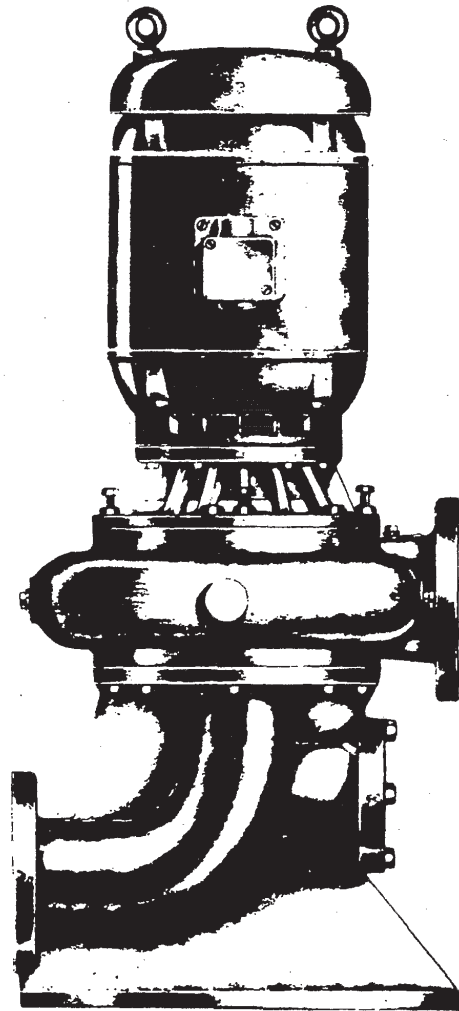




**FAIRBANKS NIJHUIS™**



# MODEL 5430

## **VERTICAL BILTOGETHER DRY-PIT SOLIDS HANDLING PUMPS**

### **INSTALLATION, OPERATION AND MAINTENANCE MANUAL**

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

# NOTICE

## CAUTION: IMPORTANT SAFETY NOTICE

THE INSTALLATION, USE AND OPERATION OF THIS TYPE OF EQUIPMENT IS AFFECTED BY VARIOUS FEDERAL, STATE AND LOCAL LAWS AND THE REGULATIONS CONCERNING OSHA. COMPLIANCE WITH SUCH LAWS RELATING TO THE PROPER INSTALLATION AND SAFE OPERATION OF THIS TYPE OF EQUIPMENT IS THE RESPONSIBILITY OF THE EQUIPMENT OWNER AND ALL NECESSARY STEPS SHOULD BE TAKEN BY THE OWNER TO ASSURE COMPLIANCE WITH SUCH LAWS BEFORE OPERATING THE EQUIPMENT.

**CALIFORNIA PROPOSITION 65 WARNING:**

### **WARNING:**

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

## **STORAGE OF PUMPS**

IF THE EQUIPMENT IS NOT TO BE INSTALLED AND OPERATED SOON AFTER ARRIVAL, STORE IT IN A CLEAN, DRY, WELL-VENTILATED PLACE, FREE FROM VIBRATION, MOISTURE, AND RAPID OR WIDE VARIATIONS IN TEMPERATURE. ROTATE THE SHAFT SEVERAL REVOLUTIONS. (NOT TO EXCEED EVERY TWO WEEKS) TO:

1. COAT THE BEARINGS WITH LUBRICANT,
2. RETARD OXIDATION OR CORROSION AND,
3. PREVENT POSSIBLE FALSE BRINELLING.

FOR OIL LUBE BEARINGS FILL THE RESERVOIR FULL OF OIL FOR STORAGE. DRAIN OIL TO THE PROPER LEVEL FOR START-UP. ROTATE THE SHAFT PERIODICALLY, ALSO NOT TO EXCEED EVERY TWO WEEKS.

CONSIDER A UNIT IN STORAGE WHEN:

1. IT HAS BEEN DELIVERED TO THE JOB SITE AND IS AWAITING INSTALLATION.
2. IT HAS BEEN INSTALLED BUT OPERATION IS DELAYED PENDING COMPLETION OF PLANT CONSTRUCTION.
3. THERE ARE LONG (30 DAY OR MORE) PERIODS BETWEEN OPERATION CYCLES.
4. THE PLANT (OR DEPARTMENT) IS SHUT DOWN.

**NOTE:** STORAGE REQUIREMENTS VARY DEPENDING ON THE LENGTH OF STORAGE, THE CLIMACTIC ENVIRONMENT AND THE EQUIPMENT. FOR STORAGE PERIODS OF THREE MONTHS OR LONGER, CONTACT THE MANUFACTURER FOR SPECIFIC INSTRUCTIONS. IMPROPER STORAGE COULD RESULT IN NON-WARRANTY COVERED RESTORATION REQUIREMENTS OR NON-WARRANTY COVERED PRODUCT FAILURES.

## STANDARD TERMS AND CONDITIONS

**LEGAL EFFECT:** Except as expressly otherwise agreed to in writing by an authorized representative of Seller, the following terms and conditions shall apply to and form a part of this Quotation and any order resulting therefrom and any additional and/or different terms of Buyer's purchase order or other form of acceptance are rejected in advance and shall not become a part of any order resulting from this Quotation.

The rights of Buyer hereunder shall neither be assignable nor transferable, except with the written consent of Seller.

Any order resulting from this Quotation cannot be cancelled or altered except with the written consent of Seller and upon terms which will indemnify Seller against all loss occasioned thereby. All additional costs incurred by Seller due to changes in design or specifications, modification of any order resulting from this Quotation or revision of product must be paid for by Buyer.

In addition to the rights and remedies conferred upon Seller by any contract resulting from this Quotation, Seller shall have all rights and remedies conferred at law and in equity and shall not be required to proceed with the performance of any order resulting from this Quotation if Buyer is in default in the performance of such order or of any other contract or order with Seller.

### PRICES:

- A. Prices for items of equipment included in the Quotation, other than equipment noted in Paragraph B, manufactured by Seller, are subject to escalation in accordance with Clause 1 below, unless Clause 2 is specifically stated in the price quotation portion of this Quotation.

**CLAUSE 1 —** The price for each item of equipment shall be escalated by the percentage increase of the published price for such item after applicable discounts in effect at the time of shipment, over the published price for such items after applicable discounts in effect at the date of this Quotation.

**CLAUSE 2 —** The quoted price for each item of equipment shall be subject to escalation in accordance with the price adjustment policy specified in Form KC586.

- B. Items of equipment purchased by Seller which are not covered by published prices and which are separately identified in this Quotation (such as motors, engines, controls, etc.) will be subject to escalation by the ratio of Seller's purchase price at the time of shipment over Seller's purchase price at the time of this Quotation.

**TERMS OF PAYMENT:** Unless otherwise specified in this Quotation, the terms of payment shall be as follows:

- a. On all orders under \$100,000, net cash, within thirty (30) days after shipment.
- b. On all orders over \$100,000, as follows:
  - 15% on submittal of drawings
  - 25% on release to manufacture
  - 50% at time of shipment
  - 10% 30 days after shipment

These terms shall apply to partial as well as complete shipments. If any proceeding be initiated by or against Buyer under any bankruptcy or insolvency law, or in the judgment of Seller the financial condition of Buyer, at the time the equipment is ready for shipment, does not justify the terms of payment specified, Seller reserves the right to require full payment, in cash, prior to making shipment. If such payment is not received within fifteen (15) days after notification of readiness for shipment, Seller may cancel the order as to any unshipped item and require payment of its reasonable cancellation charges.

