FAULTS CAUSES AND REMEDIES:

1. Tank not emptying - Pump running.

   a) Block outlet pipe - check.
   b) Airlock in pipework - check bleed-hole in pump.
   c) Discharge head too high.
   d) On/Off switch stuck in on position

2. Insufficient discharge:- check for

   i) Jammed float rod
   ii) Free movement of switch pivot
   iii) Tank is in a level position

   b) Pump inlet blocked:- check for debris.
   c) Discharge valve shut (if fitted).
   d) Jammed non return valve (if fitted).
   e) Damaged impeller - check for missing/damaged blades.

3. Tank not emptying - pump not running.

   a) No electrical supply - check supply.
   b) Float not operating stop/start switch:- check for

   i) Perforated float
   ii) Jammed float rod
   iii) Free movement of switch pivot
   iv) Tank is in a level position

   c) Faulty switch - replace switch .
   d) Faulty motor. - replace pump unit.
   e) Blocked pump inlet/jammed impeller - check for foreign bodies.

4. Alarm switch fails:

   a) Float rod jammed - check for free movement.
   b) Faulty switch contact rating exceeded - switch damaged.
   c) Foreign matter in impeller.

5. Vibration:

   a) Pump running with no fluid in tank.
   b) Excessive running wear - replace pump unit.
   c) Bent pump shaft - replace pump unit.

SPARES:

We keep records of all the pumps that we supply. When ordering spares the pump serial number, pump size, part reference number and name of part together with the quantity of parts required should be quoted.

Please quote all the information stated above to ensure that we can give you the best possible after sales service.

SCREW TORQUE SETTINGS

Agitator/Propeller when fitted - left hand thread - replace finger tight - action of pump will ensure final tightening.
All screws 2.8 N-m.

INSTRUCTIONS FOR THE INSTALLATION, OPERATION AND MAINTENANCE OF MARCH MAY VSP AND HC PUMPS.

GENERAL:

1. Read the following instructions before proceeding with installation.
2. Provided that the recommendations following are carefully adhered to we cannot foresee circumstances where our equipment will present a health hazard.
3. The pumps are manufactured in Polyphenylene Sulphide resins (PPS) and have the following temperature and pressure limitations:-

Max temp	100 deg.C
Minimum temp	0 deg. C
Working pressure limitations	5 Bar @ 20 deg. C and 3 Bar @ 80 deg. C

4. Pump models covered by these instructions:
   VSP-1, VSP-2, VSP-3 and VSP-4 HC-1 and HC-2.
5. Date of issue: December 1994 Revised: September 2007
6. All the pumps covered by these instructions have a sound pressure level at work stations below 70 dBA
7. All the pumps listed will normally require an electrical supply of 220/240 volts single phase 50 Hz.

TRANSPORT:

1. The pumps are suitably packed in cartons for the method of transport used. The outer packaging should be removed upon receipt and the items checked against the delivery note.

   CAUTION: Models HC-1 and HC-2 are despatched with packaging inside the pump tank which MUST BE REMOVED before pumps are put into operation.

2. Storage of the pumps should be in a clean and dry location All piping connection plugs/covers and where fitted, clear plastic bags should be left in place to keep pump free from foreign bodies. To prevent brinelling of bearing raceways **do not store adjacent to vibrating equipment.** All the bearings of the motors supplied for our pumps are fitted with bearings lubricated for life.

DESCRIPTION OF PUMP UNITS:

1. The March May Vertical Spindle Centrifugal pumps are of single or multi stage construction, having impeller or impellers (up to four stages) attached stainless steel shaft (composite with the motor rotor). The pump chambers are concentric with the flow from one stage to the next by means of diffuser plates. The whole assembly is held to a central column, bolted to the face of the motor and adaptor mounting plate. Inter-stage sealing is by means of "O" rings. Efficiency is maintained by a shaft lip seal on the last stage. A second lip seal is housed in the adaptor plate to protect the motor from liquid rising up the shaft.
2. The pumps are basically designed and sold for water duties. Mild chemical transfer is possible where compatible with the material of construction as listed in the general parts list.
3. The pump motors are capacitor start single phase and are equipped with automatic thermal overload protection.
   CAUTION: Automatic overload will allow motor to restart without warning.
4. The HC-1 and HC-2 units are constructed as described but also are contained in a stainless steel tank with an automatic stop/start float switch and high level alarm connections

