

**ZJCQ 型透平油过滤机**

# **使用说明书**

**OPERATION INSTRUCTION FOR  
MODEL ZJCQ TURBINE OIL FILTER**

**自贡川滤设备制造有限公司**

**ZIGONG CHUANLU EQUIPMENT MANUFACTURE CO., LTD.**

# 一、简介

我厂是机械部分离机械设备定点生产厂，有近三十年研制制造过滤机械历史。几十年来，我厂始终以满足日益发展的电力事业对分离机械设备的需要为己任，致力于分离机械的开发研制及设计制造，为国内大中型重点工程项目提供了大量的分离机械设备及油液输送设备。各种产品畅销国内，并远销巴基斯坦、孟加拉、印尼、泰国、缅甸、伊朗、越南、叙利亚、独联体、科威特等二十多个国家和地区，在国内外市场上享有较高的声誉。主要产品有 ZJCQ 型系列透平油过滤机，ZJB、ZJA 型系列单、双级真空净油机，ZJY（原 ZLY）型真空净油机，ZLSG 普通型、ZLSG-A 差动刷洗型、ZLSG-B 高精度滤网快换型、ZLSG-G 复合排污型全自动滤水器，LSG 型转动式滤水器，LY 型系列板框压力式滤油机，WLY 微型系列滤油机，BAS 型板框压滤机，BAY 型系列轻便过滤机，JYG 型系列精密过滤机，以及 2CY 型、KCB 型、WCB 型齿轮油泵等。本说明书主要介绍的是 ZJCQ 型透平油过滤机。

# 二、用途

ZJCQ 型系列透平油过滤机主要适用透平油类润滑油、液压油及其它类似油液的过滤净化。本机能高效地脱除油中水份、气体、酸质、胶质、皂类、色素，以及金属微粒、砂子、碳粒等机械杂质，使严重含水或浑浊乳化的油液得以净化，提高油品质量，保证机组的安全运行。

### 三、主要技术参数

名称	ZICQ-1	ZICQ-2	ZICQ-3	ZICQ-4	ZICQ-6	ZICQ-9	ZICQ-12
公称排量 Lh	1000	2000	3000	4000	6000	9000	12000
工作真空 Pa	$\leq 9500$						
工作压力 MPa	$\leq 0.5$						
工作油温 °C	40-70°C						
加热功率 kW	16	24	32	32	64	72	96
总功率 kW	18.25	27.79	34.29	38.34	72.49	81.59	112.5
噪声 dB (A)	76					$\leq 82$	$\leq 85$
进出口径 mm	20	25	32	32	40	40	50
外形尺寸 cm	长	120	138	140	145	147	210
	宽	110	125	130	136	146	170
	高	155	158	160	164	190	230
重量 kg	920	1160	1360	1650	1800	2300	2850

### 四、技术性能指标

本机组由于采用了国际上先进的 WGF 聚结分离与极性物质分离，使净化质量达到国际公认的，要求最高的 API-581 标准，对含有大量水份（30%左右），污染度低于 15 级，以及乳化特别严重的油液，经本机组处理后可迅速达到如下指标：

- 1、外观：透明、无杂质、无游离水
- 2、机械杂质(过滤精度)： $\leq 5\mu\text{m}$ ；
- 3、含水量： $\leq 100\text{ppm}$  (0.01%)
- 4、净化清洁度达到 NAS1638-5 级；
- 5、脱除酸性和极性物质的效率达到 99% 以上。

## 五、结构特点

ZJCQ 型系列透平油过滤机主要由粗滤器、输油泵、WGF 聚结分离器、沉淀分离器、脱气罐、加热器、净化器（包括精滤器和磁性过滤器）、真空泵、冷凝器、水泵、循环水箱及各种阀组成，详见工作原理图。它具有脱水、脱气、破乳、精滤、聚结分离等五种功能；自动化程度高，且联锁保护功能齐全，操作简便，安全可靠。