If Buyer delays shipment, payments based on date of shipment shall become due as of the date when ready for shipment. If Buyer delays completion of manufacture, Seller may elect to require payment according to percentage of completion. Equipment held for Buyer shall be at Buyer's risk and storage charges may be applied at the discretion of Seller.

Accounts past due shall bear interest at the highest rate lawful to contract for, but if there is no limit set by law, such interest shall be eighteen percent (18%). Buyer shall pay all costs and expenses, including reasonable attorney's fees, incurred in collecting the same, and no claim, except claims within Seller's warranty of material or workmanship, as stated below, will be recognized unless delivered in writing to Seller within thirty (30) days after date of shipment.

**TAXES:** All prices exclude present and future sales, use, occupation, license, excise, and other taxes in respect to manufacture, sales, or delivery, all of which shall be paid by Buyer unless included in the purchase price at the proper rate or a proper exemption certificate is furnished.

**ACCEPTANCE:** This Quotation is not an offer. All offers to purchase, quotations and contracts of sale are subject to final acceptance by an authorized representative at Seller's Kansas City plant.

**DELIVERY:** Except as otherwise specified in this Quotation, delivery will be F.O.B. cars point of shipment. In the absence of exact shipping instructions, Seller will use its discretion regarding best means of shipment. No liability will be accepted by Seller for so doing. All transportation charges are at Buyer's expense. Time of delivery is an estimate only and is based upon the receipt of all information and necessary approvals. The shipping schedule shall not be construed to limit Seller in making commitments for materials or in fabricating articles under this order in accordance with Seller's normal and reasonable production schedules.

## STANDARD TERMS AND CONDITIONS

Seller shall in no event be liable for delays caused by fires, acts of God, strikes, labor difficulties, acts of governmental or military authorities, delays in transportation or procuring materials, or causes of any kind beyond Seller's control. No provision for liquidated damages for any cause shall apply under this order. Buyer shall accept delivery within thirty (30) days after receipt of notification of readiness for shipment. Claims for shortages will be deemed to have been waived if not made in writing within ten (10) days after the receipt of the material in respect of which any such shortage is claimed. Seller is not responsible for loss or damage in transit after having received "In Good Order" receipt from the carrier. All claims for loss or damage in transit should be made to the carrier.

**TITLE & LIEN RIGHTS:** The equipment shall remain personal property, regardless of how affixed to any realty or structure. Until the price (including any notes given therefore) of the equipment has been fully paid in cash, Seller shall, in the event of Buyer's default, have the right to repossess such equipment.

**PATENT INFRINGEMENT:** If properly notified and given an opportunity to do so with friendly assistance, Seller will defend Buyer and the ultimate user of the equipment from any actual or alleged infringement of any published United States patent by the equipment or any part thereof furnished pursuant hereto (other than parts of special design, construction, or manufacture specified by and originating with Buyer), and will pay all damages and costs awarded by competent court in any suit thus defended or of which it may have and notice and opportunity to defend as aforesaid.

**STANDARD WARRANTY:** Seller warrants products of its own manufacture against defects in materials and workmanship under normal use, and service for one (1) year from date of installation or startup, but not more than eighteen (18) months after date of shipment. Accessories and components not manufactured by Seller are warranted only to the extent of the original manufacturer's warranty. Notice of the alleged defect must be given to Seller in writing with all identifying details including serial number, type of equipment and date of purchase within thirty (30) days of the discovery of same during the warranty period. Seller's sole obligation on this warranty shall be, at its option, to repair or replace or refund the purchase price of any product or part thereof which proves to be defective as alleged. No allowances will be made for repairs or alterations effected without specific written authorization from Seller.

If requested by Seller, such product or part thereof must be promptly returned to the manufacturer prior to any attempted repair; or sent to an authorized service station designated by the manufacturer. All shipping expenses are to be prepaid by the buyer. Seller accepts no responsibility for loss or damage in transit of goods, nor will any warranty claim be considered unless the returned goods are received intact and undamaged as a result of shipment. Repaired or replaced material returned to customer will be shipped F.O.B. the manufacturer's factory.

Seller warrants repaired or replaced parts of its own manufacture against defects in materials and workmanship under normal use and service for ninety (90) days or for the remainder of the warranty on the product being repaired. This warranty applies to the repaired or replaced part and is not extended to the product or any other component of the product being repaired.

Under the terms of this warranty, Seller shall not be responsible nor liable for:

- a. Consequential, collateral or special losses or damages.
- b. Equipment conditions caused by fair wear and tear, abnormal conditions of use, accident, neglect, or misuse of said equipment.
- c. Labor charges, loss or damage resulting from the supplying of defective part(s) or improper repairs by unauthorized person(s).
- d. Damage caused by abrasive materials, chemicals, scale deposits, corrosion, lightning, improper voltage or mishandling.

Seller reserves the right to substitute new equipment and/or improve the part(s) on any equipment judged defective without further liability. All repairs and/or services performed by Seller, not adjusted as covered by this warranty, will be charged in accordance with the current equipment and service prices.

This warranty is VOID unless the purchaser provides protective storage, installs and maintains the equipment in accordance with manufacturer's instructions.

Credit will NOT be allowed nor shipment accepted on any part(s) or equipment returned unless prior approval in writing has been obtained.

**THIS WARRANTY IS THE SOLE WARRANTY OF SELLER AND ANY OTHER WARRANTIES EXPRESS, IMPLIED IN LAW OR IMPLIED IN FACT, INCLUDING ANY WARRANTIES OF MERCHANTABILITY AND FITNESS FOR USE, ARE HEREBY SPECIFICALLY EXCLUDED.**

No employee of the Seller and no agent, dealer or distributor has any authority to change or enlarge the terms of this warranty to obligate the Seller to other than strictly the terms of this written warranty.

**LIABILITY LIMITATIONS:** Under no circumstances shall the Seller have any liability for liquidated damages or for collateral, consequential or special damages or for loss of profits, or for actual losses or for loss of production or progress of construction, whether resulting from delays in delivery or performance, breach of warranty, negligent manufacture or otherwise. The aggregate total liability of Seller in connection with the performance of this order, whether for breach of contract or warranty, negligence, indemnity or otherwise, shall in no event exceed the contract price. Buyer agrees to indemnify and hold harmless Seller from all claims by third parties in excess of these limitations.

Since the compliance with the various Federal, State and Local laws and regulations concerning occupational health and safety and pollution are affected by the use, installation and operation of the equipment and other matters over which the Seller has no control, the Seller assumes no responsibility for compliance with those laws and regulations, whether by way of indemnity, warranty or otherwise.

## INTRODUCTION

The pumps covered by these instructions, when properly installed and maintained, will operate satisfactorily. Adherence to these instructions will insure proper installation, maintenance, and satisfactory operation of the product described herein.

### General Application

These pumps are volute type centrifugal pumps, designed for handling liquids containing soft solids, and are, therefore, termed solids handling pumps.

They use a close-coupled motor as the driver; i.e., the pump shaft and bearings are incorporated with the motor. The motor shaft extends through the stuffing box and is protected from wear by a removable sleeve which is sealed by a mechanical seal.

The volute is a cast iron type with an integral discharge nozzle capable of passing any soft solid that is passed by the impeller. The impeller is an enclosed solids handling type, cast in one piece. The clearance between the impeller and front head can be externally adjusted to compensate for wear.

