

Installation, Operation, Maintenance and Safety Instructions



RAY PUMP

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WARNING

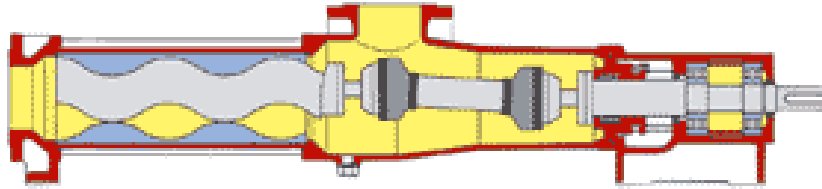
UNIT TO BE USED IN STRICT ACCORDANCE
WITH RAY PUMP INSTALLATION OPERATION

MAINTENANCE & SAFETY INSTRUCTIONS

SOCIETE RAYMOND BARAKEH SAL

RAY PUMP 8080 B

Installation, Operation, Maintenance and Safety Instructions



INSTALLATION

INSTALLATION AND SAFETY RECOMMENDATIONS

GENERAL

In common with other items of process plant a pump must be installed correctly to ensure satisfactory and safe operation. The pump must also be maintained to a suitable standard. Following these recommendations will ensure that the safety of personnel and satisfactory operation of the pump is achieved.

SYSTEM DESIGN AND INSTALLATION

At the System design stage, consideration must be given to provision of filler plugs, and the installation of non-return and/or isolating valves. Ray pumps must be installed with their baseplates mounted on a flat surface, grouted in and bolted, thus ensuring firm fixing and a reduction in noise and vibration. All the pipework should be independently supported).

HANDLING AND STORAGE

During installation and maintenance, attention must be paid to the safe handling of all items. Where a pump or its components weighs in excess of 20kg (45lb.) it is recommended that suitable lifting tackle should be used to ensure that Personal injury or damage to components does not occur. If the pumps are to be left unused or stored for any length of time, it will be necessary to rotate the shaft once every six months.

ELECTRICAL

Electrical connection should only be made using equipment suitable for both rating and environment. Where any doubts exist regarding the suitability of equipment, Ray Pumps should be consulted before proceeding. Normally the Ray pump should be installed with starting equipment arranged to give direct on line starting.

Earthing points are provided and it is essential that these are correctly connected. When the motor is being wired and checked for rotation, it must be uncoupled from the pump to prevent dry running or pressurising upstream equipment.

When handling harmful or objectionable materials, adequate ventilation must be provided in order to disperse dangerous concentrations of vapours. It is recommended that wherever possible, Ray pumps should be installed with provision for adequate lighting, thus ensuring that effective maintenance can be carried out in satisfactory conditions. With certain product materials, a hosing down facility with adequate draining will simplify maintenance and prolong the life of pump components

SAFETY NOTE

GREAT CARE MUST BE TAKEN TO PROTECT ALL ELECTRICAL EQUIPMENT FROM SPLASHING WHEN HOSEING DOWN. WHERE SOCIETE RAYMOND BARAKEH SAL HAS SUPPLIED A BARESHAFT PUMP, THE RESPONSIBILITY IS ON THE USER TO FIT ADEQUATE GUARDS IN COMPLIANCE WITH THE REQUIREMENTS OF THE U.K. HEALTH AND SAFETY AT WORK ACT1974 OR EQUIVALENT NORM.

All nuts and bolts, securing flanges and base mounting fixtures must be checked for tightness before operation. All guards must be securely fixed in position when commissioning the plant, all joints in the system must be checked thoroughly for leakage. If, when starting, the pump does not appear to operate correctly, the plant must be shut down immediately and the cause of the malfunction established before operations are recommended. It is recommended that depending on plant system operation, either a combined vacuum and pressure gauge, or a vacuum gauge only be fitted to the pump inlet branch, these will then continuously monitor the pump operating conditions. It is further recommended that a pressure relief valve of adequate capacity should be installed on the discharge side of the Ray pump

NEVER RUN THE PUMP AGAINST A CLOSED INLET OR OUTLET VALVE

DUTY CONDITIONS

Pumps should only be installed on duties for which SOCIETE RAYMOND BARAKEH SAL have specified the materials of construction, flow rates, pressure, temperature, speeds, etc. Where dangerous materials are to be pumped, consideration must be given to the safe discharge from the relief valve.

IF THE DUTY SHOULD BE CHANGED, SOCIETE RAYMOND BARAKEH SAL SHOULD BE CONTACTED AND THEIR RECOMMENDATIONS SOUGHT IN THE INTERESTS OF APPLICATION, SAFETY OF PLANT, EFFICIENCY AND PUMP LIFE.

