

ALBANY

CAST IRON POSITIVE DISPLACEMENT HELICAL GEAR PUMPS

GENERAL INSTRUCTIONS

INDEX

SECTION 1 — Pages 1 and 2

PRINCIPAL OF OPERATION • MOUNTING BASES •
INSPECTION • ALIGNMENT • PIPING •
STRAINERS • DISCHARGE • CONTAMINATION

SECTION 2 — Page 2

PRIMING • RELIEF VALVE ADJUSTMENT •
LUBRICATION • PUMP ROTATION • PUMP
ROTATION WITH RELIEF VALVE

SECTION 3 — Pages 3 and 4

DISASSEMBLING PUMP • REASSEMBLING PUMP •
TEMPERATURE • STARTING

SECTION 4 — Page 4

GENERAL MAINTENANCE • STUFFING BOXES

SECTION 5 — Page 5

CLOSE COUPLED MODELS

INSTALLATION, OPERATION, REPAIR AND MAINTENANCE INSTRUCTIONS

SECTION I – INSTALLATION

PRINCIPAL OF OPERATION —

All Albany Gear pumps are of the positive displacement type. A definite amount of liquid is displaced with each revolution of the pump. The displacement capacity will vary directly with the pump speed within specified limitations. These pumps will produce a discharge pressure equivalent to the conditions of the particular installation. If these conditions are in excess of the design capability of the pump, the discharge pressure may rise to a point where the pump will be damaged and/or the driver overloaded.

INSPECTION — Upon receipt of any pump or pump unit check carefully for possible damage or shortages. Be sure that the shaft has not been bent or damaged. Rotate the pump by hand to be sure it is free and without tight spots. If the pump is to be stored, it should be kept in a dry location and those parts subject to rust should be protected with a suitable coating.

MOUNTING BASES — Pump units should be mounted on either a concrete or metal foundation of sufficient weight and strength to properly support the entire pump unit. It should be located as close to the liquid source as is practical, while allowing for accessibility for normal pump maintenance. The foundation should be made flat and smooth to ensure correct alignment of the pump. Provisions should be made to bolt the unit securely in place.

Do not locate the pump unit in a pit unless provisions have been made for proper drainage and ventilation.

ALIGNMENT: Correct alignment is absolutely essential for satisfactory pump life. Complete pump units are set and aligned at the factory on a flat surface plate and shims are inserted where necessary to provide perfect alignment. However, all baseplates are somewhat elastic and as a result we cannot assume responsibility for mechanical operation unless the shop alignment is reproduced when the unit is secured to its foundation. Since no foundation is perfectly flat or level, it is therefore necessary to shim the baseplate until the pump and motor shafts are level and parallel.

The setting of pump units which incorporate V-belt drives is not as critical as with those units which are direct connected. However, it is important to ensure that the pump and motor shafts are parallel and in line. Recheck the alignment after the piping has been connected to the pump.

After the unit has been completely set and piped, check that the pump rotates freely by hand before activating the driver.

When pumps only are supplied for field mounting, it is important that the proper alignment between pump and driver is maintained. The baseplate should be secured to a flat surface plate and the driver and pump set so that the shafts are level and parallel.

The use of a flexible coupling will not compensate for poor

MOUNTING BASES (CONT'D)

alignment. **PARALLEL ALIGNMENT** can be determined by use of a straight edge across the rim of both coupling halves at four positions ninety degrees apart. Couplings aligned in this manner should be true to within .005" at any position. **ANGULAR ALIGNMENT** can be checked by gauging the coupling gap at several points. (See Fig. # 1, page 1.)

NEVER exert pressure or force on the exposed pump drive shaft end. *NEVER* force a coupling or pulley on the pump shaft by pounding or pressing. Damage can result to internal parts. Seal components and retaining rings can be forced out of normal operating positions. Malfunctioning and seal leakage can result.

It is particularly important that pumps driven through a flexible coupling be mounted in such a manner as to ensure sufficient gap between the coupling components to allow for any end play in the driver.