Both the suction elbow and discharge casings have openings with removable covers to provide access to the impeller.

## PREINSTALLATION

### Inspection

Upon receipt of the equipment, check it against the packing list and inspect for broken and/or damaged parts. Report any shortage or damage to the transit company that delivered the equipment and advise Fairbanks Nijhuis™ immediately of any requirements for product inspection and/or replacement parts.

### Storage

**NOTE: THE MOTOR MUST BE PROTECTED FROM MOISTURE.** If the pump is to be stored for any length of time, the flanges must be covered and the inside of the seal housing must be filled with oil. Refer to the storage of pumps notice for definitions as to when a unit is to be considered as "in storage."

### Cleaning

Prior to installation, the suction and discharge flanges must be free of dirt, grit, or any other foreign particles to insure proper sealing of the gasket.

## INSTALLATION

### Location

The pump should be located as near the liquid supply as possible to keep suction losses and lift to a minimum. The pump should also be easily accessible for inspection and maintenance.

### Foundation

The foundation for the pump should be sufficiently substantial to absorb any vibration and to form a permanent level and rigid support. Foundation bolts of the proper size should be imbedded in the concrete, and located by a drawing or template. A pipe sleeve about 2-1/2 times the bolt diameter and a length of 10 times the bolt diameter should be used to allow final positioning. It is recommended that the top of the foundation be finished reasonably smooth and the height be made 3/4" to 1-1/2" less than the desired finish height to allow for grouting.

### Installation

1. Lower the pump into place.
2. Using wedges placed as close to the foundation bolts as possible, raise the pump to the desired elevation. Again, using a machinist level, adjust the wedges so that the suction and discharge flanges are vertical.
3. As the motor is an integral part of this pump, no motor alignment checks will be necessary.
4. Refer to the paragraph entitled "Grouting" for the remainder of the installation procedure.

### Grouting

When the alignment is correct and installation is complete, the foundation bolts should be tightened evenly, but not too firmly. The pump may then be grouted to the foundation. The area under the base should be completely filled with non-shrinking grout. It is desirable to grout the leveling pieces, shims or wedges in place.

After the grout has hardened, recheck the alignment.

**NOTE: AT LEAST 48 HOURS SHOULD BE ALLOWED FOR THE GROUTING TO SET BEFORE FOUNDATION BOLTS ARE TIGHTENED, OR REFER TO THE SPECS FOR THE GROUT BEING USED.**

If no misalignment is present, the foundation bolts may be securely tightened. If misalignment is present, it should be corrected as outlined in the preceding topic entitled "Installation" before the foundation bolts are tightened.

## PIPING

### Suction and Discharge

The piping must meet the pump flanges squarely and be supported so that stresses are not transmitted to the pump.

The suction piping should be as direct as possible and its length held to a minimum. If a long suction line is required, increase the pipe size (using eccentric reducers) to reduce friction losses; the piping should have a continual rise toward the pump, to eliminate air pockets. A gate valve is required on the suction line, if there is a positive suction. This valve is for isolation purpose only and should not be used for throttling the pump.

The discharge piping requires a check valve and a gate valve. The check valve, placed between the pump and the gate valve, is to protect the pump from any possible reverse rotation during driver start-up and during a power failure to the motor.

## OPERATION

### Lubrication of Motor

Follow the motor manufacturer's instructions and specifications on lubrication of motor bearings.

### Lubrication of Double Mechanical Seal

This type of mechanical seal has two sealing surfaces. Double seals are furnished on all B5430 pumps. The seal manufacturer's instructions, furnished with the pump, should be followed. For the construction of the double mechanical seal, refer to FIGURE 2.

The double mechanical seal must be lubricated and cooled by clean or filtered liquid supplied to the bottom (lowest) pipe connection in the seal housing. The air in the seal housing must be vented out the upper (highest) pipe plug at initial installation and any other time that air is allowed into the seal housing. The liquid must be supplied to the seal housing at a pressure 10 psi higher than the discharge pressure. Pressure must be maintained at the seal during all operations of the pump.

The liquid to the seal is usually "dead-headed." A continuous circulating flow of the liquid is only required when the liquid pressure at the seal housing is greater than 60 psi or when the seal housing begins to heat up. A good guide to follow is: when the seal housing is too hot (140° to 160°F or above) to touch by hand, circulating liquid to the seal is required.

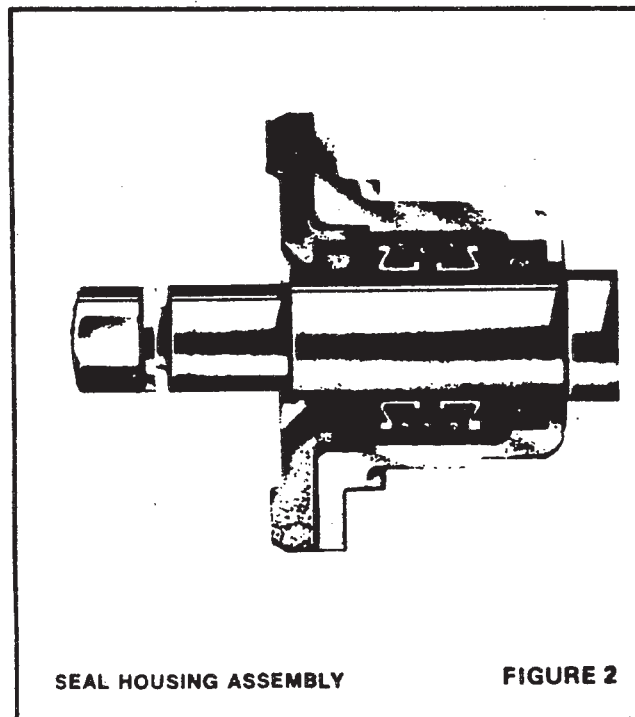
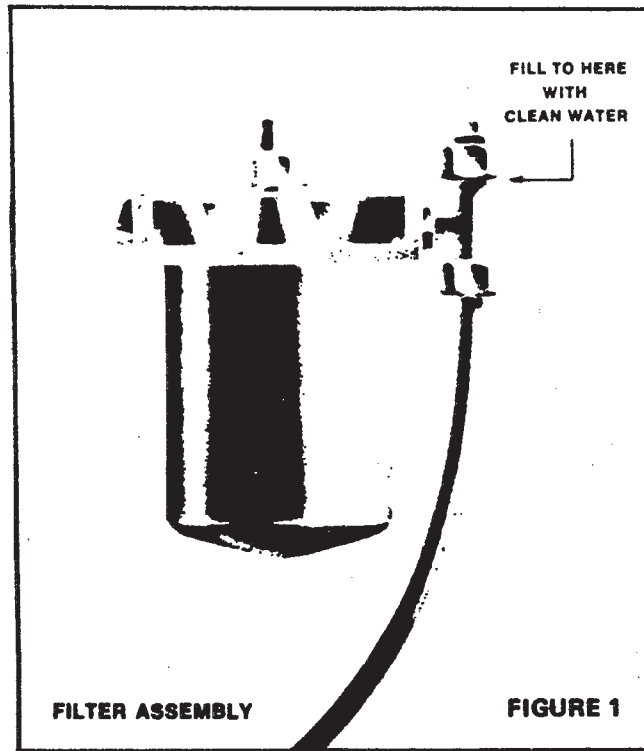
### Optional Filter System

