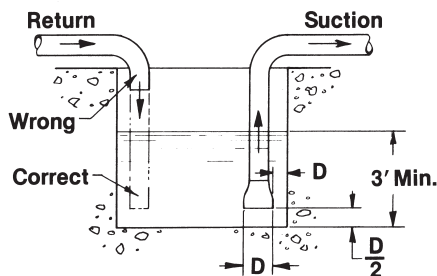


Fig. 8

fill the casing with liquid, start drive unit and allow 25 sec./ft. of suction lift for dry priming. If your unit was supplied with a flapper valve priming will be instantaneous after the initial priming. On pumps using packing it may be necessary to tighten packing gland (#9) to prevent pulling of air through shaft clearances. After pump is primed properly loosen gland to achieve a slight trickle of water through the stuffing box. After packing has been given time to be lubricated adjust the leakage gradually to approx. 30 drops per minute.

OIL CAPACITY OF POWER FRAMES

51H.....	1 1/4 pt. approx.
52H.....	1 1/2 pt. approx.
53H.....	2 1/2 pt. approx.
7071S	1 1/4 pt. approx.
7071M	2 1/4 pt. approx.
7071L.....	4 pt. approx.

PUMPS WITH MECHANICAL SEALS

In applications where leakage from the stuffing box is not permissible or is undesirable, Gusher pumps are available in a wide variety of mechanical seals to meet most any application.

MAINTENANCE

A. LUBRICATION —

1. **Oil Bath Lubrication** — All pumps are lubricated at the Gusher plant and should not require any additional oil. However, if additional oil is needed follow these steps. 1) Check the oil sight gauge to see if the oil is below the level indicated on gauge. 2) Unscrew top vent cap. 3) Add oil as needed. 4) Replace top vent cap. Once a year as routine maintenance the oil should be drained from the power frame and renewed.

2. **Grease Lubrication** — All pumps are lubricated at the Gusher plant and should not require additional lubrication for approximately 1200 hours of operation. A well planned maintenance schedule can only be devised after the first six months of operation and the lubrication record review at that time. Each pump installation is unique and requires individual attention to set up the proper lubrication schedule for each specific installation. About once a year it is recommended that the bearings be cleaned and flushed with kerosene or carbon tetrachloride and then filled with fresh grease.

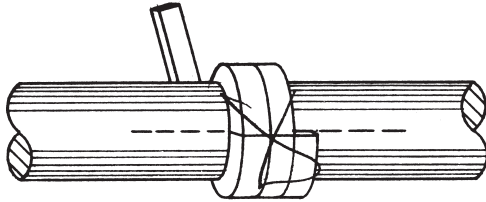
OIL — Use MOBILE DTE 26 (300 SUS) or Equiv.

GREASE — Use Chevron SRI #2 or Equiv.

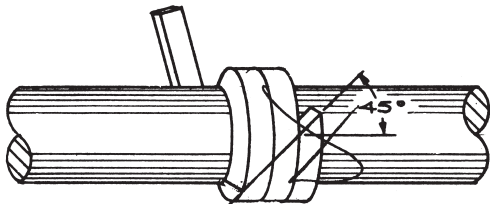
- B. **Coupling Alignment** — Must be checked before and after system start-up, after 300 hours of operation, and again after 1200 hours of operation. Follow procedure given in installation instruction. Again we strongly recommend following a routine preventative maintenance program to assure optimum life from your pump.
- C. **Packed Stuffing Box** — DO NOT STOP LEAKAGE! Packed glands drawn up too tight increases power consumption, increases wear on shaft sleeve and shortens life of packing. When leakage can no longer be controlled by drawing up on the packing gland (#9) add another ring of packing (#28) to the stuffing box. After further operation and leakage again can no longer be controlled replace the packing by using the following procedure:
 1. Remove all old packing from the stuffing box. Clean box and shaft sleeve (20) thoroughly and examine for wear. Replace shaft sleeve if wear is excessive. Check bearing by lifting shaft up and down; do not expect packing to act as a bearing.
 2. Use the right cross-section of packing, Gusher uses Green Tweed 1092 packing as our standard for general purpose applications. Packing for special applications available, consult factory.

3. When using coil or spiral packing always cut the packing into separate rings. Never wind a coil of packing into a stuffing box. Rings can be cut either with butt (square) joint or diagonal joints.

The best way to cut packing rings is to cut them on a mandrel the same diameter as the shaft sleeve. Hold the coil packing tightly and firmly on the mandrel but do not stretch excessively. Cut the ring and try it in the stuffing



Butt Joint



Diagonal Joint

box to make certain it fills the packing space properly with no gap in the joint at the O.D. of the ring.

It is necessary that the rings be cut to the correct size, otherwise service life is reduced.

4. Install one ring at a time. Make sure it is clean and has not picked up any dirt in handling. If clean oil is available, lubricate the shaft and the inside of the stuffing box.

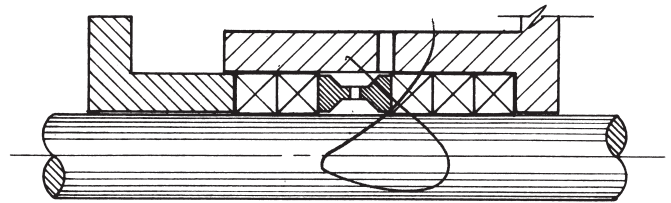
Seat rings firmly. (Except for TFE filament and graphite yarn packings which should be snugged up very gently. Then wrench in gradually. . . after the pump is back in operation.) Joints of successive rings should be staggered and kept at least 90° apart. Each individual ring should be firmly seated with a tamping tool. When enough rings have been individually seated so the nose of the gland (#9) will reach them, individual tamping should be supplemented by the gland. Never depend entirely on the gland to seat a set of rings properly — this practice will jam the last rings installed but leave the bottom rings loose in the box.

5. After the last ring is installed, take up bolts finger tight or very slightly snugged up. Do not jam the packing into place by excessive gland loading. Start pump, and take up bolts until leakage is decreased to minimum. Make sure gland bolts are taken up evenly, stopping leakage entirely at this point will cause the packing to burn up.

6. Allow packing to leak freely when starting up a newly packed pump. Excessive leakage during the first hour of operation will result in a better packing job over longer period of time. Final adjustment should allow approximately 30 drops per minute to leak from the packing.

7. When specified, Gusher can provide means of lubricating the shaft and packing through a lantern ring by supplying water, oil, grease, or liquid handled in the pump.

8. If the stuffing box has a lantern ring, make sure the lantern ring, as installed, is slightly behind the fluid inlet so it will move under the inlet as gland pressure is applied. (See illustration below.)



Stuffing box with lantern ring

9. Replace packing when leakage cannot be controlled by further take-up on the gland.

Some of the most common reasons for packing failure are:

1. Improper installation
2. Uneven gland adjustment
3. Shaft misalignment and shaft whip
4. Improper selection of packing for liquid
5. Improper selection for pressure and temperature
6. Contaminated liquid (dirt, abrasives, etc.)

MECHANICAL SEAL

The most important factor in a mechanical seal, other than the sealing qualities, is the fact that once it has been properly installed there is little or no maintenance required.

Some of the most common reasons for seal failure are:

1. Improper installation

2. Shaft misalignment and shaft whip

3. Wrong selection for liquid pumped

4. Wrong selection for pressure and temperature

5. Dirt or grit between faces

6. Seal gland (#9) tightened unevenly so stationary seat is not perpendicular to shaft

REPAIR

Refer to cross section and parts list on pages 12, 14, and 17.

Shut off main power switch and disconnect motor wiring. Close suction and discharge valves and drain impeller housing (11). Disconnect suction and discharge pipe. Unbolt pump from base (33) and remove, take pump to maintenance department for repairs. In many cases it is advisable to have a spare pump to install at once to keep down time to a minimum.

