

WATERCO
Water, the Liquid of Life

Waterco Limited ABN 62 002 070 733

OFFICES - AUSTRALIA

NSW (HEAD OFFICE)	Sydney	Tel : +61 2 9898 8686	Fax : +61 2 9898 1754
VIC/ TAS	Melbourne	Tel : +61 3 9879 5141	Fax : +61 3 9879 5143
WA	Perth	Tel : +61 8 9273 1900	Fax : +61 8 9273 1999
QLD	Brisbane	Tel : +61 7 3299 9900	Fax : +61 7 3299 9911
SA/ NT	Adelaide	Tel : +61 8 8244 6000	Fax : +61 8 8244 6011
ACT (Distributor)	Canberra	Tel : +61 2 6280 6476	Fax : +61 2 6239 1395

OFFICES - OVERSEAS

USA	Phoenix	Tel : +1 623 434 4703	Fax : +1 623 434 4704
USA (Baker Hydro)	Augusta	Tel : +1 706 793 7291	Fax : +1 706 790 5688
CANADA (Focus Temp)	Quebec	Tel : +1 450 796 4333	Fax : +1 450 796 4365
NEW ZEALAND	Auckland	Tel : +64 9 525 7570	Fax : +64 9 525 6580
MALAYSIA	Kuala Lumpur	Tel : +60 3 6250 8169	Fax : +60 3 6250 8175
CHINA	Guangzhou	Tel : +8620 8335 1107	Fax : +8620 8335 1114
INDONESIA	Jakarta	Tel : +62 21 4585 1481	Fax : +62 21 4585 1480
EUROPE (Lacron)	United Kingdom	Tel : +44(0) 1795 521 733	Fax : +44(0) 1795 522 085

(W99189) 12/ 2005

水泵
PUMPS



CE



WARNING

This equipment must be installed and serviced by a qualified technician. Improper installation can create electrical hazards which could result in property damage, serious injury or death. Improper installation will void the warranty.



Notice to Installer

This manual contains important information about the installation, operation and safe use of this product. Once the product has been installed **this manual must be given to the owner/ operator of this equipment.**

GENERAL SAFETY RULES

1. The products mentioned in this manual are specially designed for the pre-filtering and re-circulation of water in swimming pools and spas.
2. They are designed to work with clean water at a temperature not exceeding **35 degrees Celsius (95 degrees Fahrenheit)**.
3. The installation should be carried out in accordance to the safety instructions of swimming pools, **especially Standard HD 384.7.702**, and the specific instructions for each facility.
4. The rules enforce on accident prevention should be carefully followed.
5. Any modification of the pump requires the **prior consent of the manufacturer**. Original replacement parts and accessories authorized by the manufacturer ensure a high level of safety. The manufacturer of the pump assumes no liability for the damage and injuries **caused by un-authorized replacement parts and accessories**.
6. During operation, some parts of the pump are subject to dangerous electric voltage. Work may only be performed on each pump or on the equipment connected to it after **disconnecting them from the mains power, and after disconnecting the starting device**.
7. The user should make sure that assembly and maintenance tasks are carried out by **qualified authorized persons** and that these persons have first carefully read the instructions for service and installation.
8. The operating safety of the pump is only guaranteed if the installation and service instructions are correctly followed.
9. The limit values stated in the technical table **should not be exceeded under any condition**.
10. In the event of defective operation or fault, contact the technical support department of the manufacturer or its nearest authorized agents.
11. If the supply cord is damaged, it must be replaced by the manufacturer or its service agent or a similarly qualified person to avoid a hazard.
12. The appliance is not intended for use by young children. Young children should be supervised to ensure that they do not play with the appliance.

LOCATION

The pump must be located as close as practical to the pool. The pump must also be in a position that enables easy access for periodic servicing.

Care must also be taken to position the pump in an area that is **free from flooding in a well ventilated and dry area**.

