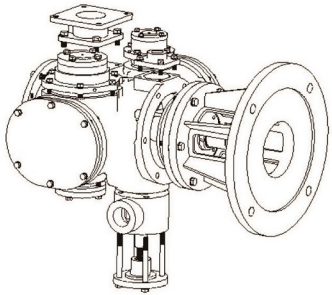
水润滑无油螺杆空压机
操作手册

Water Lubricated Oil-free Screw Air Compressor
Operation Manual



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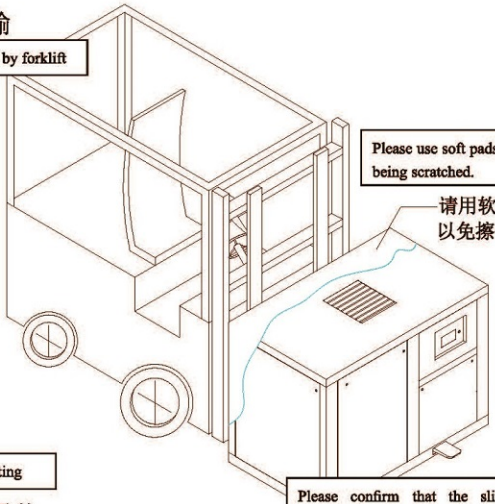
1.1、安装现场搬运 On-site Installation Handling

叉车运输

Transportation by forklift



Please use soft pads to avoid the chassis being scratched.

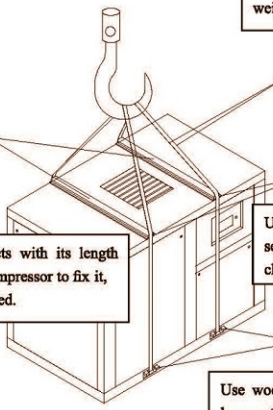
请用软物塞垫，以免擦伤机箱

Crane hoisting

起重机吊装

Please confirm that the sling has enough strength before lifting. It is better to check the weight of the air compressor in advance.

起吊前确认吊索有足够的强度，最好事先察看压缩机重量的说明。



用大于机箱宽度的木垫或同类型支撑条固定，防止吊索滑动或挤压伤害机箱。

Use wood blocks or brackets with its length more than the width of air compressor to fix it, Avoiding the body being hurted.

用软垫（海绵或软布）与机箱隔开，防止擦伤机箱。

Use soft pads (sponge or soft cloth) to separate the chassis to avoid to crush the chassis.

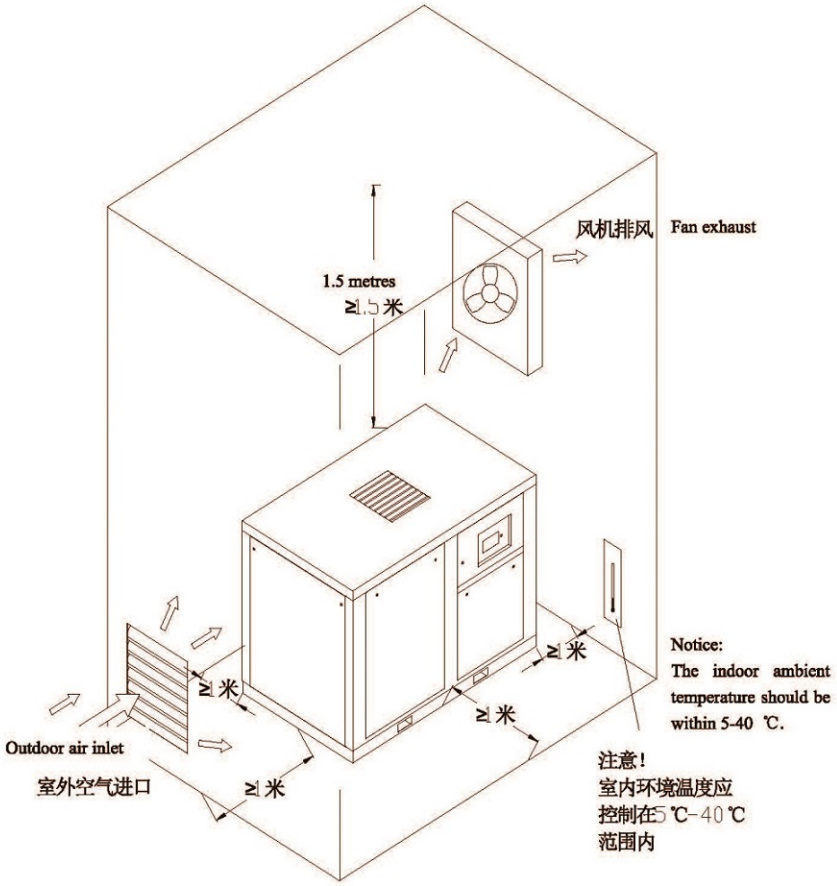
用大于机箱宽度的木垫或同类型支撑条固定，防止吊索滑动或挤压伤害机箱

Use wood block or the bracket with its width longer than the width of compressor to fix it. avoiding the compressor body being hurted.

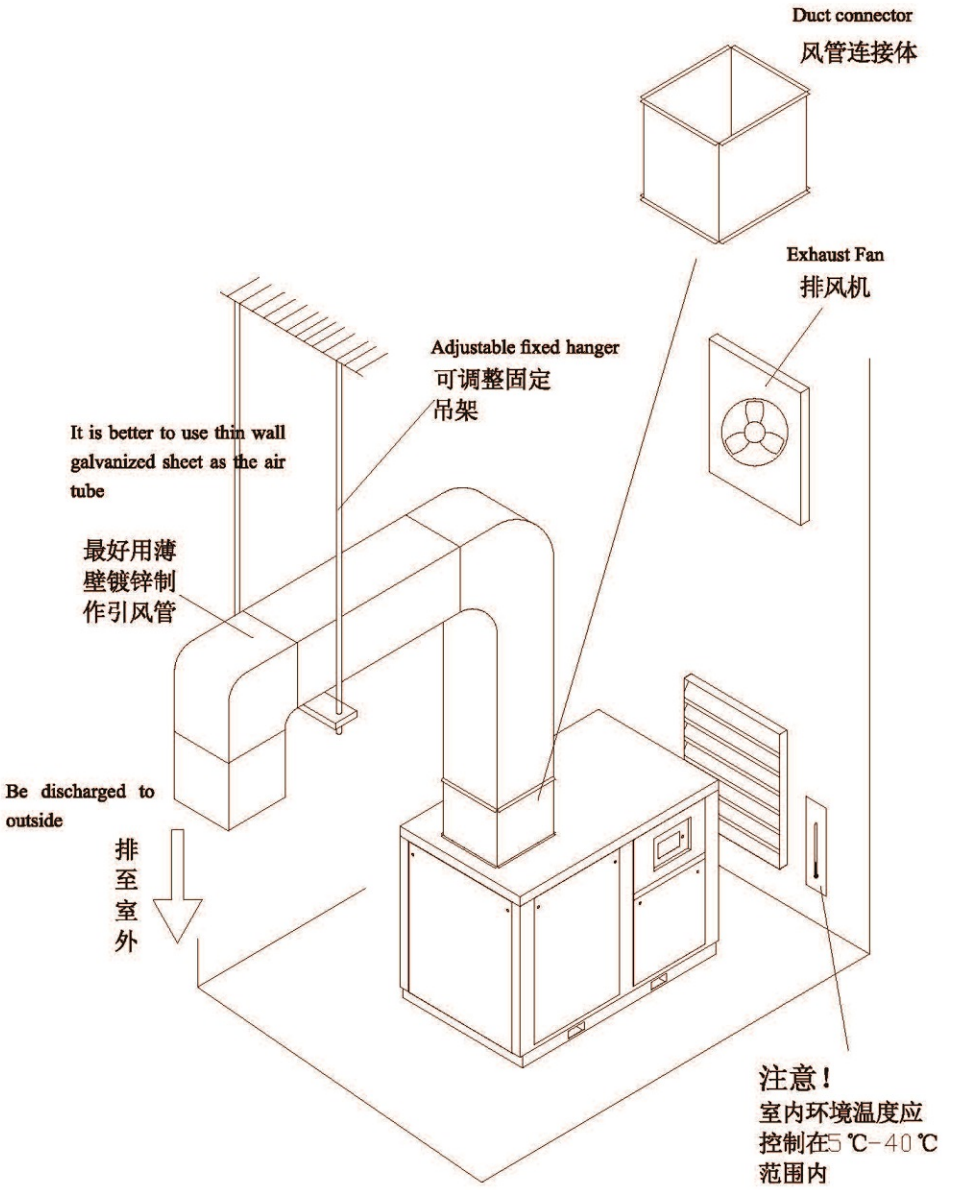
1.2、安装场所要求 On-site Installation Requirements