Remove screws (38) securing stem plate (14) to impeller housing (11). Pull rotating assembly back to remove. Remove impeller retaining screw (16) impeller lock washer (17) and impeller retaining washer (18). Pull impeller (12) off the pump shaft (1) using care not to discard key (19). Remove screws securing stem plate (14) to stem (7) slide stem plate (14) off pump shaft (1). Generally the shaft sleeve (20) will slide off shaft (1) with stem plate (14). Remove gland screws and remove gland (9) from stem plate (14). If shaft sleeve (20) did not slide off shaft (1) when

removing stem plate remove it from shaft and inspect for wear, replace if badly worn.

On pumps with packed stuffing box, remove old packing, clean stuffing box, and repack when reassembling pump by following instructions on pages 7 and 8.

On pumps with mechanical seals remove spring from seal cavity after sliding impeller (12) off of shaft (1). Slide shaft sleeve (20) off shaft and remove seal head, inspect sleeve for wear and replace if necessary. Seal seat is located in seal gland (9) if cracked, damaged or worn out, replace. To remove seat from gland insert a screw driver from flanged end of gland as shown in Fig. 9 and tap seal seat out. Clean stuffing box and seal gland (9) thoroughly before re-assembly. To install new seat, oil rubber cup with clean oil and push seat into gland by hand being sure seat is pressed all the way down against the shoulder in the gland. If seat is not square against the gland shoulder the seal will leak and there will be uneven wear on the faces. Install new seal gland gasket (29) and carefully slide seal gland (9) over shaft (1) so as not to hit seat on shaft. Mount stem plate (14) on stem (7) and securely tighten holding screws. Slide seal gland (9) into stem plate (14) and draw screws down tight. (Do not slide packing gland into stem plate (14) on packed pumps.)

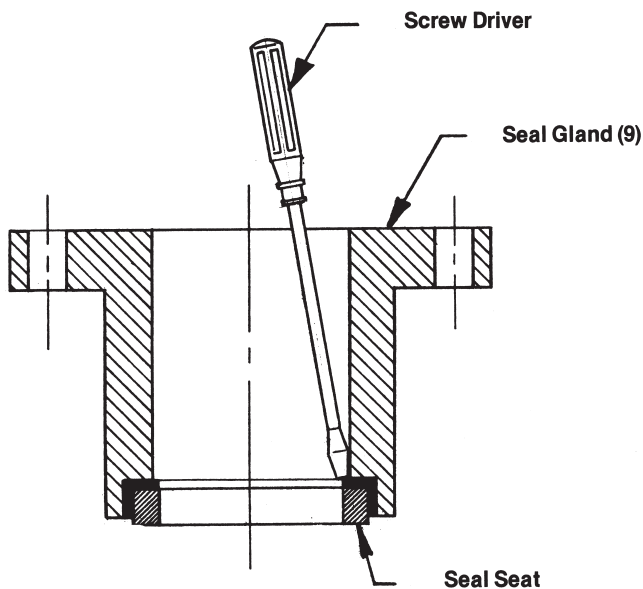


Fig. 9

Clean shaft sleeve (20) and oil thoroughly, slide seal head (rotating member) onto shaft sleeve by hand, starting at end without slot. Slide seal head onto shaft sleeve until it is flush with end of shaft sleeve. Install new shaft sleeve gasket (24). Slide shaft sleeve (20) onto shaft (1) gently allowing seal head to make contact with seal seat in seal capacity and then sliding sleeve to shaft shoulder, install seal spring. Slide impeller (12) onto shaft (1) and lock in place using retaining washer (18). Lock washer (17) and retaining screw (16). Install new impeller housing gasket (15) and then install rotating assembly. Draw bolts tight and check impeller clearance (.010-.020 normal), if clearance exceeds .020 remove a gasket, if clearance is less than .010 or if pump is locked-up add gaskets until proper clearance is achieved.

TO DISASSEMBLE POWER FRAME

7500H

Remove screws, ball bearing retainer (2), slide shaft (1) with ball bearings (4) and (6) remaining on shaft. Remove snap ring (61) or lock-nut (3 on 53H power frame) and press bearing off shaft.

7071H

Remove screws (57), and check seal (8). Slide shaft (with ball bearings and cartridge assembly remaining on shaft) out of housing. Press ball bearing (4) off of shaft. Remove screws (76) and ball bearing retainer (2). Slide cartridge (84) off of ball bearing (6) and shaft (1). Remove locknut (3) from shaft. Press bearing off of shaft.

Replace ball bearings by following procedure below.

To reassemble, reverse above procedures.

BEARING INSTALLATION

Begin by cleaning your work area thoroughly, contaminants can cause bearing failures as fast as any other reason.

When a bearing is installed, the mounting force should be applied against the ring, and only the ring, which is being press-fitted. A bearing should never be forced onto a shaft by pressure or hammer blows applied to the outer ring, nor should the bearing be press-fitted into a housing by force applied to the inner ring.

Using an arbor press, the bearing may be laid on a face block which contacts only the bearing inner ring and which has a hole diameter greater than the bearing bore, as shown in Fig. 10. The shaft is pressed through the bearing until it is seated firmly against the shaft shoulder.

If the shaft is not too long, it can be supported beneath the table of the arbor press and the bearing pressed onto it by ram pressure against a piece of soft metal tubing, as

RECOMMENDED SPARE PARTS

If a spare pump cannot be justified, Gusher recommends several parts be kept in your stock for emergency situations. We recommend:

1. Mechanical seal
2. Set of packing (on packed pumps)
3. Set of gaskets
4. Set of ball bearings
5. Shaft sleeve
6. Impeller

shown in Fig. 11. The tubing must be clean, inside and out, and the inside diameter of the tubing should be slightly greater than the bearing bore. The ends of the tubing should be square (with corners chamfered to avoid flaking) and should contact only the bearing inner ring. The shaft must be held in line with the ram of the arbor press to avoid cocking the bearing on the shaft seat.

When an arbor press is not available, the bearing can be driven onto the shaft seat by light hammer blows against the end of the soft metal tubing. These blows should be made alternately against opposite sides of the tubing face, and great care must be taken to avoid cocking the bearing as it is driven onto the shaft seat.

When a ball bearing is installed onto the housing it is normally a slip fit, however if force is necessary to install bearing the force should be exerted on the outer ring of the bearing as shown in Fig. 12. Again the force must be applied evenly so as not to cock the bearing in the bore.

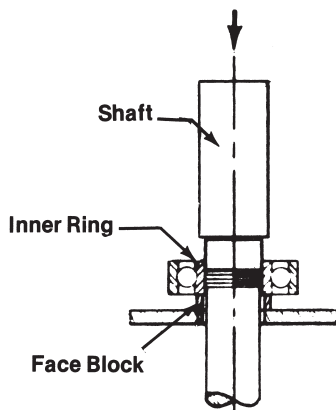


Fig. 10

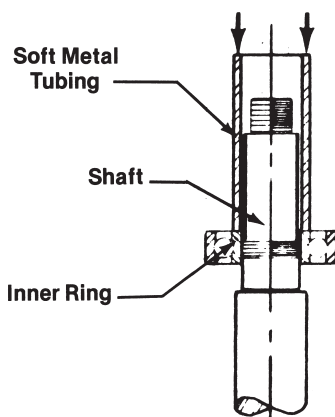


Fig. 11

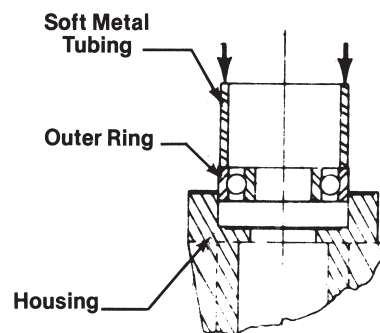


Fig. 12

TROUBLE SHOOTING

Check over suction connections; air leaks in suction line are the most frequent cause of trouble. If hose couplings are used, keep a supply of hose washers or gaskets handy and change frequently.