INSTALLATION

Waterco Limited use the latest technology when designing and manufacturing our pumps, a few simple precautions during installation will ensure years of trouble free operation.

1. The pump suction line should not be smaller than 1 1/2" (40mm imperial) or 50mm true metric.
2. The suction line is to have as few bends or elbows as possible. There must not be an air trap on the suction line.
3. Use only the **pump barrel unions** supplied with the pump.
4. Installation shall occur on a solid, flat foundation with the pump bolted securely to it.
5. **The pump electrical cable must be wired for the proper voltage and rotation in accordance with the wiring instructions.**
6. All wiring (electrical) work must be carried out **by licensed electricians** and must be installed in accordance to the local codes.
7. The motor must be grounded.
8. The weight of the plumbing and fittings is to be independently supported and not carried by the pump.
9. The maximum total head (Hmax) of the pump (in metres) shown on the pump label should be noted by the installer.

~ IMPORTANT ELECTRICAL NOTICE ~

The electrical installation is to be done by a licensed electrician.

Each pump requires a circuit breaker to separate the pump from the electrical supply.
The open contact distance of the circuit breaker is to be **no less than 3mm.**

The pump is to be supplied by an isolating transformer, or supplied through a residual current device (RCD) with a rated residual current not exceeding 30mA.

Check the pumps name plate for the following: Voltage, Amp draw and Cycle.

The power cord, including the ground wire shall have a quality of **245 IEC66 (H07RN-F)** for models greater than 1kW power input.

For models less than 1kW input the quality shall be of **245 IEC57 (H05RN-F).**

All installations must comply with local codes, based on **IEC 364-7-702** requirements.

- **RESPECT THE MINIMUM GAUGE GIVEN IN THE CHART OF THE TECHNICAL MANUAL.**

ELECTRICAL CONNECTION

Check that the information on the nameplate corresponds to the power supply.

Employ a competent electrician to ensure wiring installation is made in accordance with any local electrical codes. Every motor requires either a **fused disconnect switch** or a **circuit breaker**.

A SINGLE PHASE MOTOR has a built in thermal overload switch.

THREE PHASE MOTOR

THREE PHASE MOTORS require a starter switch or magnetic starter with correctly sized overload protection in addition to the fused disconnect switch.

CHECK THE ROTATION OF THREE PHASE MOTORS.

The motor is only suitable for clockwise operation when viewed from the motor end fan (cowl) cover.

Three phase motors could rotate in either direction. Changing any of the cables on a three phase motor will reverse the direction of rotation. To check the rotation of the motor, turn on for approximately 1 second. If it is running in the wrong direction turn off power and interchange wiring and repeat the above step to check.

When installing three phase pumps a separate device must be available for permanent installation, this is so the pump can be isolated from the mains power. **A contact distance of 3mm per pole is required for both three phase and single phase units.**

Motor protection **MUST** be installed corresponding to the nominal current of the motor. **SEE VALUE ON RATING PLATE.**

It is the **RESPONSIBILITY** of the user to ensure adequate protection between the motor and the power supply.

The installer must protect all three phases on the supply of the motor so that the pump cannot run on 1 or 2 phases only.

WARNING :

Before disconnecting electrical connections, shut of the electricity at its source:

EXAMPLE : The fuse or circuit breaker box. Before work is carried out on the pump ensure the pump switch or timers are turned off and **MAKE CERTAIN THE MAINS POWER IS SWITCHED OFF.**

WIRING DIAGRAM

● SINGLE PHASE



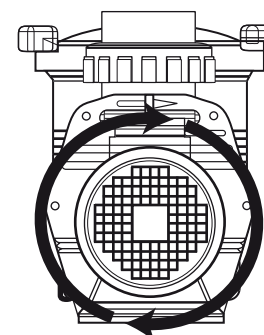
Blue = Neutral
Brown = Live
Green/ Yellow = Earth