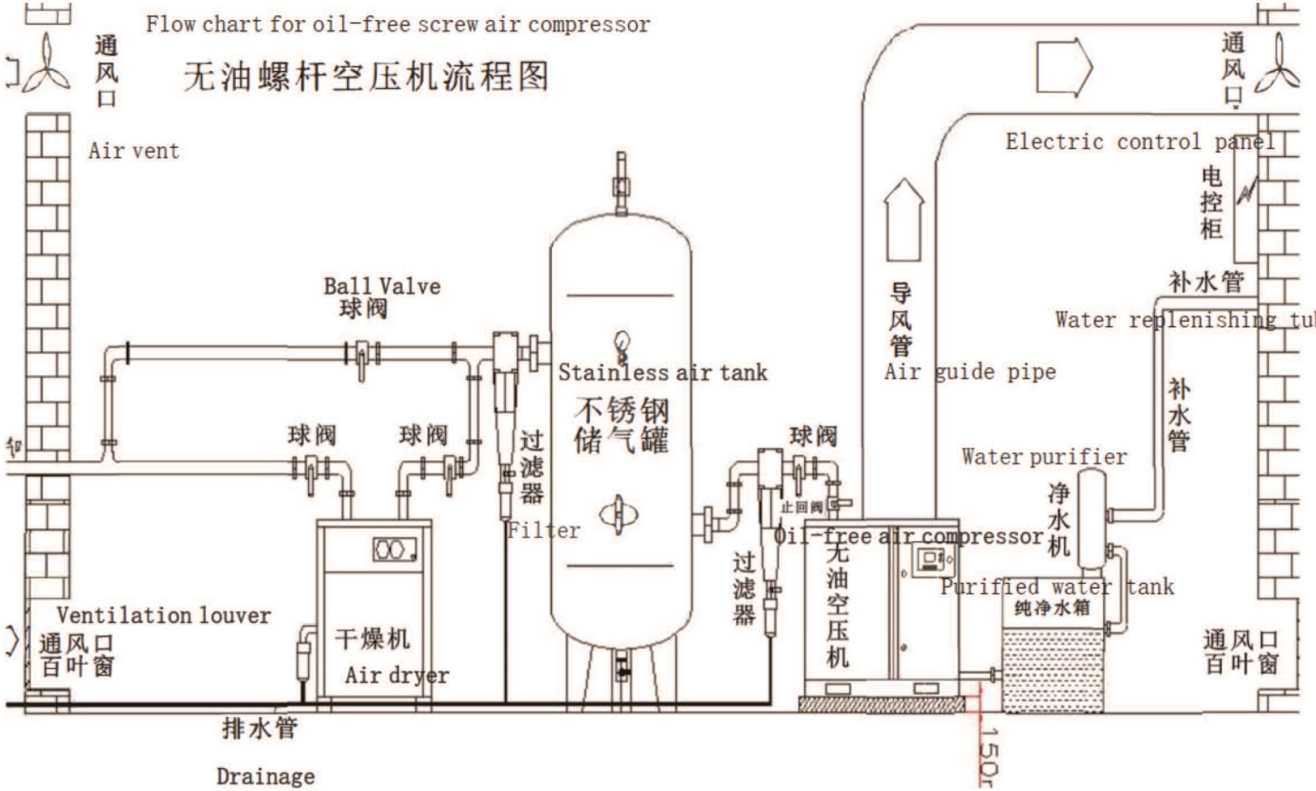
螺杆空气压缩机的工作介质取之于空间的空气，因此它对工作环境的空间必须有一个最低限度的要求，并且这一空间还必须保证有足够的开放面积与外界进行空气交流，同时还必须满足这一空间及其外界的周围没有粉尘和烟雾，以上是螺杆空气压缩机最基本的运行环境条件。具体的空间大小请见下图：

The working medium of screw air compressor is air taken from the ambient space, so it must have a minimum requirement for the space of working environment, and this space must also ensure enough open area for air exchange with the outside world. At the same time, it must satisfy that there is no dust and smoke in this space and its surroundings. It is the most basic operation environmental requirement of screw air compressor. The specific size of the space can be referred as the following figure:



1.3、导管的安装 Installation of Guided Pipe




Flow chart for oil-free screw air compressor
无油螺杆空压机流程图
通风口
Air vent
Ball Valve
球阀
球阀
球阀
过滤器
Filter
Stainless air tank
不锈钢气罐
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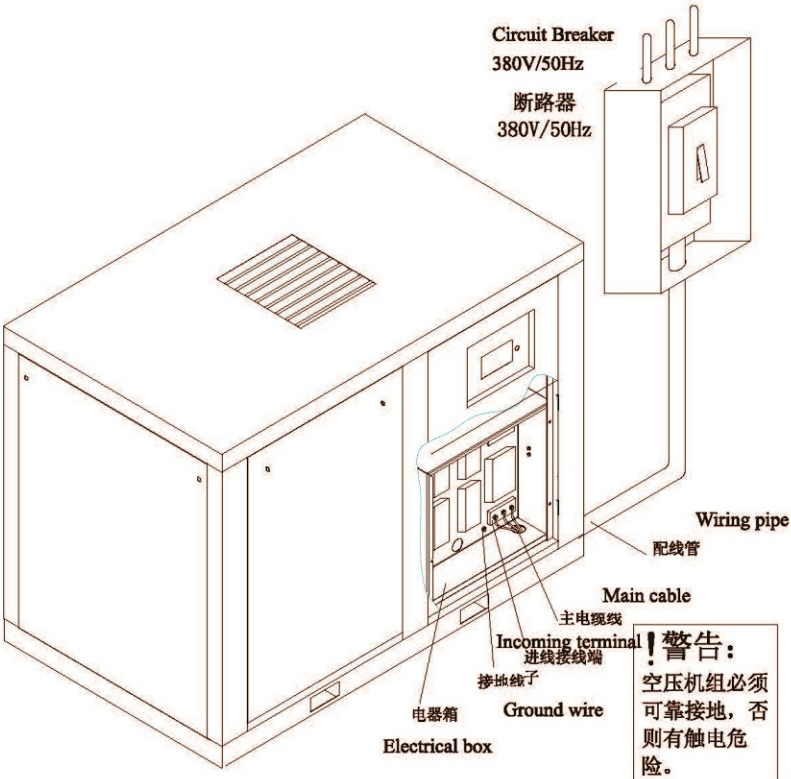
导风管
Air guide pipe
通风口
Electric control panel
电控柜
补水管
Water replenishing tube
补水管
Water purifier
净水机
Purified water tank
纯净水箱
Ventilation louver
通风口百叶窗
干燥机
Air dryer
排水管
Drainage
通风口百叶窗
150

1.4、电源配置 Power configuration

压缩机的电源配置应严格按下表要求，否则可能引起电线发热，电路烧坏等严重故障。

Compressor power configuration should be strictly complied with the requirements of the table below, otherwise it may cause serious faults such as wire heating, circuit burnout and so on.



Warning:
The air compressor must be grounded reliably, otherwise there will be an electric shock.

型号 Model	08W	11W	15W	22W	37W	45W	55W	75W	90W	110W	132W	160W	185W	200W	220W	250W
额定断路器电流（A）Rated circuit breaker current	60	60	80	100	175	200	250	350	400	500	630	720	850	900	1000	1200
国际铜线主配线横截面（mm²）Cross section of international copper wire main wiring（mm²）	≥6		≥10	≥16	≥25		≥50	≥50	≥70	≥95	≥120	≥130	≥150	≥170	≥200	≥220
配线长度（m）Cable length	配线长度请按图示要求，由用户自定，配线不宜过长。 The length of the wiring must be set according to the graphic requirements, and the user must make the wiring with appropriate length.															

1.5、空压机水质要求 Water quality requirements of air compressor

无油水润滑空压机在运转时，润滑水是提供润滑、冷却及密封等功能，因此压缩机的效率及性能跟水质有密切的关系。为了防止空压机的冷却器和管路出现腐蚀、水垢及其他不洁物质造成的损坏，就要求每 150 小时换一次纯水，纯水水源必须遵循下列有关水质要求：

When water lubricated oil-free air compressor is running, the lubricating water is to provide lubrication, cooling and sealing functions, so the efficiency and performance of the compressor is closely related to the water quality. In order to prevent the air compressor cooler and pipeline from corrosion, scale and other impurities caused by damage, it is required to replace pure water every 150 hours. Pure water sources must comply with the following water quality requirements:

项目 Item	标准 Standard	影响 influence		
		腐蚀	水垢	污泥
外观 Appearance	透明无色 Transparent and colorless	Corrosion	Scale	Sludge
浑浊度 Turbidity	2 以下 Less than 2			
酸碱值 pH（25℃） PH Range	6.5—8	O	O	
导电值（25℃）Conductive value	2—150us/cm	O	O	
总固体溶解度 （TDS） mg/l Total solid solubility	1—70		O	
铁含量（Fe）Iron Content mg/l	0.3 以下 less than 0.3	O		
碱度（$CaCO_3$）Alkalinity mg/l	50 以下 less than 50		O	
氯离子含量（ Cl^- ）Chloride ion content mg/l	50 以下 less than 50	O		

硫酸离子含量（SO_4^{2-}） mg/1 Sulfate ion content	50 以下 less than 50	O		
硝酸离子含量（NO_3^-） mg/1 Nitrate ion content	0.3 以下 less than 0.3	O		
氧化硅含量（SiO_2） mg/1 Silicon oxide content	30 以下 less than 30		O	
COD Mn（O） mg/1	2.5 以下 less than 25			O
总硬度（ $CaCO_3$ ） Total hardness mg/1	50 以下 less than 50		O	
氨离子含量（ NH^{4+}）Ammonia ion content mg/1	0	O		

※ 若无法提供上述水质，可采用桶装（家庭用）纯净水更换。

If water quality above is not available, barreled (household) purified water can be replaced.