INSTALLATION/ASSEMBLY:

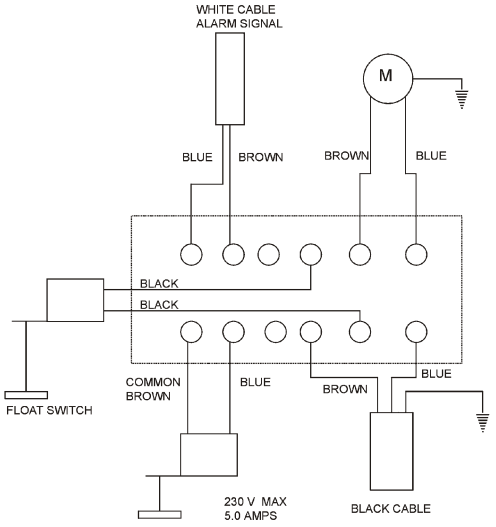
1. The pumps are of simple construction and require only screwdriver, pin punch and joint pliers.
2. The connecting pipework **must be self-supporting and under no circumstances must the pump provide that support. As the pump is of a solid shaft construction (ie; no flexible coupling), it is advisable to have flexible piping between the pump and solid pipework to avoid vibration.**
3. Pipework must be flushed out of foreign bodies before the pumps are installed as these units have fine running clearances and consequently **ONLY CLEAN FLUIDS CAN BE PUMPED safely.**
4 . All centrifugal pumps must be primed and the minimum fluid level should coincide with the top of the pump chamber. Pump levels in the HC-1 and HC-2 are determined by automatic controls and priming is by a small bleed hole adjacent to the discharge.
5. Ensure that the pumps are installed in clean suction tanks and that every precaution has been take to prevent the entry of foreign bodies. FAILURE TO DO SO may result in the suction clogging and the pump ceasing to operate.

BEWARE : Although the pump construction will allow the units to run for considerable periods without fluids it is NOT RECOMMENDED.

6. To facilitate removal of the pump for maintenance purposes it is recommended that valves are fitted on the suction and delivery branches.
7. It is recommended in long delivery lines, to prevent flow reversal, that a non-return valve should be fitted. To reduce friction this should be of the free flow type. Check with your valve supplier.
8. The pump should be mounted with the adaptor plate in a horizontal plane and the pump hanging vertically downwards. The adaptor plate should be fixed securely by screws to prevent operational movement.
8. The pump should be mounted with the adaptor plate in a horizontal plane and the pump hanging vertically downwards. The adaptor plate should be fixed securely by screws to prevent operational movement.
9. Check that the pump itself and external wiring is protected from spillage or mechanical damage and that there is ample free air circulating around the motor for proper cooling. Check that there is sufficient room for removal/maintenance. sufficient room for removal/maintenance.
10. The motor must be wired by a competent electrician who must ensure that the electrical supply and details on the motor plate are compatible. Models HC-1 and HC-2 must be wired in accordance with the wiring diagram on the pump tank and as reproduced here. (see attached drg)
11. The pumps must always start and turn in the correct direction which is clockwise when viewed from the pump end (anti-clockwise when viewed from the motor fan) As the motors are of single phase and pre-wired, the direction of rotation is correct when leaving thefactory. It is not necessary to predetermine the direction of rotation .

CAUTION: IT IS DANGEROUS TO RUN A PUMP FITTED WITH AN AGITATOR/PROPELLER OTHER THAN AN INSTALLED POSITION AS THIS COULD CAUSE SEVERE INJURY.

