

Installation, Operation & Maintenance Manual

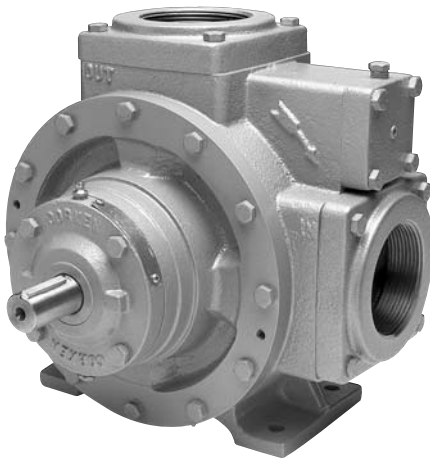
Stationary & Mobile Coro-Vane® Pumps
for Industrial Applications



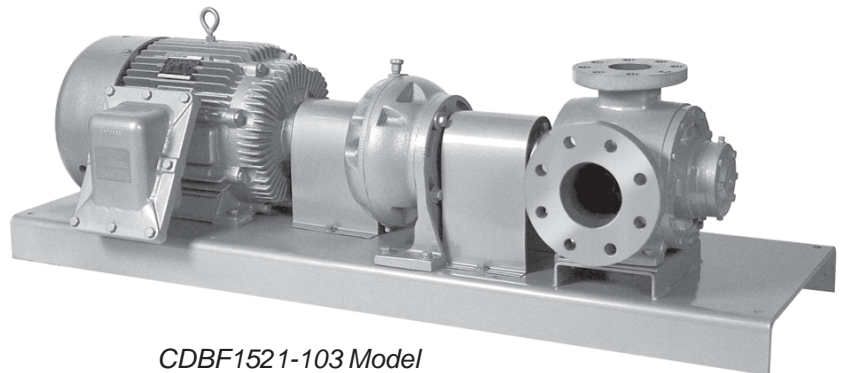
C51 Model



CPHN0521 Model



CDBN1021 Model



CDBF1521-103 Model

Warning: (1) Periodic inspection and maintenance of Corken products is essential. (2) Inspection, maintenance and installation of Corken products must be made only by experienced, trained and qualified personnel. (3) Maintenance, use and installation of Corken products must comply with Corken instructions, applicable laws and safety standards (such as NFPA Pamphlet 58 for LP-Gas and ANSI K61.1-1972 for Anhydrous Ammonia). (4) Transfer of toxic, dangerous, flammable or explosive substances using Corken products is at user's risk and equipment should be operated only by qualified personnel according to applicable laws and safety standards.

Solutions beyond products...



CORKEN
IDEX

Warning

Install, use and maintain this equipment according to Corken's instructions and all applicable federal, state, local laws and codes. Periodic inspection and maintenance is essential.

Corken One Year Limited Warranty

Corken, Inc. warrants that its products will be free from defects in material and workmanship for a period of one year from date of installation, provided that the warranty shall not extend beyond twenty-four (24) months from date of shipment from Corken.

Corken products which fail within the warranty period due to defects in material or workmanship will be repaired or replaced at Corken's option, when returned, freight prepaid to Corken, Inc., 3805 N.W. 36th Street, Oklahoma City, Oklahoma 73112.

Parts subject to wear or abuse, such as mechanical seals, vanes, piston rings, packing and other parts showing signs of abuse are not covered by this limited warranty. Also, equipment, parts and accessories not manufactured by Corken but furnished with Corken products are not covered by this limited warranty and purchaser must look to the original manufacturer's warranty, if any. This limited warranty is void if the Corken product has been altered or repaired without the consent of Corken.

All implied warranties, including any implied warranty of merchantability or fitness for a particular purpose, are expressly negated to the extent permitted by law and shall in no event extend beyond the expressed warranty period.

Corken disclaims any liability for consequential damages due to breach of any written or implied warranty on Corken products. Transfer of toxic, dangerous, flammable or explosive substances using Corken products is at the user's risk. Such substances should be handled by experienced, trained personnel in compliance with governmental and industrial safety standards.

Important notes relating to the European Union (EU) Machinery Directive

Pumps delivered without electric motors are not considered as machines in the EU Machinery Directive. These pumps will be delivered with a Declaration of Incorporation. The fabricator of the machinery must assure and declare full compliance with this Directive before the machine in which the pump will be incorporated, or of which it is a part, is put into service.

Contacting the Factory

Before you contact the factory, note the model number and serial number of your pump. The serial number directs us to a file containing all information on material specifications and test data applying to your specific pump. When ordering parts, the Corken service manual or Installation, Operations and Maintenance (IOM) manual should be consulted for the proper part numbers. **ALWAYS INCLUDE THE MODEL NUMBER AND SERIAL NUMBER WHEN ORDERING PARTS.**

The model and serial numbers are shown on the nameplate of the unit. Record this information for future reference.

Model no. _____

Serial no. _____

Date purchased _____

Date installed _____

Purchased from _____

Installed by _____

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Principles of Your Coro-Vane® Pump

The Corken Coro-Vane® pumps are a special type of rotary positive displacement pump, known as a sliding vane pump.

The sliding vane pump has many of the positive displacement advantages of the gear pump, plus the ability to compensate for wear, and operate at a lower noise level.

The sliding vane pump consists of a rotor turning in a cam (liner) machined eccentrically in relation to the rotor; thereby displacing the liquid trapped between the rotor, cam and vanes. The Corken Coro-Vane® pumps are made with vanes produced from advanced polymers which exhibit extremely low coefficients of friction. The vanes are self-adjusting for wear which gives the pump long life.

Exclusive Features of Your Coro-Vane® Pump

The pumping of volatile liquids is one of the most difficult of all pumping jobs, so more attention must be given to the design and manufacture of the pump and to its installation and operation.

In addition to being especially suited for handling volatile liquids, your Coro-Vane® pump has a number of features to help make it more easily operated and maintained.

The industrial style Coro-Vane® pump is manufactured in six models: the Models C51 and F51 small stationary and the Models 0521/0522, 0721/0722, 1021/1022, 1321/1322 and 1521/1522 stationary pumps. The F Models (e.g. CPBF1021) have ANSI flanged connections.

The CASE AND HEADS are made of cast or ductile iron.

The VANES are manufactured of advanced polymers to provide excellent life and quiet operation. After long service, the vanes are simply and inexpensively replaced.

Both the CAM and the SIDEPLATES are easily replaced should the need arise.

The MECHANICAL SEAL is designed for longer life under greater loads and may be inspected or replaced without disturbing the piping of the pump. No special tools are needed.

BEARINGS are heavy-duty roller type for long bearing life.

PRESSURE GAUGE connections, 1/4" pipe thread, are provided.

The PUMP NOZZLES on Models 521, 721, 1021, 1321 and 1521 equipped with flanges to simplify piping. It is not necessary to provide unions in the piping system near the pump because the flanges serve this purpose.

The RELIEF VALVE is built-in as part of the pump on all NPT models and is adjustable under pressure.



NOTE: EVEN WITH THIS INTERNAL SAFETY VALVE, AN EXTERNAL BY-PASS VALVE MUST BE INSTALLED.

Coro-Vane® Stationary Pumps

Installation of Your Coro-Vane® Stationary Pump

The installation of the Coro-Vane® pump is simple. However, in order for the pump to deliver optimum performance, the principles discussed in this book should be followed. The piping details are furnished to illustrate methods proved by hundreds of installations. Your own needs may require slight variations, but every effort should be made to follow the recommendations identified in this manual.

No pump can discharge more liquid than it receives, so the pump location and the inlet piping must be given careful attention. If the inlet piping is inadequate to supply the demand of the pump, you may have trouble. In the piping diagram shown in figure 2, page 5, never use a piping size smaller than the inlet of the pump.

For the transfer of flammable liquids like LPG, the pump must be installed according to the applicable local safety and health regulations. The installer and/or the user must take into account the following:

- The pump must be located as near as possible to the storage tank. The complete inlet line, including the vertical line from the tank must not exceed twelve feet (3.7 m) in length.

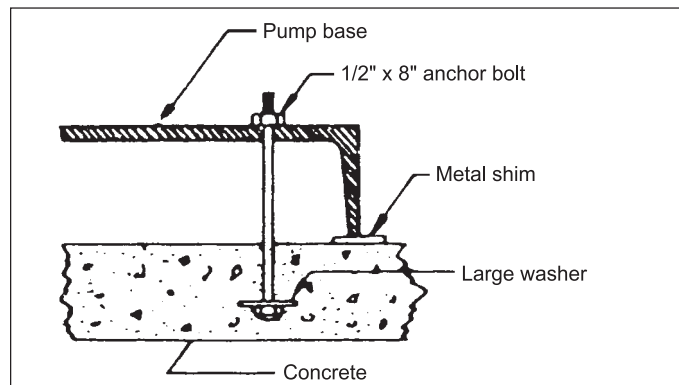


Figure 1: Concrete Foundation Diagram

- The bottom of the tank must be no less than two feet (0.6 m) above the pump inlet nozzle, with four feet (1.2m) considered standard.
- The foundation for the pump is important. The foundation must be firm, level and preferably made of concrete. The suggestions in figure 1 should be observed.
- Potential risk due to local conditions regarding the installation and operation (e.g. poor ventilation and additional risks due to other elements in the vicinity, etc.).
- Qualification of the personnel.
- Type of liquid being transferred.

- Specific safety measures to be applied (e.g. gas detection, automatic shut-off valves, personal protective equipment, etc.).

The following table shows the approximate weight of the bare pump for each model. For handling a bare pump, lifting slings should be used. Web slings are preferred over metal slings to minimize damage to the paint. See Appendix D for outline dimensions.

Model	Approximate Shipping Weight	
	lb	kg
C51	50	22.7
F51	25	11.3
521	120	54.4
721	140	63.5
1021	200	90.7
1321	170	77.1
1521	205	92.9

The Inlet Piping Should Include the Following:

1. The tank excess flow valve (EFV) should have a flow rate of 1-1/2 to 2 times the capacity of the pump. Do not use an EFV without knowing its flow capacity.
2. The tank shut-off valve must be a free-flow type and not a standard globe valve.
3. A strainer of the “Y” type, with 20 to 40 mesh screen, must be on the inlet line of the pump. (Mesh size indicates the number of openings per lineal inch).
4. Use a flexible connection in the pump inlet and outlet piping to compensate for piping strains.
5. Use an eccentric swage at the pump inlet nozzle to change the line size (flat side up).
6. Make the inlet line level or slope it downward to the pump.
7. Inlet piping size should never be smaller than the inlet of the pump (see piping diagram in figure 2 for more details).

The Outlet Piping Should Include the Following:

1. A pressure gauge should be installed in the pump outlet or near it. A pressure gauge is necessary to determine the efficiency of your pumping system.
2. A hydrostatic relief valve is required by most state laws and for your own safety.
3. If the outlet piping exceeds 50 feet (15.2 m) in length, a check valve should be installed near the pump outlet and after the by-pass valve. A check valve is not necessary in applications that do not require a by-pass valve.
4. Outlet piping size should never be smaller than the outlet

of the pump (see piping diagram in figure 2 for more details).

The Bypass System Must Include the Following:

1. A pump by-pass system must be installed. If the pump discharge is shut off before the driver is stopped, dangerously high pressures can develop, unless a by-pass valve is installed to permit the pump to discharge back to the supply tank, at a predetermined pressure.
2. The pump may have an internal relief valve, but it is intended as a safety relief valve device and not an operational by-pass.

Pump Model	Max Differential Pressure
521, 721, 1021, 1321, 1521	125 psi (8.8 kg/cm ²) 100 psi (7.0 kg/cm ²)

3. Always install an external by-pass relief valve (such as the Corken B177) in the pump discharge line. The by-pass valve may discharge into the tank at any convenient opening, either liquid or vapor; however, it should not connect into the pump inlet piping system.

A Vapor Equalizing System Should be Included:

To obtain maximum performance from your Coro-Vane® pump, a vapor equalizing system should be installed. This system is simply a pipe connecting the vapor sections of the tank being unloaded and the tank being filled. This equalizing line allows vapor to move freely between the two tanks (in either direction) and assures that both tanks remain at the same pressure.

As liquid is withdrawn from a tank, it must be replaced by an equal amount of vapor or the pressure in the tank will drop. If an equalizing line is not present, this vapor is formed by “boiling” of the liquid and a reduction of the tank’s pressure. Meanwhile, the tank being filled experiences a pressure increase as the rising fluid levels compresses the vapor space above it. A vapor equalizing line will eliminate both of these problems and will reduce pumping time, differential pressure, noise and wear on the entire system. Slow transfer rates will minimize these effects, and reduce the need for a vapor equalizing line. However, today’s high transfer rates require that a vapor equalizing line be installed.

Another way to consider this principle is to remember that it takes two holes in an oil can for oil to be poured smoothly from the can; one for the oil to exit and the other for the air to enter (see the piping diagram in figure 2, page 5 for more details).

Driver Installation

The wiring of your electric motor is extremely important and must be done by a competent electrical contractor. The following wire sizing chart indicates the minimum standards for wire sizes.

Coro-Vane® Truck Pumps

Installation of Your Coro-Vane® Truck

Hp	Motor			Recommended wire size, AWG ¹		
	Motor phase	Volts	Approximate full load amperes	Length of run (ft)		
				0-100	to 200	to 300
3	1	115	34.0	6	4	2
		220	17.0	12	8	8
	3	230	9.6	12	12	12
		460	4.8	12	12	12
5	1	115	56.0	4	1	1/0
		230	28.0	10	6	4
	3	230	15.2	12	12	10
		460	7.6	12	12	12
7-1/2	1	230	40.0	8	6	4
	3	230	22.0	10	10	8
		450	11.0	12	12	12
10	3	230	28.0	8	8	8
		460	14.0	12	12	12
15	3	230	42.0	6	6	6
		460	21.0	10	10	10
20	3	230	54.0	4	4	4
		460	27.0	8	8	8
25	3	230	68.0	2	2	2
		460	34.0	6	6	6
30	3	230	80.0	1	1	1
		460	40.0	6	6	6
40	3	230	100.0	2/0	2/0	2/0
		460	52.0	4	4	4
50	3	230	130.0	3/0	3/0	3/0
		460	65.0	2	2	2

¹Based upon 3% voltage loss copper wire type TW. Single phase motor calculations are based on two times distance.

Improper motor wiring will cause expensive motor difficulties from low voltage. If you suspect you have low voltage, call your power company. Connecting your motor for the voltage you have available is important too. The motors furnished with the stationary pumps are usually dual voltage, so you must be sure of the voltage your power company is supplying you. Your motor will be completely ruined if it is connected to the wrong voltage.

A humid climate can cause problems, particularly in explosion proof motor applications. The normal breathing of the motor, and alternating between being warm when running and cool when stopped, often will cause moist air to be drawn into the motor housing. This moist air will condense, and may eventually add enough free water to the inside of the motor to cause it to fail. To prevent this, make a practice of running the motor and pump at least once a week on a bright, dry day for an hour or so (pumping through the by-pass system). In this period the motor will heat up and vaporize the condensed moisture, and drive it out of the motor. No motor manufacturer will guarantee an explosion-proof or totally enclosed motor against damage from moisture.

Engine drivers pose a special consideration. The manufacturer's instructions must be followed. When the stationary pump is equipped with an engine from the factory, the engine speed should normally not exceed 1,800 RPM. Excessive engine speed will overload the engine and cause early failure. The engine loses 3% of its power for every 1,000 feet (305 m) above sea level, so if your installation is at a higher altitude than normal, consult the factory.

The mechanical installation of a Coro-Vane pump is a simple matter; however, proper attention must be paid to the design of the piping and drive system to ensure proper pump performance and life.

Pump Rotation

Pump rotation direction is indicated by an arrow that is cast on the side of the case. Truck pump models have shafts on both sides to allow use of the pump without modification regardless of PTO direction.

If it is necessary to run the pump backwards, expect reduced capacity and increased noise. (It will be helpful to slow the pump down). A separate pressure relief valve will be required to protect the pump from excessive pressures should it pump against a closed valve.

Pump Piping

The piping system design must be carefully reviewed to ensure proper pump operation. Suction head/lift, friction losses due to piping and fittings and fluid properties must all be evaluated before installing a pump.

All piping should be solidly supported at frequent intervals. Loose hangers or strap-like supports can allow pipe movement and are not acceptable. No strain from the piping should be imparted to the pump body.

Pipes subject to wide temperature variations, and pipes installed outdoors must have provisions made to allow for pipe contraction and expansion. A section of flexible pipe near the pump is desirable.

Use low restriction type fittings whenever possible, particularly on the suction line. Oversize piping, strainers and valves; long radius elbows and ball valves will help reduce friction losses.

Suction Piping Guidelines

- A. Keep the suction pipe as short and simple as possible.
- B. Use as few elbows and other fittings as possible.
- C. The pipe size must be as large as the pump inlet; one size larger is preferable.
- D. Always use a strainer in the suction line. The strainer's net open area should be at least four times the size of the pump suction (eight times for fluids with viscosities over 1000 SSU). A 20-40 mesh screen is normally adequate. A strainer may sometimes be omitted if the pump is above the suction tank.
- E. Do not use any fitting closer than 10 pipe diameters to the pump inlet.
- F. Air leaks must be eliminated from the suction line. A pressure test of the inlet is advisable.

Outlet Piping Guidelines

- A. The pipe size should be at least as large as the pump discharge opening.
- B. A hydrostatic relief valve is required by most state laws and for your own safety.
- C. All pumps with or without an internal relief valve should have an external by-pass valve.
- D. Pumps handling liquefied gases must have an external back-to-tank by-pass system. (Liquefied gases are stored in sealed vessels at their vapor pressure. Some typical liquefied gases are propane, anhydrous ammonia, refrigerants, sulphur dioxide, carbon dioxide, etc.)
- E. Pumps handling volatile liquids at a high suction lift should have an external back-to-tank by-pass system.

Back-To-Tank Bypass Systems

(Liquefied Gas Pumps or Volatile Liquid Pumps Only)

1. A back-to-tank by-pass system must be installed if the pump is to handle liquefied gases or highly volatile liquids. If the pump discharge is shut-off before the driver is stopped, dangerously high pressures can develop, unless a by-pass valve is installed to permit the pump to discharge back to the supply tank at a predetermined pressure.
2. The pump may have an internal relief valve, but it is intended as a relief device and not as an operational valve.
3. Always install an external by-pass relief valve (such as the CORKEN ZV200, B166, T166, B177 by-pass valve) in the pump discharge line. The by-pass valve may discharge into the tank at any convenient "opening," either liquid or "vapor," but it must not connect into the pump inlet piping system.

PUMP SIZE	Maximum Differential Pressure
522, 722, 1022	125 psi (8.8kg/cm ²)
1322, 1522	100 psi (7.0kg/cm ²)

4. The setting of the external by-pass relief valve should be lower than the internal relief valve (if so equipped).

Vapor Equalizing System

(Liquefied Gas Pumps Only)

To obtain maximum performance from your Coro-Vane pump when used on liquefied gases, a vapor equalizing system should be installed. This system is simply a pipe connecting the vapor sections of the tank being unloaded and the tank being filled. This equalizing line allows vapor to move freely between the two tanks (in either direction) and assures that both tanks remain at the same pressure.

As liquid is being withdrawn from a tank, it must be replaced by an equal amount of vapor or the pressure in the tank will drop. If an equalizing line is not present, this vapor is formed by "boiling" of the liquid and a reduction of the tank's pressure. Meanwhile, the tank being filled experiences a pressure increase as the rising liquid level compresses the vapor space above it. A vapor equalizing line will eliminate both of these problems and will reduce pumping time, differential pressure, noise, and wear on the entire system. Slow transfer rates will minimize these effects, and reduce the need for a vapor equalizing line. However, today's high transfer rates require that a vapor equalizing line be installed.

Another way to consider this principle is to remember that it takes two holes in an oil can for oil to be poured smoothly from the can; one for the oil to exit and the other for the air to enter.

Power Take-off Drive Systems

Proper pump operation and long life are directly dependent upon a good drive system. Many truck pumps utilize a power train consisting of shafts and universal joints from a power take-off shaft on the truck engine to the pump.

There are several basic principles that should be followed in laying out a PTO drive. These principles should not be violated. Following them will produce a workable power train that results in long pump life and reduced drive wear.

First, the driver shaft and the driven shaft must be parallel to one another within plus or minus one degree. Improper alignment will cause jerking and back and forth "whip" to the pump shaft, thereby imparting a surging pulsation to the liquid flow, which results in noise, vibration and abnormal wear.

Second, the angle of the "floating" shaft should be within the limits for the particular equipment being used (usually a maximum of 15° at pump speeds up to 800 RPM). To ensure that shaft expansion or contraction does not distort the drive system, a splined slip joint should be placed between the two universal joints. The drive shaft should be of the "splined" or slip type to permit the shaft to adjust for PTO movement and twisting of the truck frame. A fixed drive shaft transmits the forces directly to the pump and PTO which will shorten the life of both considerably.

Third, the yokes of the drive shaft universal joints must be in a parallel position. Figures 3 and 4 illustrate the proper arrangement.

Improper installation of the U-joints will soon destroy them along with the bearings in the pump and PTO.

Properly mounted, the second universal gives uniform motion to the drive shaft by compensating for the rotational error introduced by the first U-joint. An even number of universal joints (2, 4, 6 etc.) should always be used. An odd number of U-joints will cause unbalanced pump shaft rotation. This problem becomes greater with increased angularity.

Other points to consider include the proper sizing of the shaft components with a maximum horsepower load to be

expected, good alignment of hanger bearings and proper pump coupling alignment. Improper PTO systems count for a high percentage of truck pump failures. Always remember to disengage the clutch before shifting the PTO into gear. Shifting the PTO into gear without disengaging the clutch imparts an enormous shock on the PTO, drive shaft, pump and meter and will soon damage one or all of them.

For proper installation of pump drives, follow the rules listed below:

1. Driver shaft and pump shaft must be parallel, plus or minus one degree.
2. Operating angle of the "floating" shaft must be fifteen degrees maximum.
3. Universal yokes must be in line and parallel.
4. Splined slip joints must be used where needed.
5. Use an even number of universal joints.
6. Always use the least practical number of shafts.

PTO selection and drive system design is extremely important. The PTO should have an average output speed of 500 to 800 RPM when the truck engine is operating at the recommended speed.

The designer of the drive system must select a PTO drive shaft capable of meeting the torque requirements of the pumping system.

Hydraulic Drive Systems

Truck pumps are also driven by hydraulic systems, consisting of an adaptor, motor, pump, cooler and connecting hoses.

The truck pump's shaft must be properly aligned with the hydraulic motor's shaft to avoid excessive stress on the truck pump's main and thrust absorbing bearings. See Appendix D for outline dimensions.

The sizing of the hydraulic motor, the hydraulic pump and the hydraulic oil cooler must be done using the operational requirements of the truck pump, i.e., flow rate, differential pressure, pump speed, required torque and power. These data are on the performance charts in Appendix C. Information on the Char-Lynn hydraulic motor is found in Appendix H.

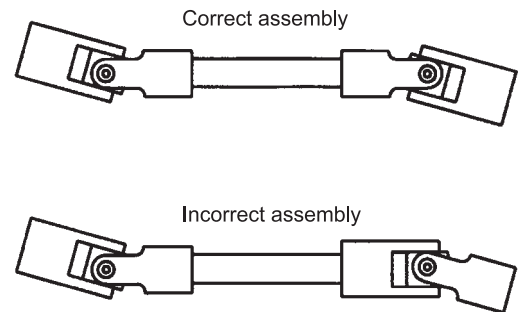


Figure 3: Universal Joint Alignment

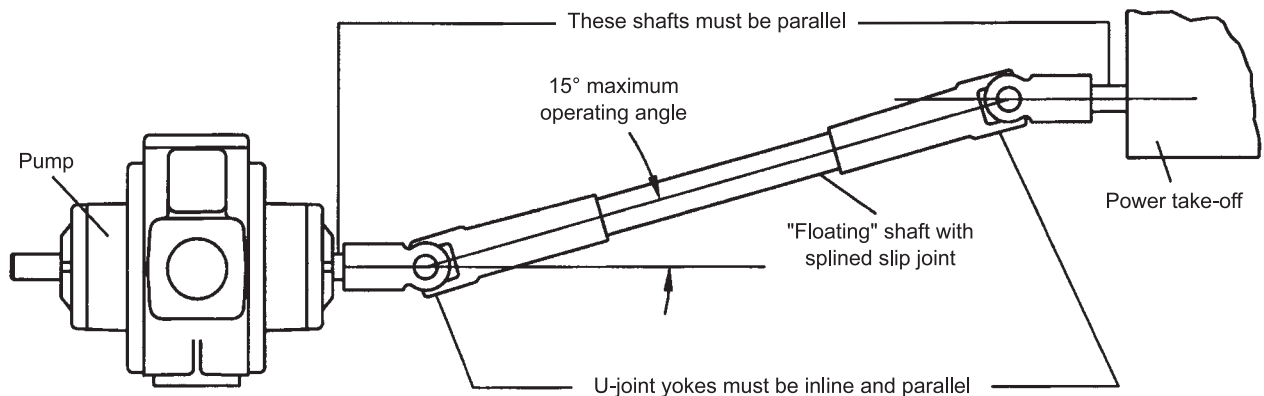


Figure 4: Shaft Alignment

Operation of Your Coro-Vane® Pump

Performance curves and charts are provided in Appendix C.

The following steps should be performed for the initial pumping operation:

1. Make sure the strainer screen is clean.
2. Rotate the pump by hand.
3. Check V-belt drive or direct drive coupling alignment. Misalignment will cause accelerated wear of the drive system, motor bearings and pump.
4. Check motor for proper wiring.
5. Review complete system to make certain the function of every valve and piece of equipment is clearly understood. Everyone operating this system must be properly trained in normal operating procedures and emergency procedures in event of a malfunction.
6. Close all hose valves.
7. Slowly open the storage tank bottom shut-off valve (suction line to the pump). Immediately check the system for leaks.
8. Open any shut-off valves between the by-pass valve and the storage tank.
9. Record all pressure gauge readings, especially the pressure gauge located at the discharge of the pump. Start the pump and circulate the liquid through the by-pass system back to the storage tank.
10. Verify the proper pump rotation direction. There is an arrow cast in the side of the pump case.
11. An ampmeter may be used by adjusting the by-pass valve until the ampmeter indicates the full load motor amperage rating shown on the motor nameplate or maximum rated differential, whichever comes first. Permit the pump to circulate liquid for half an hour or more. If the motor overload protection device stops the motor in this period the by-pass valve setting is too high and should be readjusted until the motor will run for half an hour. After a satisfactory setting is achieved, "seal" the valve adjusting stem to prevent tampering with the adjustment (see IH102 and IH106 for more details on the use of the Corken by-pass valves).
12. If your pump has an internal relief valve, it must be set higher than the external by-pass setting. The internal relief valve may be adjusted while the pump is under pressure by removing the flush seal plug. Turning the adjusting screw clockwise decreases the internal relief valve setting. Replace the flush seal plug after adjustment.
13. After initial operation, re-check the strainer screen.

Maintenance of Your Coro-Vane® Pump System



All repairs to the pump must be performed by qualified personnel in a safe manner, utilizing tools and/or equipment that are free of hazards, and follows the applicable safety codes of practice set by the local authorities having jurisdiction. Make sure the system pressure has been relieved before attempting any repair to the pump.

Your Corken pump requires regular maintenance and care like all mechanical equipment. A neglected or improperly repaired pump will result in premature failure and cause unsafe conditions.



To promote product longevity and safety, maintenance must be performed by properly trained technicians. Make sure all safety systems are in place and the system pressure has been relieved before attempting ANY maintenance.

Make sure the transfer hoses are not "kinked" which can cause excessive pump discharge pressure. Always make sure your hoses are not out of date.

There are two lubrication points in which to grease the pump bearings; one zerk per bearing cap located at opposite ends of the pump. Four grease relief and seal ventilation fittings have been provided, two at each end of the pump, to prevent overgreasing the bearings. Overgreasing can cause seal failure if grease passageways are blocked in some way. Clean each fitting before lubricating the bearings. This practice helps to prevent foreign-material contamination of the bearings and accidental over-pressurization of the mechanical seals. Use only ball bearing grease (MIL-G-10924C) with a temperature rating of -50°F.

Normal wear parts are the mechanical shaft seals, bearings, vanes and sideplates. All of these parts plus O-rings and grease seals are offered in the Corken "repair kit" listed in this manual directly after the "Seal Replacement Instructions". Use only genuine Corken replacement parts when repairing your Corken pump.

When it becomes necessary to repair your pump or remove it from the system, you must be absolutely certain that all propane, anhydrous ammonia or whatever product being pumped is bled from the pump and connecting piping. Once all the product has safely been bled from the pump and connecting piping, make certain no pressure is left in the system.



SPECIAL CARE MUST BE TAKEN DURING THE BLEED DOWN PROCESS TO AVOID DANGER TO PERSONNEL AND PROPERTY IN THE AREA.

Bleeding a system too fast is a common mistake and may leave "refrigerated" liquid in the pump and piping even

though the pressure gauge shows no pressure. As the "refrigerated" liquid begins to warm, more gas will escape causing a dangerous condition. Take your time in bleeding your system and make proper provisions to vent or capture the gas in accordance with local regulations.



ONLY A PROPERLY TRAINED INDIVIDUAL SHOULD BE ALLOWED TO BLEED A PUMPING SYSTEM.

Pump Maintenance Schedule

	Daily	Monthly	3 Months
Lubricate bearings			X ¹
Inspect drive coupling			X
Clean inlet strainer		X	
Check for leaks	X		
Inspect hose and fittings	X		

¹Continuous duty applications may require monthly lubrication.
Figure 5

For a complete list of storage procedures for your Coro-Vane® pump, refer to Appendix G.

Preventative Maintenance Program for Corken Coro-Vane® Pumps

Purpose

By following an effective preventive maintenance program, unscheduled downtime can be eliminated. This program should be used by the Operation Manager to get a maximum utilization of manpower and equipment as well as to prevent possible unsafe situations and/or production delays due to equipment breakdown.

Scope

The Preventive Maintenance chart in figure 5 includes the items to be regularly checked and inspected with a recommended time schedule. These are basic maintenance recommendations, and each company should develop their own comprehensive preventive maintenance program schedule, tailor-made to their individual operational procedures and requirements.

Maintenance must only be performed by a properly trained and qualified individual following all the applicable safety procedures.

Procedures

Every procedure herein recommended must be performed in a safe manner (utilizing tools and/or equipment which are free of hazards) and following the safety codes of practice set by the authorities having jurisdiction. These are general guidelines and are not intended to cover all the safety aspects that must be considered and followed while performing these procedures.

1. Visual Inspection:

This includes checking for leaks, corroded areas, condition of hoses, piping and fittings, and any unsafe condition which may hinder the safety of the personnel and/or the facility.

2. Clean Inlet Strainer Screen:

A clogged strainer screen will create too much flow restriction and vapor will be formed causing the pump to cavitate. This reduces the pump's capacity and accelerates the wear of the internal parts.