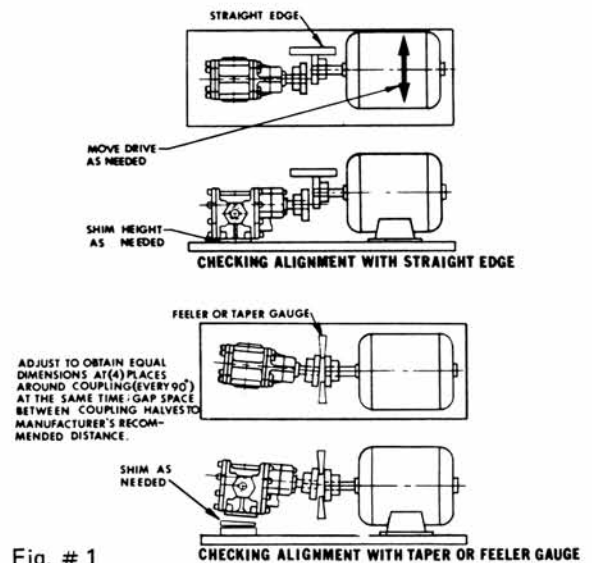


Fig. # 1

SUCTION PIPING —

Albany Gear pumps are capable of operating up to 25 ft. suction lift based on fuel oil 70°F. If the static lift plus pipe friction losses combine to exceed this figure, pump operation will be erratic or no pumping at all will be realized.

The most desirable pump installations are those with the shortest suction lines. It is therefore important to locate the pump as close to the liquid source as is practical. Suction piping should never be less in diameter than the pump suction opening. When handling thick liquids with appreciable viscosity, the suction pipe should be increased to a greater size than the pump opening.

It is particularly important that the suction line be air tight. Use a good pipe joint compound or tape at all joints. If the suction line is not tight and air is allowed to enter the pump capacity will be noticeably reduced or it may not pump at all.

SUCTION PIPING (CONT'D)

Be sure that the suction line is completely clean and free of any foreign matter. Avoid high spots in piping which will tend to trap air. It is good practice to install either a foot valve or check valve in the suction line to ensure that the pump will prime quickly when started.

When handling highly volatile liquids, it is necessary to reduce the suction lift to a point where vaporization will not occur. In some instances a positive suction head will be required. **THE PUMPING OF LIQUIFIED PETROLEUM (PROPANE, BUTANE) IS NOT RECOMMENDED.**

SUCTION STRAINERS — Gear pumps are designed and fitted with very close internal clearances. The entry of foreign material or abrasives will cause rapid wear or extensive damage to the pump. It is therefore necessary to install a strainer at the pump suction.

Select a strainer of proper size with as fine a mesh as is practical, being careful that the pressure drop through the strainer will not add to the suction lift to exceed the suction capability of the pump. Install the strainer as near the pump suction as is practical and in such a manner that it can be easily opened and cleaned. Be sure to arrange a regular inspection on the strainer basket to avoid clogging.

DISCHARGE — Select pipe of sufficient size to ensure that the resulting friction loss does not add to the discharge head an amount that will exceed the design capability of the pump or motor. It is advisable to install a fitting in the discharge line adjacent to the pump to allow for priming or venting and installation of a pressure gage for both system and pump performance evaluation. To avoid excessive pressure build-up due to a closed or blocked discharge line, or due to an increase in liquid viscosity, it is often necessary to install a relief valve in the pumping system.

ALL Albany Gear pumps are available with an optional integral relief valve built onto the pump. However, it is sometimes more desirable that the relief valve be installed in the discharge piping and piped back to the source of supply. Heat is better dissipated over large surface areas. The relief valve should be set at a pressure of approximately 10 P.S.I. in excess of the designed operating pressure, but not so high as to overload the drive or the pump itself.

PRODUCT CONTAMINATION — All pumps are assembled and tested using a suitable grade of machinery oil. Unless specified this oil is left in the pump during shipment to protect against corrosion and to ensure some lubrication during start up. If this oil will be detrimental to the system it will be necessary to dismantle the pump and clean all parts thoroughly. Before starting, be sure to fill the pump with a compatible liquid.

SECTION II — OPERATION

PRIMING — Before starting the pump make sure that it is thoroughly primed. If at all possible, use a good grade of light lubricating oil. Failure to properly prime the pump could cause immediate damage to the working parts.

RELIEF VALVE ADJUSTMENT — Optional relief valves furnished with pumps are not pre-set at the factory and must therefore be set to the required pressure on the job. Before starting the pump, adjust the integral or in-line relief valve so that it is set at its lowest pressure. This is done by removing the bonnet or cap nut and rotating the adjusting screw counter-clockwise until it is completely off the spring.