● THREE PHASE

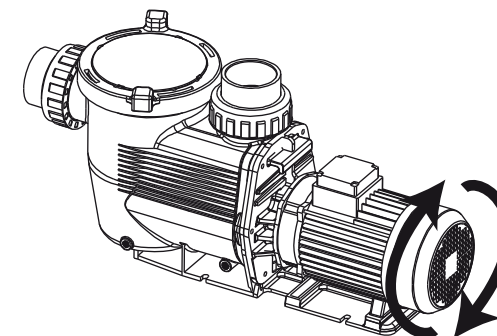


Black = L3
Blue = L2
Brown = L1
Green/ Yellow = Earth

● ROTATION OF 3 PHASE PUMP



CLOCKWISE ROTATION



PRIMING

The Waterco Limited pump will prime and re prime providing the hair and lint pot bowl is full of water and there is sufficient supply from the suction point.

If you lose water from the hair and lint pot bowl it will be necessary to re fill it before starting.

1. Remove the clear lid and fill the hair and lint pot bowl with water.
2. Replace the lid ensuring **the o-ring is correctly** located and start the pump.

After you have done this allow a **few minutes (maximum)** for the pump to start delivering water.

WARNING:

High suction lift or long suction lines will require additional time to prime and can severely affect the performance of the pump. If the pump will not prime, (flow) repeat step 1 and 2 above.

WARNING:

Mechanical seals if allowed to run dry can be damaged rapidly and may need to be replaced.

ENSURE that there is always adequate water in the hair and lint pot bowl before you commence start up.

If you are unable to prime the pump please see the trouble-shooting guide.

Ensure all suction and discharge valves are open before you start the pump, operating the pump with these valves shut can damage the pump.

MAINTENANCE

The strainer basket in the hair and lint pot bowl should be inspected and cleaned at **regular intervals**.

1. Remove lid and lift out basket.
2. Remove debris and hose off with clean water if necessary.
3. Inspect the lid gasket, lubricate with **SILICON** based grease only if needed. If it is damaged replace.
4. Replace the strainer.
5. Re-prime the hair and lint pot bowl.
6. Correctly locate the o-ring.
7. Replace the lid (**hand tighten**) only.
8. Switch on pump.

In Climates where the pump may be **exposed to frost or freezing**, care must be taken to ensure the pump is protected from damage.

It is **recommended** that if the pump is not used during this winter period it should be **drained completely**.

Waterco Limited supply drain plugs for this purpose.

Do not replace the drain plug. Store it in a safe place until you require the use of the pump. **An example would be within the hair and lint pot bowl basket.**

If at all possible remove the pump away and store it in a dry location during this period.

When you re activate the pump ensure all seals and o-rings are in operational condition, re-grease if necessary (**replace**) if unsure of condition.

- **Check that the motor shaft moves freely before re-activation.**

FLUID TEMPERATURE

The permissible temperature is **> than 0°C and < than 35°C**. The pump should never be operated outside of these temperatures or damage may occur.

WARNINGS FOR INSTALLATION AND ASSEMBLY TASKS

1. When connecting electric cables to the motor of the pump, be careful to correctly arrange them inside the connection box, verify that no bits of cable are left inside the box on closing it. **See that the earth wire is correctly connected.** When connecting the motor, follow the wiring diagram supplied with the pump.
2. Be especially careful **that no water enters the motor or electrical parts under voltage.**
3. In the event that the planned use is not as specified, adaptations and supplementary technical rules may be necessary.

WARNINGS FOR START UP

- *Before starting the pump, verify the calibration of the electrical protection devices of the motor and that the protections against electrical and mechanical contacts are correctly positioned and attached.*

WARNINGS FOR ASSEMBLY AND MAINTENANCE TASKS

1. **Be especially careful that no water enters the motor or the electrical parts under voltage.**
2. Avoid all contact, even accidental, with the moving parts of the pump.
3. Wait until the pump has stopped completely before handling it in any way.
4. **Before carrying out electrical or mechanical maintenance tasks, make sure that the machine has been disconnected from the mains and that starting devices have been locked.**
5. It is advisable to follow the steps listed below before handling the pump in any way.
 - a) Turn off the voltage to the pump.
 - b) Lock starting devices.
 - c) Verify that there is no voltage in the circuits, including ancillary devices and auxiliary circuits.
 - d) Wait until motor stops completely.

