



LDR小型电加热蒸汽发生器
LDR Series mini Electric Heating Steam Generator

用户手册

USER MANUAL



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免检说明

该产品按照《小型和常压热水锅炉安全监察规定》和JB/T7985《小型和常压热水锅炉技术条件》以及JB/T10393《电加热锅炉技术条件》设计开发的小型蒸汽发生器，按TSG G0001-2012《锅炉安全技术监察规程》及《特种设备安全监察条例》第九十九条对锅炉的定义，本蒸汽发生器容积小于其规定的30L容积的要求，不属于《锅炉压力容器制造监督管理办法》规定的产品安全性能强制监督检验的范畴，所以可免去地方安装监督检验。

一、重要注意事项

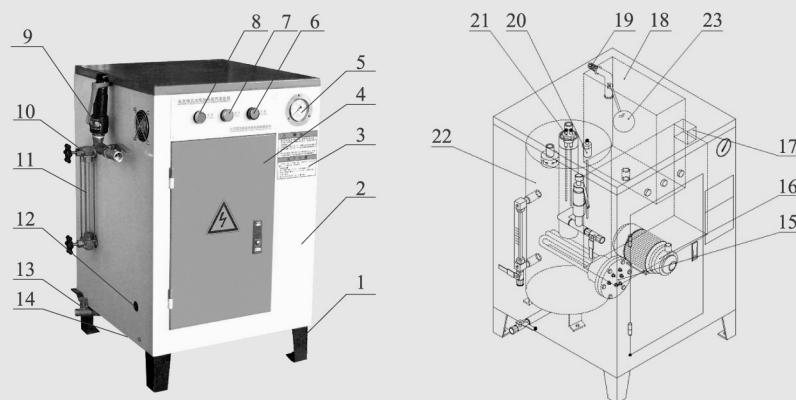
- » 请在使用本产品前及进行维护保养时仔细阅读本说明书；
- » 设备用水的水质必须符合国家标准，不使用软化水会造成内部结垢，影响锅炉使用效率和寿命，严重时会引起事故。因此，应配备软水器；
- » 请勿使用蒸馏水、纯净水等类似电导率低的介质而影响水位控制检测的正确性；
- » 与本设备相连的管道须符合国家相关标准要求；
- » 设备用电的配电终端必须接入相应参数规格的漏电保护器（自备），并且接入可靠接地线，以确保用电安全；
- » 每周由专业人员对主回路连接件、动力线冷压头、断路器、接触器、加热管等紧固件进行检查；
- » 维护、维修时必须切断供电电源；
- » 每周必须对安全阀做手动排放试验，若不执行产生的后果则由使用单位负责；
- » 产品使用过程中每天至少带压（0.15MPa以下）排污2次；排污管道应妥善连接至安全处；
- » 为防止设备内部产生负压，排污后，在下次运行前，请不要关闭排污阀；
- » 定期冲洗水位筒（带压0.15MPa以下），清理水位电极(设备内部没有压力状态下)，定期清理给水箱；
- » 若环境温度在0℃以下，请注意供水管路的防冻工作，并且在工作完毕后，把水泵泵头的余水放空，避免泵头冻裂；
- » 设备如有转移，必须将有关(所有)技术文件同时移交；
- » 由于产品持续改进及国家规范的变动等，有时实际产品可能与本说明书有些地方不同，具体按提供的各部件使用说明书及最新国家规范为准，恕不另行通知；

- » 如有因进行任何本手册未提及的维护操作，或不正确的操作设备而引起的故障和人身伤害，本公司不负任何责任；
- » 在使用本产品前，请按国家相关规定向所在地质量技术监督部门申报，取得同意后方可使用。

二、产品说明

1 产品部件说明

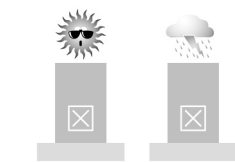
- | | | |
|----------|----------|-----------|
| 1. 底脚 | 9. 安全阀 | 17. 压力控制器 |
| 2. 外壳 | 10. 主汽阀 | 18. 水箱 |
| 3. 特别提示 | 11. 水位计 | 19. 进水口 |
| 4. 电控箱 | 12. 动力接线 | 20. 缺水电极 |
| 5. 压力表 | 13. 排污口 | 21. 水位电极 |
| 6. 故障指示灯 | 14. 接地线 | 22. 本体 |
| 7. 运行指示灯 | 15. 电加热管 | 23. 水箱浮球阀 |
| 8. 电源开关 | 16. 补水泵 | |



