GESO SYSTEMS

螺杆空压机系列

SCREW AIR COMPRESSOR SERIES

用户操作手册

USER'S MANUAL

ISO9001

一、安全注意事项 Security considerations

1.新机调试必须由本公司指定或认可的调试人员调试。

New machine commissioning must be commissioned by the Company's designated or recognized commissioning personnel.

2.空压机在最初开车或空压机及其系统设备检修后重新起动时应遵循下述程序：

The following procedure should be followed when the compressor is initially started or restarted after the compressor and its system equipment have been serviced:

■2.1 检查所有的阀门是否处于合适的位置及正确的启闭状态；
Check that all valves are in their proper position and correctly opened and closed;

■2.2 除去所有为安全维护而安装的维修附件（如盲板）及维修用标志牌；
Remove all maintenance accessories (e.g., blinds) installed for safe maintenance and signage for maintenance;

■2.3 检查系统并除去其内外来的异物；
Inspect the system and remove any foreign matter coming from inside or outside it;

■2.4 按已建立的锁定设备程序使设备脱锁；
Unlock the device according to the established locking device procedure;

■2.5 打开并再次关闭排污阀；
Open and close the drain valve again

■2.6 通知工作区内所有人员，设备即将起动；
Notify all personnel in the work area that the equipment is about to start;

■2.7 盘车至少一圈以确保无机械干涉；
Coil the vehicle at least one turn to ensure no mechanical interference;

■2.8 确保驱动机及旋转设备的旋转方向正确；
Ensure the correct direction of rotation of the drive machine and rotating equipment;

■2.9 检查并确保所有的安全保护装置均处于合适的操作状态；
Check and ensure that all safety protection devices are in a suitable operating condition;

■2.10 观察驱动机是否正常工作，如否应立即停车检查。
Observe whether the driving machine is working normally, if not, stop and check immediately.

3.维护 Maintenance

■3.1 所有的维修工作均应停车进行。
All maintenance work shall be stopped.

■3.2 维修空压机时应在起动装置上设一标示牌，其上标明： “警告：正在检修，严禁

开车”。同时还应采取下列一项或几项措施将空压机断路，以避免因疏忽或意外而起动空压机；

When servicing an air compressor, a sign shall be placed on the starting device stating: "WARNING: SERVICE IN PROGRESS, NO DRIVING". At the same time, one or more of the following measures should be taken to disconnect the compressor in order to avoid starting the compressor by negligence or accident;

3.2.1 拉掉保险丝并锁闭保险丝盒盖，必要时可以拆除电源进线；
if necessary,Pull the fuse and lock the fuse box cover, removing the power inlet

3.2.2 用一锁定机构将动力开关锁定在脱开的位置；
The power switch is locked in the disengaged position by a locking mechanism;

3.2.3 除去驱动机起动装置；
Remove the driver starter;

3.2.4 脱开空压机与驱动机之间的联轴器或其他传动机构。
Disengage the coupling or other transmission mechanism between the air compressor and the driving machine.

■3.3 拆卸空压机及辅助设备的受压部件时，应将其与压力源隔开并把其内所有的压缩空气排尽。

When disassembling pressurized parts of air compressors and auxiliary equipment, isolate them from the pressure source and exhaust all compressed air from them.

4.检验和清洗。Inspection and cleaning.

■ 4.1 应定期检查空压机的压力控制装置、压力释放装置、停车保护装置及报警装置，确保它们处于正常工作状态。

The pressure control device, pressure release device, parking protection device and alarm device of the air compressor should be checked regularly to ensure that they are in normal working condition

■ 4.2 应定期检查空压机的储气罐、气缸、脉冲缓冲罐、排气管、中冷器和后冷却器等受热及热传递设备及部件，清洗污垢和积碳物。

The air compressor's storage tank, cylinder, pulse buffer tank, exhaust pipe, intercooler and aftercooler, and other heat receiving and heat transfer equipment and parts should be inspected regularly to clean the dirt and carbon deposits.

■ 4.3 应定期清洗气阀、过滤器、消声器、气腔、空气管道及正常条件下与压缩空气接触的其他部件。任何情况下均不应用易挥发易燃清洗剂或对人体有害的清洗剂来清洗。清洗完成之后所有部件应漂洗并吹干。

Air valves, filters, mufflers, air chambers, air piping and other parts that come into contact with compressed air under normal conditions should be cleaned regularly. Under no circumstances should they be cleaned with volatile and flammable cleaning agents or cleaning agents that are harmful to humans. All parts should be rinsed and blown dry after cleaning is completed.

■4.4 压力容器的定期检验应符合《压力容器安全技术监察规程》或《简易压力容器安全技术监察规程》的要求。

The periodic inspection of the pressure vessel shall comply with the requirements of the "Pressure Vessel Safety Technology Supervision Regulations" or "Simple Pressure Vessel Safety Technology Supervision Regulations".

5.移动空压机行驶前应对储气罐减压到合理的压力值。开车前应采取措施防止机器运转时发生位移。

Before driving the mobile air compressor, the storage tank should be depressurized to a reasonable pressure value. Measures should be taken before driving to prevent the machine from being displaced during operation.

6.储气罐底部带轮子的空压机在挪动前应对储气罐减压到合理的压力值。开车前应将空压机摆放稳定或固定轮子以防振动引起机器位移。

Compressors with wheels on the bottom of the tank should be depressurized to a reasonable pressure before moving. Before driving, the compressor should be stabilized or the wheels should be fixed to prevent the machine from shifting due to vibration .

7.所有的防护罩、警告标志等安全防护装置应定期检查，不合格时应更换。

All guards, warning signs and other safety protection devices should be inspected regularly and replaced if they fail.

8.引到压缩机的供电线上，必须安装空气开关，熔断丝等安全装置。为了确保电器设备的可靠性，务必请按照有关的安全条例，接上合适的接地线，必要时安装避雷装置。安装时要考虑在压缩机设备周围留出一定的维修空间。

Air switches, fuses and other safety devices must be installed on the power supply line to the compressor. In order to ensure the reliability of the electrical equipment, be sure to connect a suitable ground wire and, if necessary, install a lightning protection device in accordance with the relevant safety regulations. When installing the compressor, consider leaving a certain amount of space around the compressor unit for maintenance.

9.压缩机不能在高于铭牌规定的排气压力下工作，否则电动机会过载，其结果导致电动机和压缩机停车。

The compressor must not be operated at a discharge pressure higher than that specified on the nameplate, otherwise the motor will be overloaded, with the result that the motor and compressor will stop.

10.只能使用安全溶液来清洗压缩机和辅助设备。

Use only safe solutions for cleaning compressors and auxiliary equipment.

11.须定期检查安全阀，停机保护系统，确保其灵敏可靠，一般每年应检验一次。

Must regularly check the safety valve, shutdown protection system, to ensure its sensitivity and reliability, generally should be tested once a year.

12.机组附近应配有适当的灭火器。

Appropriate fire extinguishers should be provided in the vicinity of the unit.

13.当压缩处于远程控制时，机器随时可能启动，应挂牌提醒。

When compression is under remote control, the machine may start at any time and should be signaled as a reminder.

14.如遇下列情况，不属产品质量担保范围：

Product quality is not guaranteed in the following cases:

■使用假冒、替代等非原厂配件；
Use of counterfeit, replacement, and other non-original parts;

■未按照机组使用说明书中的要求安装、使用和维护保养机组；
Failure to install, use and maintain the unit in accordance with the requirements in the unit's instruction manual;

■环境温度超出压缩机的使用要求范围；
The ambient temperature is outside the range required for use of the compressor;

■机组运行电压超过压缩机的使用要求范围；
The unit is operating at a voltage that exceeds the range required for the compressor's use;

■在露天和潮湿的环境中存放或使用机组；
Store or use the unit in open and wet conditions;

■在含有腐蚀性气体或高粉尘等恶劣环境中使用机组；
Use the unit in harsh environments such as those containing corrosive gases or high levels of dust;

■按照说明书要求2000H，未加注电机润滑脂而使用机组；
Use the unit without greasing the motor as required by the instruction manual 2000H;

■非本公司及授权服务代理商维修或保养机组造成的损坏；
Damage not caused by the repair or maintenance of the unit by the Company and authorized service agents;

■未经本公司授权私自对机组结构进行改装；
Private modification of the unit structure without our authorization;

■用户在运输、搬运和安装过程中造成的机组损坏；
Damage to the unit caused by the user during transportation, handling and installation;

■由于自然灾害或不可抗力因素造成的损坏，如： 地震、灾害、战争等。
Damage due to natural disasters or force majeure factors, e.g., earthquakes, disasters, wars, etc.

二、变频器注意事项 inverter precautions

1.不要触碰热态时的散翅片和变阻器。否则，可能会被烫伤。

Do not touch the diffuser fins and rheostat in the hot state. Otherwise, you may be burned.

2.不要随意改变变频器的出厂设定参数，改变不当会损坏变频器。

Do not arbitrarily change the factory-set parameters of the inverter, improper change will damage the inverter.

3.不要触碰变频器的接线端子，它们带有高压电。碰到的话可能导致触电。

Do not touch the terminals of the inverter, they are charged with high voltage. Touching them may result in electric shock.

4.在进行检查或维修保养前，必须切断主电源回路，并确保充电指示灯熄灭。当变频器的电容量上还有残余电压时，进行任何工作都是危险的。

Before carrying out inspections or maintenance, the main power circuit must be disconnected and make sure that the charging indicator is extinguished. It is dangerous to carry out any work when there is still residual voltage on the inverter' s electrical capacity.

5.只有具备合格资质的人员才能进行检查、修理或更换零件。事先要移开一切全属物体（比如手表、手镯等），使用的工具都要有绝缘功能，以免触电。

Only qualified personnel should carry out inspections, repairs or replacement of parts. Remove all fully-owned objects (e.g. watches, bracelets, e t c.) beforehand, and use tools t ha t are insulated to avoid electric shock.

6.变频器装有直流电抗器。当附近装有无线电或其它电子装置时，请在输入电源侧安置滤波器。

The inverter is equipped with a DC reactor. When a radio or other electronic device is installed nearby, place a filter on the input power side.

7.不遵守这些规则会引起触电。

Failure to follow these rules can cause electrocution.

目录 CONTENTS

第一章　　螺杆式空压机通则及规范

Chapter 1: Screw Compressor General Principles andSpecifications

一.油螺杆式空压机简介

Introduction of Less-oil screw air compressor

微油式螺杆压缩机具有运转性能可靠、易损件少、振动小、噪音低、效率高的特点。在压缩过程中，压缩机凭借其自身所产生的压力差，不断向压缩室及轴承喷入冷却液，冷却液主要有四个作用：

The Less-oil screw compressor is characterized by reliable operation, few wearing parts, low vibration, low noise and high efficiency. In the compression process, the compressor by virtue of its own pressure difference, constantlyto the compression chamber and bearing spray into the coolant, coolant has four main role:

1.润滑作用：冷却液可以在转子之间形成油膜，避免了转子间的接触减少摩擦。

lubrication: coolant can be formed between the rotor oil film, avoiding the contact between the rotor to reduce friction.

2.密封作用：冷却液产生的油膜能对压缩空气起到密封作用，提高了压缩机的容积效率。

sealing effect: the coolant produced by the oil film can play a sealing effect on the compressed air, improve the volumetric efficiency of the compressor.

3.冷却作用：由于冷却液吸收了大量的压缩热，使压缩过程接近于等温压缩，降低了压缩机的比功率。

cooling effect: because the coolant absorbs a lot of heat of compression, so that the compression process is close to isothermal compression, reducing the specific power of the compressor.

4.环保作用：冷却液可减低因高频压缩所产生的噪音。

environmental protection: coolant can reduce the noise generated by high-frequency compression.

二.微油螺杆式空压机机体构造

Second, micro-oil screw air compressor body structure

1.基本结构（单级压缩)

Basic structure (single-stage compression)

本公司所采用微油螺杆式压缩机，系一种双轴容积式(Two shaft positive displacement)回转型压缩机。进气口开于机壳(Casing)之上端，排气口开于下部，一对高精密度主（阳）、副（阴）转子，则水平且平行装于机壳内部，主（阳）转子有五个形齿，而副（阴）转子有六个形齿。主转子直径较大，副转子直径较小。齿形成螺旋状，环绕于转子外缘，两者齿形

相互啮合。主、副转子二端分别由轴承支承，进气端各有一只滚柱轴承(Roller bearing)排气端各有两只对称安装的锥形滚柱轴承。机体共分二种，一种为皮带传动式，另一种为直接传动式。直接传动式系以一联轴器将电动机动力源与主机体结合在一起直接传动，或者再经一组高精度增速齿轮将主转子转速提高。皮带传动式是由二个依速度比例制造的皮带轮将动力经由皮带传动。

The less-oil screw compressor used by our company is a two shaft positive displacement type (Two shaft positive displacement) return type compressor. The air inlet is open at the upper end of the casing, and the exhaust port is open at the lower part. A pair of high-precision main (male) and vice (female) rotors are installed horizontally and parallel to the inside of the casing, and the main (male) rotor has five teeth, while the vice (female) rotor has six teeth. The main rotor has five teeth and the secondary (yin) rotor has six teeth. The main rotor has a larger diameter and the secondary rotor has a smaller diameter. The teeth form a spiral, around the outer edge of the rotor, the two teeth form a mutual thumbing together. The main and vice rotor two ends are supported by bearings, inlet end each has a roller bearing (Roller bearing) exhaust end each has two symmetrically mounted conical roller bearings. The machine is divided into two types, one for the belt-driven type, the other for the direct drive type. The direct-drive type is a coupling that combines the motor power source with the main body for direct transmission, or a set of high-precision incremental gears to increase the speed of the main rotor. The belt drive type is made by two pulleys in proportion to the speed of the power will be transmitted by the belt.

2.啮合 Engagement

电动机经联轴器(Coupling)、增速齿轮(Increasing Gear)或皮带(Belt)带动主转子。由于二转子相互啮合，主转子即直接带动副转子一同旋转。冷却液由压缩机机壳下部经由喷嘴直接喷入转子间啮合部分，并与空气混合，带走因压缩而产生的热量，达到冷却效果。同时形成油膜，防止转子间全属与全属直接接触及封闭转子间和转子与机壳间之间隙。喷入的冷却液亦可减少高速压缩所造成的噪音。由于排气压力的不同，喷油的重量约为空气重量的5-10倍。

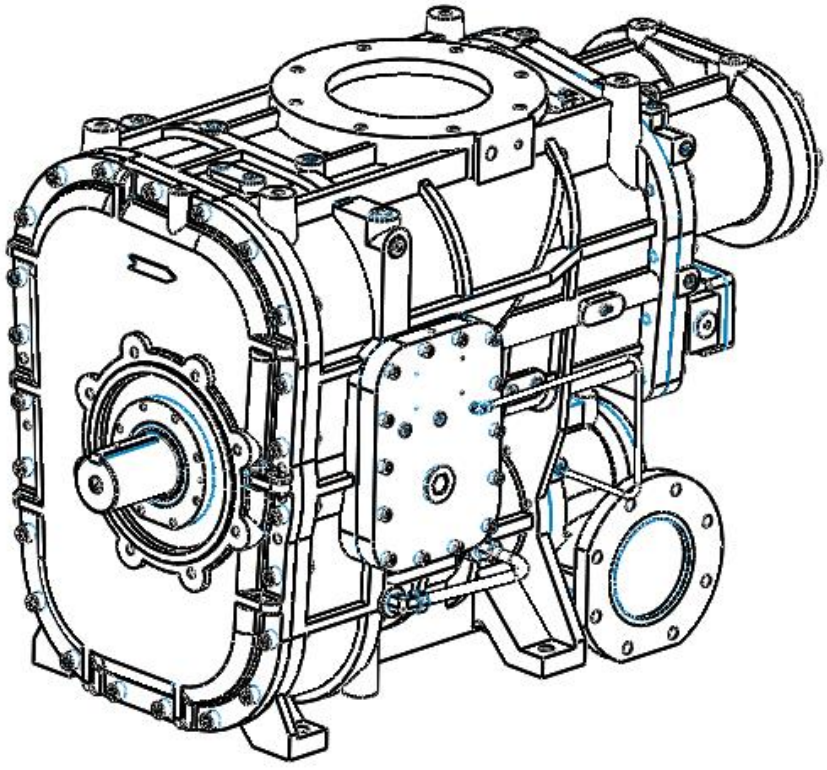
The main rotor is driven by the motor through coupling, increasing gear or belt. As the two rotors are mutually thumbed together, the main rotor is directly driven by the vice-rotor together with the rotation. The coolant is sprayed from the lower part of the compressor casing through the nozzles directly into the meshing part between the rotors and mixed with the air to take away the heat generated by compression to achieve the cooling effect. At the same time, the formation of oil film, to prevent direct contact between the rotor and the whole genus and close the gap between the rotor and the rotor and the casing. The injected coolant can also reduce the noise caused by high-speed compression. Due to the difference in exhaust pressure, the weight of injected oil is about 5-10 times the weight of air.