**输油泵** 采用特殊推进装置，能在高真空下低噪音吸油。

**粗滤器** 滤除大颗粒杂质，由两层不锈钢丝网分别绕在两个钻有眼孔不锈钢骨架上，然后组装在过滤器筒体内。因此，它具有容杂能力强，且不易堵塞的特点。

**沉淀分离器** 利用沉淀法，沉淀分离大量水份，并具有一定破乳功能。

**聚结分离器** 内装 LXM 聚结滤芯（油液内进外出）和 YSF 分离滤芯（油液外进内出），两种滤芯必须套用。

LXM 聚结滤芯能迅速地将溶解在油中的水份及游离水聚结于滤芯表面，随着水份的不断聚结，逐渐变成较大粒径的水珠，最终沉淀在聚水箱内。

YSF 分离滤芯是一种亲油型的滤芯，它具有很小的过滤阻力，当含有水份的油液通过此滤芯时，油能顺利通过，而水份则分离沉淀于聚水箱内。

由于 LXM 滤芯和 YSF 滤芯所采用的特殊材质，它还能将乳化严重的油液迅速破乳。

**真空脱气罐** 采用雾化器和高效脱气元件相结合，能迅速地脱除油中的微量水份和气体。

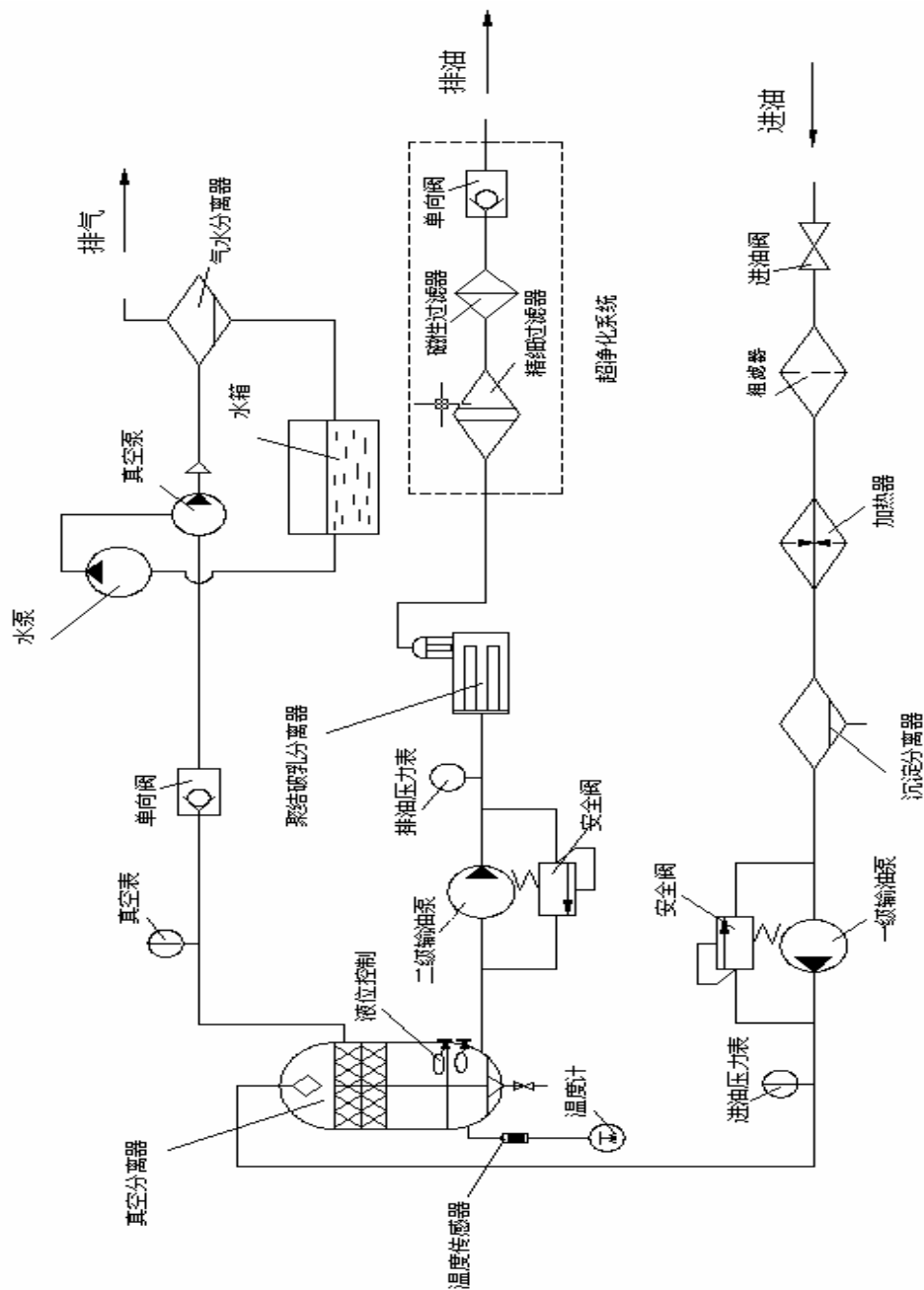
**真空抽气系统** 由真空泵、气水分离器、循环水箱组成。真空泵的启动和停止，由电接点真空表控制（可调）。