3. Inspect Drive Coupling and Driveline:

Check the coupling alignment and the condition of the union for cuts, broken sections and wear.

4. Lubricate Pump Bearings:

Use only ball bearing grease, applied with a manual lubrication pump or gun. Always clean the grease openings thoroughly before greasing.

5. Lubricate Motor Bearing:

Follow the recommendations of the electric motor manufacturer for the type of grease to use and the lubrication frequency.

6. Performance Test:

- a. While transferring liquid with the pump, check the pressure at the pump's inlet port. The pressure drop in the inlet piping is typically less than 3 psi.
- b. While transferring liquid with the pump, close the discharge valve(s) so the full flow will be directed back to the storage tank through the by-pass valve. Then slowly close the valve downstream of the by-pass valves. The discharge pressure of the pump should increase to the maximum differential pressure of the pump at no flow conditions (see Appendix C, Performance Curves).
- c. If the maximum differential pressure is not obtained, the pump must be serviced. See Appendix F, Troubleshooting Guide for additional help.
- d. Replace vanes or sideplates if worn.

7. Tighten all hold-down bolts.

8. Inspect motor starter contact points.

This procedure must be performed by an authorized and qualified electrician according to the electric motor manufacturer's guidelines.

Stationary Coro-Vane® Seal Replacement Instructions (excluding all 51 models)

Simple as A, B, C ... but watch alignments A, B and C or your new seal will leak!



Caution: Bleed all pressure from the pump and piping before starting to install your seal assembly.

Cleanliness

Even the smallest amount of dirt on your new seal can cause early failure. Keep all parts, tools and your hands clean while installing the seal. Never touch the smooth lapped faces of the carbon rotor or seal seat. For LP-Gas, anhydrous ammonia and similar liquids, you are trying to seal a fluid that is 5 to 10 times thinner than water! Your new seal needs every chance it can get, so keep it clean.

Workmanship

Your Corken pump is a precision piece of equipment with very close clearances. Treat it as such. Never beat on it to get parts in or out.

Bill of Materials for each Coro-Vane® Seal Assembly or Replacement Seal

Assembly	Description	Part Number	Description	Qty
1769-X_1,3	Seal assembly, cast iron seal	1769-X1	Bearing housing assembly	1
		1822	Seat adapter plate	1
		2-128_1	O-ring	1
		2-240_1	O-ring	1
		2298-X_2 ¹	Cast iron	1
		2755	Bearing inner race	1
1769-XR_1,3	Seal replacement, cast iron	2-128_1	O-ring	1
		2-240_1	O-ring	1
		2298-X_2 ¹	Cast iron seal	1
1769-X_2 ¹	Seal assembly, Ni-resist	1769-X1	Bearing housing assembly	1
		1822	Seat adapter plate	1
		2-128_1	O-ring	1
		2-240_1	O-ring	1
		2298-X_3 ¹	Ni-resist seal	1
		2755	Bearing inner race	1
1769-XR_2 ¹	Seal replacement, Ni-resist	2-128_1	O-ring	1
		2-240_1	O-ring	1
		2298-X_3 ¹	Ni-resist seal	1

O-ring Code	
A	Buna-N
B	Neoprene ^{®2}
D	Viton ^{®2}
E	Teflon ^{®2}
G	Ethylene Propylene ^{®2}
K	Kalrez ^{®2}

¹ _ denotes O-ring code. See chart to the right for details.

² Registered trademarks of the DuPont company

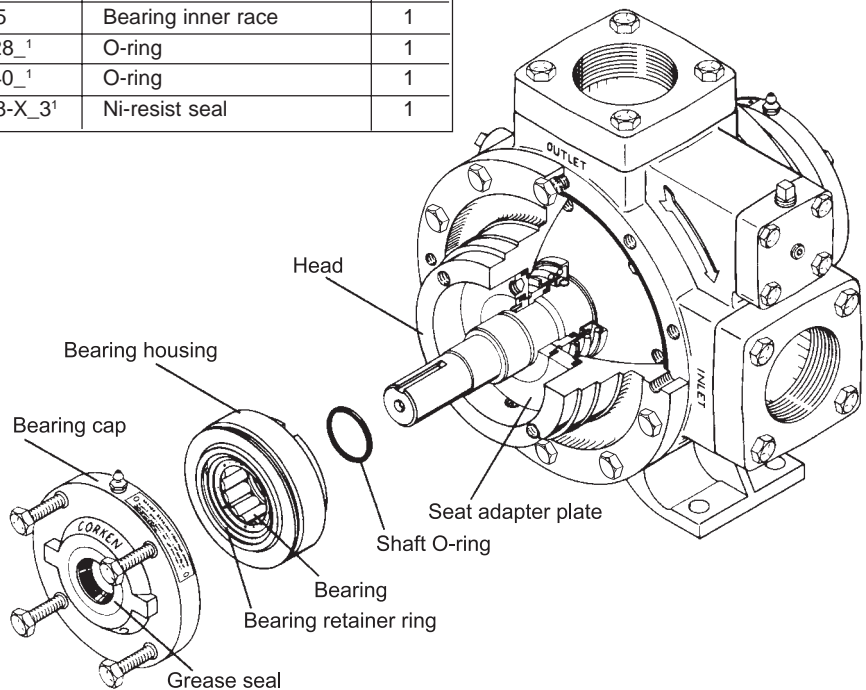
³ Not available in Teflon®, use 1769-XE2 or 1769-XE2R

Step 1

Depressurize and open the pump.



**FOLLOW ESTABLISHED
SAFETY REGULATIONS!**



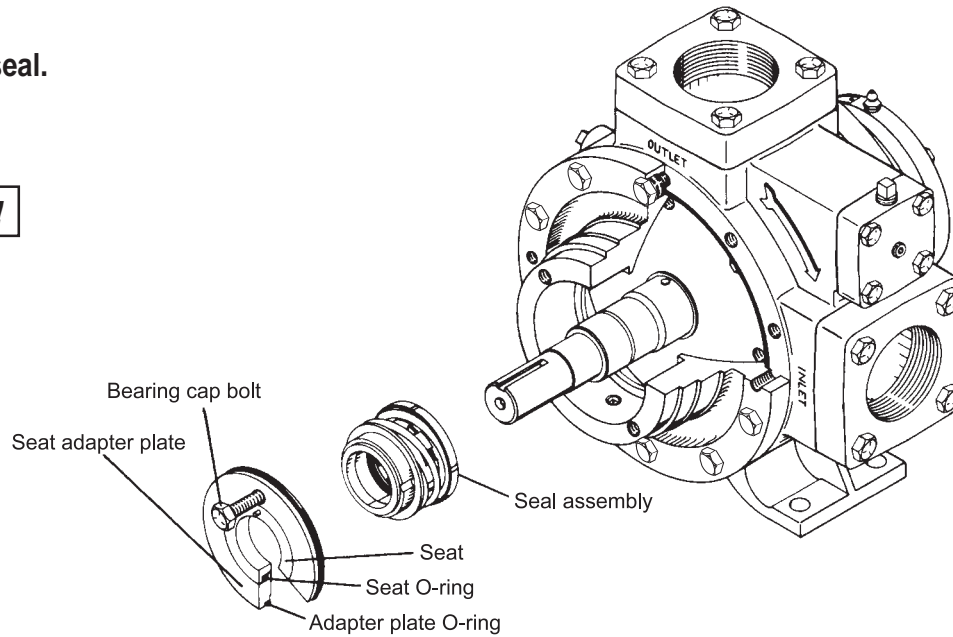
Remove the bearing cap and bearing housing. Should the bearing housing be rusted or frozen in place it may be necessary to remove the entire pump head. The housing can then be driven out gently with a block of wood.

Remove the old shaft O-ring and discard it. Never reuse an old O-ring except in an emergency. If you are also installing a new bearing or grease seal do so now.

Step 2

Remove the old seal.

KEEP IT CLEAN!



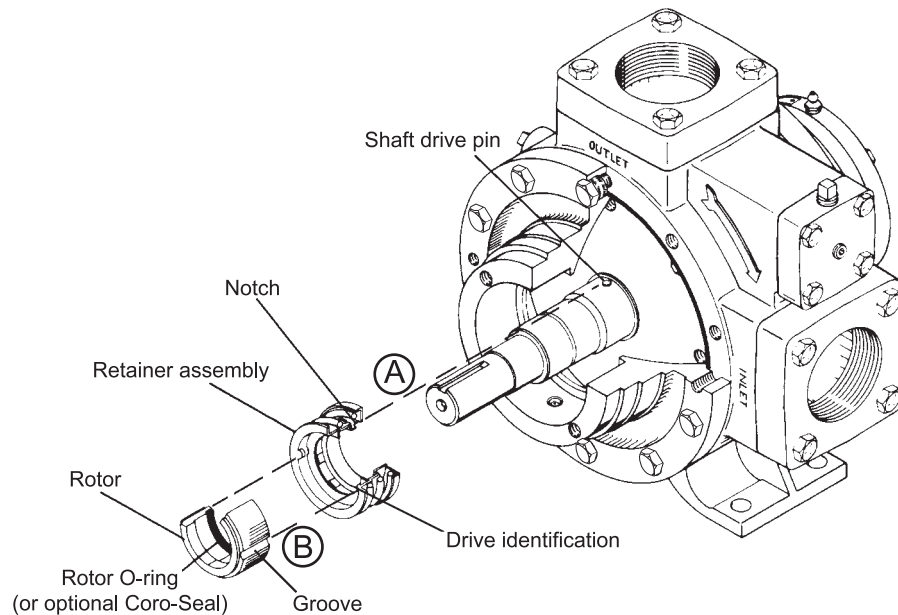
The seat adapter plate can be removed using a bearing cap bolt as a puller. Disregard the old adapter plate O-ring, seat and seat O-ring. Remove and discard the rest of the old seal. Thoroughly clean all surfaces that contact O-rings.

Use fine emery or crocus cloth. The shaft under the seal O-ring should be shiny smooth. Lubricate all surfaces with a clean, light oil. Do not let dirt settle on the parts.

Step 3

Proper alignment.

**WATCH ALIGNMENTS
A and B!**



This is the most critical part of your seal installation. Be sure your hands are clean. Unwrap your new seal and make certain you do not touch the seal faces.

- A.** Locate the notch over the shaft drive pin and install the retainer assembly. If the pin is not in the notch, the seal will be improperly positioned and will leak. It should not require any force to install the retainer assembly.

Hold the carbon rotor without touching the lapped face; lubricate the rotor O-ring with a light oil and install both on the pump shaft. (For the optional Teflon®¹ Coro-Seal installation see the following paragraph.)

If you are using the optional Teflon®¹ Coro-Seal make sure the shaft is very clean and smooth as the Teflon®¹ seal is not as tolerant of surface blemishes as the rubber type O-ring. After lubricating the Coro-Seal install in back of carbon rotor with the spring toward you, and then slide the carbon rotor in position as previously described.

- B.** The two grooves in the carbon rotor must line up with the drive indentations in the retainer assembly. If they do not, the seal will be improperly positioned and will leak. Do not allow the carbon rotor to cock or you may chip the lapped face.

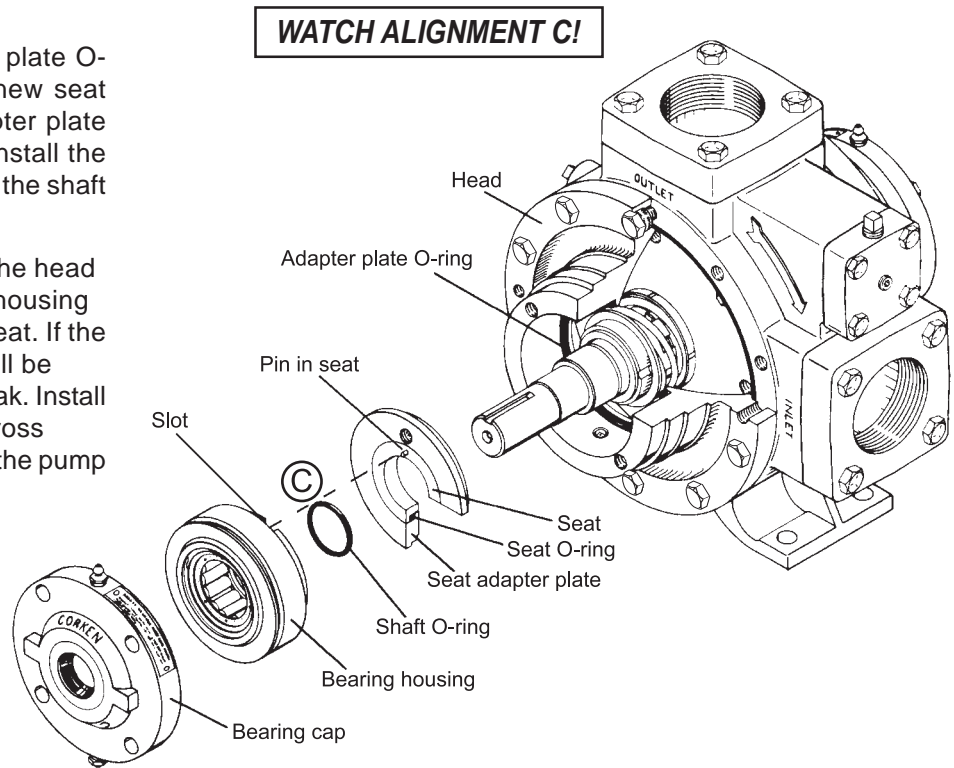
¹Registered trademark of the DuPont company

Step 4

Completing the installation.

Oil first and place the new adapter plate O-ring into the pump head. Put the new seat and oiled seat O-ring into the adapter plate without touching the lapped face. Install the adapter plate in the pump head. Put the shaft O-ring on the shaft.

- C. Slide the bearing housing into the head locating the slot in the bearing housing over the pin in the back of the seat. If the pin is not in the slot, the seal will be improperly positioned and will leak. Install the bearing cap using a criss-cross method on the bolts. Make sure the pump turns freely.



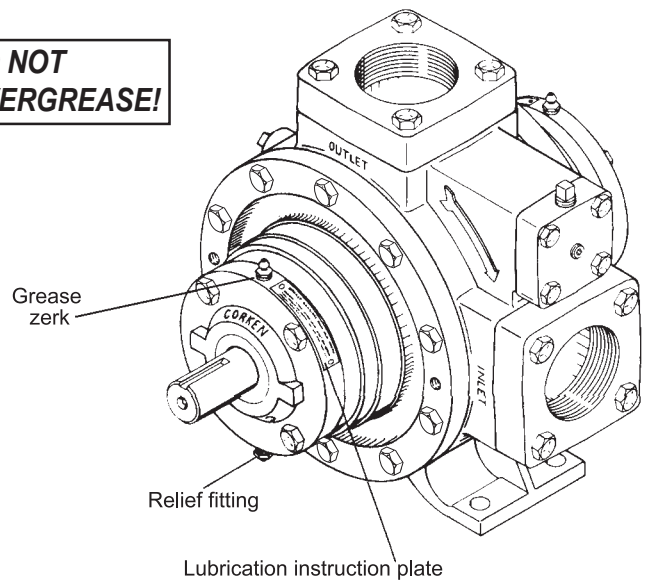
Step 5

Proper lubrication.

Regrease the bearings after thoroughly cleaning the grease openings and fittings. If dirt is forced into the bearings, early failure will result.

Special relief fittings have been provided to prevent over-greasing the bearings. Excessive grease may drip out for several hours after lubrication. Over-greasing will damage the pump bearings. Use only a recommended ball bearing grease. Using a hand grease gun, put the grease in as slowly as possible and stop as soon as the relief fitting opens.

**DO NOT
OVERGREASE!**

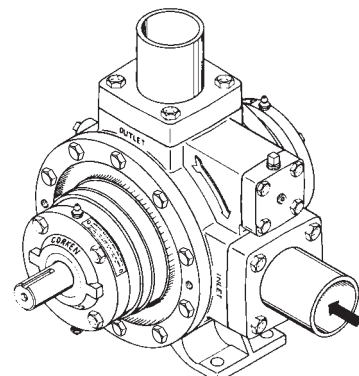


Step 6

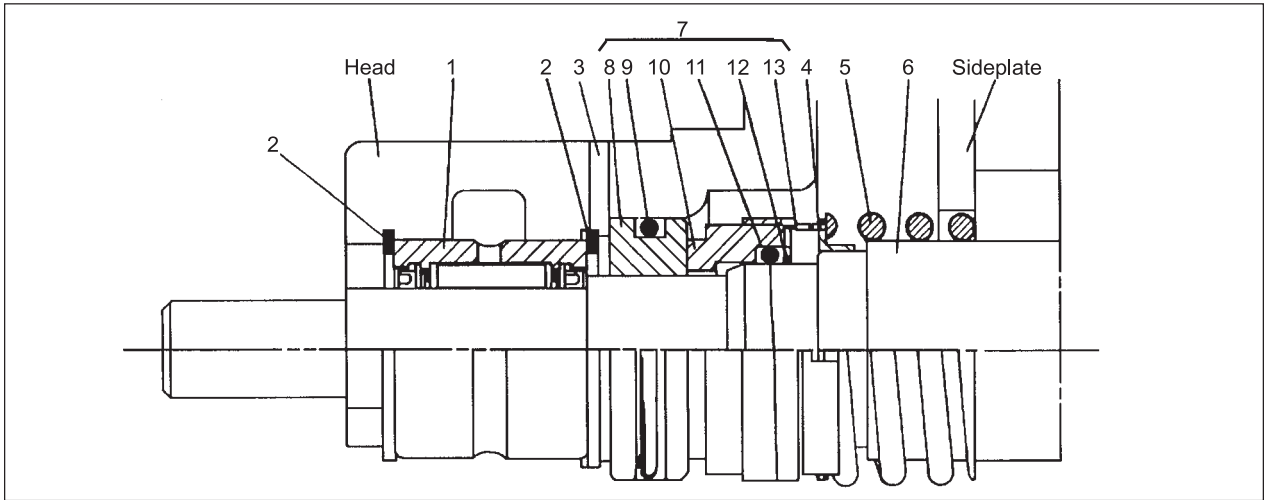
⚠ Repressurize the system.

Best results are usually obtained by slowly pressurizing the vapor pressure. Liquid entering the pump, even slowly, can sometimes refrigerate enough to keep seal elastomers from reaching their proper sealing positions thereby causing leakage.

**VAPOR FIRST,
THEN LIQUID!**



Parts Details For A Stationary Coro-Vane® Seal Assembly Models C51, D51 and F51



CAUTION: Always relieve pressure in the unit before attempting any repairs.

Ref No.	Part No.	Description	Qty
1	2471	Roller bearing	1
2	5000-112	Retainer ring	1
3	2595	Seat location pin	1
4	2735	Drive band (w 2492-X)	1
5	3471	Spring (w 2492-X)	1
6	2492-X	Rotor & shaft assembly	1
7	2296-1X_ _1.4	Seal Assembly	1
8	^{2,3}	Seat	1
9	^{2,3}	Seat O-ring	1
10	^{2,3}	Rotor	1
11	^{2,3}	O-ring	1
12	^{2,3}	Disc	1
13	^{2,3}	Retainer	1

¹ _denotes O-ring code and/or seal seat code. See charts to the right for details.

² Not sold separately

³ These items are included in both the seal and the seal assembly.

⁴ Seal assembly includes the seal and a 2-154_1 case O-ring.

⁵ Neoprene® and Viton® are registered trademarks of the DuPont company.

Seal Part Number

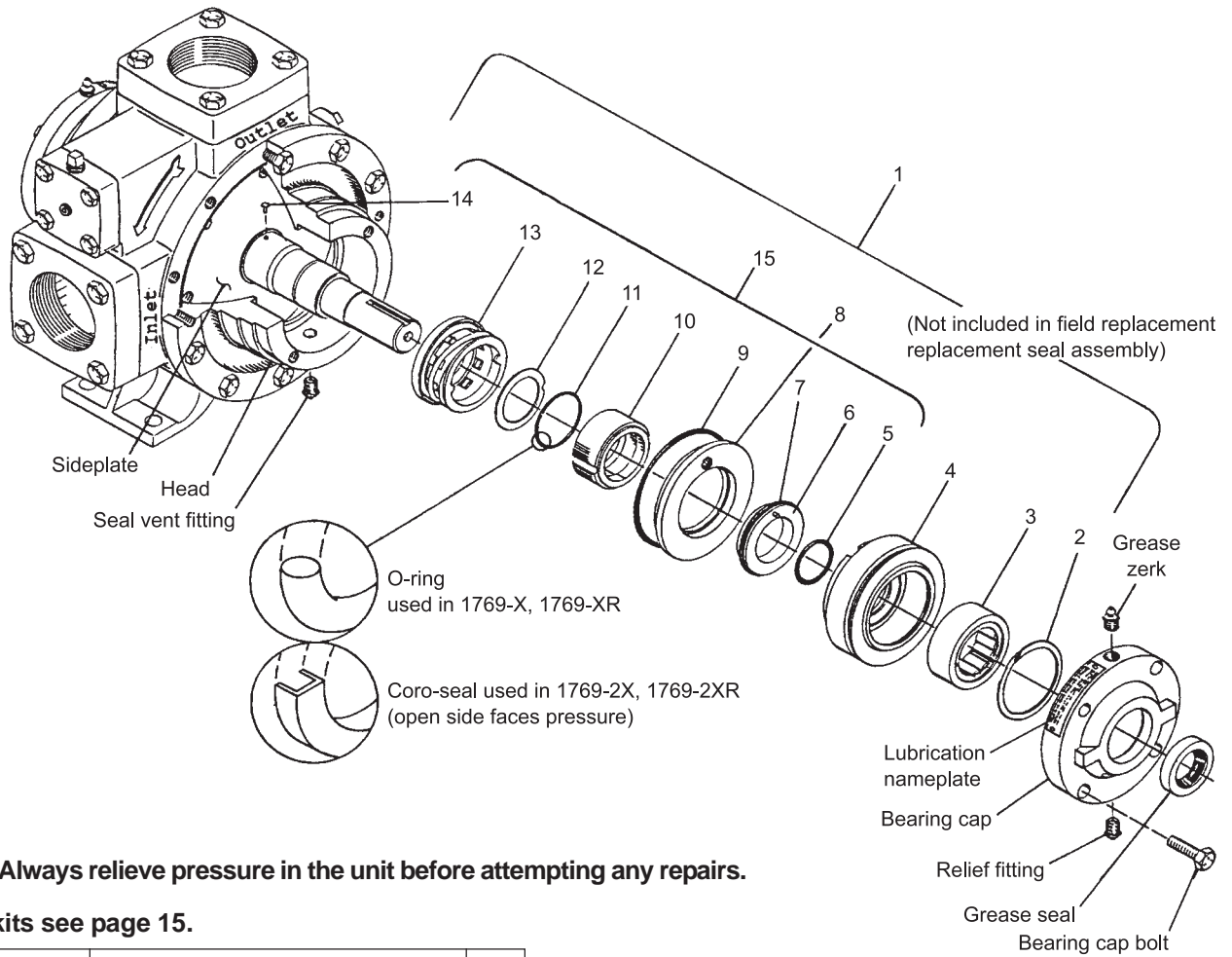
Seal Seat	O-ring Materials		
Material	Buna-N	Neoprene® ⁵	Viton® ⁵
Ceramic	2296-XA1	2296-XB1	2296-XD1
Ni-Resist	2296-XA2	2296-XB2	2296-XD2
Stainless S.	2296-XA3	2296-XB3	2296-XD3
Tungsten Carbide	2296-XA4	2296-XB4	2296-XD4
Cast Iron	2296-XA5	2296-XB5	2296-XD5

Complete Seal Assembly Part Number

Seal Seat	O-ring Materials		
Material	Buna-N	Neoprene® ⁵	Viton® ⁵
Ceramic	2296-1XA1	2296-1XB1	2296-1XD1
Ni-Resist	2296-1XA2	2296-1XB2	2296-1XD2
S.S.	2296-1XA3	2296-1XB3	2296-1XD3
Tungsten Carbide	2296-1XA4	2296-1XB4	2296-1XD4
Cast Iron	2296-1XA5	2296-1XB5	2296-1XD5

Parts Details For A Coro-Vane® Seal Assembly (1769-XRA)

All Coro-Vane® Stationary and Truck Models



CAUTION: Always relieve pressure in the unit before attempting any repairs.

For repair kits see page 15.

Ref. No.	Part No.	Description	Qty
1	1769-X_	Complete seal assembly ¹	1
	1769-2X	Complete seal assy Coro-Seal	1
2	2760-244	Retainer ring	1
3	2754-X	Roller bearing, complete	1
	2754	Bearing outer race	1
	2755	Bearing inner race	1
4	1769	Bearing housing	1
5	2-128_ ³	Shaft O-ring ¹	1
6	—	Seat	1
7	2-227_	Seat O-ring ¹	1
8	1822	Seat adapter plate	1
9	2-240_	Adapter plate O-ring ¹	1
10	—	Carbon	1
11	2-223_	Rotor O-ring ¹	1
12	—	Disc	1
13	—	Retainer assembly	1
14	2701	Drive pin	1
15	1769-XR_	Field replacement seal assembly ¹	1
	1769-2XR_	Field repl. seal assy Coro-Seal ¹	1

O-ring Code	
A	Buna-N
B	Neoprene ^{®2}
D	Viton ^{®2}
E	Teflon ^{®2}

¹_ denotes O-ring code. See chart to the right for details.

² Registered trademark of the DuPont company

³Available in Buna-N only

Repair Kits and Spare Parts For Stationary Coro-Vane® Pumps

C51/F51 Standard Repair Parts (no kit available)

2296-1X_5 ¹	Seal assembly	1
2451-2	Vane	8
2-154_1	Case O-ring	2
2491	Sideplate	2

C51/F51 Additional Spare Parts¹

2492-X	Rotor & shaft assembly	1
2471	Roller bearing	2

¹For complete list of parts and O-ring codes see part details in Appendix E

All 0521/0522 Models

Repair Kits: Includes blades, pushrods, seals, bearings, grease seals, and O-rings.

<u>Part #</u>	<u>Trim Option</u>
3101-X1A	Buna-N
3101-X1B	Neoprene® ²
3101-X1D	Viton® ²
3101-X1E	Teflon® ²

Rebuild Kits: Includes a repair kit plus sideplates and cam.

<u>Part #</u>	<u>Trim Option</u>
3101-X2A	Buna-N
3101-X2B	Neoprene® ²
3101-X2D	Viton® ²
3101-X2E	Teflon® ²

All 0721/0722 Models

Repair Kits: Includes blades, pushrods, seals, bearings, grease seals, & O-rings.

<u>Part #</u>	<u>Trim Option</u>
3126-X1A	Buna-N
3126-X1B	Neoprene® ²
3126-X1D	Viton® ²
3126-X1E	Teflon® ²

Rebuild Kits: Include a repair kit plus sideplates and cam.

<u>Part #</u>	<u>Trim Option</u>
3126-X2A	Buna-N
3126-X2B	Neoprene® ²
3126-X2D	Viton® ²
3126-X2E	Teflon® ²

¹Registered trademark of the DuPont Company.

All 1021/1022 Models

Repair Kits: Include blades, pushrods, seals, bearings, grease seals, & o-rings.

<u>Part #</u>	<u>Trim Option</u>
3103-X1A	Buna-N
3103-X1B	Neoprene®
3103-X1D	Viton®
3103-X1E	Teflon®

Rebuild Kits: Includes repair kit plus sideplates and cam.

<u>Part #</u>	<u>Trim Option</u>
3103-X2A	Buna-N
3103-X2B	Neoprene® ²
3103-X2D	Viton® ²
3103-X2E	Teflon® ²

All 1321/1322 Models

Repair Kits: Include blades, pushrods, seals, bearings, grease seals, & o-rings.

<u>Part #</u>	<u>Trim Option</u>
3106-X1A	Buna-N
3106-X1B	Neoprene® ²
3106-X1D	Viton® ²
3106-X1E	Teflon® ²

Rebuild Kits: Includes repair kit plus sideplates and cam.

<u>Part #</u>	<u>Trim Option</u>
3106-X2A	Buna-N
3106-X2B	Neoprene® ²
3106-X2D	Viton® ²
3106-X2E	Teflon® ²

All 1521/1522 Models

Repair Kits: Include blades, pushrods, seals, bearings, grease seals, & O-rings.

<u>Part #</u>	<u>Trim Option</u>
3105-X1A	Buna-N
3105-X1B	Neoprene® ²
3105-X1D	Viton® ²
3105-X1E	Teflon® ²

Rebuild Kits: Includes repair kit plus sideplates and cam.

<u>Part #</u>	<u>Trim Option</u>
3105-X2A	Buna-N
3105-X2B	Neoprene® ²
3105-X2D	Viton® ²
3105-X2E	Teflon® ²

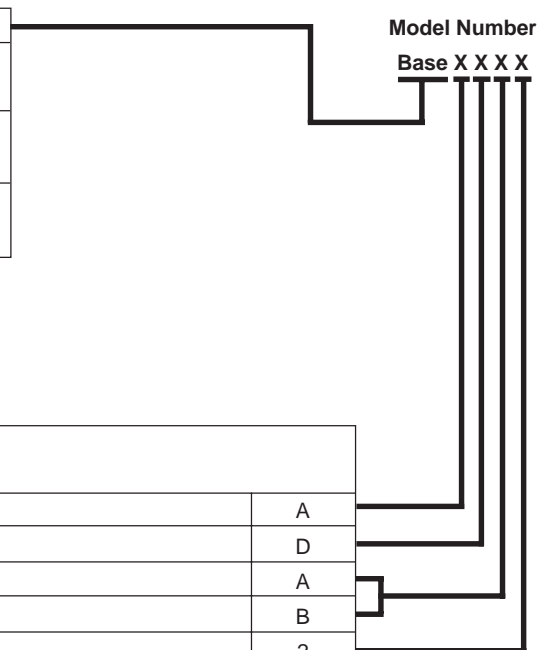
Appendix A—Model Number and Identification Code

Models C51, D51, and F51

Product Description

C51	Pump direct mounted to a 1/2 hp fan cooled, capacitor type motor. Motor includes built-in switch and automatic thermal overload for 115 volt, 50/60 Hz, single phase current.
D51	Bare pump with mounting bracket and flexible coupling to close couple the pump to any NEMA 56 or 66 C-face motor. (Note motor is not included)
F51	Frame mounted pump for baseplate mounting (bare pump only)

Base Model	C51	D51	F51
Inlet	1" NPT	1" NPT	1" NPT
Outlet	3/4"	3/4"	3/4"
Weight—bare pump lb (kg)	50 (23)	25 (11.3)	25 (11.3)



Materials Selection			
Pump	Ductile iron	Standard	A
Vanes	Carbon	Standard	D
O-rings	Buna-N	Standard	A
	Neoprene® ¹	No charge option	B
Seal seat	Cast iron	Standard	2

Mounting Option	Model Reference	Part Number	Maximum Motor Frame Size	Ship Weight lb (kg) Mounting Only
Mounting for frame mounted pump (F51) mounting includes steel baseplate and direct drive through flexible coupling.	F51 only	101-12	145T	25 (11.3)

Part Number	Test and Parts Options
3000-X4	Hydrostatic test
2296-1XA5	Seal assembly (Buna-N O-rings)
2296-1XB5	Seal assembly (Neoprene® ¹ O-rings)
2451-2	Vanes

¹Neoprene® is a registered trademark of the DuPont company.