START-UP PROCEDURE

GLAND PACKING

Where a pump is supplied fitted with gland packing, this will be manufactured from a non-asbestos material, the gland will require adjustment during the initial running in period. Under normal working conditions, a slight drip from the gland under pressure does no harm and assists in lubricating the packing. A gland drip is however, undesirable when handling corrosive, de-greasing, or abrasive materials. Under these conditions the gland must be tightened the minimum amount whilst the pump is running to ensure satisfactory sealing

when under pressure, or stop entry of air when under suction conditions.

When a mechanical seal is fitted to the pump it may be necessary to provide a barrier fluid to some part of the seal.

This would be provided in line with the seal manufacturers instructions.

GUARDS

In the interests of safety, and in accordance with the U.K. Health and Safety at Work Act 1974 or equivalent norm, all guards must be replaced after necessary adjustments have been made to the pump.

STARTING

Pumps **must** be filled with liquid before starting, filling plugs are provided for this purpose. The initial filling is not for priming purposes, but to provide necessary lubrication of the stator until the pump primes itself.

DRY RUNNING

NEVER RUN THE PUMP IN A DRY CONDITION EVEN FOR A FEW REVOLUTIONS OR THE STATOR WILL BE DAMAGED IMMEDIATELY. CONTINUAL DRY RUNNING COULD PRODUCE HARMFUL OR DAMAGING EFFECTS.

RELIEF VALVE

TO ENSURE THAT THE PUMP IS NOT DAMAGED DUE TO A CLOSED VALVE OR BLOCKAGE IN THE DELIVERY LINE, A RELIEF VALVE SHOULD BE FITTED BETWEEN THE PUMP DELIVERY BRANCH AND THE FIRST PUMP ISOLATING VALVE.

When the pump is stopped, sufficient liquid will normally be trapped in the rotor/stator assembly to provide lubrication upon restarting. If however, the pump has been left standing for an appreciable time, moved to a new location, or has been dismantled and re-assembled, it must be refilled with liquid and given a few turns by hand before starting. The pump is normally somewhat stiff to turn by hand owing to the close rotor/stator fit. However, this stiffness disappears when the pump is running normally against pressure.

TO REMOVE THE STATOR – Moulded to Metal

After removing all bolts securing pipework to the pump and removing adjacent pipework thus ensuring sufficient working space, the stator can be removed as follows:

Remove the bolts securing the end cover to the barrel flange and also the bolts securing the barrel to the suction chamber. Remove support ring halves. The stator can then be removed by turning the shaft so that the stator screws off the rotor.

REMOVAL OF ROTOR/COUPLING ROD/DRIVE SHAFT ASSEMBLY

Loosen gland thrower bolts. Slide drive shaft thrower sleeve towards gland section until drive pin is exposed. Tap out drive pin. Pull complete rotor/coupling rod/drive shaft assembly off geared driver shaft, sliding thrower sleeve off the drive shaft at the same time.

Finally, pull complete assembly out of gland section and suction chamber.

MECHANICAL SEALS

ROTATION

All the pumps are suitable for rotation in either direction. When looking on the drive end, counter clockwise will cause the branch nearest to the drive end to be inlet, conversely, clockwise rotation will make this same branch the outlet.

BEFORE THE DIRECTION OF ROTATION IS CHANGED, SOCIETE RAYMOND BARAKEH SAL MUST BE CONSULTED SO THAT THEY CAN CONFIRM THE SUITABILITY OF THE PUMP WHEN OPERATING ON THE NEW DUTY.

DISMANTLING PROCEDURE

SAFETY

BEFORE ANY MAINTENANCE WORK IS CARRIED OUT ON THE PUMP ENSURE THAT THE PUMP IS ISOLATED FROM THE ELECTRICAL SUPPLY AND ALSO THE PUMP MAIN ISOLATING VALVES ON THE INLET AND OUTLET ARE CLOSED.

Where hazardous fluids are pumped, personnel about to dismantle the pump must wear protective clothing throughout the dismantling procedure. If the pump has been out of operation for more than one hour, it will assist dismantling if the rotor is given a slight turn, thereby breaking the rotor/stator seal. Where a pump has been out of operation for a longer period of time, dismantling will be helped by lubricating the rotor/stator assembly through the pump tappings and rotating the rotor. Now electrically isolate the pump and close both inlet and outlet valves. Drain the equipment by removing the plugs located on the pump. The pump inlet and outlet connections may now be opened and the pump end cover be removed.

GENERAL NOTE

When it is required to dismantle the pump it will be necessary to follow the sequence of steps as follows.