The above list should be considered indicative and not binding for the purpose of safety; specific safety rules may exist in particular regulations.

Regularly verify:

1. The correct attachments of the mechanical parts and of the support screws of the pump.
2. The correct position, attachment and condition of the supply cables and of the insulating parts.
3. The temperature of the motor. In the event of any irregularity stop the machine immediately and have it repaired.
4. The vibration of the pump. In the case of any irregularity, stop the machine immediately and have it repaired.

Owing to the complexity of the cases covered, the instructions for installation, use and maintenance contained in this manual do not attempt to examine all possible and imaginable cases of service and maintenance. If supplementary instructions are required or if special problems arise, do not hesitate to contact the distributor or to address directly the manufacturer of the pump.

TROUBLESHOOTING

SYMPTOMS	PROBABLE CAUSE	ACTION
1. PUMP WILL NOT PRIME	Suction air leak	Make sure water level is correct through suction points. Ensure baskets and strainers are free of debris. Tighten all fittings/ unions on the suction side of the pump, remove and replace mechanical seal.
	No water in the pump	Make sure hair and lint pot is full.
	Closed valves or blocked lines	Open all valves in system, clean skimmer and pump basket, check pump impeller of blockage.
2. MOTOR WILL NOT RUN	No power to motor	Check that all electrical switches are on. Ensure the circuit breakers are properly set. Check if timer is set properly. Check motor wiring at terminals.
	Pump jammed	With power switched off turn pump shaft (should spin freely). If not contact electrician or nearest Waterco Limited branch for service.
3. LOW FLOW	Dirty filter	Backwash or clean cartridge.
	Dirty Skimmer and Pump strainer	Clean skimmer and pump strainer.
	Suction air leak	See 1.
	Closed valve or blocked line	See 1.
4. MOTOR RUNS HOT	Low or incorrect voltage	Supply to be corrected by Electrician. Motors run hot to touch and is normal. Thermal overload protector will function to turn them off if there is an overload or high temperature problem.
	Installed in direct sunlight	Shield from the weather.
	Poor ventilation	Do not tightly cover or enclose motor.
5. NOISY PUMP OPERATION	Bad bearing	Have electrician replace.
	Air leak in suction	See 1.
	Suction blockage	Locate and clear blockage.
	Foreign matter in impeller	Contact electrician or nearest Waterco Limited branch for service.
	Cavitations	Improve suction, reduce suction lift, reduce number of fittings, increase pipe size, increase discharge pressure and reduce flow by throttling discharge valve.
6. MOTOR OVER LOAD CUTS OUT	Motor not connected properly	Have electrician check wiring.
	Low incoming voltage	Have electrician check voltage, ensure pump is not running on an extension cord. Report low supply to authorities.
	Over load due to binding in pump or wrong size impeller	Contact Waterco Limited for service.

WARNING: If the Waterco Limited pump is within the stated warranty period and you experience faults always contact your supplier or the nearest Waterco Limited branch for advice. Failure to do this may void warranty. Refer to warranty documentation supplied with pump.

All electrical work is to be carried out by a Qualified Electrician; under no circumstances should you attempt repairs on the electrical components of Waterco Limited pumps unless you are qualified to do so.