Appendix A—Model Number & Identification Code

CP-Series (low pressure)

Model Number
Base X X X X X

Base Model #	CPBN0521	CPBN0721	CPBF0721	CPBN1021	CPBF1021	CPBN1321	CPBF1321	CPBN1521	CPBF1521
Inlet*	2" NPT	2-1/2" NPT	3" ANSI 300 LB	3" NPT	3" ANSI 300LB	4" NPT	4" ANSI 300LB	4" NPT	4" ANSI 300LB
Outlet*	2" NPT	2-1/2" NPT	2" ANSI 300 LB	3" NPT	2-1/2" ANSI 300LB	3" NPT	3" ANSI 300LB	4" NPT	3" ANSI 300LB
Internal Relief Valve	Yes	Yes	No (a)	Yes	No (a)	Yes	No (a)	Yes	No (a)
Ship Wt. (lbs)	121	138	145	170	170	194	205	194	205

F = 300 lb. ANSI flanges no internal relief valve N = NPT threaded flanges with internal relief valve

a) External by-pass required such as Corken model B177

*See flange options below for available sizes

Specification Fields

Blade Type	6 Blades with Blade Drivers	Standard	H
Blade Material	GCB-50 with composite push rods	Standard	G
O-Ring Material	Buna-N	Standard	A
	Neoprene®	No Charge Option	B
	Viton®	Optional	D
	PTFE	Optional	E
	Buna-N w/Viton Seal O-rings	Optional	L
	Buna-N w/PTFE Seal O-rings	Optional	M
Viton w/PTFE Seal O-rings	Optional	N	
Seal Seat Material	Stainless Steel	Optional	1
	NI-Resist	Standard	3

Flange Options WF=Slip-on weld flange All ANSI flanges are 300 lb.

Inlet Flange

Standard	2" NPT	•								E
	2-1/2" NPT		•							J
	3" NPT			•						M
	3" ANSI			•		•				P
	4" NPT						•		•	Q
	4" ANSI							•		•
No Cost	2-1/2" NPT	•			•					J
	3" NPT	•	•							M
Extra Cost	2" WF	•								F
	2-1/2" WF	•	•		•					K
	3" WF	•	•		•					N
	4" WF						•		•	R

Outlet Flange

Standard	2" NPT	•								E
	2-1/2" NPT		•							J
	2" ANSI			•						H
	2-1/2" ANSI				•		•			L
	3" NPT				•		•			M
	3" ANSI							•		•
No Cost	4" NPT							•		Q
	1-1/2" NPT	•								C
	2" NPT		•		•					E
	2-1/2" NPT	•			•					J
	3" NPT		•					•		M
Extra Cost	4" NPT					•				Q
	1-1/2" WF	•								D
	2" WF	•	•		•					F
	2-1/2" WF	•	•		•					K
	3" WF		•		•		•		•	N
	4" WF						•		•	R

Neoprene® and Viton® are registered trademarks of Dupont • - Available Option "Blank" - Not Available

Appendix A—Model Number & Identification Code

CD-Series (high pressure)

Model Number
Base X X X X X

Base Model #	CDBN0521	CDBN1021	CDBF1021	CDBN1321	CDBF1321	CDBN1521	CDBF1521	SF521 (b)
Inlet*	2" NPT	3" NPT	3" ANSI 300 LB	4" NPT	4" ANSI 300LB	4" NPT	4" ANSI 300LB	2-1/2" ANSI
Outlet*	2" NPT	3" NPT	2-1/2" ANSI 300 LB	3" NPT	3" ANSI 300LB	4" NPT	3" ANSI 300LB	2" ANSI
Internal Relief Valve	Yes	Yes	No (a)	Yes	No (a)	Yes	No (a)	No (a)
Ship Wt. (lbs)	121	170	170	194	205	194	205	140

F = 300 lb. ANSI flanges no internal relief valve N = NPT threaded flanges with internal relief valve

a) External by-pass required such as Corken model B177

b) This pump has a cast steel case

*See flange options below for available sizes

Specification Fields

Blade Type	6 Blades with Blade Drivers	Standard	H
Blade Material	GCB-50 with composite push rods	Standard	G
O-Ring Material	Buna-N	Standard	A
	Neoprene®	No Charge Option	B
	Viton®	Optional	D
	PTFE	Optional	E
	Buna-N w/Viton Seal O-rings	Optional	L
	Buna-N w/PTFE Seal O-rings	Optional	M
Viton w/PTFE Seal O-rings	Optional	N	
Seal Seat Material	Stainless Steel	Optional	1
	NI-Resist	Standard	3

Flange Options WF=Slip-on weld flange All ANSI flanges are 300 lb.

Inlet Flange

Standard	2" NPT	•							E
	3" NPT		•						M
	3" ANSI			•					P
	4" NPT				•		•		Q
	4" ANSI					•		•	S
	2-1/2" ANSI							•	L
No Cost	2-1/2" NPT	•							J
	3" NPT								M
	4" NPT		•						Q
Extra Cost	2" WF	•							F
	2-1/2" WF	•							K
	3" WF		•						N
	4" WF		•		•		•		R

Outlet Flange

Standard	2" NPT	•							E
	2" ANSI							•	H
	2-1/2" ANSI			•					L
	3" NPT		•		•				M
	3" ANSI					•		•	P
	4" NPT						•		Q
No Cost	1-1/2" NPT	•							C
	2" NPT								E
	2-1/2" NPT	•							J
	3" NPT						•		M
	4" NPT		•		•				Q
Extra Cost	1-1/2" WF	•							D
	2" WF	•							F
	2-1/2" WF	•							K
	3" WF		•		•		•		N
	4" WF		•		•		•		R

Neoprene® and Viton® are registered trademarks of Dupont • - Available Option "Blank" - Not Available

Appendix A—Model Number & Identification Code

Hydraulic/Internal Gear CD-Series (high pressure)

Model Number
Base X X X X X X

Base Model #	CDHN0521	CDHN1021	CDHN1521
Inlet*	2" NPT	3" NPT	4" NPT
Outlet*	2" NPT	3" NPT	4" NPT
Internal Relief Valve	Yes	Yes	Yes
Ship Wt. (lbs)	121	170	194

F = 300 lb. ANSI flanges no internal relief valve N = NPT threaded flanges with internal relief valve
 a) External by-pass required such as Corken model B177
 *See flange options below for available sizes

Specification Fields

Blade Type	6 Blades with Blade Drivers	Standard	H
Blade Material	GCB-50 with composite push rods	Standard	G
O-Ring Material	Buna-N	Standard	A
	Neoprene®	No Charge Option	B
	Viton®	Optional	D
	PTFE	Optional	E
	Buna-N w/Viton Seal O-rings	Optional	L
	Buna-N w/PTFE Seal O-rings	Optional	M
	Viton w/PTFE Seal O-rings	Optional	N
Seal Seat Material	Stainless Steel	Optional	1
	NI-Resist	Standard	3

Flange Options WF=Slip-on weld flange All ANSI flanges are 300 lb.

Inlet Flange

Standard	2" NPT	•			E
	3" NPT		•		M
	4" NPT			•	Q
No Cost	2-1/2" NPT	•			J
	4"NPT		•		Q
Extra Cost	2" WF	•			F
	2-1/2" WF	•			K
	3" WF		•		N
	4" WF		•	•	R

Outlet Flange

Standard	2" NPT	•			E
	3" NPT		•		M
	4" NPT			•	Q
No Cost	1-1/2" NPT	•			C
	2-1/2" NPT	•			J
	3" NPT			•	M
	4" NPT		•		Q
Extra Cost	1-1/2" WF	\$30			D
	2" WF	\$30			F
	2-1/2" WF	\$30			K
	3" WF		\$30	\$44	N
	4" WF		\$30	\$44	R

Neoprene® and Viton® are registered trademarks of Dupont • - Available Option "Blank" - Not Available

Appendix A—Model Number and Identification Code

Truck CD-Series (high pressure)

Base Model #	CDBN0522	CDBN1022	CDBF1022	CDBN1322	CDBF1322	CDBN1522	CDBF1522
Inlet*	2" NPT	3" NPT	3" ANSI 300 LB	4" NPT	4" ANSI 300LB	4" NPT	4" ANSI 300 LB
Outlet*	2" NPT	3" NPT	2 1/2" ANSI 300 LB	3" NPT	3" ANSI 300LB	4" NPT	3" ANSI 300 LB
Internal Relief Valve	Yes	Yes	No (a)	Yes	No (a)	Yes	No (a)
Ship Wt. (lbs)	121	170	170	194	205	194	205

F = 300 lb. ANSI flanges no internal relief valve N = NPT threaded flanges with internal relief valve

*See flange options below for available sizes

a) External by-pass required such as Corken model B177

Model Number
Base X X X X X

Specification Fields

Blade Type	6 Blades with Blade Drivers	Standard	H
Blade Material	GCB-50 with composite push rods	Standard	G
O-Ring Material	Buna-N	Standard	A
	Neoprene®	No Charge Option	B
	Viton®	Optional	D
	PTFE	Optional	E
	Buna-N w/Viton Seal O-rings	Optional	L
	Buna-N w/PTFE Seal O-rings	Optional	M
Seal Seat Material	Stainless Steel	Optional	1
	NI-Resist	Standard	3

Flange Options WF=Slip-on weld flange All ANSI flanges are 300 lb.

Inlet Flange

Standard	2" NPT	•						E
	3" NPT		•					M
	3" ANSI			•				P
	4" NPT				•		•	Q
No Cost	4" ANSI					•	•	S
	2-1/2" NPT	•						J
Extra Cost	4" NPT		•					Q
	2" WF	•						F
	2-1/2" WF	•						K
	3" WF		•					N
	4" WF			•		•		R

Outlet Flange

Standard	2" NPT	•						E
	2-1/2" ANSI			•				G
	3" NPT		•		•			M
	3" ANSI					•	•	P
No Cost	4" NPT					•		Q
	1-1/2" NPT	•						C
	2-1/2" NPT	•						J
	3" NPT						•	M
Extra Cost	4" NPT		•					Q
	1-1/2" WF	•						D
	2" WF	•						F
	2-1/2" WF	•						K
	3" WF		•		•		•	N
	4" WF			•		•		R

Neoprene® and Viton® are registered trademarks of Dupont • - Available Option "Blank" - Not Available

Appendix B—Specifications For Models C51, D51 and F51 Pumps

Operating Specifications

Minimum RPM:	1450	Maximum RPM:	1750
Minimum temperature:	-25°F (-32°C)	Maximum temperature:	225°F (107°C)
Maximum working pressure:	350 psig (25.2 bar g)	Maximum differential pressure:	125 psi (8.6 bar d)
Maximum driver size:	2 hp (1.5 kW)	Flow range:	1–6 gpm (4–23 L/min)

Material Specifications

Part	Model	Standard Material	Optional Material
Case, head rotor	All	Ductile iron ASTM A536	None
Sideplate	All	Gray iron ASTM A48, Class 30	None
Seal seat	All	Cast iron	Ni-Resist, stainless steel, ceramic, and tungsten carbide
Seal rotor	All	Carbon	None
Seal metal parts	All	Steel	None
Vanes	All	Carbon	None
Relief valve springs	All	Steel, cadmium plated	None
Relief valve	All	Steel	None
Shaft	All	“Stressproof” steel	None
Mounting bracket	C51	Gray iron ASTM A48, Class 30	None
Base	F51	Steel	None
O-rings	All	Buna-N	PTFE, Viton®, Neoprene® ¹
Relief valve adjusting stem seal	All	Buna-N	None
Retainer rings	All	Steel	None
Bearings	All	Cylindrical roller	None

¹Viton® and Neoprene® are registered trademarks of the DuPont company.

Appendix B—Specifications For All CP-Series (low pressure) Models

Operating Specifications

Specifications	All CP-Series Models with NPT Flanges				
	0521/22	0721/22	1021/22	1321/22	1521/22
Suction flange	2"	2-1/2"	3"	4"	4"
Discharge flange	2"	2-1/2"	3"	3"	4"
Maximum RPM	950	950	780	780	780
Minimum temperature	-25°F (-32°C)				
Maximum temperature	225°F (107°C)				
Maximum working pressure	200 psig (13.8 bar)				
Maximum differential pressure	125 psid (8.6 bar)			100 psid (6.9 bar)	
Suction flange option	2½", 3"	3"	2½"	No	No
Discharge flange option	2½"	2", 3"	2½"	4"	3"
Internal relief	Yes	Yes	Yes	Yes	Yes
Seal seat material options	Iron, Stainless steel, Ni-resist (standard)				
Steel slip-on flange option	Yes (suction & discharge)				
Maximum driver	10 hp (7.5 kW)		20 hp (15 kW)		30 hp 22 kW

Specifications	All CP-Series Models with ANSI Flanges		
	0721/22	1021/22	1521/22
Suction flange	2-1/2" 300 lb ANSI	3" 300 lb ANSI	4" 300 lb ANSI
Discharge flange	2-1/2" 300 lb ANSI	3" 300 lb ANSI	4" 300 lb ANSI
Maximum RPM	950	780	780
Minimum temperature	-25°F (-32°C)	-25°F (-32°C)	-25°F (-32°C)
Maximum temperature	225°F (107°C)	225°F (107°C)	225°F (107°C)
Maximum working pressure	200 psig (13.8 bar)	200 psig (13.8 bar)	200 psig (13.8 bar)
Maximum differential pressure	125 psid (8.6 bar)	125 psid (8.6 bar)	100 psid (6.9 bar)
Suction or discharge flange option	No	No	No
Internal relief	No	No	No
Seal seat material options	Gray iron (standard), Stainless steel, Ni-resist		
Maximum driver	10 hp 7.5 kW	20 hp 15 kW	30 hp 22 kW

Material Specifications

Part	Standard		Optional
	Pump Construction	Material	Material
Case	0521/22, 0721/22, 1021/22	Gray iron ASTM A48, Class 30	
Head	0521/22, 0721/22, 1021/22	Ductile iron ASTM A536	
Case, head	1321/22, 1521/22	Ductile iron ASTM A536	
Flange, rotor, seat adapter plate	All	Ductile iron ASTM A536	
Sideplate	All	Gray iron ASTM A48, Class 40	
Cam, bearing cap	All	Gray iron ASTM A48, Class 30	
Welding flange	All	Steel	
Seal seat	All	Gray iron ASTM A48, Class 30	316 Stainless steel, Ni-resist
Seal metal parts	All	Steel	
Shaft	All	8620 Steel	
Blades	All	Ryton ^{®1}	
Relief valve spring	All	Steel cadmium plated	
Relief valve	CPBN/HN0521	Steel	
	All others	Gray iron ASTM A48, Class 30	
Bearing	All	Cylinder roller	
O-rings	All	Buna-N	PTFE, Viton ^{®1} , Neoprene ^{®1}
Retainer rings	All	Steel	

¹Ryton[®], Viton[®] and Neoprene[®] are registered trademarks of the DuPont Company.

Appendix B—Specifications For All CD-Series (high pressure) Models

Operating Specifications

Specifications	All CD-Series Models with NPT Flanges			
	0521/22	1021/22	1321/22	1521/22
Suction flange	2"	3"	4"	4"
Discharge flange	2"	3"	3"	4"
Maximum RPM	950	950	860	860
Minimum temperature	-25°F (-32°C)			
Maximum temperature	225°F (107°C)			
Maximum working pressure	400 psig (27.6 bar)			
Maximum differential pressure	125 psid (8.6 bar)	125 psid (8.6 bar)	100 psid (6.9 bar)	100 psid (6.9 bar)
Suction flange option	2½", 3"	2½"	No	No
Discharge flange option	2½"	2½"	4"	3"
Internal relief	Yes	Yes	Yes	Yes
Seal seat material options	Iron, Stainless steel, Ni-resist (standard)			
Steel slip-on flange option	Yes (suction & discharge)			
Maximum driver	10 hp (7.5 kW)	20 hp (15 kW)	20 hp (15 kW)	30 hp 22 kW

Specifications	All CD-Series Models with ANSI Flanges		
	1021/22	1321/22	1521/22
Suction flange	3" 300 lb ANSI	4" 300 lb ANSI	4" 300 lb ANSI
Discharge flange	2-1/2" 300 lb ANSI	3" 300 lb ANSI	3" 300 lb ANSI
Maximum RPM	950	860	860
Minimum temperature	-25°F (-32°C)	-25°F (-32°C)	-25°F (-32°C)
Maximum temperature	225°F (107°C)	225°F (107°C)	225°F (107°C)
Maximum working pressure	400 psig (27.6 bar)	400 psig (27.6 bar)	400 psig (27.6 bar)
Maximum differential pressure	125 psid (8.6 bar)	125 psid (8.6 bar)	100 psid (6.9 bar)
Suction or discharge flange option	No	No	No
Internal relief	No	No	No
Seal seat material options	Gray iron (standard), Stainless steel, Ni-resist		
Maximum driver	20 hp 15 kW	20 hp 15 kW	30 hp 22 kW

Material Specifications

Part	Standard		Optional
	Pump Construction	Material	Material
Case, head	All	Ductile iron ASTM A536	
Flange, rotor, seat adapter plate	All	Ductile iron ASTM A536	
Sideplate	All	Gray iron ASTM A48, Class 40	
Cam	All	Gray iron ASTM A48, Class 40	
Bearing cap	All	Ductile iron ASTM A536	
Welding flange	All	Steel	
Seal seat	All	Gray iron ASTM A48, Class 30	316 Stainless steel, Ni-resist
Seal metal parts	All	Steel	
Shaft	All	8620 Steel	
Blades	All	Ryton ^{®1}	
Relief valve spring	All	Steel cadmium plated	
Relief valve	CDBN/HN0521	Steel	
	All others	Gray iron ASTM A48, Class 30	
Bearing	All	Cylinder roller	
O-rings	All	Buna-N	PTFE, Viton ^{®1} , Neoprene ^{®1}
Retainer rings	All	Steel	

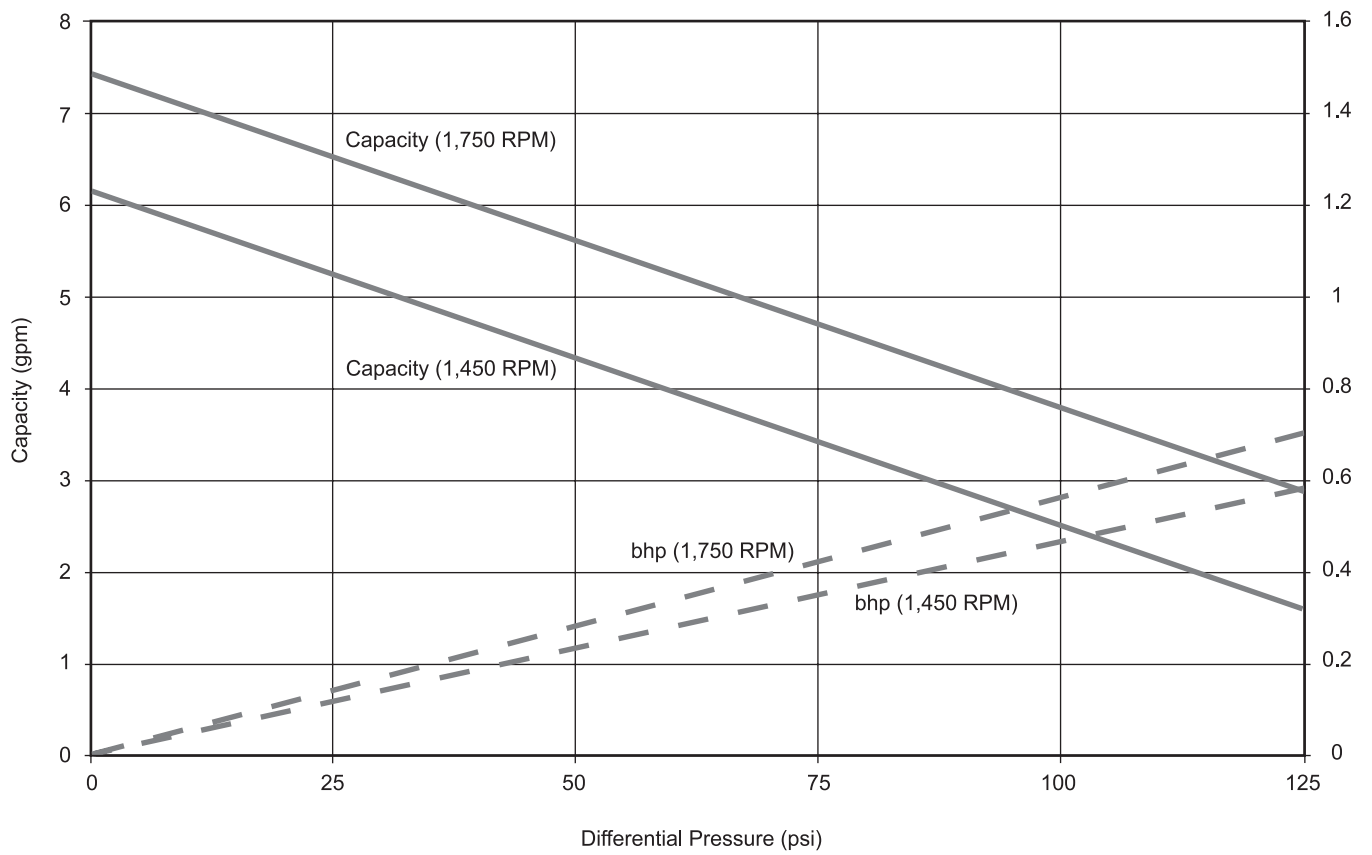
¹Ryton[®], Viton[®] and Neoprene[®] are registered trademarks of the DuPont Company.

Appendix B—Specifications for V-Belt Selection

1,450 RPM Motor			Motor Hp	Nominal Pump RPM	1,750 RPM Motor			
Belt Number	Sheave Pitch Diameter				Sheave Pitch Diameter		Belt Number	
	Pump	Motor			Pump	Motor		
B64	B15.4	B7.4	2	420	1-3V14.0	1-3V3.35	3V600	
B60	B13.6	B4.2		470	1-3V10.6	1-3V2.80	3V530	
B60	B12.4	B4.2		520	1-3V10.6	1-3V3.15	3V530	
B55	B11.0	B4.2		580	1-3V10.6	1-3V3.65	3V560	
B56	B11.0	B4.8		640	1-3V8.0	1-3V3.00	3V500	
B64	B15.4	B4.4		3	420	2-3V10.6	2-3V2.65	3V530
B64	B15.4	B4.8	470		2-3V10.6	2-3V2.80	3V530	
A55	2A10.6	2A3.6	520		1-3V14.0	1-3V4.12	3V630	
B55	2B11.0	2B4.2	580		1-3V14.0	1-3V4.75	3V630	
B60	B12.4	B5.4	640		2-3V8.0	2-3V3.00	3V500	
B56	B11.0	B5.2	710		2-3V6.9	2-3V2.80	3V475	
B53	B9.4	B4.8	780		1-3V8.0	1-3V3.65	3V500	
B53	B8.6	B5.0	860		2-3V5.3	2-3V2.65	3V450	
B51	B7.4	B4.8	950		1-3V6.5	1-3V3.65	3V475	
B64	2B15.4	2B4.4	5		420	3-A13.2	3-A3.2	A60
B60	2B13.6	2B4.2			470	2-A13.2	2-A3.6	A60
B60	2B12.4	2B4.2		520	2-A12.0	2-A3.6	A56	
B55	2B11.0	2B4.2		580	2-3V10.6	2-3V3.65	3V560	
B56	2B11.0	2B4.8		640	3-3V8.0	3-3V3.00	3V500	
B56	2B11.0	2B5.2		710	2-3V8.0	2-3V3.35	3V500	
B53	2B9.4	2B4.8		780	2-3V6.9	2-3V3.15	3V475	
B53	2B8.6	2B5.0		860	2-3V6.5	2-3V3.15	3V475	
B51	2B7.4	2B4.8		950	2-3V6.0	2-3V3.35	3V475	
B64	3B15.4	3B4.4	7-1/2	420	4-A13.2	4-A3.2	A60	
B64	2B15.4	2B4.8		470	3-A13.2	3-A3.6	A60	
B60	3B12.7	3B4.2		520	3-3V14.0	3-3V4.12	3V630	
B55	3B11.0	3B4.2		580	2-3V14.0	2-3V4.75	3V630	
B56	3B11.0	3B4.8		640	2-3V14.0	2-3V5.30	3V630	
B56	3B11.0	3B5.2		710	2-3V10.6	2-3V4.50	3V560	
B53	3B9.4	3B4.8		780	3-3V6.9	3-3V3.15	3V475	
B53	3B8.6	3B5.0		860	3-3V6.5	3-3V3.15	3V475	
B51	3B7.4	3B4.8		950	2-3V8.0	2-3V4.50	3V530	
B71	3B18.4	3B5.2	10	420	3-3V19.0	3-3V4.50	3V710	
B71	2B18.4	2B5.8		470	3-3V19.0	3-3V5.00	3V710	
B60	4B12.4	4B4.2		520	3-3V14.0	3-3V4.12	3V630	
B55	4B11.0	4B4.2		580	3-3V14.0	3-3V4.50	3V630	
B56	4B11.0	4B4.8		640	2-3V14.0	2-3V5.30	3V630	
B62	3B12.4	3B5.8		710	2-3V14.0	2-3V5.60	3V630	
B56	3B11.0	3B5.8		780	2-B12.4	2-B5.6	B60	
B62	3B12.4	3B7.0		860	2-3V10.6	2-3V5.30	3V560	
B60	3B9.4	3B6.0		950	2-3V10.6	2-3V5.60	3V560	
B71	4B18.4	4B5.2	15	420	4-3V19.0	4-3V4.75	3V710	
B71	3B18.4	3B5.8		470	4-3V19.0	4-3V5.00	3V710	
B62	5B13.6	5B4.8		520	3-3V19.0	3-3V5.60	3V750	
B60	5B12.4	5B4.8		580	4-3V14.0	4-3V4.75	3V630	
B56	5B11.0	5B4.8		640	3-3V14.0	3-3V5.30	3V630	
B56	5B11.0	5B5.2		710	3-3V14.0	3-3V5.60	3V630	
B53	5B9.4	5B4.8		780	3-B12.4	3-B5.6	B60	
B53	5B8.6	5B5.0		860	2-B12.4	2-B6.0	B60	
B51	5B7.4	5B4.8		950	2-B11.0	2-B6.0	B56	
B75	4B18.4	4B6.6	20	520	4-3V19.0	4-3V5.60	3V750	
B68	4B15.4	4B6.8		640	4-3V14.0	4-3V5.30	3V630	
B64	4B12.4	4B6.6		780	3-B13.6	3-B6.0	B62	
B68	3B13.6	3B8.0		860	4-3V10.6	4-3V5.30	3V560	
B65	3B12.4	3B8.0		950	3-B11.0	3-B6.0	B56	

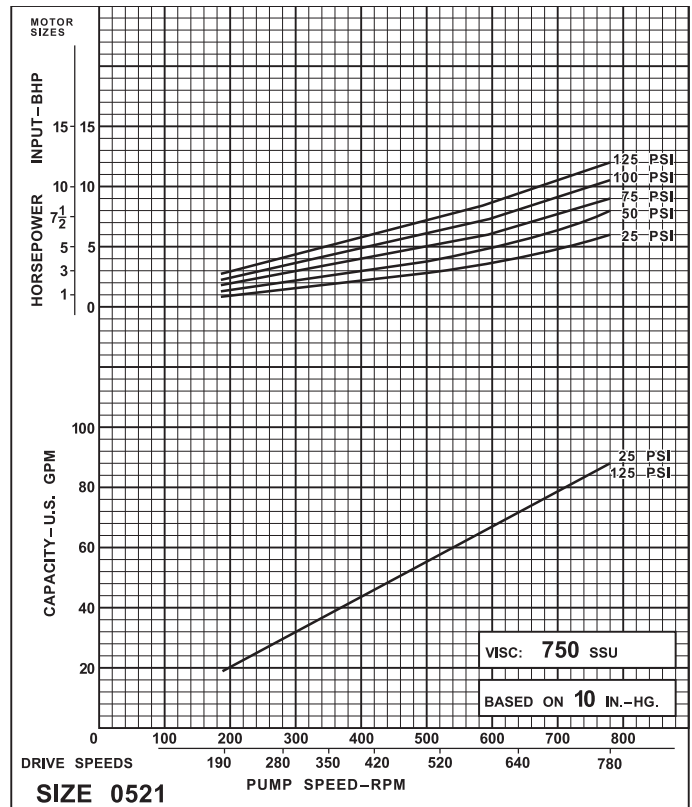
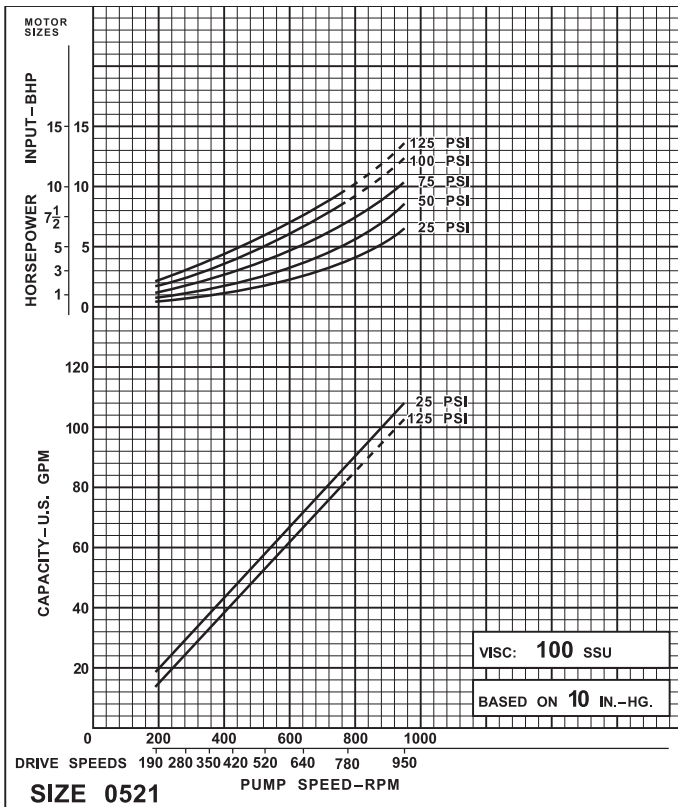
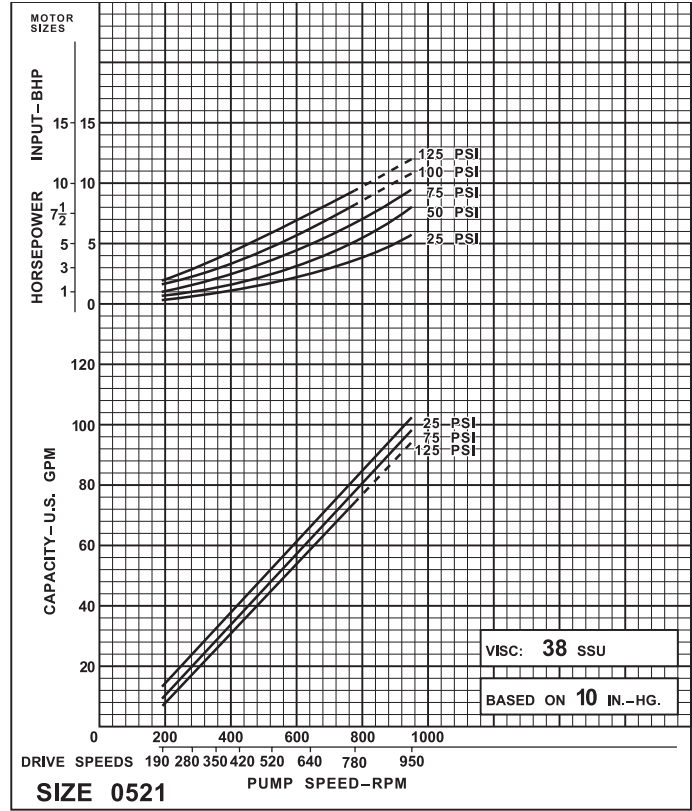
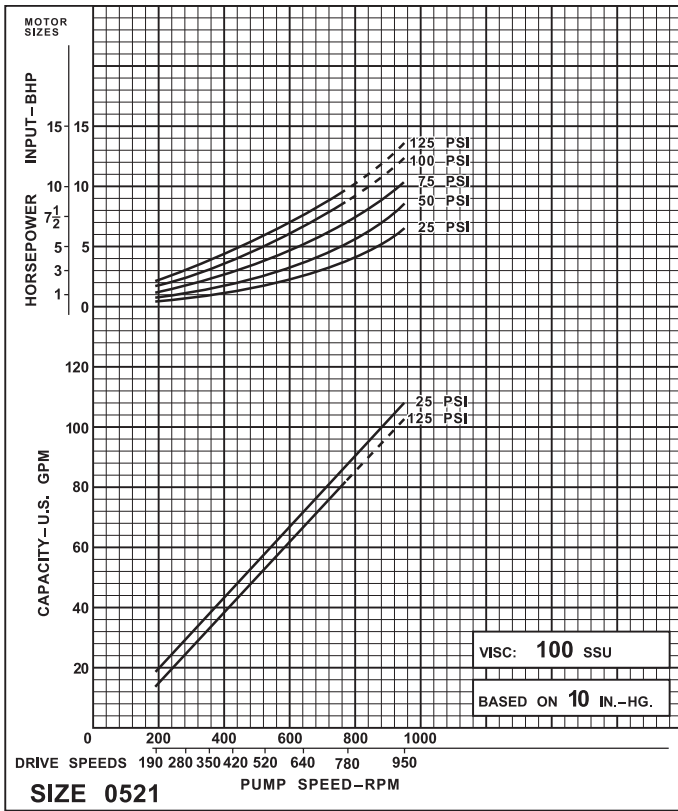
Do not use a V-belt drive system on a Coro-Vane® pump with a driver greater than 25 horsepower. Consult factory if your application is outside this parameter.