A system to supply seal liquid as recommended when the operating pump discharge pressure is below 60 psi is as follows :

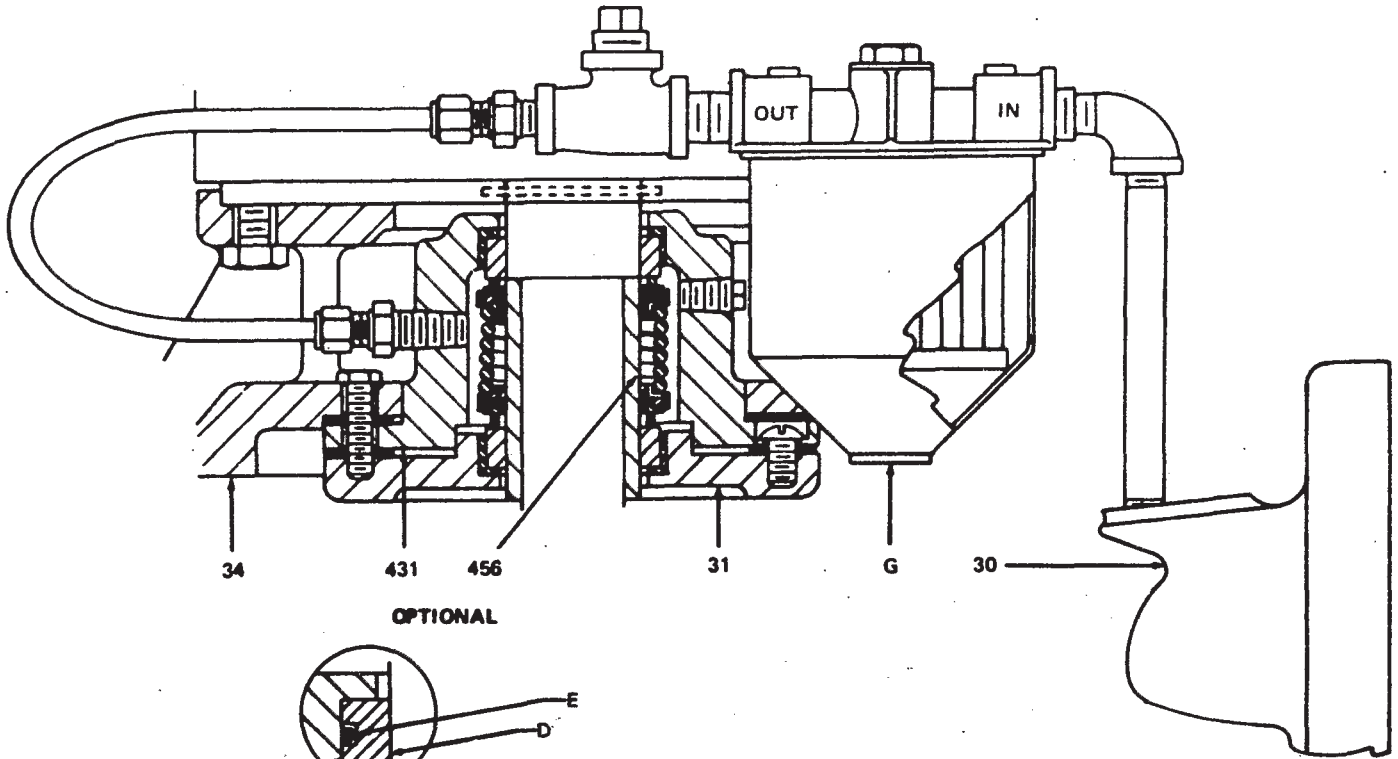
Install a pressure line from the 1/4" pipe tap at the volute discharge nozzle to lower connection at the seal housing. This line must contain a filter having a filter element capable of trapping all particles larger than 25 microns. Either a 1/4" or 3/8" tube may be used, although for most applications, the 1/4" size is sufficient. It is also necessary to provide some means of occasionally blowing out the filter. The seal manufacturer states that the losses of seal box fluid due to vaporization of the fluid film between the sealing faces will be approximately one tablespoonful per week.

The capacity of the filter system is approximately 100 gallons; therefore, it will only be necessary to replace the filter element every three to four months. In some cases, the water may contain minerals that tend to precipitate. Under such conditions, a separate source of sealant may be necessary.

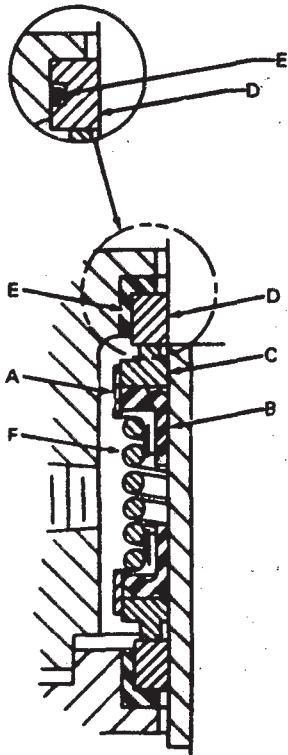
### SELF PRIMERS



**MECHANICAL SEAL AND FILTER SECTIONAL**



**OPTIONAL**



**NOTES:**

- THIS OPTIONAL FILTER SYSTEM MAY BE USED WHEN:
1. DISCHARGE PRESSURE IS LESS THAN 60 P.S.I.
  2. SEAL HOUSING TEMPERATURE IS LESS THAN 160°F.

REF. NO.	DESCRIPTION	REF. NO.	DESCRIPTION
A	METAL PARTS	G	FILTER
B	ROTARY BELLOWS	30	VOLUTE
C	ROTARY FACE	34	ADAPTER
D	STATIONARY SEAT	431	HOUSING, SEAL
E	STATIONARY SEAL	31	GLAND
F	SPRING	456	MECHANICAL SEAL

**FIGURE 3**



**Lubrication of Mechanical Seal (Precautions)**

Special operating techniques are not involved when using pumps equipped with mechanical seals. However, there are certain precautions that should be taken. They are:

1. Ensure that shipping oil, when supplied, has been flushed out of the seal housing box. Ensure that fluid is in the seal box.
2. The seal should never be operated, even to test electrical connections, until the operator knows that there is fluid in the seal box. Running the seal with an air bound box is the same as running the seal without fluid.
3. Ensure that the line to seal housing is installed and the seal housing is vented. If you have ordered the optional filter system, furnished by Fairbanks Nijhuis™, it will be packaged separately from the pump. Inspect these parts and install in accordance with FIGURES 1, 2 and 3.
4. Some seals will leak slightly when first run. This leakage should cease within a very short time.

**Rotation Check**

The correct rotation of the pump is indicated by an arrow cast on the casing. To check for the correct rotation, bump the motor and note the direction of rotation of the deflector on the motor shaft. If you are unable to see the deflector rotate, the volute clean-out can be removed to observe rotation when the motor is bumped. **DO NOT PUT HANDS OR ANY ITEM IN THE VOLUTE TO DETERMINE DIRECTION OF ROTATION.**

**CAUTION: DRY OPERATION OF THE PUMP MAY CAUSE DAMAGE TO THE MECHANICAL SEAL AND IMPELLER.**

**Priming**

1. Positive suction head.
  - a. Open all suction valves.
  - b. Open vent on the highest point of the pump casing. When liquid appears (no air bubbles), close vent. The pump is now primed.
2. Negative suction head (ejector or vacuum pump).
  - a. Close the discharge valve.
  - b. Attach ejector or vacuum pumps to the highest point on the casing.
  - c. Open the suction valve.
  - d. Start the ejector or vacuum pump.
  - e. When a continuous flow of liquid is exhausted from the ejector, close the valve on the vent. The pump is now primed.