3.双级压缩结构介绍 two-stage compression structure introduction

双级压缩螺杆机是一种采用两个单级压缩主机组合在一起的结构。进气口开于机壳之上端,一级排气口开于下部,一对高精密度 主(阳) 、副(阴)转子,水平且平行装于机壳内部,主(阳)转子有五个形齿,而副(阴)转子 有六个形齿,主转子直径大,副转子直径较小。齿形呈螺旋状,两者齿形

相互啮合,主、副 转子二端分别由轴承支承定位。一级压缩排出混合空气再进入二级压缩主机，二级压缩主机与一级压缩主机结构相似，尺寸不同，再通过齿轮箱或者同步电机的形式连接主机。

two-stage compression screw machine is a combination of two single-stage compression host structure. The air inlet is open at the upper end of the casing, and the exhaust air outlet is open at the lower part of the casing. A pair of high-precision main (yang) and vice (yin) rotors are mounted horizontally and parallel to each other inside the casing, the main (yang) rotor has five teeth, and the vice (yin) rotor has six teeth, and the diameter of main rotor is large, and the diameter of the vice rotor is small. The teeth are in spiral shape, the two teeth meshing with each other, the main and vice rotor two ends are supported by the bearing positioning. The primary compression air mixture is discharged into the secondary compression mainframe, the secondary compression mainframe and the primary compression mainframe are similar in structure but different in size, and then connected to the mainframe in the form of gear box or synchronous motor.



三.螺杆式压缩机压缩原理
Three, screw compressor compression principle

1.吸气过程 Suction process

螺杆式的进气侧吸气口，必须设计得使压缩腔可以充分吸气，而螺杆式压缩机并无进气与排气阀组，进气只靠一调节阀的开启、关闭调节，当转子转动时，主副转子的齿沟空间在转至进气端壁开口时，其空间最大，此时转子的齿沟空间与进气口之自由空气相通，因在排气时齿沟之空气被全数排出，排气完了时，齿沟乃处于真空状态，当转至进气口时，外界空气即被吸入，沿轴向流入主副转子的齿沟内。当空气充满了整个齿沟时，转子之进气侧端面转离了机壳之进气口，在齿沟间的空气即被封闭，以上为【进气过程】。

Screw-type intake side suction port, must be designed so that the compression chamber can be fully suction, and screw compressor and no intake and exhaust valve group, intake only by a regulator valve open, close the regulator, when the rotor rotation, the main rotor tooth groove space in the turn to the intake wall opening, the space is the largest, the rotor's tooth groove space and the inlet of the free air through, because in the exhaust of the tooth groove of the air is discharged in full! When the exhaust is finished, the tooth groove is in a vacuum state, when turned to the air inlet, the outside air is sucked in, along the axial flow into the tooth groove of the main rotor and vice-rotor. When the air fills up the whole tooth groove, the air inlet side of the rotor is turned away from the air inlet of the casing, and the air between the tooth grooves is closed, the above is the [air inlet process].

2.封闭及输送过程 Closure and conveying process

主副两转子在吸气终了时，其主副转子齿峰会与机壳闭封，此时空气在齿沟内闭封不再外流，即【封闭过程】。两转子继续转动，其齿峰与齿沟在吸气端吻合，吻合面逐渐向排气端移动，此即【输送过程】。

Main and vice two rotors in the suction end, the main vice rotor tooth summit and shell closed, this time the air in the tooth groove closed no longer outflow, that is, [closed process]. The two rotors continue to rotate, the tooth peak and tooth groove in the suction end of the anastomosis, the anastomosis surface gradually to the exhaust end of the movement, which is [transportation process].

3.压缩及喷油过程 Compression and injection process

在输送过程中，啮合面逐渐向排气端移动，亦即啮合面与排气口间的齿沟空间渐渐减小，齿沟内之气体逐渐被压缩，压力提高，此即【压缩过程】。而压缩同时冷却液亦因压力差的作用而喷入压缩室内与空气混合。

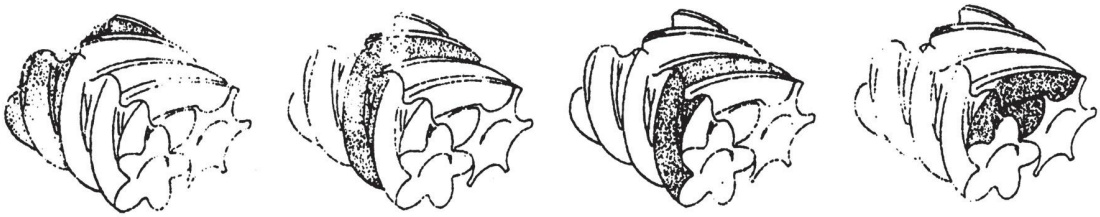
In the conveying process, the meshing surface gradually move to the exhaust end, that is, the space between the meshing surface and the exhaust port of the tooth groove gradually decreases,

the gas in the tooth groove is gradually compressed, the pressure is increased, which is the [compression process]. At the same time, the coolant is also sprayed into the compression chamber and mixed with the air due to the pressure difference

4. **排气过程** Exhaust process

当转子的啮合端面转到与机壳排气口相通时，（此时压缩气体之压力最高）被压缩之气体开始排出，直至齿峰与齿沟的啮合面移至排气端面，此时两转子的啮合面与机壳排气口之齿沟空间为零，即完成【排气过程】，在此同时转子之啮合面与机壳进气口之间的齿沟长度又达到最长，其吸气过程又在进行。

When the rotor's thumbing end face to turn to the exhaust port with the chassis, (at this time the highest pressure of the compressed gas) the compressed gas began to discharge until the tooth peak and tooth groove of the meshing surface to the exhaust end face, at this time the two rotor's meshing surface and the chassis of the tooth groove of the exhaust port of the zero space, that is, the completion of the [exhaust process], at the same time, the rotor's meshing surface and the chassis between the inlet of the tooth groove length of the longest, and its inhalation process again! At the same time, the length of the groove between the rotor meshing surface and the inlet port of the casing reaches the maximum length, and the suction process is carried out.



1. 吸气行程 Suction stroke

2.封闭及输送行程 Closed and delivery stroke

3. 压缩及喷油行程 Compression and injection stroke

4. 排气行程 Exhaust stroke

第二章　空压机收货与安装

Chapter II Air Compressor Receiving and Installation

一. 收货与安装

Receiving and Installation

(一) 收货　Receiving

1.当您收到空压机时，请依项目清点数量、型式与规格及附带资料。

When you receive the air compressor, please count the quantity, type and specification and accompanying information according to the item.

2.目视检查空压机及其附件在运送过程中是否受损。

Visually inspect the air compressor and its accessories for damage during transportation.

3.如有短缺或受损，请将情况注明，并通知业务人员处理。

If there is any shortage or damage, please note the situation and notify the operational staff to deal with it.

(二) 安装　Installation

1. 地板　Floor

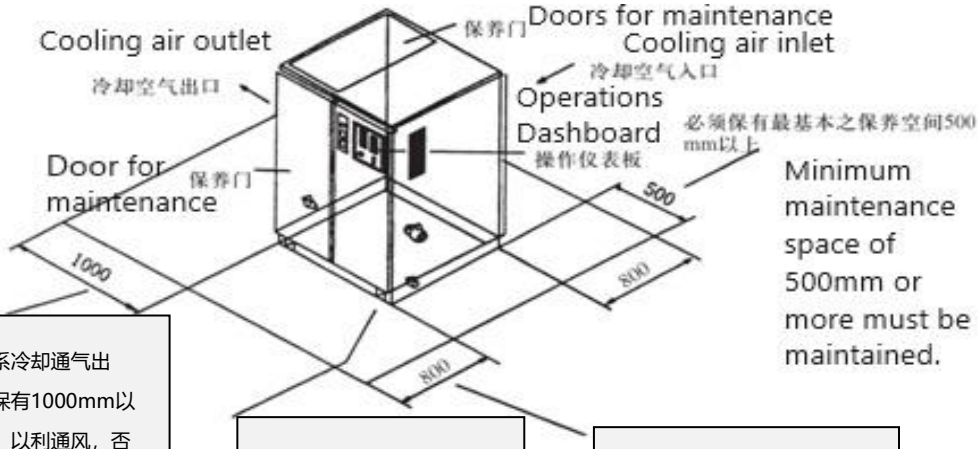
必须是水平平坦的工业用地板，应能承受机器重量（见基本技术参数表）。

It must be a horizontal, flat industrial floor that should be able to support the weight of the machine (see table of basic technical parameters).

2、室内空间　Interior space

当机器运行时，机房内温度应保证低于40℃。机房空间应大于100M3预留通道及起重设备（大功率空压机尤其需要），便于将来的维修保养所需。

When the machine is running, the temperature in the machine room shouldbe guaranteed to be less than 40℃. The space in the machine room should be more than 100M3 Reserve access and lifting equipment (especially needed for high-power air compressors) for future maintenance.



此方向若系冷却通气出口，必须保有1000mm以上之空间，以利通风，否则通风不良易造成空压机之高温跳脱现象，若只系一般侧盖则需保有500mm以上之空间作业。

If this direction is the outlet of cooling ventilation, there must be more than 1000mm space for ventilation, otherwise poor ventilation will easily cause high temperature of the compressor to jump off the phenomenon, if it is only a general side cover, then there must be more than 500mm space for operation.

地面必须保持水平，空压机底部最好铺上软垫或防震垫以防止振动及噪音

The floor must be kept level and the bottom of the compressor should be covered with soft or anti-vibration mats to prevent vibration and noise.

前方须保800mm之保养空间，以利保养之开启及控制盘之检修作业。

A maintenance space of 800mm must be kept in front to facilitate the opening of the maintenance and the maintenance of the control panel.

二、配管、基础及冷却系统注意事项
Second, piping, foundation and cooling system precautions

1.空气管路之配管注意事项 Piping precautions for air piping

(1) 主管路配管时，管路须有1~2之倾斜度，以利管路中的凝结水排出。

When piping the main line, the piping should have an inclination of 1~2 to facilitate the discharge of condensate in the piping.

(2) 配管管路之压力降不得超过空压机设定压力之5%，故配管时最好选用较设计值大的管径。

The pressure drop of piping should not exceed 5% of the set pressure of the compressor, so it is better to use a larger pipe diameter than the designvalue when piping.

(3) 支线管路必须从主管路的顶端接出，避免管路中的凝结水下流至工作机器中或者回流至空压机内。

The branch line must be connected from the top of the main line to avoid condensate in the line running down into the work machine or back into the air compressor.

(4) 需润滑的工具应三联组合（空气滤水过滤器、调压器、给油器），以维护工具之使用寿命。

Tools that require lubrication should be tripled (air and water filter, regulator, oiler) to maintain tool life.

(5) 主管路不要任意缩小，如果必要缩小或放大管路时须使用渐缩管，否则在接头处会有混流情况发生，导致大的压力损失，同时对管路的寿命影响很大。

The main line should not be arbitrarily reduced, if it is necessary to reduce or enlarge the pipeline must be used to shrink the tube, otherwise in the joints will be mixed flow occurs, resulting in a large pressure loss, and at the same time on the life of the pipeline has a great impact.

(6) 空压机之后如果有储气罐及干燥器等净化缓冲设施，理想之配管应是空压机＋储气罐＋干燥机。如此储气罐可将部分的凝结水滤除，同时储气罐亦有降低气体排气温度之功能。较低温度且含水量较少之空气再进入干燥器，可减轻干燥器之负荷。

After the air compressor, if there are storage tanks and dryers and other purification and buffer facilities, the ideal piping should be air compressor + storage tank + dryer. So that the storage tank can be part of the condensate filtered out, while the storage tank also has the function of reducing the gas exhaust temperature. Lower temperature and less water content of the air into the dryer, can reduce the load of the dryer.

(7) 若系统之空气用量很大且时间很短，最好加装一储气桶做为缓冲之用，如此可以减少空压机空重车之次数，对空压机有很大的助益。

If the air consumption of the system is very large and short, it is best to install a storage tank as a buffer, so as to reduce the number of air compressor empty heavy vehicle, the air compressor has a great benefit.

(8) 系统压力在1.5Mpa以下的压缩空气，其输送管内之流速须在15M/sec以下,以避免过大的压力降。

For compressed air with system pressure below 1.5Mpa, the flow rate in the delivery pipe should be below 15M/sec to avoid excessive pressure drop.

(9) 管路中尽量减少使用弯头及各类阀门，以减少压力损失。

Minimize the use of elbows and various types of valves in the pipeline to reduce pressure loss.

(10) 理想的配管是主管线环绕整个厂房，如此在任何位置均可获得双方面的压缩空气。如在某支线用气量突然大增时，可以减少压力降。且在环状主干线上配置适当之阀门，以利检修切断之用。

The ideal piping is a main line that runs around the entire plant so that compressed air is available from both sides at any location. Such as in a branch line of air consumption uddenly increased, you can reduce the pressure drop. And in the ring on the main line configuration of the appropriate valve, in order to facilitate the maintenance of the cut-off.

2.基础 Foundation

(1) 基础应建立在硬质土壤上，在安装前须将基础平面磨水平，以避免空压机产生振动。

The foundation should be built on hard soil, and the foundation plane should be ground level before installation to avoid vibration of the air compressor.

(2)空压机如装在楼上，须做好防振处理，以防止振动传至楼下，或产生共振，对空压机及大楼本身均有安全上的顾虑。

If the air compressor is installed on the upper floors of a building, it must be properly anti-vibration to prevent vibration transmission to the lower floors or resonance, which is a safety concern for both the air compressor and the building itself.

(3) 螺杆式空压机所产生的振动很小，故不需做基础。但其所放置之地面须平坦，且地下不可为软性土壤。

Screw compressors produce very little vibration, so they do not require a foundation. However, the ground on which it is placed must be flat and the ground must not be soft soil.

3.冷却系统 Cooling system

(1) 风冷机组 air-cooled unit

机房必须有两个通风口，每个面积不小于2m2第一个通风口在高处，用于排出热空气；第二个通风口在低处，用于吸入外部冷空气，如果环境空气灰尘较大，建议安装过滤板。

The machine room must have two vents, each with an area of not less than 2m2 The first vent

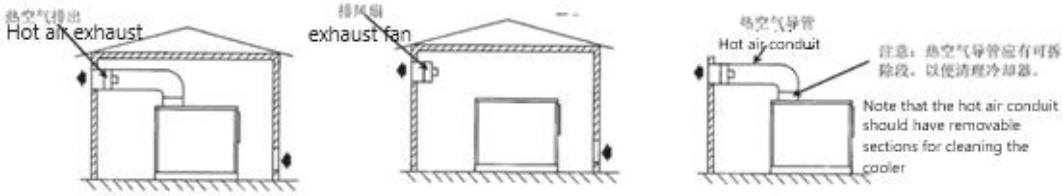
is at a high level for exhausting hot air; the second vent is at a low level for drawing in cold external air, and it is recommended to install filter panels if the ambient air is dusty.

风冷型压缩机排出的热空气可以用导管排出，水冷型的不需要。

Hot air discharged from an air-cooled compressor can be ducted out, not required for water-cooled models.