## 六、工作原理

待净化油经入口先后进入粗滤器、沉淀分离器，大量的水份和杂质被分离沉淀在废水箱里。然后油液经加热器加热后进入脱气罐，油液被雾化，油中气体及部

分溶解于油中的水份在真空、加热状态下，通过脱气元件的作用被真空泵脱除。

脱除气体的油液被排油泵输送入聚结分离器、净化器。水份则被聚结分离器聚结并分离出来，沉淀于存水罐内。这样，除去水份和大颗粒杂质的油液再经过净化器时，油中的细小金属微粒和其他微粒杂质被彻底滤除，洁净的油液经单向阀从出口流出，完成全部净化过程，从而实现油液的彻底净化（见工作原理图）。



## 七、安装调试

- 1、关闭本机所有阀门，连接好进出油管，保证本机进出口油路畅通；
- 2、接好三相四线电源及二次线路，本机设有安全接地标记，要特别注意接好零线；
- 3、启动冷却水泵（若直接采用自来水循环冷却时，则无冷却水泵），注意电机旋向是否正确；
- 4、启动排油泵、真空泵，应无卡阻和不正常的噪音现象，同时，检查各泵旋向是否正确；
- 5、检查冷水泵与真空泵是否联锁，即冷水泵控制真空泵；
- 6、检查进油泵与加热器是否联锁，即电磁阀必须控制加热器。

注意！调试检查各泵时，应注意不能长时间空转，特别是在检查进油泵与加热功能的联锁情况时，只能在一瞬间完成。

## 八、操作方法

- 1、打开各循环水阀，其余阀门全关闭；
- 2、启动冷水泵，然后启动真空泵；
- 3、待系统真空度正常后，打开进口阀门，启动进油泵，将排油泵开关置于自动位，排油泵在液位控制下自动运行；
- 4、待整机运行正常后，方可启动加热器，并在启动加热器之前，预先将恒温调节器调节到40-70℃之间；
- 5、整机正常工作；
- 6、当油处理完毕或中途需停机时：
  - a、首先关加热器5分钟左右，再分别关真空泵、冷水泵及各供水阀；
  - b、若需彻底排完机组内存油，此时，将进油管脱离油箱，待机组内残存油

