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AQua Major

Installation, Operating & Maintenance Instructions

for

AQM Series

PUMPS

TO OBTAIN THE BEST PERFORMANCE FROM YOUR AQM-SERIES PUMP PLEASE READ THESE INSTRUCTIONS CAREFULLY

Failure to observe the recommended procedures may result in damage to equipment and personal injury, and may invalidate the supplier's warranty.

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Let's Solve Water

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1. CHECKING YOUR PUMP ON DELIVERY

Your pump left our works in perfect condition. We want it to reach you in the same condition, and to provide you with long and trouble-free service. On receiving your pump, please make the following preliminary checks:

1. check that the model number conforms to your order

2. check that the details on the plate of the electric motor correspond to your power supply: volts (a.c. or d.c.), number of phases & frequency (a.c. units only)

3. check that no damage has occurred in transit. Check for loose nuts and bolts and for missing parts. Did you order accessories or spare parts? Are they all there?

Report immediately to your supplier any damage or missing or incorrect parts. Delay in notification may cause problems in dealing with claims under warranty.

2. SCOPE OF USE

Aqua Major pumps are intended for use in pressurised fresh water systems. Some models can also handle seawater - please check with your supplier.

WARNING!

Aqua Major pumps are not intended for use with fuel oils or with petrol, gasoline, benzene or other light-fraction petroleum fuels or solvents, and they must not be used for this purpose. The electric motors are not explosion-proof or spark-protected, and are not suitable for use in areas where flammable vapours can occur.

3. INSTALLING THE PUMP

1. Locate the pump in a dry, well-ventilated space. Provide adequate access, so that maintenance work can carried out without difficulty.

2. Secure the pump to a firm, horizontal base. Mounting on rubber pads can help to reduce vibration and transmitted noise.

3. The electrical installation should be carried out or supervised by a qualified electrician. With low-voltage d.c. units, it is particularly important to use adequately sized cable to minimise voltage drop. Refer to TABLE 1. If the pump is more than 6 metres from the battery, use a heavier grade of cable than that specified.

TABLE 1

D.C. CABLE SIZES and FUSE RATINGS for cable runs up to 6m

Model	12V d.c Conductor cross-sectional area per wire, mm^2	FUSE Amp	24V d.c Conductor cross-sectional area per wire, mm^2	FUSE Amp
AQM2-12	6	20		
AQM2-24			4	10
AQM6-24			6	25
AQM20-24			10	75

4. For a.c. pumps, the use of a proper electrical starter is recommended. A starter will:

   a) prevent accidental restarts after power failure

   b) provide a safe, waterproof switch enclosure (e.g. to IP55 hose-protected' specification)

   c) protect the motor with a correctly set thermal overload cut-out. A fuse protects only the wiring.

d) withstand the heavy starting current of the motor, preventing arcing and rapid contact wear.

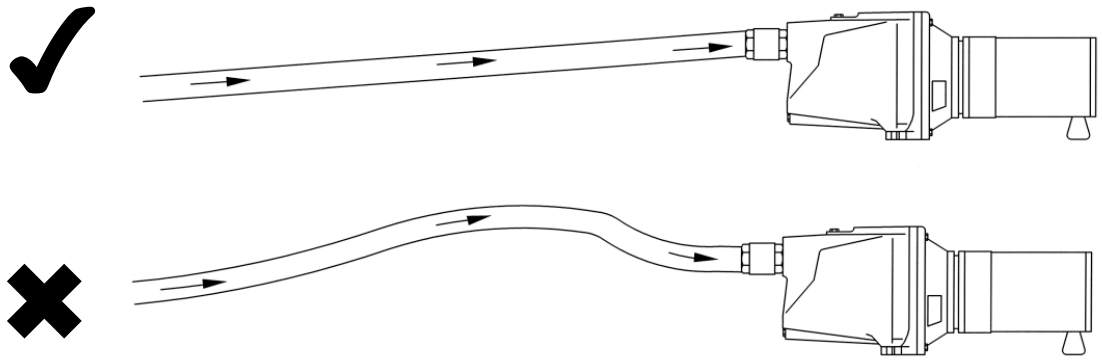
Three-phase units are supplied without wiring. It is necessary to use a reduced control voltage for safety reasons. These units must be wired by a qualified electrician. The pressure switch is pre-set to the correct pressure settings for the unit.