Be sure strainer is not clogged with mud or debris. If a foot valve is used, be sure flapper in foot valve can open—sometimes an accumulation of sand on top of the flapper will prevent it from opening. If pump capacity is much below normal, carefully check suction hose for stoppage. The rubber lining in smooth bore hose may become loose and completely shut off the suction line. Where pump develops a high vacuum but discharge is low, this may be the cause.

The pump is not designed to handle a suction lift greater than 25 feet at sea level; very small pin-holes in the suction line will cause difficulty. Therefore, keep the pump as close to water level as convenient; it will give best performance on suction lifts below 15 feet. Above 15 feet, the pump capacity decreases rapidly, consult factory for details.

In case of difficulty in starting the engine, see engine instruction sheet.

If pump is not protected with a strainer, foreign material may plug or damage the impeller. If clogging is suspected remove port covers and remove foreign material, replace port covers and restart pump. Do not remove foreign material while pump is running. If impeller damage is expected, rotating element must be removed and visually inspected.

PUMP DOES NOT PRIME PROPERLY

1. Pump casing is not filled with water.
2. Leak in suction line or connections.
3. Pump is clogged
4. Pump seal is worn and leaks air.
5. Pump is running too slowly.
6. Clearance between impeller and wear plate is greatly worn.
7. Suction line or suction strainer is clogged.

NOT ENOUGH WATER DELIVERED

1. Motor is not running at rated speed.
2. Strainer or inlet valve or line is partially clogged.
3. Suction line or fittings leak air.
4. Pump seal is worn and leaks air.
5. Too much clearance between impeller and wear plate due to wear.
6. Discharge head is too high.

NOT ENOUGH PRESSURE

1. Operating speed too slow.
2. Leaking seal.
3. Too much clearance between impeller and wear plate due to wear.

MOTOR STOPS THEN STARTS

(This indicates that reset overload is opening and automatically resetting)

1. Check for low source voltage, which must not be less than motor rating for pump and/or control.
2. Check for proper connection.
3. Check for impeller bind.
4. Check for clogged strainer.
5. Check with factory if pumping heavier-than-water liquids.
6. Check for ground in motor wiring.

MOTOR RUNS WITH REDUCED OR NO OUTPUT

1. Check impeller rotation.
2. Make sure that there is sufficient water in pump.
3. Check total discharge head which must not be greater than pump rating.
4. Check impeller for wear.

PUMP TAKES TOO MUCH POWER.

- (1) Speed too high.
- (2) Head lower than rating, pumps too much water.
- (3) Specific gravity or viscosity too high.
- (4) Mechanical defects:
 - Shaft bent.
 - Rotating element binds.
 - Stuffing boxes too tight.
 - Wearing rings worn.
 - Casing packing defective.

OPERATION DO'S AND DON'TS

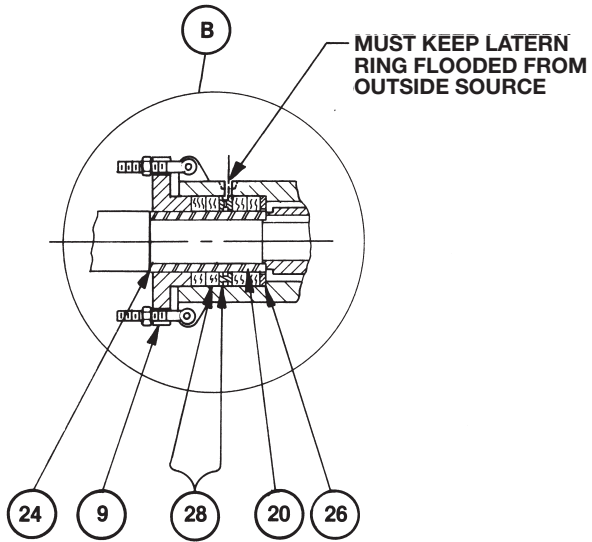
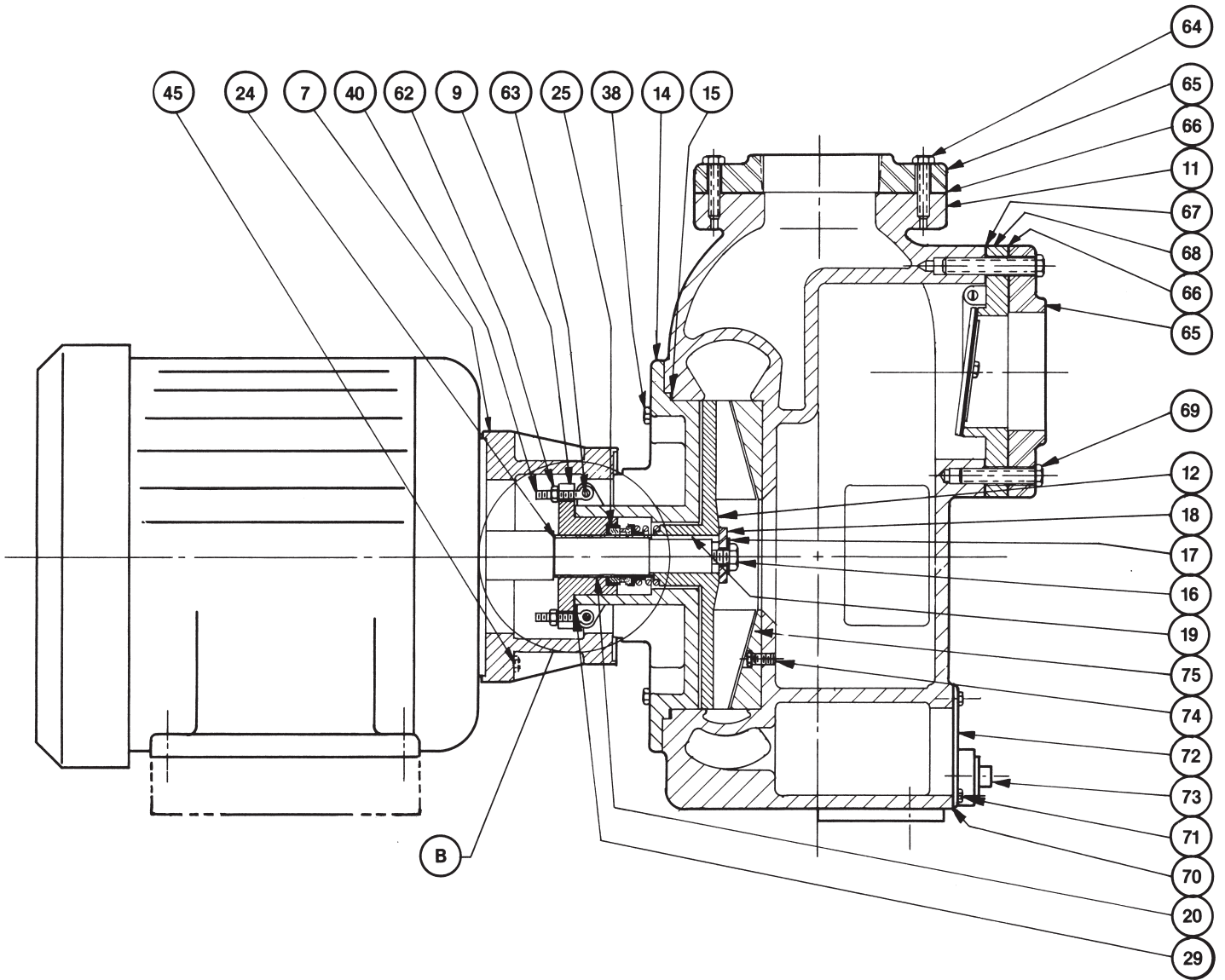
DO

Keep suction hose connection on tight.
Keep suction strainer clean.
Follow manufacturer's lubrication instructions on motor and pump.
Keep suction lifts to a minimum.

DON'T

Run the pump dry.
Try suction lifts over 25 feet.

