

DC 24V Submersible Pump Manual



E-Tech technology (shenzhen) Ltd

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E-Tech Technology (Shenzhen) Ltd

■ Introduction

Thank you very much for choosing E-Tech's brand "Ve-tech" DC24V Brushless Submersible Pump. Before using, please read carefully and follow it strictly.

■ Company Profile

E-Tech Technology (Shenzhen) Limited established in 2004, formerly by the name of E-Tech Heat Pumps (Shenzhen) Limited. We E-Tech Technology (Shenzhen) Limited specialize in R&D, production and sales of Water Technology Products—DC 24V SS304 Submersible Pump / Digital Waterfall / Digital Waterfall Swing and etc. Our Safety Water Entertainment Equipment are well used in Fountain, SPA, Spring, Hotel, Water Park, shopping mall and etc.

As the leader of the Water Technology Product in China, by our full experiences on product application, our water products are well decorated all over the China.

We company fix on the business principle of "Grow on Water, Focus on Water", and promise customers with safe quality products and considerate service based on great technical strength and the mature quality management system.

1. Read Carefully for Your Safety

In order to manipulate this device correctly, please read all this manual carefully and understand fully on the safety precaution. The purpose of safety precaution in this manual is to keep you and others away from danger or loss. The two situations that might misconduct are subjected and marked: WARNING and CAUTION. These two signs of "WARNING" and "CAUTION" mean it might cause some loss or need certain necessary precaution. Please pay attention: no matter it is one of "WARNING" or "CAUTION" or not but related with SAFETY or similar with SAFETY clause, following strictly this manual is A MUST.

- ! WARNING: Failing on this precaution or misconduct on this device would cause death or injury.
- ! CAUTION: Failing on this precaution or misconduct on this device would cause people injury or other physical harm.

Product Feature

■ The Submersible Pump adopts DC 24V safety voltage, conforming to the operating voltage of the equipment in area 0 less than 30V among swimming pools and other pools in dry fountains, pools, artificial waterfalls and other projects, from which Requirements for special installations or locations-Section 702, Electrical installations of buildings-Part 7 of GB 16895.19-2002, and Code for electrical design of civil buildings JGJ-T16-2008.

■ The Submersible pump adopts permanent magnet rotor, which provides excitation without excitation current and no excitation loss. It has the advantages of high accuracy and high efficiency. The efficiency and power density of the motor are improved a lot. Comparing to the AC asynchronous motor, the efficiency is increased by 15-20%.

■ The working situation of fountain submersible pump is very complicated. It will frequently start, stop, increase or decelerate. As load increasing, the asynchronous motor rotor speed will be lower than the stator magnetic field speed which will cause fountain water instability, low precision and poor effect. DC 24V brushless motor adopts the form of permanent magnet rotor synchronous motor. The rotating speed is strictly working according to the stator magnetic field speed. The fountain using our DC 24V submersible pump is more stable, accurate and better effect.

■ Submersible pump shell, impeller and other parts are made of high-quality stainless steel 304/316, which is corrosion-resistant and suitable for fresh water, swimming pool water and other water environment.

■ The main communication protocol of fountain and lighting control system is that the submersible pump is equipped with driver, and the speed can be adjusted by DMX512 protocol. In fountain project, the communication speed can be directly connected with fountain control or lighting control system, and the frequency converter and complicated communication switching solution are no longer needed. Comparing to the traditional analog control, the DMX512 has higher precision and lower interference.

2. Before Operation

Do the following checks first before delivering the pump:

■ Examination

After opening the package, please check if the pump is damaged during transportation and ensure that all bolts and nuts are properly tightened.

■ Specification Examination

Check the model to ensure the product is an ordered model and its voltage and frequency are correct.

Notice: If there is any problem with the delivered product, please contact with the Dealer that you buy this product from or E-Tech Representative immediately.

3. Installation

! Caution:

- These pumps can only be used for pumping CLEAN WATER.
- Do NOT use it in the water temperature beyond (0-50℃), which will cause in failure, leakage or electric shock.
- Do NOT use it near inflammable and explosive cargo.
- Use it after fully assemble.