导管的最小截面积应不小于1m2，且长度不大于3m，否则应安装排风扇。

The minimum cross-sectional area of the conduit should be not less than 1m2 and the length not more than 3m, otherwise an exhaust fan should be installed



安装排风扇的风量必须***大于等于下表中的数值***（表中为一台的数值，多台叠加）。

The airflow of the installed exhaust fan must be greater than or equal tothe values in the table below (the table is for one unit, multiple units arestacked).

风冷型 Air- cooled	30kW that amount or less	37- 45kw	55- 90kw	110- 132 kw	160- 180 kw	200- 250 kw	280- 315 kw	350- 400 kw
冷却风量 Cooling air volume (M^3/h)	3600~ 7200	10800	13200	15000	18000	30000	36000	48000

(2) 对水冷机组，冷却水供水压力应为0.4—0.6MPa，进出口均应装阀门，如果冷却水可能有杂物，应装过滤器。

or water-cooled units, the cooling water supply pressure should be 0.4- 0.6MPa, valves should be installed at both the inlet and outlet, and filters should be installed if there may be debris in the cooling water.

(3) 冷却水量应大于规定的最低水量。

The amount of cooling water shall be greater than the specified minimum.

(4) 在气温低于0°C时，停机后应将水冷却器内的水完全排放干净，避免冷却器冻裂。

At temperatures below 0°C, the water in the water cooler should be completely drained after shutdown to avoid freezing and cracking of the cooler.

(5) 水冷型机器冷却水水质应符合以下要求：

The cooling water quality of water-cooled machines should meet the following requirements:

●总硬度用 CaC03 来表示应小于100PPM(100毫克 / 升)

Total hardness expressed as CaC03 should be less than 100PPM (100mg/l)

●PH值在6.0~8.0之间

PH value between 6.0 and 8.0

●悬浮物不超过5OPPM(50毫克 / 升)，劣质的冷却水会降低冷却器的冷却效果，严重时会导致整个冷却器失效而不能使用。

Suspended matter does not exceed 5 OPPM (50 mg / l), poor qualitycooling water will reduce the cooling effect of the cooler, and in seriouscases will lead to the failure of the entire cooler and can not be used.

机型功率 Model power	75 ~ 90KW	110 ~ 160KW	200 ~ 315Kw
冷却水量 Cooling water olume（M³/h）	10	18	35
冷却水压 Cooling water pressure（bar）	4 ~ 6		
冷却水温 cooling water emperature	30℃		
冷却水质 Cooling water uality	总硬度用CaCo3来表示应小于100PPM（100毫克/升） Total hardness expressed as CaCo3 should be less than 100 PPM (100 mg/l) PH值在6 ~ 8之间,悬浮物不超过50PPM（50毫克/升） PH value between 6 and 8, suspended solids not exceeding 50 PPM (50 mg/l)		
水过滤器 water filter	Stainless steel Y-filter with no less than 80 mesh		

（6）循环冷却供水量=24×机组水流量/冷却塔温差。

Circulating cooling water supply = 24 x unit water flow rate / cooling tower temperature difference.

三.电器一般规范及安全规范，*电源线径要求*

General and safety norms for electrical appliances, *Power cord diameter requirements*

1. 依使用空压机之功率大小，选择正确之电源线径，不得使用太小的线径，否则电源线易因高温烧毁而发生危险，甚至导致接触器及电机烧毁。

According to the use of air compressor power size, select the correct power cord diameter, do not use too small a wire diameter, otherwise the power cord is easy to burn due to high temperature and danger, and even lead to contactor and motor burned.

2. 空压机最好单独使用一套电力系统，尤其要避免与其他不同电力消耗系统并联使用，如并联使用时，可能会因过大电压降或三相电流不平衡形成空压机之过载而使保护装置动作跳机，大功率之空压机对此项尤须注意。

Air compressor is best to use a separate set of power system, especially to avoid parallel use with other different power consumption system, such as parallel use, may be due to excessive voltage drop or three-phase current imbalance formation of the compressor of the overload and make the protective device action to jump off the machine, high-power compressor on this especially must pay attention to.

3. 依空压机kw数装置适当的NFB(无熔丝开关）以维护电力使用系统及维修保养之安全。

Depending on the number of compressor kw, appropriate NFB (non-fuse-bearing switch) is installed to maintain the safety of the electric power system and maintenance.

4. 空压机配电时须确认其电压之正确性。

When distributing the air compressor, make sure the voltage is correct.

5. 电动机或系统的接地线应确实架设，而且接地线不可直接接在空气输送管或冷却水管上。

The grounding wire of the motor or system should be actually erected, and the grounding wire should not be connected directly to the air conveying pipe or cooling water pipe.

6. 一般规定，三相交流电动机超载运转，电流不得超过额定电流之3%，若三相电流不平衡则最低一相电流与最高一相电流之比值不得超过5%，同时若有电压降则电压降不得低于额定电压之5%。

General provisions, three-phase AC motor overload operation, the current shall not exceed 3% of the rated current, if the three-phase current imbalance, the lowest phase current and the highest phase current ratio shall not exceed 5%, at the same time, if there is a voltage drop, the voltage drop shall not be less than 5% of the rated voltage.

7. 空压机必须拉一条接地线至地上，防止因漏电而造成危险。

The air compressor must be pulled a grounding wire to the ground to prevent danger due to leakage of electricity.

8. 用户电源线及空气开关选型参见下表（另需选择合适的接地线并接地良好）。

Refer to the following table for the user's power cord and air switch selection (also need to select the appropriate grounding wire and grounded well).

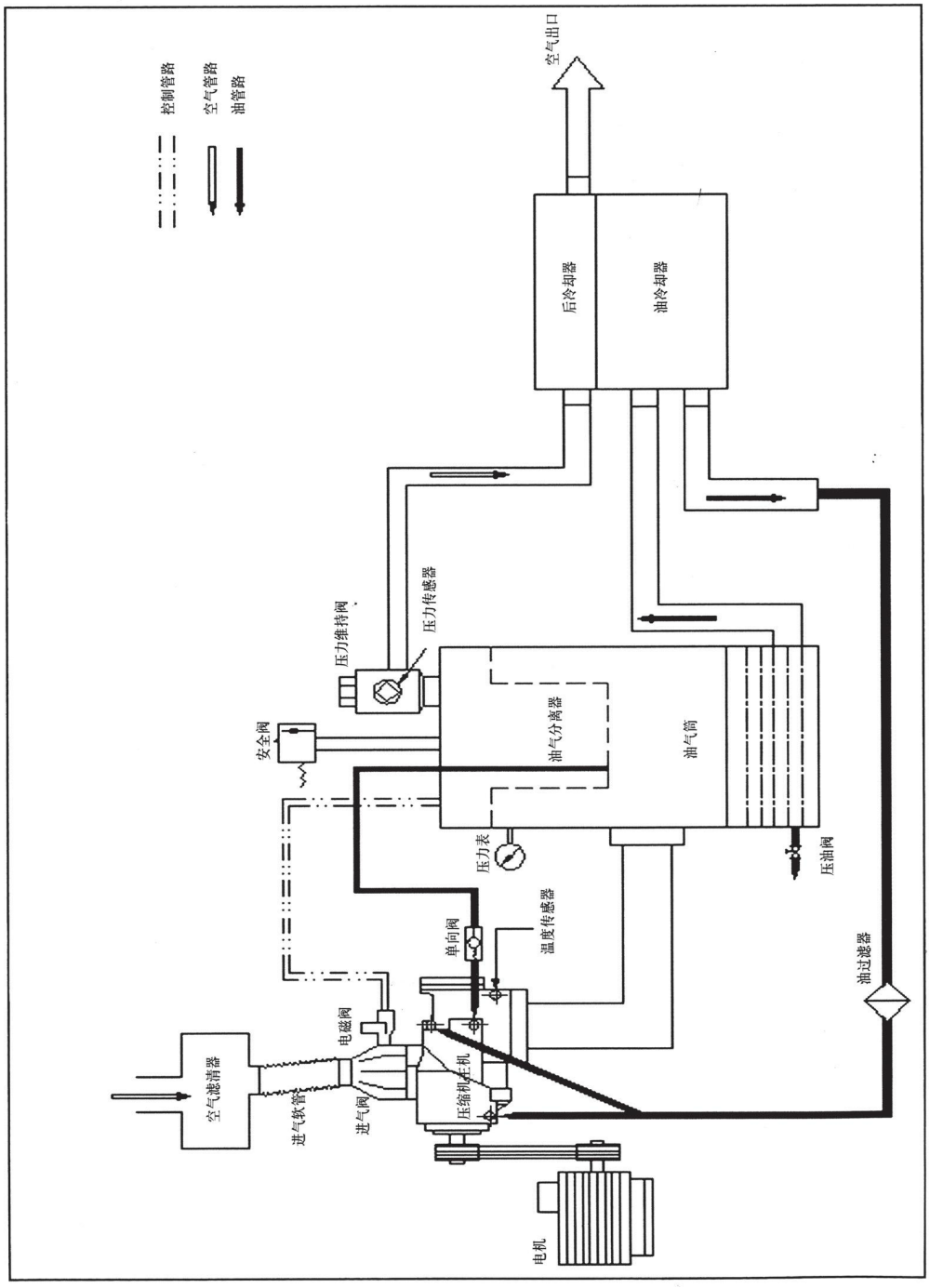
额定功率 Rated power (kW)	最大电流 Maximum Current (A)	距离 Distance (m)						客户空气开关规格不小于以下电流 Customer Air Switch Specifications Not less than the following current (A)
		0-15	15-30	30-50	50-75	75-100	100-150	
		客户电源线径(40°C载流量计算) Customer's power supply wire diameter (40°C load capacity calculation)						
5. 5-7.5	17.3	4mm2		6mm2		10mm2		32 A
11-15	24.7	6mm2			10mm2			50 A
15-18.5	40.3	l6mm2			25mm2			63 A
22	47.9	25mm2			35mm2			80 A
30-37	78.8	35mm2			50mm2			125 A
45-55	95.5	50mm2			70mm2			180 A
75	158	70mm2			95mm2			225 A
90	186	95mm2						315 A
110	237	120mm2						400 A
132	282	150mm2						400 A
160	340	185mm2						500 A
185	393	240mm2						630 A
200-250	524	300mm2						800 A
280-315	674	400mm2						1000 A
355	760	500mm2						1200 A

第三章　系统流程及原理

Chapter 3 System Flow and Principle

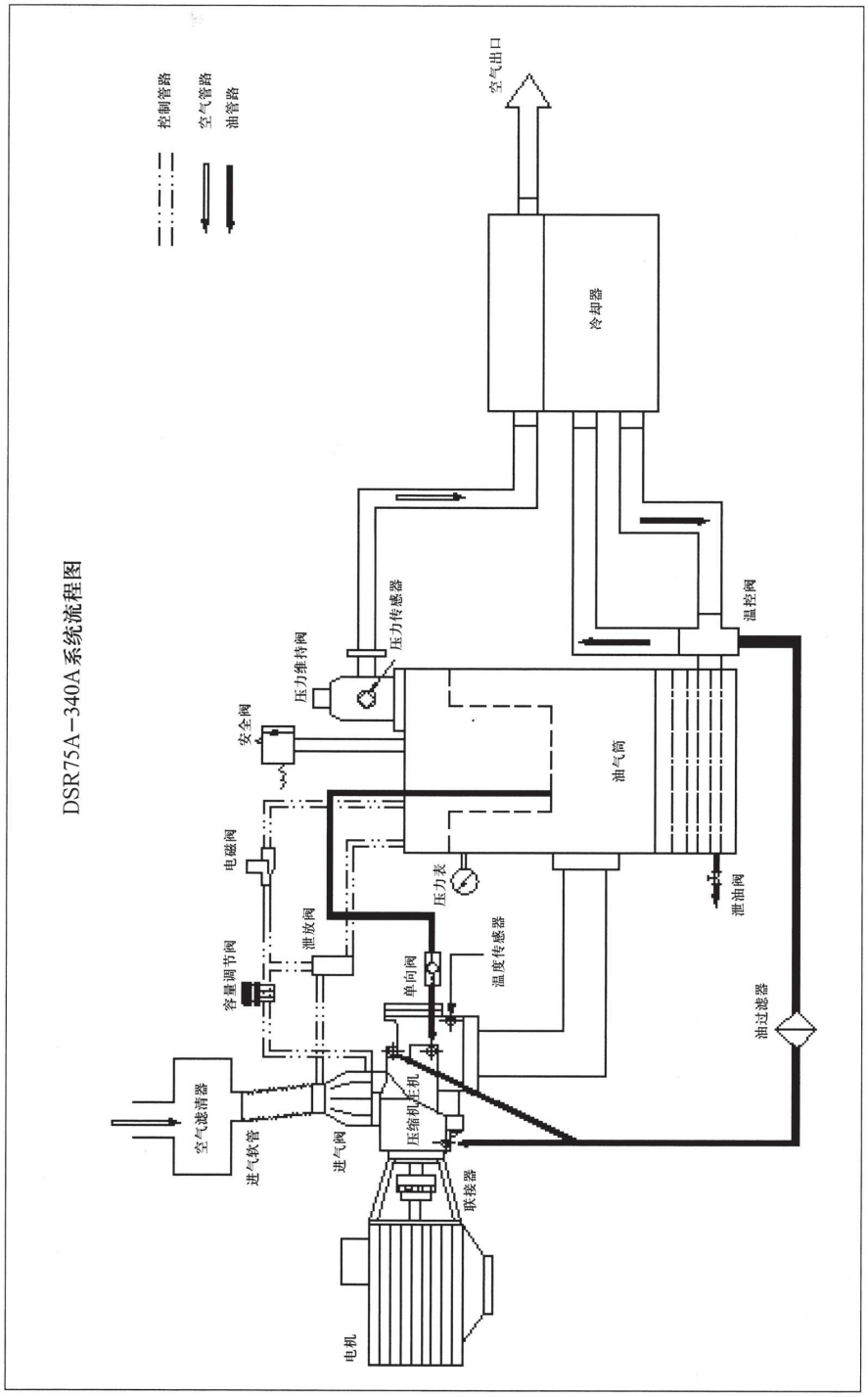
一、系统流程 System processes

皮带式连接系统流程图　Belt Connection System Flowchart



直连式连接系统流程图

Flowchart of the direct connection system



二、系统原理 System principles

1、空气流程（参照各机型之系统流程图）

Air flow (refer to the system flow chart of each model)

（1）空气由空气滤清器滤去尘埃之后，经由进气阀进入主压缩室压缩；并与冷却液混合，

与油混合之压缩空气经排气止回阀进入油气桶，再经由油细分离器压力维持阀、后部冷却器，送入使用系统中。

The air is filtered by the air filter to remove the dust, then through the air inlet valve into the main compression chamber compression; and mixed with the coolant, and mixed with the oil compressed air through the exhaust check valve into the oil and gas tank, and then through the oil and fine separator pressure maintenance valves, after the cooler, and sent to the use of the system.

（2）主气源通路中各组件功能说明：

Functional description of each component in the main gas supply path

A. 空气过滤器 (AirFilter)

空气过滤器为一干式纸质过滤器，过滤纸细孔度约为10μ左右，通常每1000小时应取下清除表面之尘埃，清除的方法是使用低压空气将尘埃由内向外吹除。部分机型空气过滤器内部装有一压差探测器，如果仪表板上之空气滤清器△p指示灯亮，即表示空气过滤器必须清洁或更换。

The air filter is a dry paper filter, the pore size of the filter paper is about 10μ, usually it should be removed every 1000 hours to remove the dust on the surface, the method of removal is to use low pressure air to blow the dust out from the inside to the outside. Some models are equipped with a differential pressure detector inside the air filter. If the air filter △p indicator light on the instrument panel is on, it means that the air filter must be cleaned or replaced.

B. 进气阀 (Suction Valve)

空、重负荷控制 Empty and heavy load control

此种进气阀系采用活塞式控制，利用活塞上下的动作来做空重负荷的控制。当起动、停机或空车时，均利用电磁阀之动作，未控制进气阀活塞向上关闭阀门，同时也利用节流阀来维持系统循环所需的最低压力。

This type of intake valve adopts piston type control, utilizing the up and down action of the piston to do the control of empty and heavy loads. When starting, stopping or empty, are using the action of the solenoid valve, did not control the intake valve piston up to close the valve, but also the use of throttle valves to maintain the minimum pressure required for the system cycle.