Appendix C—Performance Curves For Models C51, D51 and F51



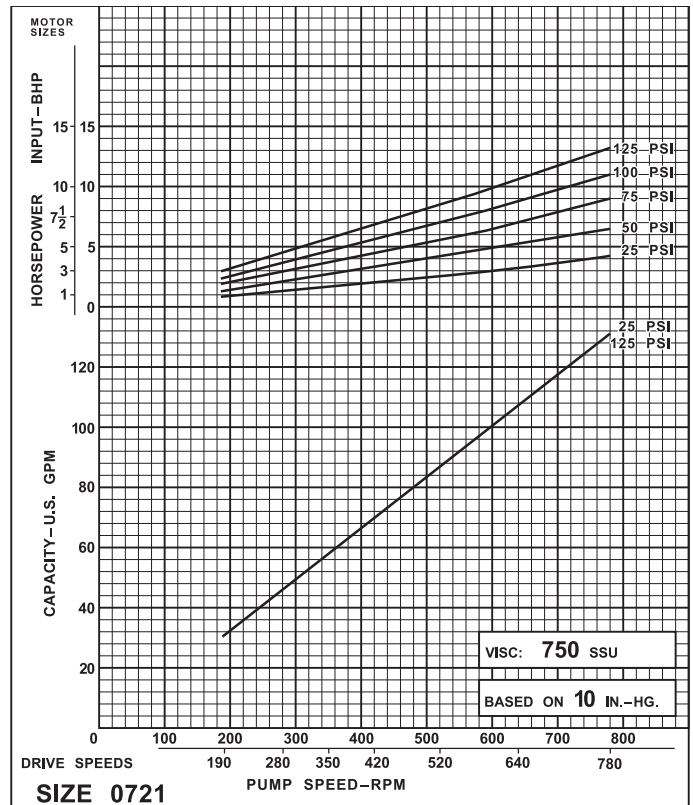
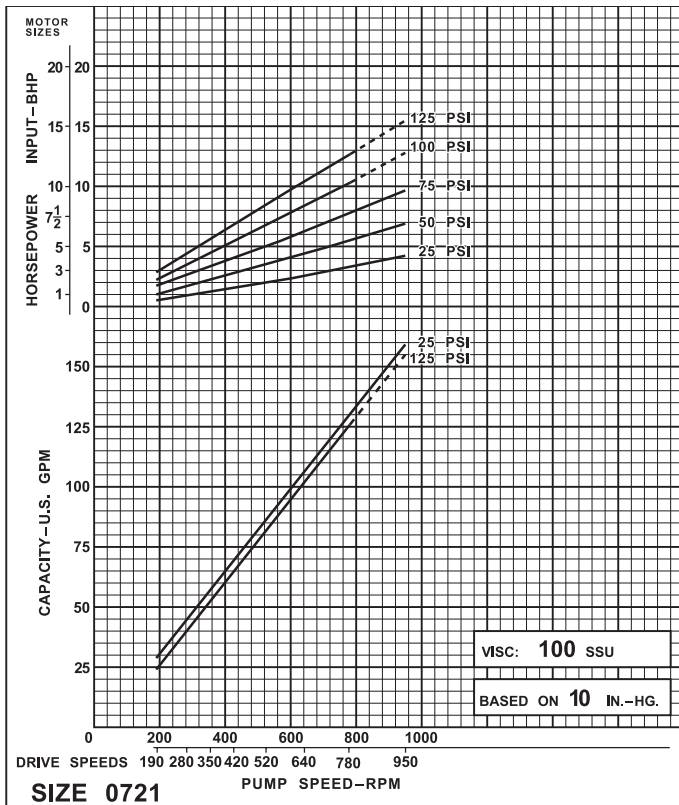
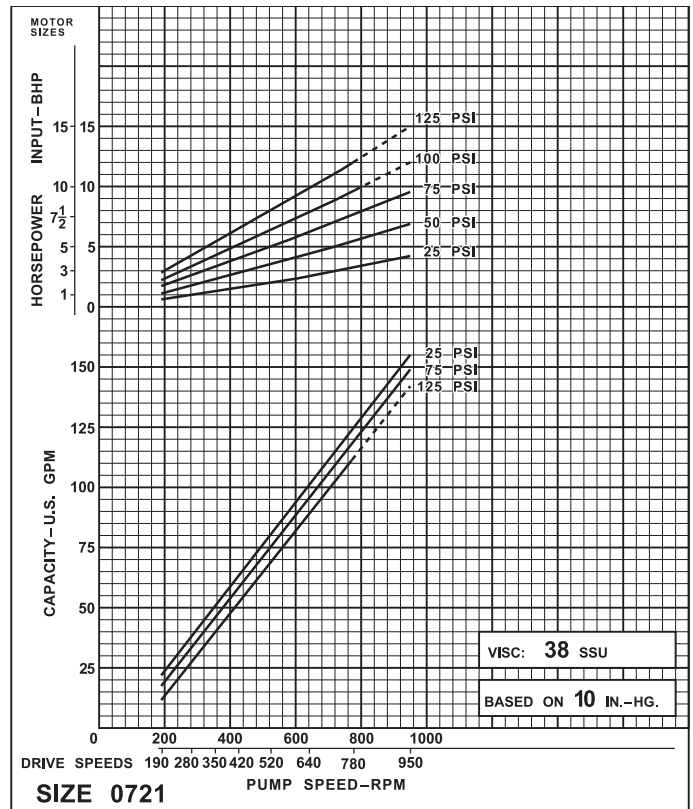
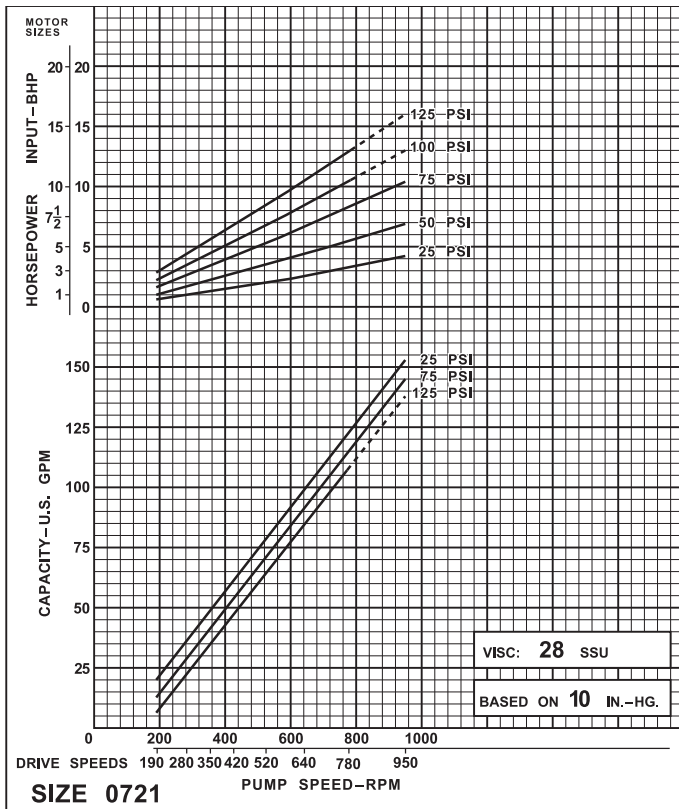
Appendix C—Performance Curves

For All Mechanically Sealed Models 0521/22

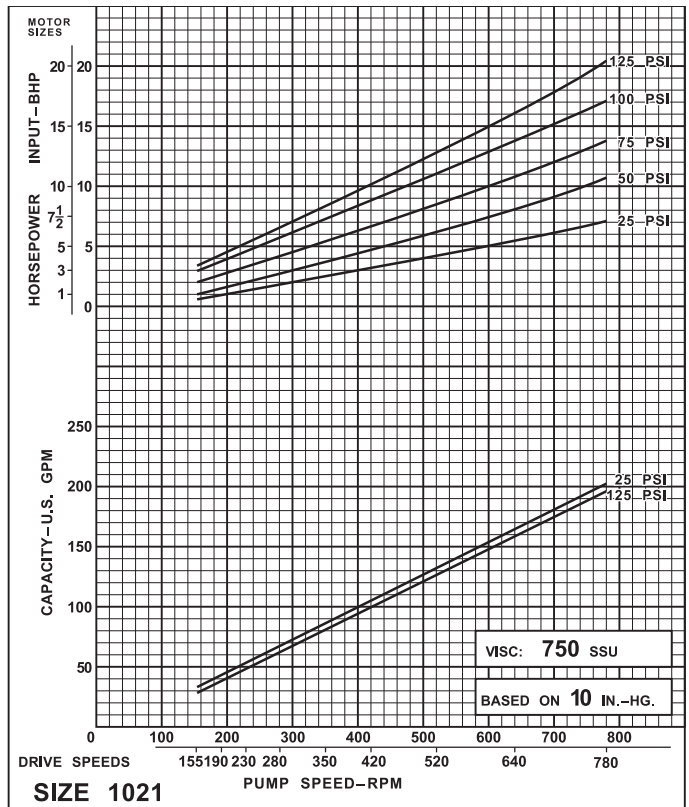
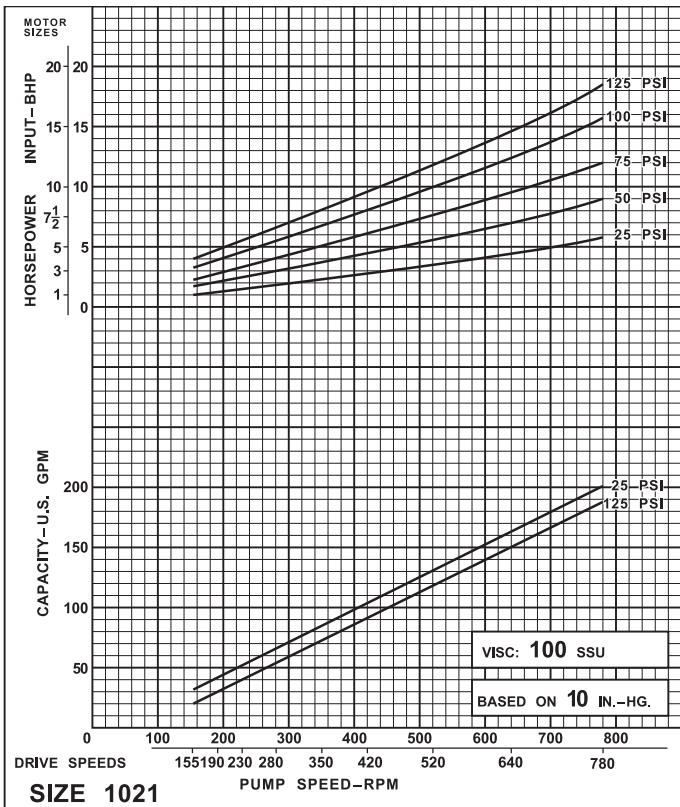
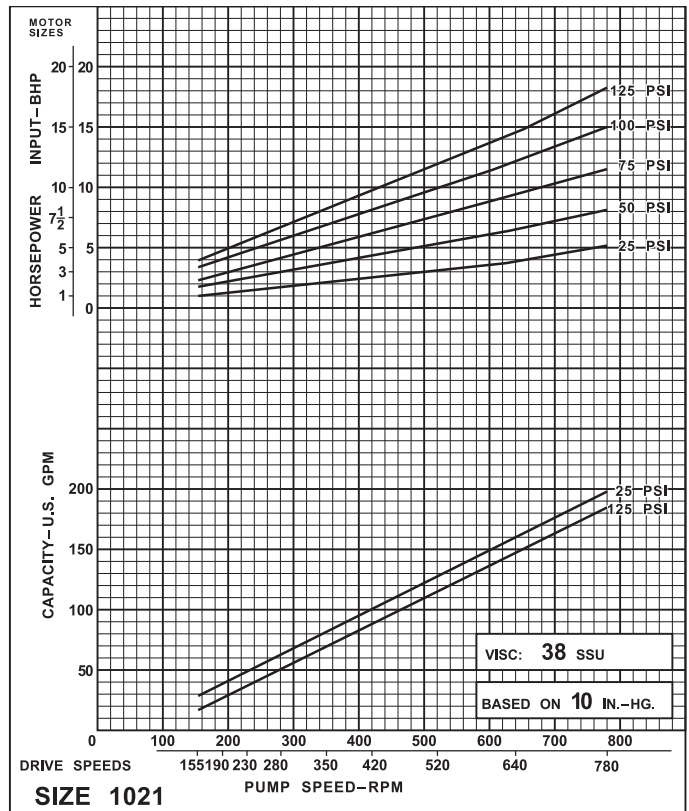
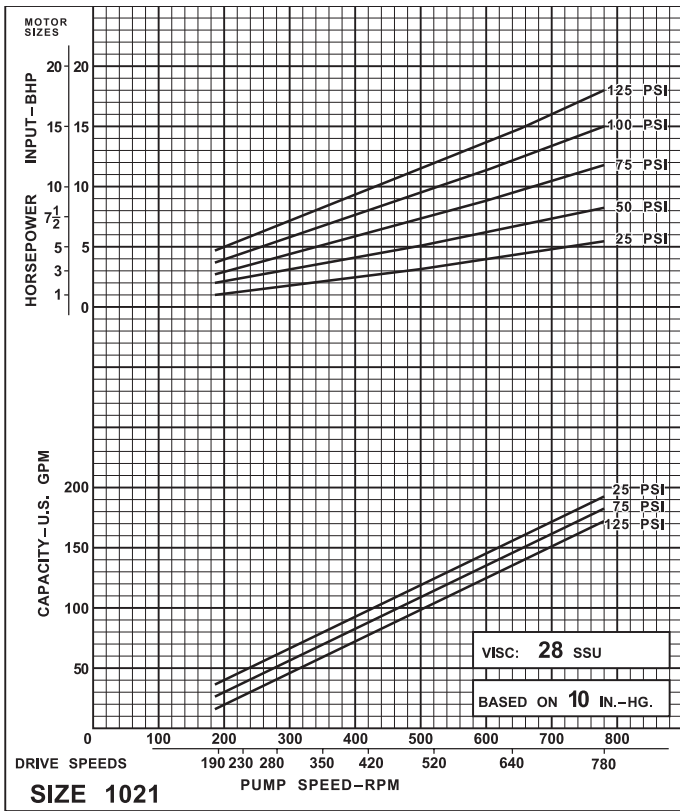


Appendix C—Performance Curves

For All Mechanically Sealed Models 0721/22

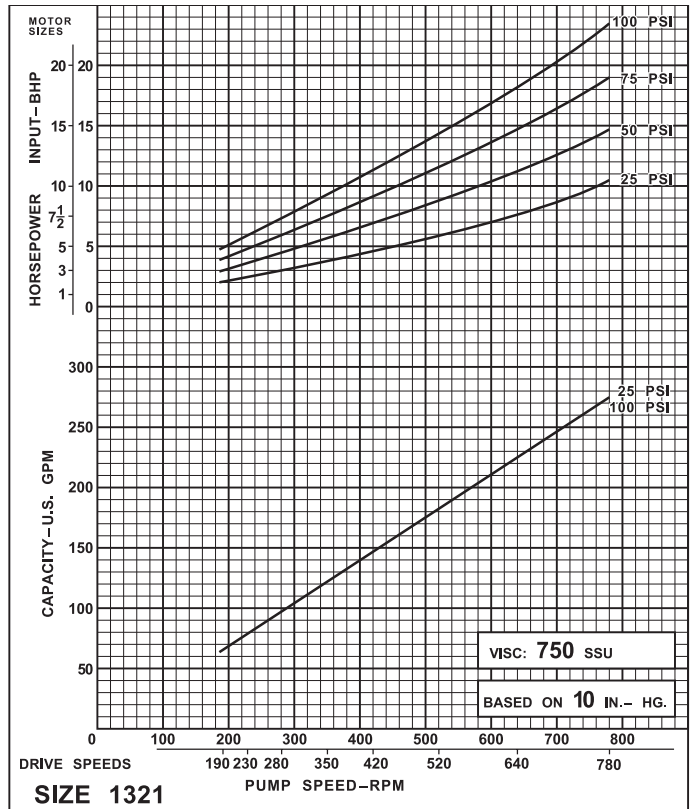
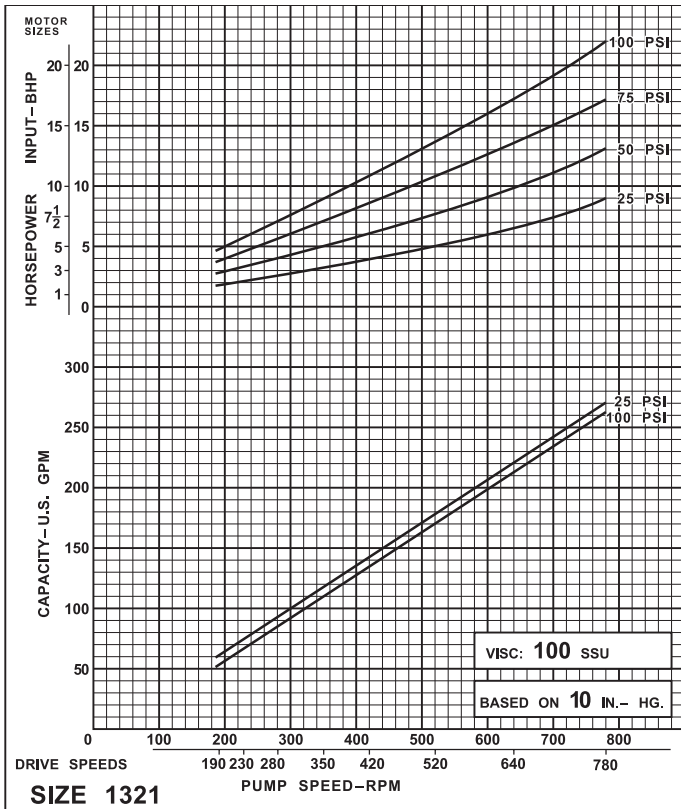
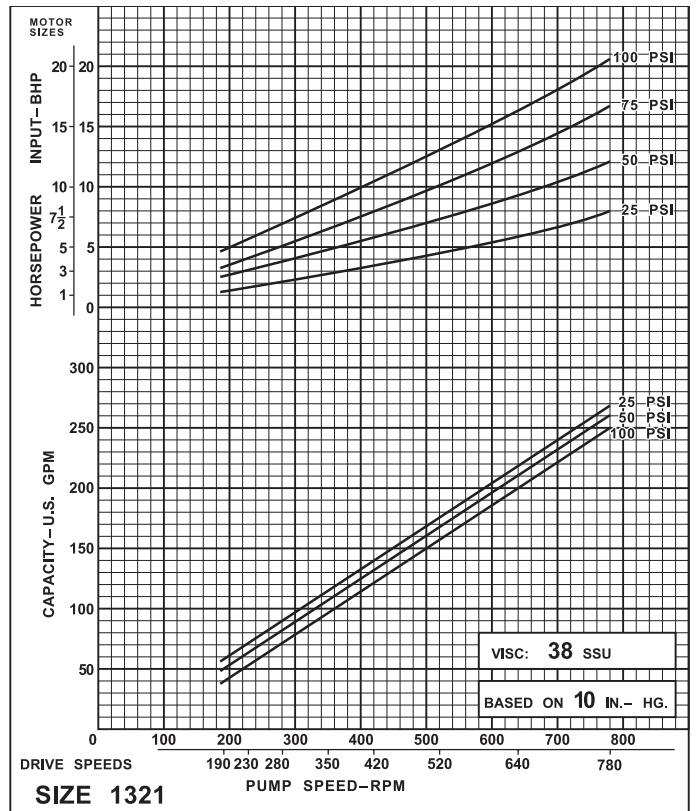
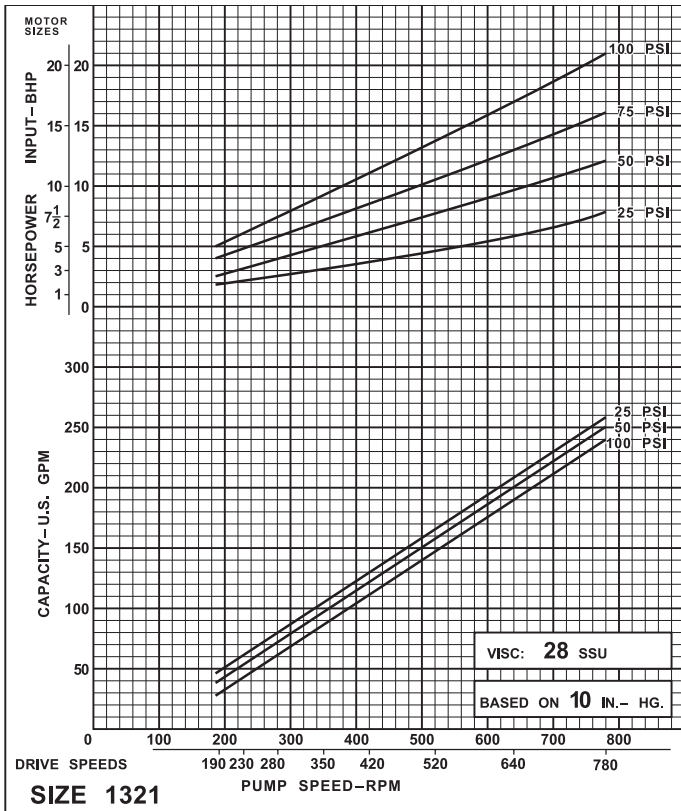


Appendix C—Performance Curves For All Mechanically Sealed Models 1021/22

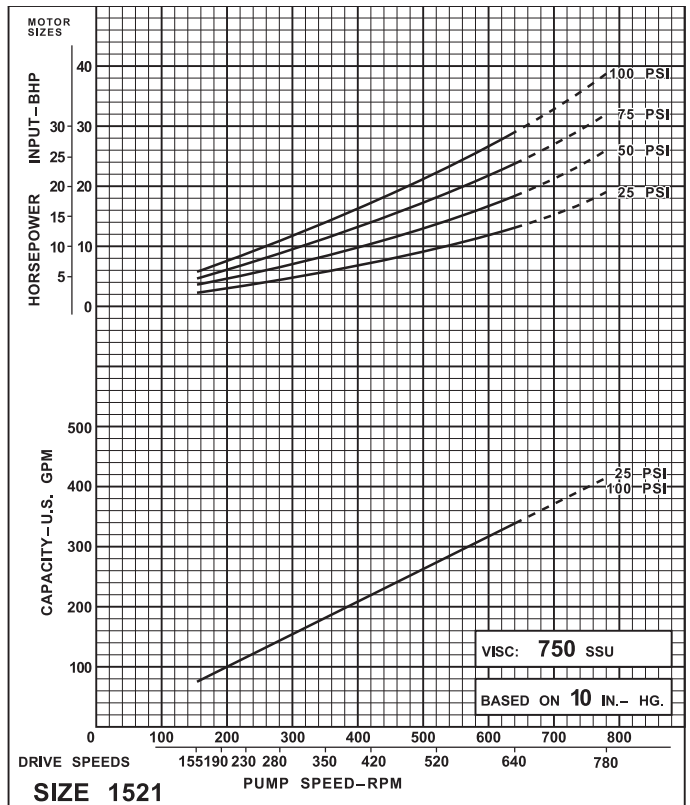
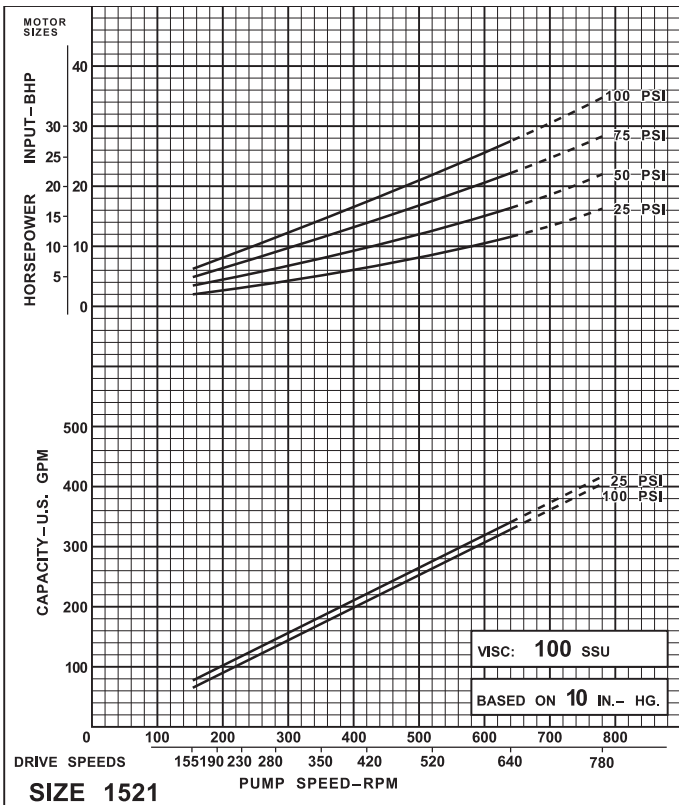
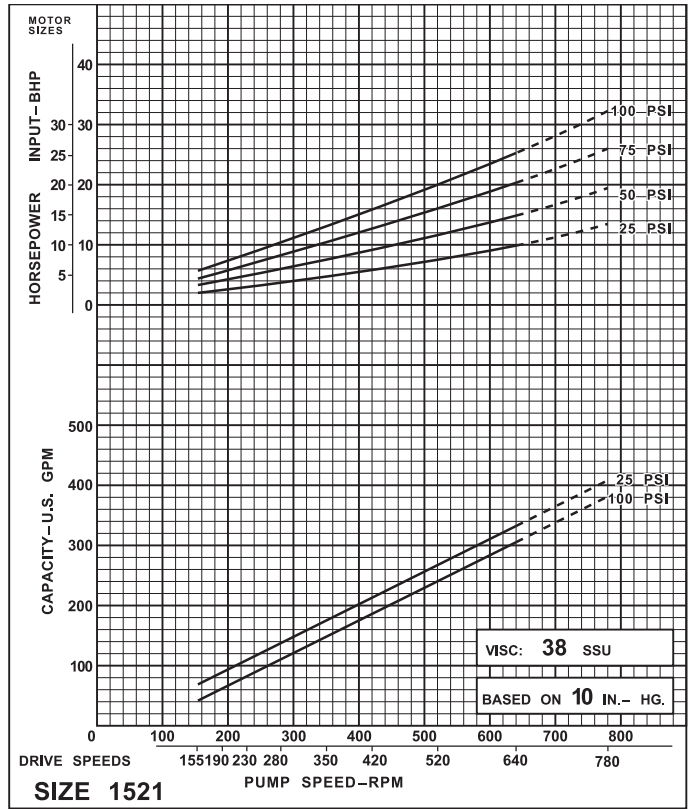
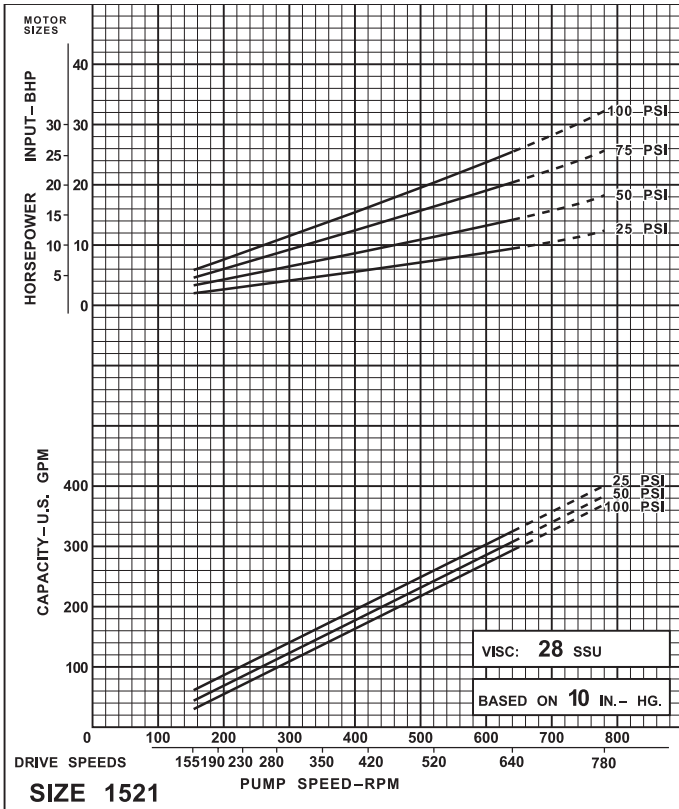