1.6、冷却水配置 Cooling water

无油水润滑空压机冷却水水泵配置要求：冷却器进水水泵扬程≥20 米（冷却器进出水的压力差必须≥1.5bar；冷却水温度≤35℃）。

冷却水水量配置要求如下表：

Configuration requirements of cooling water pumps for water lubricated oil-free air compressors: water pump lift is ≥20 meters for cooler inlet water(the pressure difference between the inlet and outlet water of the cooler must be more than 1.5 bar; the temperature of the cooling water should be less than 35 ℃).

The cooling water requirement is as follows:

输入功率	7.5KW	11KW	15KW	18KW	22KW	30KW	37KW	45KW	55KW	65KW
冷却水水量（T / h）Cooling water volume	2.5	3.5	5	6	7	10	12	15	18	22

输入功率	75KW	90KW	110KW	132KW	160KW	185KW	200KW	220KW	250KW
冷却水水量（T / h）Cooling water volume	24	30	36	45	55	65	72	80	90

1.7、纯水器（离子交换树脂）Water purifier (ion exchange resin)

1、无油水润滑系列空压机，以水提供润滑、冷却及密封的效果，因此水质影响了压缩机的效率与寿命，纯水器为控制水质的重要组件。

Oil-free water lubrication air compressors provide lubrication, cooling and sealing effect with water, so water quality affects the efficiency and life of compressors. Water purifier is an important component to control water quality.

2、水中的钙、镁离子是使水硬化的主要原因，它们会在压缩机的机体与管路内壁形成水垢，严重影响压缩机的效率与寿命，因此选配的纯水器系藉由离子交换原理来除去水中的钙、镁离子，以便得到适合压缩机使用的水质。

Calcium and magnesium ions in water are the main reasons for water hardening. They form

scales in the inner walls of the pipelines, which seriously affects the efficiency and life of the compressor. Therefore, the water purifier equipped by our selective configuration uses ion exchange principle to remove calcium and magnesium ions in water in order to obtain water quality suitable for compressor.

3、然而纯水器在使用一段时间后，因为阳离子逐渐减少，进而影响离子交换能力，所以需要定期更换内部的离子交换树脂。一般而言，纯水器树脂再生期限为一年左右，若处理水质较硬，则期限缩短。反之，则延长。However, after the water purifier is used for a period of time, because cations gradually decrease, which affects the ion exchange capacity, it is necessary to periodically replace the internal ion exchange resin. Generally speaking, the regeneration period of resin in water purifier is about one year. If the treated water quality is hard, the period will be shortened. On the contrary, it is extended.

4、此纯水器使用于自来水，当使用其它较差水质之水源，将影响纯水器过滤后之水质，请定期做水质检验（建议 3～6 个月），确保过滤后之水质符合压缩机水质要求，若无法符合上述水质要求，请与本公司服务单位联络。The tap water is applicable for the water purifier. When using other water sources with poor water quality, it will affect the water quality of the purifier after filtration. Please make periodic water quality inspection (recommendation 3-6 months) to ensure that the filtered water quality meets the water quality requirements of the compressor. If it fails to meet the above water quality requirements, please contact our company's service department.

2、空压机调试运行及开机步骤

Commissioning and start-up procedures of air compressor

2.1、运行准备 Operation preparation

2.1.1、为保证空压机正常运行，其环境温度风冷机型必须保持在 2℃～40℃之间，水冷机型必须保持在 2℃～45℃之间，防止润滑水结冰或因高温而使排气温度过高。

In order to ensure the normal operation of air compressor, the ambient temperature must be maintained between 2 ~40 ℃ for air cooled compressor, and which be maintained between 2 ~45 ℃ for water cooled compressor, to prevent the lubricating water from freezing or excessive exhaust temperature caused by high temperature.

2.1.2、接上电源线与接地线，检测主电源是否接通，三相电源线相位是否无误。

Connect the power cable and ground wire, check whether the main power is connected, and whether the phase of the three-phase power supply is correct.

2.1.3、关闭排污阀，打开水气桶的手动补水阀，加入符合水质要求的纯水或家庭用的纯净水，使面板显示水位为中水位，然后关闭手动补水阀，打开进气管，打开阀板，从进气阀入口处加入纯净水，使主机内水位达到主机中部。

Close the sewage valve, open the manual water supply valve of the water/air tank, and add the pure water that meets the water quality requirements or the pure water for household use, so that the water level reaches the middle position of airend.

2.1.4、在补水桶中加入符合水质要求的纯水或家庭用的纯净水，并打开补水桶阀门或打开补水管阀门。

Add pure water that meets the water quality requirement or pure water for household use in the water supply tank, and open the water supply tank valve or the water supply pipe valve.

2.1.5、打开空压机与储气罐之间相连的阀门。

Open the valve between the air compressor and the air receiver.

2.2、上电显示 Power display

空压机通电后显示屏显示报警时，位置出现相序错误时，先关闭电源，再将输入的三相电源中的任意两相调换一下，再重新接上电就可以了。

When the air compressor is powered on and the display screen displays alarm, when the phase sequence error occurs, the power supply should be turned off first, then any two phases of the three-phase power supply can be exchanged, and then the power can be re-connected.

2.3、开机运行 Start-up operation

2.3.1、按下“启动”按钮后，立即按下急停按钮，观察压缩机主机及风机转向是否正确，显示屏显示各参数是否正常，若有异常声音、振动、漏水等不正常现象应马上排查故障，然后再把主机里水位加到主机中部，点动 2 秒后，就可正常启动。

After press the "Start" button, and then press the emergence button immediately to observe whether the rotary direction of compressor airend and fan are correct, and whether the parameters on display screen are normal. If there are abnormal, such as sounds, vibration, water leakage and other abnormal phenomena, Troubleshooting should be done immediately, then let the water level reaches the middle position of airend. Inching after 2 seconds, it will start normally.

2.3.2、按下“启动”按钮，因机组在控制屏上显示水气桶缺水报警而无法开机，此时只要打开水气桶上的手动补水阀直接对水气桶进行手动加水，直到水位达到水位计高水位即可。按复位键，重新按下“启动”按钮，系统启动 60 秒后无报警，机组进入正常运行状态。

Press the "Start" button, if the compressor control panel displays the alarm of water shortage and can not start, then just open the manual water supply valve on the water/air tank and add water manually until the water level reaches the high level of the water gauge. Press the reset button and press the "Start" button again. After 60 seconds of system start-up with no alarm and the system is in normal operation.

2.4、长时间停机前后的处理 Handling after long shutdown

2.4.1、交货前或长时间停机前，建议将水气桶内和主机内部的润滑水放完，并将空压机内部擦干净，控制盘等电气设备用塑胶纸或油纸包好，再将空压机所有开口封闭以防湿气、灰尘侵入及锈蚀。

Before delivery or long shutdown, it is suggested that the lubricated water in the water/air tank and airend should be discharged completely, the internal air compressor should be wiped clean, the control system and other electrical components should be wrapped in plastic paper or oil paper, and then all openings of the air compressor should be closed to prevent moisture, dust invasion and rust.

2.4.2、长时间停机后开机，应手动加入润滑水到水气桶内直到中水位，并从进气阀加入 3～10L 润滑水，用手盘动空压机数转，防止启动时空压机主机因缺水而烧毁，此流程最少做 2 次；若交货时或长时间停机后，水气桶内润滑水一直存到开机，那么第一次开机时应及时更换润滑水；在重新开机时，一定要注意测量电动机绝缘电阻应在 1MΩ以上，否则会出现漏电现象而导致电动机烧毁或触电等事故。

Start after long shutdown, the lubricated water should be manually added to the middle level of the water/air tank, and add 3-10L lubricated water from the intake valve, and manually turn the air compressor several cycles to prevent the airend of the compressor from being burnt due to water shortage when start; This process should be done at least twice, if long shutdown, there will

be lubricated water in the water/air tank, then the lubricated water should be replaced in time when the first start. When restarting it, we must pay attention to measure the insulation resistance of the motor. The value should be more than 1M. Otherwise, leakage will occur, which will lead to motor burnout or electric shock, other accidents.

2.4.3、防冻措施：空压机安置环境低于 2°C 之区域停机时，必须将水气桶、过滤器、冷却器、主机及管路的水卸除干净。水结冰会导致零件损坏（不在三包范围）。下次开机时，要按长时间停机再开机流程处理。

注：在压缩机内部干燥下，按下压缩机运转，因主机无水润滑，将导致的空压机严重损坏，不在公司三包范围。

Anti-freezing measures: When the air compressor is shut down in an area with temperature less than 2 ℃, the water in the air tank, filter, cooler, airend and pipeline must be discharged completely. Water freezing can cause some parts to be damaged (not in the scope of the 3 guarantee services). The process of long shutdown should be followed when start on next time.

Note: Base on the internal pipeline of the air compressor is dry, the compressor will be seriously damaged due to the water shortage of the airend if starting the compressor to run, which is not within the scope of the company's guarantee services.

