ZXJ 型抽气机组

操作维护手册

Instruction Manual For ZXJ Roots Pump Vacuum Pumping Unit

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一、简　介

我厂为分离机械设备定点生产厂，有三十多年制造分离机械的历史，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已任，致力于分离机械的开发研制及油液输送设备和电液装置的设计制造。近十年来，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，产品远销拉美、欧洲、东南亚一带二十多个国家和地区。主要产品有 ZJA 型双级高真空净油机、ZLSG 型全自动滤水器、ZLSG-B 滤网快换型全自动滤水器、ZLSG-G 型复合排污全自动滤水器、LSG 型转动式滤水器、QGZ 型气体干燥装置、ZJCQ 型透平油过滤机、ZJCQ/A 型全物理式透平油过滤机、ZJB 型单级真空净油机、ZXJ 型真空抽气机组、LY 型压力式滤油机、WLY 型手提滤油机、JYG 型精密滤油机、2CY 型齿轮油泵及电力用油罐、手动注油机、呼吸器、快速接头、机外加热器等二十多个系列、三百多个规格。本说明书主要介绍的是 ZXJ 型罗茨真空泵抽气机组。

二、结构特点及用途

本机组为罗茨泵真空抽气机组，它以罗茨泵作为主泵，以旋片式真空泵作为前级泵；在前级泵与主泵中间串联一个压差阀，随前级泵的开关而启闭，。在任何状态停机时，自动切断外界大气与被抽系统的通道，以确保被抽系统的真空度，并确保真空泵油不反流入被抽系统；本机组的进气口采用球阀，阀门前安装真空计，以便准确地观察被抽设备或容器的残余气体状况和控制罗茨泵的启动。

本机组的工作压力为 133-7Pa，所能达到的极限真空为 7Pa。由于机组具有起动快，抽速大等特点，可用于真空冶炼、焊接、干燥及化工制药、电真容器件等工业作为抽真空用。但不适用于抽除含氧过高的，有毒的，有爆炸性，含水分过重的，对金属有腐蚀作用的，对泵油起化学反应的，以及含有颗粒尘埃的气体；也不适用于把气体从一个容器输送到另一个容器作为输送真空机组用。

三、工作原理

当被抽系统（变压器）被抽到一定的真空度（通过真空计进行设定）时，自动启动罗茨泵。

循环水冷却装置主要用来冷却真空泵。

四、主要技术参数

型号 参数	ZXJ-30	ZXJ-70	ZXJ-150	ZXJ-300	ZXJ-600
抽气速率 L/S	30	70	150	300	600
极限真空 Pa	≤7				
工作真空 Pa	≤133				
抽气级数	2				
罗茨泵型号	ZJ-30	ZJ-70	ZJ-150	ZJ-300	ZJ-600
配用前级泵	2X-4	2X-15	2X-15	2X-30	H-150
配套功率 kW	1.3	3.3	4.4	5.34	16.56
重量 kg	240	650	760	960	2400
外形尺寸 mm	700×480×1100	1110×900×1500	1110×960×1480	1210×870×1520	1620×1360×1820

五、操作步骤

1、作好准备工作，将设备移至被抽容器附近，接好三相电源，调试各泵，注意其运转方向是否正确；

2、接好相应的抽气管道及水箱冷却水加满，关闭所有阀门.

3、启动电源，打开管道真空阀，若采用水泵循环冷却时，此时即可启动冷水泵；

4、启动真空泵，同时接通真空计电源，设置所需要的罗茨泵启动真空度，当系统真空度达到所设定值范围时，自动启动罗茨泵。

5、当被抽容器真空度达到规定要求时，即可关闭机组，真空压差阀与罗茨泵自动关闭，同时关闭冷水泵和其它阀门，若不需真空计再显示值时，可断开真空计电源，将设备擦洗干净，盖好防护用具，以待下次使用。

