



AquaGuard BS9251:2021 Fire Pump Controller User & Installation Manual

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If additional assistance or information is required, please contact
AquaGuard Pumps Technical on 0800 040 7738.

1. Product Description

The AquaGuard fire pump controller has been designed as an easy to install, all in one solution to control the operation, monitoring and automatic testing of the fire pump in accordance with BS9251:2021.

Incorporating an informative LCD display, easy to use interface and a 128 event log making the AquaGuard fire pump controller the most advanced on the market.

Features

Jockey Mode - Upon pressure loss the pump will operate, if no flow is detected then pump will shut off after 1 minute. Jockey limit fault will indicate if Jockey starts have exceeded weekly limit.

Fire Mode - If pressure loss and flow are detected by either of the two pressure switches and the flow switch then pump will operate in fire mode until manually shut down.

Test Mode – Each Monday at 10am the controller will open the solenoid valve until both the pressure switches are activated and run the pump checking voltage/current and power are within set parameters.

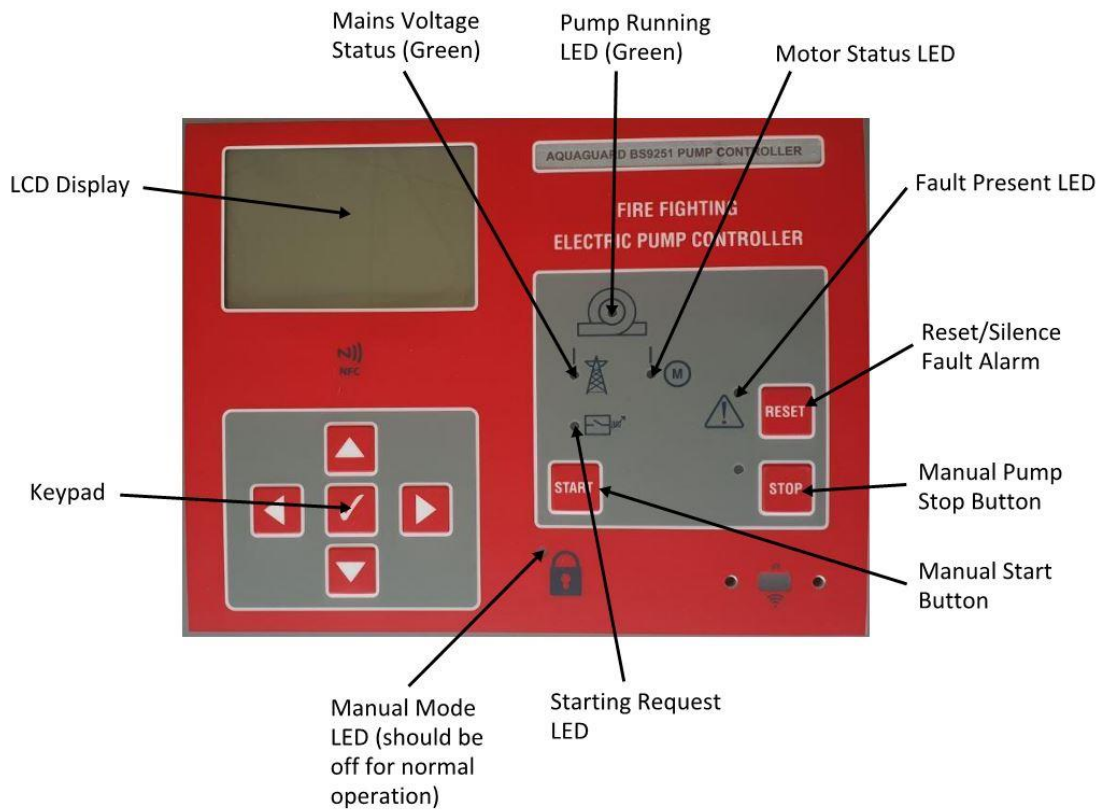
Maintenance - Maintenance interval is pre-set to every 12 Months but can be adjusted to suit specific interval requirements. Maintenance due indicator will require a physical flow test to reset.

Event Log - Event log up to 128 entries can be accessed on the control panel.