LUBRICATION — The internal bearings in all Albany Gear pumps are either lubricated by the liquid being pumped or are self-lubricating. Outboard shaft bearings are sealed and greased for life. Therefore, lubrication is not required for the pump itself. Motor or driver bearings should be lubricated as covered by the manufacturer's instructions.

DIRECTION OF ROTATION — Standard direction of rotation is clockwise when facing shaft end of pump. When rotated in this manner the pump must be installed so that the suction line is connected to the port on the left hand side of the pump. If the right hand port is to be the inlet or suction, the rotation must be counter clockwise when facing the pump from the shaft end.

When this is done the rear cover must be rotated 180° to ensure proper lubrication of bearings. Be sure the rear cover is positioned to correspond with arrows indicating in and out. Albany Gear pumps are designed to operate in either direction of rotation. See Diagram Fig. # 2.

The relief valve adjusting screw must always be located adjacent to the pump inlet port. When changing the direction of rotation it will be necessary to change the position of the integral relief valve. Be sure that the relief valve cover is set to correspond with arrows indicating in and out. Failure to ensure the proper position will render the valve useless. The relocation of the valve cover is accomplished by rotating the complete relief valve pump cover 180°.

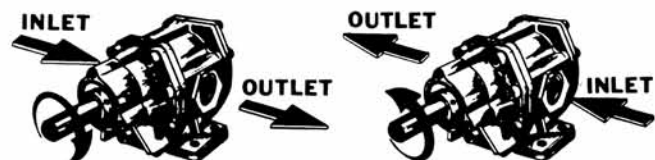


Fig. # 2.

SECTION III – REPAIR



DISASSEMBLING PUMP – Repair kits are available for all Albany Gear pump models. Each repair kit includes replacement gaskets, seal, gears, shafts and bearings. Remove rear cover. Using fingers or hook tool, remove rear bearings. Slide out idler gear assembly. Grasp drive gear, slide off drive shaft and carefully remove key from shaft.

Remove 3 screws from bearing retainer and pull shaft assembly from pump.

Remove screws from front cover. Remove cover by light tapping; to ease off dowel pins, while pulling from body. Front bearings can now be removed.

Loosen 2 set screws in outboard bearing and slide retainer off shaft.

For 03 Models only: Remove snap ring from shaft in front of outboard bearing and push shaft through retainer pushing out wearface and seal seat at same time. Remove snap ring from shaft behind bearing.

To remove rotating seal head from shaft it is necessary to protect the rubber bellows from grooves and keyway. This can be accomplished by covering them with scotch tape. Lubricate shaft and slide seal head off shaft.

To remove wearface and seal seat, remove snap ring from outboard bearing. Pull out bearing and then push out wearface and seal seat.

Replace any parts where wear is evident before re-assembling pump.

RE-ASSEMBLING PUMP – Carefully clean all parts and lubricate lightly. Make sure pump body faces are clean and free of nicks or scratches. If new bearings are used try in body and on shafts before re-assembling pump.

Insert front bearings. Replace gasket, install front cover using dowel pins for alignment. Tighten eight screws finger tight. Slide rotating seal head on shaft using caution not to cut rubber bellows or scratch seal wearfaces until spring washer is against snap ring. Press wearface and seal seat in bearing retainer; taking care not to nick the seal seat, and make sure wearface is seated squarely on back face. Press sealed ball bearing in retainer and inset snap ring. Slide this assembly over shaft after cleaning and lubricating seal faces. Remove one set screw from ball bearing, push retainer until screw hole lines up with locking groove on shaft and tighten other set screw. Insert other screw and tighten both set screws until allen wrench flexes approximately 15°.

For 03 Models only: After installing front cover as previously, slide rotating seal head on shaft using caution not to cut rubber bellows or scratch seal wearfaces until spring washer is against snap ring. Press wearface and seal seat in bearing retainer taking care not to nick the seal seat, and make sure

RE-ASSEMBLING PUMP (CONT'D)

the wearface is seated squarely on its back face. Slide bearing retainer on shaft and place middle snap ring on shaft. Push ball bearing on shaft and press into retainer until snap ring can be inserted to hold bearing in retainer. NOW place outer snap ring on shaft to complete retainer, seal and shaft assembly.

Insert retainer, seal and shaft assembly in front cover making sure drain hole is pointing down and replace screws.