CLOSE COUPLED STYLE 'CC'



STANDARD PARTS

CHART C

No.	Description	Pump Model						
		1 ¹ / ₄ x1 ¹ / ₂ -5	1 ¹ / ₂ x1 ¹ / ₂ -7	2x2-10	3x3-10	4x4-11	6x6-10	8x8-11
-11	Impeller Housing	27077	27089	27084	27085	27086	27087	27088
-15	Impeller Housing Gasket	61051	61013	61007		61086	61007	61027
-38	Hex Head Screw	⁵ / ₁₆ -18	³ / ₈ -16	1 ¹ / ₂ -13				
-62	Hex Head Nut	—	—	—	—	⁵ / ₁₆ -18	—	—
-63	Hex Head Screw	—	—	—	—	⁵ / ₁₆ -18	—	—
-64	Hex Head Screw	—	1 ¹ / ₂ -13	⁵ / ₈ -11			³ / ₄ -16	
-65	Companion Flange	30002-1	81412	81407	81408	81409	81410	81411
-66	Companion Flange Gasket	—	61101-1	61101-2	61101-3	61101-4	61101-5	61101-6
-67	Flapper Valve Flange Gasket	61077	61085	61083	61082	61089	61093	61095
-68	Flapper Valve Flange	—	66083	66084	66085	66086	66087	66088
-69	Hex Head Screw	⁵ / ₁₆ -18	1 ¹ / ₂ -13	⁵ / ₈ -11			³ / ₄ -16	
-70	Clean Out Port Gasket	—	61052					
-71	Hex Head Screw	—	1 ¹ / ₄ -20					
-72A	Clean Out Port Cover Plate	—	70013					
-72B	Clean Out Port Cover Plate	—	70012					
-73	Drain Plug	—	1" NPT					
-74	Socket Head Screw	—	⁵ / ₁₆ -18	³ / ₈ -16				
-75	Wear Plate	—	65083	65084	65085	65086-1	65087	65088

CC STYLE

CHART D

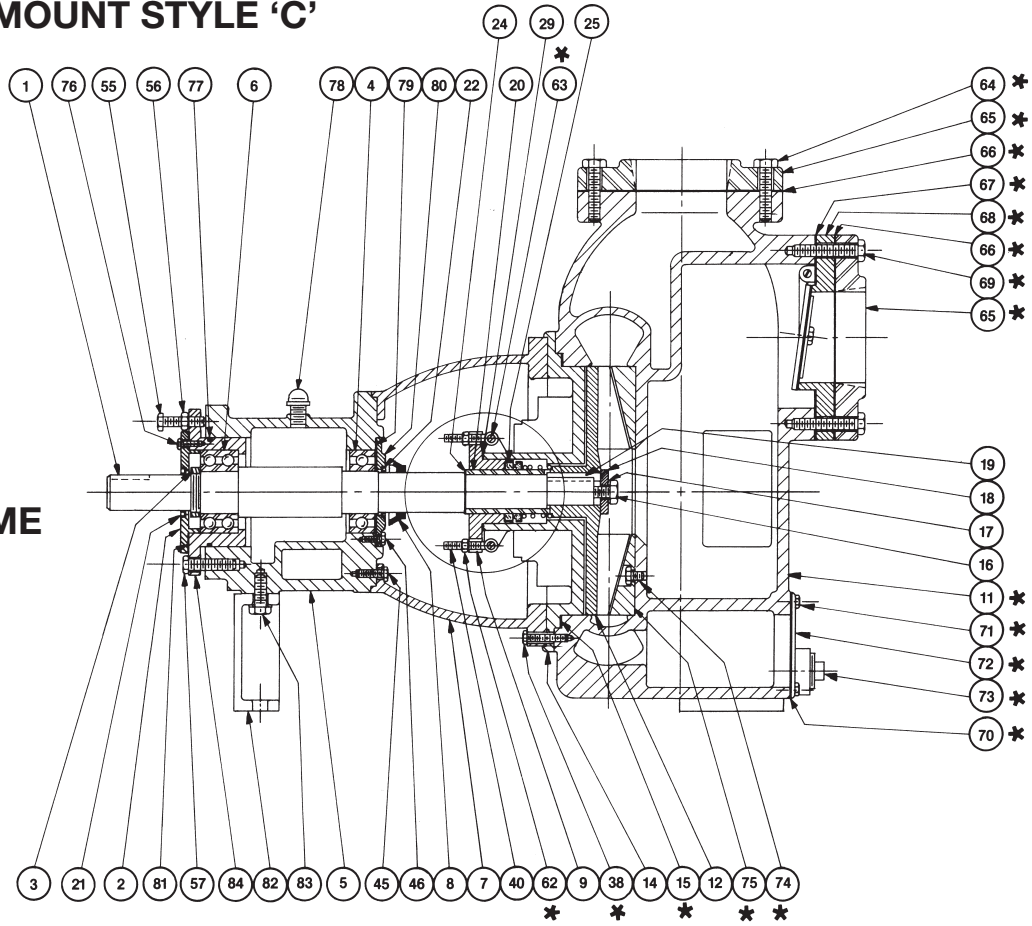
No.	Description	JM Motor Frame Size							
		56	143-145	182-184	213-215	254-256	284-286	324-326	364-365
-7	Stem	—	17010		17008		17053-4		
-16	Impeller Retaining Screw	—	³ / ₈ -16			1 ¹ / ₂ -13			
-17	Lock Washer	—	³ / ₈			1 ¹ / ₂			
-18	Impeller Retaining Washer	—	68007			68004-1		68024	
-19	Impeller Drive Key	—	3 ¹ / ₁₆ " Sq.			1 ¹ / ₄ " Sq.		3 ³ / ₈ " Sq.	
-24	Shaft Sleeve Gasket	—	61015			61014		61006	
-25	Seal	84000	84002			84004		84006	
-26	Packing Seat Washer	—	68008						68008-1
-28	Packing w/Lantern Ring	—	85001-LR						85005-LR
-29	Seal Gland Gasket	—	61016						
-45	Hex Head Screw	³ / ₈ -16			1 ¹ / ₂ -13		⁵ / ₈ -11		