END COVER REMOVAL

Remove the bolts securing the support foot to the baseplate and then remove the nuts at each end of the tie bars. Supporting the weight of the stator withdraw the end cover complete with the mounting foot and tie bars.

Commence the removal of the stator from the rotor by pulling and rotating it until the rotor form is exposed. Before removing the stator completely, it is essential to support the rotor mass in its natural position. The stator may now be removed from the rotor. Where difficulty is experienced in the stator removal, it may be preferable to dismantle the rotor/coupling rod/drive shaft assembly at the drive end of the pump (see following paragraph), to a more suitable location.

TO REMOVE THE STATOR – Moulded to Metal

After removing all bolts securing pipework to the pump and removing adjacent pipework thus ensuring sufficient working space, the stator can be removed as follows:

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rotor/coupling rod/drive shaft assembly at the drive end of the pump (see following paragraph), to a more suitable location.

REMOVAL OF ROTOR/COUPLING ROD/DRIVE SHAFT ASSEMBLY

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Finally, pull complete assembly out of gland section and suction chamber.

ROTOR REMOVAL

First bend back the tabs on the Pin Cap Washers, then unscrew the shaft end Pin Caps and knock out the Coupling Rod Pin. The Rotor and the Coupling Rod can then be withdrawn from the pump. To overcome any slight resistance caused by close fitting Seal Rings, a slight twisting action on the pump shaft will help removal. If assistance is not available for turning the pump, it may be easier to remove the Barrel, Stator, Rotor and Coupling Rod in one piece and then extract the Rotor from the Stator.

COUPLING ROD REMOVAL FROM DRIVE SHAFT

The procedure for removing the coupling rod from the drive shaft is basically the same as that for removing the rotor.

GLAND SECTION REMOVAL

After first withdrawing the drive shaft, the gland section can be removed from the body housing.

REMOVAL OF SHAFT AND BEARINGS

These can be removed from the pump as a complete assembly by removal of the bearing cover locking bolts. The bearing cover can now be slid off the shaft and the whole shaft assembly withdrawn from the body for inspection. If the bearings or shaft require renewal the bearings can be pressed off the shaft after first undoing the locknut.

ASSEMBLY OF SHAFT BEARINGS

The large bearing is to be pressed onto the pump shaft and suitably greased.

The bearing spacer can then be positioned on the bearing outer race.

The small bearing can then be pressed onto the shaft until the bearing locknut can be screwed onto the shaft along with the lockout tab washer.

The locknut can then be used to press on the small bearing until a gap in line with dimension "A" on the sectional arrangement is evident between the bearing spacer and the small bearing outer race,

Upon determination of the correct gap it is now possible to undo the locknut and then retighten it lining up a tab on the washer with one of the notches in the locknut.

The tab can then be bent into the notch and this then completes the assembly of the shaft bearings. It is worthwhile to re-check the gap with feeler gauges at this point in time, to ensure that the correct loading will be put on the bearings when they are fitted into the pump body.

LOCATION OF SHAFT ASSEMBLY INTO BEARING HOUSING

The Shaft assembly can next be inserted into the pump body ensuring the bearing seal is not damaged as the shaft is passed through. Prior to pushing the shaft home into the stuffing box the gland and the thrower should be slipped on to the shaft. The bearing cover can now be bolted to the body to lock the shaft assembly into position.

COUPLING ROD BUSH REPLACEMENT

New coupling bushes can be press fitted after first removing the old bushes. When fitting new bushes, their correct orientation and positioning should be noted.

GLAND SECTION AND SUCTION CHAMBER

This is a reversal of the dismantling procedure, ensuring new gaskets and seals are fitted in place of the old ones.

RE-ASSEMBLY

COUPLING RODS AND UNIVERSAL JOINTS

The universal joints of the Coupling Rods are designed so that any wear occurring at these points bears on small, inexpensive and easily replaceable components. In addition, all universal joints are protected by rubber Seal Rings to prevent solids reaching the pins

Where coupling rod bushes are fitted, they can be removed, and replacements inserted by using an ordinary vice as a press. When replacing these bushes it is essential that they are aligned with the elongation of the holes lying along the length of the Coupling Rod. When the Coupling Rod is secured by the Coupling Rod Pins in the Shaft. It should be free to move conically so that it can touch the interior of the Shaft all the way round.