常规安全手册

1. 本手册中所提及的水泵都是被设计用于游泳池或者按摩池的过滤和循环系统的专用水泵。
2. 泳池水泵的工作温度不得超过摄氏35度（华氏95度）。
3. 水泵应当安装在一个设计建造符合要求的游泳池（尤其符合HD384.7.702规范），并且使用合适的工具进行安装。
4. 严格执行事故防止条例。
5. 任何对于产品的改动必须得到生产厂家的同意。任何用于产品改动的新的零部件必须得到生产厂家的检验认证。由于使用未经生产厂家检验认证的零部件而造成产品问题及事故的话，生产厂家不承担相关责任。
6. 水泵工作时，泵体的某些部分不能带电。在确认他们不与主电源以及启动电源接触的情况下再连接水泵和其他设备。
7. 水泵使用者应当聘请有资质的专业人员对设备进行日常维护和保养。这些人员在工作前应当仔细阅读本手册。
8. 只有在正确的安装和使用条件下，水泵的安全运行才能够得到保证。
9. 技术参数表中的相关数据在任何情况下都要被遵守。
10. 如果由于操作问题出现产品问题或事故，请立即联系生产厂家的技术部门或厂家认可的代理商。
11. 如果水泵的电源线部分有问题，必须由运水高的代理商进行更换。
12. 水泵不能被未成年人接触。未成年人应当被禁止接触设备。

安装位置

水泵应当尽量安装于离泳池近的地方，并且该位置应当方便对水泵进行定期保养。

水泵所在位置应当有良好的通风，干燥并且不会被残留的水浸没。

安装

运水高公司在设计制造水泵的时候采用了大量的新技术，在安装的时候注意一些细节问题将会有效的避免水泵在以后运行过程出现不应有的故障。

1. 水泵的吸水端管道口径不应当小于1 1/2英寸 (40mm) 或者公制50mm。
2. 水泵吸水端离水泵较近处的管道应当尽量减少弯头和变径。这样可以防止空气积留在吸水管道中产生气阻。
3. 使用水泵自带的活接头进行安装。
4. 用螺栓将水泵固定在相应位置（以防运行时发生移动）。
5. 水泵的电源电缆线必须连接到合适的电源，电压和相位必须严格符合接线说明的要求。
6. 所有的电安装必须由当地的持牌电工操作，并且安装过程要符合当地规范。
7. 电机必须有接地措施。
8. 水泵上的支撑固定装置不应被拆卸。
9. 安装者应当重视水泵铭牌上标明的水泵扬程（最大扬程）数值（单位：米）。

电安装重要注意事项

所有电部分的安装必须由持牌电工操作。

每一台水泵和电源之间必须安装开关。
开关两端接线端的断开距离不能小于3mm。

水泵必须由单独的变压器供电，或者通过RCD装置供电，并且额定泄露电流不能大于30mA。

请仔细检查电机铭牌上的相关参数：电压 电流 转速。

输入功率大于1Kw的时候，电源线、接地线质量必须达到245 IEC66（H07RN-F）。

输入功率小于1Kw的时候，电源线、接地线质量必须达到245 IEC57（H05RN-F）。

所有的电安装要基于IEC364-7-702的要求，并且符合当地的相关规范。

- 请注意在技术手册中图表内给出的最小数据。

电相关部分的连接

仔细阅读电机铭牌上的参数并选择合适的电源。

所有的电安装应当由一位合格的电工来操作，以确保整个安装过程能够符合当地的相关规范。每台水泵必须安装一个断电保护器或者开关。

单相电机的水泵必须安装热保护器。

三相电机水泵

三相电机的启动开关或启动器内必须安装合适的过载保护装置。

检查三相电机的转向

当从电机后部散热风扇观看时，电机的转向应为顺时针方向。

三相电机有可能向两个方向中的任何一个转动交换接线头中的任意两个将会改变电机转动方向。检查电机转向时，打开电源一秒钟左右，如果转向错误的话，切断电源交换任意两个接线头重复以上步骤。