Notice: Please consult with your local distributor or E-Tech representative before any using in special liquid.

■ Installation Preparation.

The tools and instruments should be prepared before pumps are installed as below:

- Insulation resistance tester (Meg-ohmmeter)
- DC clamp multimeter
- 500W Electric Iron
- Bolts and nuts fasteners.
- Power connection tool (screwdriver or spanner) electric pen

and adhesive tape

Notice : Please read the instructions of the tester tools above.

■ Examination Item before installation as below:

- When a common power socket plug is provided, the electrical insulation resistance (with alligator clamp) between the tip of the rubber insulated cable plug and the ground wire is measured with a meg-ohmmeter.

- When the supplied plug is equipped with a ground pin, the insulation resistance of the motor between the tip of the plug of the rubber insulated cable and the ground pin is measured by a meg-ohmmeter.

- In the case of a single connected terminal or three-phase power supply, the insulation resistance between the cored conductor and the ground conductor (red or green/yellow) is measured with a meg-ohmmeter.

- Insulation resistance reference: 50-100MΩ

- The driver of DC brushless submersible pump CANNOT be measured by meg-ohmmeter or other high voltage equipment for insulation value.

Notice : Refer to the insulation resistance (50-100 M omega) to determine whether the pump is new or repaired.

■ Pre-warning in Installation

! **Warning** : Be careful its gravity and weight when pump is being installed. If it is not properly lowered, it may fall and cause damage or injury to people.

! **Caution** : Do not install or move the pump through the way of hanging the pump on the rubber insulation cable, it may be broken, causing the leakage or fire.

(1) Avoid to bend the rubber insulation cable or use it as a rope when it is transported and installed.

(2) Lift the rubber insulated cable and chain or rope lightly. Fasten them to the hooks.

! **Caution** : The wiring of the pump cable should not be arranged along the route of the float (electrode) cable or other inductor cables. Use separate conduit to power wires.

(3) The pump must be submerged below the water surface and the water level switch must be installed before the controller switch can allow water pump to start running. Otherwise, the pump will run in an anhydrous state, which will cause the motor to burn out.

(4) When installing the DC 24V power supply, attention should be paid to the correct series and parallel connection of the positive and negative poles, otherwise the DC24 power supply will not be able to output the required voltage for the controller and pump to work properly.

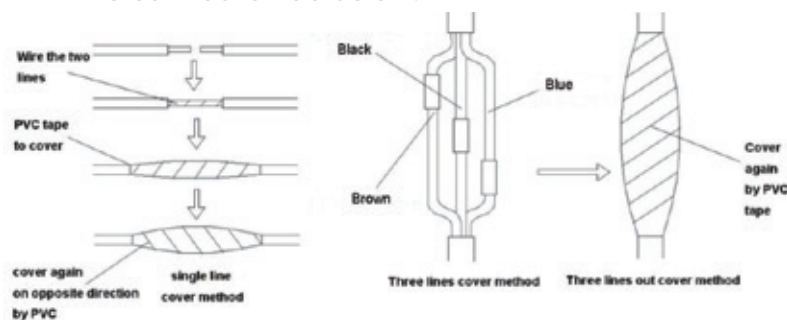
(5) Do not extend your hand or body into the connection between the motor and the pump body when the pump is still running, so as not to cause injury to the human body.

4. Electrical wiring

■ Connect the cable to the power cable.

- Cut off the outer sheath and main insulating layer of the cable, expose the copper wire 35-40mm, repair the rubber near the core into a cone, polish the oxide layer on the core clean, and wipe the core, the insulating layer and sheathing layer to be bound with alcohol, and make it dry naturally.

- The connection as below:



- Prepare 500W electric iron, rosin, solder, 1mm bare copper wire and insulation tape.

- Use bare copper wire to tighten the cable core evenly, use electric iron to heat and infiltrate tin, and require infiltration. Repair the welded parts with a file knife (no burrs or sharp shuttles allowed) and wipe the remaining part with alcohol again.