2 使用环境要求



⊗ 请勿置于不平或倾斜之处



⊗ 避免放置阳光直射、雨淋或潮湿之处、保持通风



⊗ 请远离火源及高温，机器上方勿放置物品

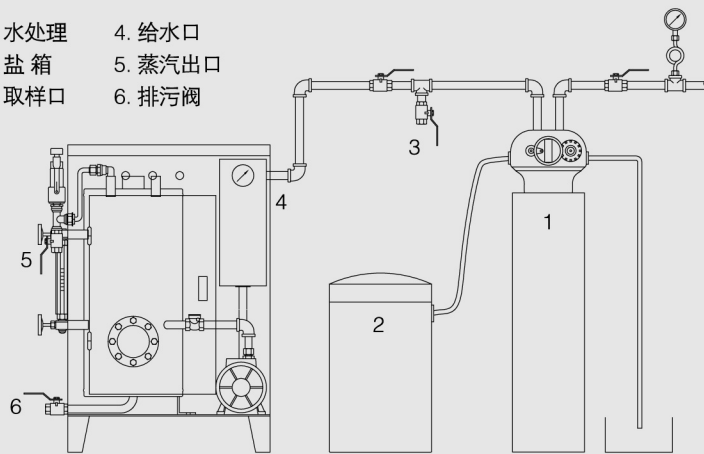


⊗ 避免置于含腐蚀性气体、易燃易爆气体处

- ⚠ 注意**
- ⊗ 环境温度：+5℃ ~ +40℃ (+41°F ~ +104°F)
 - ⊗ 相对湿度：45% ~ 85%无结露
 - ⊗ 良好的通风条件和适当的照明

系统安装示意图

- | | |
|--------|---------|
| 1. 水处理 | 4. 给水口 |
| 2. 盐箱 | 5. 蒸汽出口 |
| 3. 取样口 | 6. 排污阀 |



三、产品使用方法

1. 安装前检查

机器在运输、装卸等过程中可能会引起损伤，必须在开机前作如下检查：

- 1.1 各种管路、仪表及接口应紧固，无松动。
- 1.2 电气线路无破损，接头无松脱现象，重点检查动力线接口是否松动。
- 1.3 是否有其它受损现象。
- 1.4 检查现场执行的所有电气连接与电路图中的说明是否准确相符。

⚠ 注意：必须具备可靠的接地线，连接至机器外壳。



2. 安装必要条件

- 2.1 动力线的选用应根据设备功率选用，具体选用标准请参阅附表。
- 2.2 本产品水箱内置，水位由浮球阀控制，给水源须保证有0.05-0.15Mpa压力。
- 2.3 接软水源至水箱进水口处，禁用深井水和河水等非软化水。

⚠ 注意：由于使用非软化水导致的产品故障，不在保修范围之列。

请勿使用蒸馏水、纯净水等类似电导率低的介质而影响水位控制检测的正确性。

- 2.4 第一次使用或使用过程中水泵内进入空气时，请旋开水泵出水口旁放空塞螺丝，让其充满水后将此塞旋紧，详见日常维护与保养。

- 2.5 关闭排污阀和蒸汽输出阀。

⚠ 注意：请把安全阀出口接到室外安全处，排污阀固定接入下水道。
在使用本设备前，请检查漏电保护功能是否正常。
上述各项检查合格后才能开启本产品。

3. 开机步骤

- 3.1 打开进水水源，关闭排污阀，往右拨动电源开关，控制器报警（因设备内部及水箱缺水），当水箱内有水时控制器停止报警，同时水泵开始运转，补水至低水位，运行指示灯亮，电热管开始工作。自动补水至高水位，水泵停止补水。

⚠ 注意：控制器报警为水箱水位报警，开机前保证水箱水位是相当重要的。



3.2 补水到正常水位，设备内压力为低时，电热管自动开始运行加热。

3.3 当设备压力达到设定值时，自动停止加热，此时便可打开主汽阀，使用蒸汽。

3.4 使用蒸汽时，炉内压力下降，压力降到下限设定值时，自动开始加热。

(该压力值可根据客户对蒸汽使用要求进行设定)

3.5 使用蒸汽时，本体内水位不断下降，当降低到低水位时，即启动水泵，自动向本体内补水至高水位。(当水位低于低水位，补水系统未正常工作时，5秒后水位未到达低水位电极，电热管停止加热，如水位继续下降低于超低水位电极，控制器停机保护。)(打开电源开关后，所有运行均为控制系统自动运行无需另行操作)

