AQUA SPHERE VSP Variable Speed Instruction Manual

AQUASPHERE VSP
INSTRUCTIONS MANUAL

THANK YOU FOR PURCHASING OUR INVERTER POOL PUMPS.
THIS MANUAL CONTAINS IMPORTANT INFORMATION THAT WILL HELP YOU IN OPERATING AND MAINTAINING THIS PRODUCT.

PLEASE READ THE MANUAL CAREFULLY BEFORE INSTALLATION & OPERATION AND RETAIN IT FOR FUTURE REFERENCE.

Contents

⚠ IMPORTANT SAFETY INSTRUCTIONS

⚠ WARNING:
This manual can be read and downloaded as a PDF file from the website: **www.aquaspheremanuals.com**

- The appliance described in this manual is specially designed for the pre-filtering and recirculation of water in swimming pools, with clean water at temperatures that do not exceed 35ºC
- This appliance is not intended for use by persons (including children) with reduced physical, sensory or mental capabilities, or lack of experience and knowledge, unless they have been given supervision or instruction concerning use of the appliance by a person responsible for their safety. Children should be supervised to ensure that they do not play with the appliance.
- This appliance can be used by children aged from 8 years and above and persons with reduced physical, sensory or mental capabilities or lack of experience and knowledge if they have been given supervision or instruction concerning use of the appliance in a safe way and understand the hazards involved. Children must not play with this appliance. Cleaning and maintenance must not be carried out by children without supervision.
- ⚠ Our pumps may only be assembled and installed in pools compliant with standards IEC/HD 60364-7-702 and required national rules. The installation should follow standard IEC/HD 60364-7-702 and required national rules for swimming pools. Consult your local dealer for more information.
- If a self-priming pump is to be fitted above the water level, the pressure differential to the pump suction pipe should not be higher than 0.015 MPa (1.5 mH2O). Ensure that the suction pipe is as short as possible as a longer pipe would increase suction time and the installation's load losses.
- The pump is intended to be used while fastened to a support or while secured in a specific location in a horizontal position.
- Place a sump with an adequate outlet for the liquid where flooding is likely to occur.
- The pump cannot be installed in Zone 0 (Z0) or Zone 1 (Z1). To see drawings, refer to page 4/5.
- See the maximum total head (H max), in meters see page 3.
- The unit should be connected to an alternating current supply (see data on the pump™ plate) with an earth connection, protected by a residual current device (RCD) with a rated residual operating current that does not exceed 30 mA.

- A disconnector must be fitted to the fixed electrical installation in accordance to the installation regulations.
- Failure to heed the warnings can cause serious damage to the pool's equipment or serious injury, including death.
- ⚠ Observe the regulations in force on accident prevention.
- Before handling the unit, ensure that the power supply is switched off and disconnected from the mains.
- If the unit breaks down, do not try to repair it yourself. Contact a qualified service engineer instead.
- All modifications to the pump require the manufacturer's prior authorization. Spare parts and original accessories authorized by the manufacturer ensure greater safety. The pump's manufacturer may not be held liable for any damage caused by unauthorized spare parts or accessories.
- Do not touch the fan or moving parts and do not place a rod or your fingers near the moving parts while the device is running. Moving parts can cause serious injury or even death.
- Do not dry-run the pump or without water (the warranty will become null and void).
- Do not do any maintenance or repair work on the device with wet hands or if the device is wet.
- Do not submerge the device in water or mud.

GENERAL SAFETY WARNINGS

These symbols (⚠ ⚠ ❗) mean that there is a potential hazard as a result of not heeding the relevant warnings.

⚠ **HAZARD. Risk of electrocution.**
Disregarding this warning entails the risk of electrocution.

⚠ **HAZARD.**
Disregarding this warning entails the risk of harming people or damaging objects.

❗ **IMPORTANT.**
Disregarding this warning entails the risk of damaging the pump or the installation.