3、系统工作原理、工作流程、操作说明及故障处理

The working principle, workflow, operation instructions and troubleshooting of the system

3.1、螺杆空气压缩机系统工作原理

Working principle of screw air compressor system

3.1.1、启动 **startup**

螺杆空压机主机采用星三角转换空载或变频软启动模式，当主电机在停止状态时，进气阀关闭，放空阀开启，主电机在无负载时以星形启动，同时断水电磁阀得电，断水阀开启 6～10 秒后转成三角形运行，这时压缩机主机通过进气阀上的进气小孔吸气并压缩到水气桶内，建立了约 0.2～0.3MPa 的系统初始压力，使水气桶内的水经过冷却器、断水阀及水过滤器后向主机供水。

The airend of screw air compressor adopts star triangle conversion or variable frequency soft startup. When the main motor is in stop state, the intake valve closes, the release valve opens, and the main motor starts in star mode without load. At the same time, the water cut-off solenoid valve gets electricity, the cut-off water valve opens after 6-10 seconds, and turns into triangle operation. At this time, air passes through the small holes in intake vale to be compressed into water/air tank. The initial pressure of the system is about 0.2-0.3 MPa. The water in the water/air tank is supplied to the airend after passing through cooler, cut-off water valve and water filter.

3.1.2、加载 **Load**

主电机转成三角形运行后约 5～10 秒，控制器使加载电磁阀得电，加载电磁阀打开，放空阀关闭，进气阀开启，主机开始负载运行，当水气桶内压力超过 0.4MPa 时，最小压力阀打开，压缩机开始向外供气。

About 5-10 seconds after the main motor turns into triangle operation, the controller makes the loaded solenoid valve to be electrified, the loaded solenoid valve opens, the release valve closes, the intake valve opens, and the airend begins to run with load. When the pressure in the water/air tank exceeds 0.4 MPa, the minimum pressure valve opens, and the compressor begins to generate compressed air.

3.1.3、卸载—加载 Unload-- load

当控制器检测到系统压力达到卸载压力时，控制器使加载电磁阀断电，这时进气阀关闭，放空阀开启，当外部压力大于水气桶压力，最小压力阀关闭，压缩机继续运转，并通过进气阀小孔吸气，压缩至水气桶内，放空阀开启放空，使水气桶内的压力保持在 0.4MPa，以维持系统的正常运行。这时主电机是空载运行，电流为满负荷的 15%左右。当外部供气压力下降至加载压力时，控制器使加载电磁阀得电，放空阀关闭，进气阀打开，压缩机加载运行，开始向外供气，如此循环动作。

When the controller detects that the system pressure reaches the unloading pressure, the controller shuts down the loading solenoid valve. At this time, the intake valve closes and the release valve opens. When the external pressure is higher than the water/air pressure, the minimum pressure valve closes, and the compressor continues to operate. Air is sucked through small holes of air intake valve, and compressed into the water/air tank, and the release valve opens and discharges. The air pressure inside the water tank keeps 0.4MPa to maintain the normal operation of the system. At this time, the main motor is running at no load and the current is about 15% of the full load. When the external supply pressure drops to the loading pressure, the controller makes the loading solenoid valve get electricity, the release valve closes, the intake valve opens, the compressor runs with load, and begins to supply air outward, the circulation action is repeated like this.

3.1.4、水气分离 Water/air Separation

压缩机工作时，水气桶内的水由系统压力驱动，经冷却器、水过滤器及断水阀向主机内喷水，压缩机排出的是水气混合物，经水气桶时，由于气流产生的离心力及碰撞等作用，使水气混合物中 99.99%以上的水分离沉淀在水气桶中，压缩空气经由最小压力阀排出水气桶外。

When the compressor runs, the water in the water/air tank is driven by the system pressure is to be sprayed into the airend through the cooler, water filter and cut-off water valve. The compressor discharges a mixture of water and gas. When the mixture passes through the water/air tank, more than 99.99% of the water in the water/air mixture is separated and precipitated in the water/air tank due to the centrifugal force and collision produced by the air flow, the compression air will be discharged away from the water/air tank through the minimum pressure valve.

3.1.5、自动补排水 Automatic filling water and drainage

当压缩机持续进行压缩及冷却时，空气中的水分便凝结累积在水气桶内，水位上升，若水位高于正常时，自动排水阀开启，排出多余的水分；当湿度较低（如冬天）或是冷却器效率较差造成温度上升，桶内的水气随着空气排出，水位降低，若水位低于正常时，自动补水阀开启，由压缩机吸气侧补充水进入水气桶内。

When the compressor continuously runs and, the moisture in the air will condense and accumulate in the water/air tank, and the water level rises. If the water level is higher than normal, the automatic drain valve opens and discharges excess water. When the humidity is low (such as in winter) or the efficiency of the cooler is poor, the temperature rises, and the water/air in the tank is discharged with the compressed air. When the water level is lower than normal, the automatic water supply valve opens and the compressor sucks the supplementary water into the water/air tank.

3.1.6、主机运行温度及冷却 Operation temperature and cooling of airend

喷水螺杆机主机的运行温度应维持在≤环境温度+20℃，这样可使润滑水能得到有效分离，而不会因高温使水汽化或高温。当压缩机一开机时冷却风扇就得电，压缩机水得到冷却，冷却后的压缩机水喷至主机内，使主机温度下降。

The operating temperature of the airend of the water injected screw air compressor should be

maintained at ≤ ambient temperature+20 ℃, so that the lubricating water can be effectively separated without water vaporization or high temperature. When the compressor starts, the cooling fan gets electricity, the compressor water is cooled, and the cooled compressor water is sprayed into the airend, which reduces the temperature of the airend.

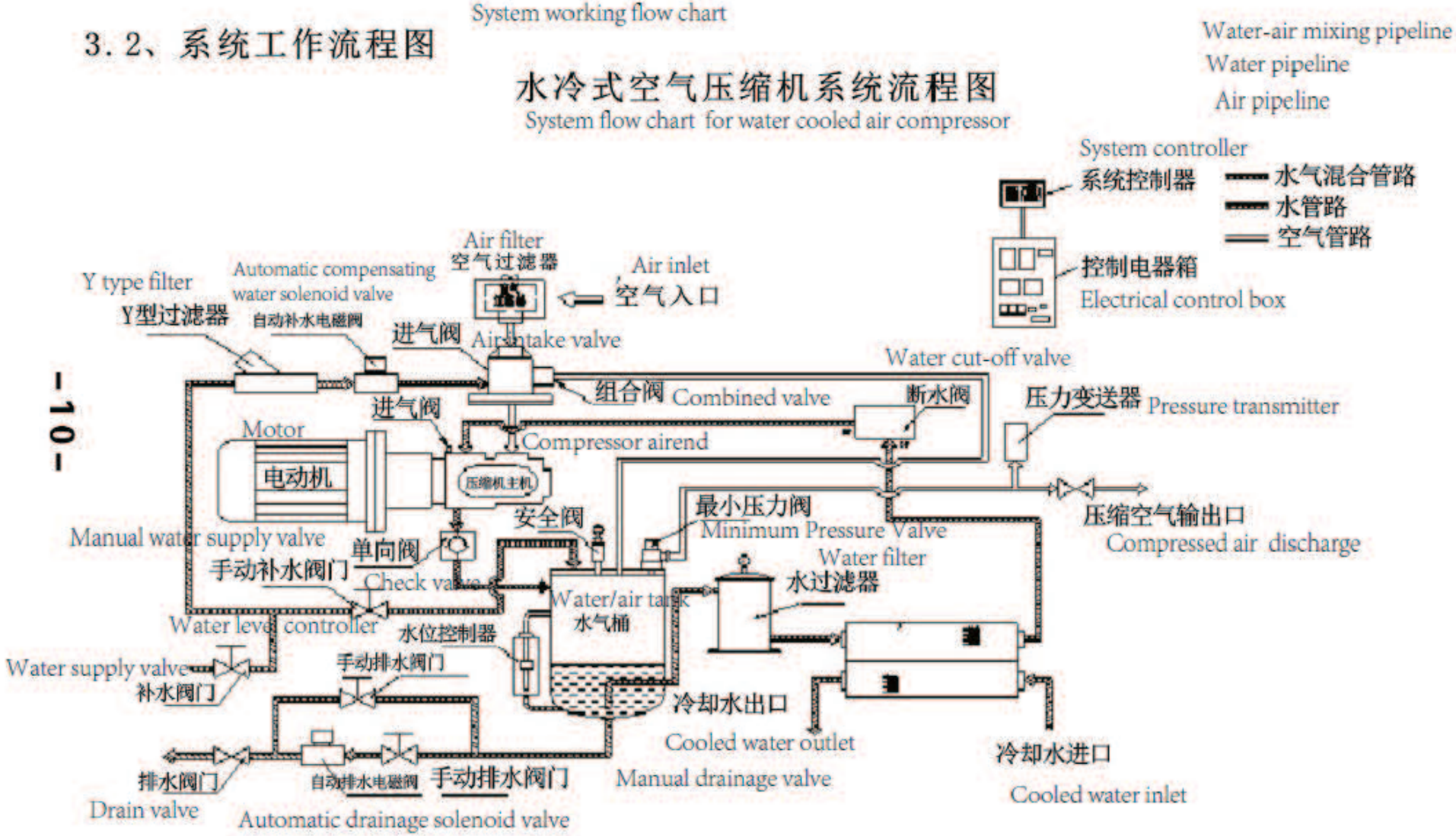
3.1.7、停机 Downtime

停机时，压缩机会先卸载运行 15～35 秒，当水气桶压力下降 0.4MPa 时，主接触器断电，主电机停止，同时断水电磁阀断电，断水阀关闭。

When the compressor stops, the compressor will run for 15-35 seconds after unload. When the pressure in the water/air tanks drops to 0.4 MPa, the main contactor will be cut off, the main motor will stop, and the solenoid valve will be cut off at the same time, and the cut-off water valve will be closed.