Appendix C—Performance Curves

For All Mechanically Sealed Models 1321/22



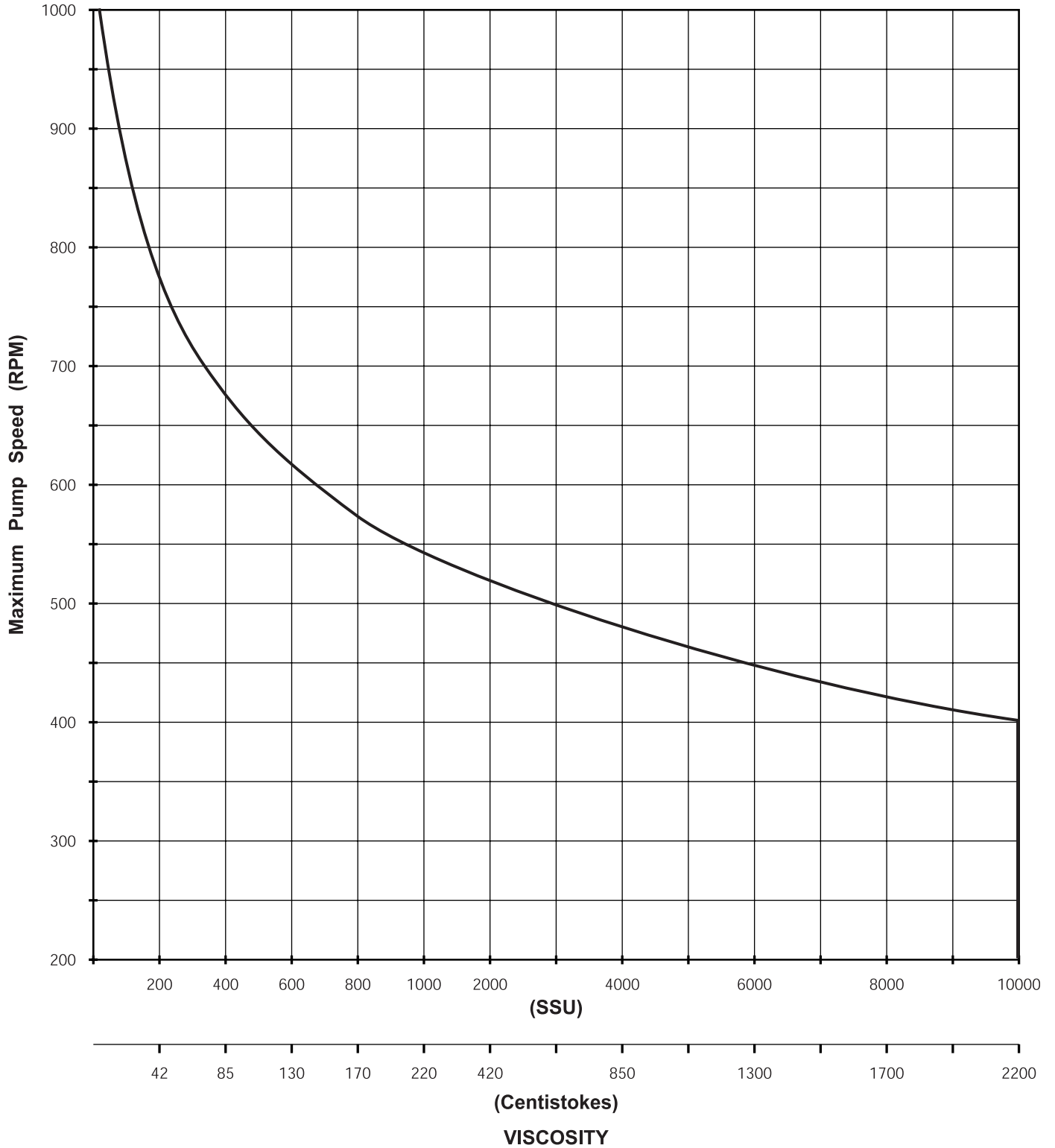
Appendix C—Performance Curves For All Mechanically Sealed Models 1521/22



Appendix C—Viscosity Performance Curves

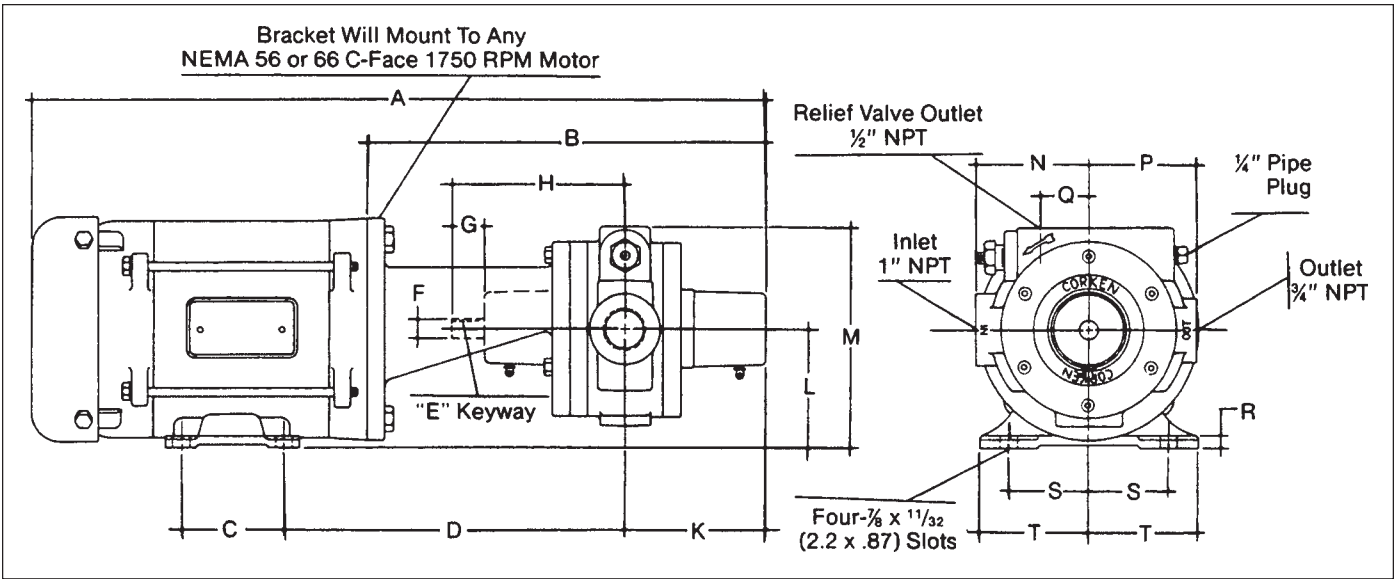
For All Coro-Vane® Industrial Pumps

The graph below provides recommendations for maximum pump speed when operating at elevated viscosities. Use this as a guideline when determining the pump speed for your application. Currently our published performance curves stop at just under 1,000 SSU. For applications in which the liquid exceeds this viscosity, please contact your local distributor or call our factory.

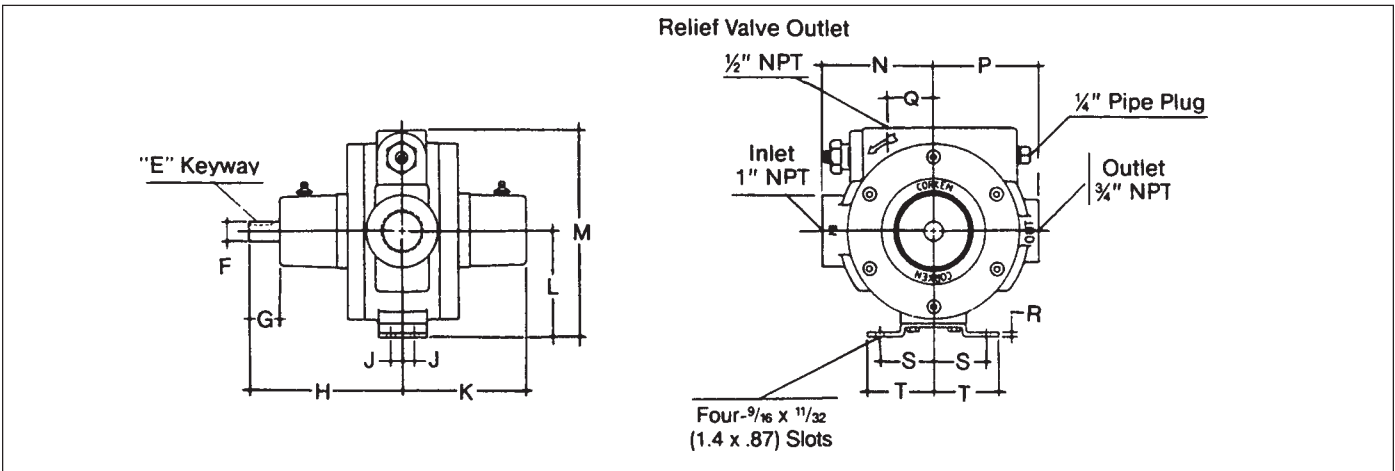


Appendix D—Outline Dimensions For Models C51, D51 and F51

C51 Model



F51 Model

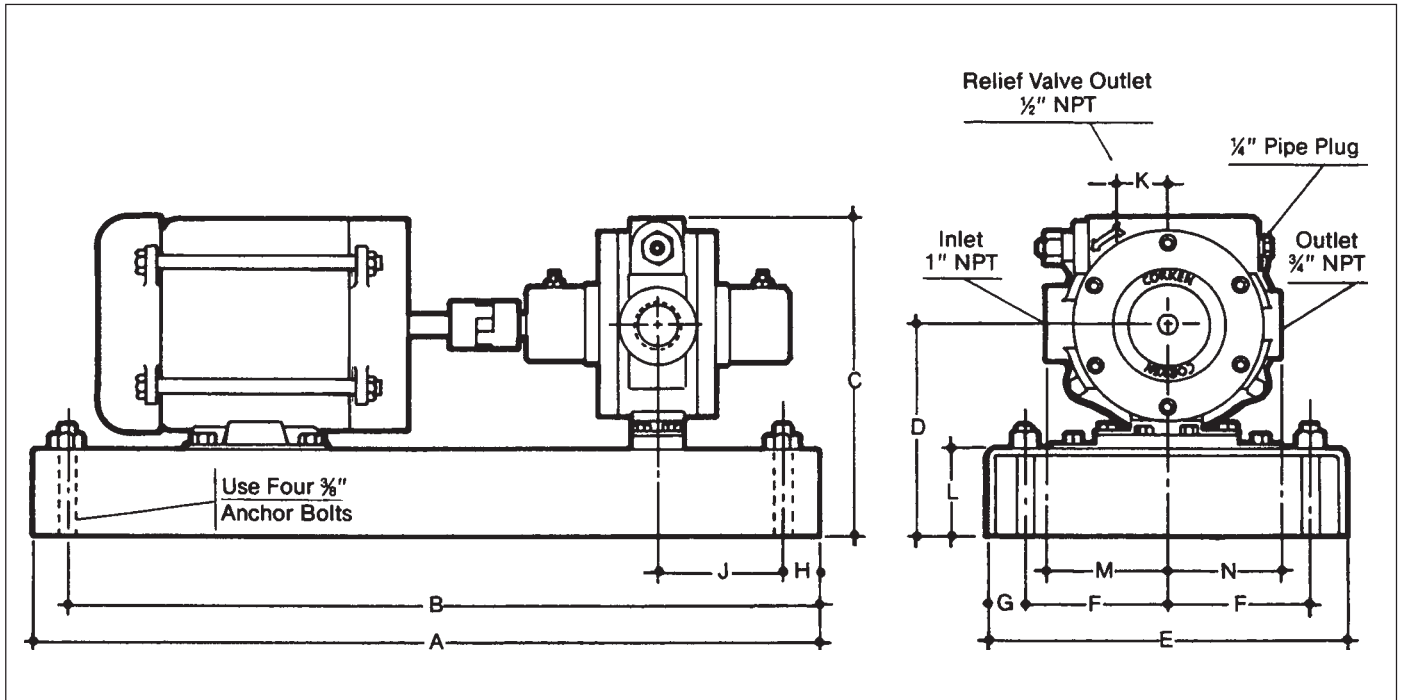


Outline Dimensions—Inches (Centimeters)

Model	A	B	C	D	E	F	G	H	J
C51	23 (58.4)	1-5/16 (28.7)	3 (7.62)	10-3/16 (25.9)	1/8 (0.32)	9/16 (1.43)	15/16 (2.38)	4-5/8 (11.7)	— —
F51	—	—	—	—	1/8 (0.32)	9/16 (1.43)	15/16 (2.38)	4-5/8 (11.7)	7/16 (1.10)

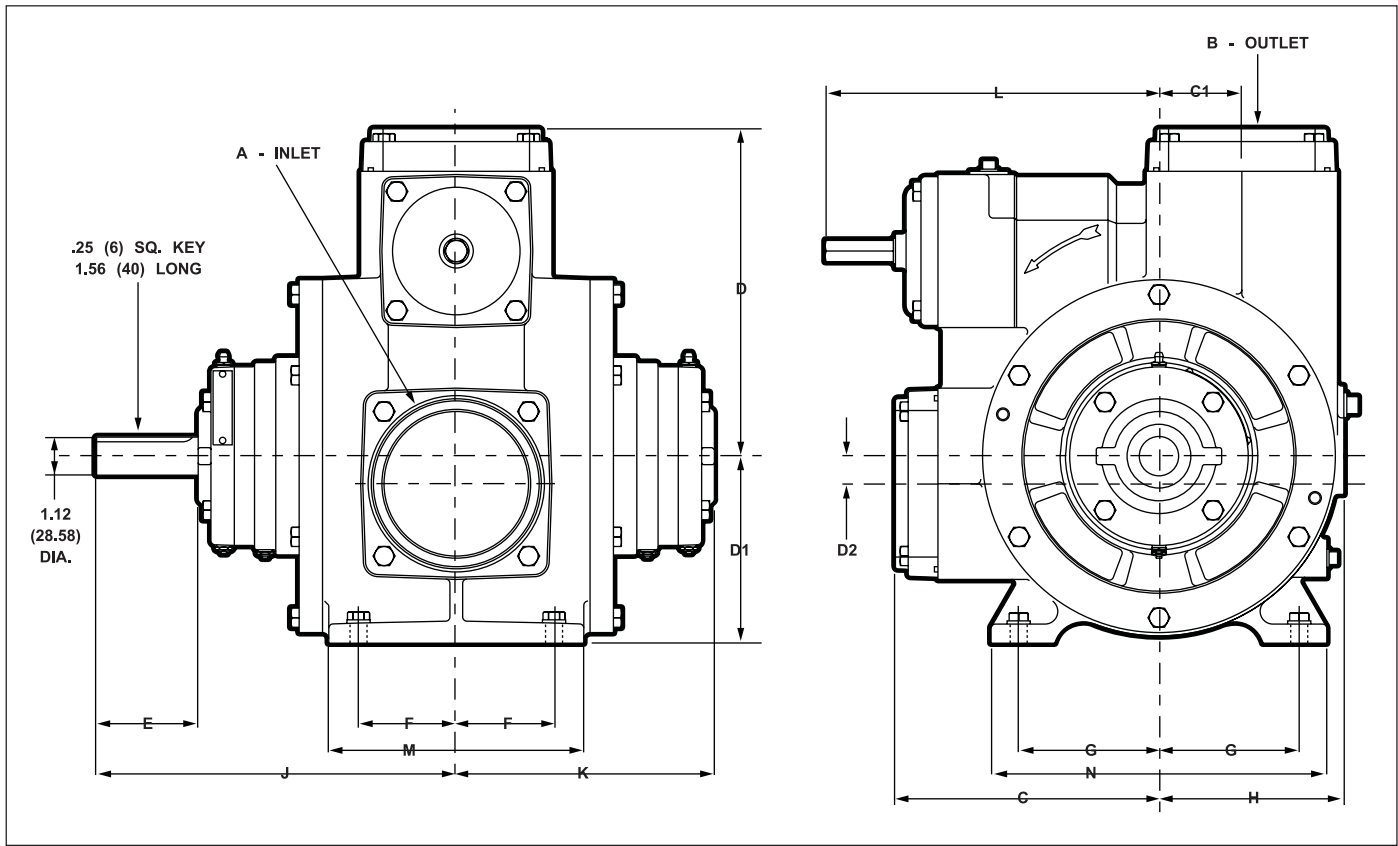
Model	K	L	M	N	P	Q	R	S	T
C51	3-11/16 (9.36)	3-1/2 (8.89)	6-1/2 (16.5)	3-3/8 (8.57)	3-3/16 (8.10)	1-7/8 (3.65)	7/32 (0.56)	2-7/16 (6.19)	3-1/4 (8.26)
F51	3-11/16 (9.36)	3-1/8 (7.93)	6-1/8 (15.6)	3-3/8 (8.57)	3-3/16 (8.10)	1-7/16 (3.65)	1/8 (0.32)	1-11/16 (4.29)	2 (5.08)

Appendix D—Outline Dimensions For Model F51-103



Outline Dimensions—Inches (Centimeters)													
Model	A	B	C	D	E	F	G	H	J	K	L	M	N
F51-101	22 (55.9)	20 (50.8)	9 (22.9)	6 (15.2)	10 (25.4)	4 (10.2)	1 (2.54)	1 (2.54)	3-1/2 (8.89)	1-7/16 (3.65)	2-1/2 (6.35)	3-3/8 (8.57)	3-3/16 (8.10)

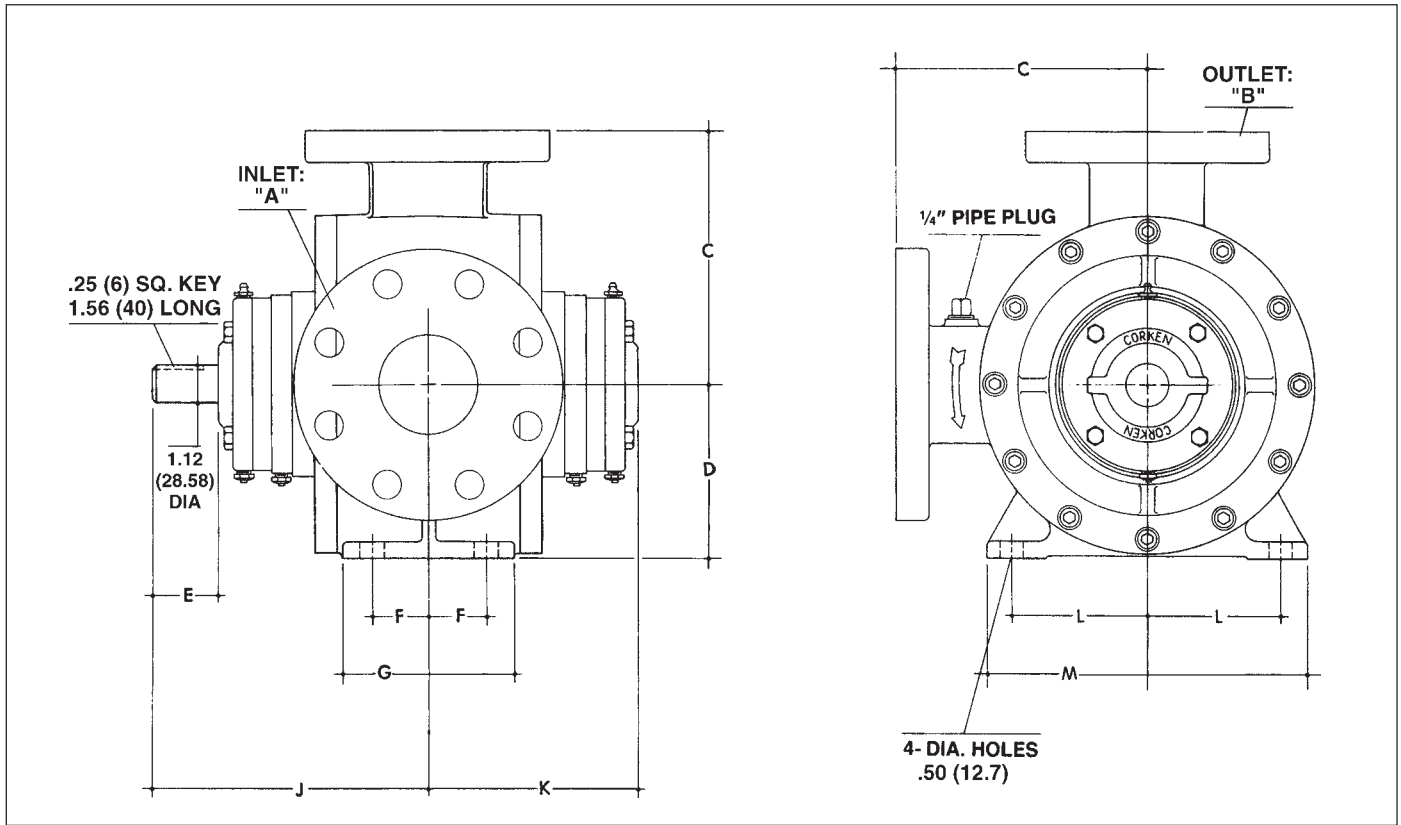
Appendix D—Outline Dimensions For All CP-Series (CPBN) and CD-Series (CDBN) Models with NPT Flanges



Model	A Inlet	B Outlet	C	C1*	D	D1	D2*	E	F	G	H	J	K	L	M	N
CPBN0521 (in/mm)	STD: 2" NPT OPT: 2-1/2" NPT 3" NPT	STD: 2" NPT OPT: 2-1/2" NPT 1-1/2" NPT	6.13 157	0 0	6.13 157	5.00 127	0 0	2.00 51	1.38 35	4.00 102	4.69 119	7.88 200	5.88 149	7.38 187	3.75 95	9.00 229
CPBN0721	STD: 2-1/2" NPT OPT: 3" NPT	STD: 2-1/2" NPT OPT: 2" NPT & 3" NPT	5.62 143	1.16 29	5.75 146	4.56 116	0.81 21	2.00 51	1.50 38	3.38 86	4.56 116	8.69 221	6.69 170	10.19 259	4.50 114	8.19 208
CPBN1021	STD: 3" NPT OPT: 2-1/2" NPT	STD: 3" NPT OPT: 2" NPT 2-1/2" NPT	6.88 175	3.13 79	7.63 194	5.50 140	0 0	2.00 51	1.75 44	4.12 105	5.50 140	8.44 214	6.44 164	8.88 225	5.25 133	9.88 251
CPBN 1321	STD: 4" NPT	STD: 3" NPT OPT: 4" NPT	7.75 197	2.44 62	9.62 244	5.50 140	0.81 21	3.00 76	2.88 73	4.12 105	5.38 137	10.62 270	7.62 194	9.38 238	7.50 191	9.88 251
CPBN1521	STD: 4" NPT	STD: 4" NPT OPT: 3" NPT	7.75 197	2.44 62	9.62 244	5.50 140	0.81 21	3.00 76	2.88 73	4.12 105	5.38 137	10.62 270	7.62 194	9.38 238	7.50 191	9.88 251
CDBN0521	STD: 2" NPT OPT: 2-1/2" NPT	STD: 2" NPT OPT: 2-1/2" NPT & 1-1/2" NPT	6.13 157	0 0	6.13 157	5.00 127	0 0	2.00 51	1.38 35	4.00 102	4.69 119	7.88 200	5.88 149	7.38 187	3.75 95	9.00 229
CDBN1021	STD: 3" NPT OPT: 4" NPT	STD: 3" NPT OPT: 4" NPT	7.06 179	0 0	7.19 183	5.50 140	0 0	2.00 51	1.75 44	4.12 105	5.38 137	8.50 216	6.50 165	11.25 286	5.25 133	9.88 251
CDBN1321	STD: 4" NPT	STD: 3" NPT OPT: 4" NPT	7.75 197	2.44 62	9.62 244	5.50 140	0.81 21	3.00 76	2.88 73	4.12 105	5.38 137	10.62 270	7.62 194	9.38 238	7.50 191	9.88 251
CDBN1521	STD: 4" NPT	STD: 4" NPT OPT: 3" NPT	7.75 197	2.44 62	9.62 244	5.50 140	0.81 21	3.00 76	2.88 73	4.12 105	5.38 137	10.62 270	7.62 194	9.81 249	7.50 191	9.88 251

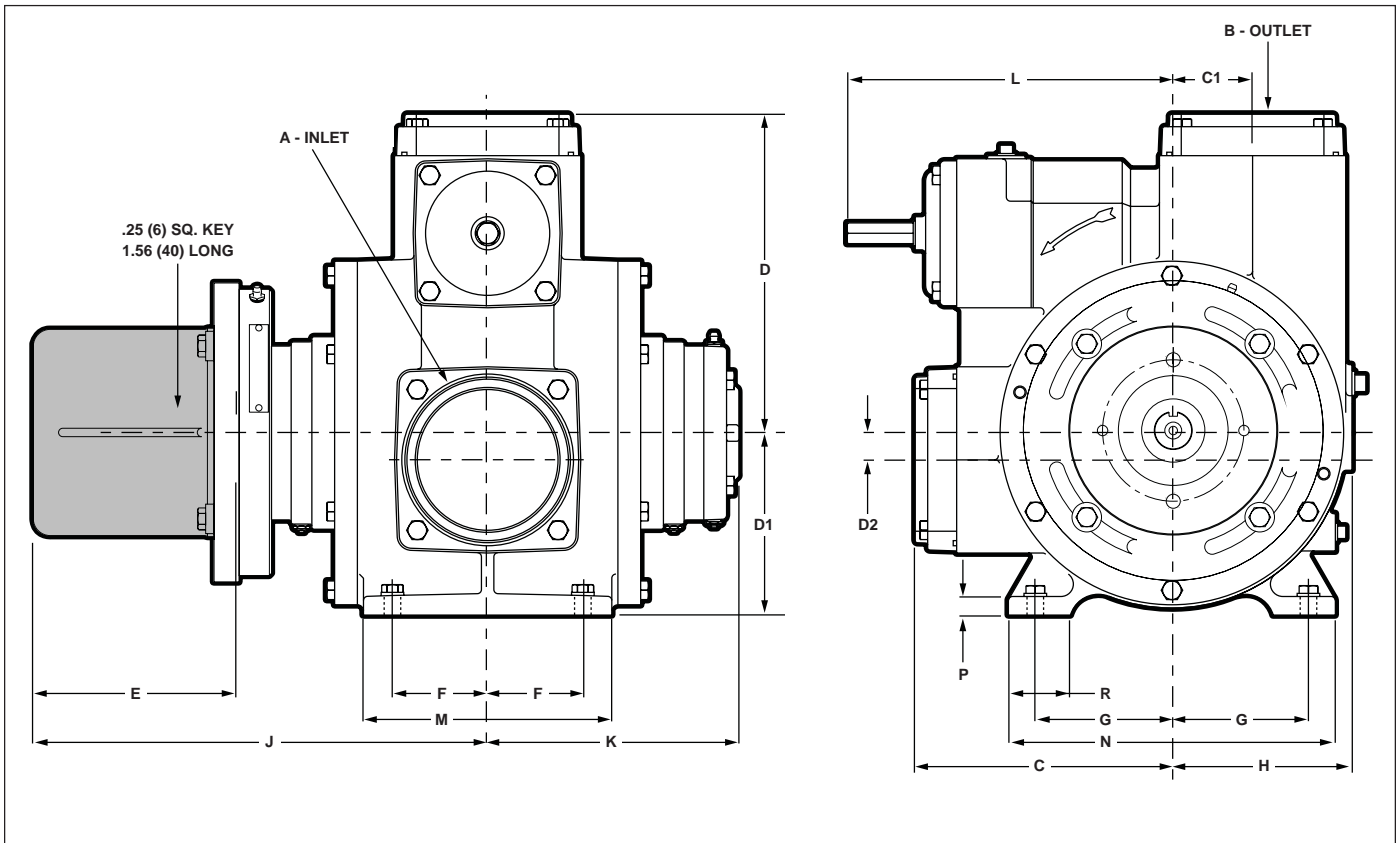
*NOTE: For some models C1 and D2 will be 0. This denotes that the suction and/or discharge flange will be centered with the shaft.