**Initial Starting**

1. With the discharge valve closed and the pump primed, start the motor according to motor instructions.

**CAUTION: DRY OPERATION OF THE PUMP MAY CAUSE DAMAGE TO THE MECHANICAL SEAL AND IMPELLER.**

2. Open the discharge valve slowly to prevent water hammer.

**Operating Checks**

When the pump is started, and during the initial operation of the pump, it is advisable to perform the operating checks outlined in the "Trouble Shooting" section of these instructions.

**MAINTENANCE****Lubrication**

Follow the motor manufacturer's instructions and specifications on lubrication of motor bearings.

**Impeller Running Clearances**

As the impeller and front seat wear, the clearance increases causing internal leakage and decreasing the performance of the pump. This clearance can be adjusted to compensate for wear.

Clearance may be checked either by removing the suction handhole cover and placing a feeler (thickness) gage between the impeller and the front head or by checking between the adapter and volute. **Note:** In any clearance, check at least 4 places 90° apart. Clearance is adjusted by removing the jackscrews and loosening the capscrew at the adapter, thus, lowering the motor and rotating assembly until the impeller contacts the front head. Measure the gap between the adapter and volute. Put the jackscrews back in the adapter and tighten each jackscrew in a crisscross method, 1/8 turn at a time, until the gap is increased by the amount of the impeller clearance as shown below:

Pump Size	Clearance
2" and 3"	.010" to .020"
4" and 5"	.015" to .025"
6" and 8"	.010" to .030"
10"	.015" to .035"

Tighten the capscrews.

**Note:** If the gap is decreased after tightening the capscrews, the capscrews will then have to be loosened and the jackscrews turned to compensate for the loss of clearance.

**Disassembly**

1. Disconnect the piping to the seal housing (431).
2. Remove the capscrews (30B) and jackscrews (30A) that hold the adapter (34) to the volute (30).
3. Pull up the motor; the impeller (1) will now be accessible. (Note: Electrical connections to the motor should be removed to pull the motor up.)
4. Remove the impeller capscrew (9) and impeller washer (9A). The impeller (1) is fitted on a straight shaft; a wheel puller or similar device may be required to remove the impeller from the shaft.
5. When wearing rings are furnished, the rings may be removed by heating the rings to approximately 400°F., and then tapping on them. The rings may be ground off if the heating and tapping does not work.

**CAUTION: HEAT RESISTANT GLOVES MUST BE WORN WHEN HANDLING THE HOT RINGS OR HOT IMPELLER.**

6. The gland (31) and the seal housing (431) are removed as a cartridge from the adapter (34) after removing the small capscrews (433A) that hold the cartridge to the adapter (34).
7. To replace the mechanical seal (456), remove the small pan head screws (31A) that hold the gland (31) and seal housing (431) together. This will allow the gland and the seal housing to be removed.

The seal may then be removed.

8. The sleeve (14) is held in place by the clamping force of the impeller hub against the sleeve, and the sleeve I.D. is sealed with Permatex #2 to the shaft O.D. The sleeve may be removed by pulling on it.

Do not disassemble any further unless the pump is to be removed from the installation.

9. Remove the adapter (34) from the motor.
10. Disconnect the suction and discharge piping.
11. Remove the volute (30) and gasket (156) from the front head (33).

**Assembly**

**IMPORTANT:** All machined fits must be clean and free of burrs. New gaskets should be used.

1. Place the adapter (34) on the motor and tighten capscrews.
2. Sub-assemble the seal housing cartridge first. Place the stationary seal (item 5 of the mechanical seal) in the seal housing (431) and in the gland (31).

3. A light grease or oil is to be put on the sleeve (14) O.D. Slide the remaining parts of the mechanical seal (456) on the sleeve and place in the seal housing (431). Then, with the gasket (433) on the gland (31), bolt the gland onto the seal housing.

You now have the seal housing cartridge assembled.

4. Put a thin coat of Permatex #2 on the sleeve (14) inner surface where the motor shaft fits. Place the seal housing cartridge (with the gasket (433) on the shaft and slide into place. Check to see that the inlet water tap and vent tap are oriented properly to allow for the pipe connections; then tighten the bolting.
5. Place the impeller (1) on the shaft and, with washer (9A) in place, tighten the impeller capscrew (9) to the torque as shown below:

Bolt Size	Torque Required	
	Dry	Lubricated
3/8-16	20 ft. lb.	15 ft. lb.
1/2-13	50 ft. lb.	35 ft. lb.
5/8-11	100 ft. lb.	75 ft. lb.
3/4-10	175 ft. lb.	130 ft. lb.
7/8-9	165 ft. lb.	125 ft. lb.

6. Place the front head (33) on the base (15)\*, place the gasket (156) on the front head, and then place the volute (30) on the gasket. Now tighten the bolting.  
\*When an integral combination of front head and base (33 & 15) is supplied, the first part of this step is omitted.
7. With STP or Parker "O" lube on the "O" ring (156A) lower the motor assembly into the volute (30).
8. The proper impeller clearance is adjusted measuring the gap between the adapter (34) and the volute (30). Place jackscrews (30A) and jam nuts in the adapter (34) and tighten each jackscrew in a crisscross method, 1/8th turn at a time, until the gap is increased by the amount of impeller clearance as shown below:

Pump Size	Clearance
2" and 3"	.010" to .020"
4" and 5"	.015" to .025"
6" and 8"	.010" to .030"
10"	.025" to .035"

Tighten jam nuts to lock jackscrews in place.

**Note:** If the gap is decreased after tightening, then the capscrews will have to be loosened and the jackscrews will have to be turned to compensate for the loss of clearance.

## TROUBLE SHOOTING

### Insufficient Discharge Pressure or Flow

1. Pump not primed.
2. Speed too slow.
3. Discharge head too high.
4. Suction lift too high.
5. Wrong direction of rotation.
6. Air leaks into suction piping.
7. Impeller passage partially plugged.
8. Impeller damaged.
9. Impeller running clearance too large.
10. Suction line not submerged enough.
11. Air in liquid.
12. Impeller diameter too small.
13. Observe suction and discharge gage for conditions. This will determine #3 and #4 blockage in either line.

### Loss of Suction During Operation

1. Leaky suction line.
2. Water seal line plugged.
3. Suction lift too high.
4. Air or gases in liquid.
5. Volute gasket defective.

### Excessive Power Consumption

1. Speed too high.
2. Head lower than rating, pumps too much liquid.
3. Specific gravity or viscosity of liquid pumped is too high.
4. Mechanical defects:
  - Shaft bent.
  - Rotating element binds.
  - Wear rings set too close, dragging.
5. Check suction and discharge gages for conditions.

### Vibration or Noise

1. Misalignment between driver and adapter.
2. Foundation bolts loose or defect in grouting.
3. Mechanical defects:
  - Shaft bent.
  - Rotating element binds.
4. Head lower than rating, pumps too much liquid.
5. Check suction and discharge gages.

### Over-Heating

1. Bearings
  - Excessive grease.
  - Shaft bent.
  - Rotating element binds.
2. Seal Housing
  - Water seal plugged.
  - Air not vented out.
  - Flushing water not circulating.