Insert key in drive shaft and slide drive gear against front bearing. Insert idler gear assembly and insert rear bearings. Replace gasket and rear cover. Tighten all screws while rotating drive shaft by hand.

REPAIR



DISASSEMBLING PUMP – Repair kits are available for all Albany Gear pump models. Each repair kit includes replacement gaskets, seal, gears, shafts and bearings. Remove rear cover. Using fingers or hook tool, remove rear bearings. Slide out idler gear assembly.

Remove screws from seal retainer and remove seal retainer from pump.

IMPORTANT -

Do not remove screws fastening front cover to body - keep pump body and front cover assembly together as a unit in order to preserve relative positions and alignment. In the event body and front cover are separated, it will be necessary to tap body and cover lightly at pump reassembly while tightening screws in order to insure alignment and free turning.

Remove drive shaft and gear assembly from cover and body assembly by pushing on drive shaft end while supporting on body flange.

For pumps equipped with mechanical seals and lip seals, it is necessary to protect the rubber lip or bellows from shaft grooves and keyway. This can be accomplished by covering them with scotch tape. Lubricate shaft before pushing drive shaft and gear assembly from cover.

To remove wearface and seal seat, push out wearface and seal seat from seal retainer.

Replace any parts where wear is evident before re-assembling pump.

RE-ASSEMBLING PUMP – Carefully clean all parts and lubricate lightly. Make sure pump body faces are clean and free of nicks or scratches. If new bearings are used try in body and on shafts before re-assembling pump.

Place internal pump parts into front cover and body unit. Suggested sequence includes front bearings, drive and idle gear assemblies, and rear bearings.

RE-ASSEMBLING PUMP (CONT'D)

Replace gasket and install rear cover to body.

Tighten body to cover screws while tapping lightly to insure alignment and free turning.

For mechanical seals, install seal retaining ring, (snap ring) on shaft. Slide rotating seal head on shaft using caution not to cut rubber bellows or scratch seal wearfaces until spring washer is against snap ring (seal retaining ring). Press wearface and seal seat in seal retainer; taking care not to nick the seal seat, and make sure wearface is seated squarely on back face. Slide this assembly over shaft after cleaning and lubricating seal faces. Fasten seal retainer to pump cover making sure gasket or "O" ring is in place.

For lip seals, pryout old lip seal from lip seal retainer. Remove lip seal spacer and discard. Press new lip seal into lip seal retainer until bottomed in its chamber. *NOTE:* By bottoming the new lip seal it assumes the position previously occupied by the discarded spacer presenting a new and unblemished shaft surface for the new lip seal to ride on. (See Fig. # 3.)

Slide the lip seal and retainer onto the shaft using caution not to cut or gouge the seal lip. Use tape to protect against sharp shaft groove and keyslot edges by wrapping around the shaft and lubricate prior to lip seal retainer insertion. Fasten the lip seal retainer to the pump cover making sure the gasket or "O" ring is in place.

OPERATING TEMPERATURE — Standard pumps when fitted with a mechanical seal or lip seal are limited to a maximum temperature of 175°F. Pumps fitted with standard packing are suitable for temperatures to 250°F. Albany Gear pumps, when specified can be specially fitted for temperatures to 400°F. When handling products with temperatures in excess of 200°F, care should be taken to avoid sudden temperature shock by introduction of high temperature to a cold pump or reverse. It is advisable to bring the temperature up gradually.

STARTING — Never start or run the pump dry. This will inevitably cause galling or seizing of the internal parts. Always prime the pump with a clean, light lubricating oil or with liquid to be pumped.

Before starting, rotate the pump by hand. It should rotate freely without tight spots. Check that all suction and discharge valves are open and that any relief valves have been "backed off". After priming, start the driver and allow pump to operate at a reduced load while observing for unreasonable noise, heat or vibration. Check to be sure pump is delivering liquid. If not, shutdown immediately and review foregoing instructions.

Gradually bring pump up to operating pressure by tightening relief valve adjustment until the pressure gauge indicates that the system design pressure has been reached. Again check pump for excessive noise, heat or vibration. Check that the pump is delivering the required capacity and that the vacuum is not in excess of design conditions. If it is determined that the pump is meeting the required conditions, it is important to check that the driver is not overloaded. Be sure that the overload protection for electric motor is properly sized. Check that the electric motor is operating within the nameplate amperage limitation.