当电动机全负荷运转后，电磁阀通电，即停止泄放，此时，进气阀活塞因进气压力差的关系，活塞被吸向下成进气状态。若压力到达压力开关之上限值，压力开关动作，电磁阀开始泄放，并且将进气阀活塞推挤向上关闭阀门，成空负荷状态。

When the motor is fully loaded, the solenoid valve is energized, that is, to stop the discharge, at this time, the intake valve piston due to the relationship between the pressure difference between the intake, the piston is sucked down into the intake state. If the pressure reaches the upper limit of the pressure switch, the pressure switch operates, the solenoid valve starts to discharge, and the intake valve piston is pushed upward to close the valve into the no-load state.

● 容调控制 / Tolerance control

当系统压力逐渐上升（未达压力开关之设定值）之时，首先到达容调阀设定压力，则会有少许空气经过，将进气阀活塞向上推挤，而进气量会逐渐减少，此时系统已经开始容调。若压力持续上升则进气活塞也越向上关闭，反之若系统压力降低，则进活塞开启进气量越大。直到低于容调阀之设定值，则容调动作停止。

When the system pressure rises gradually (not up to the setting value of the pressure switch), the first to reach the set pressure of the tolerance valve, there will be a little air through the intake valve piston pushed upward, and the amount of air inlet will be gradually reduced, at this time, the system has begun to adjust the tolerance. If the pressure continues to rise, the intake piston is also the more upward closure, and vice versa, if the system pressure is reduced, the intake piston opens into the larger amount of air. Until it is lower than the setting value of the tolerance valve, then the tolerance operation will stop.

● 导杆式容量控制阀 / Pilot rod type capacity control valve

本进气阀的制动器有左右两处，左方为进气制动器，右方为容量调整制动器。重负荷时，由电磁阀来的压力进入左方气压缸。由于曝露于压力的面积不同，阀负荷时由电磁阀来的压力进入左方压缸，由电磁阀来的压力进入左方压缸。由于暴露于压力的面积不同，阀杆被推向右边，此时进气阀门打开而达到重负荷运转。

This intake valve has left and right brakes, the left side is the intake brake and the right side is the capacity adjustment brake. When the valve is heavily loaded, the pressure from the solenoid valve enters the left side air pressure cylinder. Due to the difference in the area exposed to pressure, the pressure from the solenoid valve enters the left side pressure cylinder when the valve is loaded, and the pressure from the solenoid valve enters the left side pressure cylinder. Due to the difference in the area exposed to pressure, the valve stem is pushed to the right, at which time the inlet valve opens and heavy duty operation is achieved.

系统压力有一支管经容调调压阀而接至右方压力控制阀的入口，并进入容调控制室。当系统压力因使用量减少而升高且达到容调阀调整的设定压力时，压力即开始进入容调控制室在容调控制室中有一泄放孔，当空气进入量大于泄放量时，则容调控制室中逐渐建立压力，膜片受压向左推经由推栓将阀杆推向左方，以限制进气量。若此时系统用量增

加时，系统压力略为下降，容调阀关闭或关小，此时容调控制室之压力来源减小或被切断。原有的压力由泄放孔泄放而减小或消失。膜片左方之推力亦减小，阀杆又可推向右方而增大进气量，此为容量调整之过程。

The system pressure is connected to the inlet of the right pressure control valve through the regulator and enters the regulator control room. When the system pressure due to the use of less and higher and reach the tolerance valve adjustment of the set pressure, the pressure that is beginning to enter the tolerance control room in the tolerance control room there is a relief hole, when the amount of air into the amount is greater than the amount of relief, the tolerance control room gradually build pressure, the diaphragm is pressurized by the left push through the push pin will be pushed to the left side of the valve stem to limit the amount of air intake. If the system dosage increases at this time, the system pressure drops slightly, the regulator valve closes or shuts down, at this time the pressure source of the regulator control room is reduced or cut off. The original pressure is reduced or disappears by the relief hole. The thrust of the left side of the diaphragm is also reduced, and the valve stem can be pushed to the right side to increase the air inlet, which is the process of capacity adjustment.

若系统之用量减少甚多，压力上升之速度，超过容量调整的反应能力。则压力开关动作即将电磁阀失电，左方进气制动室中失压，阀杆由弹簧推回关闭位置，切断进气量。同时油气桶中的空气由泄放阀排至进气口，主机处于空负荷运转。系统压力降至预定之下限时，再重使用电磁阀激磁恢复重负荷程序。

If the volume of the system is reduced significantly, the rate of pressure rise exceeds the capacity adjustment response capability. Then the pressure switch action is about to lose power to the solenoid valve, the left side of the air inlet brake chamber pressure loss, the valve lever by the spring pushed back to the closed position, cut off the air inlet. At the same time, the air in the oil and gas drum is discharged to the air inlet by the relief valve, and the host is in no-load operation. When the system pressure drops to a predetermined lower limit, the solenoid valve is reused to magnetize and resume the heavy load program.

（3）温度传感器　temperature sensor

在失水、失油、水量不足、油量不足等情况下，均有可能会导致排气温度过高，当排气温度达到温度开关所设定之温度值时，则主控器动作，而停机。温度开关一般是设定在100℃，它并附有一温度表于仪表盘上，可读出排气之温度。

In the case of water loss, oil loss, insufficient water, insufficient oil, etc., may lead to the exhaust temperature is too high, when the exhaust temperature reaches the temperature value set by the temperature switch, then the main controller action, and shutdown. The temperature switch is usually set at 100 ℃, and it is attached with a temperature meter on the instrument panel, which can read out the temperature of the exhaust gas.

（4）止回阀　check valves

能防止停机时，油气桶内的压缩空气倒流回机体内造成转子之反转。可消除因热而形成管路膨胀之内应力及机组之振动。

It prevents the compressed air in the oil and gas tank from flowing back into the machine during shutdown, causing the rotor to reverse. Eliminate the internal stress of piping expansion and vibration of the unit due to heat.

（5）油气桶　oil and gas barrels

油气桶桶侧装有油标，静态冷却液之油位应在油位计的高油位线与低油位线之间，桶上开有一处加油孔，可供加油用。油桶下装有泄油阀，**每次启动前应略为扭开泄油阀以排除油气桶内之凝结水。**

he oil and gas barrel is equipped with an oil marker on the side of the barrel, the oil level of the static coolant should be between the high oil level line and the low oil level line of the oil level meter, and there is a refueling hole on the barrel, which can be used for refueling. There is an oil drain valve under the oil drum, and the oil drain valve should be slightly twisted open before each startup to exclude the condensation water in the oil and gas drum

由于油桶之宽大截面积，压缩空气可使流速减小，油滴分离，此为第一段之除油。

Due to the wide cross-sectional area of the oil drum, the compressed air can reduce the flow rate and separate the oil droplets, which is the first stage of oil removal.

（6）油细分离器　oil-fine separator

详细内容请参阅后节说明
For details, please refer to the note in the following section

（7）安全阀 Safety Valve

当压力开关调节不当或失灵而使油气桶内之压力比设定排气压力高出0.1MPa以上时，安全阀即会跳开，使压力降至设定排气压力以下。**安全阀于出厂前即已经过调整，请勿随意动它。**

When the pressure switch is improperly adjusted or malfunctions and the pressure in the tank is more than 0.1MPa higher than the set exhaust pressure, the safety valve will pop open and reduce the pressure to below the set exhaust pressure. The safety valve has been adjusted before leaving the factory, please do not move it.

（8）泄放阀　Relief Solenoid Valve

泄放阀为二通常开之电磁阀，当停机或空车时，此阀即打开，排出桶内之压力，以确保压缩机能在无负载之情况下起动或空负荷运转。

The relief valve is a two normally open solenoid valve, when stopping or empty, this valve will open to discharge the pressure in the drum to ensure that the compressor can start or run without load.

（9）压力维持阀 Minimum pressure Valve

位于油气桶上方油细分离器之出口处，开启压力设定于0.45MPa左右。压力维持阀的功能为：

It is located at the outlet of the oil/gas separator above the oil/gas tank, and the opening pressure is set at about 0.45MPa. The function of the pressure maintaining valve is:

A．起动时优先建立起冷却液所需之循环压力，确保机体的润滑。

Prioritize the establishment of circulating pressure of coolant during startup to ensure the lubrication of the body.

B．于压力超过0.45MPa之后方行开启，可降低流过油细分离器的空气流速，除确保油细分离效果之外，并可保护油细分离器免因压差太大而受损。

Open only after the pressure exceeds 0.45MPa to reduce the air flow rate through the oil separator, which ensures the oil separation effect and protects the oil separator from being damaged due to the pressure difference.

（10）后冷却器(After Cooler)

A．若为风冷式的冷却器，冷却风扇将冷空气吹过冷却器去冷却压缩空气。其排气温度一般在（大气温度+15°C以下）**风冷式的空压机对环境温度条件较敏感，选择放置场所时，最好注意环境的通风条件。**

In case of air-cooled cooler, the cooling fan blows cold air through the cooler to cool the compressed air. Its exhaust temperature is generally in (atmospheric temperature +15 ° C below) air-cooled air compressor on the ambient temperature conditions are more sensitive to the choice of place, it is best to pay attention to the environment of the ventilation conditions.

B．若为水冷式的机型，则使用管壳式冷却器，用冷却水来冷却压缩空气，其排气温度在40℃以下（冷却水入口水温最高不得超过35℃）。水冷式空压机对环境温度条件较不敏感，且较易控制其排气温度，若冷却水水质太差，则冷却器易结垢而阻塞必须特别注意，而且若水中PH值很低（即酸度高）亦须用特殊铜材质以免腐蚀。

If the model is water-cooled, the use of shell and tube cooler, cooling water to cool the compressed air, the exhaust temperature below 40 ℃ (cooling water inlet water temperature shall not exceed a maximum of 35 ℃). Water-cooled air compressor is less sensitive to ambient temperature conditions, and easier to control its exhaust temperature, if the cooling water quality is too poor, the cooler is easy to scale and blockage must be especially careful, and if the water PH value is very low (i.e., acidity is high) must be used to avoid corrosion of the special copper material.

2、冷却液流程（参照各机型之系统流程图）
Coolant flow (refer to the system flow chart of each model)

（1）喷油流程说明 Description of the oil injection process

由于油气桶内之压力，将冷却液压入油冷却器，在冷却器中将润滑加以冷却之后，经过油过滤器除去杂质颗粒，然后分成二路，一路由机体下端喷入压缩室，冷却压缩空气，另一路通到机体的两端，用来润滑轴承组及传动齿轮，而后（各部之冷却液）再聚集于

压缩室底部，随压缩空气排出。

Due to the pressure in the oil and gas barrel, the cooling pressure into the oil cooler, the lubrication will be cooled in the cooler, after the oil filter to remove impurity particles, and then divided into two ways, one way from the lower end of the body sprayed into the compression chamber to cool the compressed air, and the other way to the ends of the body, used to lubricate the bearings and transmission gears, and then (all the coolant) and then gathered in the bottom of the compression chamber, with the compressed air discharged.

与油混合之压缩空气经排气口进入油气桶，分离一大部分的油，其余的含油雾空气再经过油细分离器，滤去所余的油，经压力维持阀进入后部冷却器冷却，即可送至使用系统。

Mixed with oil compressed air through the exhaust port into the oil and gas barrel, separating a large portion of the oil, the rest of the oil mist air and then through the oil fine separator, filtering out the remaining oil, through the pressure maintenance valve into the rear cooler to cool, can be sent to the use of the system.

（2）喷油量的控制 Control of fuel injection quantity

喷油螺杆式压缩机所喷入的油主要是用来带走空气在压缩过程中所产生的热量，喷油量的多少直接影响压缩机的性能。喷油量在出厂前均已经本厂技师设定好，因此请不要随意动它。若因排气温度原因而要调整，请事先与本公司服务单位联系以免损伤空压机。

The oil injected into the oil-injected screw compressor is mainly used to take away the heat generated by the air in the compression process, the amount of oil injected directly affects the performance of the compressor. The amount of oil injected into the compressor is set by the factory technician before delivery, so please do not move it at will. If you need to adjust it because of the exhaust temperature, please contact our service unit beforehand to avoid damaging the compressor.

（3）油路上各组件功能说明：

unctional description of each component on the oil line:

A．油冷却器(Oil cooler)

油冷却器与空气后冷却器的冷却方式相同，有风冷与水冷二种冷却方式。

The oil cooler has the same cooling method as the air aftercooler, and there are two types of cooling methods: air-cooled and water-cooled.

若环境状况不佳，则风冷式冷却器之翅片易受灰尘覆盖而影响冷却效果，排气温度会过高而致跳机。因此每过一段时期，应用低压之压缩空气将翅片表面之灰尘吹掉，若无法吹干净则必须以溶剂来清洗，务必保持冷却器散热表面之干净。

If the environmental conditions are not good, the air-cooled cooler fins are easy to be covered by dust and affect the cooling effect, the exhaust temperature will be too high and lead to jump. Therefore, after a period of time, the application of low- pressure compressed air will be blown off the surface of the fins of the dust, if you can not blow clean must be cleaned with solvents, be sure to keep the cooler cooling surface of the clean.

管壳式之冷却器在堵塞时，必须以特殊药水浸泡，且以机械方式将堵塞在管内之结垢清除，务必确定完全清洗干净。

Shell and tube type cooler in the clogging, must be soaked in special medicinal water, and mechanical way to block in the tube of the scale removal, be sure to determine the complete cleaning.

B．油过滤器 (Oil Filer)

油过滤器是一种纸质量过滤器，其功能乃是除去油中之杂质如全属微粒，油之劣化物等，过滤精度在10μ,~15μ,之间，对轴承及转子有完善的保护作用，部分机型装有压差指示灯，如果压差指示灯亮，表示油过滤器阻塞，必须更换。**新机第一次运转500小时之后即需要更换油及油过滤器**，尔后则依设定的保养间隔或者压差指示灯亮而更换。若油过滤器压差大而没更换，则可能导致进油量不足，而排气高温跳机，同时因油量不足会影响到轴承之寿命。

Oil filter is a kind of paper quality filter, its function is to remove impurities in the oil such as all the particles, oil degradation, etc. The filtration precision is between 10μ,~15μ, which has perfect protection for the bearings and rotor, some models are equipped with a differential pressure indicator, if the differential pressure indicator is on, it means that the oil filter is clogged and has to be replaced. If the differential pressure indicator light is on, it means that the oil filter is blocked and must be replaced. The oil and oil filter need to be replaced after the first 500 hours of operation of the new machine, and then they will be replaced according to the set maintenance intervals or when the differential pressure indicator light is on. If the oil filter is not replaced due to high differential pressure, it may lead to insufficient oil intake and high exhaust temperature, and the life of the bearings will be affected due to insufficient oil intake.

C．油细分离器 (Oil Separator)

油细分离器之滤芯是用多层细密的玻璃纤维制成，压缩空气中所含的雾状油气经油细分离器后几乎可被完全滤去，油颗粒大小可控制0.1m以下，含油量则可低于5ppm。冷却液的油品及周围环境的污染程度对其寿命影响甚大，如果环境污染甚为严重，可考虑加装前置空气过滤器；至于冷却液的选择，必须采用本公司所推荐的牌号，最忌使用假油或再制油。油细分离器出口装有安全阀、泄放阀及压力维持阀，压缩空气由此引出，通至后冷却器。

The filter element of the oil fine separator is made of multi-layer fine glass fiber, the misty oil contained in the compressed air can be almost completely filtered out after the oil fine separator, the size of the oil particles can be controlled to be less than 0.1m, and the oil content can be less than 5ppm. The oil of the coolant and the degree of pollution of the surrounding environment have great influence on the life of the coolant, and if the pollution of the environment is very serious, the addition of a pre-filter can be considered. As for the selection of coolant, the grade recommended by the company must be used, and the use of fake oil or remanufactured oil is most avoided. The outlet of the oil fine separator is equipped with a safety valve, a drain valve and a pressure maintaining valve, and the compressed air is led out from it to the after-cooler.