液排出完毕后，即可关闭进油泵、排油泵和进口球阀；

c、断开总电源，打开各放水阀，放掉里面水份及油污染杂质，注意放后要关闭阀门。

## 九、操作注意事项

1、由于水份、固化颗粒杂质的密度大于透平油的密度，应尽量将本机进油口接到油箱的最低点，以便实现油水的彻底分离和固体颗粒杂质的充分滤除。

2、运行过程中，各废水箱及存水罐内储水较多时，要特别注意及时放掉，充分发挥本机的性能。

3、水环真空泵工作时，应注意泵的供水情况，保证供水量在 20 升/分钟左右。

4、注意冷却水泵的供水情况、循环水温，即使在夏天也不得超过 30℃，水箱内冷却水应经常更换，或采用其他降温处理，以确保真空泵抽气性能。

5、经常注意压力表值，当压力大于最大安全压力时，排油量会出现不足现象，此时，应清洁过滤器或更换过滤元件。

6、运行中随时注意检查各泵及相应电机的运行噪音和温度是否正常，如有异常应立即排除，各泵及电机允许温升不得大于 40℃（即最高温度不得大于 80℃）。

7、本机停置不用时，尤其在冬季，须打开真空泵放水阀，将存水放尽，以免冻裂真空泵。

## 十、维护保养

1、设备每运行 50 小时应检查：

A、电器控制系统是否安全、可靠；

B、恒温控制器是否灵敏、可靠、准确；

C、各泵轴封是否损坏、泄漏；

D、各管路系统及密封处有无漏气、漏油现象;

E、液位控制是否可靠;

F、工作压力是否正常,如有异常,应立即排除。

2、随时注意补加真空泵润滑油。

3、电机运行3000 小时, 应补加ZL-2 或ZL-3 锂基润滑。

4、如果停机一月以上, 本机应放在干燥的地方, 关闭电气柜门和所有阀门, 盖好机身。

## 十一、故障排除

故 障	产 生 原 因	排 除 方 法
A、真空度下降	1、长管路接头或其他密封不良产生漏气 2、水环泵供水量太大或太小 3、水环泵密封不良或损坏	1、检修 2、调节供水量 3、检修或更换
B、滤油量减少	1、各过滤器压力太大内部滤渣多 2、系统中有堵塞物 3、排油泵密封损坏 4、吸油管道太长或进口吸程过高	1、清洗或更换过滤元件 2、排除 3、更换密封件 4、调整
C、排油泵有不正常噪音。	1、泵或传动电机紧固螺钉松动 2、内部零件损坏 3、进油不足	1、紧固 2、更换 3、调整安全阀或检修管路
D、真空泵有不正常噪音	1、泵或传动电机的紧固螺钉松动 2、内部零件损坏 3、真空度过高	1、紧固 2、更换 3、按该泵说明书规定调整
E、油泵电机油温太高	1、轴承缺油或损坏 2、安装不正确 3、内部零件或密封损坏	1、加油或更换 2、调整 3、更换
F、加热器开启后油温升不高或太少	1、温度控制器失灵 2、内部加热器烧坏或电线断接	1、更换 2、检修导线或更换加热器
G 电器件失灵	电器件损坏或没有安全接地	更换或安全接地



# 1. Introduction

With a history of more than thirty years manufacturing separation equipments. Our factory is a specialized enterprise direct under The Ministry of Machine-Building of China. For decades, we have devoted to development of separation machinery and to design and manufacture of oil delivery equipments to meet demands of separation equipments of developing power industry. In recent ten years, a large quantity of separation equipments and oil delivery equipments provided by our factory have been supplied to important projects at home and exported to more than 20 countries and regions in Latin America Europe, South-eastern Asia.

Main productions: Model ZJCQ Series Turbine Oil Filter, Model ZJB, ZJA Series Vacuum Oil Purifier, Model ZJY (ZLY) Vacuum Purifier, Model ZLSG Common Automatic Water Strainer, Model ZLSG-A Differential Pressure Brush Type, Model ZLSG-B Fine Precision Filter Mesh Fast Changed type, Model ZLSG-C Brush Double Discharge Type, Model ZLSG-G Double Discharge, Filter Mesh Fast Charged Type Automatic Water Strainer, Model LSG rotary water filter, Model LY/BAS/BAY Pression Filter, Model WLY portable oil filter, Model JYG high precision oil filter, Model 2CY\KCB gear pumps. This manual mainly deals with model ZJCQ Series Turbine Oil Filter.

## 2. APPLICATION

Model ZJCQ turbine oil filter is suitable to purification of lube oils of turbine oil kind, hydraulic oil and other kinds of oils, it can remove effectively water, gas acid, glue, soap, pigment, metal grain, sand, carbon, grain etc. contained in oil with much water or contained in emulsified oil. It also can operate together with turbine unit so as to ensure safe running of the unit.