SECTION IV – MAINTENANCE

GENERAL — Standard Albany Gear pumps are designed to be lubricated by the liquid being pumped and therefore do not require lubrication maintenance. Pumps to handle liquids with little or no lubrication quality should be fitted with self-lubricating carbon bearings. Ball bearings are sealed and lubricated for life.

Lubrication for reduction gear drives and electric motors should be maintained as specified in the manufacturer's instructions furnished with the shipment.

STUFFING BOXES — Pumps equipped with packings will require adjustment periodically to avoid excessive leakage. The packing gland should be tightened as needed, but only when the shaft is rotating. Do not attempt to tighten gland to the point where leakage is completely stopped. Allow for a small continuous leakage of approximately one drop per minute to ensure lubrication and cooling at the packing area. Eventually all the packing in the pump will become deteriorated and will have to be replaced.

Pumps equipped with mechanical seals and lip seals require no adjustment.

LIP SEALS — Lip seals are positive in their sealing action with zero liquid leakage.

No mechanical adjustments are required.

Some common causes of lip seal leakage include:

Scouring of shaft at lip contact area due to contaminated liquids (abrasives).

Excessive seal lip contact pressure on pump shaft due to excessive pump pressure or incorrect pump direction of rotation.

NOTE: It is important to insure correct direction of pump rotation as the seal cavity is internally vented to pump suction side (low pressure side) - see page 2 "Direction of Rotation".

Lip seals are replaceable by pressing out the old seal and pressing in a new replacement seal. *DO NOT* replace the original seal spacer Item 1. Be sure to press and bottom the new seal into the position which the space, Item 1, had occupied. This insures the new seal will be in contact with a new area of the pump shaft. (Fig. 3)

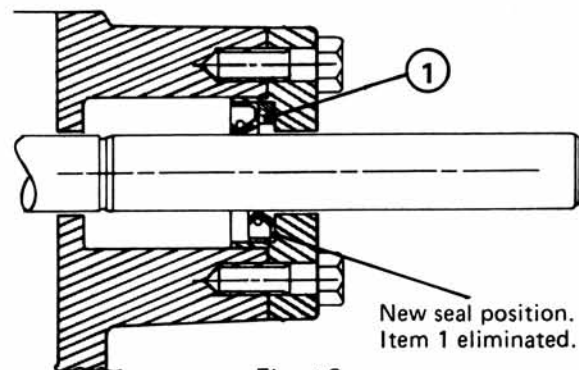
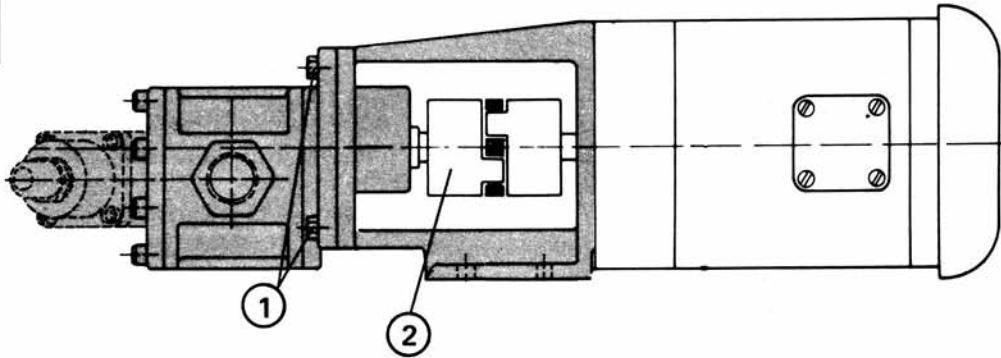


Fig. # 3

SECTION V – CLOSE COUPLED MODELS

- Remove pump from motor mounting bracket by removing four (4) mounting bolts Item 1.
- Remove flexible coupling half Item 2 from the pump shaft. Except for mounting features, pedestal pumps and close coupled pumps are very similar. Although close coupled pumps do not have mounting feet as found on pedestal models, all procedures and instructions contained in this manual are applicable and usable. However, individual part number identification can vary. Refer to individual model parts lists for specific part numbers and repair kit numbers.

MANUFACTURED AND GUARANTEED BY

ALBANY PUMP COMPANY LIMITED

420 Harry Walker Parkway, Newmarket, Ontario L3Y 8P5