FITTING SEAL RING

When fitting Seal Rings to the Coupling Rod, in order to prevent undue stretching to the Seal Rings it is recommended that they be fitted without the use of tools. The ball end of the Couplings Rod should be positioned away from the operator. The Seal Ring should then be drawn by hand over the ball end and onto the seating collar. The Seal Ring must not be greased or lubricated before fitting as this may cause difficulty in assembly due to a tendency for the Seal Ring to turn on the seating collar when the Coupling Rod is being inserted into the

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LOCATION OF SHAFT ASSEMBLY INTO BEARING HOUSING

The Shaft assembly can next be inserted into the pump body ensuring the bearing seal is not damaged as the shaft is passed through. Prior to pushing the shaft home into the stuffing box the gland and the thrower should be slipped on to the shaft. The bearing cover can now be bolted to the body to lock the shaft assembly into position.

COUPLING ROD BUSH REPLACEMENT

New coupling bushes can be press fitted after first removing the old bushes. When fitting new bushes, their correct orientation and positioning should be noted.

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This is a reversal of the dismantling procedure, ensuring new gaskets and seals are fitted in place of the old ones.

RE-ASSEMBLY

COUPLING RODS AND UNIVERSAL JOINTS

The universal joints of the Coupling Rods are designed so that any wear occurring at these points bears on small, inexpensive and easily replaceable components. In addition, all universal joints are protected by rubber Seal Rings to prevent solids reaching the pins.

Where coupling rod bushes are fitted, they can be removed, and replacements inserted by using an ordinary vice as a press. When replacing these bushes it is essential that they are aligned with the elongation of the holes lying along the length of the Coupling Rod. When the Coupling Rod is secured by the Coupling Rod Pins in the Shaft, it should be free to move conically so that it can touch the interior of the Shaft all the way round.

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When fitting Seal Rings to the Coupling Rod, in order to prevent undue stretching to the Seal Rings it is recommended that they be fitted without the use of tools. The ball end of the Couplings Rod should be positioned away from the operator. The Seal Ring should then be drawn by hand over the ball end and onto the seating collar. The Seal Ring must not be greased or lubricated before fitting as this may cause difficulty in assembly due to a tendency for the Seal Ring to turn on the seating collar when the Coupling Rod is being inserted into the Shaft or Rotor head. The outer surface of the Seal Ring can however, be smeared with grease AFTER FITTING to the Coupling Rod, to assist its entry into the Shaft or Rotor head.

REASSEMBLING ROTOR/COUPLING ROD/DRIVE SHAFT ASSEMBLY

The procedure for assembling the joints at the rotor and drive shaft ends is the same and is as follows:

1. Slide rubber sealing cover onto coupling rod, past its retaining groove and position clear of joint area. Similarly, slide retaining sleeve onto coupling rod.
2. Fit spiral clip to rotor/shaft head and position it some way past its retaining groove. Also fit new sealing ring.
3. During assembly, ensure all parts are coated in lubricant. Slide coupling rod into rotor/shaft head, aligning coupling rod bush with cross holes. Carefully tap rotor/shaft bushes into place using a soft faced mallet.
4. Aligning bores of both coupling rod and rotor/shaft bushes, push drive pin into place. Slide retaining sleeve back over rotor/shaft head, sufficiently to expose sealing cover retaining groove.

5. Completely fill joint cavity with lubricant, ensuring all air is expelled.

6. Slide rubber sealing cover into position, ensuring location in retaining grooves in both rotor/shaft head and coupling rod.

7. Carefully slide retaining sleeve back towards sealing cover, ensuring sealing cover is gripped in its retention groove until spiral clip groove is exposed. Slide spiral clip into groove to retain sleeve in position.

8. Insert spout from oil can under rubber sealing cover to ensure joint is fully filled with lubricant as shown in Figure 4b.

9. Finally, the rubber sealing cover requires clamping to coupling rod by means of a new steel retaining clamp, positioned in the groove on the outside of the cover.

Follow assembly steps 1 to 7 and 9 but ensure joint is fully packed with grease during assembly.

REFITTING OF ROTOR/COUPLING ROD/DRIVE SHAFT ASSEMBLY

This is a reversal of the dismantling procedure but it is important to ensure that all gaskets and seal rings are renewed and fitted correctly.

SUCTION CHAMBER EXTENSION AND STATOR

This is a reversal of the dismantling procedure but it is important to ensure that all gaskets and seal rings are renewed and fitted correctly.

END COVER AND TIE BARS

Re-fit end cover complete with support foot and tie bars. Before tightening the tie bars, care should be taken that all the components previously assembled are seated and aligned correctly.

The tie bar nuts can then be tightened in a progressive diagonally opposite sequence prior to the support feet holding down bolts being tightened.

Finally, check all joints are seated correctly and tighten support feet bolts.

Note: **Tie** bar nuts should be very well tightened.

Published information other than that marked **CERTIFIED** is to be used as a guide only.

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