TECHNICAL SPECIFICATIONS

CODE	MODEL	P1	Voltage (V/Hz)	Amax (m3/h)	Humax (m)	Capacity (m3/h)	
		kW				At 8m	At 10m
75946	AQUASPHERE VSP 150	1,05	220-240/ 50/60	30,5	14,2	23,9	19,3
75948	AQUASPHERE VSPC 150	1,05	220-240/ 50/60	30,5	14,2	23,9	19,3

OVERALL DIMENSION (mm)

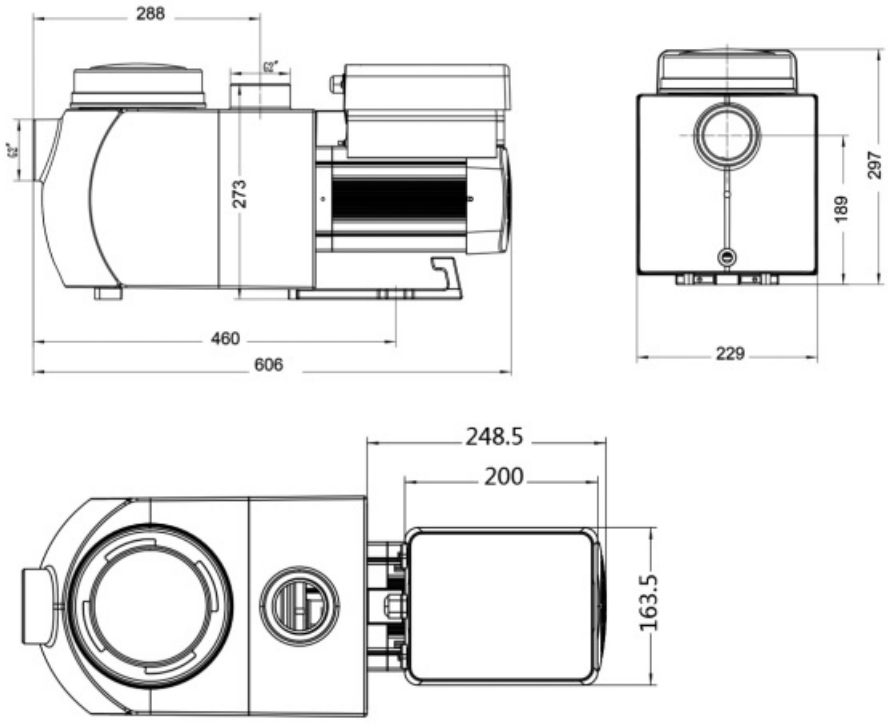


Figure 1

INSTALLATION

4.1. Pump Location

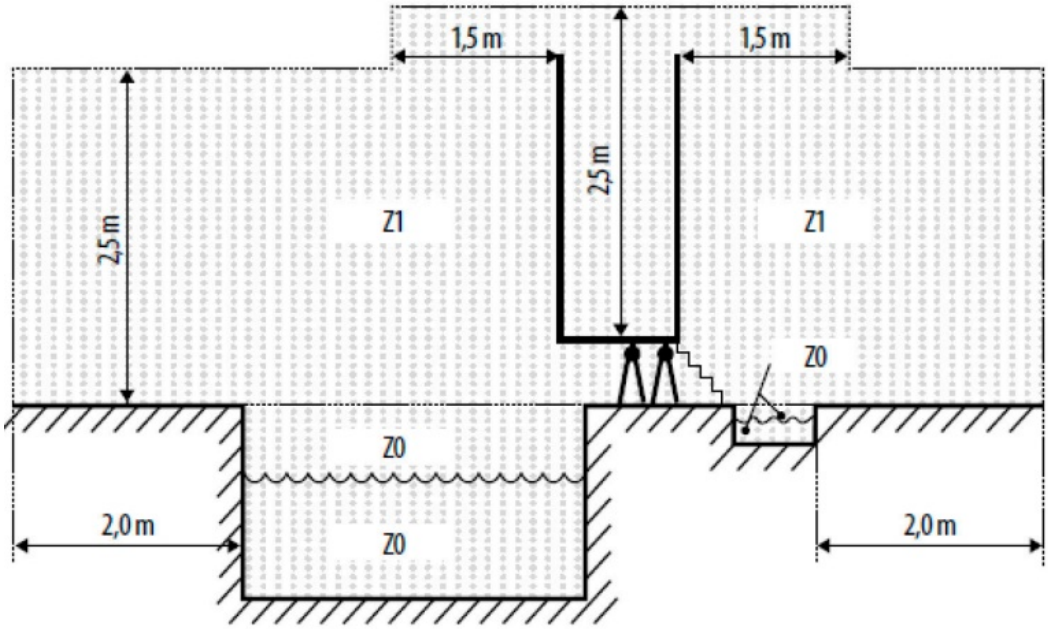
THE PUMP MUST BE INSTALLED:

1. Before the filter, heating system and/or water treatment unit.
   • At a distance of 2 meters from the edge of the pool, to prevent water from splashing the unit. Some standards allow other distances. Consult the standards in force in the country of installation.
2. Install the pump as close to the pool as possible, to reduce friction loss and improve efficiency, use short, direct suction and return piping.
3. To avoid direct sunshine, heat or rain, it is recommended to place the pump indoors or in the shade.
4. Install the pump in a ventilated location. Keep pump and motor at least 100mm away from obstacles, pump motors require free circulation of air for cooling.
5. The pump should be installed horizontally and fixed in the hole on the support with screws to prevent unnecessary noise and vibration.

   THE PUMP MUST NOT BE INSTALLED:

   • In an area susceptible to rainfall and splashing.
   • Near a heat source or source of inflammable gas.
   • In an area that cannot be cleaned or kept free of leaves, dry vegetation and other inflammable items.
   • In Zone 0 (Z0) and Zone 1 (Z1), (Figure 2).

4.1. INSTALLATION ZONES


1,5 m
1,5 m
2,5 m
2,5 m
Z1
Z1
Z0
Z0
Z0
2,0 m
2,0 m

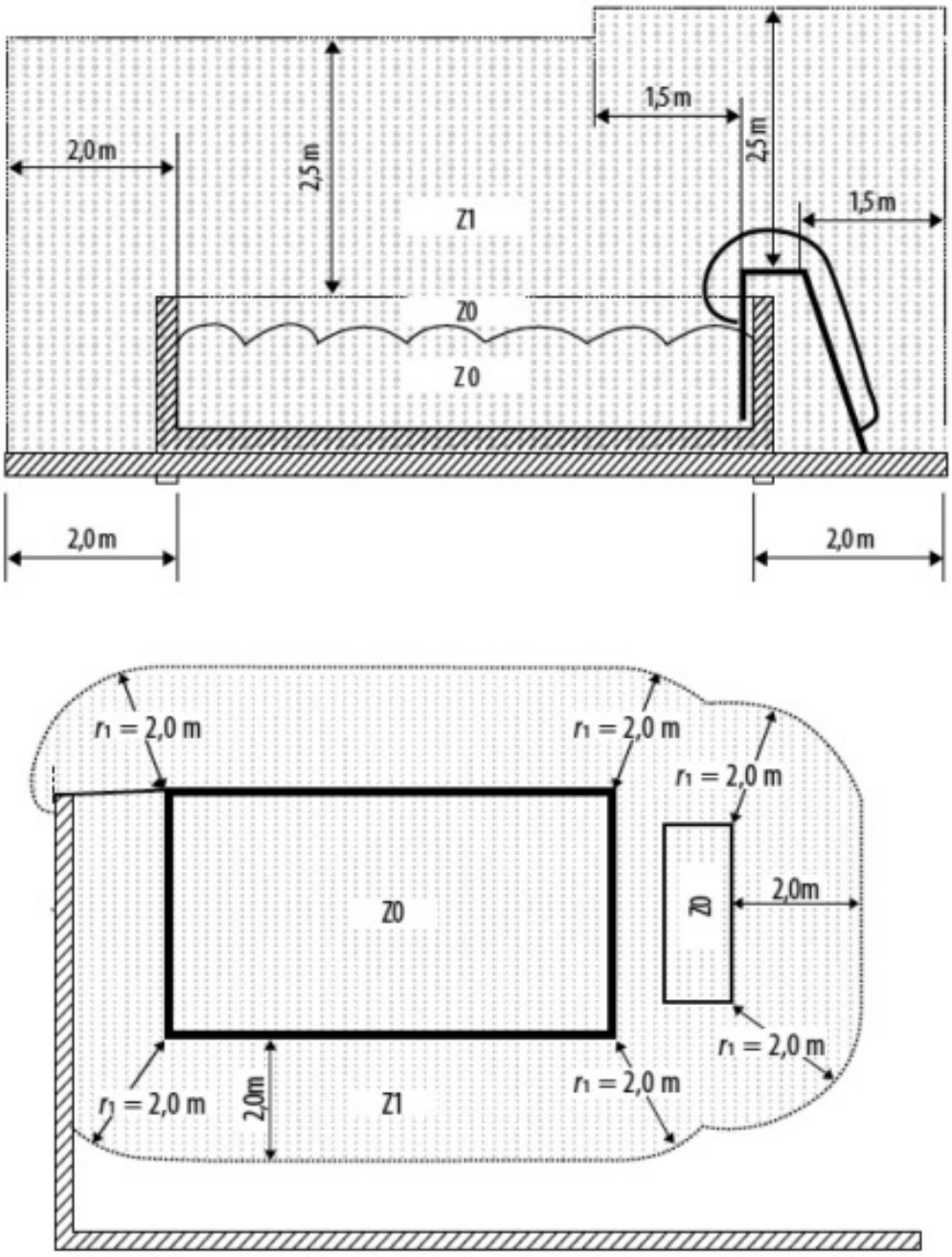


Figure 2

4.2 Piping

1. For optimization of the pool plumbing, it is recommended to use a pipe with size of 63mm. When installing the inlet and outlet fittings (joints), use the special sealant for PVC material.
2. The dimension of suction line should be the same or larger than the inlet line diameter, to avoid pump sucking air, which will affect the efficiency of the pump.
3. Plumbing on the suction side of the pump should be as short as possible.
4. For most installations we recommend installing a valve on both the pump suction and return lines, which is more convenient for routine maintenance. However, we also recommend that a valve, elbow, or tee installed on the suction line should be no closer to the front of the pump than seven times the suction line diameter.
5. Pump outlet piping system should be equipped with a check valve to prevent the pump from the impact of

medium recirculation and pump-stopping water hammer.

4.3 Valves and Fittings

1. Elbows should be no closer than 250mm to the inlet. Do not install 90° elbows directly into the pump inlet/outlet. Joints must be tight.