油细分离器所滤过的油集中于中央的小圆凹槽内，再由一回油管回流至机体进口侧可避免已被过滤的冷却液再随空气排出。

The oil filtered by the oil fine separator is concentrated in the small round groove in the center, and then returned to the inlet side of the body by a return pipe to avoid the coolant that has been filtered to be discharged with the air.

一般而言，油细分离器是否损坏可由以下方法判断：

In general, whether the oil-fine separator is damaged can be determined by the following methods:

a.空气管路中所含有的油分增加。 Increase in oil contained in air lines.

b.部分机型在油桶与油细分离器间装有一个油细分离器压差开关发出报警，其设定压差值0.15MPa当油细分离器前后压差超过设定值则压差指示灯亮发出报警，表示油细分离器已阻塞，应立即加以更换。

Part of the model in the oil drum and oil fine separator is equipped with an oil fine separator pressure difference switch alarm, the set pressure difference value of 0.15MPa when the oil fine separator before and after the pressure difference exceeds the set value of the pressure difference indicator light alarm, indicating that the oil fine separator has been clogged, it should be replaced immediately.

c.检视油压是否偏高 Check for high oil pressure

d.电流是否增加 Whether the current increases

D.温控阀 Temperature control valve

部分机型油冷却器前方装有一热控制阀，其功能是维持排气温度在压力露点温度以上）刚开机时，冷却液温度低，此时热控制阀会自动把回流的回路打开，油则不经过油冷却器而进入机体内。若油温升高到67℃以上则阀漫慢打开，至72℃时全开，此时油会全部经过油冷却器冷却再进入机体内。

Part of the model oil cooler is equipped with a thermal control valve in front of the function is to maintain the exhaust temperature in the pressure dew point temperature above) just start, the coolant temperature is low, this time the thermal control valve will automatically open the return circuit, the oil does not go through the oil cooler and into the body. If the oil temperature rises to 67 ℃ or more, the valve will open slowly, to 72 ℃ when the full open, at this time the oil will be all cooled by the oil cooler and then into the body.

3、冷却系统 Cooling system

（1）风冷式机型 Air-cooled models

冷空气经由一循环风扇抽入，吹过冷却器之散热翅片，与压缩空气及冷却液做热交换，达到冷却之效果。**此冷却系统之最高允许环境温度为40℃**,若环境温度超过40℃则系统即有引起跳闸之可能，如放置场所在高温之锅炉边等。

Cold air is drawn in by a circulating fan, blowing through the cooling fins of the cooler, and heat exchange with compressed air and coolant to achieve the cooling effect. The maximum permissible ambient temperature of this cooling system is 40℃, if the ambient temperature exceeds 40℃, the system will cause the possibility of tripping, such as placing the place in the high temperature of the boiler side.

（2）水冷式机型 Water-cooled models

冷却水之水温设计基准系32℃,所以冷却水循环系统设计必须特别注意。尤其是冷却水水质必须符合一般工业用水标准以上才可，尽量避免使用地下水，若水质差则冷却水塔须定期加清洗剂业清洗沉积物，以免影响冷却器的效率及寿命。**冬季时，常温在冰点以下地区，机组停机后，必须将冷却器中冷却水排放干净。**

Cooling water temperature design benchmark is 32 ℃, so the cooling water circulation system design must pay special attention. In particular, the cooling water quality must meet the general industrial water standards or more can, try to avoid the use of groundwater, if the water quality is poor, then the cooling water tower must be regularly added to the cleaning agent industry to clean the deposits, so as not to affect the efficiency of the cooler and the life of the cooler. In winter, the room temperature in the freezing point below the region, the unit shutdown, must be cooled in the cooler cooling water discharge clean.

三、安全保护系统及警告装置

Safety protection systems and warning devices

1、电动机超载保护 Motor overload protection

空压机系统内共有二个主要电机，一为空压机驱动主电机，二为冷却循环风扇电机。电机在一般正常状况下，其运转电流均不会超过额定电流之3%，(例如因电压降，三相不平衡等因素）。当电动机运转电流超过过电力保护装置所设定之上限时，过电流保护装置会自动切断主电源。空压机停机，此时除非重新设定，否则空压机无法启动。一般电动机超载之原因：

There are two main motors in the air compressor system, one is the main compressor drive motor and the other is the cooling circulating fan motor. Under normal conditions, the operating current of the motor will not exceed 3% of the rated current (e.g. due to voltage drop, three-phase unbalance, etc.). When the motor operating current exceeds the limit set by the over-current protection device, the over-current protection device will automatically cut off the main power supply. The compressor stops and cannot be started unless it is reset. General causes of motor overload:

（1）人为的操作失误：如自行调整排气压力系统调整不当等。

Man-made operational errors: such as self-adjustment of exhaust pressure system improperly adjusted.

（2）机械故障：Mechanical failure:

如电动机内部损耗、电动机欠相运转、安全阀不动作、系统设定失效、油细分离器阻塞

等。

For example, internal motor losses, under-phase motor operation, inoperative safety valves, failure of system settings, clogged oil-fine separators, etc.

如果在运转中发现电动机有超载之情形，应即刻与制造厂商联络。派员前往检查，确实查明原因，否则电动机烧毁就得不偿失了。

If you find the motor overloaded during operation, you should contact the manufacturer immediately. Send staff to inspect the motor and find out the cause, otherwise the motor will be burned down and the loss will not be worthwhile.

2、排气温度过高保护 Exhaust gas temperature is too high protection

系统所设定之最高排气温度为100°c，若超过100°C则系统立即报警后自行切断电源。一般排气温度过高的原因很多，但最常见的原因系油冷却器失效。风冷式之油冷却器若散热翅片被灰尘堵塞，冷风无法自由通过冷却器则冷却液温会逐渐上升而导致因高温停机。因此每隔一段时间即须利用低压空气清除散热翅片上灰尘，若翅片上堵塞物无法吹干净，最好用清洁液或溶剂清洗。

The maximum exhaust temperature set by the system is 100°C. If it exceeds 100°C, the system will immediately alarm and cut off the power supply by itself. There are many reasons for high exhaust temperature, but the most common reason is the failure of the oil cooler. If the cooling fins of air-cooled oil cooler are blocked by dust, the cold air can not pass through the cooler freely, the temperature of coolant will rise gradually and lead to shutdown due to high temperature. Therefore, it is necessary to use low-pressure air to remove the dust on the cooling fins every once in a while. If the blockage on the fins can not be blown clean, it is best to use cleaning fluid or solvent to clean them.

水冷式之空压机一般则因冷却铜管积垢堵塞导致传热效率降低，而因高温跳闸。空压机设计之最高环境温度为40℃若环境温度愈高则排气温度愈高，因此选择一个环境温度低且通风良好之场所放置空压机是必要的。

Water-cooled air compressors are generally clogged due to the accumulation of scale in the cooling copper tube, resulting in a reduction in heat transfer efficiency and tripping due to high temperatures. The maximum ambient temperature of air compressor is 40℃. If the ambient temperature is higher, the exhaust temperature will be higher, so it is necessary to choose a place with low ambient temperature and good ventilation to place the air compressor.

当排气温度超出设定值以后，系统启动回路即被切断，此时无法再次启动系统，除非重新设定一次。

When the exhaust temperature exceeds the set value, the system start circuit is cut off and the system cannot be started again unless it is reset.

四、控制系统及电气线路

Control system and electrical wiring

1.螺杆式空压机控制系统 Screw air compressor control system

（1）电动机起动（降压或Y运转）Motor starting (buck or Y operation)

在此期间，进气阀全闭，泄放阀全开，电磁阀处于闭合状态之位置，此时进气侧成高度真空，压缩室及轴承所须之冷却液，由压缩室之真空与油桶内的大气压力差所确保。

During this period, the inlet valve is fully closed, the drain valve is fully open, and the solenoid valve is in the closed position. At this time, the inlet side becomes a high degree of vacuum, and the coolant required for the compression chamber and the bearings is ensured by the vacuum of the compression chamber and the difference in atmospheric pressure in the oil drum.

（2）电动机全压动转（全压或△运转）

Motor full-voltage dynamic rotation (full-voltage or △ operation)

控制切入全压运转后，电磁阀因通电后呈开启之状态，泄放阀关闭，此进空气桶中之压力逐渐升高，进气阀渐开，因此油桶内之压力迅速增高，以致进气阀全开，压缩机开始全负荷运转，当压力升至0.45MPa时，压力维持阀全开，空气输出。

Control cut into full-pressure operation, the solenoid valve is open due to the state of energized, the relief valve is closed, the pressure in the inlet air drum gradually increased, the inlet valve gradually open, so the pressure in the drum increases rapidly, so that the inlet valve is fully open, the compressor began to run at full load, when the pressure rises to 0.45MPa, the pressure maintenance valve is fully open, the air output.

（3）重负荷 / 无负荷操作Heavy load/no load operation

当排气压力达压力开关设定之上限时，切断电源，电磁阀关闭，因而进气阀亦关闭，同时泄放阀全开，将油桶内之空气排至大气中，此时压缩机在无负荷状态下运转，其所需之冷却液压即由真空与大气压力之差所确保。

When the exhaust pressure reaches the upper limit set by the pressure switch, the power supply is cut off, the solenoid valve is closed, thus the inlet valve is also closed, and at the same time the relief valve is fully open, the air in the oil drum is discharged to the atmosphere, at this time the compressor operates in a no-load state, and the cooling hydraulic pressure required is ensured by the difference between the vacuum and the atmospheric pressure.

待管路系统之压力降至压力开关之下限时，压力开关再接通电源，电磁阀再次开启，进气阀亦全开，同时泄放阀关闭，压缩机再负载运转。

When the pressure of the piping system drops to the lower limit of the pressure switch, the pressure switch is turned on again, the solenoid valve opens again, the air inlet valve also opens fully, and at the same time, the relief valve closes, and the compressor runs under load again

（4）停机 stop

按下停机OFF按扭后，电磁阀断电关闭，同时泄放阀全开，将油桶内之空气排至大气中，待油桶内的压力降至一定值时，电动机停转。

After pressing the OFF button, the solenoid valve will be shut down, and at the same time, the drain valve will be fully open to discharge the air in the oil drum to the atmosphere, and the motor will stop when the pressure in the oil drum drops to a certain value.

（5）紧急停机 emergency stop

当排气温度超过100℃或电动机因超载致过电流保护装置动作时，电源将被切断电动机即刻停转，同时电磁阀，进气阀亦关闭，泄放阀则全开，**只有当机组在运行过程中出现异常情况时，才允许按紧急停机钮，否则会造成系统失灵。**

When the exhaust temperature exceeds 100 ℃ or motor overload due to overcurrent protection device action, the power supply will be cut off the motor immediately stop, while the solenoid valve, air inlet valve is also closed, the relief valve is fully open, only when the unit in the process of operation in the event of abnormalities, it is permitted to press the emergency shutdown button, otherwise it will result in the failure of the system.

（6）无负荷过久自动停机系统

Automatic stopping system for long time without load

若当系统之使用空气量减少时，压缩机保持在无负荷情况下运转，若无负荷运转时间超过设定之时间，则空压机会自动停机，电动机停止运转，当系统的使用空气量增加，系统压力会降低，则空压机会自动起动，以补充空气量，无负荷运转过久停机之时间设定限制以电动机每小时启动次数不超过二次为原则，客户可自行依使用状况而加以设定，但切忌使电动机之启动次数变得频繁易导致电动机烧毁。

If the air volume of the system is reduced, the compressor will keep running under no-load condition, if the no-load running time exceeds the set time, the compressor will automatically shut down and the motor will stop running, when the air volume of the system is increased, the system pressure will be lowered, then the compressor will automatically start to replenish the air volume, and the no-load running time limit for the long time of the shutdown will be set at the rate of no more than two motor start- ups per hour. Customers can set the limit according to the usage condition, but do not make the motor start more frequently, which may cause the motor to burn out

2、变频螺杆式空压机控制保护系统

Variable frequency screw air compressor control and protection system

在用户用气量小或暂停用气的时候，关闭进气阀的主进气阀门，使压缩机在轻载条件下运行，进入卸载状态，从而实现节能的目的。在用气量恢复后，微电脑控制器又重新打开进气阀的主进气阀门，使压缩机转入全负荷运行，恢复加载运行状态。同时微电脑控制器还对机组进行监控，在机组出现异常情况时（如电机过载、排气超温等）自动停机，保护压缩机不受到

损害。

When the user's gas consumption is small or suspended, the main inlet valve of the inlet valve is closed, so that the compressor operates under light load conditions and enters the unloading state, thus realizing the purpose of energy saving. After the recovery of gas consumption, the microcomputer controller re-opens the main inlet valve of the inlet valve, so that the compressor is transferred to full load operation, and resumes the loading operation state. At the same time, the microcomputer controller also monitors the unit, and automatically stops the unit in case of abnormal conditions (such as motor overload, exhaust gas over-temperature, etc.) to protect the compressor from damage.

油气筒上设有安全阀，当油气筒内的压力超过设定值时，安全阀便会自动打开，迅速放气卸压，确保机组安全。本机设有完善的卸压功能，所以在一般情况下，安全阀是不会打开的。

The oil and gas cylinder is equipped with a safety valve, when the pressure in the cylinder exceeds the set value, the safety valve will automatically open and quickly bleed off the pressure to ensure the safety of the unit. This machine is equipped with a perfect pressure relief function, so under normal circumstances, the safety valve will not open.

3、螺杆式空压机电气线路

Screw air compressor electrical wiring

空压机之电气控制可构成二个系统，一个为内部控制系统，另一个为起动盘部分，起动盘乃是一般机械常用Y—△起动控制。而控制部分则为电子式控制。电子控制部分由于内部线路及控制较复杂，在此章中不深入介绍，若有损坏或故障请直接与本司各服务单位联络，直接将电路板更换即可。

The electrical control of the air compressor can be composed of two systems, one for the internal control system and the other for the starter disk part, the starter disk is the general machinery commonly used Y-△ starting control. The starter disk is the Y-△ starter control commonly used in general machinery, while the control part is the electronic control. Due to the complexity of the internal wiring and control, the electronic control part is not introduced in depth in this chapter. If there is any damage or failure, please contact our service units directly and replace the circuit board directly.