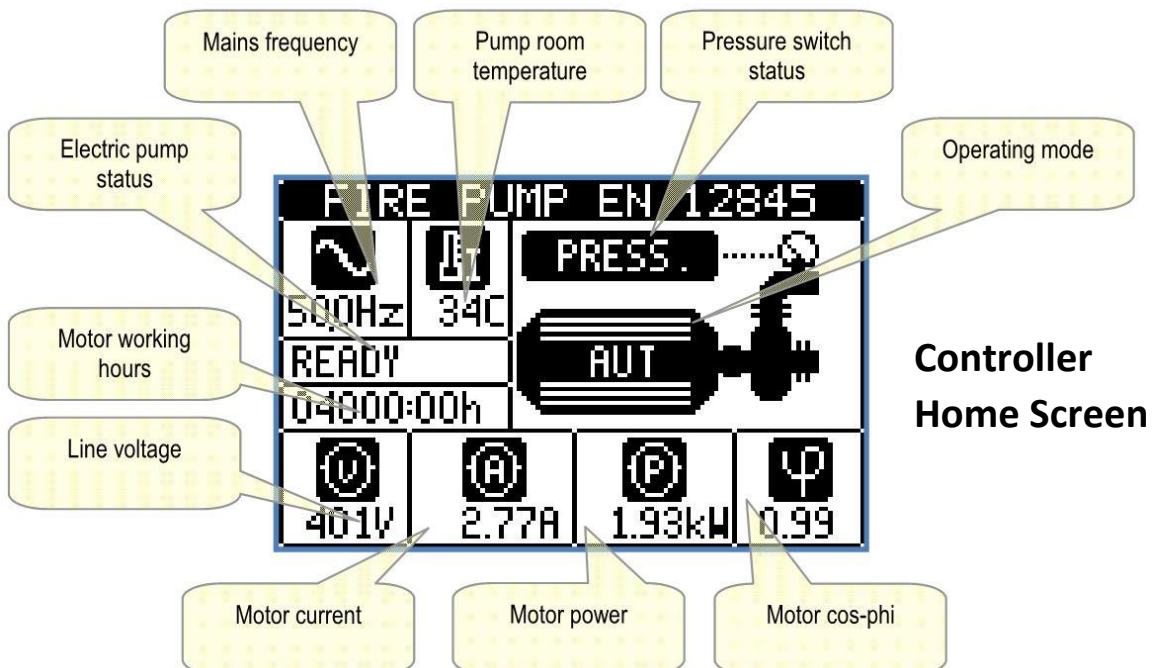
Setup Mode - All settings can be changed if required with the use of an advanced user password to prevent unauthorised access to settings.

2. User Interface

2.1 – AquaGuard fire pump controller button and LED description.



2.2 – AquaGuard fire pump controller LCD Display 'Home Screen' description.



3. Installation Guide

General

3.1 - This product must be installed by a suitably qualified electrician.