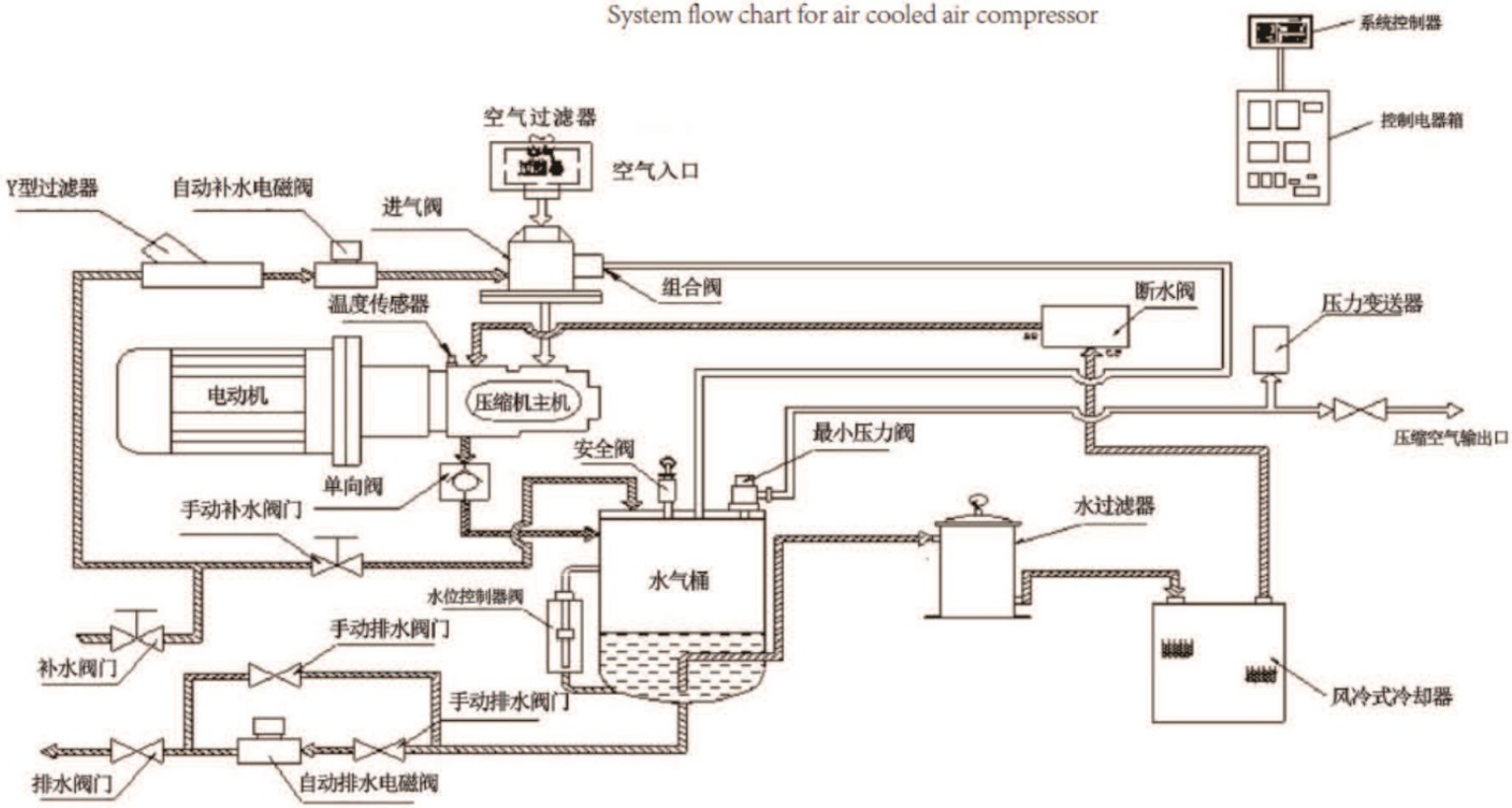
3.2、系统工作流程图

System working flow chart



风冷式空气压缩机组系统流程图

System flow chart for air cooled air compressor



4、自动补排水、自动换水和报警解除操作

Automatic filling and draining, automatic water change and alarm relieving operation.

4.1、自动补排水 Automatic filling and draining,

4.1.1、自动排水 Automatic draining,

当空气湿度大于压缩空气的出口湿度时，压缩空气中的水分便凝结累积在水气桶内，使水气桶内的水位上升，若水位高于水位控制器的最高点时，自动排水电磁阀开启，排出水气桶内多余的水，排至水位控制器的中水位，自动排水电磁阀关闭，自动排水结束。

When the air humidity is higher than the humidity of the outlet compression air, the water in the compression air will condense and accumulate in the water/air tank, which causes the water level in the water/air tank to rise. If the water level is higher than the highest point of the water level controller, the automatic drainage solenoid valve opens and discharges the excess water in the water/air tank until the water level reaches the middle water level of the water level controller. The drainage valve is closed and the automatic drainage finish.

4.1.2、自动补水 Automatic filling water

当空气湿度较低（如冬天干燥天气时），低于压缩空气的出口湿度时，水气桶内的部分水气随着压缩空气排出，水气桶内的水位逐渐降低，若水位低于水位控制器的最低点时，自动补水电磁阀开启，补水桶内的水被吸入主机后再进入水气桶内，当水位达到水位控制器的中水位时，自动补水电磁阀关闭，自动补水结束。

When the air humidity is low (e.g. in dry weather in winter) and lower than the humidity of the outlet compressed air, the water level in the water/air tank gradually decreases with the discharge of compressed air. If the water level is lower than the lowest point of the water level controller, the solenoid valve for automatic water replenishment opens and the water in the water replenishment tank is absorbed into the airend. When the water level reaches the middle level of the water level controller, the solenoid valve for automatic water replenishment closes and the automatic water replenishment ends.

4.2、自动换水 Automatic water exchange

4.2.1、自动换水条件 Automatic water exchange conditions

压缩机换水一般每 150 小时左右为一个周期，自动换水。用户应随时确保补水桶内有足够纯净水或接至补水口的水管不会断水，否则会造成换水程序停止。

The automatic water exchange cycle of the compressor is usually 150 hours per hour. Users should always ensure that there is enough pure water in the water supply tank or the water pipes connected to the water supply nozzle will not be cut off, otherwise the water exchange process will stop.

4.2.2、定时自动换水 Timing automatic water exchange

定时自动换水时指在系统运行 60 秒后，当润滑水使用时间达到设定的自动换水时间时，系统自动执行自动换水程序，自动换水程序结束时，润滑水使用时间自动清零并返回到主界面。自动换水时间和换水次数在显示屏的厂家设置菜单里设置。（注：出厂时参数已设置完，切勿修改。）

Timing automatic water change refers to after 60 seconds of the system operation, when the use time of the lubricated water reaches the set automatic water exchange time, the system automatically executes the water exchange program, when the automatic water exchange program ends, the use time of the lubricated water automatically clears and returns to the main interface. The automatic water exchange time and the number of water exchange are set in the manufacturer

menu of the display screen. (Note: when the factory parameters are set, not allowed to be modified.)

4.2.3、手动执行自动换水 Manual Automatic Water Exchange

手动执行自动换水是指在系统运行 60 秒后，通过手动修改显示屏显示的换水菜单中的手动换水“关”改为“开”并确认修改后，开始执行自动换水程序，自动换水程序结束时，润滑水使用时间自动清零并返回到主界面。(此功能为第一次开机或润滑水受到意外污染时使用)

Manual automatic water exchange refers to: after 60 seconds of the system operation, the manual water exchange "off" is changed to "on" in the water exchange menu displayed on the display screen by manual modification, and after confirming the modification, the automatic water exchange program is started. At the end of the automatic water exchange program, the use time of the lubricated water is automatically cleared and returned to the main interface. (This function can be used for the first run or lubricated water is accidentally contaminated.)

4.3、报警解除操作 Alarm Relieving Operation

在运行自动补排水或自动换水过程中程序出现“补水超时”或“排水超时”时，程序都要停止，在排出故障后，按复位键复位后，才能重新运行程序，在执行自动补排水和自动换水程序时，必须在系统运行 60 秒后才能执行。

In the process of automatic re-filling, drainage or automatic water exchange, when the program appears "overtime of re-filling" or "overtime of drainage", the program stops. After the fault is removed, press the "F2" reset button to be reset before the program can be run again. The system must be run for 60 seconds before performing automatic water re-filling, draining and automatic water exchange procedure.