CHART E

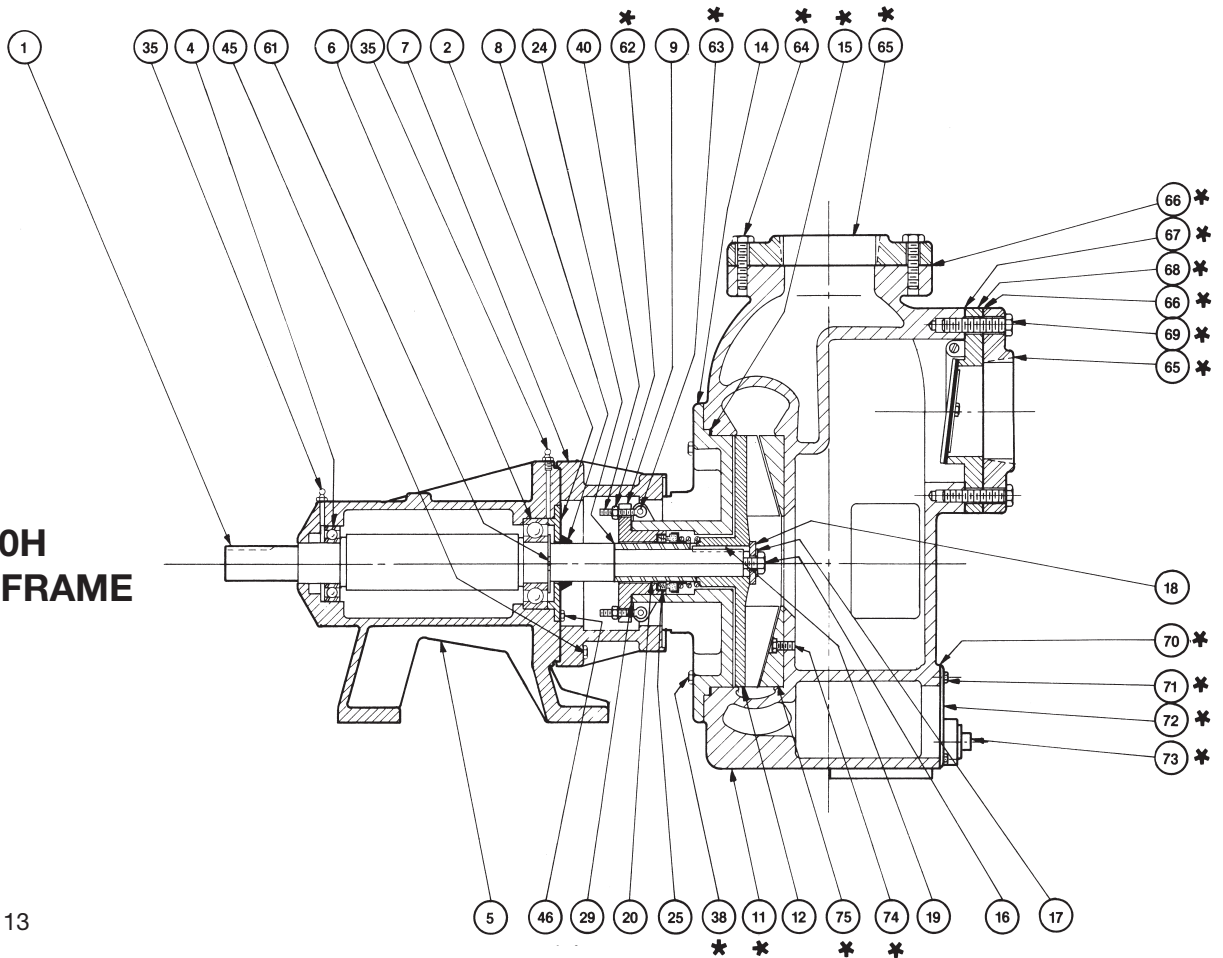
No.	Description	Motor Frame Size	(Pump Model)						
			1 ¹ / ₄ x1 ¹ / ₂ -5	1 ¹ / ₂ x1 ¹ / ₂ -7	2x2-10	3x3-10	4x4-11	6x6-10	8x8-11
-9	Seal Gland	143-215	—	69001-2			69015-1	—	—
		254-326	—	—	—	—	69015-2	69001	
		364-365	—	—	—	—	—	—	69001-13
-9	Packing Gland	143-215	—	69001-3			69015-3	—	—
		254-326	—	—	—	—	69015-3	69001-3	
		364-365	—	—	—	—	—	—	69001-16
-12	Impeller	56	25036	—	—	—	—	—	—
		143-215	—	25015-F	25009-F	25007-F	25086-I-F	—	—
		254-326	—	—	—	—	25086-I-H	25023-H	25027-H
		364-365	—	—	—	—	—	—	25027-L
-14	Stem Plate	143-365	17119	21037H	21040H		21086	21040H	21048H
-20	(Seal) Shaft Sleeve	143-215	—	63015			63086-1	—	—
		254-326	—	—	—	—	63086-2	63014	
-20	(Packing) Shaft Sleeve	143-215	—	63019-1			63086-3	—	—
		254-326	—	—	—	—	63086-4	63019-2	
		364-365	—	—	—	—	—	—	63021
-40	Hex Head Screw	143-365	—	⁵ / ₁₆ -18			68012	⁵ / ₁₆ -18	

PEDESTAL MOUNT STYLE 'C'

7071H POWER FRAME



7500H POWER FRAME



*SEE PAGE 13

SP w/7071H OR 7500H POWER FRAME

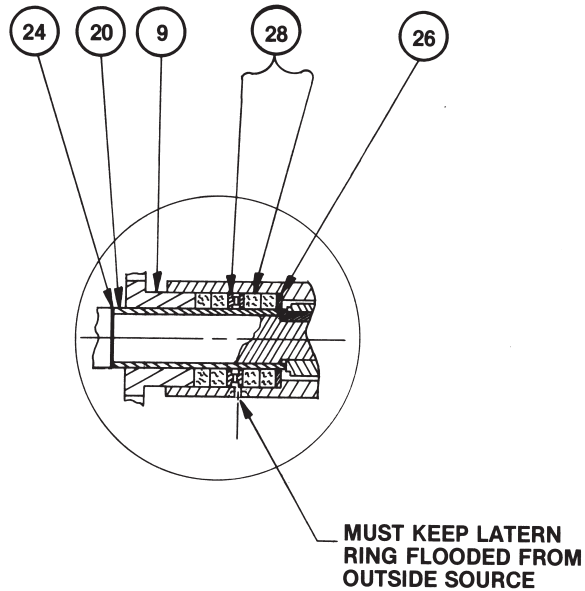
CHART A

No.	Description	Power Frame	Pump Model						
			1 ¹ / ₄ x1 ¹ / ₂ -5	1 ¹ / ₂ x1 ¹ / ₂ -7	2x2-10	3x3-10	4x4-11	6x6-10	8x8-11
-1	Shaft	51H	7500H-56JP	7500H-377	7500H-377	7500H-377	7500H-377	—	—
		7071S	100007	100004	100004	100004	100004	—	—
		52H	—	—	—	—	7500H-399	7500H-399	7500H-399
		7071M	—	—	—	—	100005	100005	100005
		53H	—	—	—	—	—	7500H-311-5	7500H-311-5
		7071L	—	—	—	—	—	100006	100006
-9	Seal Gland	51H	—	69001-2	69001-2	69001-2	69015-1	—	—
		7071S	—	—	—	—	—	—	—
		52H	—	—	—	—	69015-2	69001	69001
		7071M	—	—	—	—	—	—	—
		53H	—	—	—	—	—	69001-13	69001-13
		7071L	—	—	—	—	—	—	—
-9	Packing Gland	51H	—	69001-3	69001-3	69001-3	69015-3	—	—
		7071S	—	—	—	—		—	—
		52H	—	—	—	—		—	—
		7071M	—	—	—	—	—	69001-3	69001-3
		53H	—	—	—	—	—	—	—
		7071L	—	—	—	—	—	—	—
-12	Impeller	51H	—	—	—	—	—	—	—
		7071S	25036	25015-G	25009-G	25007-G	25086-1-G	—	—
		52H	—	—	—	—	25086-I-J	25023-J	25027-J
		7071M	—	—	—	—	—	—	—
		53H	—	—	—	—	—	25023K	25027K
		7071L	—	—	—	—	—	—	—
-14	Stem Plate	51H	17119	21037H	21040H	21040H	21086	—	—
		7071S	—	—	—	—		—	—
		52H	—	—	—	—		—	—
		7071M	—	—	—	—	—	21040H	21048H
		53H	—	—	—	—	—	—	—
		7071L	—	—	—	—	—	—	—
-20	Shaft Sleeve (Seal)	51H	—	63015	63015	63015	63086-1	—	—
		7071S	—	—	—	—	—	—	—
		52H	—	—	—	—	63086-2	63014	63014
		7071M	—	—	—	—	—	—	—
		53H	—	—	—	—	—	63090	63090
		7071L	—	—	—	—	—	—	—
-20	Shaft Sleeve (Packing)	51H	—	63019-1	63019-1	63019-1	63086-3	—	—
		7071S	—	—	—	—	—	—	—
		52H	—	—	—	—	63086-4	63019-2	63019-2
		7071M	—	—	—	—	—	—	—
		53H	—	—	—	—	—	63091	63091
		7071L	—	—	—	—	—	—	—
-25	Seal	51H	84000	84002	84002	84002	84002	—	—
		7071S	—	—	—	—	—	—	—
		52H	—	—	—	—	84004	84004	84004
		7071M	—	—	—	—	—	—	—
		53H	—	—	—	—	—	84006	84006
		7071L	—	—	—	—	—	—	—
-40	Hex Head Screw	51H	—	5/16-18	5/16-18	5/16-18	68012	—	—
		7071S	—	—	—	—		—	—
		52H	—	—	—	—		—	—
		7071M	—	—	—	—	—	5/16-18	5/16-18
		53H	—	—	—	—	—	—	—
		7071L	—	—	—	—	—	—	—