△ 注意：为确保蒸汽发生器正常运行及安全，设备运行时操作人员应经常观察设备的压力、水位以及加热状况是否正常。当蒸汽发生器发生故障，应立即停机检查，排除故障后方可重新启动。

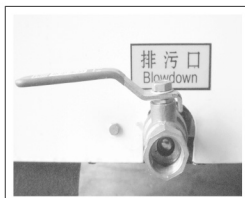


4. 关机步骤

4.1 工作完毕，往左拨动电源开关，关闭电源总开关。



4.2 待压力表指针降到0.15~0.1MPa时，关闭进水阀门，将排污阀打开进行排污。排污能延缓水垢的产生和对本内壁的沉积，能延长锅炉使用寿命，每日至少排污2次，必须在工作结束后排空本体内存水。



△ 注意：为防止本体内产生负压，排污后，在下次设备运行前，请不要关闭排污阀。

四、控制系统

本蒸汽发生器控制系统具有水位控制、蒸汽压力控制、缺水保护控制、超压保护控制等自动控制功能，具体接线请参考电气总接线图。

1. 状态显示

本机具有丰富的显示功能，可将采集到的压力、水泵、电热管等的工作状态准确直观的显示出来。

2. 输入与输出

2.1 输入信号：

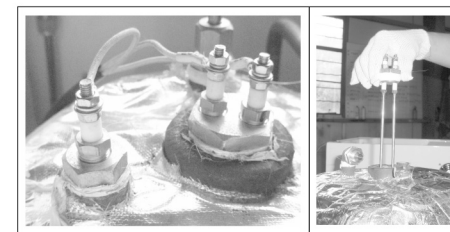
(1) 压力控制器

压力通过压力控制器控制。当压力低于整定值时压力控制器输出信号接通；压力高于整定值时信号断开；信号断开后当压力下降到回差整定值时再次接通。



(2) 水位信号

控制器使用水位电极测量水位，使用时应注意水位电极两端的绝缘，不要受潮。当水位电极两端的电阻低于100K时，控制器即认为水面已高于电极；当水位电极两端电阻升至500K以上时，控制器即认为水面已低于电极。



2.2 控制输出执行泵控制

控制器可配接功率小于1KW的单相水泵，具体接线参考电加热蒸汽发生器电气总接线图。

3. 报警保护

控制器开启后即不间断地对压力传感器、水位电极以及自身电路进行检测，发现故障立即报警并停机保护。控制器自动显示故障点，蜂鸣器发出报警声，具体排除方法请参阅“常见故障排除”。

五、日常维护与保养

<p>1</p> 	<p>安全阀</p> <p>安全阀由当地安全技术监督检查部门认可的单位校验，每年至少校验一次。</p> <p>为防止安全阀的阀瓣与阀座粘住，每周应对安全阀做手动排放试验。</p> <p>严禁用任何手段提高安全阀整定压力，导致安全阀失效。</p>
<p>2</p> 	<p>排污</p> <p>这项操作至为重要，即使采用软化水或除垢剂时，在炉内也会产生水垢和矿物质。排污能延缓水垢的产生和对炉壁的沉积，能延长设备使用寿命，每日至少2次，必须在工作结束后排空设备内存水。</p>
<p>3</p> 	<p>电极清理</p> <p>设备供水系统能否自动可靠的工作，取决于设备内部的高低水位电极探针，因此必须在每二至三个月内擦洗水位电极探针一次。若使用地区水质较差时，应半个月清理一次。具体方法如下：注：设备内部应无水。机器完全泄压后，拆下顶盖，卸下电极上的导线（做好标记），按逆时针方向拧下电极，除去金属棒上的结垢；若结垢严重，可用砂皮打磨表面使其露出金属光泽，用万用表电阻档测量金属棒和外壳间应有500KΩ以上的电阻值，且越大越好。</p>
<p>4</p> 	<p>水位筒清理</p> <p>本产品水位筒位于发生器本体内部，在其下端底部和侧部开有小孔，用于稳定运行时水位的波动性，提高水位电极检测的正确性。较长时间运行或水质状况，会生成水垢堵塞小孔，影响水位电极的正常检测。</p> <p>为防止水位电极失效，保证发生器的安全稳定运行。应定期对水位筒进行检查（一般2个月左右）。首先拆下电加热管，从电加热接管孔中伸进手，用铁丝疏通水位保护器的小孔后重新安装电热管。</p>