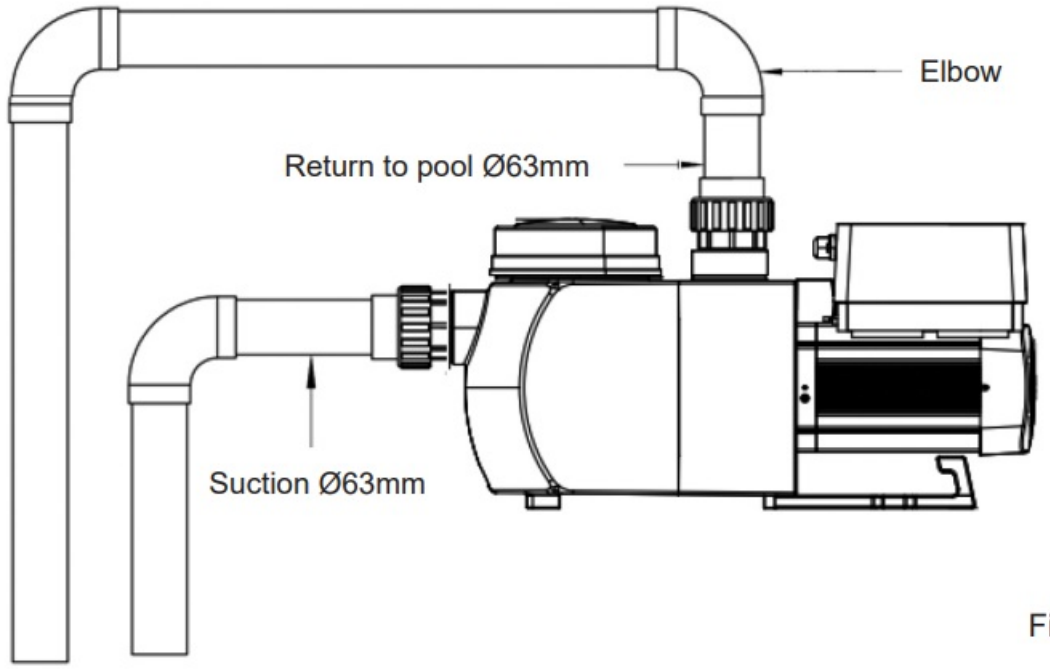


Figure 3

2. Flooded suction systems should have gate valves installed on suction and return line for maintenance; however, the suction gate valve should be no closer than seven times the suction pipe diameter as described in this section.
3. Use a check valve in the return line where there is significant height between the return line and the outlet of the pump.
4. Be sure to install a check valves when plumbing in parallel with other pumps. This helps prevent reverse rotation of the impeller and motor.

4.4 Check before initial startup

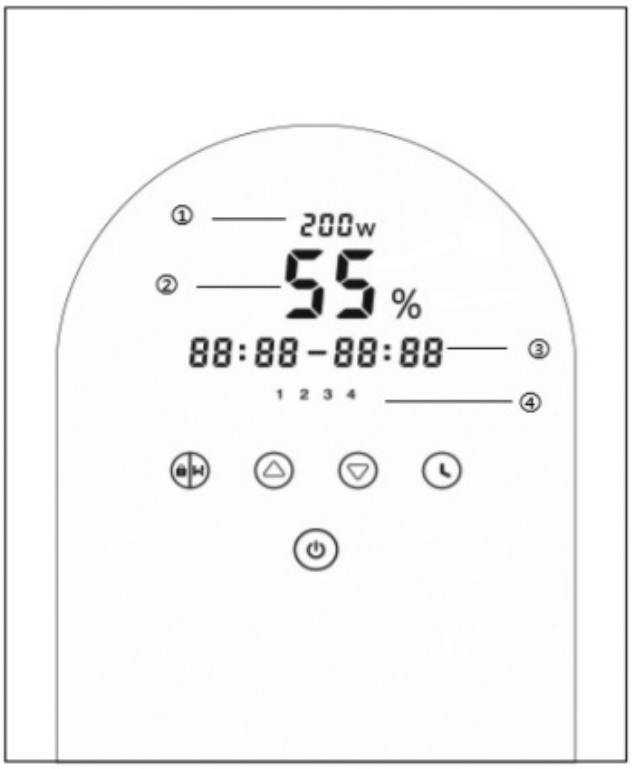
1. Check whether pump shaft rotates freely;
2. Check whether power supply voltage and frequency conform to the nameplate;
3. Facing the fan blade, the direction of motor rotation should be clockwise;
4. It is forbidden to run the pump without water.

4.5 Application conditions

Ambient temperature	Indoor installation, temperature range: 2-50ºC
Water temperature	5ºC-35ºC
Maximum water salt level	6g/l (6000 ppm)
Humidity	≤90% RH, (20ºC±2ºC)
Altitude	Not exceed 1000m above sea level
Installation	The pump can be installed max. 1,5m above water level
Insulation	Class F, IPX5

SETTING AND OPERATION

5.1 Display on control panel:



1 Power consumption
2 Running capacity
3 Timer period
4 Timer 1/2/3/4
Backwash/unlock
Up/down: to set the value (capacity/time)
Timer setting
On/off

5.2 Startup:

When the power is switched on, the screen will be fully light for 5 seconds, the device code will be displayed, and then it will enter the normal working state. When the screen is locked, only the button is lit; Press and hold for more than 3 seconds to unlock, other buttons will all light up. The screen will automatically lock up when there is no operation for more than 1 minute and the brightness of the screen is reduced by 1/3 of the normal display. Short press to wake up the screen and observe the relevant operating parameters.

