Product & Chemical Disclaimer

The user must take responsibility in the selection of the products materials of construction. Empire Pumps Ltd will act in an advisory role and offer recommendations; however, the user is liable for the product selection in line with solutions and temperatures in which the equipment is operated.

Safety Precautions

WARNING: Prior to operating the pump read and understand the operating and maintenance instructions.

WARNING: Ensure the pump is compatible with the fluids and temperatures being transferred. Always consult Empire Pumps Ltd if there is any change in chemical concentrations or solution temperatures.

WARNING: Wear protective eye and personal equipment at all times when operating the pump. Follow standard safety procedures when handling corrosive or harmful solutions.

WARNING: Ensure all operators of this equipment have been trained for safe working practices, understand its limitations and wear safety goggles and equipment at all times.

WARNING: Correct procedures must be followed to drain the pump of all chemistries prior to physical inspection of the pump.

WARNING: Excessive Pressure. Can result in serious injury or equipment damage. Do not service or clean the pump whilst the system is pressurised. Relieve pressure from the system prior to disassembly.

WARNING: Never operate the pump above the specified maximum operating pressure of the pump.

WARNING: Suction and discharge connections must be compatible with the solutions being pumped and the maximum pressure capability of the pump.

WARNING: Maximum temperatures are based on mechanical stress only. Certain chemicals will significantly reduce the maximum operating temperature of the pump materials. Consult with the chemical manufacturer and Empire Pumps Ltd for solution compatibility and temperature limitations.

WARNING: The pump must not be used as structural support to the piping system. Ensure suction and discharge pipe-work are independently supported to avoid stress on the pump parts.

WARNING: Use only Empire Pumps Ltd genuine spare parts to assure compatible pressure rating and longest service life.

WARNING: Re-torque all fasteners before operation. Excessive torque is unnecessary and may cause damage to the pump.

WARNING: Upon receipt of the pump, inspect for any signs of shipping damage. If damage has occurred contact Empire Pumps Ltd.

WARNING: Flammable or Combustible Liquids: Please immediately consult Empire Pumps Ltd if the solutions being transferred are flammable. The pumps detailed in this operating and maintenance instructions cannot be used in explosive atmospheres. We have available specially manufactured pumps for use in zoned areas.

WARNING: Hot Surfaces: Please note the maximum temperature capabilities of the pump materials. It may be hot solutions are transferred and this can cause the outside areas of the pump to become hot and cause burns.

WARNING: Rotating Parts. The pump has rotating components, follow local safety standards for locking out the electrical drive motor from the power supply during maintenance and service.

Important Checks

WARNING: Please ensure suction and discharge valves are always open when operating the pump.

WARNING: Please follow standard lifting procedures when installing and maintaining pumps.

WARNING: Always ensure the solution level is above the pump impeller prior to initial start up.

WARNING: Direction of rotation. Standing above the pump and looking down at the motor fan end, the direction of rotation should be clockwise.

WARNING: Cold Environments. The pump must be drained of solution when installed outside or in an environment where temperatures will drop below freezing point.

WARNING: Discharge pipe. It is recommended a non-return valve is fitted in the discharge line of the pump, if the outlet pipe is higher than the pump. This will prevent solution from gravity feeding back into the pump body and electrical motor.

Installation

- Re-torque all fasteners before operation.
- The pump-unit should be securely fastened to a solid foundation which will enable the support of the entire pump-unit.
- Locate the pump as close to the fluid supply as possible.
- Maximum immersion depth: Ensure the suction casing of the pump is flooded to the level indicated on the pump or primed prior to operation. However, the solution level must not rise above the overflow drain port.
- The suction line should not have elevated pipe runs. This can create air locks which will reduce the pump performance and cause cavitation.
- Suction and discharge pipe-work must be independently supported preventing potential strain on the pump plastic parts.
- Do not use metallic piping with plastic pumps.

- The suction and discharge pipe-work must be aligned to avoid placing stress on the pump casing.
- The bore size of the suction pipe must be at least the same size or larger than the pump inlet connection.
- Use minimal number of bends at the suction and discharge of the pump.
- Pump suction. If bends cannot be avoided ensure bends are kept a minimum of 10x the pipe diameter away from the suction.
- The suction line must be clean of impurities and foreign particles.
- The suction valve must be completely open to avoid restricting the suction flow.
- When transferring solutions containing solids it is recommended a suction strainer is used. It is imperative the suction strainer is periodically maintained and the pump is never starved of solution. The strainer only acts to prevent solids entering the pump inlet.
- The accumulative clearance of the holes in the strainer must be 5 to 10 times of the pump inlet diameter.
- It is recommended to use hard plastic piping and not flexible hose.
- Discharge: It is recommended a non-return valve is fitted in the discharge line of the pump, if the outlet pipe is higher than the pump. This will prevent solution from gravity feeding back into the pump body and electrical motor.