如果三相电机水泵作为一个独立的设备安装的话，应该装在一个与主电源隔离开的合适位置。无论三相或者单相电机，接线柱之间的距离至少需要3mm。

根据电机的电流选择合适的电机保护器。请参照电机铭牌。

使用者有责任去确保电机和电源有足够的保护装置。

安装者必须保证三相电机的三相正常运行，绝对不能缺相运行。

注意：

在拆卸接线装置的时候必须完全切断电源。

例如：

当从水泵里取出保险丝或者开关的时候，请确认水泵开关或定时器处于关闭状态，并且保证主电源处于关闭状态。

配线图

● 单相



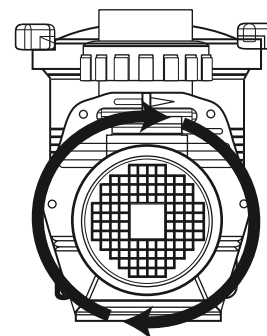
蓝色= 零线
棕色= 火线
绿色/黄色= 地线

● 三相

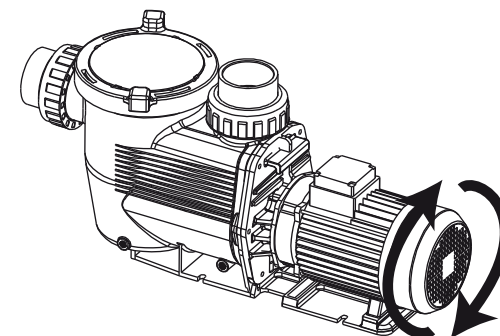


黑色= L3
蓝色= L2
棕色= L1
绿色/黄色= 地线

● 三相电机水泵



顺时针转动



预灌水

运水高公司的水泵需要在毛发过滤器的隔渣篮里灌水，以确保水泵吸水口有足够的吸力。如果毛发过滤器的隔渣篮里没有水，那么在启动水泵之前灌满水。

1. 打开毛发过滤器的透明塑料盖，将毛发过滤器中灌满水。
2. 盖上透明塑料盖，并确认O形圈安装正确后旋紧后再开启水泵。

当您花费几分钟时间完成以上工作后就可以放心的开动水泵了。

注意:

当水泵工作在较高的吸水高度或者较长的吸程的环境下，效率将会收到一定的影响。如果没有对水泵进行预灌水，请务必在启动水泵前执行以上两个步骤。

注意:

如果您不能为水泵正常预灌水，请参考常见故障表查找问题。

在启动水泵之前请检查进水阀门和出水阀门是否打开，因为不打开这些阀门而启动水泵的话将会对水泵造成一定的伤害。

日常维护

毛发过滤器中的滤篮应当进行周期性的清洗以保持清洁。

1. 打开盖子取出滤篮。
2. 清理滤篮内的杂物，如果需要的话用清洁的水冲洗滤篮。
3. 仔细检查密封垫，如果需要的话可以抹上一些硅脂。如果损坏请更换新的。
4. 把滤篮装回原处。
5. 将毛发过滤器灌满水。
6. 安装O形圈。
7. 装上盖子。
8. 开动水泵。

由于地域的差别，有些地区会有严寒和冰冻，请确保水泵在寒冷气候条件下得到充分的保护。

如果水泵在冬季长期不使用的話，请务必保证将水泵内的水排干。

运水高公司的水泵上设计排水塞来提供这个功能。

排水后请不要将塞子装回原处，将它放在一个安全的地方以便下次使用水泵时安装。比如可以将排水塞放在滤篮里。

如果有可能的话，可以将水泵拆卸并放到干燥的地方储存。

当您准备再次启用水泵的时候，请检查O形圈是否能够使用并再次涂抹硅脂，如果没有把握请更换新的O形圈。

- 请在启动水泵前检查电机轴是否能正常转动。

环境温度

水泵合适的工作环境温度为摄氏0度到摄氏35度之间。水泵不要在此问题范围之外工作以防止出现故障。

安装重要注意事项

1. 在连接水泵电源线时，请注意各电缆线的排布，不得有多余的线头等留在接线盒里。务必保证接地线正确安装。在连接电机电源时，请参照水泵附带的接线图表。
2. 请确保不得有水进入电源接线盒和其他带电部分。
3. 技术手册将根据实际使用情况进行不断的增补和修改。