## PARTS ORDERING

### Ordering Parts

When ordering spare or replacement parts for the Figure B5430 pump, the figure number, size, item number and serial number are required. Refer to the drawings and parts list in the back of the manual to be sure of the correct name and item number. Each part carries numbers and symbols that will be particularly helpful in ensuring that you receive the correct replacement part. Your order may be forwarded to your nearest Fairbanks Nijhuis™ distributor or directly to the factory.

### Returning Parts

All materials or parts returned to the factory must have prior approval and a Fairbanks Nijhuis™ "Returned Goods Tag" to accompany them. Unnecessary delays and wasted efforts will be avoided by using the proper procedure in returning parts or equipment.

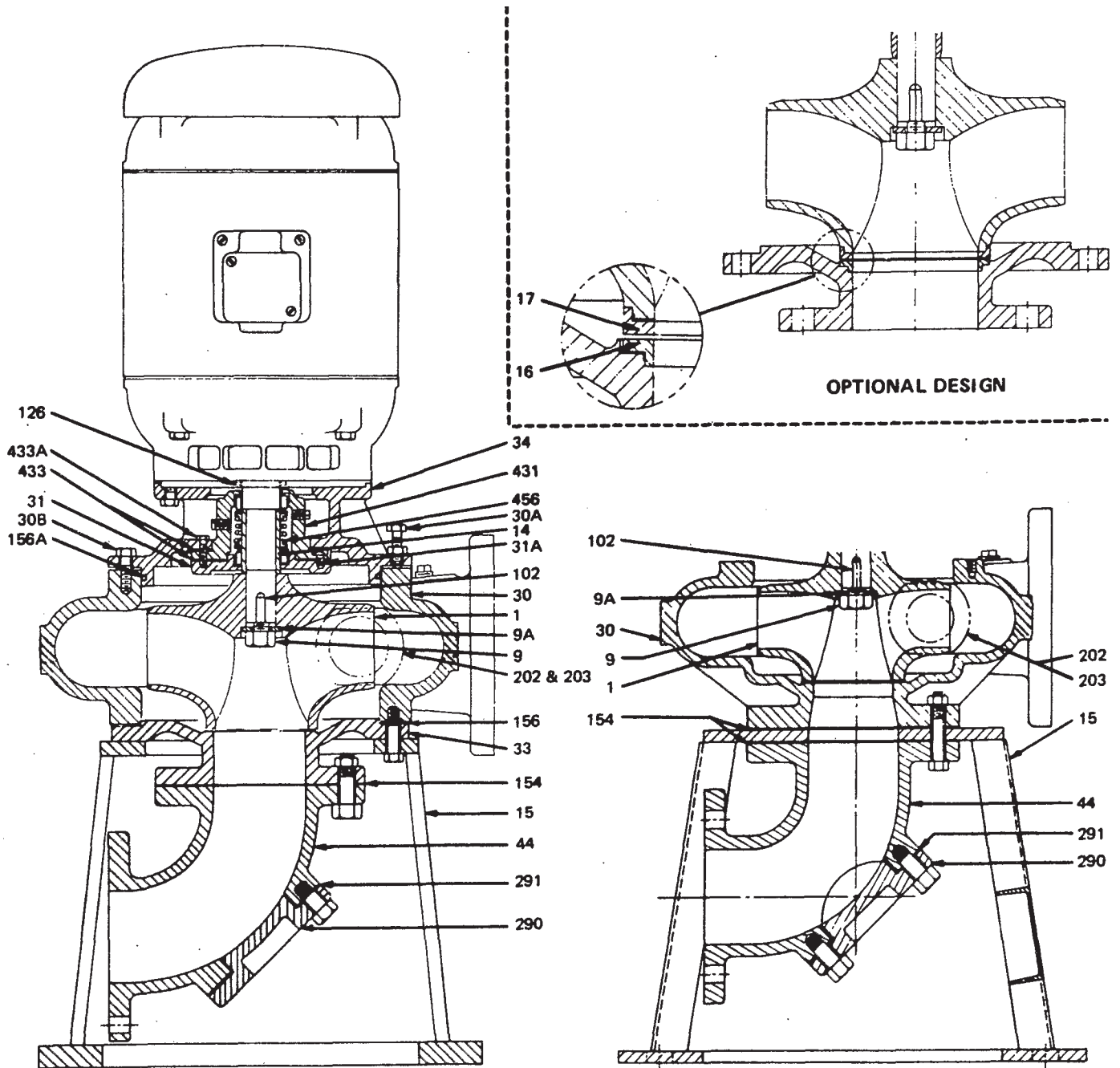
Contact your nearest Fairbanks Nijhuis™ distributor, listing the material to be returned and the reasons for the return. He will contact the factory to obtain approval for the return and to obtain the necessary "Returned Goods Tag" if the return is approved. You will be notified of the reasons if the approval is not given.

All material to be returned should be carefully packed to avoid damage in route from rough handling or exposure to weather. The "Returned Goods Tag" will give shipping instructions. All material to be returned freight prepaid unless otherwise instructed.

**NOTE: WE RESERVE THE RIGHT TO CHANGE DESIGN AND SPECIFICATIONS OF PRODUCTS AT ANY TIME.**

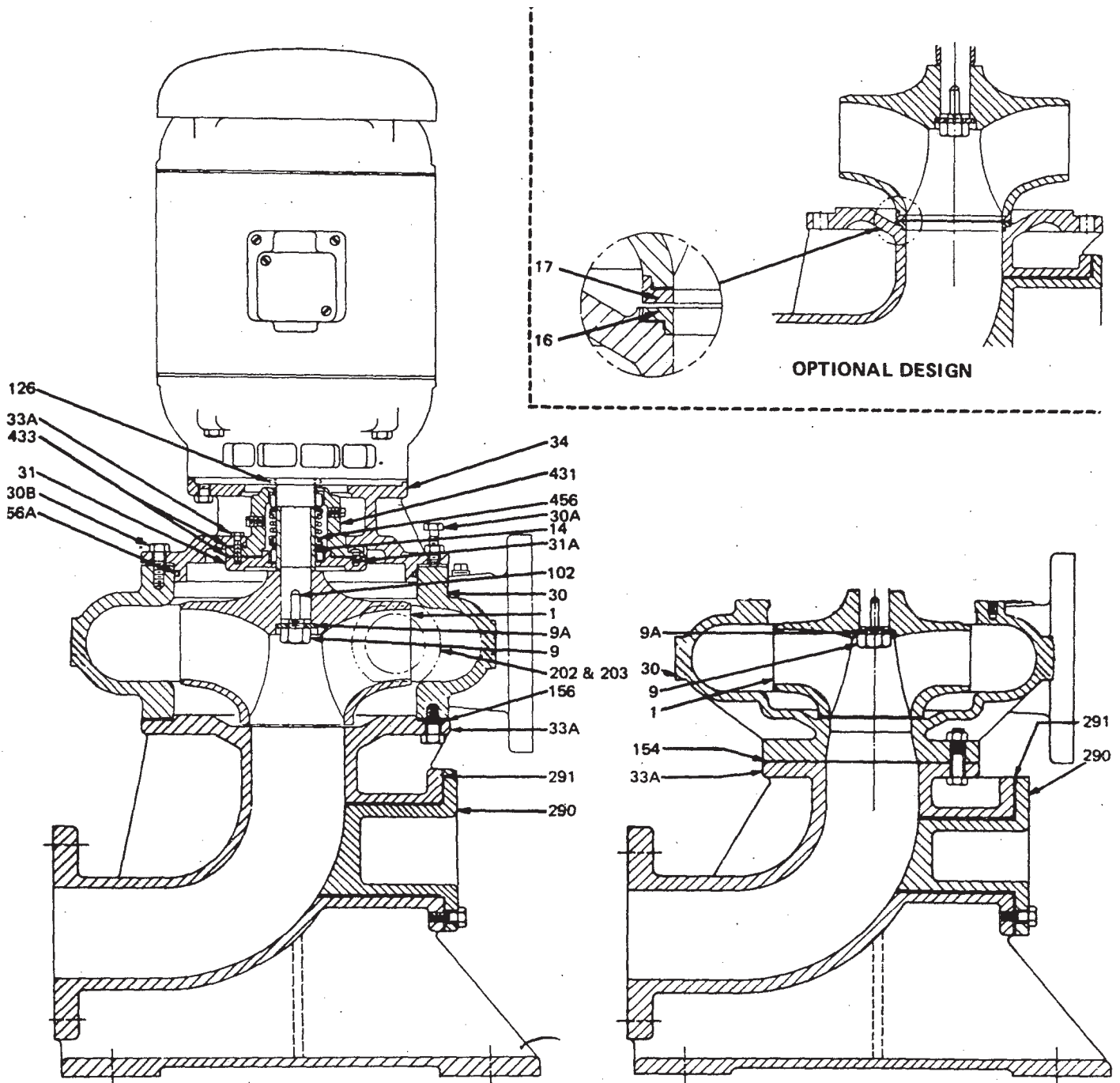
**AN INTERCHANGEABLE OR ADAPTABLE PART, NOT IDENTICAL IN APPEARANCE, MAY BE SUBSTITUTED IF THE PART ORDERED HAS BEEN IMPROVED OR OTHERWISE MODIFIED.**