Pump Positioning

- The Vertical Sealless range of pumps must be mounted vertically but may be installed in tank or out of tank.
- When the pump is mounted externally, it is imperative to plumb the overflow drain point back to process tank or to an adequate drain.
- The pump maybe be mounted on the side of a process tank or on an independent mounting frame.
- Maximum immersion depth: Ensure the suction casing of the pump is flooded to the level indicated on the pump. However, the solution level must not rise above the overflow drain port.
- The pump motor should always be installed at a higher level than the liquid level.
- The drain port must open or piped back into the tank or a common drain without rise restriction in the pipe-work.
- Suction extension pipe-work: Our range of Vertical Sealless Pumps can be supplied with various suction pipe lengths up to a maximum of 3m.
- If low level is reached and air enters the base of the suction extension pipe the pump will need to be isolated and restarted once the solution reaches the impeller ‘minimum solution level’ point.
- Alternatively, low level controllers or a foot valve can be installed to the suction extension piece to ensure the pump is always primed.
- Discharge: It is recommended a non-return valve is fitted in the discharge line of the pump, if the outlet pipe is higher than the pump. This will prevent solution from gravity feeding back into the pump body and electrical motor.
- Position the non-return valve at a height below the electrical motor and overflow port.

Electrical

1. Check that the supply and phase of the electric drive motor is the same as the electric supply being used.
2. Electrical connections must be completed by a qualified electrician.
3. Contact Empire Pumps Ltd for further information regarding electrical connection.

Start Up:

1. The solution level must be above the pump impeller 'minimum solution level' point prior to start up.
2. Open the suction valve and discharge valves completely.
3. Partially close the discharge valve to 75% closed and 25% open.
4. Run the motor momentarily - Switch on off to check the direction of rotation. Looking down from above the pump and looking at the motor fan end, the direction of rotation should be clockwise.
5. The pump body will detail an arrow indicating the direction of rotation. Please ensure the pump is operated in this direction. Contact Empire Pumps Ltd for further information if required.
6. Start the electric motor and gradually open the discharge valve until you reach the desired flow. Do not attempt to adjust the flow with the suction valve.

Shutdown

1. Slowly close the discharge valve. If the suction valve is closed before the discharge valve, cavitation of the pump will occur.
2. Once the discharge valve is closed, immediately turn off the electric drive motor.
3. Close the suction valve.

Maintenance

During the warranty period of the equipment, disassembly and assembly of the pump are allowed only by Empire Pumps Ltd personnel or personnel authorized by Empire Pumps Ltd. All of the operations below must be done exclusively by qualified staff and in full accordance with the detailed procedure.

Inspection

Periodic inspections are recommended to substantiate the condition of the internal parts. It is advisable the pump is flushed and neutralised a minimum of once in every 12 months. If a problem has occurred see below procedures 'prior to disassembly' and 'disassembly'.

Procedure prior to disassembly

Prior to maintenance ensure the pump has cooled from hot liquids before disassembly procedure. It is possible the pump has transferred toxic liquids, so it is necessary to wear personal protective equipment at all times.

After the initial visual, non-contact examination of the pump it is recommend that the pump be removed from service as follows:

1. Use antistatic equipment to clean the external surface of the pump.
2. The pump has rotating parts when in operation. Follow safety standards for locking out the motor from the power supply during maintenance.
3. Disconnect the electric drive motor. Every operation on the equipment has to be done after disconnection of the electric supply.
4. Caution some internal liquids can have dangerous reactions in contact with water
5. Prior to pump disassembly, make sure the internal liquids have been removed and the pump has been fully flushed and neutralised. The pump must be drained and decontaminated. The liquid has to be collected and eliminated according to environmental laws.
6. Prior to opening the pump all internal pressure must be relieved.

Disassembly

1. Remove the 8nos bolts positioned in the suction casing of the pump and remove item 12 the front casing from the pump body.
2. Remove the impeller screw (item 10) by rotating anti clockwise. The impeller sleeve assembly can then be removed.
3. Remove the 8nos bolts positioned at the top of the pump body, connecting the body to the pump mounting plate.
4. Remove the shaft sleeve vapour seal and seat by untightening the locking nut which is positioned underneath the pump mounting plate. A standard socket spanner will suffice. Once loose, manoeuvre the shaft sleeve and remove from the pump shaft.
5. To dissemble the mounting plate from the electric motor, remove the 4nos bolts connecting the motor to the mounting plate.