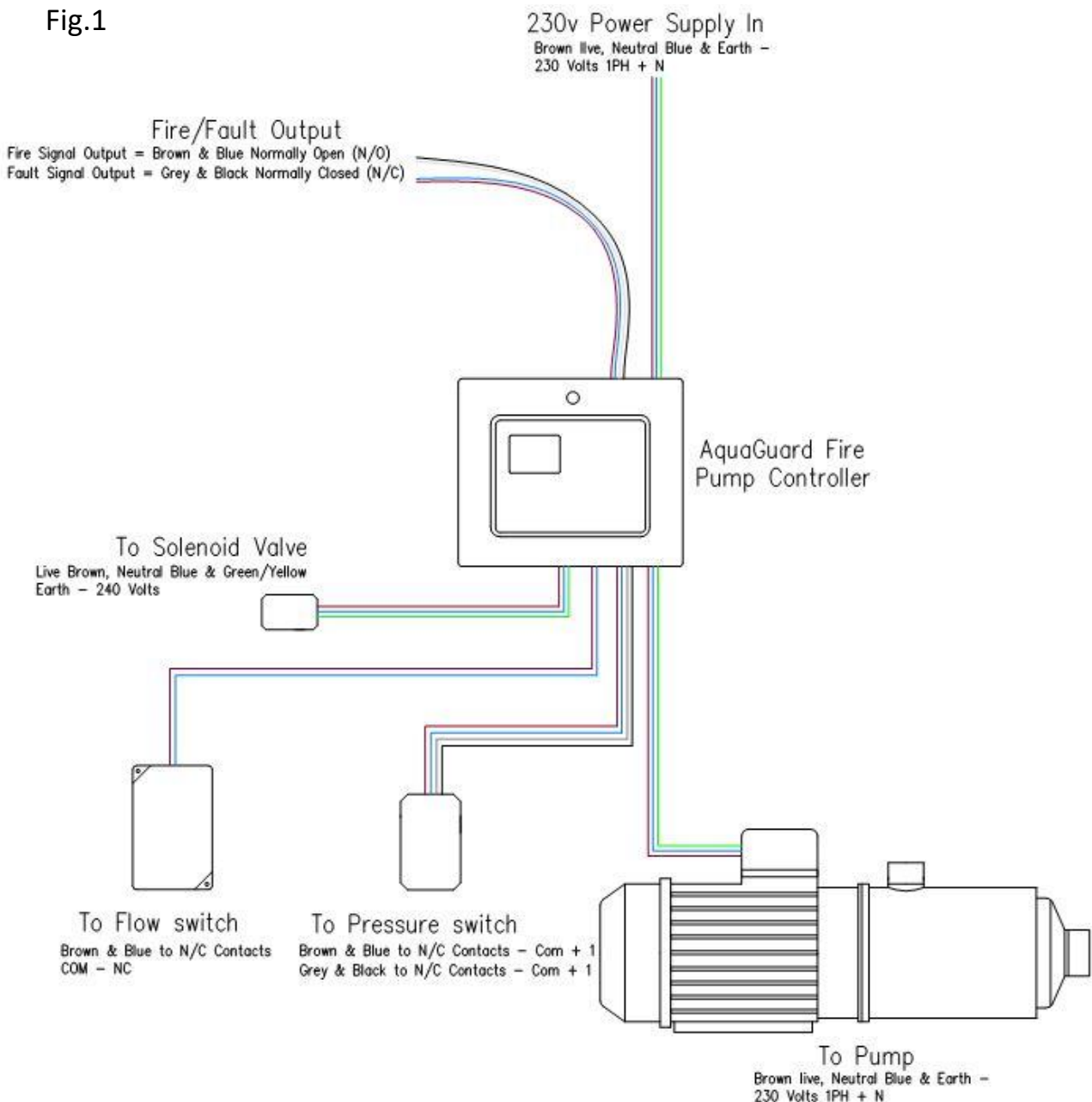
3.2 - This controller must be earthed.

3.3 – This controller should be wired to a suitable isolator, fed directly from the electrical distribution board protected by a dedicated RCD/RCBO suitably sized for the fire pump installed.

Installation

3.4 – If purchasing in kit form the AquaGuard Fire Pump Controller must be connected as per diagram below. Take care with solenoid connection as 230v will be present to solenoid when requested.

Fig.1



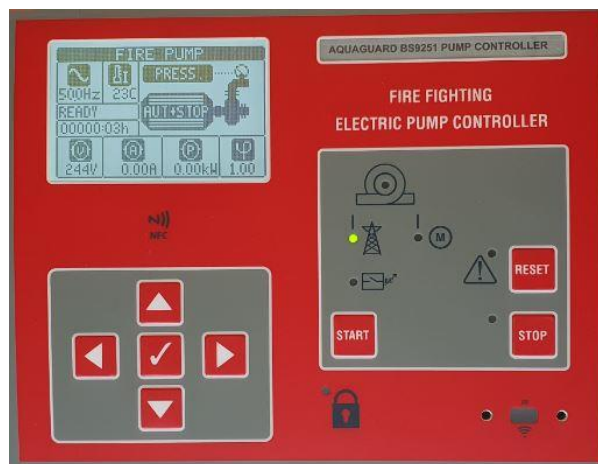
4. Controller Set Up and User Guide

4.1 – Once controller has been wired as per diagram (Fig.1) the controller power supply can be switched on, please note that on initial power up the pump will run to reach system pressure, please ensure that all suction valves are open and pump has been fully primed and free of any air before switching on for the first time.