**B5430 PARTS SECTIONAL ASSEMBLY DRAWING**

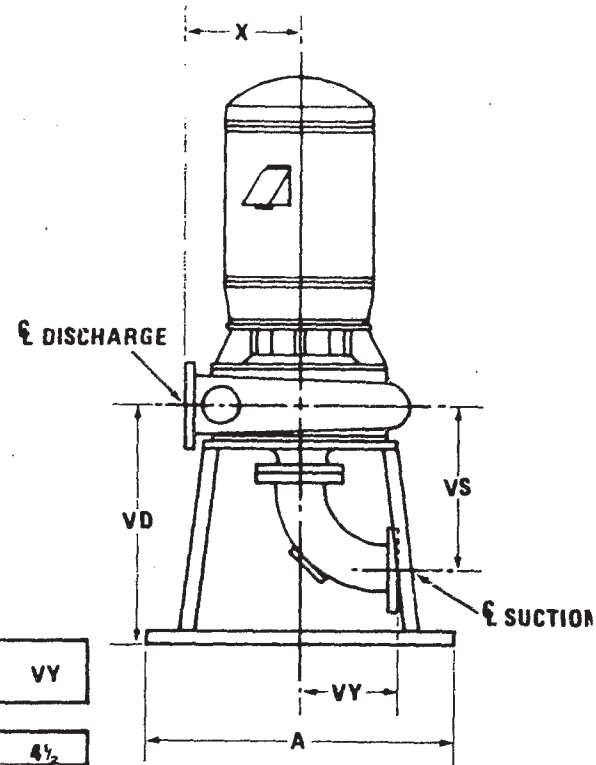
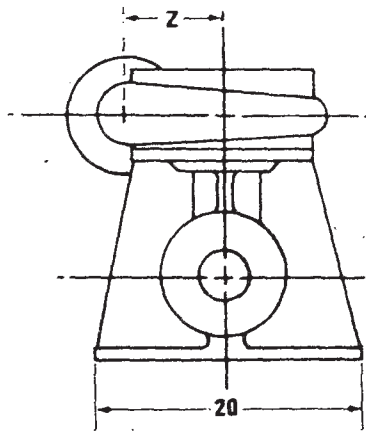
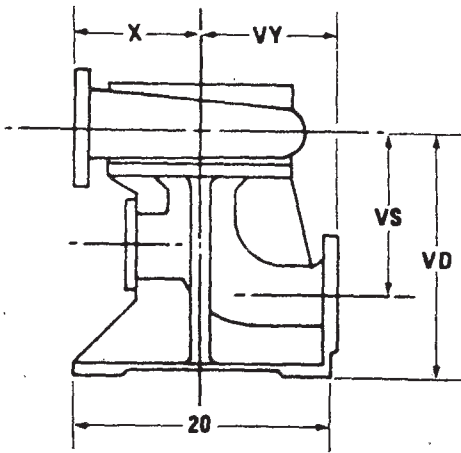


REF. NO.	DESCRIPTION	REF. NO.	DESCRIPTION	REF. NO.	DESCRIPTION
1	IMPELLER	30B	CAPSCREW, ADAPTER	156A	O RING, ADAPTER
9	CAPSCREW, IMPELLER	31	GLAND, SOLID	202	COVER, VOLUTE HANDHOLE
9A	WASHER, IMPELLER	31A	SCREW, GLAND	203	GASKET, VOLUTE HANDHOLE
14	SLEEVE, SHAFT	33	FRONTHEAD	290	COVER, SUCTION HANDHOLE
15	BASE	34	ADAPTER	291	GASKET, SUCTION HANDHOLE
16	WEAR RING, FRONTHEAD	44	ELBOW, SUCTION	431	HOUSING, SEAL
17	WEAR RING, IMPELLER	102	KEY, IMPELLER	433	GASKET, SEAL HOUSING
30	VOLUTE	126	DEFLECTOR	433A	CAPSCREW, SEAL HOUSING
30A	JACKSCREW, ADAPTER	154	GASKET, SUCTION	456	MECHANICAL SEAL
		156	GASKET, VOLUTE		

**B5430 PARTS SECTIONAL ASSEMBLY DRAWING**



REF. NO.	DESCRIPTION	REF. NO.	DESCRIPTION	REF. NO.	DESCRIPTION
1	IMPELLER	31	GLAND, SOLID	156A	O RING, ADAPTER
9	CAPSCREW, IMPELLER	31A	SCREW, GLAND	202	COVER, VOLUTE HANDHOLE
9A	WASHER, IMPELLER	33A	COMBINATION BASE ELBOW	203	GASKET, VOLUTE HANDHOLE
14	SLEEVE, SHAFT	34	ADAPTER	290	COVER, SUCTION HANDHOLE
16	WEAR RING, FRONTHEAD	102	KEY, IMPELLER	291	GASKET, SUCTION HANDHOLE
17	WEAR RING, IMPELLER	126	DEFLECTOR	431	HOUSING, SEAL
30	VOLUTE	154	GASKET, SUCTION	433	GASKET, SEAL HOUSING
30A	JACKSCREW, ADAPTER	156	GASKET, VOLUTE	433A	CAPSCREW, SEAL HOUSING
30B	CAPSCREW, ADAPTER			456	MECHANICAL SEAL



Pump Size	Suction Size	A	X	Y	Z	CP	HC Maximum	VD	VS	VY
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**5431**