5. Aqua Major pumps are self-priming. Maximum recommended suction lifts are indicated in TABLE 2.

TABLE 2

Model	Maximum vertical suction lift (new pump)
AQM 2	1 metre (3 ft)
AQM 6, 20	3 metres (10 ft)

The **suction lift** is the vertical distance from the lowest level of the water source to the centre line of the pump inlet port. Do not exceed this recommended maximum. For optimum pump life and performance, keep the suction lift to a minimum.



6. The **inlet line** to the pump should be as short and straight as possible, with a bore at least as large as the nominal bore of the pump inlet port. Use rigid or reinforced pipe that will not deform or collapse under suction conditions. The inlet pipe should be angled below the horizontal, to prevent entrapment of air and loss of prime when running.

   If a long inlet line is unavoidable, it may be advantageous to increase the size of the pipe. Check with your pump supplier if in doubt.

   Fit an **inlet strainer** to protect the pump from entry of solid material. The strainer should be of suitable material, with approximately 0.5mm mesh size and with an open area of at least 2½ times the cross-sectional area of the inlet pipework. The strainer should be inspected regularly and cleaned when necessary.

Check the inlet line carefully for **air leaks**, which will stop the pump from priming itself.

7. The **discharge line** should preferably be of the same bore as the pump discharge port. Smaller pipework will limit the system flow rate. On the AQM20 units the accumulator tank must be teed into the pump discharge line within 3m of the pump. Pipework of reduced size may be used for branches to individual fittings.

4. CONNECTING THE ELECTRIC SUPPLY

1. **Isolate the unit from the electric supply.**
2. Connect the pump's power cable to the electric supply.
3. The unit is normally supplied with the motor prewired to its controls. It if is not, follow the instructions in the motor terminal box (a.c. motors) or as set out in the wiring diaphragm included with these instructions. With **d.c. motors**, observe the correct polarity when connecting the motor lead to the power supply cable from the battery.
4. With **a.c. motors**, ensure that the **earth connection** is properly made. **Three-phase** units require a starter, and a low-voltage supply for the control circuit. A **qualified electrician** must do this work.
5. For **d.c. pump units**, check that a correctly rated fuse has been fitted in the power supply.

5. STARTING THE PUMP

1. Remove the filler plug on the top of the pump. Fill the pump body with water and replace the plug, ensuring that it is screwed fully home to make an air-tight seal.
2. Check that the wiring is complete and correct, that the motor terminal box cover is in place and that all enclosures containing live components have been secured. Turn on the power supply at the master switch.
3. **3-phase a.c. units only:** start the motor briefly, and check by watching the motor fan that the pump rotates in the direction shown by the arrow on the pump casing. If the direction of rotation is incorrect, exchange any two of the power connections in the terminal box.

   D.C. units: the motor will rotate in the correct direction if it is connected with the polarity shown in its wiring diagram.
4. Check the water level in the supply tank, open taps and other outlets. Check that isolating valves in the inlet and discharge lines are fully open.
5. Switch on the pump. After a short time, water and air should start to flow from the open outlets. Allow a few seconds for the air to clear itself. If the

pump has not primed itself and established a steady flow after about 20 seconds, stop the pump and investigate for air leaks in the inlet pipework. As soon as water flows smoothly from the taps, turn them off one by one. The pump should turn itself off within a few seconds of closing the last outlet. Your system is now ready for use.