- First, three layers of self-adhesive butyl tape are applied, and gradually extend to the outside of the core. The adhesive tape must be stretched 150% - 200% when wrapping up, and the outer layer should be wrapped with polyethylene adhesive tape for three layers, and gradually extended to the outside to ensure that the dressing part is not shorter than 200mm.

- When connecting the three cores cable, the three joints should be staggered to a certain distance.

! **Warning** : Make sure the power supply (circuit breaker, etc.) is cut off before connecting the wire to the terminal to avoid damage caused by electric shock, short circuit or pump start-up inadvertently.

! **Warning** : We must use the dedicated power supply with earth leakage circuit breakers.

! **Caution** : Do not use the pump if the rubber insulated cable is worn or damaged or if the plug is not plugged into the socket. This will lead to electric shock, short circuit or fire.

! **Caution** : With a dedicated socket, the outlet must have enough power for the pump. Sharing a socket with other devices may cause overheating of the socket and cause a fire.

■ Electrical connection performing

! **Warning** : Electrical wiring shall be performed by qualified persons in accordance with all existing local regulations. Failure to comply with this advance warning is not only illegal but also extremely dangerous.

- Incorrect wiring can cause electric leakage, electric shock or fire.

- If two or more pumps are installed, each pump must be equipped with its own circuit breaker and circuit protector. Operate correctly within the range of power supply and wiring power.

■ Grounding

! **Warning** : First of all, correct grounding. No grounding, do

not use pumps. No grounding can cause electric shock due to leakage or pump failure.

! **Caution:** Do not connect ground wire to gasoline pipe, water pipe, lightning arrester or telephone ground wire. Improper grounding can lead to electric shock.

■ Rubber insulated cable

! **Caution:** If necessary, the length of the core of the rubber insulated cable should be extended to equal to or larger than that of the original cable. This is necessary not only to avoid performance degradation, but also to prevent fire, leakage, or electric shock caused by overheating of cables.

- If the insulated layer of cable is cut off or immersed in the water when it is damaged, there is a danger of water infiltrating into the motor and causing the circuit short. It may cause the damage to the pump、electric leakage、electric shock or fire.

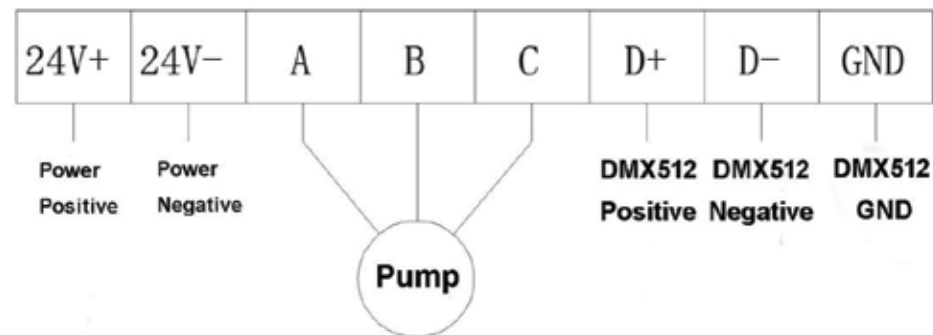
- Be careful not to cut or block rubber insulated cables. It may cause the damage to the pump、electric leakage、electric shock or fire.

- If it is necessary to bury the connection wire of the rubber insulated cable in the water, the wire must be completely sealed and placed in the formed protective sleeve to avoid electric leakage, electric shock or fire.

- Do not wet the wires of the rubber insulated cables or power plugs.

- Make sure that cables do not become too bended or tripping, and do not rub structural parts. This may damage the cable.