<p>5</p> 	<p>加热管的维护</p> <p>由于设备长期使用及水质影响，加热管容易结垢而影响工作效率，严重时影响加热管的使用寿命，应根据设备运行及水质情况定期对加热管清理（一般2~3个月一次）。重新装加热管时，应注意连线的复原、法兰上的螺丝紧固，以免发生漏水现象。</p>
<p>▲ 注意：3.4.5.项可根据锅炉运行和水质情况同步进行。</p>	
<p>6</p> 	<p>清洁止回阀</p> <p>当发现设备有回水现象时，及时拆下止回阀清除里面的水垢和杂质，当摇晃止回阀时，里面的挡板能自由运动、密封好。如无法清理，请更换。</p>
<p>7</p> 	<p>给水箱</p> <p>给水箱内置于发生器外壳中，应定期打开给水箱①，清理水箱滤网③杂物，检查水箱电极④是否正常，以保证水泵补水正常，如遇溢水口溢水请检查浮球阀②关闭是否正常。</p>
<p>8</p> 	<p>水泵</p> <p>水泵进水口①与水箱连接，出水口③通过止回阀连接至设备进水口，新水泵由于运输过程受振动，可能导致水泵的叶轮转动不灵活或卡住，因此，水泵第一次运行或长期停用再启动时，应用螺丝刀通过风罩④孔拨动电机后面的风叶，直至水泵运转灵活。（此项工作应在关闭电源状态下操作）</p> <p>旋开放空气螺栓（注水塞②），注水满后，将放空螺栓旋紧（可以点动水泵以帮助注水）。</p> <p>天气寒冷时，注意泵内存水结冰。</p>

9 定期紧固

加热管上连接导线螺钉和法兰上的螺帽应定期紧固。并且由于加热管易结垢，应六个月内左右拆卸下来去除水垢。经常检查主回路（动力线冷压头、断路器、接触器、电热管等），控制板、给水泵、电控箱、压力开关和安全阀等主要部件的运行状况，出现异常及时查找原因。

10 软水器

在设备运行工程中，可能由于水质问题而带来不安全因素从而影响产品的正常使用。水垢的热传导系数很小，不但会引起设备能耗的增加，而且会影响到运行安全。因此，进行水处理的目的是非常明确的，我们要消除水垢给设备带来的危害，节省能源消耗，延长设备使用寿命，获得较高的运行完好率。

按照国家标准《低压锅炉水质》对发生器运行时的水质要求，可采用除去钙镁离子方式，即采用软化水作为给水。最普遍的软化方式是离子树脂法。

▲ 注意：具体操作说明请参阅水处理操作使用说明书。

11 其它注意事项

设备停止运行时间较长时，应切断电源，同时将设备内部、管道内的水放尽以防止出现冻坏、生锈现象。平时不使用机器时，切断电源，打开控制箱，对所有的电器件接线端子紧固件进行检查，对松动的应紧固，以防接触不良导致烧焦电线及电器元件。

▲ 注意：电控箱不得进水或蒸汽及易燃易爆气体，在设备运行时必须关好电控箱门。

六、常见故障排除

故障现象	故障原因	排除方法
故障报警	设备新启用或刚排污	补水泵放空气
	水箱缺水或水箱电极线脱落，水箱底部固定螺钉松动	给水箱补水，重新连接
	控制器出错	修理或更换
	不加水	拆下清除污垢或更换进水泵
	补水不停	拆下清除污垢、修理或更换
	频繁补水	检查接线、用汽量
	回水	清理或更换止回阀
	不加热	检查水位电极、压力控制器
	加热慢或蒸汽量不够	修理或更换
	水泵进水慢	放空气或更换叶轮
	安全阀喷水、水位偏高	拆下清除污垢、垢通孔
	升压快而汽量不足	排污水至正常水位
	加热管损坏	更换电热管
漏电断路器跳闸	加热管老化漏电	
	电极棒击穿导致缺水干烧	拆下清除污垢、更换加热管
溢水孔溢水	水泵漏电或短路	修理或更换
	断路器或控制器损坏	修理或更换
	浮球阀损坏或浮球掉落	检查或更换
	进水压力过高 $\geq 0.25\text{Mpa}$	降低进水压力

▲ 注意：控制主板上发光管指示 ED2：超低水位；ED3：高水位；ED4：低水位；ED5：水箱水位。如设备运行异常请根据主板指示作出相应维护，维护时必须切断电源。