It is recommended to proceed to fill the entire sprinkler system shortly after powering on for the first time and leave the pump delivery valve open to create volume in the pump manifold, this is to ensure the pump will not repeatedly enter 'Jockey mode' caused by the stopping of the pump triggering the pressure switch due to the small volume in the pump manifold.

Warning: Tank must be full, pump must be fully primed from all bleed nipples and all suction valves must be open prior to powering the controller up for the first time.


4.2 – Shortly after switching the controller on for the first time, once system pressure (Pmax) has been made the controller will start a 1 minute countdown indicating 'Jockey Mode' press the 'Stop' button and the home screen and green power led should be visible as image below. If the 'Spr Activation' is displayed press the 'Reset' button to reset.

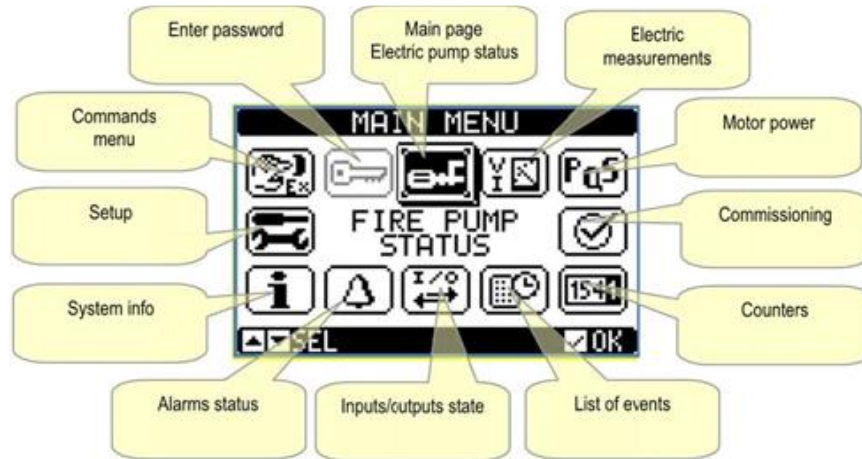


4.3 – Setting Time and Date

From the home screen display, press the up key until the time and date are visible on display, then press the left and right keys at the same time to edit. Use the up, down, left, right keys to set time and date then press ok (tick) button to set. Press the down key until the home screen is displayed. Note: date is in the format of MM/DD/YYYY.

4.4 – Accessing the menu

1. To access the menu containing pump set information, reset the annual maintenance and view event log the Aquaguard controller has a user-friendly menu interface, to access press the  Button, icon descriptions are indicated below.

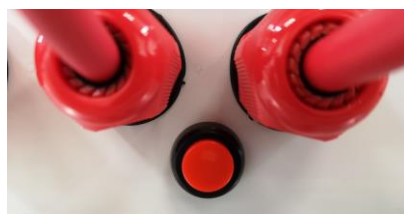


2. Most functions can be accessed without the use of a password but to gain access to the command's menu or setup menu then a password will need to be entered. To access the Commands menu, navigate to 'Enter Password' (key icon), enter the user password '2000', press right to the key symbol then press ok (tick).



Note: Access to the setup menu is possible by entering an advanced password but the installer will be required to speak to Aquaguard technical to obtain and discuss required changes, as any changes in this menu without technical guidance could affect operation and invalidate warranty.

3. Within a short period of entering the password, re-enter main menu, navigate to 'Commands Menu'. To enter commands you must first hold the 'Manual Mode' button located on the underside of the controller (below) and press ok on the keypad, once into the commands menu the manual mode button (shown below) can be released.



4.5 – Jockey Limit Reset

If the pump has entered jockey mode five times or more within a week then the 'Jockey Limit' fault will be displayed, this may also be displayed shortly after start-up/initial filling of the system. To reset the 'Jockey Limit' initiate a weekly test procedure by following the steps in 5.3.

4.6 – Pump Running Indicator

A 'Pump Running' fault will be displayed If the fire sprinkler pump was to run for more than one minute, this is to meet the requirements of BS9251:2021 to ensure in the event of a fault whereby the pump was running when not called upon then a fault signal is transmitted. Note: This fault will be present when operating the pump set in 'Fire Mode' for more than one minute, this will reset automatically when stopped.