CHART B

No.	Description	Pump Frame					
		51H	52H	53H	7071S	7071M	7071L
-2	Ball Br'g. Retainer	14005	14004	14053	14071	14072	14076
-3	Bear Hug Nut	—	—	—	BH-06	BH-09	BH-13
-4	Ball Bearing (Radial)	207	209	211	3207	3309	3313
-5	Ball Bearing Housing	51001	51002	51053	51071	51072	51074
-6	Ball Bearing (Thrust)	307	309	311	5306	5309	5313
-7	Stem*	17010	17008	17053-4	—	17008	17053-4
-8	Check Seal	58051	58052	58053	58051	58052	58071L
-16	Impeller Retaining Screw*	3/8-16	1/2-13	5/8-11	3/8-16	1/2-13	5/8-11
-17	Lock Washer*	3/8	1/2	5/8	3/8	1/2	5/8
-18	Impeller Retaining Washer*	68007	68004-1	68024	68007	68004-1	68024
-19	Impeller Drive Key*	1/4" Sq.	5/16" Sq.	3/8" Sq.	1/4" Sq.	5/16" Sq.	3/8" Sq.
-21	Oil Seal	—	—	—	8624C/R	11060 C/R	23640 C/R
-22	Oil Seal	—	—	—	13650 C/R	17286 C/R	23640 C/R
-24	Shaft Sleeve Gasket*	61015	61014	61025	61015	61014	61025
-26	Packing Seat Washer*	68008	68008	68008	68008	68008	68008
-28	Packing w/Lantern Ring*	85001-LR	85001-LR	85001-LR	85001-LR	85001-LR	85001-LR
-29	Seal Gland Gasket*	61016	61016	61016	61016	61016	61016
-35	Grease Fitting	1/8" NPT	1/8" NPT	1/8" NPT	—	—	—
-45	Hex Head Screw	3/8-16	1/2-13	5/8-11	—	1/2-13	5/8-11
-46	Hex Head Screw	10-32	5/16-18	5/16-18	5/16-18	5/16-18	5/16-18
-55	Hex Head Screw	—	—	—	3/8-16	1/2-13	5/8-11
-56	Hex Head Nut	—	—	—	3/8-16	1/2-13	5/8-11
-57	Hex Head Screw	—	—	—	3/8-16	1/2-13	5/8-11
-61	Snap Ring or Bear Hug Nut	5100-137	5100-177	BH-11	—	—	—
-76	Hex Head Screw	—	—	—	3/8-16	3/8-16	3/8-16
-77	O-Ring	—	—	—	01-152	01-157	01-167
-78	Vent Cap	—	—	—	3/8"NPT	3/4"NPT	3/4"NPT
-79	End Plate Gasket	—	—	—	61105	61104	61099
-80	End Plate	—	—	—	71123	71122	71094
-81	Ball Br'g. Retainer Gasket	—	—	—	61103	61102	61100
-82	Pedestal	—	—	—	—	37000	37002
-83	Hex Head Screw	—	—	—	—	1/2-13	5/8-11
-84	Telescoping Ball Br'g. Hous.	—	—	—	51075	51076	51078

*NOT USED ON MODEL 1 1/4x1 1/2-5



SP w/ASE #3 & 4 BELL HOUS'G.
CHART G

No.	Description	Bell Hous. No.	Pump Model			
			3x3-10	4x4-11	6x6-10	8x8-11
-1	Shaft	1 ⁵ / ₈ Seal	100008			
			100010			
		1 ³ / ₄ Seal	—	—	100009	
			—	—	100011	
-7	Stem	3	17201			
		4	17200			
-9	Packing Gland	3	69001-3	69015-3	69001-3	
		4				
-14	Packing Plate	3	21040H	21086	21040H	21048H
		4				
-26	Packing Seat Washer	3	68008			
		4				
-28	Packing w/ Lantern Ring	3	85001-LR			
		4				
-29	Seal Gland Gasket	3	61016			
		4				
-40	Hex Head Screw	3	5/16-18	68012	5/16-18	
		4				
-45	Hex Head Screw	3	M 10x17			
		4	—			
-85	Shaft Flange	3	59060			
		4	59061			
-86	Lock Washer	3	—			
		4	—			
-87	Hex Head Screw	3	M 10 x17			
		4	—			

BELL HOUS'G./w/SHAFT 100010/100008
CHART I

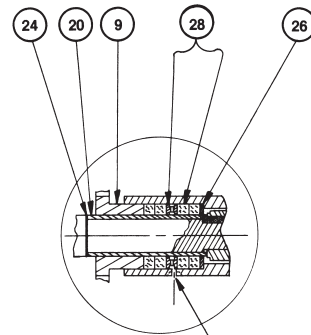
No.	Description	PUMP MODEL			
		3x3-10	4x4-11	6x6-10	8x8-11
-9	Seal Gland	69001	69015-2	69001	
-12	Impeller	25007-J	25086-1-J	25023-J	25027-J
-16	Impeller Retaining Screw	1/2-13			
-17	Lock Washer	1/2			
-18	Impeller Retaining Washer	68004-1			
-19	Impeller Drive Key	5/16" Sq.			
-20	Shaft Sleeve (Seal)	63014	63086-2	63014	
-20	Shaft Sleeve (Packing)	63019-2	63086-4	63019-2	
-24	Shaft Sleeve Gasket	61014			
-25	Seal	84004			

BELL HOUS'G./w/SHAFT 100011/100009
CHART H

No.	Description	PUMP MODEL	
		6x6-10	8x8-11
-9	Seal Gland	69001-13	
-12	Impeller	25023-K	25027-K
-16	Impeller Retaining Screw	5/8-11	
-17	Lock Washer	5/8	
-18	Impeller Retaining Washer	68024	
-19	Impeller Drive Key	3/8" Sq.	
-20	Shaft Sleeve (Seal)	63090	
-20	Shaft Sleeve (Packing)	63091	
-24	Shaft Sleeve Gasket	61025	
-25	Seal	84006	

SP w/BRIGGS & STRATON MOTOR
CHART F

No.	Description	Motor Model No.	Pump Model			
			1 ¹ / ₄ x1 ¹ / ₂ -5	1 ¹ / ₂ x1 ¹ / ₂ -7	2x2-10	3x3-10
-12	Impeller	81332	25036-1	25015-1	25009-1	—
		131232	—	—	—	—
		195432	—	25015-2	25009-2	25007-2
		221432	—			
		326431	—			
-14	Stem Plate	81332	17202	17204	17203	—
		131232	—	—	—	—
		195432	—	17205	17206	
		221432	—	17205-1	17206-1	
		326431	—	17207	17208	
-16	Impeller Retaining Screw	195432	—	7/16-20		
		221432	—	—		
		326431	—	3/8-24		
-17	Lock Washer	195432	—	7/16		
		221432	—	—		
		326431	—	3/8		
-18	Impeller Retaining Washer	195432	—	68007		
		221432	—	—		
		326431	—	—		
-19	Impeller Drive Key	195432	—	1/4" Sq.		
		221432	—	—		
		326431	—	—		
-20	(Seal) Shaft Sleeve	195432	—	63050		
		221432	—	63051		
		326431	—	63052		
-24	Shaft Sleeve Gasket	195432	—	61015		
		221432	—	—		
		326431	—	—		
-25	Seal	81332	84000	84000		—
		131232	—	—		—
		195432	—	84002		—
		221432	—	—		—
		326431	—	—		—
-45	Hex Head Screw	81332	5/16-24	5/16-24		—
		131232	—	—		—
		195432	—	3/8-16		—
		221432	—	3/8-24		—
		326432	—	7/16-14		—