本公司保留对产品改进权利，恕不另行通知。

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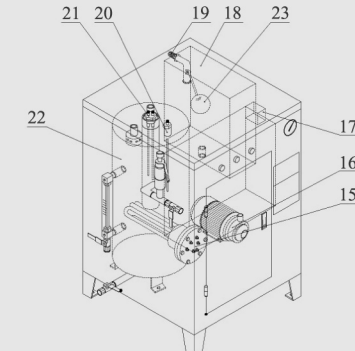
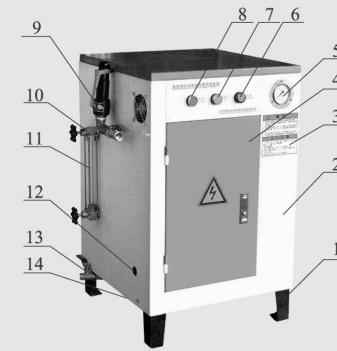
1. Important notes:

- » Pls. read the manual in details when operate and maintain the steam generators.
- » Equipment feed water must meet the state standards and we should be equipped with water softner, otherwise it is easy to be scaled and caused lower efficiency and service life, even accident.
- » Do not use low conductivity medium such as distilled water, pure water, it will affect level controlling and measuring.
- » Pipe connected to the equipment must meet state standards.
- » To make sure operating safety, terminal electricity should be equipped with suitable leakage protector and be connected to ground reliable by customers.
- » Professionals should tighten and check main circuit connections, power line, cool pressure terminals, breaker, contactor, heating elements every week.
- » Cut the electricity when maintain and repair the equipment.
- » Pls discharge safety valve by hand every week, otherwise any consequence is not of manufacturer's business.
- » The equipment should be blowdown twice everyday below pressure 0.15Mpa. Blow-down pipe should be connected to safety place.
- » To avoid operating in negative pressure, do not shut down blowdown valve after blow-down.
- » Washing the water level gauge (when pressure is below 0.15Mpa), electrode and water tank regularly.
- » After operating, pls. discharge rest water in water pump. When environment temperature is below 0°C, take care of feed water pipe avoid damaged.
- » When shift the equipment, do make sure shift documents together with the equipment.
- » No particular notice when the technology is improved and the state regulations changed. There will be some difference between products and the manual, pls. operate as detail parts manual and state updated regulations.
- » Any consequences caused by incorrect operation of equipment, or ways not mentioned in the manual, are not in manufacturer's responsibility.
- » Before operating the generators, pls. apply permission from local institution.


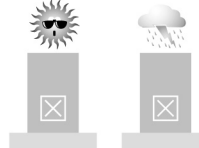


2. Product description:

2.1 Parts description:

- | | | |
|------------------------|------------------------------|-----------------------------|
| 1. bottom support | 9. safety valve | 17. pressure controller |
| 2. shell | 10. steam valve | 18. water tank |
| 3. special reminder | 11. water level gauge | 19. water inlet |
| 4. electric controller | 12. power connection | 20. water lackage electrode |
| 5. pressure gauge | 13. blowdown valve | 21. water level electrode |
| 6. alarm lamp | 14. ground lead | 22. body |
| 7. operating lamp | 15. electric heating element | 23. water tank electrode |
| 8. power switch | 16. feed water pump | |



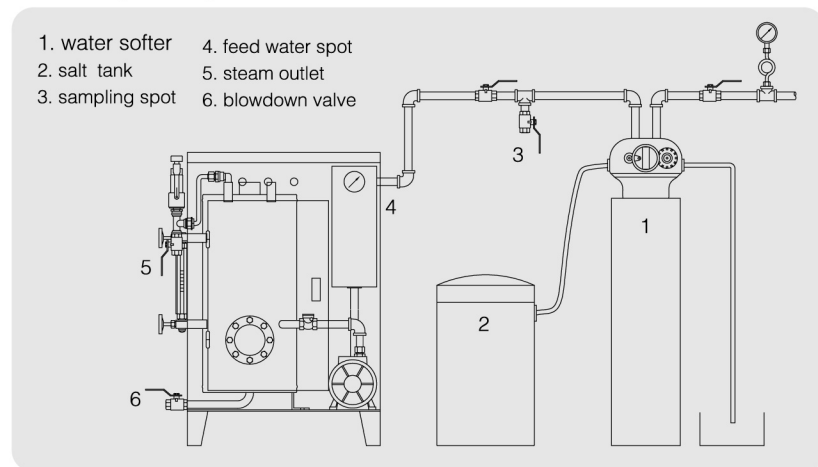
2.2 Place requirements

- No keeping it on the inclination or un-flat position. 
- To avoid keeping on the position has direct sunlight, rain or wet, Keep ventilation. 
- Keeping away from the fire resources and high temperature. No other articles on the top of the products. 
- To avoid keeping on the position contains corrosive gas, inflammable and explosive gas. 