2	2	20	6½	4	5½	23	35 <sup>7</sup> / <sub>16</sub>	18	9	4½
3	3	20	7¼	4¼	5¾	23½	37 <sup>3</sup> / <sub>16</sub>	18½	9¼	5½
4	4	20	8½	4½	6 <sup>7</sup> / <sub>16</sub>	24¼	42 <sup>5</sup> / <sub>16</sub>	18½	11½	13¼

**5432**

2	2	20	8	4½	6 <sup>5</sup> / <sub>16</sub>	21¾	40 <sup>3</sup> / <sub>16</sub>	16 <sup>5</sup> / <sub>16</sub>	9¼	4½
3	3	20	9	5	7¼	22¼	45 <sup>15</sup> / <sub>16</sub>	16 <sup>7</sup> / <sub>16</sub>	10½	5½
4	4	20	10	5½	7 <sup>7</sup> / <sub>16</sub>	23¼	46 <sup>13</sup> / <sub>16</sub>	17 <sup>3</sup> / <sub>16</sub>	11¾	13¼

**5433**

3	3	24	11	5½	7¾	29½	54½	23¾	11	5½
4	4	24	12	6¼	9	30½	57 <sup>13</sup> / <sub>16</sub>	24¼	12¾	13¼
5	5	24	13	7¼	9½	31½	58 <sup>13</sup> / <sub>16</sub>	24¾	14¾	7½
6	8	24	12	9	9	31½	58 <sup>13</sup> / <sub>16</sub>	24¾	17	8

**5434**

4	5	30	14¾	7 <sup>3</sup> / <sub>16</sub>	10 <sup>3</sup> / <sub>16</sub>	33¾	56 <sup>3</sup> / <sub>16</sub>	25 <sup>15</sup> / <sub>16</sub>	14 <sup>13</sup> / <sub>16</sub>	7½
5	6	30	16	8	11½	34 <sup>3</sup> / <sub>16</sub>	57¼	26 <sup>3</sup> / <sub>16</sub>	14 <sup>7</sup> / <sub>16</sub>	10
6	8	30	17	8 <sup>3</sup> / <sub>16</sub>	12 <sup>13</sup> / <sub>16</sub>	34 <sup>7</sup> / <sub>16</sub>	59 <sup>1</sup> / <sub>16</sub>	26½	16 <sup>3</sup> / <sub>16</sub>	8
8	10	30	18	9 <sup>1</sup> / <sub>16</sub>	14	35 <sup>7</sup> / <sub>16</sub>	60½	27	18 <sup>1</sup> / <sub>16</sub>	11

**5436**

5	8	30	14	9 <sup>17</sup> / <sub>32</sub>	12 <sup>3</sup> / <sub>16</sub>	33¾	63¾	25 <sup>15</sup> / <sub>16</sub>	18 <sup>7</sup> / <sub>32</sub>	9
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Pump Size	Suction Size	X	Z	CP	HC Maximum	VD	VS
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**5430C**

4	6	8½	6 <sup>7</sup> / <sub>16</sub>	24	42 <sup>7</sup> / <sub>16</sub>	18	12
4	6	10	7 <sup>7</sup> / <sub>16</sub>	25½	49 <sup>3</sup> / <sub>16</sub>	17 <sup>7</sup> / <sub>16</sub>	11 <sup>7</sup> / <sub>16</sub>
4	6	12	9	24 <sup>5</sup> / <sub>16</sub>	51 <sup>7</sup> / <sub>16</sub>	17 <sup>7</sup> / <sub>16</sub>	11 <sup>7</sup> / <sub>16</sub>

These dimensions are approximate and not to be used for installation purposes.  
 HC dimension will vary with make, type and HP of motor.

**CONSULT YOUR LOCAL TELEPHONE DIRECTORY  
 FOR THE WARRANTY SERVICE CENTER OR DISTRICT SALES OFFICE NEAREST YOU.**

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## Fairbanks Nijhuis Standard Pump Warranty

Seller warrants equipment (and its component parts) of its own manufacture against defects in materials and workmanship under normal use and service for one (1) year from the date of installation or start-up, or for eighteen (18) months after the date of shipment, whichever occurs first. Seller does not warrant accessories or components that are not manufactured by Seller; however, to the extent possible, Seller will assign to Buyer its rights under the original manufacturer's warranty, without recourse to Seller. Buyer must give Seller notice in writing of any alleged defect covered by this warranty (together with all identifying details, including the serial number, the type of equipment, and the date of purchase) within thirty (30) days of the discovery of such defect during the warranty period. No claim made more than 30 days after the expiration of the warranty period shall be valid. Guarantees of performance and warranties are based on the use of original equipment manufactured (OEM) replacement parts. Seller assumes no responsibility or liability if alterations, non-authorized design modifications and/or non-OEM replacement parts are incorporated. If requested by Seller, any equipment (or its component parts) must be promptly returned to Seller prior to any attempted repair, or sent to an authorized service station designated by Seller, and Buyer shall prepay all shipping expenses. Seller shall not be liable for any loss or damage to goods in transit, nor will any warranty claim be valid unless the returned goods are received intact and undamaged as a result of shipment. Repaired or replaced material returned to customer will be shipped EXW (Domestic Shipments) or FCA (International Shipments) Seller's factory. Seller will not give Buyer credit for parts or equipment returned to Seller, and will not accept delivery of any such parts or equipment, unless Buyer has obtained Seller's approval in writing.

The warranty extends to repaired or replaced parts of Seller's manufacture for ninety (90) days or for the remainder of the original warranty period applicable to the equipment or parts being repaired or replaced, whichever is greater. This warranty applies to the repaired or replaced part and is not extended to the product or any other component of the product being repaired.

Repair parts of its own manufacture sold after the original warranty period are warranted for a period of one (1) year from shipment against defects in materials and workmanship under normal use and service.

This warranty applies to the replacement part only and is not extended to the product or any other component of the product being repaired. Seller may substitute new equipment or improve part(s) of any equipment judged defective without further liability. All repairs or services performed by Seller, which are not covered by this warranty, will be charged in accordance with Seller's standard prices then in effect.

**THIS WARRANTY IS THE SOLE WARRANTY OF SELLER AND SELLER HEREBY EXPRESSLY DISCLAIMS AND BUYER WAIVES ALL OTHER WARRANTIES EXPRESSED, IMPLIED IN LAW OR IMPLIED IN FACT, INCLUDING ANY WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE.** Seller's sole obligation under this warranty shall be, at its option, to repair or replace any equipment (or its component parts) which has a defect covered by this warranty, or to refund the purchase price of such equipment or part. Under the terms of this warranty, Seller shall not be liable for (a) consequential, incidental, collateral, special or liquidated losses or damages; (b) equipment conditions caused by normal wear and tear, abnormal conditions of use, accident, neglect, or misuse of said equipment; (c) the expense of, and loss or damage caused by, repairs or alterations made by anyone other than the Seller; (d) damage caused by abrasive materials, chemicals, scale deposits, corrosion, lightning, improper voltage, mishandling, or other similar conditions; (e) any loss, damage, or expense relating to or resulting from installation, removal or reinstallation of equipment; (f) any labor costs or charges incurred in repairing or replacing defective equipment or parts, including the cost of reinstalling parts that are repaired or replaced by Seller; (g) any expense of shipment of equipment or repaired or replacement parts; or (h) any other loss, damage or expense of any nature.

The above warranty shall not apply to any equipment which may be separately covered by any alternate or special warranties.