Appendix D—Outline Dimensions For All CP-Series (CPBF) and CD-Series (CDBF) Models with ANSI Flanges



Model	A Inlet	B Outlet	C	D	E	F	G	J	K	L	M
CPBF0721	3" 300# ANSI	2" 300# ANSI	7.00 178	5.00 127	2.00 51	1.38 35	4.00 102	8.69 221	6.69 170	4.00 102	9.25 235
CPBF1021	3" 300# ANSI	2-1/2" 300# ANSI	7.75 197	5.50 140	2.00 51	1.75 44	5.25 133	8.50 216	6.50 165	4.12 105	9.88 251
CPBF1321	4" 300# ANSI	3" 300# ANSI	7.84 199	5.50 140	3.00 76	2.88 73	7.50 191	10.62 270	7.62 194	4.12 105	9.88 251
CPBF1521	4" 300# ANSI	3" 300# ANSI	7.84 199	5.50 140	3.00 76	2.88 73	7.50 191	10.62 270	7.62 194	4.12 105	9.88 251
CDBF1021	3" 300# ANSI	2-1/2" 300# ANSI	7.75 197	5.50 140	2.00 51	1.75 44	5.25 133	8.50 216	6.50 165	4.12 105	9.88 251
CDBF1321	4" 300# ANSI	3" 300# ANSI	7.84 199	5.50 140	3.00 76	2.88 73	7.50 191	10.62 270	7.62 194	4.12 105	9.88 251
CDBF1521	4" 300# ANSI	3" 300# ANSI	7.84 199	5.50 140	3.00 76	2.88 73	7.50 191	10.62 270	7.62 194	4.12 105	9.88 251

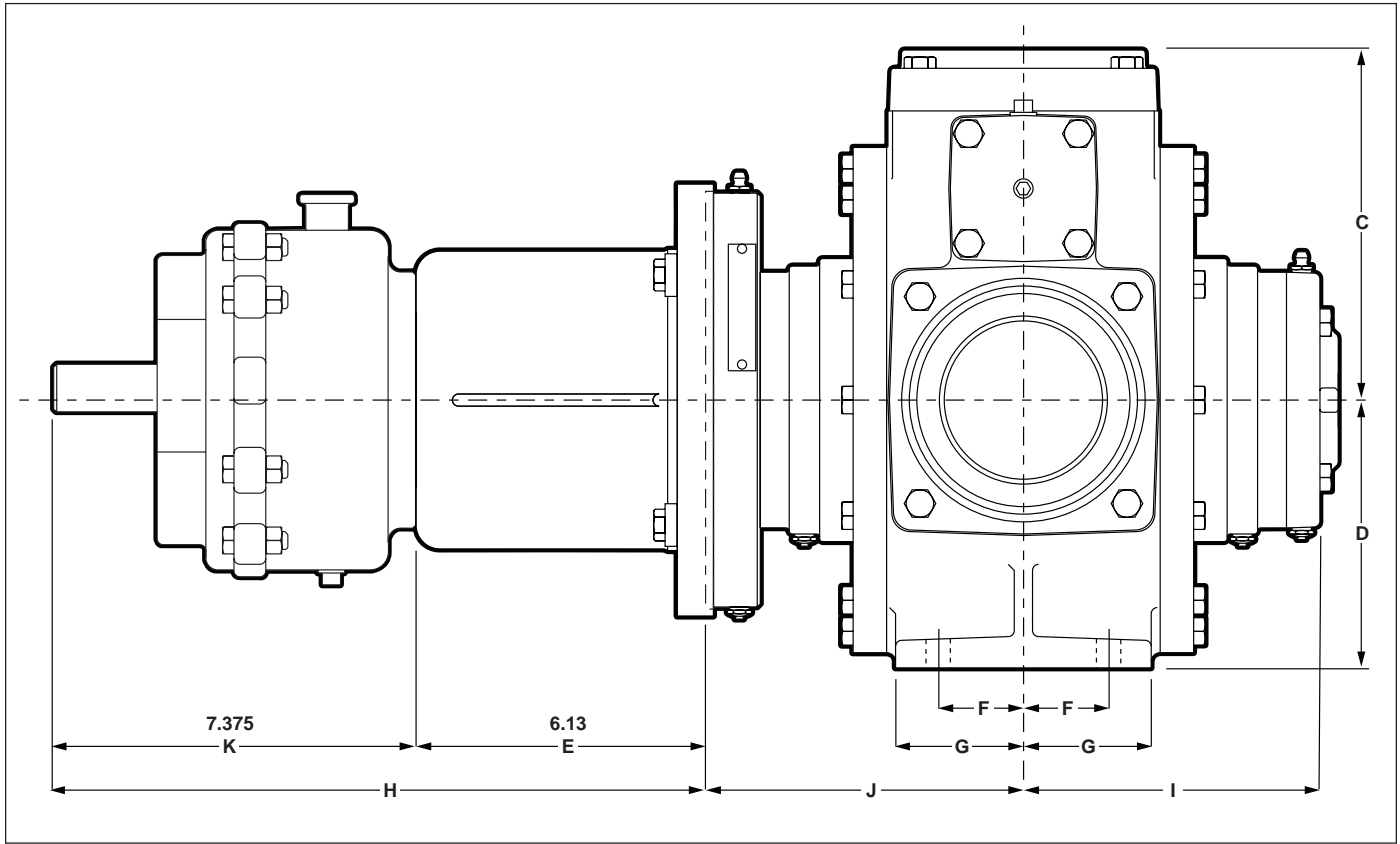
Appendix D—Outline Dimensions For All CP-Series (CPHN) and CD-Series (CDHN) Hydraulic Drive Models with NPT Flanges



Model	A Inlet	B Outlet	C	C1*	D	D1	D2*	E	F	G	H	J	K	L	M	N
CPHN0521	STD: 2" NPT	STD: 2" NPT	6.13	0	6.13	5.00	0	6.13	1.38	4.00	4.69	12.00	5.88	7.38	3.75	9.00
	OPT: 2-1/2" NPT 3" NPT	OPT: 2-1/2" NPT 1-1/2" NPT	157	0	157	127	0	157	35	102	119	305	149	187	95	229
CPHN0721	STD: 2-1/2" NPT	STD: 2-1/2" NPT	5.62	1.16	5.75	4.56	0.81	6.13	1.50	3.38	4.56	12.81	6.69	10.19	4.50	8.19
	opt: 3" NPT	OPT: 2" NPT	143	29	146	116	21	157	38	86	116	325	170	259	114	208
CPHN1021	STD: 3" NPT	STD: 3" NPT	6.88	3.13	7.63	5.50	0	6.13	1.75	4.12	5.50	12.56	6.44	8.88	5.25	9.88
	OPT: 2-1/2" NPT	OPT: 2-1/2" NPT 2" NPT	175	79	194	140	0	157	44	105	140	319	164	225	133	251
CPHN 1321	STD: 4" NPT	STD: 3" NPT	7.75	2.44	9.62	5.50	0.81	6.13	2.88	4.12	5.38	13.75	7.62	9.38	7.50	9.88
		OPT: 4" NPT	197	62	244	140	21	157	73	105	137	349	194	238	191	251
CPHN1521	STD: 4" NPT	STD: 4" NPT	7.75	2.44	9.62	5.50	0.81	6.13	2.88	4.12	5.38	13.75	7.62	9.38	7.50	9.88
		OPT: 3" NPT	197	62	244	140	21	157	73	105	137	349	194	238	191	251
CDHN0521	STD: 2" NPT	STD: 2" NPT	6.13	0	6.13	5.00	0	6.13	1.38	4.00	4.69	12.00	5.88	7.38	3.75	9.00
	OPT: 2-1/2" NPT	OPT: 2-1/2" NPT 1-1/2" NPT	157	0	157	127	0	157	35	102	119	305	149	187	95	229
CDHN1021	STD: 3" NPT	STD: 3" NPT	7.06	0	7.19	5.50	0	6.13	1.75	4.12	5.38	12.63	6.50	11.25	5.25	9.88
	OPT: 4" NPT	OPT: 4" NPT	179	0	183	140	0	157	44	105	137	321	165	286	133	251
CDHN1521	STD: 4" NPT	STD: 4" NPT	7.75	2.44	9.62	5.50	0.81	6.13	2.88	4.12	5.38	13.75	7.62	9.81	7.50	9.88
		OPT: 3" NPT	197	62	244	140	21	157	73	105	137	349	194	249	191	251

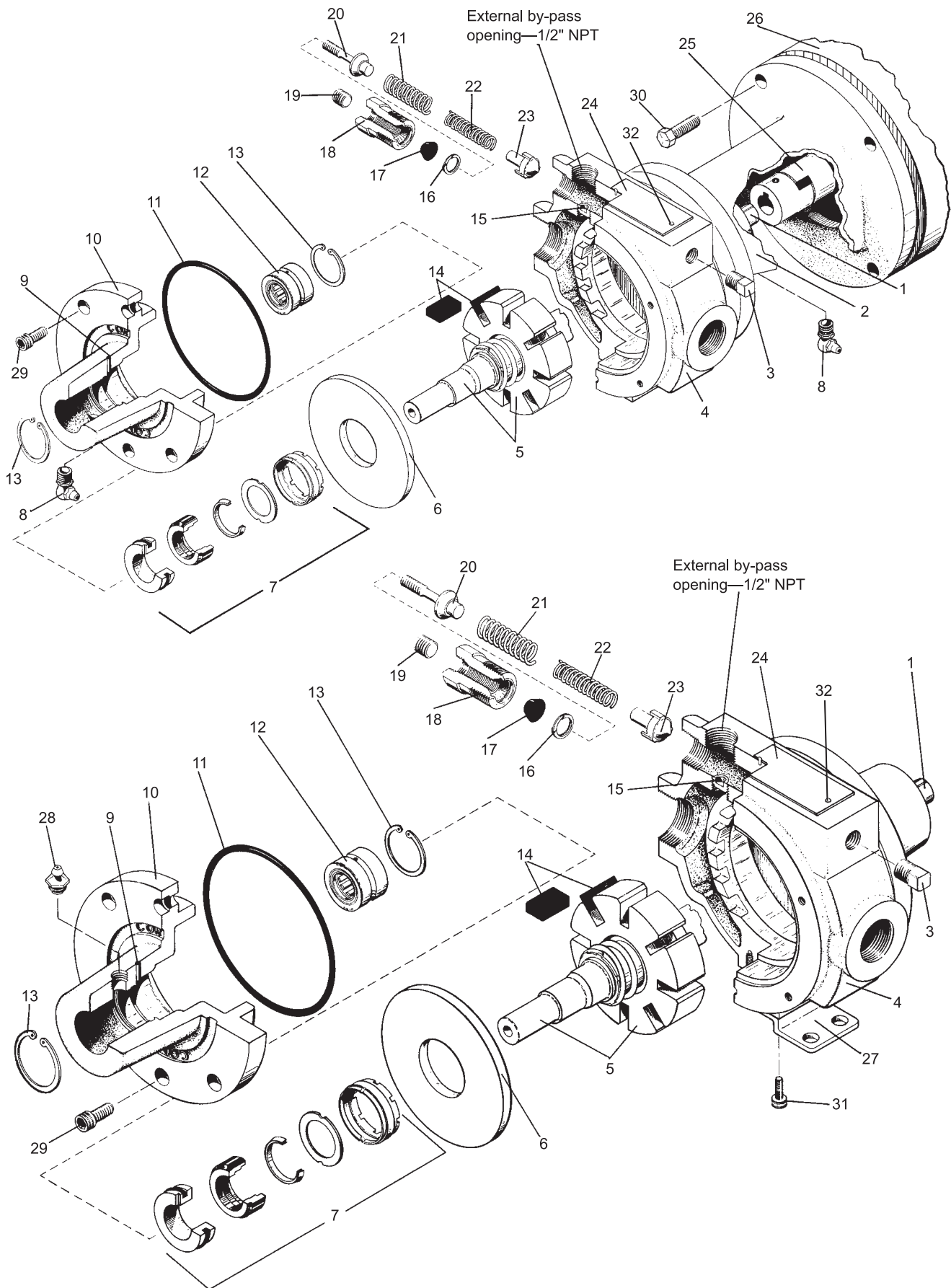
*Note: For some models C1 and D2 will be 0. This denotes that the suction and/or discharge flange will be centered with the shaft.

Appendix D—Outline Dimensions For All CP- & CD-Series Hydraulic Drive Models with Integral Gear and NPT Flanges



Model	A Inlet	B Outlet	C	D	E	F	G	H	I	J	K
CPHN0521	STD: 2" NPT	STD: 2" NPT	6.13	5.00	6.13	1.38	1.88	13.50	5.88	5.88	7.38
	OPT: 2-1/2" NPT 3" NPT	OPT: 2-1/2" NPT 1-1/2" NPT	157	127	157	35	48	343	149	149	187
CPHN0721	STD: 2-1/2" NPT	STD: 2-1/2" NPT	5.75	4.56	6.13	1.50	2.25	13.50	6.69	6.69	7.38
	OPT: 3" NPT	OPT: 2" NPT	146	116	157	38	57	343	170	170	187
CPHN1021	STD: 3" NPT	STD: 3" NPT	7.63	5.50	6.13	1.75	2.63	13.50	6.50	6.44	7.38
	OPT: 2-1/2" NPT	OPT: 2-1/2" NPT 2" NPT	194	140	157	44	67	343	165	164	187
CPHN1321	STD: 4" NPT	STD: 3" NPT	9.62	5.50	6.13	2.88	3.75	13.50	7.62	7.62	7.38
		OPT: 4" NPT	244	140	157	73	95	343	194	194	187
CPHN1521	STD: 4" NPT	STD: 3" NPT	9.62	5.50	6.13	2.88	3.75	13.50	7.62	7.62	7.38
		OPT: 3" NPT	244	140	157	73	95	343	194	194	187
CPHF0721	STD: 3" 300#	STD: 2" 300#	7.00	4.56	6.13	1.38	2.25	13.50	6.69	6.69	7.38
			178	116	157	35	57	343	170	170	187
CPHF1021	STD: 3" 300#	STD: 2-1/2" 300#	7.75	5.50	6.13	1.75	2.63	13.50	6.50	6.44	7.38
			197	140	157	44	67	343	165	164	187
CPHF1521	STD: 4" 300#	STD: 3" 300#	7.84	5.50	6.13	2.88	3.75	13.50	7.62	7.62	7.38
			199	140	157	73	95	343	194	194	187
CPHF1321	STD: 4" 300#	STD: 3" 300#	9.62	5.50	6.13	2.88	3.75	13.50	7.62	7.62	7.38
			244	140	157	73	95	343	194	194	187
CDHN0521	STD: 2" NPT	STD: 2" NPT	6.13	5.00	6.13	1.38	1.88	13.50	5.88	5.88	7.38
	OPT: 2-1/2" NPT	OPT: 2-1/2" NPT 1-1/2" NPT	157	127	157	35	48	343	149	149	187
CDHN1021	STD: 3" NPT	STD: 3" NPT	7.19	5.50	6.13	1.75	2.63	13.50	6.50	6.50	7.38
	OPT: 4" NPT	OPT: 4" NPT	183	140	157	44	67	343	165	165	187
CDHN1521	STD: 4" NPT	STD: 4" NPT	9.62	5.50	6.13	2.88	3.75	13.50	7.62	7.62	7.38
		OPT: 3" NPT	244	140	157	73	95	343	194	194	187

Appendix E — Parts Details For Stationary Coro-Vane® Pumps Models C51, D51 and F51



Appendix E—Parts Details For Stationary Coro-Vane® Pumps Models C51, D51 and F51



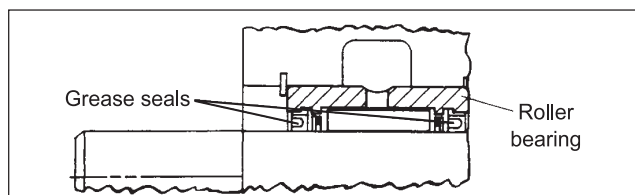
CAUTION: Always relieve pressure in the unit before attempting any repairs.

Ref. No.	Part No.	Description	Qty	Ref. No.	Part No.	Description	Qty
1	2592	Key 1/8" sq. x 9/16"	1	18	2585	Relief valve plug	1
2	2510	Mounting bracket (mod. C51)	1	19	2590	Flush seal plug 1/8" NPT	1
3	3442	Pipe plug 1/4" NPT	1	20	2584-X	Adjusting stem assembly	1
4	2468	Case (model C51)	1	21	2587 ²	Outer relief valve spring	1
	2468-1	Case (model F51)	1	22	2586 ²	Inner relief valve spring	1
5	2492-X	Rotor & shaft assembly	1	23	2588	Relief valve	1
6	2491	Sideplate	2	24	2591	nameplate	1
7	2296-1X_1	Seal assembly	2	25	2593-1	Coupling with spider (C51)	1
8	2604	Elbow grease zerk 1/8" NPT (model C51)	2		2774	Coupling spider only (C51)	1
	2159	Lubricap #2 (not shown)	2	26	2767	1/2 hp 50/60 Hz motor (C51)	1
9	2595	Seat location pin	2	27	2594	Base (model F51)	1
10	2472	Head	2	28	2158	Grease zerk 1/8" NPT (F51)	2
11	2-154_1	Case O-ring	2		2159	Lubricap #2 (not shown)	2
12	2471 ³	Roller bearing	2	29	7002-025 NC062A	Bolt soc head (model C51)	9
13	5000-112	Retainer ring	4		7002-025 NC062A	Bolt soc head (model F51)	12
14	2451-2	Carbon vane	8	30	7001-037 NC100A	Bolt hex head	4
15	2590 ²	Flush seal plug 1/8" NPT	1	31	7002-010 NC050A	Bolt soc head	3
16	2760-53	Retainer ring	1	32	7012-006 SF019E	Nameplate screw	2
17	2589	Stem seal	1				

¹_ denotes O-ring code

O-ring Code	
A	Buna-N
B	Neoprene ^{®4}
D	Viton ^{®4}
E	Teflon ^{®4}

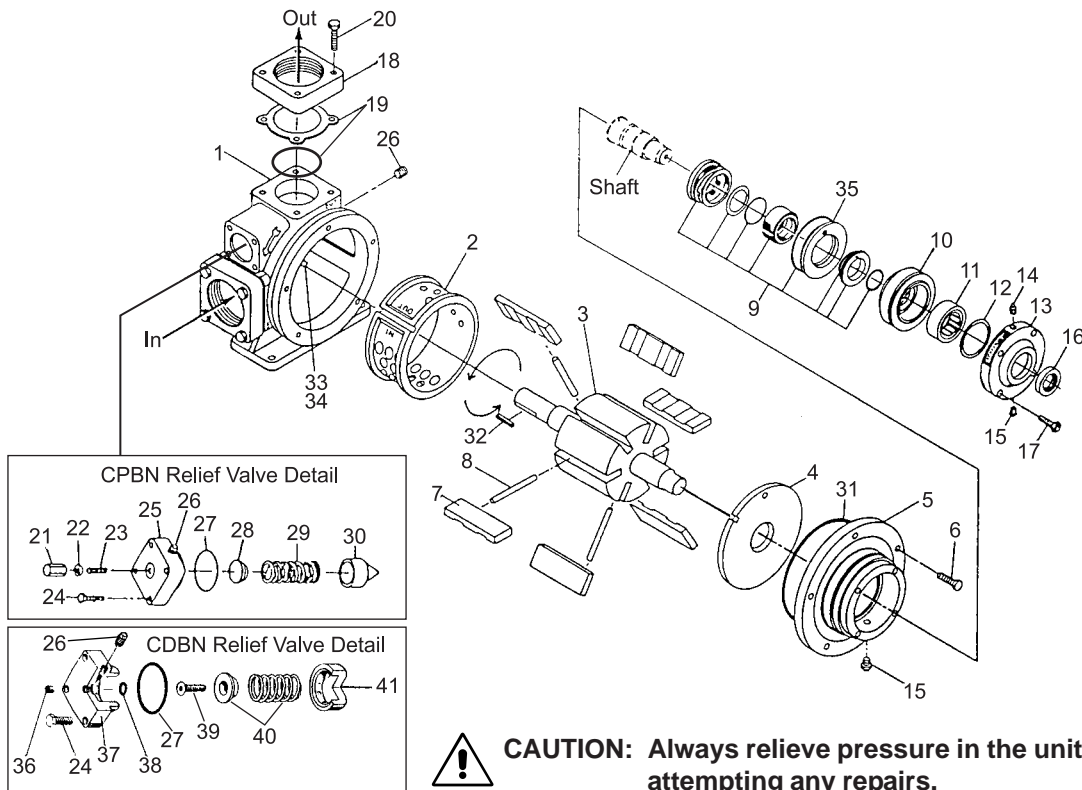
²The pump relief valve is installed at the factory to operate as an external bypass through the 1/2" NPT hole back to the storage tank. To change from this external configuration to an internal relief valve, remove relief valve plug 2585 and relief valve springs 2586 and 2587. Then remove flush seal plug 2590 and plug the 1/2" NPT opening. Replace the relief valve plug and springs. In this case a separate external by-pass valve must be used in the piping between the pump discharge and the storage tank. Set the internal valve at a pressure slightly above the steeing on the external valve. Use only the outer relief valve spring 2587 for units with 1/3 hp motors. use both springs for 1/2 hp motors and larger. Always replace the flush seal plug 2590 that screws into the relief valve plug 2585 after any relief valve adjustment.



³Bearing replacement: Install roller bearing 2471 with open side of grease seals toward outside of pump as shown below.

⁴Registered trademark of the DuPont company

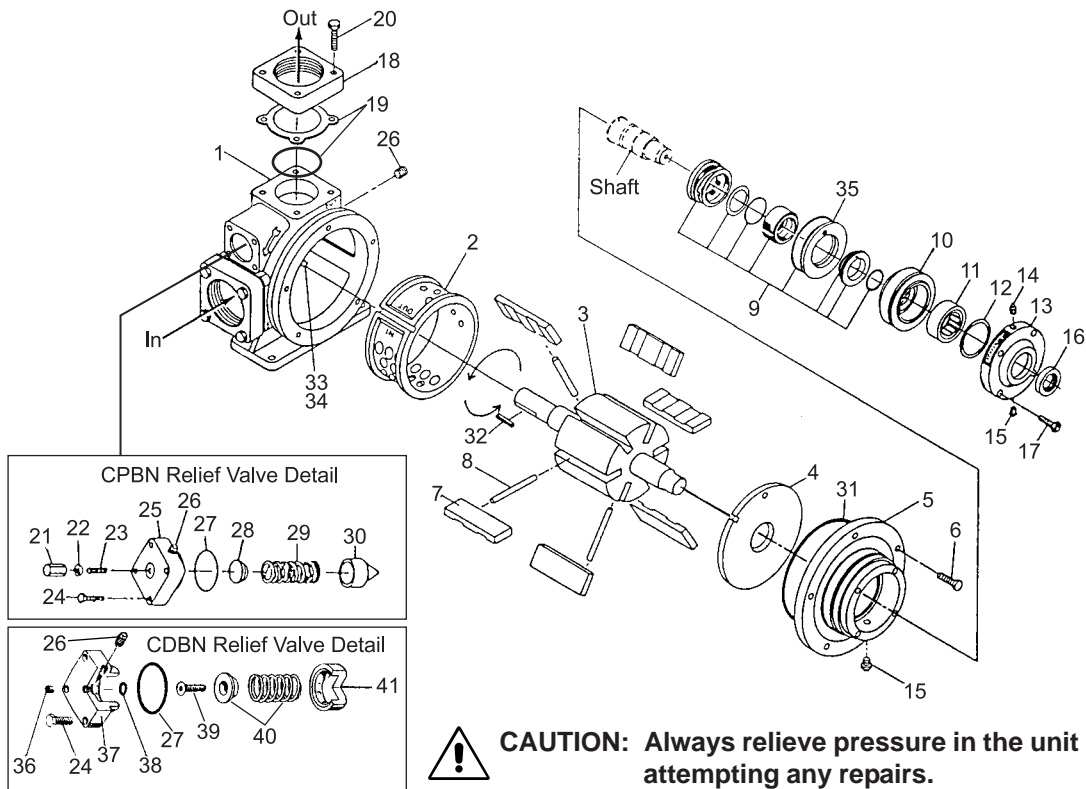
Appendix E—Parts Details For Stationary & Truck Coro-Vane® Pumps Models CPBN 0521/0522 and CDBN 0521/0522



Number	Part Number	Description	Quantity
1	2153	Casing (CPBN)	1
	2832	Casing (CDBN)	1
2	1162-2	Liner	1
3	1166-1X5R	Rotor & shaft assembly (0521)	1
	1166-1X6R	Rotor & shaft assembly (0522)	1
4	3932	Side plate	2
5	1161-5	Head (CPBN)	2
	1161-4	Head (CDBN)	2
6	7001-037NC125A	Bolt for head 3/8" — 16 NC x 1-1/4" (CPBN)	10
	7001-037NC125A	Bolt for head 3/8" — 16 NC x 1-1/4" (CDBN)	20
7	3934	Vane	6
8	2705-X	Pushrod	3
9	1769-XRA2	Mechanical seal assembly (Buna-N standard)	2
	1769-XRB2	Mechanical seal assembly (Neoprene® optional) ¹	2
	1769-XRD2	Mechanical seal assembly (Viton® optional) ¹	2
	1769-XRE2	Mechanical seal assembly (Teflon® optional) ¹	2
10	1769	Bearing housing	2
11	2754-X	Roller bearing	2
12	2760-244	Retainer ring	2
13	1164-1	Bearing cap	2
14	2158	Grease zerk	2
15	1343	Relief fitting	4
16	1358	Grease seal	2
17	7001-037NC125A	Bolt for bearing cap 3/8" — 16 NC x 1-1/4"	8
18	1172-1.5	Flange 1-1/2" NPT	2
	1172-2	Flange 2" NPT	2
	1172-2.5	Flange 2-1/2" NPT	2
	1172-3	Flange 3" NPT	2
19	1999	Gasket for 1172 Flange for CPBN	2
	2-234A	Flange O-ring for CDBN (Buna-N standard)	2
	2-234B	Flange O-ring for CDBN (Neoprene® optional) ¹	2
	2-234D	Flange O-ring for CDBN (Viton® optional) ¹	2
	2-234E	Flange O-ring for CDBN (Teflon® optional) ¹	2

¹Registered trademark of the DuPont Company.

Appendix E — Parts Details For Stationary & Truck Coro-Vane® Pumps Models CPBN 0521/0522 and CDBN 0521/0522 (continued)

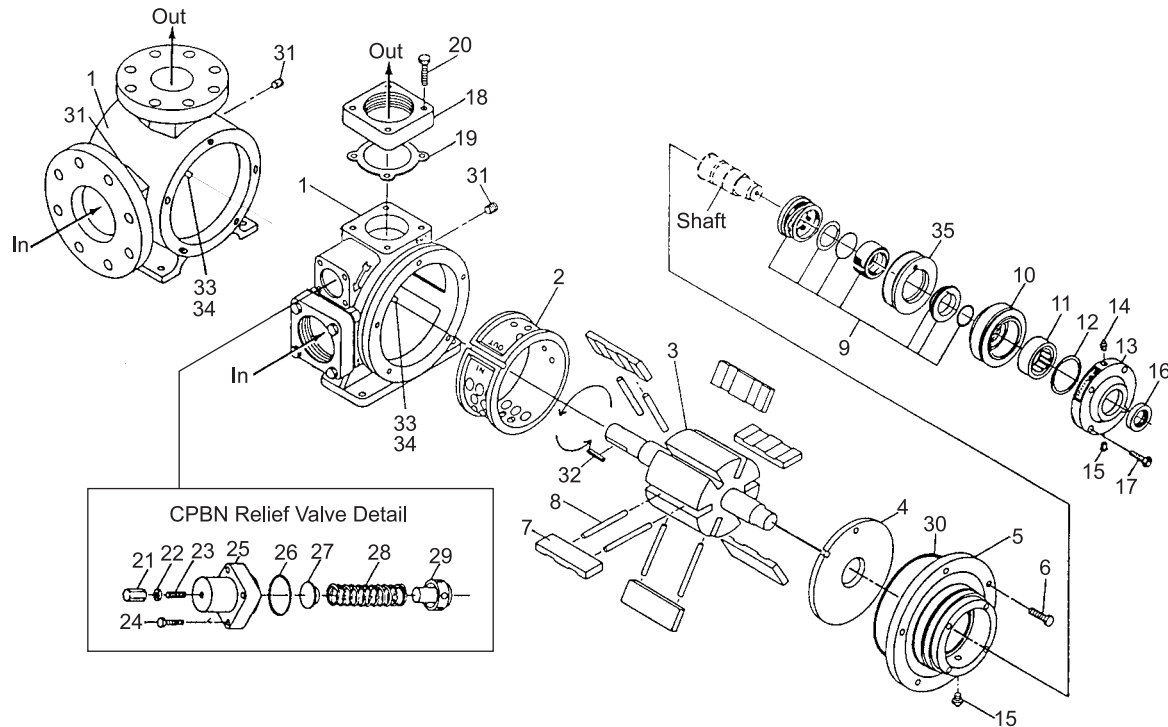


CAUTION: Always relieve pressure in the unit before attempting any repairs.

Number	Part Number	Description	Quantity
20	7001-037NC150A	Bolt for flange 3/8" — 16 NC x 1-1/2"	8
21	2458	Adjusting screw cap (CPBN)	1
22	1480	Relief valve adjusting screw gasket (CPBN)	1
23	2459	Relief valve adjusting screw 7/16" — 14 NC x 1-1/4" (CPBN)	1
24	7001-031NC125A	Bolt for relief valve cover 5/16" — 18 NC x 1-1/4"	4
25	1174-1	Relief valve cap (CPBN)	1
26	3442	Pipe plug 1/4" NPT (CPBN)	1
27	2-224A	Relief valve cap O-ring (Buna-N standard)	1
	2-224B	Relief valve cap O-ring (Neoprene® optional) ¹	1
	2-224D	Relief valve cap O-ring (Viton® optional) ¹	1
	2-224E	Relief valve cap O-ring (Teflon® optional) ¹	1
28	2457	Relief valve spring seat (CPBN)	1
29	2178	Relief valve spring (CPBN)	1
30	2456	Relief valve poppet (CPBN)	1
31	2-261A	Casing O-ring (Buna-N standard)	2
	2-261B	Casing O-ring (Neoprene® optional) ¹	2
	2-261D	Casing O-ring (Viton® optional) ¹	2
	2-261E	Casing O-ring (Teflon® optional) ¹	2
32	2270	Key	1
33	1170	Liner key	1
34	3253	Liner key pin 3/8" x 1/2"	2
35	1822	Seal adaptor plate	2
36	2590	Pipe plug, 1/8" NPT flush seal (CDBN)	1
37	1174	Relief valve cap (CDBN)	1
38	2-212A	O-ring adjusting screw (Buna-N standard) (CDBN)	1
	2-212B	O-ring adjusting screw (Neoprene® optional) ¹ (CDBN)	1
	2-212D	O-ring adjusting screw (Viton® optional) ¹ (CDBN)	1
	2-212E	O-ring adjusting screw (Teflon® optional) ¹ (CDBN)	1
39	2252	Relief valve adjusting screw (CDBN)	1
40	1242-X	Spring guide assembly (CDBN)	1
41	1241	Relief valve (CDBN)	1

¹Registered trademark of the DuPont Company.

Appendix E—Parts Details for Stationary & Truck Coro-Vane® Pumps Models CPBN 0721/0722 and CPBF 0721/0722

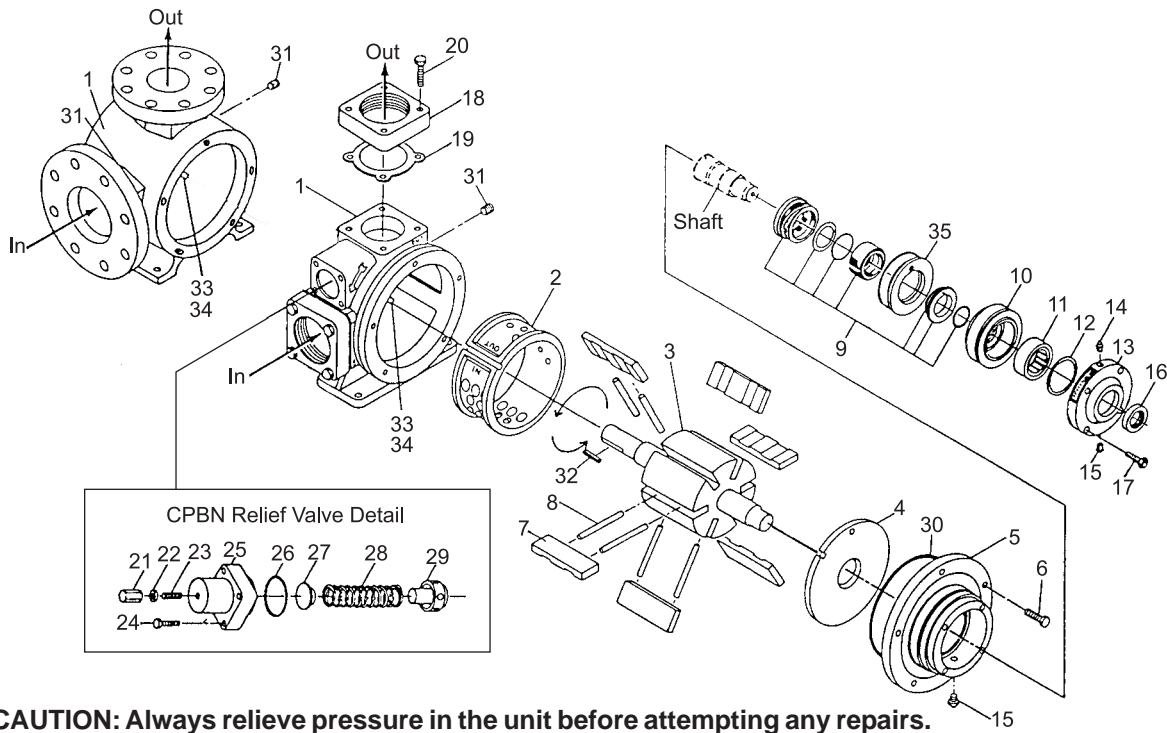


CAUTION: Always relieve pressure in the unit before attempting any repairs.