⚠ Surrounding Requirements:

- Temperature +5°C ~ +40°C (+41OF ~ +104OF)
- Relative Humidity: 45% ~ 85% no dew
- Good Ventilation Conditions and Proper Illumination

2.3. Installing drawings:



can see the following table.

- 3.2.2 Softner water tank is located inner the shell. Water level is controlled by float ball valve. Make sure feed water pressure between 0.05–0.15Mpa.
- 3.2.3 The water source should connected with the inlet of the magnetic valve, it is forbidden to use non-soft water such as well water, river water and so on.

⚠ Note: Any damage caused by non-soft water is not in our guarantee. To make sure water level electrodes work in good condition, it is not allowed to use low conductivity media, such as distilled water, purified water.

- 3.2.4 During using the water pump or the first time we use the water pump, if the air enter into the pump, should loose the screw of the discharge plug beside the outlet of the pump, then filled with water, tighten the water plug.
- 3.2.5 Shut the blow down valve and the steam outlet valve.

⚠ Note: Before operating, check whether the leakage protection function is normal. You can start the steam generator after you finished all the inspections that mentioned above.

3.3. Start and run

- 3.3.1 Open feed water valve, close blowdown valve, turn power swift to right, controller alarming (for equipment and inner water tank lack of water), when tank is full of water, alarming stopped, meanwhile, water pump start up, feed water to low water level, The equipment operating indicator lightening, heating elements working. When up to high water level, water pump stops.



⚠ Note: Controller alarming is because of the equipment inner tank lack of water. It is very important to make sure water level in water tank before operating.



- 3.3.2 Feeding water to the middle level, the equipment pressure is low, the heating elements start heating automatically.
- 3.3.3 When the pressure goes to the set point, stop heating automatically, now you can open the steam valve and use steam.
- 3.3.4 When using the steam, the pressure of the generator will drop until it goes to the limit low set point, heating will start again automatically. (pressure could be adjusted by customer accordingly).
- 3.3.5 When using the steam, the water level of the generator will be down continuously until it



3. Product operating

3.1. Checking before installing:

There may be many damages when transport, loading or unloading, so it should be checked before operation:

- 3.1.1 Check all kinds of pipeline and interface to see weather there are any flexible or damage.
- 3.1.2 the electric line should be checked to see weather there are loose or other damage.
- 3.1.3 Check all the electric line to see weather they are match with the instructions in the circuit diagrams.



⚠ Note: There must be equipped with the credible earth wire which connect to the machine shell.

3.2. Essential conditions installation

- 3.2.1 The power line must chosen according to the electric power of the heater, for details you

to the low water level, the water pump start automatically, feeding water to the equipment until it goes to the high water level (when the water level is lower than the low level, the feeding water system doesn't work normally, also can't go to the low water level electrode in 5seconds, the heating elements will stop heating. If the water level continues drop until it to the limit low water level electrode, the controller will send alarm signal and stop running the equipment). After supply power, products will operate automatically.

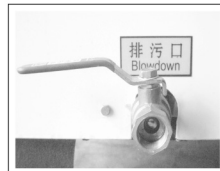
⚠ Note: To assure the good running and the safety of the generator, the stoker should observe weather the pressure, the water level and the heating are running normally. When the generator went wrong, it should be shut down and checked immediately, and restart when finished the trouble shooting.

3.4. Shut down

3.4.1 After finish working, push down the switch of "power", shut off power source, the indication lamp of "power" will be off, close the general switch of power source.



3.4.2 When the indication pin of the pressure gauge point at 0.15 ~ 0.1 Mpa. Close the inlet water valve and open the blow down valve.



⚠ Note: To make preparation against the negative pressure in the generator, after blowing down, please don't close the blow down valve.

4. Control System

The control system of the steam generator has the following automatic controlling function: the water level control, the steam pressure control, the protection control for lacking of water, the controlling for protection of over pressure and so on. For the details, please refer to 'General electrical wiring diagram of electrical heating steam generator'.

4.1 Status Indication

The steam generator has abundant indication functions as following: the working status of pressure, water pump, electric-heating tube and so on can be shown correctly and directly. There are power switching setting functions, users can adjust the power according to the steam for using so that will be more energy-saving, when the button is pushed that means in the full-load functional mode, otherwise that means in the half full-load functional mode(only limit to the LDR series 0.008-0.7).