5.3 Self-priming

When switched on for the first time after installation, the pump will start self-priming automatically.

The system performs the self-priming in Boost mode, it will count down from 1500s and stop automatically when the system detects the pump is full of water, then the system will recheck for 60s again to make sure the self-priming is completed. When completed, the pump will run at 80%.

Remark:

The pump is delivered with self-priming enabled. Each time the pump restarts, it will perform self-priming automatically. The user can enter the parameter setting to disable the default self-priming function (see 5.7)

If the default self-priming function is disabled, and the pump has not been used for a long time, the water level in basket may drop, the user could manually activate the Boost mode of priming to fill it (see 5.7), the adjustable period is from 600s to 1500s (default value is 600s).

The user could press for more than 3 seconds to exit the Boost mode.

5.4 Backwash

User can start the backwash or fast re-circulation in any running state by pressing.

	Default	Setting range
Time	180s	Press or to adjust from 0 to 1500s with 30 seconds for each step
Running capacity	100%	80~100%, enter the parameter setting (see 5.7)

If backwash is completed or disabled, press and hold for 3 seconds, the pump will return to the normal operating state before backwash.

5.5 Setting the running capacity

1		Press for more than 3 seconds to unlock the screen, press to start
2		Press or to set the running capacity between 30%~100%, each step by 5%

5.6 Timer mode

The pump's on/off and running capacity could be commanded by timer, which could be programmed daily as needed.

1	Enter timer setting by pressing
2	Press or to set the local time
3	Press to confirm and move to time 1 setting
4	Press or to choose the desired running periods and specific capacity or flow
5	Repeat above steps to set other 3 timers
6	Hold 3 seconds to save setting
7	or Check 4 timers to make sure there is no invalid setting

Note: Overlap setting of time will be considered as invalid, the pump will only run based on the previous valid setting.

During timer setting, if you want to return to the previous setting, hold both for 3 seconds.

5.7 Parameter Setting

Restore factory setting	Under off mode, hold both for 3 seconds
Check the software versi on	Under off mode, hold both for 3 seconds
Boost mode of priming	Under on mode hold both for 3 seconds
Enter parameter set- tin g as below	Under off mode, hold both for 3 seconds; If current address does no need to b e adjusted, hold both to next address.

Parameter A ddress	**Description**	**Default Setting**	**Setting Range**
1	PIN3	100%	30-100%, by 5% increments
2	PIN2	80%	30-100%, by 5% increments
3	PIN1	40%	30-100%, by 5% increments
4	Backwash capacity	100%	80-100%, by 5% increments
5	Control mode of Analo g Input	0	0: current control 1: Voltage control
6	Enable or disable the p riming that occurs at e ach start	25	25:enables / 0: disables

EXTERNAL CONTROL (Not included in standard model).

External control can be enabled via following contacts. If more than one external control is enabled, the priority is as below: Digital Input >Analog Input > RS485 > Panel control