### 3. Main Technical Data

Model Index Parament		ZJCQ-1	ZJCQ-2	ZJCQ-3	ZJCQ-4	ZJCQ-6	ZJCQ-9	ZJCQ-12
Nominal discharge L/h		1000	2000	3000	4000	6000	9000	12000
Working Vacuum Pa		$\leq 9500$						
Working Pressure MPa		$\leq 0.5$						
Operating temp. °C		40-70°C						
Max.Power of heat kW		16	24	32	32	64	72	96
Total Power kW		18.25	27.79	34.29	38.34	72.49	81.59	112.5
Noise dB (A)		76					$\leq 82$	$\leq 85$
Inlet/outlet mm		20	25	32	32	40	40	50
Dimensi on MM	L	120	138	140	145	147	210	220
	W	110	125	130	136	146	170	180
	H	155	158	160	164	190	230	240
Weigh kg		920	1160	1360	1650	1800	2300	2850

### 4. TECHNICAL PERFORMANCES

With exception of performances of ordinary turbine oil, filter, the products adopts advanced international WGF aggregation separation and polar separation technology so that the purification quality meets internationally recognized standard API-1581.

After treatment, turbine oil containing 30% of water or so or seriously emulsified oil can meet the following index:

A. Appearance : transparent, no impurities and no free water.

B. Mechanical impurity (filter precision) :  $\leq 5 \mu\text{m}$

C. Water content :  $\leq 100\text{ppm}(0.01\%)$

D. Particle : Below grade 5 NAS 1638.

E. Polar substance removed: above 99%.

## 5. Construction

This machine mainly consists of coarse filter, drain oil pump, WGF aggregation separator, sediment separator, vacuum deaerator, heater,(including fine filter and magnetism filter), vacuum pump, condenser, water pump, cycle water tank, and valves (for details, refer to operation principle fig ), it has five functions as dewatering, deaeration, removing emulsion, fine-filtering and aggregating separation. This article is characterized by automatic operation, perfect inter-lock protection., easy operation, reliability and safety.

**Drain Oil Pump:** Adopted a special pushing device, it can suction oil with a lower noise on a high vacuum condition.

**Coarse Filter:** It is used to filter big impurity and has such functions as remove impurity and not easy to be blocked.

**Sediment Separator:** used a sedimentation, separating a lot of water, it has a function of removing emulsion.

**Aggregation Separator:** The turbine oil filter is equipped with LXM Aggragtion core(oil enter from inner and out from outside ) and YSF separating core(oil enter from outside and out from inner), the two core must be used as a compete set parts .