5、定期检查保养及维护 Regular inspection and maintenance

5.1、螺杆空气压缩机保养项目及周期

Maintenance project and cycle of screw air compressor

保养周期 Maintenance cycle	运行时间 Running time	保养内容 Maintenance Content
每日 Daily	8	起动前，先确认外部之自动补水阀与排水阀是否开启 Before starting, confirming whether the external automatic replenishment valve and drain valve open or not.
		打开水气桶下方之手动排水阀，将底部沉淀物排出，动作完成后，请将手动排水阀关闭Open the manual drain valve under the water/air tank and drain the bottom sediment. After the operation is completed, please close the manual drain valve.
		确认水位是否在标准范围内，若水位不足，则开启手动补水阀以补水至标准范围内，待补水完毕后关闭手动补水阀Verify whether the water level is within the standard range or not, if the water level is low, open the manual water supply valve to re-fill the water to the standard range, and close the manual water supply valve after the completion of the water supply.
		运转前请再次确认手动补水阀及手动排水阀是否完全关闭，且运转中严禁开启 Before operation, please confirm again whether the manual water supply valve and manual drainage valve are completely closed, and it is strictly prohibited to open

		during operation.
每周 Weekly		检查管路接头在运转后因热膨胀而松脱或漏水，请重新上紧接头 Check whether there is loosening or leaking due to thermal expansion after operation. Please re-tighten the joints if it occurs.
		清洁机组，擦除灰尘和污垢Clean the compressor, remove dust and dirt.
每三个月 Every 3 months	500	检查Y型过滤器和冷却器并清洗灰尘（或水垢） Check Y filter and cooler and remove dust (or scale).
		检查空气滤清器并清洁滤芯（多尘环境应缩短保养周期） Check the air filter and clean the filter element (the maintenance cycle is shortened in the dust environment).
		新机第一次运行500小时，更换水过滤器及空气滤清器 New compressor runs for 500 hours for the first time, replacing water filter and air filter.
每年 Yearly	800~1000	更换水过滤器（注意使用原厂产品）Replace water filter (attention to use the original products).
	2000	更换空气滤清器滤芯 Replace air filter
	3000	检查温度传感器、压力变送器、电气系统、安全阀、水位控制器Check temperature sensor, pressure transmitter, electrical system, safety valve, water level controller.
	6000	电动机加注润滑油脂Adding lubricated grease for motor

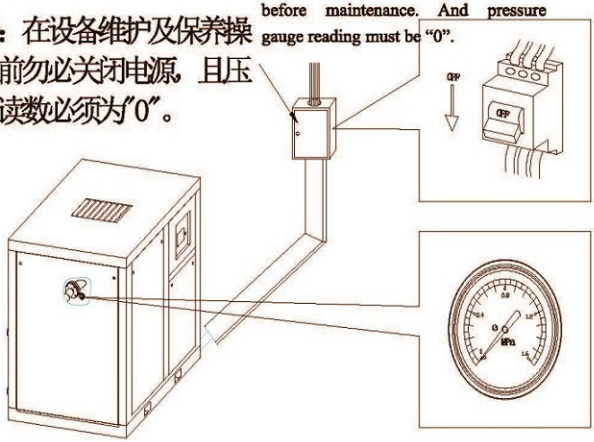
5.2、设备保养与维护之前操作

Operation before equipment maintenance and repair

警告：在设备维护及保养操作之前勿必关闭电源，且压力表读数必须为"0"。

Warning:

Be sure to turn off the power supply before maintenance. And pressure gauge reading must be "0".



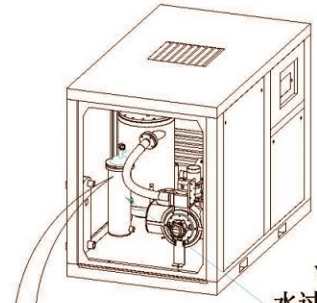
5.3、设备保养与维护一 **Equipment maintenance 1**

水过滤器芯的更换

水过滤器芯应至少每1000小时更换一次，如果工作环境粉尘较多，可考虑每800小时更换一次。

Replacement of water filter

Water filter should be replaced every 2000 hours at least.
If there is more dust in the working environment, considering replaced every 1000 hours.



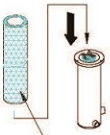
1

Unscrew the screws with the open spanner and lift the top of the filter.

用开口扳手拧下螺丝并顶出水过滤器顶盖

水过滤器
Water filter

3



安装新的水过滤芯

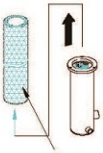
Install new water filter element

新水过滤芯
New water filter element

2

Take out water filter element

取出水过滤器芯



水过滤芯 Water filter element

4

Round bar spanner is used to tighten the water filter

用圆棒扳手拧紧水过滤器锁母。

5.4、设备保障与维护二 Equipment maintenance 2

电动机的润滑

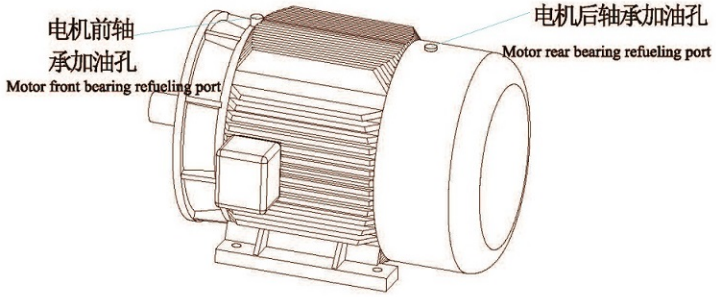
空压机使用过程中必须保证电动机轴承有良好的润滑，应定期补充润滑脂，设定为 6000 小时加油一次，具体应根据下表执行操作，电动机运行中如出现轴承过热也应及时补充油脂。当补充 2-3 次的油脂或拆检发现油脂变质时，应更换油脂。用户注意必须使用指定牌号的润滑脂，混用不同牌号的润滑油脂会缩短电机使用寿命、具体操作请参阅电机维护说明书。

Good lubrication of motor bearings must be ensured during the use of air compressor, Lubricating grease should be supplemented regularly every 6000 hours for refueling. Specific operation should be carried out according to the following table. If the bearing is overheated in the operation of the motor, the grease should also be replenished in time. Grease should be replaced when grease is replaced for 2-3 times or grease is found to deteriorate when dismantling.

User's Note: The specified brand of grease must be used. Mixing different brands of grease will shorten the service life of the motor. For specific operation, please refer to the maintenance manual of the motor.

注意：润滑脂过量会造成轴承和电机损坏，确保在加润滑脂时不要将污物带入。

Notice: Excessive grease will cause damage to bearings and motor, make sure no dirt is bring into the motor when grease is added.



电动机加油建议值（过度或频繁的加油可能使电动机受损）
Motor refueling suggestion value (excessive or frequent refueling may cause damage to the motor)

额定功率 Rated power KW	电机转速 Motor rotary speed r/min	加油周期建议值 Recommended value of fueling cycle		
		正常工况 Normal working condition	严酷工况 Harsh working condition	恶劣工况 abominable working

				condition
≤18.5	3000	5 年 5 years	3 年 3 years	1 年 1 year
18.5—90	3000	1 年 1 year	6 个月 6 months	3 个月 3 months
90—200	3000	3 个月 3 months	1 个月 1 month	1 个月 1 month

注：正常工况：在干净的环境中工作，每天 8 小时。
严酷工况：每天使用 24 小时，或者在比较脏乱和有尘埃的环境中使用。
恶劣工况：在非常脏和非常多尘埃的环境中使用。

Note:
Normal working condition: work in clean environment, 8 hours a day.
Harsh condition: use 24 hours a day, or in a dirty and dusty environment.
Abominable working condition: used in very dirty and dusty environments.

5.5、设备自动安全保护装置 Equipment automatic safety protective device

以下为压缩机的自动安全保护功能
The following is the automatic safety protective function of compressor.

5.5.1 排气温度过高保护 High exhaust temperature protection

压缩机机头上方有一个温度传感器，当排气温度超过 65℃时，压缩机自动停机，且显示屏显示报警，找出原因后按下复位键方可再次启动压缩机，温度传感器须每 6 个月或 3000 小时检查。

There is a temperature sensor in airend of compressor. the compressor stops automatically when the exhaust temperature exceeds 65 ℃, and the display screen shows alarm. After finding out the reason, press the reset key to re-start the compressor. The temperature sensor must be checked every 6 months or 3000 hours.

5.5.2 电机过载保护 Motor overload protection

主电动机、冷却风机均有过载保护，任何一组过载保护动作后，均须找出原因后按下复位键方可再次启动压缩机。

There are overload protection for the main motor and cooling fan. Any overload protection acts, the reason must be found out, and the reset key can be pressed to re-start the compressor again.

5.5.3 水位过高保护 High water level protection

由于液体不可压缩，因此水位过高会造成机体对水直接压缩，造成机体损坏，故水位过高超过设定保护水位时自动排水电磁阀打开，水气桶自动排水，当水气桶水位排至正常水位时，自动排水电磁阀关闭，水气桶停止排水。

Because the liquid is incompressible, the high water level will cause water to be compressed directly and cause damage to the compressor body. When the water level is too high, the automatic drainage solenoid valve opens and the water/air tank drains automatically. When the water level of the water/air tank is discharged to the normal level, the automatic drainage solenoid valve closes and the water/air tank stops drainage.

5.5.4 水位过低保护 Low water level protection

为避免压缩机因润滑水过少而烧毁，因此当水位过低超过设定保护水位时自动补水电磁阀打开，补水从压缩机的进气口进入补水。当水气桶水位上升至正常水位时，自动补水电磁阀关闭，水气桶停止补水。

In order to avoid compressor burning due to too little lubricated water, so when the water level is too low to exceed the set protective water level, the automatic water replenishment

solenoid valve opens and the replenishment water enters into compressor from the compressor air inlet. When the water level of the water/air tank rises to the normal water level, the automatic water replenishment solenoid valve closes, and the water replenishment stops.