Number	Part Number	Description	Quantity
1	4042	Casing (CPBN)	1
	4077	Casing (CPBF)	1
2	4044	Liner	1
3	3983-X5R	Rotor & shaft assembly (0721)	1
	3983-X6R	Rotor & shaft assembly (0722)	1
4	3932	Side plate	2
5	1161-5	Head	2
6	7001-037NC125A	Bolt for head 3/8" — 16 NC x 1-1/4"	10
7	4041	Vane	6
8	2705-X	Pushrod	6
9	1769-XRA2	Mechanical seal assembly (Buna-N standard)	2
	1769-XRB2	Mechanical seal assembly (Neoprene® optional) ¹	2
	1769-XRD2	Mechanical seal assembly (Viton® optional) ¹	2
	1769-XRE2	Mechanical seal assembly (Teflon® optional) ¹	2
10	1769	Bearing housing end	2
11	2754-X	Roller bearing	2
12	2760-244	Spiral retainer ring	2
13	1164-1	Bearing cap	2
14	2158	Grease zerk 1/8"	2
15	1343	Relief fitting	4
16	1358	Grease seal	2
17	7001-037NC125A	Bolt for bearing cap 3/8" — 16 NC x 1-1/4"	8

¹Registered trademark of the DuPont Company.

Appendix E—Parts Details for Stationary & Truck Coro-Vane® Pumps Models CPBN 0721/0722 and CPBF 0721/0722 (continued)

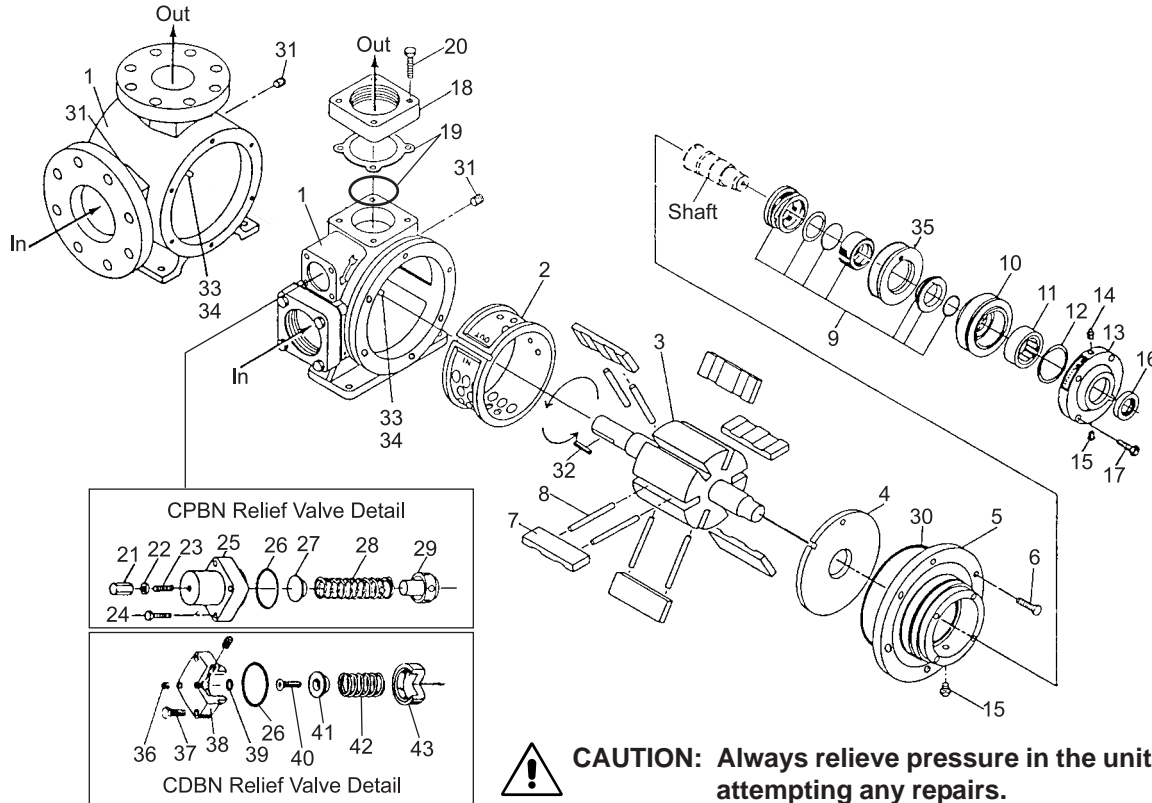


CAUTION: Always relieve pressure in the unit before attempting any repairs.

Number	Part Number	Description	Quantity
18	1172-2.5	Flange 2-1/2" NPT	2
	1172-2	Flange 2" NPT	2
	1172-3	Flange 3" NPT	2
19	1999	Gasket for flange	2
20	7001-037NC150A	Bolt for flange 3/8" — 16 NC x 1-1/2"	4
21	4025	Adjusting screw cap	1
22	1480	Relief valve adjusting screw gasket	1
23	7006-043NC250A	Relief valve socket head adjustment screw 7/16" — 14 NC x 2-1/2"	1
24	7001-037NC175A	Bolt for relief valve cover 3/8" — 16 NC x 1-3/4"	4
25	3930	Relief valve cover	1
26	2-228A	Relief valve cap O-ring (Buna-N standard)	1
	2-228B	Relief valve cap O-ring (Neoprene® optional) ¹	1
	2-228D	Relief valve cap O-ring (Viton® optional) ¹	1
	2-228E	Relief valve cap O-ring (Teflon® optional) ¹	1
27	2470	Relief valve spring seat	1
28	2949	Relief valve spring	1
29	4024	Relief valve poppet	1
30	2-261A	Casing O-ring (Buna-N standard)	2
	2-261B	Casing O-ring (Neoprene® optional) ¹	2
	2-261D	Casing O-ring (Viton® optional) ¹	2
	2-261E	Casing O-ring (Teflon® optional) ¹	2
31	3442	Pipe plug 1/4" NPT	2
32	2270	Shaft key	1
33	1891	Liner key	1
34	3253	Liner key Pin 3/8" x 1/2"	2
35	1822	Seal adapter plate	2

¹Registered trademark of the DuPont Company.

Appendix E—Parts Details for Stationary & Truck Coro-Vane® Pumps Models CPBN/BF 1021/1022 and CDBN/BF 1021/1022

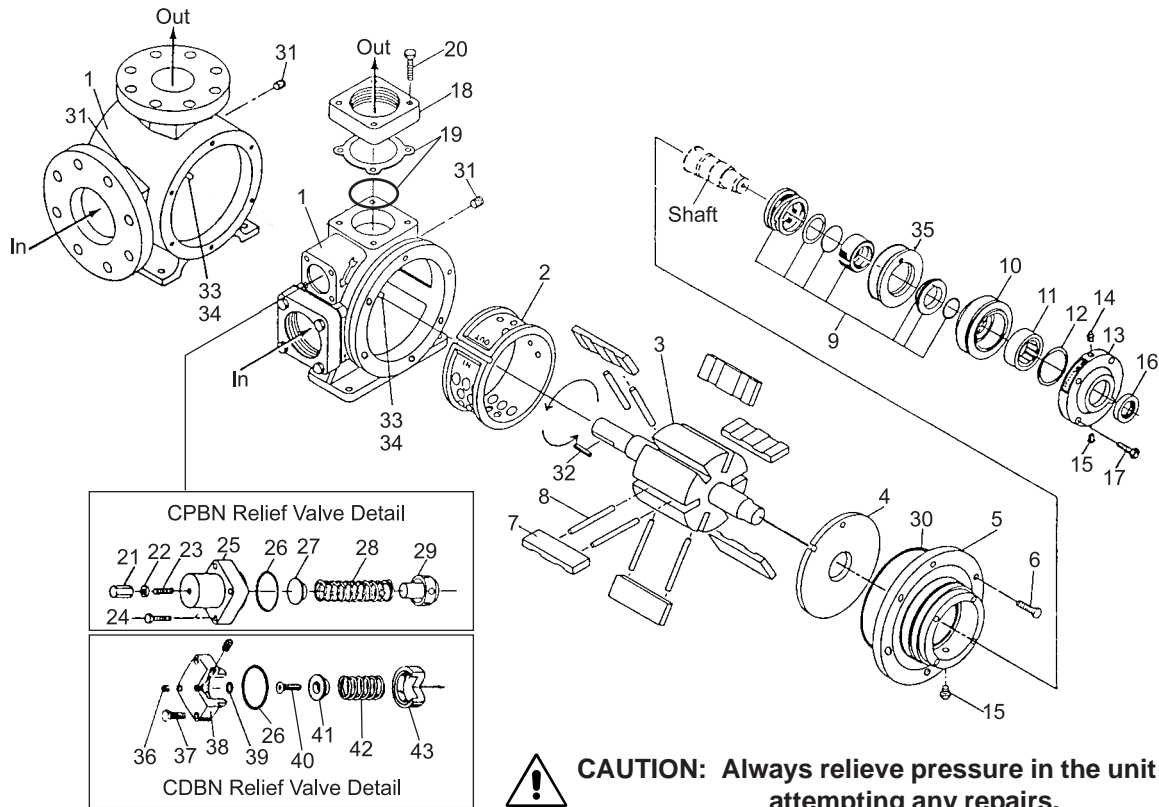


⚠ CAUTION: Always relieve pressure in the unit before attempting any repairs.

Number	Part Number	Description	Quantity
1	2227	Casing (CPBN)	1
	2841	Casing (CDBN)	1
	2433	Casing (CPBF & CDBF)	1
2	1201-2	Liner	1
3	1208-1X5R	Rotor & shaft assembly (0521)	1
	1208-1X6R	Rotor & shaft assembly (0522)	1
4	3935	Side plate	2
5	1205-5	Head (CPBN)	2
	1205-4	Head (CDBN)	2
6	7001-037NC125A	Bolt for head 3/8" — 16 NC x 1-1/4" (CPBN)	12
	7001-037NC125A	Bolt for head 3/8" — 16 NC x 1-1/4" (CDBN)	24
7	3936	Vane	6
8	2708-X	Pushrod	6
9	1769-XRA2	Mechanical seal assembly (Buna-N standard)	2
	1769-XRB2	Mechanical seal assembly (Neoprene® optional) ¹	2
	1769-XRD2	Mechanical seal assembly (Viton® optional) ¹	2
	1769-XRE2	Mechanical seal assembly (Teflon® optional) ¹	2
10	1769	Bearing housing	2
11	2754-X	Roller bearing	2
12	2760-244	Spiral retainer ring	2
13	1164-1	Bearing cap	2
14	2158	Grease zerk 1/8"	2
15	1343	Relief fitting	4
16	1358	Grease seal	2
17	7001-037NC125A	Bolt for bearing cap 3/8" — 16 NC x 1-1/4"	8
18	1172-2	Flange 2" NPT (CPBN outlet) (optional)	2
	1172-2.5	Flange 2-1/2" NPT (CPBN outlet) (optional)	2
	1172-3	Flange 3" NPT (CPBN inlet & outlet) (standard)	2
	1206-3	Flange 3" NPT (CDBN inlet & outlet) (standard)	2
	1206-3S	Flange 3" Weld (CDBN outlet) (optional)	2
	1206-4	Flange 4" NPT (CDBN outlet) (optional)	2
	1206-4S	Flange 4" Weld (CDBN outlet) (optional)	2
19	1999	Gasket for 1172 flange (CPBN)	2
	2-234A	O-ring for CDBN (Buna-N standard)	2
	2-234B	O-ring for CDBN (Neoprene® optional) ¹	2
	2-234D	O-ring for CDBN (Viton® optional) ¹	2
	2-234E	O-ring for CDBN (Teflon® optional) ¹	2

¹Registered trademark of the DuPont Company.

Appendix E—Parts Details for Stationary & Truck Coro-Vane® Pumps Models CPBN/BF 1021/1022 and CDBN/BF 1021/1022 (continued)

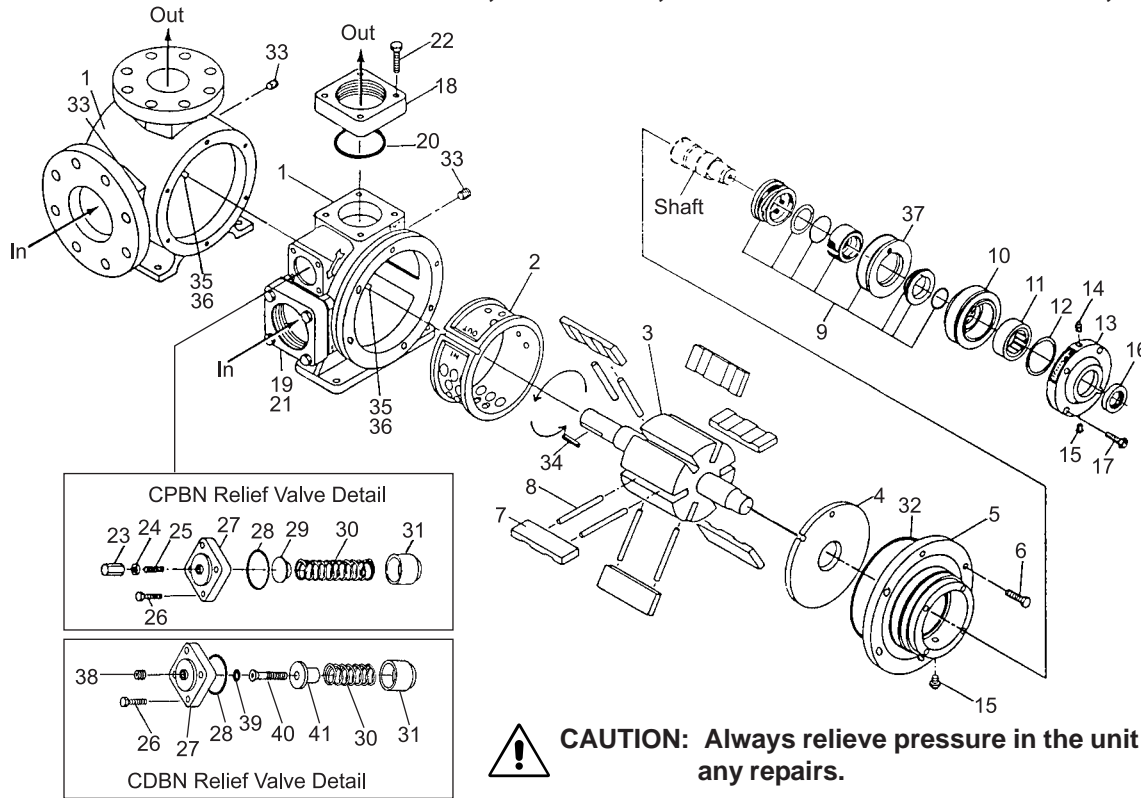


CAUTION: Always relieve pressure in the unit before attempting any repairs.

Number	Part Number	Description	Quantity
20	7001-037NC175A	Bolt for flange 3/8" — 16 NC x 1-3/4"	8
21	4025	Adjusting screw cap (CPBN)	1
22	1480	Relief valve adjusting screw gasket (CPBN)	1
23	7006-043NC250A	Relief valve socket head adjustment screw 7/16" — 14 NC x 2-1/2" (CPBN)	1
24	7001-037NC175A	Bolt for relief valve cover 3/8" — 16 NC x 1-3/4" (CPBN)	4
25	3930	Relief valve cover (CPBN)	1
26	2-228A 2-228B 2-228D 2-228E	Relief valve cap O-ring (Buna-N standard) Relief valve cap O-ring (Neoprene® optional) ¹ Relief valve cap O-ring (Viton® optional) ¹ Relief valve cap O-ring (Teflon® optional) ¹	1 1 1 1
27	2470	Relief valve spring seat (CPBN)	1
28	2949	Relief valve spring (CPBN)	1
29	4024	Relief valve poppet (CPBN)	1
30	2-268A 2-268B 2-268D 2-268E	Casing O-ring (Buna-N standard) Casing O-ring (Neoprene® optional) ¹ Casing O-ring (Viton® optional) ¹ Casing O-ring (Teflon® optional) ¹	2 2 2 2
31	3442	Pipe plug 1/4" NPT	2
32	2270	Shaft key	1
33	1309	Liner key	1
34	3253	Liner key Pin 3/8" x 1/2"	2
35	1822	Adaptor plate	2
36	2590	Pipe plug 1/8" NPT flush seal (CDBN)	1
37	7001-037NC125A	3-8/16" x 1-1/4" hex head (CDBN)	4
38	1207	Relief valve cap (CDBN)	1
39	2-112A 2-112B 2-112A 2-112A	O-ring for adjusting screw (Buna-N standard) O-ring for adjusting screw (Neoprene® optional) ¹ O-ring for adjusting screw (Viton® optional) ¹ O-ring for adjusting screw (Teflon® optional) ¹	1 1 1 1
40	2252	Relief valve adjustment screw (CDBN)	1
41	1227	Relief valve guide (CDBN)	1
42	1226	Relief valve guide spring (CDBN)	1
43	1224	Relief valve (CDBN)	1

¹Registered trademark of the DuPont Company.

Appendix E—Parts Details for Stationary & Truck Coro-Vane® Pumps Models CPBN/BF 1321/22, 1521/22, and CDBN/BF 1321/22, 1521/22



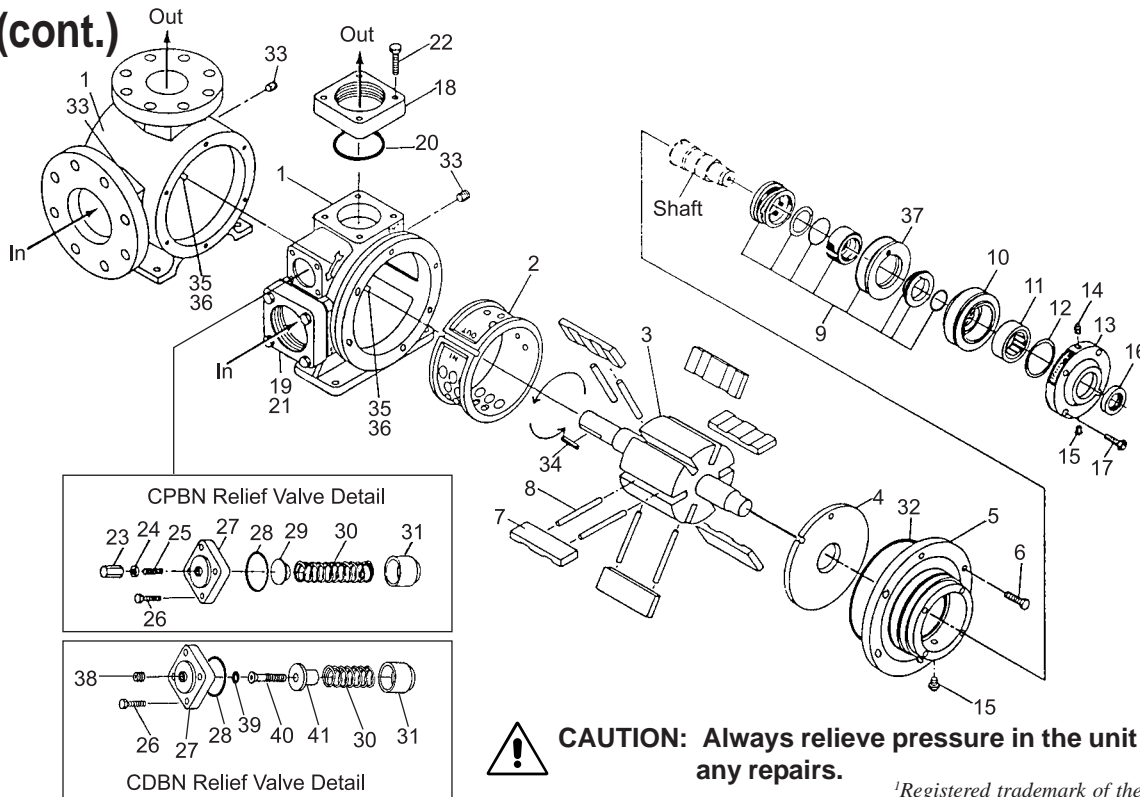
CAUTION: Always relieve pressure in the unit before attempting any repairs.

Number	Part Number	Description	Quantity
1	3254	Casing (CPBN & CDBN)	1
	2437	Casing (CPBF & CDBF)	1
2	1792-1	Liner (1521 & 1522)	1
	4072	Liner (1321 & 1322)	1
3	3350-X3R	Rotor & shaft assembly (1321 & 1521)	1
	3350-X4R	Rotor & shaft assembly (1322 & 1522)	1
4	3935	Side plate	2
5	1205-5	Head (CPBN & CPBF)	2
	1205-4	Head (CDBN & CDBF)	2
6	7001-037NC125A	Bolt for head 3/8" — 16 NC x 1-1/4" (CPBN)	12
	7001-037NC125A	Bolt for head 3/8" — 16 NC x 1-1/4" (CDBN)	24
7	3309	Vane	6
8	4028-X	Pushrod (1521 & 1522)	6
	4083-X	Pushrod (1321 & 1322)	6
9	1769-XRA2	Mechanical seal assembly (Buna-N standard)	2
	1769-XRB2	Mechanical seal assembly (Neoprene® optional) ¹	2
	1769-XRD2	Mechanical seal assembly (Viton® optional) ¹	2
	1769-XRE2	Mechanical seal assembly (Teflon® optional) ¹	2
10	1769	Bearing housing	2
11	2754	Bearing outer race	2
12	2760-244	Retainer ring	2
13	1164-1	Bearing cap	2
14	2158	Grease zerk 1/8"	2
15	1343	Relief fitting	4
16	1358	Grease seal	2
17	7001-037NC125A	Bolt for bearing cap 3/8" — 16 NC x 1-1/4"	8
18	1206-3	Flange 3" NPT CPBN/CDBN 1321 outlet standard	1
19	1206-4	Flange 4" NPT CPBN/CDBN (1321 inlet) (1521 inlet & outlet) std.	1
20	2-245A	O-ring gasket for 1206-3 flange (Buna-N standard)	1
	2-245B	O-ring gasket for 1206-3 flange (Neoprene® optional) ¹	1
	2-245D	O-ring gasket for 1206-3 flange (Viton® optional) ¹	1
	2-245E	O-ring gasket for 1206-3 flange (Teflon® optional) ¹	1

¹Registered trademark of the DuPont Company.

Appendix E—Parts Details for Stationary & Truck Coro-Vane® Pumps Models CPBN/BF 1321/22, 1521/22, and CDBN/BF 1321/22, 1521/22

(cont.)

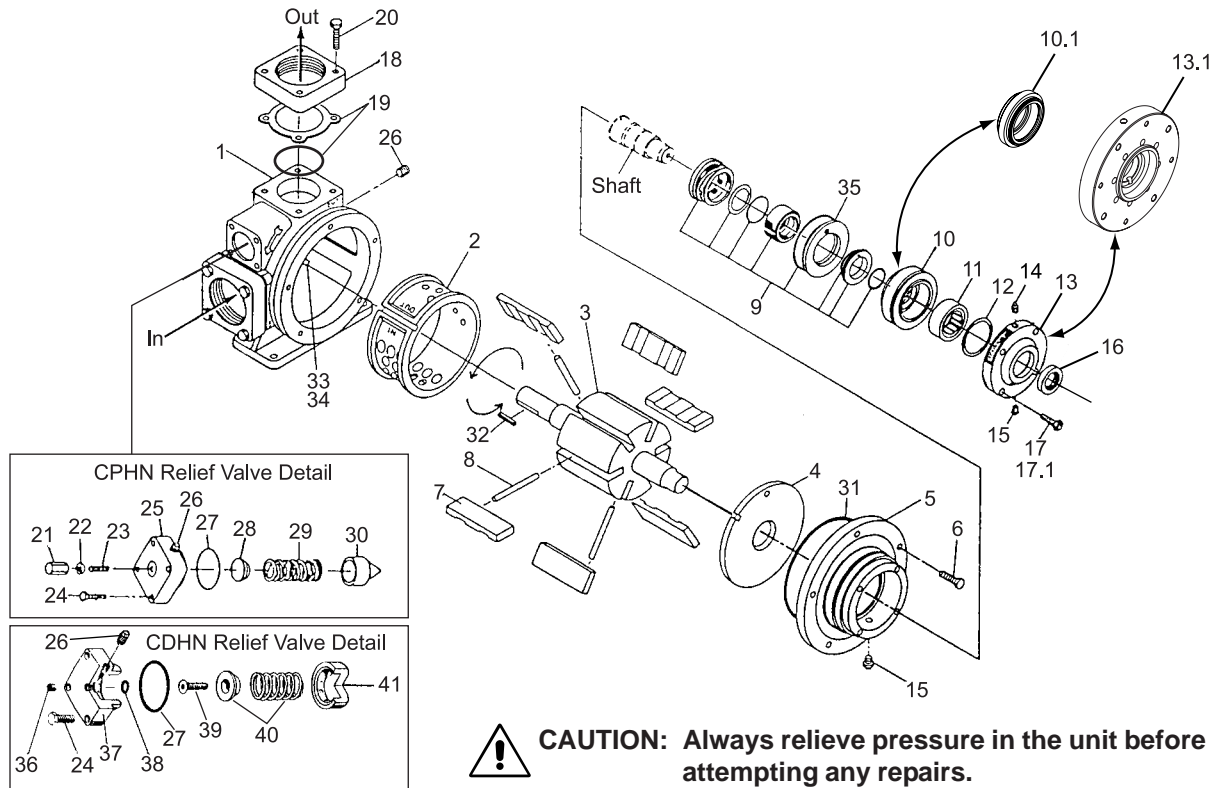


CAUTION: Always relieve pressure in the unit before attempting any repairs.

¹Registered trademark of the DuPont Company.

Number	Part Number	Description	Quantity
21	2-249A	O-ring gasket for 1206-4 flange (Buna-N standard)	1
	2-249B	O-ring gasket for 1206-4 flange (Neoprene® optional) ¹	1
	2-249D	O-ring gasket for 1206-4 flange (Viton® optional) ¹	1
	2-249E	O-ring gasket for 1206-4 flange (Teflon® optional) ¹	1
22	7001-037NC150A	Bolt for flange 3/8" — 16 NC x 1-1/2"	8
23	4025	Adjusting screw cap (CPBN)	1
24	1480	Gasket (CPBN)	1
25	7006-043NC250A	Relief valve soc. hd. adj. screw 7/16" — 14 NCx2-1/2" (CPBN)	1
26	7001-037NC100A	Bolt for relief valve cover 3/8" — 16 NC x 1"	4
27	4061-1	Relief valve cap (CPBN)	1
	4061	Relief valve cap (CDBN)	1
28	2-240A	Relief valve cap O-ring (Buna-N standard)	1
	2-240B	Relief valve cap O-ring (Neoprene® optional) ¹	1
	2-240D	Relief valve cap O-ring (Viton® optional) ¹	1
	2-240E	Relief valve cap O-ring (Teflon® optional) ¹	1
29	4074	Relief valve spring seat (CPBN)	1
30	4075	Relief valve spring	1
31	4062	Relief valve poppet	1
32	2-268A	Casing O-ring	2
	2-268B	Casing O-ring	2
	2-268D	Casing O-ring	2
	2-268E	Casing O-ring	2
33	3442	Pipe plug 1/4" NPT	2
34	2270	Shaft key	1
35	1309	Liner key	1
36	3253	Liner key pin 3/8" x 1/2"	2
37	1822	Seal adaptor plate	2
38	2590	Flush seal plug—1/8" NPT (CDBN)	1
39	2-112A	O-ring (Buna-N standard) (CDBN)	1
	2-112B	O-ring (Neoprene® optional) ¹ (CDBN)	1
	2-112D	O-ring (Viton® optional) ¹ (CDBN)	1
	2-112E	O-ring (Teflon® optional) ¹ (CDBN)	1
40	4078	Relief valve adjustment screw (CDBN)	1
41	4073	Relief valve spring seat (CDBN)	1

Appendix E—Parts Details For Hydraulic Drive Coro-Vane® Pumps Models CPHN 0521 and CDHN 0521



Number	Part Number	Description	Quantity
1	2153	Casing (CPHN)	1
	2832	Casing (CDHF)	1
2	1162-2	Liner	1
3	1166-1X5R	Rotor & shaft assembly (0521)	1
	1166-1X6R	Rotor & shaft assembly (0522)	1
4	3932	Side plate	2
5	1161-5	Head (CPHN)	2
	1161-4	Head (CDHN)	2
6	7001-037NC125A	Bolt for head 3/8" — 16 NC x 1-1/4" (CPHN)	10
	7001-037NC125A	Bolt for head 3/8" — 16 NC x 1-1/4" (CDHN)	20
7	3934	Vane	6
8	2705-X	Pushrod	3
9	1769-XRA2	Mechanical seal assembly (Buna-N standard)	2
	1769-XRB2	Mechanical seal assembly (Neoprene® optional) ¹	2
	1769-XRD2	Mechanical seal assembly (Viton® optional) ¹	2
	1769-XRE2	Mechanical seal assembly (Teflon® optional) ¹	2
10	1769	Bearing housing (used on non-hydraulic side of pump)	1
10.1	1769-3	Bearing housing (used on hydraulic drive side of pump)	1
11	2754-X	Roller bearing	2
12	2760-244	Retainer ring	2
13	1164-1	Bearing cap (used on non-hydraulic side of pump)	1
13.1	4193	Bearing cap (used on hydraulic drive side of pump)	1
14	2158	Grease zerk	2
15	1343	Relief fitting	4
16	1358	Grease seal	2
17	7001-037NC125A	Bolt for bearing cap 3/8" — 16 NC x 1-1/4 (non-hydraulic side)	4
17.1	7001-037NC150A	Bolt for bearing cap 3/8" — 16 NC x 1-1/2 (hydraulic side)	4
18	1172-1.5	Flange 1-1/2" NPT	2
	1172-2	Flange 2" NPT	2
	1172-2.5	Flange 2-1/2" NPT	2
	1172-3	Flange 3" NPT	2

¹Registered trademark of the DuPont Company.