4.7 – Internal Audible Alarm (Optional)

The optional internal audible alarm powered by a 9v battery will make an audible bleep when any fault condition arises including power failure to the pump controller. This audible alarm should be requested where the standard fault output contacts cannot be monitored. Note: Selecting internal audible alarm option will as standard remove the fault output contacts.

Supplied 9v battery to be inserted into the battery carrier on the underside of the controller.

5. Commissioning

5.1 – Filling the system

If the sprinkler system was not filled upon initial power up in step 4.1, please proceed to filling the system, this may activate the alarm output therefore it may be required to temporarily isolate the alarm. Once system pressure (P_{max}) has been made the controller will start a 1 minute countdown indicating 'Jockey Mode' press the 'Stop' button and the home screen and green power led should be visible. If the 'Fire Mode' is displayed press the 'Reset' button to reset.

5.2 – Setting of Pressure Switches (if required)

The pressure switches are pre-set from the factory to suit the associated pump but it may be required by the installer to adjust the pressure switches from factory set pressure, it is recommended that the system pressure switches be set at least 1 bar below system ' P_{max} ' and no less than the pressure required from the 'most unfavourable hydraulic calculations', it is recommended that the pressure switches are set within 0.3 bar of each other. Refer to pressure switch instruction manual for setting instructions, this should be undertaken with the Aquaguard pump controller switched off.

5.2 – Flow Test

From the pump test valve, a flow test should be undertaken to check pump satisfies the flow and pressure requirements set out in the system Hydraulic Calculations, after 20 seconds of the system flowing the 'Fire Mode' will appear triggering the alarm output. Once flow test has been completed and system repressurised press the 'Stop' button then 'Reset' button to return to home screen.

5.3 – Weekly Test

To manually initiate the weekly test to ensure correct operation, press and hold the black button on the bottom of the controller for at least 10 seconds, this will initiate the weekly test to start, opening the solenoid valve until both pressure switches are activated and run the pump for 60 seconds checking voltage/current and power are within set parameters.

If either of the pressure switches are not detected, then a fault will be displayed indicating either 'PS1 not detected' or 'PS2 not detected'. If the flow switch is not detected then 'FS not detected' fault will be displayed.

6. Annual Maintenance

6.1 – Annual Maintenance Reset

12 Months from system commissioning the 'Maintenance 1 Requested' fault will be displayed; this will not trigger the fault output unless requested. This maintenance fault can only be reset by undertaking an annual flow test and no faults other than 'Maintenance 1 Requested' should be present, the reset procedure cannot be completed until faults are rectified.

To reset annual maintenance, undertake the following procedure.

1. Undertake a flow test as per section 5.2, please note if flow detected for more than 15 seconds the alarm output will be triggered. Once finished press the 'Stop' button followed by the 'Reset' button.
2. Following the same password and button entry procedure in section 4.4, enter main menu, navigate to the 'Enter password' section, enter code '2000' then press ok on the key symbol.
3. Enter main menu, navigate to the 'Commands' menu, while holding the 'Manual mode' button press ok.
4. Once in 'Commands' menu, navigate down to 'C01 Reset Maintenance Interval 1' press ok to execute it, the device will prompt for a confirmation, press ok again, this will reset the maintenance to a further 12 months. Press the 'Stop' button several times to exit to home screen. If the flow test has not been carried out properly then the reset will prompt for the test to be undertaken again, if this is the case repeat flow test.

6.2 – Event Log

The Aquaguard controller has a 128 entry event log incorporated, this indicates in detail with a date and time every event that has occurred. To view, from the controller home screen press the up key until the 'Event Log' screen is displayed, then use the left and right keys to navigate through the log.

8. Fault Alarm Table

If any faults are present on the controller then these will be displayed on the LCD display with a code A01 – A38 or UA1 - 8, see alarm table below for description.