5.5.5 低压启动保护 Low voltage starting protection

当空压机因空车过久停车时，桶内压力若未能低于 6 bar ，则空压机将无法启动。此功能是防止空压机因背压过高而激活，进而造成电动机等电气设备损坏，待压力低于 6 bar 方可手动方式或自动方式启动。

When the air compressor stops for too long time due to empty load, if the pressure in the water/air tank is not lower than 6 bar, the air compressor will not start. This function is to prevent the air compressor from activating due to high backpressure, which will cause damage to electrical equipment, such as motor. It can be started manually or automatically when the pressure is less than 6 bar.

5.6、压缩机水质不良产生的问题 Problems caused by poor water quality of compressor

水质不良及环境状况对压缩机及循环水效率影响严重，尤其会使水过滤器很快就阻塞（一般为 800～1000 小时），水质不良可能有下列数种原因：

Poor water quality and environmental conditions have a serious impact on the efficiency of compressor and circulating water. In particular, water filters will be blocked quickly (generally 800-1000 hours). Poor water quality may be due to the following reasons:

5.6.1 水垢累积 Accumulation of scale

循环水管内壁累积无机性水垢，这些包含了钙质、氧化钙、硫酸盐、硅酸盐等等，并可归纳为下列几点原因：The inorganic scale accumulated in the inner walls of circulating water pipes, which includes calcium, calcium oxide, sulfate, silicate and so on, can be summarized as follows:

- 凝结水中含高度盐分。Condensed water contains high salinity.
- 水温升高而减低溶解能力。Water temperature rises to reduce solubility.
- 因 PH 值升高而降低溶解能力。Solubility decreases due to higher pH.

冬天时因湿度低或是冷却器效率差，因而产生水垢。建议定期每 2 周更换一次循环水以解决此类问题。

In winter, scale is produced because of low humidity or poor efficiency of the cooler. It is suggested that circulating water should be renewed every 2 weeks to solve this problem.

5.6.2 淤泥累积 Accumulation of silt

大量淤泥累积在管路及水过滤器处，主要是因为水中的细菌所造成。细菌的繁殖速度因压缩机的运转速度、水质及操作环境而有所不同。一般而言，冷却水为细菌繁殖的良好环境。再者，恶劣环境下操作会更严重，因为灰尘和细颗粒会通过空气过滤器进入循环水系统。

A lot of silt is accumulated in pipes and water filter mainly due to bacteria in water. The propagation speed of bacteria varies depend on compressor speed, water quality and operating environment. Generally speaking, cooling water is a good environment for bacteria breeding. Furthermore, the operation will be more serious in harsh environments, because dust and fine particles will enter into the circulating water system through air filters.

5.6.3 腐蚀问题 Corrosion problem

虽然压缩机的零件都已经过防腐蚀处理，不过定期检验水质及零件检查仍然是必要的工作。

Although the compressor parts have been treated for anti-corrosion, but regular inspection of water quality and parts inspection is still necessary.

※注：若操作环境较差（如空气中含较多酸性气体等），请缩短换水周期以确保水质，避免因水质劣化而影响机体使用寿命。

※ Note: If the operating environment is poor (e.g. there are more acid gases in the air), please shorten the water exchange cycle to ensure water quality and avoid the deterioration of water quality , and affect the service life of the compressor body.

5.7、空压机的故障处理 Compressor Troubleshooting

注：排除故障前必须先切断空气压缩机的电源，压缩机系统压力释放为零。

Note: Before troubleshooting, the power supply of the air compressor must be cut off first, and the pressure of the compressor system is released to zero.

5.7.1、控制器检测到以下故障时报警，不停机，显示屏显示相应故障名称。并且显示屏背光灯闪烁，蜂鸣器响，故障消除后显示恢复正常。

When the controller detects the following failures, the alarm, compressor is still running, and the corresponding fault are showed on the display screen. And the display backlight flickers and the buzzer rings. After the failure is eliminated, it shows that it is reverted to normal.

序号 No.	停机故障名称 Fault name	故障原因 Cause of failure	处理方法 Troubleshooting
1	空气滤清器超期使用 Overtime use of air filter	控制器该项使用时间超过设定允许使用时间 The use time of the controller exceeds the set time allowed.	更换空气滤清器，将空气滤清器使用时间置零 Replace air filter and zero air filter time.
2	水过滤器超期使用 Overtime use of water filters	控制器该项使用时间超过设定允许使用时间 The use time of the controller exceeds the set time allowed.	更换水过滤器芯，将水过滤器芯使用时间置零 Replace the water filter and zero the water filter element.
3	润滑脂超期使用 Overtime use of grease	控制器该项使用时间超过设定允许使用时间 The use time of the controller exceeds the set time allowed.	加注电机轴承润滑脂，将润滑脂使用时间置零 Add motor bearing grease, zero grease use time.
4	补水超时 Water replenishment overtime	水位计、补水电磁阀、补水泵、补水桶缺水等故障 Water shortage faults of water level gauge, water replenishment solenoid valve, water replenishment pump, water/air tank and so on.	检查修复或更换水位计、补水电磁阀、补水泵等，或给补水桶加水 Check and repair or replace water level gauge, water replenishment solenoid valve, water replenishment pump, etc., or fill the water/air tank with water.
5	排气温度高（预警） High exhaust temperature (early warning)	环境温度超高 Super high ambient temperature	改善机房通风条件，增加进排气通风口 Improve the ventilation of the compressor room and increase the inlet and exhaust vent.
		冷却器堵塞 Cooler blockage	检查冷却器是否有堵塞，清洗冷却器 Check if the cooler is clogged, and clean the cooler.
		断水阀失灵 Failure of cut-off water valve	检查断水阀，修复或更换 Check the cut-off water valve, repair or replace.

		水过滤器芯堵塞 Water filter blockage	更换水过滤器芯 Replacement of water filter
		风机故障 Fan fault	检查风机，修复或更换 Check the fan, repair or replace.
		温度传感器故障 Fault of temperature sensor	检查温度传感器，修复或更换 Check temperature sensor, repair or replace.
6	通讯故障 Communication failure	通讯线正负极接反；连接松动；有强烈干扰时接地不好 The communication lines are connected wrongly with the positive and negative poles; loose; strong interference; the grounding is bad.	检查通讯线连接是否正确，牢固 Check whether the connection is correct and secure.

5.7.2 当检测到以下故障时停机，液晶屏显示相应的故障名称。并且蜂鸣器响。故障消除后显示恢复正常，蜂鸣器继续鸣叫，按复位键，蜂鸣器停止鸣叫。报警后，如蜂鸣器鸣叫超过10分钟，则停止鸣叫；风机过载、风机电流过载、风机相不平衡故障时，故障记录里将记录风机当前电流，其它故障时记录主机电流

The compressor will tsop when the following faults are detected. LCD displays the corresponding fault name. And the buzzer rings. It reverts to be normal after the fault is eliminated. If the buzzer continues to ring, press the reset key, and the buzzer stops. After the alarm, the buzzer stops if the buzzer rings for more than 10 minutes. When the fan overloads, the fan current overloads and the fan phase imbalance failures occur, the current of the fan will be recorded in the fault record, and the airend current will be recorded for other failures.

序号 No.	停机故障名称 Fault name	故障原因 Cause of failure	处理方法 Troubleshooting
1	低温报警 Low temperature alarm	检测到温度≤0℃ The temperature ≤0℃.	控制空压机房温度在 0℃以上 Control air compressor room temperature above 0 C.
2	急停报警 Emergency stop alarm	急停按钮按下没有复位 The emergency stop button is not reverted.	急停按钮按箭头方向旋转进行复位 The emergency stop button shall be reset according to arrow rotatory direction.
3	排气压力过高 Too high exhaust pressure	压力传感器故障 /压力传感器值漂移未校准 Pressure sensor fault / pressure sensor value is not calibrated.	检查压力传感器，更换或校准压力传感器值 Check pressure sensor, replace or calibrate its value.
		控制器程序故障 Controller program failure	检查控制器程序，重新设定排气压力参数值 Check the controller program and reset the exhaust pressure parameter value.
		蝶阀关闭不严，气缸复位不到位 The butterfly valve is not closed tightly, and the cylinder reset is not in position.	检查蝶阀、气缸等部件，修复或更换 Check butterfly valves, cylinders and other components ,repair or replace them.
4	风机电流过载	风机机械故障 Mechanical fault of	修复或更换风机 Repair or replace fan