Normally Open



COMMISSIONING:

1. As the pump is of the vertical spindle submerged type, priming is inherent. In the case of the HC-1 and HC where there could be rapid stop/start conditions priming can be a problem. A bleed hole is provided to ensure complete evacuation of air.
2. When the priming of the system is completed the pump can be run up to speed . Should the pump fail to deliver it should be stopped and the priming procedure repeated.
3. When fully operational the quantity discharged by the pump can be regulated by the adjustment of the discharge valve, if fitted.
4. The discharge valve, if fitted , should never be shut for any length of time as the liquid in the pump chamber and/or tank could rise to a very high temperature causing possible distortion and ultimate failure.
5. During frost, if the pump tank and pipes are fixed in an exposed position, they must be emptied even when the pump set is stopped for a short time only.
6. Although the pumps have generous clearances, if they stand idle for more than fourteen days, it is advisable to switch the units on for a few moments to break up any material film that may have built up in the clearances of the rotating parts. HC-1 and HC-2 will require filling with water to activate automatic controls.
7. Solutions having heavy concentrations of salt should not be allowed to stand in the pump for extended periods and must be flushed out.

MAINTENANCE:

1.**Do not attempt any maintenance on the pump whilst it is in operation/motion.**
Before attempting any dismantling/maintenance isolate the pump by means of the discharge valve, if fitted, drain the system and disconnect the electrical supply.
Periodic inspection of the pump unit should be undertaken and all worn components and 'O' ring seal should be replaced.

DISMANTLING:

1. Repair work should always be carried out in a clean environment to prevent the pick up of debris especially ferrous swarf, nuts and bolts etc.
2.Remove the pipework from discharge branch after first ensuring that the pipework is well supported and out of the way
3. Remove the four screws holding the pump adaptor plate.
4. Withdraw pump and motor unit.
5. The assembly should now be taken to a **CLEAN AREA** for further inspection.
6. The unit should be inverted and the motor fan placed downwards onto the bench.
7. Remove the three screws holding the front cover in position. (As the restraining nuts are held in hexagonal indentations in the pump housing it may be necessary to lightly screw back and tap them gently). When the screws and nuts are loose, remove and store for future replacement.
CAUTION: SHOULD THE PUMP UNIT BE FITTED WITH AN AGITATOR/PROOPELLER< THEN IT WILL BR NECESSARY TO REMOVE THIS FIRST.
Grip the shaft with a pair of pliers and rotate the propeller **CLOCKWISE** (left hand thread).
8. Remove the front cover, complete with 'O' ring.
9. The impeller will now be exposed and will show that it is held in place by a roll pin passing through the impeller hub and a hole in the shaft. To remove use suitable size pin punch & hammer.
10.When the pin is removed the impeller can be slid up the shaft.
11.If two or more stages, the next staging can be removed with the diffuser plate and 'O' ring exposing the next impeller NOTE: Position of the diffuser plate to the stage housing which is located by a pin.
12. Repeat procedure according to number of stages fitted.
13. When the final impeller has been removed, the complete pump assembly remaining can be removed from the motor by undoing the four screws and any connecting pipework attached to the adaptor flange.
14. When removed, the state of the motor shaft can be examined by way of the lip seals.. Should wear be severe then the motor MUST BE replaced.
15. Assembly - this is a reversal of the dismantling procedure EXCEPT that the roll pins can be pressed home by means of slip joint pliers.
16. ALTHOUGH INSTRUCTIONS ARE GIVEN FOR DISMANTLING IT IS NOT NORMALLY RECOMMENDED THAT THIS STYLE OF PUMP SHOULD BE DISMANTLED OTHER THAN AT THE FACTORY.
17. RETURN OF USED PUMPS/PARTS - to conform with Health and Safety and **COSH** regulations any pump or part of pump that is returned to this Company for examination, or for any reason whatsoever, must be accompanied by a letter stating what the pump/part has been pumping. If the liquid or product is hazardous or in any way dangerous, this **MUST** be stated. The chemical make-up of the pumped solution MUST also be stated in full. Any returned parts **MUST** be flushed with a neutralising agent and be chemically inert. Unless this procedure is observed then the pump/parts will not be accepted on our Company premises.
18. Assembly - This is a straight forward reversal of the dismantling procedure.