MUST KEEP LANTERN RING FLOODED FROM OUTSIDE SOURCE

SP w/WISCONSIN MOTOR

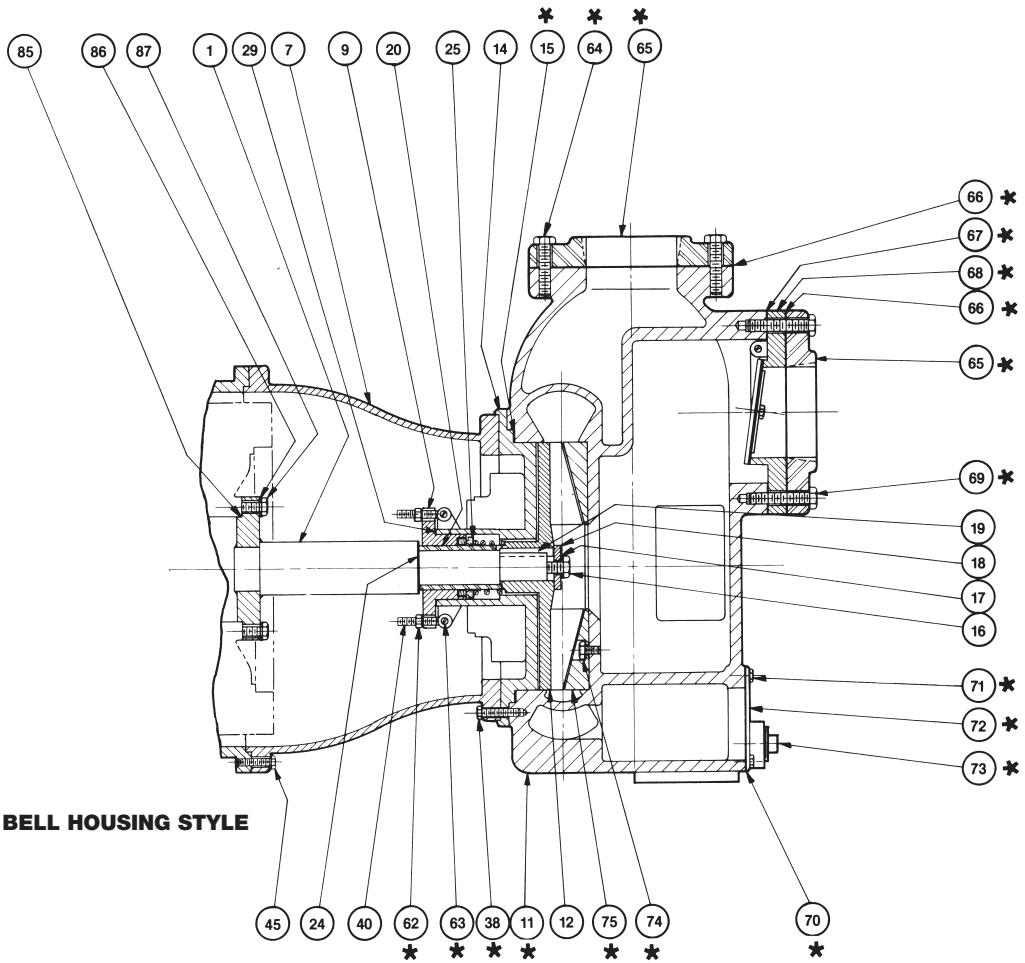
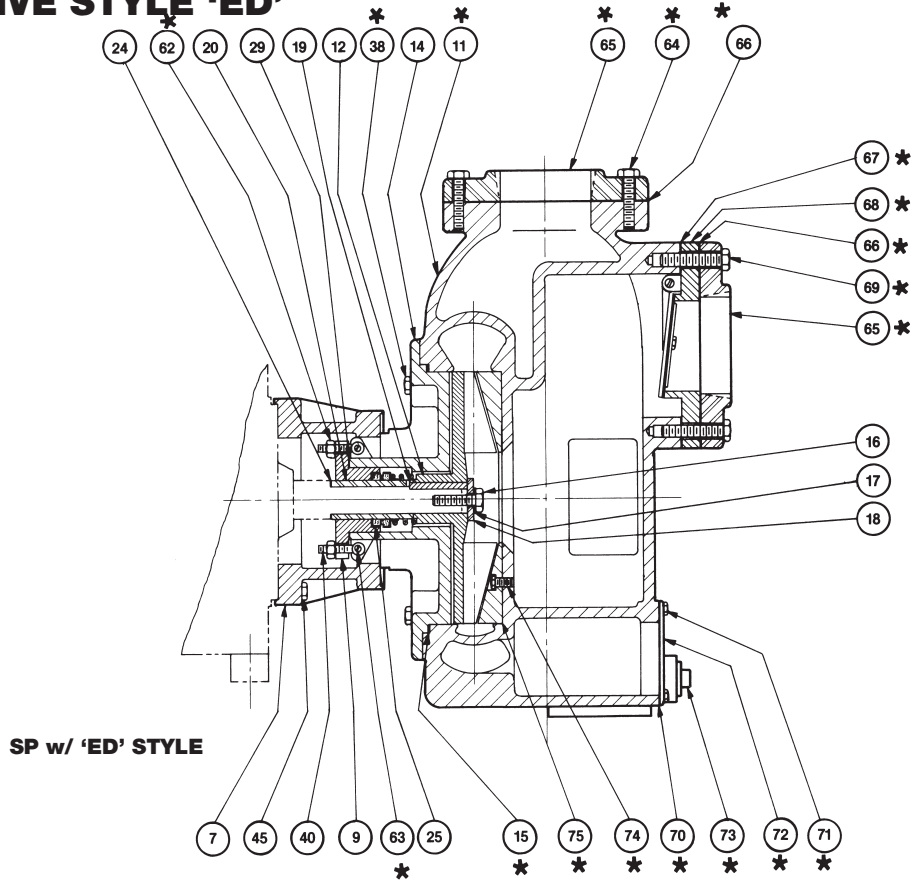
CHART J

No.	Description	Pump Model	Engine Model No.							
			TRA-12D	TJD	W2-1230	W4-1770	VH4D	W4-2460	VG4D	V-465D
-9	Seal Gland	2x2-10	69001-2		69001	—	—	—	—	—
		3x3-10			69001		—	—	—	
		4x4-11	69015-1		69015-2			—	—	
		6x6-10	—	—	69001		69001		69001-13	
		8x8-11	—	—	—	—	—	—	—	
-9	Packing Gland	2x2-10	69001-3			—	—	—	—	
		3x3-10			69001-3		—	—		
		4x4-11	69015-3					—		
		6x6-10	—	—	69001-3		69001-3		69001-16	
		8x8-11	—	—	—	—	—	—	—	
-12	Impeller	2x2-10	25009F		25009-H	—	—	—	—	
		3x3-10	25007-F		25007-H			—	—	
		4x4-11	25086-1-F		25086-1-H			—	—	
		6x6-10	—	—	25023-H				25023-L	
		8x8-11	—	—	—	—	—	25027-H	25027-L	
-14	Stem Plate	2x2-10	21040H			—	—	—	—	
		3x3-10			21040H		—	—		
		4x4-11	21086					—		
		6x6-10	—	—	21040H					
		8x8-11	—	—	—	—	—	21048H		
(Seal) -20	Shaft Sleeve	2x2-10	63015		63014	—	—	—	—	
		3x3-10			63014			—	—	
		4x4-11	63086-1		63086-2			—		
		6x6-10	—	—	63014		63014		—	
		8x8-11	—	—	—	—	—	—	—	
(Packing) -20	Shaft Sleeve	2x2-10	63019-1		63019-2	—	—	—	—	
		3x3-10			63019-2			—	—	
		4x4-11	63086-3		63086-4			—		
		6x6-10	—	—	63019-2		63019-2		63021	
		8x8-11	—	—	—	—	—	—	—	
-40	Hex Head Screw	2x2-10	$\frac{5}{16}$ -18			—	—	—	—	
		3x3-10			$\frac{5}{16}$ -18		—	—		
		4x4-11	68012					—		
		6x6-10	—	—	$\frac{5}{16}$ -18		$\frac{5}{16}$ -18			
		8x8-11	—	—	—	—	—	—		