	Overload of fan current	fan	
		电压过低 Low voltage	调整风机电压 Adjust fan voltage
		接触器触点接触不良、有松动 Contactor contact is not good, loose	更换接触器，拧紧接触器接线端子 Replace contactor and tighten contactor terminal.
		风机电流设定值不符 Fan current setting value does not match.	调整风机电流设定值 Adjust the set value of fan current.
5	风机过载 Fan overload	风机过热 Fan overheating	检查风机，修复或更换 Check the fan, repair or replace it.
		风机热传感器故障	检查风机，修复或更换
6	主机电流过载 Air end current overload	压缩机主机故障 Compressor air end fault	检查主机旋转是否正常，修复或更换 Check whether rotation of air end is normal, repair or replace it.
		接触器触点接触不良、有松动 Contactor contact is not good, loose	更换接触器，拧紧接触器接线端子 Replace contactor and tighten contactor terminal.
		电压过低 Low voltage	调整主电源电压 Adjust main power voltage
7	缺相 Phase deficiency	主机 A、B、C 相有电流为零 Zero current.for the airend phase A, B and C	检查电机及线路（首先检查保险丝） Check motor and circuit (first check fuse).
8	主机 / 风机相不平衡 Airend / fan phase imbalance	主机/风机 ABC 相电流检测值相差过大 Airend/fan 3 phase current detection value difference is too large.	检查主机/风机三相电压、去除线路上大单相负荷、更换坏电机 Check the three-phase voltage of airend / fan, remove large single phase load and replace bad motor.
9	相序错误 Phase sequence error	电源进线 ABC 三相相序错误 Power supply incoming line ABC three-phase phase sequence is wrong	电源进线任意两相交换 Any two phase power incoming line exchange
10	温度传感器故障 Fault of temperature sensor	温度传感器短路、开路，温度跳动大 Temperature sensor short circuit, open circuit, big temperature jump.	更换温度传感器，检查线路及端子接触 Replace temperature sensor, check line and terminal contact.
		温度传感器信号线与屏蔽层短路 short circuit between temperature sensor signal line and shielding layer	更换温度传感器 Replacement of temperature sensor
11	压力传感器故障 Pressure sensor fault	压力传感器短路，开路 Pressure sensor short circuit, open circuit	更换传感器，检查线路及端子接触 Replace sensor, check line and terminal contact.
12	排气温度过高	环境温度超高 Super high ambient temperature	改善机房通风条件，增加进排气通风口 Improve the ventilation of the compressor room and increase the inlet and exhaust vent.

		冷却器堵塞 Cooler blockage	检查冷却器是否有堵塞，清洗冷却器 Check if the cooler is clogged, and clean the cooler.
		断水阀失灵 Failure of cut-off water valve	检查断水阀，修复或更换 Check the cut-off water valve, repair or replace it.
		水过滤器芯堵塞 Blockage of water filter	更换水过滤器芯 Replacement of water filter
		风机机械故障或电器故障 Fan mechanical failure or electrical failure	检查电器线路或风机，修复或更换风机 Check electrical circuit or fan, repair or replace fan.
13	水气桶缺水报警 Water /air tank water shortage alarm	补水电磁阀堵了或坏了 The water replenishment solenoid valve is blocked or broken.	清洗或更换补水电磁阀 Cleaning or replacing water replenishment solenoid valve
		补水水泵堵了或坏了 The water replenishment pump is blocked or broken.	清洗或更换补水水泵 Cleaning or replacement of water replenishment pumps
		水位计 A 的浮球卡了 The float of the water level gauge A is jammed.	清洗或更换水位计 A Cleaning or replacing water level gauge A
14	变频器故障 Inverter fault	变频器故障 Inverter fault	咨询厂家或更换变频器 Consult the manufacturer or replace the converter.

5.7.3、压缩机控制器不报警出现的故障及处理方法

Failure of compressor controller without alarm and troubleshooting

序号 No.	停机故障名称 Fault Name	故障原因 Cause of failure	处理方法 Troubleshooting
1	控制显示器黑屏或无法启动 Control monitor black screen or unable to start.	断路器跳闸或损坏 Circuit breaker trip or damage	检查原因，合上或更换断路器 Check the cause, turn on or replace the circuit breaker.
		电压太高或太低 The voltage is too high or too low	检查电源线路，调整电压 Check the power circuit and adjust the voltage
		电源无电源输入或缺相 No power input or lack of power supply	输入电源或检查电源线路 Input the power or check the power circuit
		压缩机控制器故障 Compressor controller failure	检查控制器，修复或更换控制器 Check the controller, repair or replace the controller.
		变压器损坏 Transformer damage	更换变压器 Replace the transformer
2	运转电流过高，压缩机自行跳闸，保险丝烧断 Too high running current Compressor self-trip. Fuse blew	空气开关故障 Air switch fault	更换空气开关 Replacement of air switch
		压缩机主机故障 Compressor airend fault	检查主机旋转是否正常，修复或更换 Check whether rotation of airend is normal, repair or replace it
		供电电压异常 Abnormal supply voltage	检查电源线路，调整电压 Check the power circuit and adjust the voltage.

3	压缩机显示加载，实际无加载 Compressor shows load, actually no load	加载电磁阀失灵 Failure of loading solenoid valve	检查加载电磁阀，修复或更换 Check loading solenoid valve, repair or replace it
		压缩机控制器故障 Compressor controller failure	检查控制器 Check controller
		加载电磁阀与气缸间的控制管道上有泄漏 There is leakage on the control pipe between the solenoid valve and the cylinder.	检查管道及连接处，若发现泄漏，则及时修理或更换控制管 Check pipes and connections. If leakage is found, repair or replace the control pipe in time.
		气缸故障 Cylinder failure	拆开气缸进行检查，修复或更换 Disassemble the cylinder for inspection, repair or replace it.
		放空阀失灵 Failure of release valve	检查放空阀，修复或更换 Check release valve, repair or replace it
4	压缩机超负荷运转，安全阀开启 Compressor overload operation, safety valve opens	压力变送器失灵或其设定值高于安全阀的额定值 Pressure transmitter failure or its setting value is higher than safety valve rated valve.	检查压力变送器，调整设定值或修复或更换 Check pressure transmitter, adjust setting value or repair or replace it
		压力变送器进气接头处漏气 Leakage at inlet joint of pressure transmitter	检查是否漏气，若有问题及时修理或更换 Check leakage and repair or replace it if any problems occur.
		加载电磁失灵 Loading solenoid valve failure	检查加载电磁阀，修复或更换 Check loading solenoid valve, repair or replace it
		蝶阀和气缸机械故障 Mechanical failure of butterfly valve and cylinder	检查蝶阀和气缸，修复或更换 Check butterfly valves and cylinders, repair or replace them.
5	停机后压缩空气回流至滤清器 After stopping, the compressed air is reflued to the filter.	排气单向阀泄漏或损坏 Exhaust check valve leakage or damage	检查单向阀，修复或更换 Check check valve, repair or replace it
		蝶阀故障 Butterfly valve failure	检查蝶阀，修复或更换 Check butterfly valve, repair or replace it
		最小压力阀泄漏 Minimum pressure valve leaks	检查最小压力阀，修复或更换 Check the minimum pressure valve, repair or replace it.
		放空阀未放空 Release valve is not emptied.	检查放空阀，修复或更换 Check release valve, repair or replace it
6	排气量和排气压力都不能达到规定值 The discharged capacity and	耗气量超过排气量 Air consumption exceeds exhaust volume	检查排气管道系统是否有泄漏出，否则应添置压缩机 Check if there is leakage in exhaust piping system, otherwise compressor should be added.
		空气滤清器阻塞 Air filter blockage	清理或更换空气滤清器 Clean or replace air filters
		放空阀与气缸间的控制管道上有泄漏 There is leakage on the	检查管道及连接处，若发现有泄漏，则及时修理 Check pipes and connections.

	discharged pressure can not reach the specified value.	control pipe between the release valve and the cylinder.	If leakage is detected, repaired in time
		放空阀失灵 Failure of release valve	拆下空气滤清器与放空阀之间的管道，如果压缩机负荷运行时放空阀有漏气，则应修复或更换放空阀 Remove the pipeline between the air filter and the release valve. If the release valve leaks during compressor load operation, the release valve should be repaired or replaced.
		蝶阀未全打开 Butterfly valve does not fully open	拆开蝶阀或气缸进行检查，修复或更换气缸或蝶阀 Disassemble butterfly valve or cylinder for inspection, repair or replace them.
		安全阀泄漏 Safety valve leakage	检查安全阀，修复或更加 Check safety valve, repair or replace it
		压缩机出现故障 Compressor failure	与制造商联系协助修理 Contact the manufacturer for repair
7	卸载时，排气压力仍上升，安全阀开启 When unloading, the exhaust pressure still rises, and the safety valve opens	加载电磁阀关闭不严 The load solenoid valve does not close tightly.	检查加载电磁阀，修复或更换 Check loading solenoid valve, repair or replace it
		蝶阀关闭不严 Butterfly valve does not close tightly	检查蝶阀和气缸，修复或更换 Check butterfly valve and cylinder, repair or replace them
8	加载后，安全阀马上开启 After loading, the safety valve will open immediately.	排气口球阀未打开 ball valve of the discharged outlet does not open	打开排气口球阀 Open the discharged ball valve
		安全阀失灵 Safety valve failure	检查安全阀，修复或更换 Check safety valve, repair or replace it
		最小压力阀打不开 The minimum pressure valve can not be opened	检查最小压力阀，修复或更换 Check the minimum pressure valve, repair or replace it.
9	加载、卸载转换次数频繁 Frequent times of loading and unloading conversion	空气管路管径过小 Air pipe diameter is too small	更换空气管路管径合适的管子 Replacement of suitable air pipe diameters
		加载、卸载压差太小 The pressure difference between loading and unloading is too small	重新设定压差值（一般为 0.2MPa）Reset the pressure difference (usually 0.2MPa).
		储气罐容量过小 Capacity of air receiver is too small	按 1：3 容积比增加储气罐容量 Increasing air receiver volume according to 1:3 ratio