Wire connection principle as below:



24V+	Connect to positive pole
24V-	Connect to negative pole
A	Water pump motor U (brownness)
B	Water pump motor V (black)
C	Water pump motor W (blue)
D+	DMX512 communication positive pole
D-	DMX512 communication negative pole
GND	DMX512communication GND

Notice:①24V Positive and Negative Poles cannot be connected to AC, otherwise the driver will burn out (Irreparable)

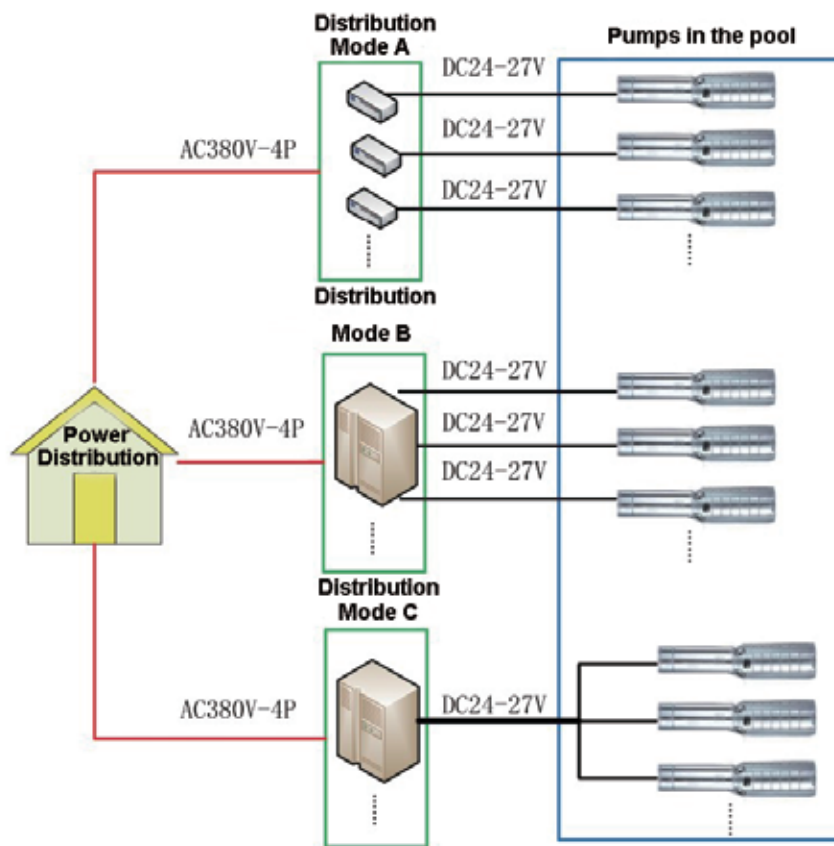
②Supply voltage should below 28V, otherwise the driver will burn out (Irreparable)

Connection wire sample diagram as below



No.	Item	Type
①	Motor Supply	Three Cores Waterproof Power Line
②	Driver DC 24V-27V Supply	Two Cores Waterproof Power Line
③	DMX512 Signal Receive Line	1 mm ² STP Line

DC24V power supply principle as the diagram



5. DMX512 Communication

■ Each Pump occupies one DMX512 channel and each pump is set up with channel before ex-factory. Please pay attention on installation.

■ Need to add one DMX512 Amplifier per 20 sets of pump, and for every Amplifier we need to parallel and add a 120Ω terminal resistance at the end of it.

DMX512 Parameter	State
0	Submersible Pump Stops to run
> 1	Submersible Pump Starts
> 60~90	Submersible Pump Releases Water
255	Submersible Pump Outputs Max

Remarks: For on-site commissioning, each pump needs to be tested for the minimum DMX512 parameter (call as Release Parameter) of water release (or pump motor rotation). Generally, the parameter is above 60~90, and the parameter is inversely proportional to the driver's input voltage. While programming, the DMX512 starting parameter of the pump must be above this Release Parameter, otherwise when the parameter is running for more than 2 seconds, the driver may have stall protection (The red light flashes 3 times). For example, after testing on site, engineer finds out some pump's Release Parameter is 88(60~90). When he makes the program shall keep the starting parameter above this Release Parameter 88. And if input parameter below 88 for over 2 seconds, the driver may go to stall protection and need to work again by power switch.

Another quick solution to avoid this testing on site, programming the starting parameters all above 90.