Assembly

1. Prior to reassembly all parts must be free of dust or deformities.

2. When reassembling the pump, always replace the O-rings and gaskets. Ensure O-rings gaskets are carefully inserted into position and are not pinched or damaged.
3. Position the electric drive motor on its base, with the fan cowl resting on the workbench and the motor facing upwards.
4. Connect the pump mounting plate (item 2) to the electric drive motor by connecting the 4nos bolts from the motor side and through the mounting plate.
5. Position the shaft sleeve vapour seal and seat over the motor drive shaft and push into position. Tighten the locking nut which is positioned underneath the pump mounting plate. A standard socket spanner will suffice.
6. Place the pump body (item 6) over the drive shaft and shaft sleeve vapour seal seat. Tighten 8nos bolts connecting the pump body to the mounting plate.
7. Place the impeller sleeve assembly into the pump body and ensure it is running free. Tighten the impeller screw (item 10) holding the impeller sleeve in position.
8. Place suction casing onto the pump body and tighten the 8nos bolts.
9. It is recommended to tighten the bolts in opposite configurations. Use a screwdriver to ensure the motor fan runs freely.

Pump Performance Characteristics

1. It is recommended the pump is operated at its optimum conditions and not within the first or last 15% of the pump performance curve. This is related to both flow and pressure characteristics of the pump.
2. The maximum flow, pressure and duty points of the pump are calculated when using water. Solutions with increased specific gravities or viscosities will decrease the performance of the pump.
3. Installation piping arrangements will affect the pump performance. Elbows and pipe reductions will significantly reduce the pump flow.
4. Assistance with pump selection and guaranteed flow rates is available when contacting Empire Pumps Ltd.

Warranty

Empire Pumps Ltd warrants this pump product to be free of defects in materials and workmanship for a period of two years from the purchase date.

It does not cover installation or system design faults, pumps seized due to deposits or damaged packaging and Empire Pumps Ltd is not liable for consequential losses.

If a warranted defect, which is determined after inspection by Empire Pumps Ltd, occurs within the 24 month warranty period, it will be repaired or replaced as per the manufacturer's decision. Proof of purchase is required, along with a manufacturing serial number, data code and date of purchase.

This warranty does not apply to any other equipment used or purchased in combination with this product. The manufacturer accepts no responsibility for product damage or personal injuries sustained when the product is modified in anyway. This warranty shall not apply to products which have been used other than for their intended use, misuse, negligence or accident.

Empire Pumps Ltd shall not be liable for damage or delays caused by defective material, nor shall be liable for incidental or consequential damages, process down time, loss of production, loss of production costs, transportation costs, labour costs, product installation or removal costs, or loss of profit. On any and all events, the manufacturer liability shall not exceed the purchase price of the product and/ or accessories.

De-contamination of Hazardous Solutions

Prior to returning equipment to Empire Pumps Ltd for refurbishment or inspection, the equipment must be fully flushed, cleaned and neutralised in accordance with the chemical hazard, safety packaging regulations and Health & Safety at Work Act 1974.

The equipment must be decontaminated and must be flushed of all dangerous chemicals in accordance with environmental laws.

Declaration of conformity

Manufacturer: **Empire Pumps Ltd**

Unit 4, Guide Bridge Trading Estate, South Street, Ashton-Under-Lyne, OL7 0HU, United Kingdom

This declaration of conformity is issued under the sole responsibility of Empire Pumps Ltd. This declaration certifies that Air-Operated Diaphragm Pump EPA series, Magnetic Driven Pump EPM series, Drum Pump EPD series, Self-priming Pump EPS series comply with the European Community Directive 2006/42/EC on Machinery, according to Annex VIII. This product has used Harmonized Standard EN809:1998+A1:2009, Pumps and Pump Units for Liquids - Common Safety Requirements, to verify conformance.

The conformance is valid only if the pump is used for the liquids communicated by the customer and for the pump characteristics required with regard to the quotation. Empire Pumps Ltd does not take any responsibility for its pumps unless the customer operates the equipment strictly in accordance with the operation and instruction manual.

Signed for and on behalf of Empire Pumps Ltd

Peter Zhang, Director of Operations: .....

Ashton-Under-Lyne, November 2019

CE