六、操作注意事项

1、真空泵工作时，应注意泵油标显示的油液情况，油位应在油标中心附近，油位过高，将引起真空泵喷油。

2、若环境温度低于 5℃而不能启动时，可将真空油加热至 15-30℃后加入泵内起动。

3、应经常补加罗茨泵润滑油，以免轴损坏。

4、冷却水若采用水泵循环冷却时，其进水温度以不高于 30℃为宜。

5、若用于抽除含有少量水汽等可凝性气体时，开真空泵时应旋开气镇阀工作 30-60 分钟，可延长泵油使用时间。

6、在使用过程中，若发现真空泵油位显著升高或油呈乳化状时，宜开气镇阀工作或放出存水，把油位降低到油标中心附近。

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

8、冬季停机，应放尽冷却水，以免冻裂真空泵。

1. BRIEF INTRODUCTION

With a history of manufacturing separation equipments of more than 30 years, our factory is a specialized enterprise direct under. The ministry of Machine-building of China. We are devoted to development and fabrication of separation equipments and oil/liquid transmission equipments to meet demands of developing power industry. In recent decades, we have supplied domestic important projects with a large quantity of separation equipments and oil delivery equipments. Our products have been sold to more than 20 countries and regions in Europe, Latin America and South-eastern Asia. We mainly produce products of more than 20 series and more than 300 specifications, including Model ZJA two-stage high vacuum oil purifier, Model ZLSG automatic water filter, Model LSG rotary water filter, Model ZJCQ turbine oil filter, Model ZJB single stage vacuum oil purifier, Model ZXJ Root Pump Pumping Unit, Model LY press filter, Model WLY portable oil filter, Model JYG high precision oil filter, Model AY centrifugal oil pump, Model 2CY\KCB gear pumps and oil tank for power industry, manual oil injector, breather, fast-connection adapter, oil regeneration unit and outside heater. This manual mainly deals with model ZXJ Root Pump Pumping Unit.

2. STRUCTURE AND APPLICATION

This unit takes Root Pump as main pumps and rotary vacuum pump as fore-pump. Between the main pump and fore-pump, a difference pressure valve is mounted. The valve is opened/ closed with switching on/off of fore pump. It cuts off the channel between atmosphere and the system pumped in case of shutdown to ensure vacuum of pumped system and to prevent vacuum pump oil from entering the pumped system, A German Delo Valve is provided at intake of the unit , A mini computer-type resistance vacuum meter before the said valve in order to monitor accurately the residual gas in pumped system or container and to control operation of Roots pump.

With operating pressure of 133-7Pa and limit vacuum of 7Pa, quick start and higher

pumping rate, the unit is suitable for pumping in vacuum melting, welding, drying chemical, Pharmaceutical and electric/vacuum industries. However, it is not applicable to pumping much oxyen-containing, poisonous, explosive, corrosive, much water containing and dusty gases. It is also not ideal for delivering gas from one container to another.

3. OPERATION PRINCIPLE

When the pumped system is pumped to certain vacuum, the Roots Pump Starts automatically. Circulation water- cooling device is for vacuum Cooling.

4.MAIN TECHNICAL DATA

Model / Data	ZXJ-30	ZXJ-70	ZXJ-150	ZXJ-300	ZXJ-600
Pumping Rate L/S	30	70	150	300	600
Limit Vacuum Pa	⩽7				
Operating Vacuum Pa	⩽133				
Stage No. of Pumping	2				
Model of Root Pump	ZJ-30	ZJ-70	ZJ-150	ZJ-300	ZJ-600
Fore-pump Matched	2X-4	2X-15	2X-15	2X-30	H-150
Matching Power kW	1.3	3.3	4.4	5.34	16.56
Weight kg	240	650	760	960	2400
Overall Dimension mm	700×480×1100	1110×900×1500	1110×960×1480	1200×870×1560	1620×1360×1820

5. OPERATION

5.1 Make the unit approach to the container to be pumped. Connect the unit with three phase power and commission all pumps to check correct running direction.

5.2 Connect corresponding pumping pipes and fill cooling water into water tank until it is full. Close all valves.

5.3 Switch on mains, Open vacuum valves of piping. In case that cooling circulation water is adopted. Cooling pump may be started at this time.

5.4 Start vacuum pump, At the same time turn on vacuum meter and set required start vacuum of Root Pump, when the system reaches to set valves , Root Pump starts automatically.

5.5 When pumped container obtains specified vacuum, turn off the unit and vacuum differential valve and Root Pumps are turned off automatically. At the same time, turn off cooling water pump and close other valves. If no readings indication of vacuum meter is needed, disconnect power of vacuum meter, Clean the unit and have it covered for next operation.

6. PRECAUTIONS

6.1 When vacuum pump is running, attention should be taken to watching oil level indicated by oil mark. The oil level should be near to the center of oil mark too much higher oil level will cause oil spray of vacuum pump. When the unit is at stand still, observing oil level can be done by opening valve of circulation filter and starting motor of vacuum pump instantaneously one or two times while observing.

6.2 If the unit can't be started at ambient temperatures below 5℃,Start can be made by heating vacuum oil to 15-30℃.

6.3 Often compensate lube oil of Roots Pump to avoid Shaft damage.

6.4 If water pump circulation cooling is adopted, inlet water temperatures should be below 30℃.

6.5 In case the unit is used to pump less-vapour containing condensate gas, gas control valve should be screwed open for 30-60 minutes in order to prolong service life of pump oil.

6.6 During operating, if oil level of vacuum pump is increased remarkably or oil is emulsified, gas control valve should be opened or water let out to lower oil level to

vicinity of oil mark center.

6.7 During operating, always keep an eye to noise and temperature of the pump and respective motor. Remove any abnormalities, if found, their allowable temperature rise should be below 40℃ (namely, max temperature can't exceed 80℃).

6.8 If shutdown is needed in winter , the unit should be drained off to avoid freezing.