4、变频螺杆式空压机电气线路

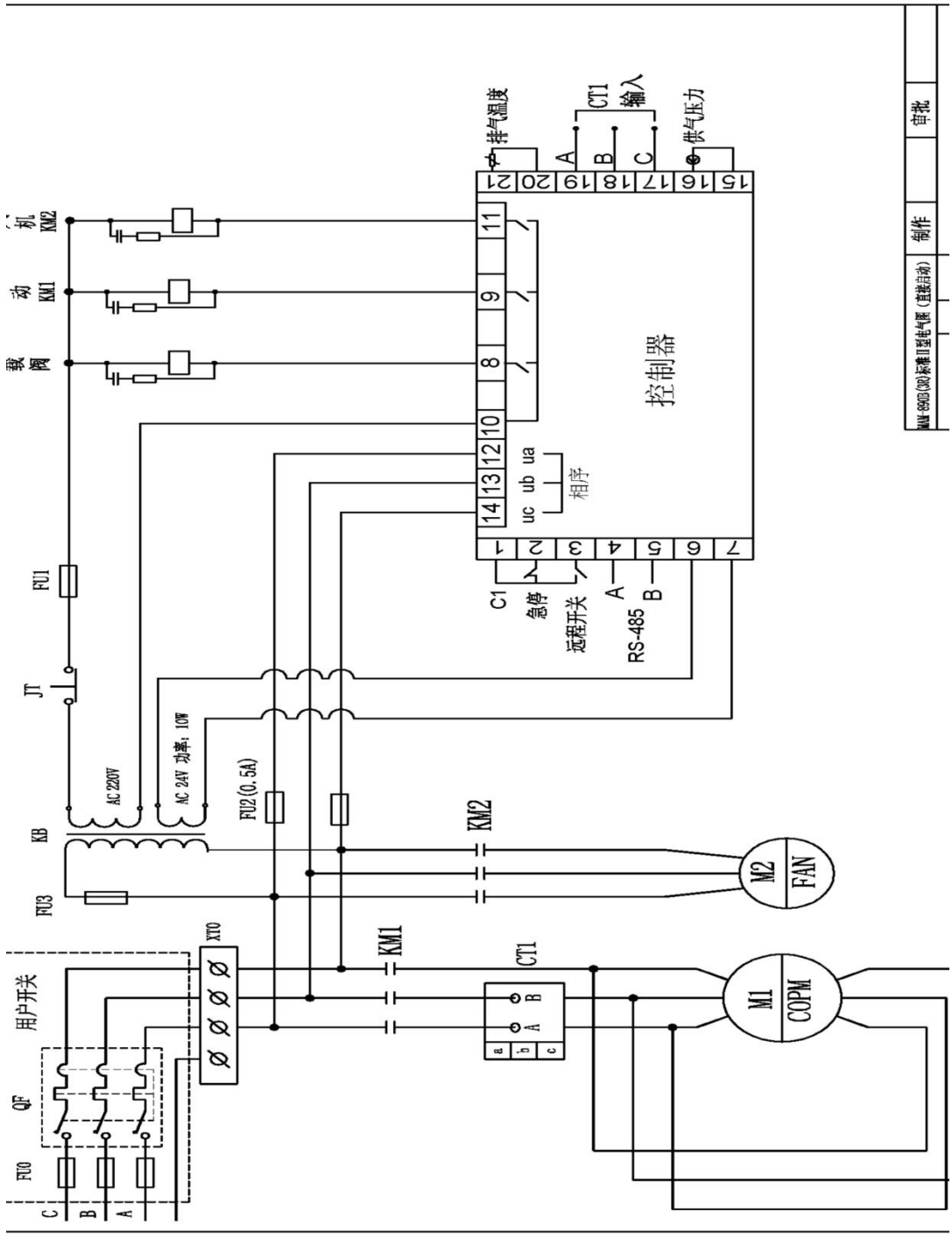
Variable frequency screw air compressor electrical wiring

电气系统由变频器、主电机、风扇电机、电控柜总成、电磁阀、温度传感器、压力变送器、微电脑控制器和操作面板等零部件组成。变频压缩机的参数设置和操作见《用户手册》

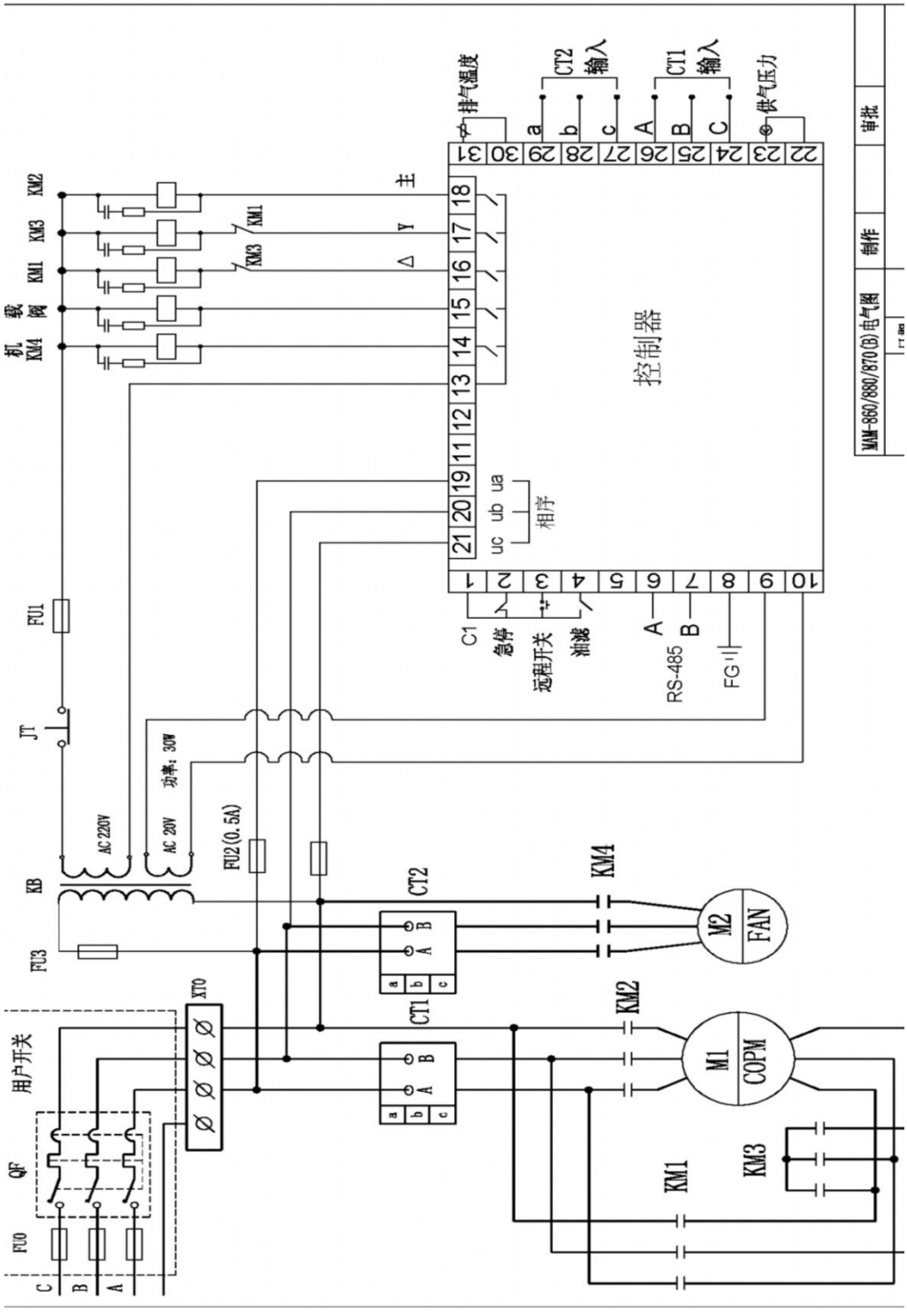
The electrical system consists of components such as frequency converter, main motor, fan motor, electric control cabinet assembly, solenoid valve, temperature sensor, pressure transmitter, microcomputer controller and operation panel. The parameter setting and operation of the inverter compressor are shown in the User's Manual

5、电路图 Circuit diagram

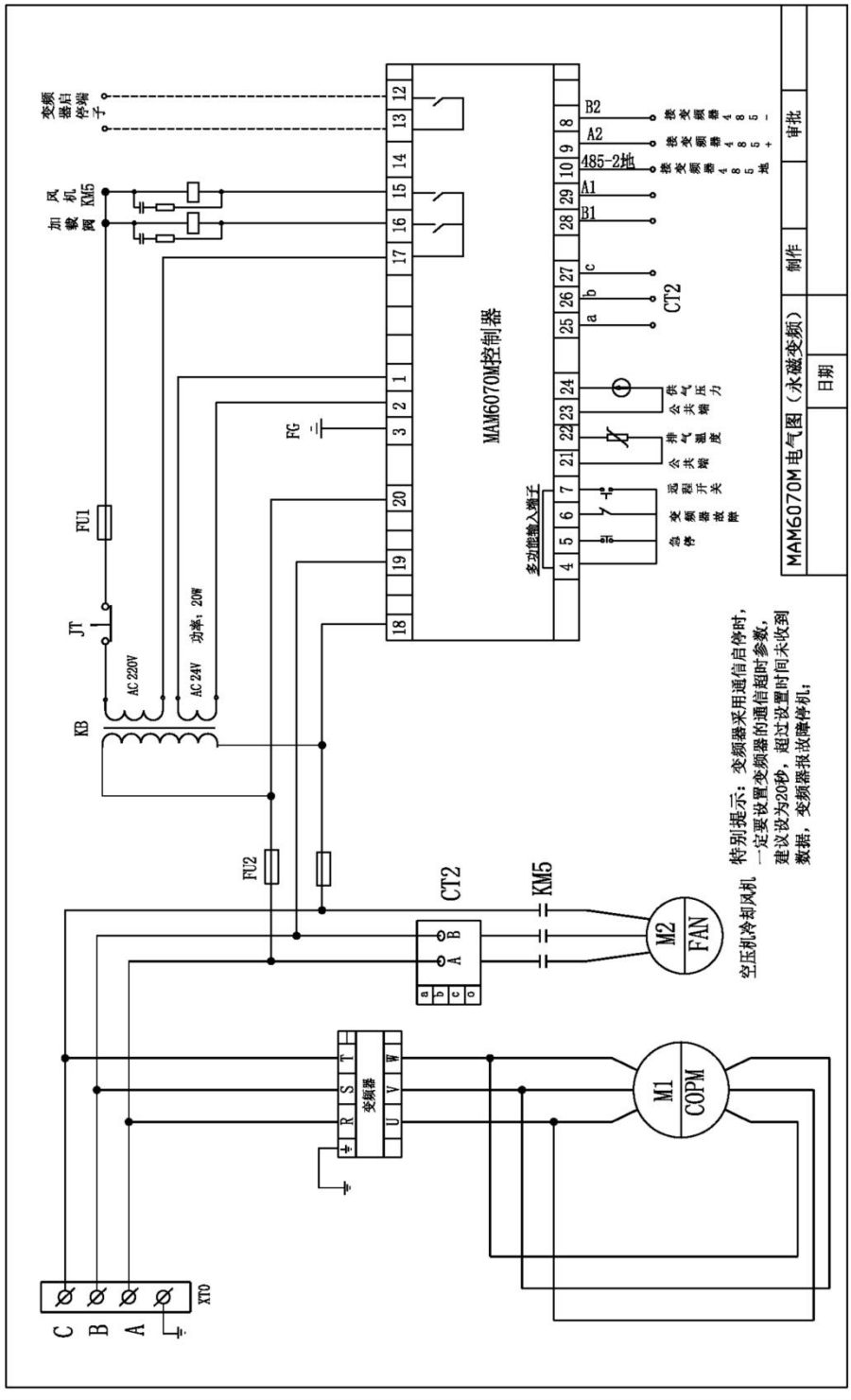
5.1 7.5KW工频电路图 7.5KW IF Circuit Diagram



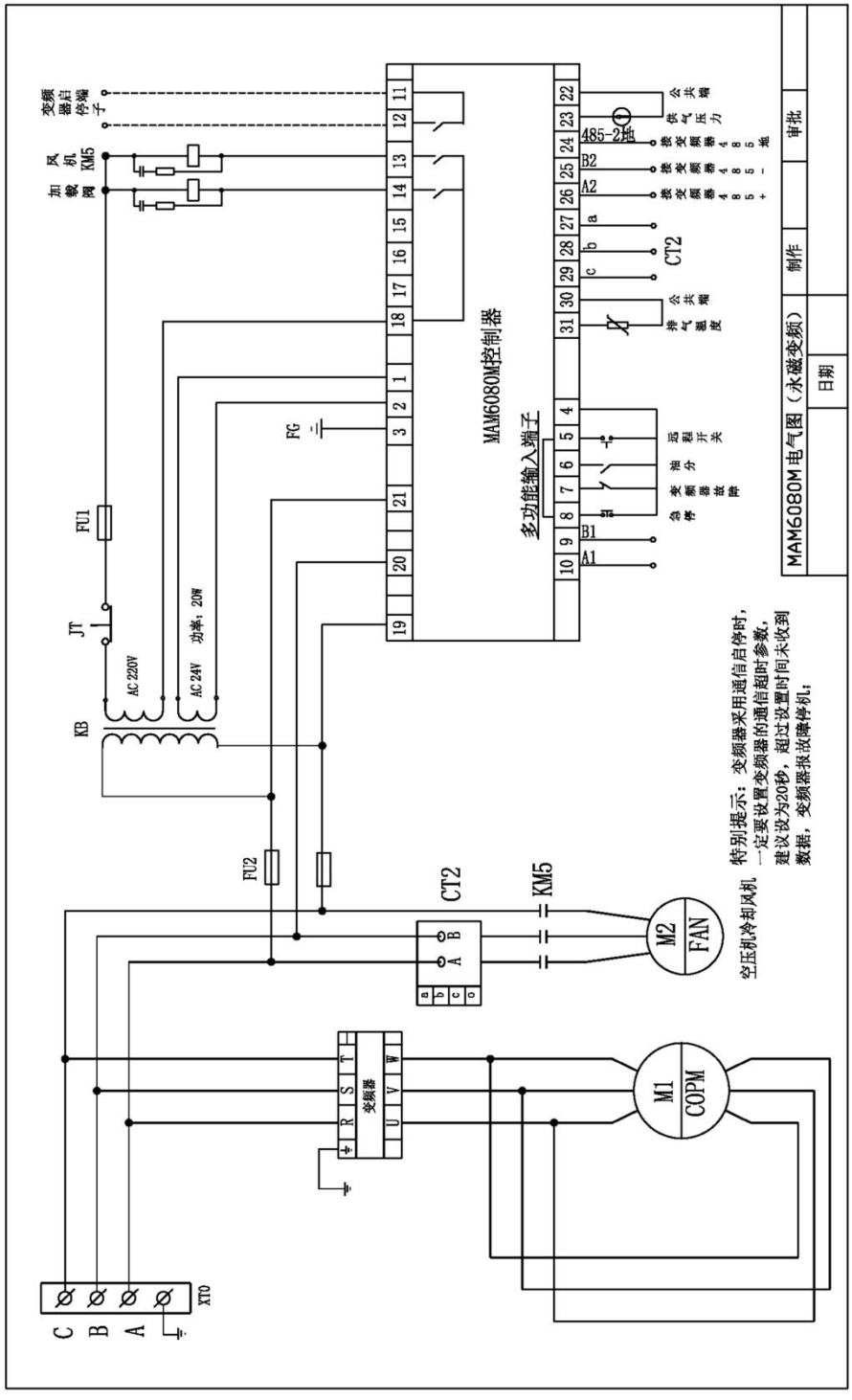
5.2 11KW以上工频电路图



5.3 永磁电路图 1 Permanent magnet circuit diagram 1

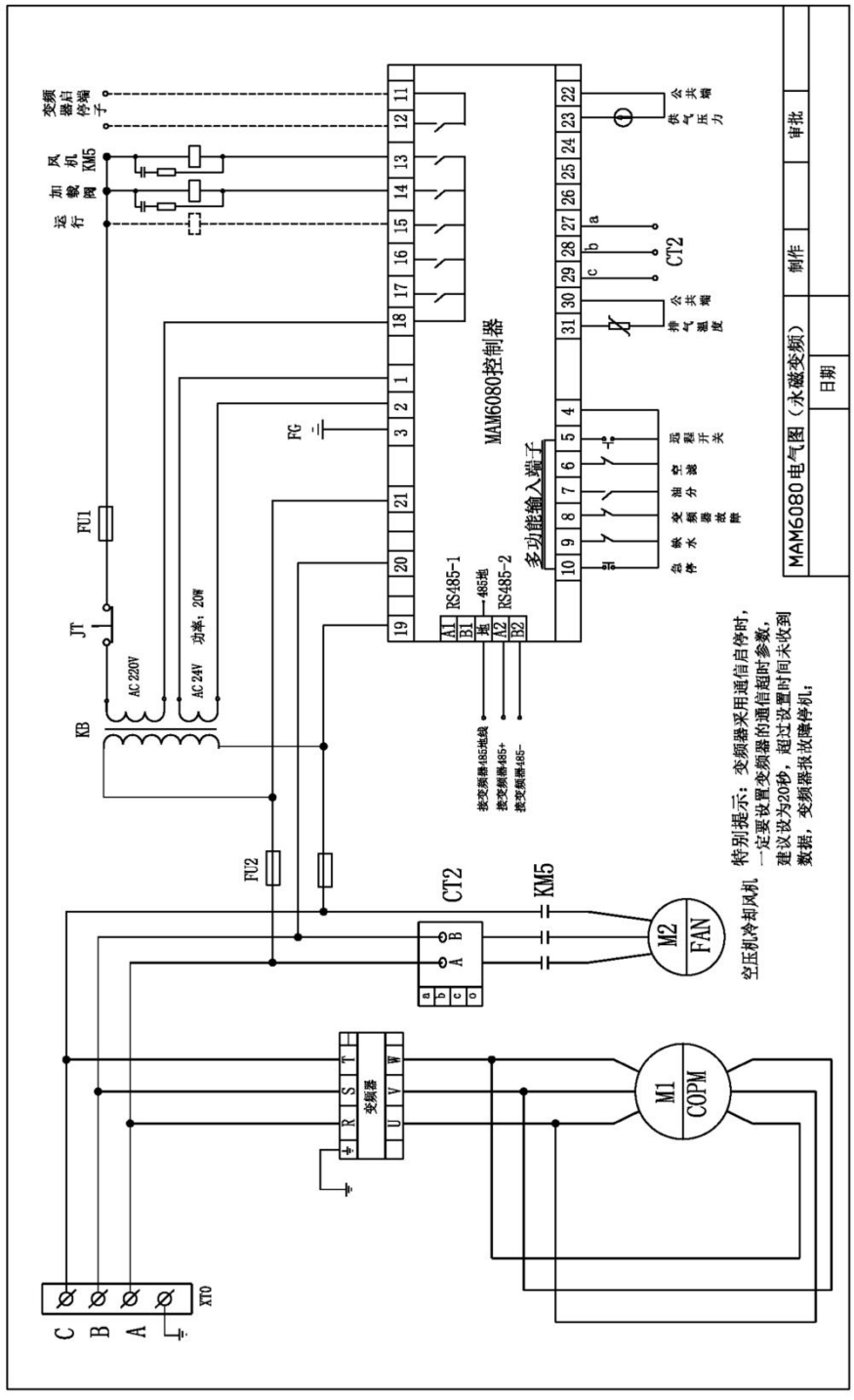


5.4 永磁电路图 2 Permanent magnet circuit diagram 2



5.5 带通讯永磁电路图

Permanent magnet circuit diagram with communication



第四章　操作 Operation

一、试车、开机与停机 Test run, start-up and shutdown

1、接上电源线及接地线，测试主电压是否正确，三相电源是否无误。

Connect the power cord and grounding wire, test whether the main voltage is correct and whether the three-phase power supply is correct.