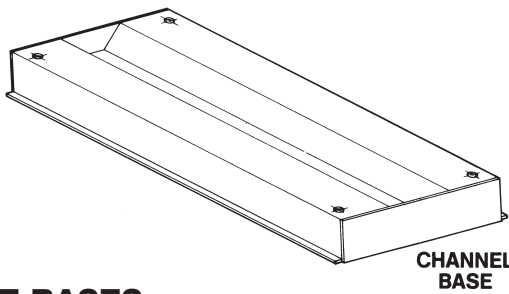
CHART K

No.	Description	Motor Model No.							
		TRA-12D	TJD	W2-1230	W4-1770	W4-2460	VH4D	VG4D	V-465D
-7	Stem	17010-2	17008-4	17008-3			17053-6	17053-5	
-16	Impeller Retaining Screw	$\frac{3}{8}$ -16	17008-3					$\frac{5}{8}$ -11	
-17	Lock Washer	$\frac{3}{8}$	$\frac{1}{2}$					$\frac{5}{8}$	
-18	Impeller Retaining Washer	68007	68004-1					68024	
-19	Impeller Drive Key	$\frac{3}{16}$ " Sq.	$\frac{1}{4}$ " Sq.					$\frac{3}{8}$ " Sq.	
-24	Shaft Sleeve Gasket	61015	61014					61006	
-25	Seal	84002	84004					84006	
-26	Packing Seat Washer	68008					68008-1		
-28	Packing w/Lantern Ring	85001-LR					85005-LR		
-29	Seal Gland Gasket	61016							
-45	Hex Head Screw	$\frac{3}{8}$ -16	$\frac{7}{16}$ -14			$\frac{5}{8}$ -11			

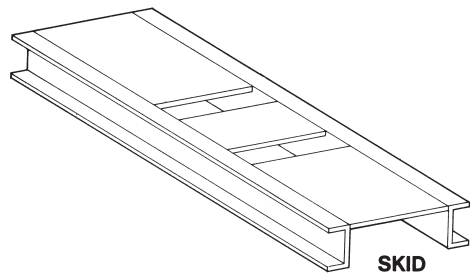
ENGINE DRIVE STYLE 'ED'



* SEE PAGE 13



**CHANNEL
BASE**

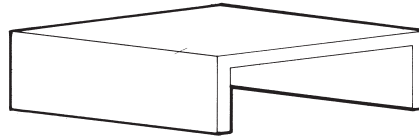


**SKID
BASE**

CBM STYLE BASES

MODEL	POWER FRAME	MOTOR FRAME SIZE							
		56	143-145	182-184	213-215	254-256	284-286	324-326	364-365
1 1/4 x 1 1/2-5	51 H	67014		—	—	—	—	—	—
	7071 S	67020-1*		—	—	—	—	—	—
1 1/2 x 1 1/2-5	51 H	67013-4			—	—	—	—	—
	7071 S	67020-1*			—	—	—	—	—
2 x 2-10	51 H	—	67013-5	67013-5	67013-6	—	—	—	—
	7071 S	—	67020-2*	6702-3*	67020-4*	—	—	—	—
3 x 3-10	51 H	—	67013-5	67013-6	67013-6	—	—	—	—
	7071 S	—	67020-5*	67020-5*	67020-6*	—	—	—	—
4 x 4-11	51 H	—	—	67013-6	67013-7	67013-7	—	—	—
	7071 S	—	—	67020-7*	67020-8*	67020-9*	—	—	—
	52 H 7071 M	—	—	—	—	67013-10 67020-10*		—	—
6 x 6-10	52 H	—	—	—	67013-10	67013-12	67013-12	67013-12	—
	7071 M	—	—	—	67020-11*	67020-12*	67020-13*	67020-14*	—
	53 H 7071 L	—	—	—	—	—	—	67013-12 67020-15*	—
8 x 8-11	52 H 7071 M	—	—	—	—	67013-12 67020-16*	67013-12 67020-17*	—	—
	53 H 7071 L	—	—	—	—	—	—	67013-13 67020-18*	67013-13 67020-19*

* SKID BASE

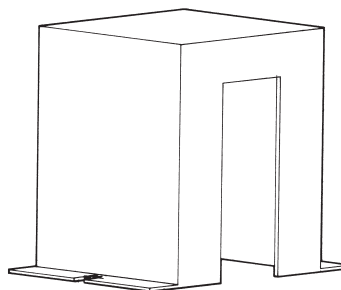


BASE FOR 'C' & 'CC' STYLE

MOTOR FRAME	MODEL						
	1 1/4 x 1 1/2-5	1 1/2 x 1 1/2-7	2 x 2-10	3 x 3-10	4 x 4-11	6 x 6-10	8 x 8-11
56	67021-1	67021-3	—	—	—	—	—
143-145	67021-2	67021-4	67021-6	67021-9	—	—	—
182-184	—	67021-5	67021-7	67021-10	67021-12	—	—
213-215	—	—	67021-8	67021-11	67021-13	67021-16	—
254-256	—	—	—	—	67021-14	67021-17	67021-20
284-286	—	—	—	—	67021-15	67021-18	67021-21
324-326	—	—	—	—	—	67021-19	67021-22
364-365	—	—	—	—	—	—	67021-23
POWER FRAME							
51H	—	—	67022-3	67022-5	67022-7	—	—
52H	—	—	—	—	67022-9	67022-11	67022-15
53H	—	—	—	—	—	67022-13	67022-17
7071 S	67022-1	67022-2	67022-4	67022-6	67022-8	—	—
7071 M	—	—	—	—	67022-10	67022-12	67022-16
7071 L	—	—	—	—	—	67022-14	67022-18

**COUPLING GUARD
FOR 'CBM' STYLE**

MODEL	PART #
1 1/4 x 1 1/2-5	71078-1
1 1/2 x 1 1/2-7	71078-1
2 x 2-10	71078-2
3 x 3-10	71078-4
4 x 4-11	71078-5
6 x 6-10	71078-10
8 x 8-11	71078-11



MAINTENANCE HISTORY

SERIAL NO. _____

MODEL NO. _____ IMP. DIA. _____

OPERATING COND. _____ GPM @ _____ FT. THD

HP. _____ SPEED/RPM _____

Start-Up Date _____ Amps at Start-Up: _____

Pressure at Start-Up _____

LUBRICATION: (REF. PG. 7)

OIL LUBRICATION Check Monthly Add Oil As Required

DATE	CHECK OIL	ADD OIL	DATE	CHECK OIL	ADD OIL	DATE	CHECK OIL	ADD OIL

TYPE OIL USED _____

GREASE LUBRICATION

DATE	GREASED	DATE	GREASED	DATE	GREASED

TYPE GREASE USED _____

COUPLING ALIGNMENT (Ref. Pg. 5)

Parallel Alignment

Angular Alignment

Date Checked	Amt. Out	Date Checked	Amt. Out	Date Checked	Amt. Out	Date Checked	Amt. Out	Date Checked	Amt. Out	Date Checked	Amt. Out

NOTES: _____



A RUTHMAN COMPANY

www.Gusher.com

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Ruthman Companies: A family-owned business supplying pumps for over 100 years



Ruthman Companies was co-founded in 1912 by brothers Alois and Edward Ruthman as the "Ruthman Machinery Company." Based in Cincinnati, the company serviced the steamboats that traveled the Ohio River.

In 1924, Alois conceived the first sealless centrifugal pump, coining the term 'coolant pump.' The brothers named this new pump "Gusher," giving birth to what is now Ruthman Companies' flagship brand, Gusher Pumps.

Alois' son Thomas R. Ruthman joined the family business in 1949, growing the business globally through organic growth and the acquisition of complementary technologies. In the early 1990's, Alois' grandson, Thomas G. Ruthman, became the third generation of Ruthmans in the pump business. Over the years, Ruthman Companies has expanded its product line from the original centrifugal coolant pumps to include valves, vertical turbine pumps, positive displacement pumps, gear pumps, and other specialized pump equipment, while upholding its reputation as a leader in the custom engineering of pumps for the most challenging applications.

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Engineering Pump Solutions™