4.2 Input and Output

4.2.1 Input Signal

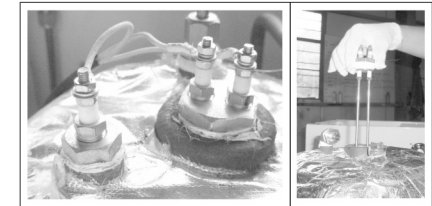
(1) Pressure Control

The pressure of steam generator is controlled by pressure switch. If the pressure is lower than set point, the output signal of pressure switch will be put through; if the pressure is higher than set point, the signal will be cut off, and when the pressure drops back to set point again, the signal will be put through again.



(2) Water Level Signal

The controller measures the water level through level electrode. During operation should pay attention to the insulation of two ends of water level electrode, keep away damp. If the electric resistance of two ends of water level electrode is less than 100K, it will be deemed that the water level is higher than electrode. If the electric resistance of two ends of water level electrode is over than 500K, it will be deemed that the water level is lower than electrode.



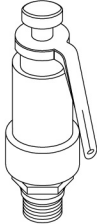
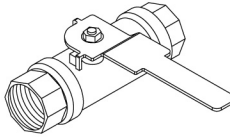
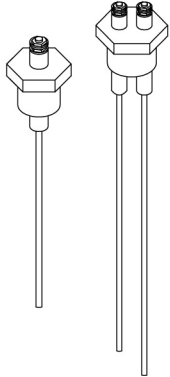
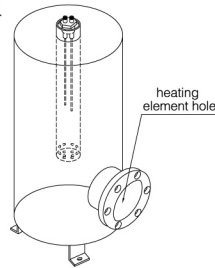
4.2.2 Controlling for Output Executive Pump

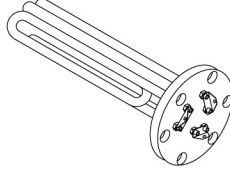
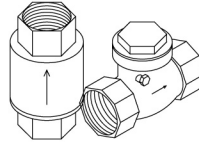
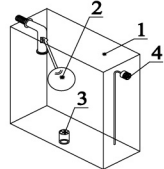
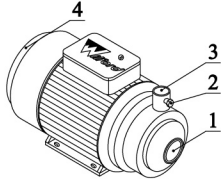
The controller can be matched with mono-phase water pump with power less than 1KVA, for detail, please refer to 《General electrical wiring diagram of electrical heating steam generator》.

4.3 Alarm Protection

After starting controller, it will check the pressure switch, water level electrode and self circuit continuously. Once find trouble will send alarm immediately and stop running boiler for protection. Controller will indicate the point of trouble automatically, the inside buzzer will send sound alarm. For the detail removal method for troubles, please refer the section of "Removal method for common troubles".

5. Daily Maintenance

<p>1</p> 	<p>Safety Valve The safety valve should be calibrated by the department approved by local labor safety supervision division. Every year should be at least calibrated for one time. In order to avoid the sticking between disk and seat of safety valve, every week should do draining test by hand. It is not permitted to increase the set pressure of safety valve by every means so as to make safety valve out of efficiency.</p>
<p>2</p> 	<p>Blow Down The operation is very important, because the scale and the mineral composition will generate in the generator even already used the soft water or the scale dissolver. The blow down can delay the generation of the scale in the equipment mural, also it can prolong the life span of the equipment, so it must be carried out at least once a day when finished the working.</p>
<p>3</p> 	<p>Electrode Clean Weather the feeding water system can work automatically and dependable largely is depend on the probe of the high-low water electrode inside the body, so the probe must be cleaned once every two or three months. If the local water quantity is poor, it should be cleaned once every half month. The detail method is as following (now there is no water inside the boiler): After released the pressure completely, dismantle the top cover, take away the electrode wire and make marking, dismantle the electrode with counter clockwise direction, Remove scal on metal rod; if scaling seriously, must use rubber polish electrode surface. Then measure the electric resistance between metal rod and the outside shell with the avometer, it should be larger than 500KΩ. The tube is better if get the larger value of the resistance.</p>
<p>4</p> 	<p>Water level protection tube clearing Protection tube is located inner the body. In the buttom and side of the tube. There are some small hole to stable water level and ensure electrode work well. After long term working and poor water quality, the hole will be blocked by scale, electrode will be impacted. To avoid electorde out of using and keep operating safety, check the water level tube regularly every two month. First remove heating elements, put hand through holes, use iron wire clear water level protector, then re-install heating elements.</p>