DMX512 Indicator Light (Blue Light)

1 second / flash 1 time	Received DMX512 signal parameters (unable to recognize signal parameter error or waveform anomaly)
2 seconds / flash 1 time	DMX512 signal line is not connected or the signal is abnormal
1 second / flash 2 times	DMX512 successfully set address

Driver Indicator Light (Red Light)

1 second / flash 1 time	Driver standby (DMX512 parameter is 0)
Red Light is not on	Driver output current and operate
Quickly flash 3 times	Stall protection or phase line is short circuit (sent parameter is not above the Release Parameter for more than 2 seconds)
Slow flash 3 times	Motor or driver malfunction
Slow flash 4~5 times	Motor or driver malfunction
Slow flash 7 times	Phase line in short circuit or overcurrent protection
Slow flash 8 times	Undervoltage protection

6. Maintenance and Inspection

There is a necessity to regularly maintain and check the continuous utility of pumps, and we suggest that a spare pump should be equipped in any case.

■ Before Inspection

(1) Clear the pump

Clear the surface area of the pump and clear it up with clean water. Special care should be taken to remove something dirty in the screw pump sleeve or impeller.

(2) Check the outer of the pump

Check if there is any crack outside the pump. If there is any crack on the surface, please consult your nearest dealer or E-Tech Representative.

■ Regular Inspection

(1) In the use of submersible pump, the insulation resistance value of stator winding should be checked frequently during shutdown interval to ensure the reliability of application and prevent accidents. When insulation resistance is less than $1M\Omega$, it should be stopped and repaired.

(2) Regularly clear the surface sludge and stains of the Driver at least every 4 weeks. Otherwise, the sludge and stains on the surface of the Driver will seriously affect the cooling effect of the Driver.

(3) When the submersible pump moves or carries, the power switch should be cut off firstly, and must not to drag the cable forcibly to prevent the cable from damage. The cable should be replaced immediately if damaged.

■ Storage

No use of the Submersible Pump for a long time, it follows as below:

- Clear all parts of the pump with dry cloth
- Put the pump、driver and cable in order.
- All parts should be placed in ventilated and dry places; the cables and controllers should not be placed in direct sunlight in case of rapid aging.

7. Troubleshooting

! Warning: Cut off the power supply before checking the pump. Failure to comply with this advance warning can lead to serious accidents. Before the troubleshooting work, please read the instruction manual carefully before checking. If there is still a problem, contact your nearest dealer or E-Tech Representative.

Common Failure	Possible Reason	Solution
Out of work	(1) No DMX512 communication parameter value	(1) Send DMX512 parameter value
	(2)No DC24V power supply	(2)Check the DC power supply
	(3)Failure on the Driver	(3)Check the Driver
	(4)Submersible Pump stuck or damaged	(4) Separate the pump head with the motor, re-stall it again
Submersible Pump outlets unstable	(1) Incorrect DMX512 communication parameter value	(1)Resend DMX512 parameter value
	(2) DMX512 communication interference	(2) Looking for the interference sources

	(3) Failure on the Driver	(3) Replace the driver
	(4) DC24V power supply unstable	(4) Check the DC power supply
Submersible	Opposite direction of rotation	Replacement of submersible
pump outlets less water		pump for any two phases position of cable or power supply
Stator winding burn out	(1)Incorrect connection of cable grounding and wire core	Removing the failure、disassembling damaged windings, re-repairing the windings as before
	(2)Water flow into submersible pump as mechanical seal and winding breakdown to ground	
	(3)Winding interturn short circuit	
	(4)Overload operation of the submersible pump	
	(5)The submersible pump is out of water too long	
	(6)The screw is blocked and the motor is locked too long	
	(7)The submersible pump starts and stops too frequently	
	(8)The cable is damaged and influent, the stator winding is damp, interturn breakdown or ground breakdown	
	(9)Submersible pump is struck by lightning	

■ Disposal of the product.

The proper way to dispose of this product is to disassemble it, classify the parts and send them to the waste disposal site. When our product needs to be repaired or otherwise, the following information is required.

Product Model:	
Serial No.:	
Purchasing Date:	
Comments:	
Contact:	
Tel or email:	

E-mail: sales@e-techwater.com Tel: 86 0755-8364 6618