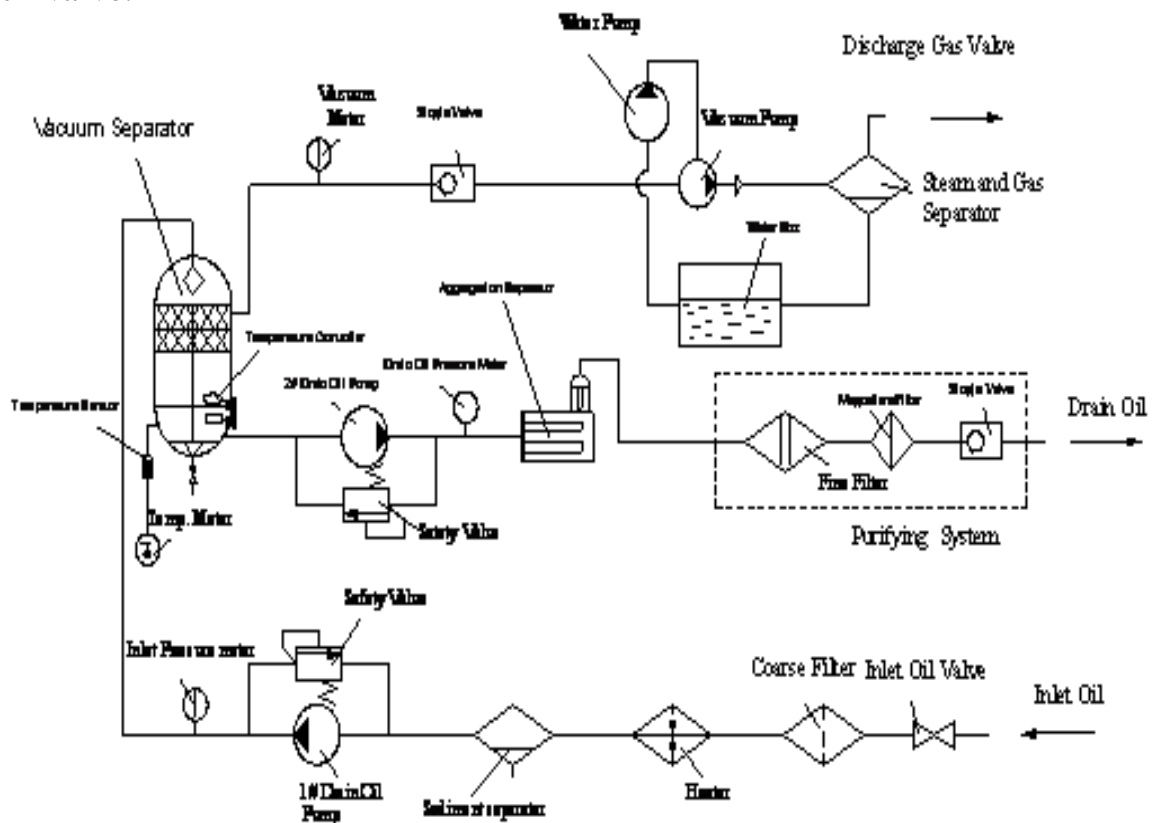
**Vacuum Seaerator:** Atomizer and efficient removing gas elements are combined, the microwater and gas in oil can remove rapidly .

**Vacuum Deaerating System:** consists of vacuum pump, gas-water separator, cycle water tank. Electric-connecting vacuummeter controls the stopping and starting of vacuum pump(able adjust ).

## 6. Operation Principle

Water /oil mixture enter into coarse filter, sediment separator, large quantity of water and impurities are separated and sunk in waste water tank. Then the oil heated by heater come into vacuum deaerator , the said oil is atomized, the gas and some water in oil are removed by vacuum pump through deaerate element under the vacuum and heating condition.

Oil liquid whose gas had been removed is delivered to aggregation separator, Purifier by drain oil pump, water is aggregated and separated by aggregation separator, and sunk in store water tank. Oil free of water and big particles impurities passes through purifier where tiny metal grains and other tiny, impurities are completely removed. Purified oil comes out from outlet by means of check valve.



## 7. INSTALLATION AND COMMISSIONING.

7.1 Close all valves. Connect inlet /outlet oil pipes. Make sure that oil piping between oil tank and inlet/outlet are connected and through.

7.2 Connect 3-phase , 4-wire mains. The machine is provided with safe earthing mark. Do connect neutral line.

7.3 Start cooling water pump(in case tap water cooling is adopted, cooling water pump is not available.) Check motor for correct running direction.

7.4 Start drain oil pump, vacuum pump .No blockage and abnormal noise should be found. Check all pumps for correct rotation direction.

7.5 Check interlock between cooling water pump and vacuum pump, namely, cool water pump controls vacuum pump.

7.6 Check to see whether Inlet Oil Pump and heater are interlocked. Namely electromagnetism must control heater.

Note: That long time idle running of pumps is not allowed when checking and commissioning. Especial for checking interlock between inlet oil pump and heater, the checking should be done instantaneously.

## 8. Operation

8.1 open circulation water valves and keep the rest valves closed.

8.2 First start cool water pump and then vacuum pump.

8.3 When vacuum gets normal, open inlet valve, then start Inlet Oil Pump, Switch of oil drain pump must be set in automatic, Drain Oil Pump shall run automatically by a meat of level controlling .