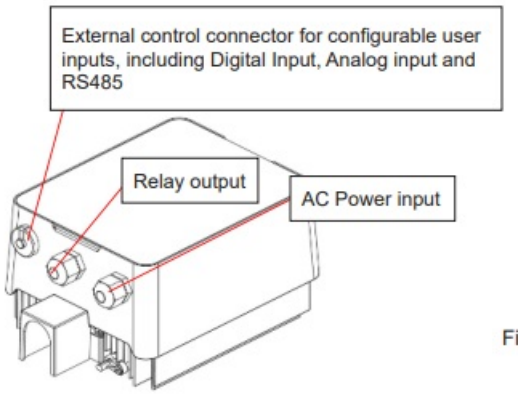


Figure 4

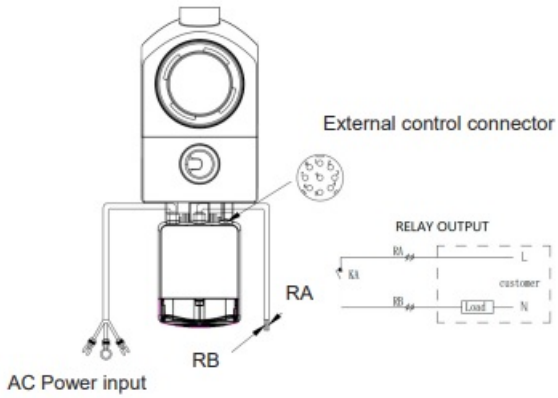
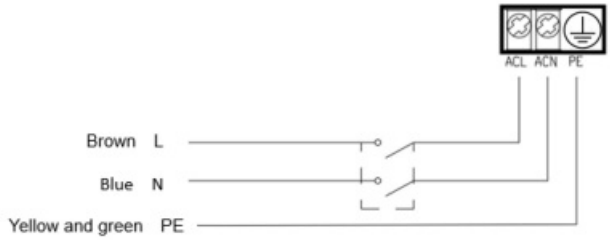


Figure 5



Name	Color	Description
PIN 1	Red	Digital Input 4
PIN 2	Black	Digital Input 3
PIN 3	White	Digital Input 2
PIN 4	Grey	Digital Input 1
PIN 5	Yellow	Digital Ground
PIN 6	Green	RS485 A
PIN 7	Brown	RS485 B
PIN 8	Blue	Analog Input 0 (0-10V or 0~20mA)
PIN 9	Orange	Analog Ground

Remark: Above table sums up the associated input signals.

a. Digital input:

When external control of digital input is enabled, the pump has a 7-wire cable ((PIN1/2/3/4/5/6/7) with open ends; to connect from PIN1 to PIN5, the assignment of the cables to the individual speeds is as below:

When PIN4 connect with PIN5, the pump will be mandatory to stop; if disconnected, the digital controller will be invalid;

When PIN3 connect with PIN5, the pump will be mandatory to run at 100%; if disconnected, the control priority will be back on panel control;

When PIN2 connect with PIN5, the pump will be mandatory to run at 80%; if disconnected, the control priority will be back on panel control;
When PIN1 connect with PIN5, the pump will be mandatory to run at 40%; if disconnected, the control priority will be back on panel control;
The capacity of inputs (PIN1/2/3) could be modified according to the parameter setting.

b. Analog Input:

When connected with PIN8 and PIN9, the running capacity could be determined by 0~10V analog voltage signal or 0~20 mA analog current signal.
The following table shows the relationship between the analog signal on input and the set value to be activated:

Analog control	Motor Stops	Motor Runs
Current (mA)	2.6-5.7 mA	5.7-20 mA
Voltage (V)	1.3-2.9 V	2.9-10 V

The default control mode is by current signal, if you want to change to voltage signal, please enter the parameter setting. (see 5.7)

c. RS485:

When connected with PIN6 and PIN 7, the pump could be controlled via Modbus 485 communication protocol.

d. Relay output:

The output is made from a relay L and N, with the following electrical characteristics.

Characteristics of Relay output	
Max. bearable current [A]	2.5 A
Max. bearable power	500 W

PROTECTION AND FAILURE

7.1 High Temperature Warning and Speed Reduction

In “Auto-Inverter/Manual-Inverter Mode” and “Timer mode” (except backwash/self-priming), when the module temperature reaches the high temperature warning trigger threshold (81° C), it enters the high temperature warning state; when the temperature drops to the high temperature warning release threshold (78° C), the high temperature warning state is released. The display area alternately displays AL01 and running speed or flow

1. If AL01 displayed for the first time, the running capacity will be automatically reduced as below:
   a. If current operating capacity is higher than 85%, the running capacity will be automatically reduced by 15%;
   b. If current operating capacity is higher than 70%, the running capacity will be automatically reduced by 10%;
   c. If current operating capacity is lower than 70%, the running capacity will be automatically reduced by 5%.
2. Suggestion for non-first displayed of AL01: check the module temperature every 2 minutes. Compared with the temperature in the previous period, for every 1-degree Celsius increase, the speed will decrease by 5%.