2、检查油桶内油位是否在上油位线H与下油位线L之间。

Check whether the oil level in the drum is between the upper oil level line H and the lower oil level line L

3、若交货很久才试车，应从进气阀内加入0.5公升左右之冷却液，并用手转动空压机数转，防止起动时压缩机内失油烧损，请特别注意不可让异物掉入压缩机体，以免损坏压缩机体。

If the delivery has been a long time before the test run, you should add about 0.5 liters of coolant from the inlet valve and rotate the compressor by hand for several turns to prevent the compressor from losing oil and burning during startup, please pay special attention to not letting any foreign objects fall into the compressor body in order to avoid damage to the compressor body.

4、检查冷却系统。 Check the cooling system.

5、按下“ON”起动后几秒内，立即按“紧急停止”钮，检查转向是否正确（如箭头方向），若转向不对请将三条电线中任意两条线调换即可。

press the "ON" start within a few seconds, immediately press the "emergency stop" button, check whether the steering is correct (such as the direction of the arrow), if the steering is not right, please switch any two of the three wires can be.

6、再按下“ON”钮空压机开始运转。

Press the "ON" button again to start the compressor running

7、观察仪表及指示灯是否正常，若有异常声音、振动、洞油，立即按“紧急停止”停机检查。

observe the meter and indicator is normal, if there is abnormal sound, vibration, hole oil, immediately press the "emergency stop" stop check.

8、注意各指示灯是否有异常指示。

Pay attention to whether there is any abnormal indication of each indicator light

9、排气温度保持在75℃~95℃之间。

Keep the exhaust temperature between75℃~95℃.

10、按下“OFF”钮后10-15秒，计时继电器动作，电动机才会停转，这是为了避免空

压机在重负状况下直接停机。

press the "OFF" button after 10-15 seconds, timing relay action, the motor will stop, this is to avoid the air compressor in the heavy load condition directly stop.

11、当按下“OFF”钮后泄放阀会自动排气。

When the "OFF" button is pressed, the bleeder valve will be automatically vented.

二、开机前之检查 Check before starting the machine

开机前确实执行检查是避免压缩机发生重大故障，提高使用效益所必须做的工作。

The checking of the compressor before start-up is essential to avoid major compressor failures and to increase the efficiency of the compressor's use.

1、打开油桶及水分离器之手动泄水阀，将停机时之冷凝水排除，若忽略此工作，则冷却液使用寿命会缩短，容易造成轴承烧损，导致主机卡死。

open the oil drum and water separator of the manual water drain valve, will be shut down when the condensate exclusion, if you ignore this work, the coolant life will be shortened, easy to cause bearing burn, resulting in the host stuck.

2、检查油位是否在H和L之间，冷却液不可太多，亦不可太少，不足时应补充之。

check whether the oil level is between H and L, the coolant should not be too much, not too little, should be supplemented when insufficient

禁止混用不同牌号之冷却液，补充冷却液时应确定系统内已经没有压力时方可打开加油口盖。

It is prohibited to mix different grades of coolant. When replenishing coolant, make sure that there is no pressure in the system before opening the oil filler cap.

3、观察油位应在停机后十分钟后，在运转中油位可能较停机时之油位稍低。

Observe the oil level should be ten minutes after the shutdown, in the operation of the oil level may be lower than the shutdown of the oil level.

三、运转中注意事项 Precautions in operation

1、当运转中有异音及不正常振动时应立即停机。

When there is a strange sound and abnormal vibration in the operation, it should be stopped immediately.

2、运转中管路及容器内均有压力，不可松开管路或栓塞，不可打开不必要之阀门。

There is pressure in the pipeline and container during operation, do not loosen the pipeline or plug, and do not open unnecessary valves.

3、在长期运转中若发现油位计上的油不见，或油位太低指示灯亮时，应立即停机，停机十分钟后观察油位若不足时待系统内部没压力时再补充冷却液。

in the long-term operation of the oil level meter if found on the oil is missing, or the oil level

is too low indicator light, should be immediately shut down, after ten minutes of downtime to observe the oil level if not enough to wait until the system is no pressure within the coolant replenishment.

4、后部冷却器及旋风分离器内会有凝结水，应每天定时排放或装一只自动泄水器，否则水分会被带到系统中。

There will be condensate in the rear cooler and cyclone separator, which should be discharged regularly every day or an automatic water drain should be installed, otherwise the water will be brought into the system.

5、运转中每小时检查仪表记录电压、电流、气压、排气温度、油位等，供日后检修参考。

running every hour to check the meter record voltage, current, air pressure, exhaust temperature, oil level, etc., for future maintenance reference.

四、长期停机之处理方法 Long-term downtime treatment

长期停机时，应仔细依下列方法处理，特别是在高湿度的季节或地区。

When shutting down for a long period of time, the following methods should be carefully followed, especially in high humidity seasons or areas.

1、停机3星期以上 Downtime of more than 3 weeks

（1）电动机控制盘等电气设备，用塑胶纸或油纸包好，以防湿气侵入。

Electrical equipment, such as motor control panels, are wrapped in plastic or greaseproof paper to prevent moisture intrusion.

（2）将油冷却器、后冷却器内的水完全排放干净。

Drain the water completely from the oil cooler and aftercooler.

（3）若有任何故障，应先排除，以利将来使用。

If there are any malfunctions, they should be eliminated first for future use.

（4）几天后再将油桶、油冷却器，后冷器之凝结水排出。

After a few days, drain the oil drum, oil cooler and condensate from the aftercooler.

2、停机2个月以上 Downtime of more than 2 months

除上述程序外，另需做下列处理：

In addition to the above procedures, the following processing is required:

（1）将所有开口封闭，以防湿气、灰尘进入。

Close all openings to prevent moisture and dust from entering.

（2）将安全阀、控制盘等用防潮纸包，以防锈蚀。

Wrap safety valves, control panels, etc. in moisture-proof paper to prevent rusting.

（3）停用前将冷却液换新，并运转三十分钟，两三天后排除油桶及油冷却器之凝结水。

Replace the coolant with a new one before stopping using it, and run it for 30 minutes, and remove the condensed water from the oil drum and oil cooler after two or three days.

（4）将冷却水完全排出。Drain the cooling water completely.

（5）尽可能将机器迁移到灰尘少，且干燥处存放。

Whenever possible, move the machine to a less dusty, dry place for storage.

3、重新开机程序 reboot sequence

（1）除去机台上塑胶纸或油纸。

Remove plastic or greaseproof paper from the machine.

（2）测量电动机的绝缘，应在lMΩ以上。

Measure the insulation of the motor, which should be above lMΩ.

（3）其他程序如试车所述步骤。

Other procedures are as described in the test drive steps.

第五章　保养与检查
Chapter V. Maintenance and inspection

一、冷却液之规范及使用保养
Coolant specification and use of maintenance

1、请使用：公司原厂螺杆式压缩机专用冷却液
Please use: the company's original screw compressor special coolant

2、换冷却液步骤　Steps for changing coolant

（1）将空压机运转，使油温上升，以利排放。然后按下“OFF”钮，停止运转。

Run the compressor so that the oil temperature rises to facilitate discharge. Then press the "OFF" button to stop operation.

（2）打开泄油阀有压力时，泄油速度很快，但容易喷出，应慢慢打开，以免冷却液四溅

When you open the drain valve with pressure, the oil drain is fast but easy to spray, you should open it slowly to avoid the coolant splashing.。

（3）冷却液泄清后，关闭泄油阀，打开加油口盖注入新冷却液。**注意：为确保冷却液的质量，更换冷却液的时候，请打开压缩机所有排污口，将残余的冷却液排尽，残留在压缩机内的冷却液会污染整个油路系统，并会缩短新冷却液的寿命。警告：请勿将不同品牌或型号的冷却液混合在一起使用。**

After the coolant is drained, close the drain valve, open the oil filler cap and inject new coolant. NOTE: To ensure the quality of the coolant, when replacing the coolant, please open all drain ports of the compressor to drain out the residual coolant, the coolant left inside the compressor will contaminate the whole oil circuit system and will shorten the life of the new coolant. WARNING: Do not mix different brands or models of coolant together.

（4）加入专用冷却液　Add special coolant

3、冷却液使用注意事项　coolant use precautions

（1）若第一次使用微油螺杆式空压机，则换冷却液之时间可以在冷却液使用500小时后，取冷却液样品寄回供应商做油品化验工作，以确定冷却液品质。尔后每1000小时都重复做一次。如此经过几次后即可以确定空压机之冷却液周期，而不致浪费冷却液。

If you are using a micro-oil screw compressor for the first time, you can　change the coolant after 500 hours of coolant use and take a coolant sample and send it back to the supplier for oil testing to determine the coolant quality. Then every 1000 hours are repeated. After several times, the coolant cycle of the compressor can be determined without wasting the coolant.

（2）切忌让冷却液超过油品之使用寿命，冷却液应按时更换，否则冷却液之品质下降，润滑性不佳，容易造成因高温跳闸现象，同时因为冷却液之燃点下降，也易形成冷却液

自燃而空压机烧毁之事件。冷却液寿命与环境有关，若使用环境差，冷却液变色严重，冷却液杂质多，则应提前更换冷却液。

Do not let the coolant more than the service life of the oil, coolant should be replaced on time, otherwise the quality of the coolant drop, lubrication is not good, easy to cause high temperature tripping phenomenon, at the same time, because of the decrease in the ignition point of the coolant, it is also easy to form a spontaneous combustion of coolant and the compressor burned down the event. The life of the coolant is related to the environment, if the environment is poor, the coolant is seriously discolored, and the coolant is full of impurities, the coolant should be replaced in advance.

（3）**空压机在使用二年后，最好用冷却液做一次冷却液“系统清洗”工作，其做法：**当更换新冷却液时，让空压机运转6~8小时后，立即再更换冷却液，使原本系统中残存的各种有机成分，可以被清洗干净，再度更换之冷却液可有较佳之使用寿命。

Air compressor in the use of two years, it is best to use the coolant to do a coolant "system cleaning" work, the practice: when replacing the new coolant, let the air compressor run for 6 to 8 hours, and then immediately replace the coolant, so that the original system of the various organic components remaining can be cleaned, and then replace the coolant can have a better service life.

警告：压缩机冷却液在压缩机运行过程中起着非常重要的作用，使用劣质的压缩机冷却液或不同品牌冷却液混合使用，将会带来以下后果：

WARNING: Compressor coolant plays a very important role in compressor operation. The use of poor-quality compressor coolant or the mixing of different brands of coolant will have the following consequences:

（1）影响空压机的运行稳定，易引发起火、爆炸等安全事故。

It affects the stability of the operation of the air compressor and may easily lead to fire, explosion and other safety accidents.

（2）产生积碳或冷却液乳化，造成冷却液路堵塞和阀门动作失灵。

Carbon deposits or emulsification of the coolant are generated, resulting in clogging of the coolant circuit and malfunctioning of the valves.

（3）油分离效果差，缩短油精分离器和油过滤器使用寿命。

Poor oil separation effect shortens the service life of the oil separator and oil filter.

（4）主机等运动件，使用寿命缩短，维护成本增加。

Shortened service life and increased maintenance costs for moving parts such as the mainframe.

因此：为确保机器的正常运行，及维护您的正常权益，请使用公司出品的专用冷却液。否则机器出现异常，您将得不到正常保修服务。

Therefore: in order to ensure the normal operation of the machine, and safeguard your normal rights and interests, please use the special coolant produced by the company. Otherwise, if the machine is abnormal, you will not get the normal warranty service.

二、常规保养 Routine maintenance

1、运转500小时(首保) 500 hours of operation (first maintenance)

①更换冷却液 Replace coolant

②更换油过滤器 Replace Oil Filter

③更换空气滤芯 Replace air filte

2、每运转2000小时（常规保养） 2,000 hours per run(routine maintenance)

①更换冷却液 Replacement of coolant

②更换油滤 Replace Oil Filter

③更换空气滤芯 Replace Air Filter

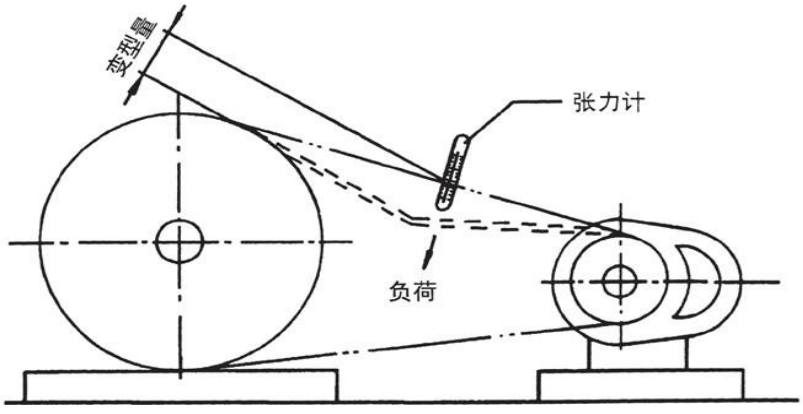
④更换油分 Replacing oil separator

警告：若环境较差，粉尘较大。应适当缩短保养时间。
Warning: If the environment is poor and dusty. Maintenance time should be shortened appropriately.