<p>5</p> 	<p>heating elements maintenace After a long term using, and water quality impact, heating elements are easily scaled. It will cause lower efficiency and less service life. We should clean heating elements regularly every 2-3 month according to the feed water conditions. When re-connected heating elements, to aviod water leakage, take care of wire and flange connectrions.</p>
<p>⚠ Noted: 3.4.5. could run under the equipment running and water quality.</p>	
<p>6</p> 	<p>Check Valve clean If find the phenomenon of back water to the equipment, should dismantle the check valve in time, and remove all scale and impurity, shake the check valve, if the baffle plate inside the check valve can move freely, it means that is good. But if can't clean it, change a new one.</p>
<p>7</p> 	<p>Feed water tank Feed water tank was equipped inner the shell. Should open tank ①regularly, clean tank filter③ sundries, check electrode ④ to ensure water pump work normally, check float valve ② when overflow shut down is normal or not.</p>
<p>8</p> 	<p>Water pump ① connect to water tank, outlet ③ feeding water to the equipment water inlet through check valve. The rotation of vane of water pump may be not so well or may be blocked because of scaling forming of water pump during operation and vibration during transportation for new water pump. So when run water pump for first time or re-start pump again after stopping running for a long time, should turn the vane behind the motor through cover hole ④ by screw driver to water pump running very well. Loose the screw for discharging air (discharge plug), ② after filling water, screw and tight the discharge plug (can help adding water by spot starting water pump). During cold weather, pay attention to the frozen ice of deposit water inside pump.</p>

9 Periodically Fixtures

The screw cap of flange and joint bolt of heating tube should be tightened periodically. The scale will be formed on the heating tubes easily, so remove the scale about every six-month. When re-assemble the heating tubes, we should pay attention to reset the connecting wire and tightness of screw of flange to avoid happening water leakage. Check the running status of main parts of power line, cool pressure terminals, breaker, contactor, heating element and electric wire, feeding water pump, electric control box, pressure switch, safety valve and so on, if occur abnormal phenomena, find the reason in time.

10 Water Softener

During operating, unqualified water will affect the generator safety. Scale, with low conductive factor, will cause higher electricity consumption and unsafety working. So, it must use softner water to save energy, extend the equipment service life and better operating.

According to state water quality rules < low pressure boiler water quality >, should use soft water, delete Ca²⁺, Mg²⁺ outside of boiler. Generally, it uses ionic resin ways to softner water.

⚠ Note: Please refer to the Installation & Operation Manual of the water softener.

11 Other Precautions

In order to avoid occurring the phenomena of freezing and rust, after stop running for a long time, cut off the power resource, and drain the water completely inside the equipment and piping. In usual time, if not running, cut off power resource, open the control box, check all terminals of electrical parts and tightening piece, if find loose parts, tighten it for preventing burning through the wires and electrical parts because of bad contacting. To avoid poor contact lead to wires and electrical components burnt

⚠ Note: The water, the steam and the flammable and explosive gas should be kept away from control box. During running close the electric control box.

6. Removal for Common Trouble

Trouble phenomena	Causing reason	Removal methods
Alarm for troubles	Start working for the first time or blow down just now	Discharge air by making up water to pump
	The water tank is lacking of water or the electrode is fallen off, Water tank screw loosening at the bottom	Feeding water to the water box and re-select it
System control	The controller has error	Repair or change a new one
	The electrode stick of high-low water level is broken down and have current leakage or make water pump is not in good status	Remove, clean the dirt or change a new inlet water pump
	High and low water level electrode scaled, water level falling	Remove, clean the dirt
	The wiring of electrode is wrong connected or the consumption of steam is very large	Check the wiring and steam consumption quantity
	The non-return valve has scale formation or impurity	Clean or change a new non-return valve
	Lack of water electrode broken, falling, or high pressure controller falling	Check electrode and controller
	The electrical heating tube has been ageing and the check-valve has been out of efficiency.	Repair or change a new one
	There is air inside the head of make up water pump or the vane is broken	Vent the air or change a new pump vane
	There is scale formation inside the electrode of water level	Remove, clean the dirt

6. Removal for Common Trouble

Trouble phenomena	Causing reason	Removal methods
Leakage	Water level is too high	Discharge water from blow down valve until get to normal water level
circuit breakers	The heating tube has been aging and has current leakage	Change a new heating tube
trip	The electrode stick is broken down so as to lacking of water and dry burning	Remove, clean the dirt/ change a new one
Overflowing	The making up water pump has current leakage or short connected	Repair/change a new one
	There is trouble of controller	Repair/change a new one
	Float valve damaged or ball falling	Check or replace
	Feed water pressure higher than 0.25MPa	Reduce water pressure

⚠ Note: the luminotron in the control plate shows: ED2: super low water level; ED3: high water level; ED4: low waterlevel; ED5: the water level in the water box. If the equipment is running wrong, please make some maintenance according to the indication in the main board.

⚠ Note: Must shut down power when maintenance.