Appendix E—Parts Details For Hydraulic Drive Coro-Vane® Pumps Models CPHN 0521 and CDHN 0521 (continued)

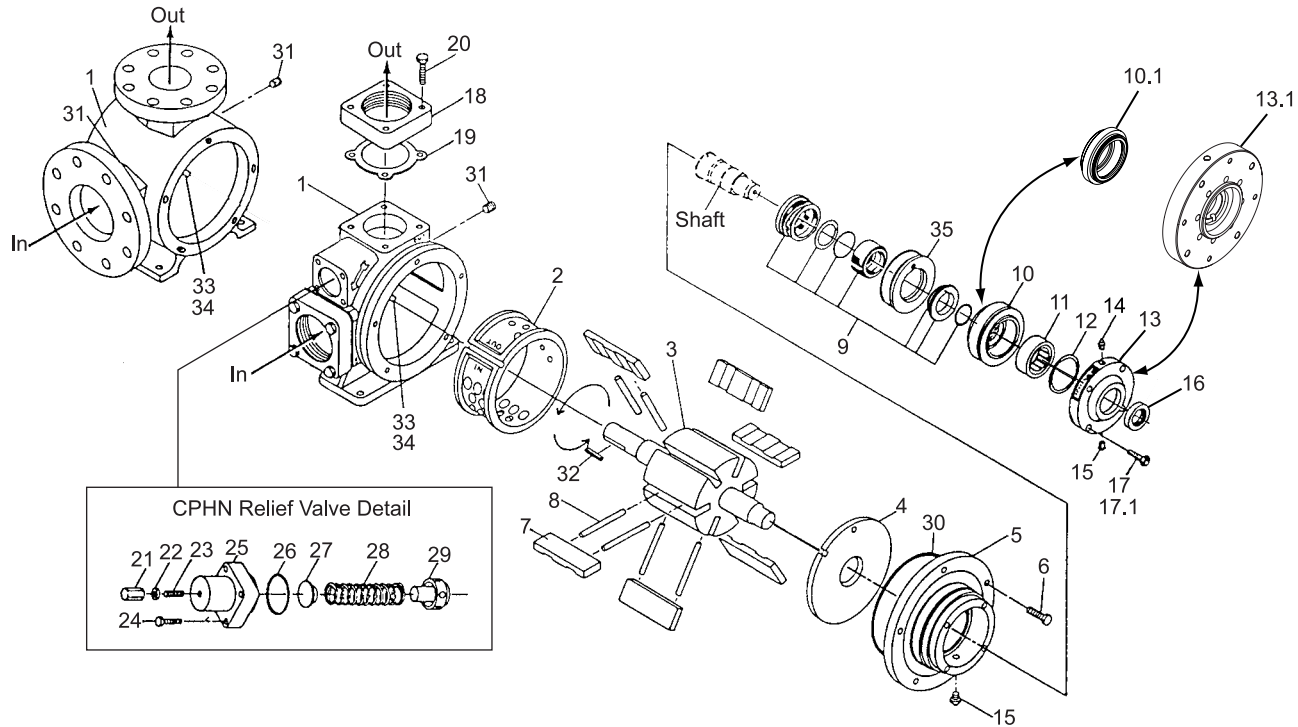


CAUTION: Always relieve pressure in the unit before attempting any repairs.

Number	Part Number	Description	Quantity
19	1999	Gasket for 1172 Flange for CPHN	2
	2-234A	Flange O-ring for CDHN (Buna-N standard)	2
	2-234B	Flange O-ring for CDHN (Neoprene® optional) ¹	2
	2-234D	Flange O-ring for CDHN (Viton® optional) ¹	2
	2-234E	Flange O-ring for CDHN (Teflon® optional) ¹	2
20	7001-037NC150A	Bolt for flange 3/8" — 16 NC x 1-1/2"	8
21	2458	Adjusting screw cap (CPHN)	1
22	1480	Relief valve adjusting screw gasket (CPHN)	1
23	2459	Relief valve adjusting screw 7/16" — 14 NC x 1-1/4" (CPHN)	1
24	7001-031NC125A	Bolt for relief valve cover 5/16" — 18 NC x 1-1/4"	4
25	1174-1	Relief valve cap (CPHN)	1
26	3442	Pipe plug 1/4" NPT (CPHN)	1
27	2-224A	Relief valve cap O-ring (Buna-N standard)	1
	2-224B	Relief valve cap O-ring (Neoprene® optional) ¹	1
	2-224D	Relief valve cap O-ring (Viton® optional) ¹	1
	2-224E	Relief valve cap O-ring (Teflon® optional) ¹	1
28	2457	Relief valve spring seat (CPHN)	1
29	2178	Relief valve spring (CPHN)	1
30	2456	Relief valve poppet (CPHN)	1
31	2-261A	Casing O-ring (Buna-N standard)	2
	2-261B	Casing O-ring (Neoprene® optional) ¹	2
	2-261D	Casing O-ring (Viton® optional) ¹	2
	2-261E	Casing O-ring (Teflon® optional) ¹	2
32	2270	Key	1
33	1170	Liner key	1
34	3253	Liner key pin 3/8" x 1/2"	2
35	1822	Seal adaptor plate	2
36	2590	Pipe plug, 1/8" NPT flush seal (CDHN)	1
37	1174	Relief valve cap (CDHN)	1
38	2-212A	O-ring adjusting screw (Buna-N standard) (CDHN)	1
	2-212B	O-ring adjusting screw (Neoprene® optional) ¹ (CDHN)	1
	2-212D	O-ring adjusting screw (Viton® optional) ¹ (CDHN)	1
	2-212E	O-ring adjusting screw (Teflon® optional) ¹ (CDHN)	1
39	2252	Relief valve adjusting screw (CDHN)	1
40	1242-X	Spring guide assembly (CDHN)	1
41	1241	Relief valve (CDHN)	1

¹Registered trademark of the DuPont Company.

Appendix E—Parts Details for Hydraulic Drive Coro-Vane® Pumps Models CPHN/HF 0721



CAUTION: Always relieve pressure in the unit before attempting any repairs.

Number	Part Number	Description	Quantity
1	4042	Casing (CPHN)	1
	4077	Casing (CPHF)	1
2	4044	Liner	1
3	3983-X5R	Rotor & shaft assembly (0721)	1
	3983-X6R	Rotor & shaft assembly (0722)	1
4	3932	Side plate	2
5	1161-5	Head	2
6	7001-037NC125A	Bolt for head 3/8" — 16 NC x 1-1/4"	10
7	4041	Vane	6
8	2705-X	Pushrod	6
9	1769-XRA2	Mechanical seal assembly (Buna-N standard)	2
	1769-XRB2	Mechanical seal assembly (Neoprene® optional) ¹	2
	1769-XRD2	Mechanical seal assembly (Viton® optional) ¹	2
	1769-XRE2	Mechanical seal assembly (Teflon® optional) ¹	2
10	1769	Bearing housing (used on non-hydraulic side of pump)	1
10.1	1769-3	Bearing housing (used on hydraulic side of pump)	1
11	2754-X	Roller bearing	2
12	2760-244	Spiral retainer ring	2
13	1164-1	Bearing cap (used on non-hydraulic side of pump)	1
13.1	4193	Bearing cap (used on hydraulic side of pump)	1
14	2158	Grease zerk 1/8"	2
15	1343	Relief fitting	4

¹Registered trademark of the DuPont Company.

Appendix E—Parts Details for Hydraulic Drive Coro-Vane® Pumps Models CPHN/HF 0721 (continued)

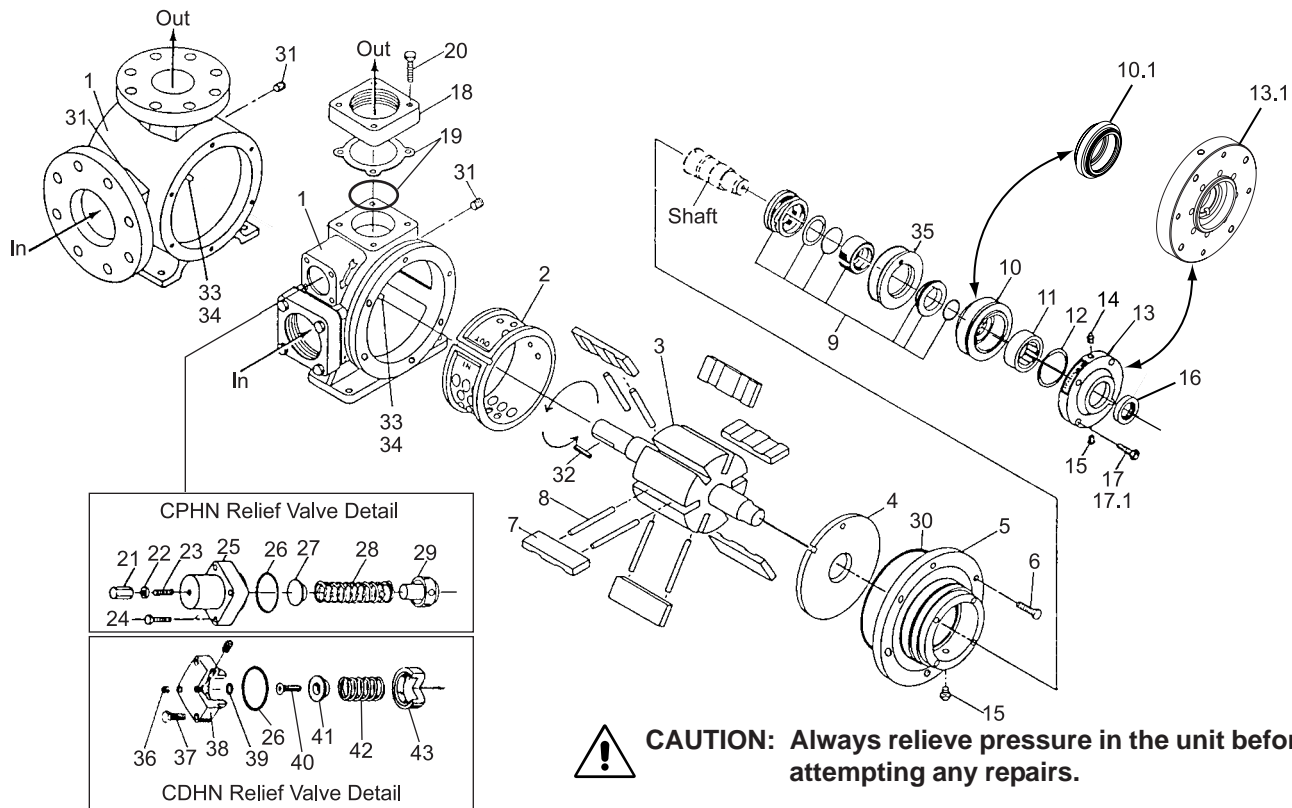


CAUTION: Always relieve pressure in the unit before attempting any repairs.

Number	Part Number	Description	Quantity
16	1358	Grease seal	2
17	7001-037NC125A	Bolt for bearing cap 3/8" — 16 NC x 1-1/4" (non-hydraulic side)	4
17.1	7001-037NC150A	Bolt for bearing cap 3/8" — 16 NC x 1-1/2" (hydraulic side)	4
18	1172-2.5	Flange 2-1/2" NPT	2
	1172-2	Flange 2" NPT	2
	1172-3	Flange 3" NPT	2
19	1999	Gasket for flange	2
20	7001-037NC150A	Bolt for flange 3/8" — 16 NC x 1-1/2"	8
21	4025	Adjusting screw cap	1
22	1480	Relief valve adjusting screw gasket	1
23	7006-043NC250A	Relief valve socket head adjustment screw 7/16" — 14 NC x 2-1/2"	1
24	7001-037NC175A	Bolt for relief valve cover 3/8" — 16 NC x 1-3/4"	4
25	3930	Relief valve cover	1
26	2-228A	Relief valve cap O-ring (Buna-N standard)	1
	2-228B	Relief valve cap O-ring (Neoprene® optional) ¹	1
	2-228D	Relief valve cap O-ring (Viton® optional) ¹	1
	2-228E	Relief valve cap O-ring (Teflon® optional) ¹	1
27	2470	Relief valve spring seat	1
28	2949	Relief valve spring	1
29	4024	Relief valve poppet	1
30	2-261A	Casing O-ring (Buna-N standard)	2
	2-261B	Casing O-ring (Neoprene® optional) ¹	2
	2-261D	Casing O-ring (Viton® optional) ¹	2
	2-261E	Casing O-ring (Teflon® optional) ¹	2
31	3442	Pipe plug 1/4" NPT	2
32	2270	Shaft key	1
33	1891	Liner key	1
34	3253	Liner key Pin 3/8" x 1/2"	2
35	1822	Seal adapter plate	2

¹Registered trademark of the DuPont Company.

Appendix E—Parts Details for Hydraulic Drive Coro-Vane® Pumps Models CPHN/HF 1021 and CDHN 1021



Number	Part Number	Description	Quantity
1	2227	Casing (CPHN)	1
	2841	Casing (CDHN)	1
	2433	Casing (CPHF & CDHF)	1
2	1201-2	Liner	1
3	1208-1X5R	Rotor & shaft assembly (0521)	1
	1208-1X6R	Rotor & shaft assembly (0522)	1
4	3935	Side plate	2
5	1205-5	Head (CPHN)	2
	1205-4	Head (CDHN)	2
6	7001-037NC125A	Bolt for head 3/8" — 16 NC x 1-1/4" (CPHN)	12
	7001-037NC125A	Bolt for head 3/8" — 16 NC x 1-1/4" (CDHN)	24
7	3936	Vane	6
8	2708-X	Pushrod	6
9	1769-XRA2	Mechanical seal assembly (Buna-N standard)	2
	1769-XRB2	Mechanical seal assembly (Neoprene® optional) ¹	2
	1769-XRD2	Mechanical seal assembly (Viton® optional) ¹	2
	1769-XRE2	Mechanical seal assembly (Teflon® optional) ¹	2
10	1769	Bearing housing (used on non-hydraulic side of pump)	1
10.1	1769-3	Bearing housing (used on hydraulic side of pump)	1
11	2754-X	Roller bearing	2
12	2760-244	Spiral retainer ring	2
13	1164-1	Bearing cap (used on non-hydraulic side of pump)	1
13.1	4193	Bearing cap (used on hydraulic side of pump)	1
14	2158	Grease zerk 1/8"	2
15	1343	Relief fitting	4
16	1358	Grease seal	2
17	7001-037NC125A	Bolt for bearing cap 3/8" — 16 NC x 1-1/4" (non-hydraulic side)	4
	7001-037NC150A	Bolt for bearing cap 3/8" — 16 NC x 1-1/2" (hydraulic side)	4
18	1172-2	Flange 2" NPT (CPHN outlet) (optional)	2
	1172-2.5	Flange 2-1/2" NPT (CPHN outlet) (optional)	2
	1172-3	Flange 3" NPT (CPHN inlet & outlet) (standard)	2
	1206-3	Flange 3" NPT (CDHN inlet & outlet) (standard)	2
	1206-3S	Flange 3" Weld (CDHN outlet) (optional)	2
	1206-4	Flange 4" NPT (CDHN outlet) (optional)	2
	1206-4S	Flange 4" Weld (CDHN outlet) (optional)	2

¹Registered trademark of the DuPont Company.

Appendix E—Parts Details for Hydraulic Drive Coro-Vane® Pumps Models CPHN/HF 1021 and CDHN 1021 (continued)

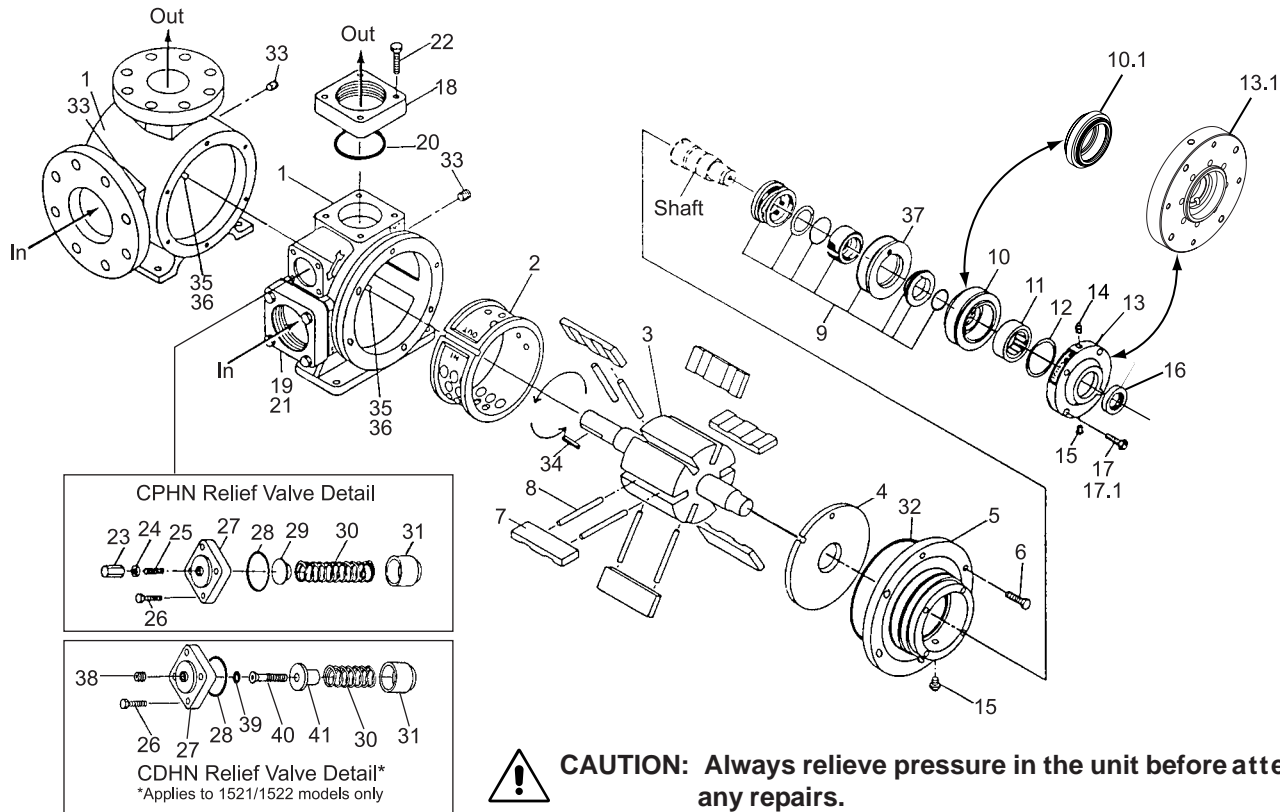


CAUTION: Always relieve pressure in the unit before attempting any repairs.

Number	Part Number	Description	Quantity
19	1999	Gasket for 1172 flange (CPHN)	2
	2-234A	O-ring for CDHN (Buna-N standard)	2
	2-234B	O-ring for CDHN (Neoprene® optional) ¹	2
	2-234D	O-ring for CDHN (Viton® optional) ¹	2
	2-234E	O-ring for CDHN (Teflon® optional) ¹	2
20	7001-037NC175A	Bolt for flange 3/8" — 16 NC x 1-3/4"	8
21	4025	Adjusting screw cap (CPHN)	1
22	1480	Relief valve adjusting screw gasket (CPHN)	1
23	7006-043NC250A	Relief valve socket head adjustment screw 7/16" — 14 NC x 2-1/2" (CPHN)	1
24	7001-037NC175A	Bolt for relief valve cover 3/8" — 16 NC x 1-3/4" (CPHN)	4
25	3930	Relief valve cover (CPHN)	1
26	2-228A	Relief valve cap O-ring (Buna-N standard)	1
	2-228B	Relief valve cap O-ring (Neoprene® optional) ¹	1
	2-228D	Relief valve cap O-ring (Viton® optional) ¹	1
	2-228E	Relief valve cap O-ring (Teflon® optional) ¹	1
27	2470	Relief valve spring seat (CPHN)	1
28	2949	Relief valve spring (CPHN)	1
29	4024	Relief valve poppet (CPHN)	1
30	2-268A	Casing O-ring (Buna-N standard)	2
	2-268B	Casing O-ring (Neoprene® optional) ¹	2
	2-268D	Casing O-ring (Viton® optional) ¹	2
	2-268E	Casing O-ring (Teflon® optional) ¹	2
31	3442	Pipe plug 1/4" NPT	2
32	2270	Shaft key	1
33	1309	Liner key	1
34	3253	Liner key Pin 3/8" x 1/2"	2
35	1822	Adaptor plate	2
36	2590	Pipe plug 1/8" NPT flush seal (CDHN)	1
37	7001-037NC125A	3-8/16" x 1-1/4" hex head (CDHN)	4
38	1207	Relief valve cap (CDHN)	1
39	2-112A	O-ring for adjusting screw (Buna-N standard)	1
	2-112B	O-ring for adjusting screw (Neoprene® optional) ¹	1
	2-112A	O-ring for adjusting screw (Viton® optional) ¹	1
	2-112A	O-ring for adjusting screw (Teflon® optional) ¹	1
40	2252	Relief valve adjustment screw (CDHN)	1
41	1227	Relief valve guide (CDHN)	1
42	1226	Relief valve guide spring (CDHN)	1
43	1224	Relief valve (CDHN)	1

¹Registered trademark of the DuPont Company.

Appendix E—Parts Details for Hydraulic Drive Coro-Vane® Pumps Models CPHN/HF 1321, 1521 and CDHN 1521



Number	Part Number	Description	Quantity
1	3254	Casing (CPHN & CDHN)	1
	2437	Casing (CPBF & CDBF)	1
2	1792-1	Liner (1521 & 1522)	1
	4072	Liner (1321 & 1322)	1
3	3350-X3R	Rotor & shaft assembly (1321 & 1521)	1
	3350-X4R	Rotor & shaft assembly (1322 & 1522)	1
4	3935	Side plate	2
5	1205-5	Head (CPHN & CPHF)	2
	1205-4	Head (CDHN)	2
6	7001-037NC125A	Bolt for head 3/8" — 16 NC x 1-1/4" (CPHN)	12
	7001-037NC125A	Bolt for head 3/8" — 16 NC x 1-1/4" (CDHN)	24
7	3309	Vane	6
8	4028-X	Pushrod (1521)	6
	4083-X	Pushrod (1321)	6
9	1769-XRA2	Mechanical seal assembly (Buna-N standard)	2
	1769-XRB2	Mechanical seal assembly (Neoprene® optional) ¹	2
	1769-XRD2	Mechanical seal assembly (Viton® optional) ¹	2
	1769-XRE2	Mechanical seal assembly (Teflon® optional) ¹	2
10	1769	Bearing housing (used on non-hydraulic side of pump)	1
10.1	1769-3	Bearing housing (used on hydraulic side of pump)	1
11	2754	Bearing outer race	2
12	2760-244	Retainer ring	2
13	1164-1	Bearing cap (used on non-hydraulic side of pump)	1
13.1	4193	Bearing cap (used on hydraulic side of pump)	1
14	2158	Grease zerk 1/8"	2
15	1343	Relief fitting	4
16	1358	Grease seal	2

¹Registered trademark of the DuPont Company.

Appendix E—Parts Details for Hydraulic Drive Coro-Vane® Pumps Models CPHN/HF 1321, 1521 and CDHN 1521 (continued)



CAUTION: Always relieve pressure in the unit before attempting any repairs.

Number	Part Number	Description	Quantity
17	7001-037NC125A	Bolt for bearing cap 3/8" — 16 NC x 1-1/4" (non-hydraulic side)	4
17.1	7001-037NC150A	Bolt for bearing cap 3/8" — 16 NC x 1-1/2" (hydraulic side)	4
18	1206-3	Flange 3" NPT CPHN1321 outlet standard	1
19	1206-4	Flange 4" NPT (CPHN1321 inlet) (CPHN/CDHN 1521 inlet & outlet) std.	1
20	2-245A	O-ring gasket for 1206-3 flange (Buna-N standard)	1
	2-245B	O-ring gasket for 1206-3 flange (Neoprene® optional) ¹	1
	2-245D	O-ring gasket for 1206-3 flange (Viton® optional) ¹	1
	2-245E	O-ring gasket for 1206-3 flange (Teflon® optional) ¹	1
21	2-249A	O-ring gasket for 1206-4 flange (Buna-N standard)	1
	2-249B	O-ring gasket for 1206-4 flange (Neoprene® optional) ¹	1
	2-249D	O-ring gasket for 1206-4 flange (Viton® optional) ¹	1
	2-249E	O-ring gasket for 1206-4 flange (Teflon® optional) ¹	1
22	7001-037NC150A	Bolt for flange 3/8" — 16 NC x 1-1/2"	8
23	4025	Adjusting screw cap (CPHN)	1
24	1480	Gasket (CPHN)	1
25	7006-043NC250A	Relief valve soc. hd. adj. screw 7/16" — 14 NCx2-1/2" (CPHN)	1
26	7001-037NC100A	Bolt for relief valve cover 3/8" — 16 NC x 1"	4
27	4061-1	Relief valve cap (CPHN)	1
	4061	Relief valve cap (CDHN)	1
28	2-240A	Relief valve cap O-ring (Buna-N standard)	1
	2-240B	Relief valve cap O-ring (Neoprene® optional) ¹	1
	2-240D	Relief valve cap O-ring (Viton® optional) ¹	1
	2-240E	Relief valve cap O-ring (Teflon® optional) ¹	1
29	4074	Relief valve spring seat (CPHN)	1
30	4075	Relief valve spring	1
31	4062	Relief valve poppet	1
32	2-268A	Casing O-ring	2
	2-268B	Casing O-ring	2
	2-268D	Casing O-ring	2
	2-268E	Casing O-ring	2
33	3442	Pipe plug 1/4" NPT	2
34	2270	Shaft key	1
35	1309	Liner key	1
36	3253	Liner key pin 3/8" x 1/2"	2
37	1822	Seal adaptor plate	2
38	2590	Flush seal plug — 1/8" NPT (CDHN)	1
39	2-112A	O-ring (Buna-N standard) (CDHN)	1
	2-112B	O-ring (Neoprene® optional) ¹ (CDHN)	1
	2-112D	O-ring (Viton® optional) ¹ (CDHN)	1
	2-112E	O-ring (Teflon® optional) ¹ (CDHN)	1
40	4078	Relief valve adjustment screw (CDHN)	1
41	4073	Relief valve spring seat (CDHN)	1

¹Registered trademark of the DuPont Company.

Appendix F—Troubleshooting Guide

In diagnosing pump and system troubles, record the following data during product transfers:

1. Pressure at pump suction.
2. Pressure at pump discharge.
3. Pressure in truck tank.
4. Pressure in tank being filled.
5. Pipe size and length of suction and discharge lines.
6. Size and length of vapor equalizing line.
7. Pump speed if practical.

Problem	Cause	Solution
Low capacity	Pump speed too slow	Check engine speed and PTO ratio. Consult pump performance curve. Use tachometer on pump if speed is questionable.
	High differential pressure	Restriction in discharge piping or hose too small. Vapor equalization lines too small or not used.
	External bypass valve stuck open or set too low	Readjust, repair, or replace valve.
	Clogged strainer	Clean strainer.
	Suction pipe too small or restricted	Indicated by pump inlet pressure dropping several pounds when pump is started. Remove restriction or modify piping.
	Worn vanes	Replace.
	Pump without vapor return	Without vapor equalization, a pump can remove only about 3% of the truck tank capacity per minute without severe cavitation and capacity loss.
	Worn sideplates	Reverse or replace sideplates. Check universal drive assembly to make sure angularity is within limits, yokes are parallel and slip-joint is greased. Check bearings.
	Vanes sticking	Remove vanes and clean out foreign matter (check strainer). Replace vanes if swollen.
Pump runs but no flow	Valve closed	Check valves. Make sure internal tank excess flow valve is open! Refer to manufacturer's instructions.
	Excess flow valve slugged	Stop pump until valve opens. If problem continues, slow pump down or install a new or larger excess flow valve.
	Broken shaft	Disassemble and inspect pump. Repair if necessary.
	Defective meter	Service meter.
Pump will not turn—locked up	Foreign matter in pump	Clean out the pump—check strainer in suction line
	Vanes broken	Clean out pump carefully and replace vanes. Has pump been operated dry? Then, check for damage to cam and rotor shaft assembly.
	Bearing seized	Replace pump bearings. Grease monthly. Use ball bearing grease manufactured for intended service.
	Moisture frozen in pump	Let thaw and break loose carefully. Add alcohol to tank (on LP-Gas). Check with product supplier about the possibility of water in the gas.
Will not build pressure	Poor suction conditions	Clean inlet strainer. Increase pipe size.
	External bypass valve set too low	Set valve for higher pressure—see instructions.
	Worn vanes and/or sideplates	Disassemble, inspect and repair as necessary. Do not run pump dry!

Appendix F—Troubleshooting Guide (continued)

Pump is noisy	Cavitation from poor suction conditions	As above.
	Vanes sticking	As above.
	Bearings worn	Replace if necessary—grease monthly.
	Very high differential pressure	Check for restriction in discharge line. Delivery hose too small and too long. Slow down pump!
		Check vapor release float assembly on meter and meter differential valve.
PTO shaft vibration	Inspect and repair driveline component.	
Pump leaks around shaft	Seal or O-rings failed	Inspect seal assembly and replace if necessary. Keep new seal very clean when replacing seal. Recommend a light oil film on O-rings. Do not run pump dry!

Appendix G—Storage of the Stationary Coro-Vane® Pumps

If your Corken Coro-Vane® pump is to be removed from service for some time, the pump must be protected as propane, butane and anhydrous ammonia all leave the metal "bare" and open to corrosion. Piping and tanks not in service should also be protected, as the rust particles can destroy the pump's seals almost immediately after startup.

1. Fill or thoroughly flush the pump with a light rust inhibiting oil. (If the pump is flushed with oil, placing some desiccant packets inside the pump will provide added protection.)
2. Plug all pump openings.
3. Store in a dry location.
4. Before placing the pump back into service, drain the oil and remove any desiccant packets.
5. Refer to the "Operation of Your Coro-Vane® Pump" on page 10 of this Installation, Operation and Maintenance (IOM) manual.

Appendix H—Operating Specifications for Char-Lynn Hydraulic Motor

Mounting flange	2 bolt SAE A
Input shaft	1" diameter straight keyed
Port 'A'	7/8-14 O-ring
Port 'B'	7/8-14 O-ring
Pilot diameter	3.250/3.245 in (57.15/57.02 mm)
Motor displacement	6.2 cubic inches per revolution
Maximum speed continuous duty	742 RPM
Flow continuous duty	20 gpm (76 L/min)
Torque continuous duty	3,500 in•lb (395.5 N•M)
Case drain	7/16-20 O-ring
Recommended fluids	premium quality anti-wear
Minimum viscosity	70 SSU (13 cSt)
Maximum operating temperature	180°F (82°C)



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