ESSENTIAL PRECAUTIONS

- **Do not run the pump dry**. Running the pump for more than a short time with no water in it will damage the shaft seal. A timer, or a level control in the water supply tank, will protect the pump. Contact your pump supplier for advice if necessary.
- **Never restrict the inlet pipe** while the pump is running. A restricted inlet line will give rise to low pressure with the risk of cavitation, loss of efficiency, vibration, noise and eventual damage to the pump.
- If the pump is to be **shut down** for an extended period, switch off the electric supply and open outlets to depressurise the system. Drain the pipework, water storage heater (calorifier) and pump casing if there is any risk of frost damage.
- For each pump there is a **service kit** containing the main wearing parts (e.g. shaft seal, d.c. motor brushes, pump body O-ring seal). You can avoid the need for emergency despatches and possible delays by keeping essential spare parts handy.
- **Check regularly** that the pump runs smoothly, delivers the required flow and pressure and does not leak. Investigate leaks, noisy running, or vibration without delay, to minimise the risk of damage or premature failure.
- **If the pump loses performance** or fails to reach its cut-out pressure, remember to check the electric supply voltage, ***at the motor terminals, with the pump running***, as well as the condition of the pump itself. Regenerative (turbine) pumps (AQM2) are particularly susceptible to loss of performance at low motor voltage.

6.Operating the pump

Provided the pump has been correctly installed and commissioned, it should operate automatically on demand. The cut-in and cut-out pressures, and the air pressure in the accumulator tank, have been pre-set before delivery.

The cut-in and cut-out pressures may be altered if required, by adjusting the settings in the pressure switch. Check with Cleghorn Waring that the pressure settings you propose are compatible with the unit.

WARNING

Before you alter the pressure settings, you are strongly advised to check that every component in the pressurised system is suitable for your intended maximum pressure. In particular, check the pressure rating of water storage heaters (calorifiers) and their pressure relief valves. Increased pressure may cause a relief valve to lift, resulting in a continuous loss of stored water.

7. Maintenance & Repair

Your Aqua Major pump is designed to give long service with minimal attention. The shaft seal and the brushes in d.c. electric motors are wearing parts and may eventually need to be replaced.

A **repair and overhaul service** is available for Aqua Major pumps. Contact Xylem Water Solutions (Cleghorn Waring) or your local Aqua Major pump supplier for details.

8. Trouble Shooting

PROBLEM	POSSIBLE CAUSE	ACTION
Motor fails to start when switched on	- loose wiring	- check wiring
	- fuse blown	- check cause, replace fuse
	- no power in pump circuit	- check power supply
	- A.C. motor overload cut-out has tripped	- check cause, reset
Motor hums but does not run	- pump has jammed	- disconnect power; turn motor fan by hand, ***or*** open pump and turn by hand; investigate cause
Overload trips out (A.C. motors)	- start winding or capacitor failure in 1-phase A.C. motor	- check motor
Motor runs but no water flows	- air leak in inlet line	- check inlet line, port connections, drain plug, priming plug
	- pump is not primed	- prime pump, open outlets
	- pump has lost prime	- open outlets to allow pump to re-prime on starting - possible inlet air leak.
	- air lock in inlet line	- alter pipework layout
	- no water supply	- check supply tank

Motor runs but no water flows	- inlet or discharge line blocked - inlet valve closed - blocked jet or impeller in pump	- check pipework - check inlet valve - open pump and check for blockages
Motor runs hot to touch; smell of burning	- motor overloading and not properly protected - cavitation due to blocked inlet line - cut-out pressure set too high, pump runs continuously - water supply has run out, pump running dry	- check cause: thermal cut-out setting, motor condition, fuse rating check inlet line - check cut-out pressure - refill tank check for pump damage.
Insufficient flow or pressure	- pump running in reverse - Inlet or discharge pipe blocked - air leak	- check direction of pump rotation - check pipework, strainers - check pipework, strainers and pump connections
Pump will not reach cut-out pressure	- low voltage - water tanks empty blocked or worn impeller - blocked orifice in pressure switch - pump unable to re-prime following loss of water supply - incorrect pressure switch settings - air leak	- check voltage at pump, with pump running - check tanks - check condition of pump - check pressure switch - open all outlets and re-start pump - correct settings. - check pipework, strainers and pump connections
Pumps starts and stops rapidly	- incorrect pressure in accumulator tank - ruptured membrane in accumulator tank	- check that pressure in accumulator tank is 0.25bar (4 psi) below pump cut-in pressure - check membrane
Water escapes from air valve of accumulator tank	- ruptured membrane in accumulator tank	- check membrane