启动水泵前注意

- 在启动水泵前，请检查水泵的电机保护装置是否安装在合适的位置和工作正常。

日常维护保养的注意事项

1. 请确保没有水进入接线盒和其他带电部分。
2. 不要接触水泵正在运动的部件。
3. 等水泵完全停止运动后再进行下一步操作。
4. 在对水泵进行电及机械方面保养的时候请务必保证水泵与电源断开并且开关处于关闭状态。
5. 在对水泵进行维护保养时请严格按照以下步骤执行:
 - a) 关闭水泵电源。
 - b) 关闭总电源。
 - c) 检查电路以及辅助电路是否还带电。
 - d) 等电机完全停止运转。

以上条款请严格执行。安全条款在一些规范要求中也被特别突出。

常规检查:

1. 水泵上的螺栓等附属装置零部件是否缺少损坏。
2. 电源线和绝缘部分是否处于正确的位置。
3. 电机的工作温度，如果出现不正常情况请立刻进行维修。
4. 电机的震动情况，如果出现不正常情况请立刻进行维修。

由于各种故障事故具有很大的复杂性，本安装使用及日常维护保养手册不能保证能够完全可以检查和解决问题。我们将不断增补完善本手册，请在可能的情况下与我们保持联系以保证得到最新的有关消息。

故障表

故障特征	可能原因	措施
1. 水泵不吸水	<p>吸水端漏气</p> <p>水泵里没有水</p> <p>阀门关闭或管路堵塞</p>	<p>检查吸水管的水位。检查滤篮是否被异物堵塞。旋紧水泵吸水端的活接头。更换新的机械密封。</p> <p>检查毛发过滤器里是否有水。</p> <p>打开阀门，清洁管路和滤篮，检查叶轮是否被异物缠绕阻碍。</p>
2. 电机不转动	<p>电机没电</p> <p>水泵堵塞</p>	<p>检查电源开关是否开启。检查水泵开关是否开启。检查定时器以及电机的接线是否正常。</p> <p>如果附近没有运水高的分支机构或代理商的话，关闭电源手动转动转轴（应当很容易转动）。</p>
3. 流量偏小	<p>过滤器滤料脏了</p> <p>管路或水泵滤篮脏了</p> <p>吸水端漏气</p> <p>阀门关闭或管路堵塞</p>	<p>对过滤器进行反冲洗。</p> <p>清洁管路和滤篮。</p> <p>参照1。</p> <p>参照1。</p>
4. 电机过热	<p>低电压</p> <p>阳光直射</p> <p>通风不畅</p>	<p>改用合适的电源。</p> <p>电机发热是正常现象，当温度过高时，电机中的热保护器将会自动切断电源。</p> <p>加装遮阳罩。</p> <p>改善通风条件。</p>
5. 电机噪音大	<p>转轴损坏</p> <p>吸水端漏气</p> <p>吸水端堵塞</p> <p>叶轮被异物卡住</p> <p>气穴现象</p>	<p>更换新的转轴。</p> <p>参照1。</p> <p>查找并清洁吸水端管路。</p> <p>售后服务请联系电工或最近的运水高分支机构。</p> <p>改善吸水管路，减少吸程，减少接头数量，增大管道口径，增加给水压力，关小泄压阀门。</p>
6. 电机过载停机	<p>电路连接不正确</p> <p>低电压</p> <p>过载保护装置损坏或叶轮大小不合适</p>	<p>请电工检查电路。</p> <p>改善供电状况。向供电商报告。</p> <p>联系运水高公司或代理商。</p>

注意：如果运水高的水泵在保修期内发生故障，请联系供应商或者最近的运水高分支机构。如果没有这样做将得不到及时的保修。具体情况请参阅水泵包装内的保修证书。所有与电有关的操作必须由持牌电工实行。不要在情况不明时擅自对水泵进行维修除非你有资格这样做。