7.2 Undervoltage protection

When the device detects that the input voltage is less than 200V, the device will limit the current running speed
When input voltage is less than or equal to 180V, the running capacity will be limited to 70%;
When the input voltage range is within 180V~190V, the running capacity will be limited to 75%;
When the input voltage range is within 190V~200V, the running capacity will be limited to 85%.

7.3 Trouble shooting

Problem	Possible causes and solution
Pump does not start	• Power Supply fault, disconnected or defective wiring. • Fuses blown or thermal overload open. • Check the rotation of the motor shaft for free movement and lack of obstruction. • Because of long time lying idle. Unplug the power supply and manually rotate motor rear shaft a few times with a screwdriver.
Pump does not prim e	• Empty pump/strainer housing. Make sure the pump/strainer housing is filled with wat er and the O ring of cover is clean. • Loose connections on the suction side. • Strainer basket or skimmer basket loaded with debris. • Suction side clogged. • Distance between pump inlet and water level is higher than 2m, the installation heigh t of pump should be lowered.
Low Water Flow	• Pump does not prime. • Air entering suction piping. • Basket full of debris. • Inadequate water level in pool.
Pump being noisy	• Air leak in suction piping, cavitation caused by restricted or undersized suction line or leak at any joint, low water level in pool, and unrestricted dis- charge return lines. • Vibration caused by improper installation, etc. • Damaged motor bearing or impeller (need to contact the supplier for repair).

7.4 Error code

When the device detects a failure (except for the running capacity reduction strategy and 485 communication failure), it will power off automatically and display the failure code. After power off for 15 seconds, check if the failure is cleared, if cleared, it will resume to start.

Item	Error Code	Description
1	**E001**	Abnormal input voltage
2	**E002**	Output over current
3	**E101**	Heat sink over heat
4	**E102**	Heat sink sensor error
5	**E103**	Master driver board error
6	**E104**	Phase-deficient protection
7	**E105**	AC current sampling circuit failure
8	**E106**	DC abnormal voltage
9	**E107**	PFC protection
10	**E108**	Motor power overload
11	**E201**	Circuit board error
12	**E203**	RTC time reading error
13	**E204**	Display Board EEPROM reading failure
14	**E205**	Communication Error
15	**E207**	No water protection
16	**E209**	Loss of prime

Note:

1. When causes for E002/E101/E103 is displayed, the device will resume working automatically, however when it appears a fourth time, the device will stop working, to resume operation, unplug the device and plug in & restart again.

MAINTENANCE

Empty the strainer basket frequently. The basket should be inspected through the transparent lid and emptied when there is an evident stack of rubbish inside. The following instructions should be followed:

1.  Disconnected the power supply.
2. Unscrew the strainer basket lid anti-clockwise and remove.
3. Lift up the strainer basket.
4. Empty the trapped refuse from the basket, rinse out the debris if necessary.
   Note: Do not knock the plastic basket on a hard surface as it will cause damage
5. Inspect the basket for signs of damage, replace it.
6. Check the lid O-ring for stretching, tears, cracks or any other damage
7. Replace the lid, hand tightening is sufficient.
   Note: Periodically inspect and clean the strainer basket will help prolong its life.

WARRANTY & EXCLUSIONS

Should a defect become evident during the term of warranty, at its option, the manufacturer will repair or replace such item or part at its own cost and expense. Customers need to follow the warranty claim procedure in order to obtain the benefit on this warranty.
The guarantee will be void in cases of improper installation, improper operation, inappropriate use, tampering or using non-original spare parts.

This symbol is required by Directive 2012/19/EU of the European Parliament and of the Council on waste electrical and electronic equipment (WEEE). It means that this appliance must not be disposed of in a normal rubbish bin. It must be taken to a selective waste collection facility so that it can be reused, recycled or transformed and any substance that it contains that poses a potential hazard to the environment can be removed or neutralized. Ask your dealer for any information about recycling processes.

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Documents / Resources

	AQUA SPHERE VSP Variable Speed [pdf] Instruction Manual VSP Variable Speed, VSP, Variable Speed, Speed

References

- English