8.4 After normal running of machine, start heater. Before starting heater, set thermostat to 40-70℃

8.5 The machine operates normally.

8.6 In case oil treatment is completed or shut down needs to be made during operating.

A. Firstly turn off heater,after 5 minutes, then turn off vacuum pump and

cool water pump and close water supply valves.

B. If complete drainage of residual oil of machine, disconnect inlet oil pipe from oil tank. When residual oil is drained off, turn off Inlet Oil Pump, oil drain pump and close inlet ball valve.

C. Turn off mains, open various water drain valves to let out water and oil dirts.

## 9. Precaution

9.1 Since density of water and solid grain is bigger than that of turbine oil, inlet oil of machine should be connected with lowest point of oil tank to ensure thoroughly separation of oil and water and thoroughly removing of solid grain.

9.2 During operation, pay attention to discharge excessive water in waste radiator and water reservoir.

9.3 When vacuum pump works, check water supply of water pump the capital must be 20 L/min.

9.4 Observe water supply of cooling water pump. Temperature of circulation water. Even in Summer, the temperature should not be above 30 °C, Cooling water in box should be changed often or abopt other temperature lowering means to ensure pumping performances of vacuum.

9.5 Often observe gauge readings. When pressure exceeds Max. Safety pressure valve, insufficient inlet and outlet oil will occur. Ringing filter or replacing filtering element should be made.

9.6 During running, observe pumps and relevant motors noise and abnormal temperature. It said abnormilities are found, remove them in time. Max. allowable temperature rise for all pumps and motors is below 40 °C (namely, Max. temperature can't exceed 80°C) .

9.7 If shut down is done in winter, drain off cooling water to prevent freezing of vacuum pump.

## 10. Maintenance and service

10.1 Following inspections should be made after 50 running hours:

- A. Check to see whether electric control system is safe and reliable.
- B. Whether thermostat is sensitive, reliable and accurate.
- C. Whether shaft seals of pumps are damaged or leaking.
- D. Whether gas-leakage, oil-leakage occur to piping system or sealed points.
- E. level is OK.
- F. Check to see whether operating pressure is normal or abnormality occurs.

10.2 Add lube oil to vacuum pump in time.

10.3 After 3000 hour's running of motor, add ZL-2 or ZL-3 Lithium-based grease.

10.4 If shut down is more than one month, the machine should be kept in dry place. Close electric cabinet door and valves and cover machine with proper thing.

## 11. Trouble Shooting

Trouble	Cause	Remedy
A. vacuum Lowered	1. Gas leaking due to long piping connector or poor sealing. 2. Excessive or less water supply of water ring pump. 3. Poor sealing of water ring pump or damage.	1. Troubleshooting. 2. Adjust water supply 3. Repair or replace
B. Less Filtered Oil	1. Excessive pressure of filters and too much debris. 2. The system is blocked. 3. Damaged inlet/outlet seal of oil pumps. 4. Oil suction pipe is too long or lift is too high.	1. Clean or change filter element 2. Remove 3. Change seal 4. Adjust
C. Abnormal Noise of Inlet/Drain Oil Pump	1. Screws of pump and driving motor are loose. 2. Internal parts damaged. 3. Insufficient oil supply.	1. Fasten 2. Replace 3. Regulate safety valve or repair piping

D. Abnormal Noise of Vacuum Pump	1.Screws fastening pump and driving motor is lose. 2.internal parts damaged. 3.vacuum is too high.	1.Fasten 2.Change 3.Adjust according to in-struction manual of pump.
E. Excessive Temperature of Oil pump Motor	1.Bearings are in short of oil or damaged. 2. Incorrect installation. 3. Internal Parts or seals damaged.	1.Add oil or change 2.Adjust 3.Change
F. Oil Temperature can't rise or too low after heater is started	1. Temperature controller is out of order. 2.Internal heater burnt or circuit shorted.	1. Replace 2.Replair wire of change heater
G. Electric element out of order	Electric parts damaged or no earthing.	Replace or safety earthing