COD	DESCRIPTION	ALARM EXPLANATION
A01	Low mains voltage	Mains voltage lower than the threshold set in P05.01.
A02	High mains voltage	Mains voltage higher than the threshold set in P05.02.
A03	Low mains frequency	Mains frequency lower than the threshold set in P05.03.
A04	High mains frequency	Mains frequency higher than the threshold set in P05.04.
A05	Voltage asymmetry mains	Mains voltage asymmetry higher than the threshold set in P05.05.
A06	Phase failure	Missing of one of the phases.
A07	Incorrect phase sequence	The phase sequence is not correct.
A08	Pump starting failure	Either the electrical parameters did not enter the limits and/or delays defined in menu M05 or the programmable input with function <i>Pump pressure switch</i> did not activate.
A09	Locked rotor	Motor current higher than 500% of rated In for a time longer than 5s.
A10	Dry running	Pump dry running. The measured power factor is lower than the threshold set in P05.13.
A11	Current too low	Motor current lower than the threshold set in P05.06
A12	Current too high	Motor current higher than the threshold set in P05.07
A13	Unbalanced current	The current asymmetry has exceeded the threshold set in P05.14.
A14	Unexpected current	The system detects a current higher than 5% of rated current In even if there is no command to run the motor.
A15	Wrong CT connection	One or more current transformers (CT) are not connected in the correct way (system measures negative active power). Check the connections at terminals 57, 58, 59, 60.
A16	System error	Internal error. Please contact Lovato Electric Technical Support (tel. 035 4282422; e-mail: service@LovatoElectric.com).
A17	Low temperature in pump room	The room temperature is lower than the threshold set in P04.02 for a time longer than P04.03.
A18	High temperature in pump room	The room temperature is higher than the threshold set in P04.04 for a time longer than P04.05.
A19	Water reserve	Alarm generated by the input programmed with the <i>Water supply</i> function
A20	Low water tank level	Water level in the tank lower than the threshold set in P02.18.
A21	Water tank empty	Water level in the tank lower than the threshold set in P02.19.
A22	Low level priming tank	The programmable input with function <i>Priming tank level</i> is active
A23	System is not in automatic mode	System not in automatic mode for more than 24 hours
A24	Fire pump running	Alarm generated by the input programmed with the 'Pressure switch start' function.
A25	Fire pump not in pressure	Alarm generated by the programmed input with the function <i>Pump pressure switch</i> not active after 1min with motor running.
A26	Pump in pressure	Alarm generated by the programmed input with the function <i>Pump pressure switch</i> active for 1 minute without motor running.
A27	Maintenance 1 requested	Alarm generated when the maintenance intervals of its

8. Fault Alarm Table Continued

A28	Maintenance 2 requested	range reach zero. See menu M08. Use the command menu to reset the hours and reset the alarm.
A29	Maintenance 3 requested	
A30	Suction valve partially opened	Alarm generated by the programmed input with the function 'Suction valve partially open', in this situation the suction valve is not capable of delivering the maximum flow rate of water needed to the pump.
A31	Discharge valve partially opened	Alarm generated by the programmed input with the function 'Delivery valve partially open', in this situation the delivery valve is not capable of delivering the maximum flow rate of water needed to the sprinkler system.
A32	Sprinkler in pump room activated	Alarm generated by the programmed input with the function ' <i>Sprinkler activated</i> '
A33	Max number of start-up jockey pump	Alarm generated when the threshold set to parameter P02.20 is exceeded and if there is a programmed input with the function ' <i>Jockey pump activated</i> '.
A34	Jockey pump alarm failure	Alarm generated by the programmed input with the function ' <i>Jockey pump failure</i> '.
A35	Timeout jockey pump	Alarm generated when the threshold set to parameter P02.21 is exceeded and if there is a programmed input with the function ' <i>Jockey pump activated</i> '.
A36	Drainage pump alarm failure	Alarm generated by the programmed input with the function ' <i>Drainage pump failure</i> '.
A37	Communication error	RS-485 communication among different FFL... is not working properly. Check wiring and communication settings in M11 menu.
A38	Pressure input test failed	During automatic test (in ON-OUT mode) the pressure switch remains closed for more than 1 minute.
UA1 ... UA8	User alarms	The user alarm is generated by enabling the variable or associated input in menu M18.

COD	DESCRIPTION	ALARM EXPLANATION
UA1	Tank Level Low	Tank Level Low
UA2	Fire Pump On	Pump in Fire Mode - running for more than 20s
UA3	No FS detected	No flow switch detected on weekly test
UA4	Pump Running	Pump running for more than 60 seconds
UA5	Auto Test On	Weekly automatic test activated
UA6	Jockey Limit	Too many pump starts in 7 days
UA7	PS1 Not Detected	Pressure switch 1 not seen on weekly test
UA8	PS2 Not Detected	Pressure switch 2 not seen on weekly test

9. Troubleshooting

Issue	Possible Cause	Action
Controller not powering on	Power supply to controller not on or wired incorrectly.	Check all connections, fuses and MCB/RCBO.
Controller powers on, then goes off when pump start requested.	Pump wired incorrectly Fuse or MCB/RCBO not sized correctly for pump.	Check pump motor wiring Replace fuse, MCB/RCBO for an adequately sized C rated type.
Pump running not pressurising system	Suction/delivery valves closed Pump not adequately primed of all air.	Check all suction and delivery valves are open. Open all pump bleed screws until water flows freely. Flow large amounts of water from test valve.
Pump not generating design flow/pressure	Pump not adequately primed of all air. Obstruction in suction or delivery pipe work. Suction pipe diameter too small or pipe run too long	Open all pump bleed screws until water flows freely. Flow large amounts of water from test valve. Check pipe work and clear if necessary. Pump suction must never be smaller than pump inlet diameter. If long suction pipe run then increased pipe size should be used.
Pump not running when pressure low or at zero	Pressure switches not wired correctly or pressure switch setting too low. Pressure switch cable wired to flow switch	Wire pressure switches between COM and 1 (normally closed). Set correct pressure on pressure switch adjustment screws.
Pump running and not shutting off	Pressure switches not wired correctly or pressure switch setting too high.	Wire pressure switches between COM and 1 (normally closed). Set correct pressure on pressure switch adjustment screws.
External Fire Panel in fault when pump controller displays no fault on the LCD Display.	Incorrect wiring of fault output Pump controller switched off	Fault output must be wired normally closed (NC) Turn pump controller on
Faults - A11 Current too low, A12 Current too high, Power too high, Power too low.	Correct pump current and power settings not input correctly Possible pump fault	Change saved current and power settings in Setup Menu. Check current/power reading if vastly different to pump data plate call pump manufacturer.
230v Solenoid valve fails to operate on weekly test followed by voltage fault on controller	Incorrect wiring to solenoid	Check wiring – may have blown 1.6A fast blow fuse in controller, replace if necessary.

9. Troubleshooting Continued.

Issue	Possible Cause	Action
Pump running fault indicated.	Pump running for more than 62 seconds.	Normal under fire pump condition if pump running for more than 1 minute. Faulty component – Investigate.
'A01 Low mains voltage' Fault	Fuse blown inside controller	Check 1.6A fast blow fuse inside controller, replace if necessary.
'UA6 Jockey Limit' Fault	Too many pump starts within 7 days	Force weekly test by pressing and holding the black button for 10+ seconds. Procedure in section 5.3
'UA8 PS2 not detected' Fault	PS2 not seen within 3 seconds of PS1 on weekly test	Raise pressure of PS2 closer to PS1 (Switch labelled high – Screw adjustment clockwise)
'UA7 PS1 not detected' Fault	PS2 is seen before PS1 on weekly test	Either raise pressure of PS1 (Low) or Lower pressure of PS2 (High)
'A38 Pressure test input failed'	Weekly test timed out, pressure switches not seen within the test period – System pressure dropping too slowly on test.	Test return pipe work too small, recommend a minimum of 3/4". Too much air in system – Bleed air if no luck call Aquaguard technical.
'FS not detected'	Flow switch not detected on weekly test	Check flow switch operates correctly
'UA2 Fire Pump on' 'UA3 Sprinkler Activated' when pump not running or after weekly test, triggering the alarm.	Flow switch triggered for more than 20 seconds – Possibly stuck open.	Check flow switch is operating correctly and not stuck open or contacts faulty.
'UA1 Tank Level Low' Fault	Tank Level low or wired incorrectly	Check tank water level or tank switch wiring contact requires normally closed switch – open on low level
'A07 Incorrect Phase Sequence' Fault	Phases wired incorrectly to isolator – Three phase pumps only.	Check wiring in pump isolator from controller, swap phases if required.
Any Fault present on controller not listed above	Refer to fault alarm table in section 8 to identify fault and possible action required.	Undertake action if possible. Call Aquaguard if problem persists.

If you have followed the above steps and controller is suspected to be faulty call Aquaguard on 0800 040 7738 for advice.