三、皮带调整 Belt adjustment

皮带传动机型，在新机第一次运转30小时后即须检查皮带，若有太松之现象，应立即加以调整，尔后每1500小时调整一次。

Belt-driven models, in the new machine for the first time after 30 hours of operation that is to check the belt, if there is too loose phenomenon, should be



models	Load (kg)	Variation(mm)
22KW	3.4	8-10
37KW	3.0	8—10
55—110KW	3.0	9—12

1、如图所示，利用一张力计及弹簧平衡器，将负荷加诸于皮带上测出其变形量，如在标准值以内则安全不必调整，如变形量超过标准值则调整皮带之张力。

as shown in the figure, the use of a tensiometer and spring balancer, the load will be put on the belt to measure the deformation, such as in the standard value of the safety within the adjustment, such as deformation exceeds the standard value of the adjustment of the tension of the belt

2、调整皮带张力时先将电动机座之四个固定螺丝稍稍放松，再用旁边的调整螺丝将皮带张力调整，用张力计测量后再上紧电动机之固定螺丝。

Adjust the belt tension by first relaxing the four fixing screws of the motor base, then adjust the belt tension with the adjusting screws next to it, and then tighten the fixing screws of the motor after measuring with a tensiometer.

3、若要更换皮带时，须所有的皮带一齐更换，不得只更换一条皮带，否则张力会不平衡。

if you want to replace the belt, all the belts must be replaced at the same time, not just replace a belt, otherwise the tension will be unbalanced.

4、注意调整或更换时，不要将冷却液溅到皮带或皮带轮上。

Be careful not to splash coolant on the belt or pulley when adjusting or replacing.

四、压力系统之调整 Adjustment of pressure system

1、系统压力调整 System pressure adjustment

①压力调整通过微电脑控制器上的键盘来操作。显示两个压力点（压力点的数值可通过键盘设定），一为卸载压力，即压力上限，气压上升到此数值时就会卸载降压。

Pressure adjustment is operated through the keypad on the microcomputer controller. Two pressure points are displayed (the value of the pressure point can be set by the keyboard), one is the unloading pressure, i.e. the upper pressure limit, the air pressure will unload and lower the pressure when it rises to this value.

②另一个压力点为加载压力，即压力下限。当卸载后系统压力下降到此数值时，机器就会自动加载，使压力上升。

The other pressure point is the loading pressure, which is the lower pressure limit. When the system pressure drops to this value after unloading, the machine automatically loads, causing the pressure to rise.

③在机型设计允许的最高压力值范围内，两个压力点均可视现场之使用状况而加以调整。

Both pressure points can be adjusted depending on field conditions within the maximum pressure range permitted by the model design.

2、气量调节系统 Air volume adjustment system

工频运行的机型，在进气阀上有一个气量调节阀（容调阀），当实际用气量小于空压机的额定排气量时，此气量调节阀可以自动调节空压机的排气量大小与用气量一致，保持排气压力的稳定，并可在一定程度上节省能量消耗。其工作原理如下：

Frequency operation models, there is an air volume adjustment valve (tolerance valve) on the inlet valve, when

the actual air consumption is less than the rated exhaust volume of the compressor, this air volume adjustment valve can automatically adjust the size of the compressor's exhaust volume in line with the volume of air consumption, to maintain the stability of the exhaust pressure, and to a certain extent, energy consumption can be saved. Its working principle is as follows:

①设定气量调压阀的压力，使系统在压力未上升至卸载压力（即压力上限）前，有少量压缩空气经过气量调节阀进入进气阀的下方推动活塞上升，进气阀的开启幅度减小，使得空压机的吸气量也逐渐减小，使得空压机的排气量与实际需求气量相一致。

et the pressure of the air volume regulator, so that the system in the pressure has not risen to the unloading pressure (i.e., the upper limit of the pressure) before a small amount of compressed air through the air volume regulator valve into the lower part of the inlet valve to promote the rise of the piston, the inlet valve to open the magnitude of the decrease in the suction volume of the compressor is also gradually reduced, so that the air compressor's exhaust volume and the actual demand for the volume of air in line with the same.

若不需气量调节功能，则将气量调节阀拧紧锁死即可。

If the air volume adjustment function is not required, just tighten and lock the air volume adjustment valve.

五、预防性保养计划 Preventive maintenance plan

项目 Description	内容 contents	检查 check 或 更换 replace 周期（小时）							备注remark
		500	1000	2000	4000	8000	16000	24000	
		/	/	小时 hourly	每半年 semi-annually	每一年 one year	每二年 two year	每三年 three year	
air filter 空气过滤芯	清扫 a sweep (against crime)	○							视工况可缩短或当压差发讯器动作时 Depending on the working conditions can be shortened or when Differential pressure transmitter operation
	更换 replacechange	◎		●					
Specialized coolant 专用冷却液	半合成油semi-syntheticoil	◎		●	◎	●			每周取样检查check油色、油质，异常时更换 Weekly sampling to check the oil color and quality, and replace it when it is abnormal
	超级合成油 Super Synthetic Oil								
油过滤器 oil filter	更换 replace	◎		●					视工况可缩短或当压差发讯器动作时 Depending on the working conditions can be shortened or when Differential pressure transmitter operation
油气分离芯 oil separator core	更换replace			●					
最小压力阀 Minimum pressure valve	检查check				○	●			
风冷却器air cooler	清除灰尘dust removal	○							风冷型视工况可缩短或延长Air-cooled type can be shortened or lengthened depending on the working conditions.
	内部清洗 Internal cleaning					○			
水冷却器 watercooler	检查check				○				水冷型视工况可缩短或延长Water-cooled type can be shortened or lengthened depending on the working conditions
	渣除水垢scale-clearing					○			
进气阀inlet valve	检查check			○					必要时更换易损件 Replacementof wearing parts if necessary

温控阀 temperature control valve	检查check				○				检查动作情况 Checking the movement
	更换replace						●		
电磁阀 solenoids	检查check		○				●		
压力表 pressure gauge			○						
安全阀 safetyvalves						○			检查开启压力Check openingpressure
排污 drain sewage		○							
电机 Motor	加润滑脂 grease					●			
	绝缘测试 insulation testing					●			
电气 electronic	检查check、紧固 fastening	○			○				首次开机时需进行The first time you turn on the machine, you need to perform
弹性体 elastomer	检查check				○		●		必要时更换 Replace as necessary
Mainframe Bearings	检查check						●		视情况可延长May be extended as appropriate
	更换replace							●	

说明 clarification：

a. ◎-首次更换；initial replacement ○-栓查、清洗； bolting and cleaning
●-更换 replacement

b. 在干净工作环境里运行，请按上表规定时间间隔维护；在恶劣环境里，皮带、冷却液、油过滤器、空气过滤芯及油气分离芯应缩短更换时间。

When operating in a clean working environment, please maintain it at the intervals specified in the above table; in a harsh environment, belts, coolant, oil filters, air filters and oil/air separator cores should be replaced at shorter intervals.

c. 在定期保养期间，应同时栓查，油气桶、排气管道、冷却器等受热及热传递设备、部件，清除，由垢和积碳物。

During regular maintenance, the oil and gas tanks, exhaust ducts, coolers and other heated and heat-transferring equipment and components should be bolted down to remove scale and carbon deposits.

第六章　故障排除　Chapter 6 Troubleshooting

项目 No.	现象 Troubles	可能的故障原因 Possible causes of failure	故障排除方法 Troubleshooting
一	无法启动 unbootable	1.保险丝烧毁 Blown fuses 2.电原电压太低 Electrogen voltage is too low 3.电源缺相或错相 Power supply lack of phase or wrong phase 4.接线太松或接触不良 Wiring too loose or poor contact 5.主电机故障 Main motor failure 6.变频器故障 Inverter failure 7.主机故障 Mainframe failure	请电气人员检修更换 Have electrical personnel overhaul and replace 若无法用手转动主机，请联系本公司服务单位 If you cannot turn the main unit by hand, please contact our service unit.
二	运行电流高， 压缩机自动停机 (主电机过热报警) High operating current, automatic compressor shutdown (Main motor overheat alarm)	1.电源电压太低 Power supply voltage is too low 2.排气压力过高 Exhaust pressure is too high 3.油分离器芯堵塞 Oil separator core clogging 4.压缩机主机故障 Compressor main unit failure 5.电路故障 Circuit failure	1.请电气人员检查 Have an electrician check it out. 2.检查 / 调整压力参数 Check/adjust pressure parameters 3.更换新件 Replacement of new parts 4.机体拆检 Airframe disassembly and inspection 5.请电气人员检查 Have an electrician check it out.
三	运转电流低于正常值 Operating current lower than normal	1.空气消耗量太大 （压力在设定值以下运转） Too much air consumption (Pressure operates below setvalue) 2.空气过滤器堵塞 Clogged air filter 3.进气阀动作不良（无法打开） Poor inlet valve operation (cannot open) 4.容调阀调整不当 Improper adjustment of the adjustment valve 5.变器频率参数设置偏低 Low frequency parameter setting of the converter	1检查消耗量，必要时增加压缩机 Check consumption and increase compressor if necessary 2.清洁或更换 Cleaning or replacement 3.检修或更换进气阀（包含电磁阀） Service or replace intake valves (including solenoids) 4.重新调整容调阀 Re-adjustment of Tolerance Valve 5.重新设定变频器参数 Reset the inverter parameters

四	排气温度过低 Exhaust temperature too low	1.冷却水流量过大 Excessive cooling water flow 2.环境温度低 Low ambient temperature 3.空载过久 / 运行频率偏低 No-load for too long / low operating frequency 4.温控阀故障 Temperature control valvefailure 5.进气阀失灵，吸气口未全打开 Inlet valve failure, the suction port is not fully open 6.温度传感器不准确 Inaccurate temperature sensor	1.减小冷却水流量 Reduce cooling water flow 2.适当减少冷却器散热面积 Appropriate reduction of cooler heatdissipation area 3.加大空气消耗量 Increase air consumption 4.检修或更换温控阀 Service or replace the temperature control valve 5.检修或更换进气阀 Service or replace intake valve 6.检查更换温度传感器 Check and replace the temperature sensor
五	排气温度过高， 压缩机自动停机 (排气温度过高报警) Compressor stops automatically if the discharge temperature is too high (high discharge temperature alarm)	1.冷却液量不足 Insufficient coolant 2.环境温度过高 High ambient temperature 3.冷却水流量不足（进出水温差大） Insufficient cooling water flow (large temperature difference between inlet and outlet water) 4.冷却水温过高 Cooling water temperature is too high 5.油冷却器翅片堵塞 Clogged oil cooler fins 6.油过滤器堵塞 Clogged oil filter 7.温控阀故障 Temperature control valve failure 8.冷却液牌号不正确 Incorrect coolant grade 9.冷却风扇故障 Cooling fan failure 10.感温元件损坏 Damaged temperature sensing element	1.检查油气桶的油位，添加冷却液 Check the oil level of the oil and gas tank and add coolant 2.改善通风条件，降低室温 Improve ventilation and reduce room temperature 3.加大冷却水流量 Increase cooling water flow 4.降低冷却水温度 Reduce cooling water temperature 5.清洁油冷却器翅片 Clean oil cooler fins 6.更换油过滤器 Replace the oil filter 7.检查油是否经过油冷却器冷却， Check that the oil is cooled by an oil cooler that 若无则维修或更换温控阀 If not, repair or replace the temperature control valve 8.更换为本公司专用冷却液 Replace the coolant with our special coolant. 9.检修或更换冷却风扇及驱动电机 Overhaul or replace cooling fan and drive motor 10.检查或更换感温元件 Check or replace the temperature sensing element
六	压缩空气中含油量偏高， 加油周期缩短 High oil content in compressed air. Shorter refueling intervals	1.加油量过多，油气桶油面太高 Excessive refueling, the oil level of the oil and gas tank is too high 2.回油管过滤器或节流孔阻塞 Return pipe filter or throttle hole blockage 3.油气分离器滤芯或密封垫圈损坏 Damaged oil/air separator filter element or sealing gasket 4.排气压力过低 Exhaust pressure is too low 5.压力维持阀故障 Pressure maintaining valve failure 6.油管路系统存在泄露点	1.检查油面，排放掉多余的油 Check the oil level and drain off excess oil 2.清洗过滤器滤芯和节流孔， Clean the filter cartridge and throttle orifice. 如有必要则更换之 Replace if necessary 3.检查油气分离器，若损坏必须更换 Check the oil-air separator, if it is damaged, it must be replaced. 4.减小用气量，提高排气压力 Reduce gas consumption and increase exhaust pressure 5.更换压力维持阀弹簧或增加压紧 Replace the pressure maintaining valve

		Leakage points in the oil piping system 7.油品差，泡沫过多 Poor oil, excessive foam	spring or increase compression. 6.检查油管路系统，排除泄漏点 Check the oil piping system and eliminate leakage points 7.更换符合要求的新油 Replace with new oil that meets the requirements
七	供气压力低于额定排气压力 Supply pressure below rated exhaust pressure	1.用户用气量大于供气量 Gas consumption by users is greater than gas supply 2.空气滤清器阻塞 Clogged air filter 3.进气阀不能完全打开 Intake valve does not open fully 4. 压力变送器故障 Pressure transmitter failure 5.主控器设置值偏低 Master controller setting value is low 6. .最小压力阀失效 Minimum pressure valve failure 7. 油气分离器堵塞 Clogged oil-air separator	1.减少用气量 Reduction of gas consumption 1.2检查输气管道上是否有泄漏。 Check for leaks on the gas pipeline 2.清洁或更换滤芯 Clean or replace the cartridge 3.检查进气阀的动作 Check the action of the intake valve 4.检修或更换压力变送器， Overhaul or replace the pressure transmitter. 5.设置不当则重新设定 Reset if not set correctly 6.检查 / 修理最小压力阀 Check/repair minimum pressure valve 7.检查并更换油气分离器 Check and replace the oil-air separator
八	供气压力高于卸载压力的设定值 Air supply pressure higher than the set value of unloading pressure	1.压力变送器故障或设置值偏高 Pressure transmitter failure or high setting value 2.卸载零件（例：进气阀内的电磁阀、放空阀等）失效控制气管路泄漏 Unloading parts (e.g. in the intake valve) Failure of solenoid valves, bleeder valves, etc.) Control of gas line leaks	1.检修、更换压力变送器或重新设定压力 Overhaul, replace the pressure transmitter or reset the pressure 2.检查卸载零件工作是否正常 Check whether the unloading parts work properly or not 3.检查排除控制气管路泄漏 Check and eliminate control air line leakage
九	压缩机排气量低于正常要求 Compressor discharge below normal requirements	1.空气滤清器堵塞 Clogged air filter 2.精油分离器堵塞 Clogged essential oil separator 3.电磁阀漏气 Solenoid valve leakage 4.气管路元件泄漏 Leaking gas line components 5.皮带打滑、过松 Belt slippage, too loose 6.进气阀不能完全打开 Intake valve not fully open	1.清除杂质或更换新件 Remove impurities or replace with new parts 2.更换新件 Replacement with new parts 3.清洗或更换新件 Cleaning or replacing with new parts 4. 检查修复 Inspection and repair 5.更换新件、张紧皮带 Replacement of new parts, tensioning belt 6.清洗、更换受损件 Cleaning and replacement of damaged parts

+	卸载与恢复加载切换过于频繁 Uninstall and resume loading switches too often	1.管路泄漏 Pipe leakage 2.压力设定值太小 Pressure setting too small 3.变频器频率下限设定值过高 Inverter frequency lower limit setting value is too high 4.空气消耗量不稳定 Unstable air consumption	1.检查泄漏位置并排除 Check the location of the leak and eliminate 2.重新设定压差值 Reset the differential pressure value 3.适当降低变频器频率下限设定值 Appropriately reduce the inverter frequency lower limit setting value 4.增加储气罐容量，如有必要，在储气罐后加装减压阀 Increase the capacity of the gas storage tanks, if necessary. Installation of a pressure reducing valve after the gas storage tank
+—	停机时油雾从空气滤清器冒出 Oil mist coming out of the air filter during shutdowns	1.进气阀内的止回阀故障 Failure of the check valve in the intake valve 2.停机前未卸载或卸载时间短 No unloading or short unloading time before stopping the machine 3.最小压力阀泄漏 Minimum pressure valve leakage 4.放空不完全 Incomplete emptying	1.检修进气控制阀 Overhauling the intake control valve 1.2重新设定控制器卸载放空时间 Reset controller unloading and emptying time 2.检修进气控制阀 Repair the air intake control valve 3.检修最小压力阀，必要时更换 Overhaul minimum pressure valve and replace if necessary 4.检查放空阀 Check the bleeder valve

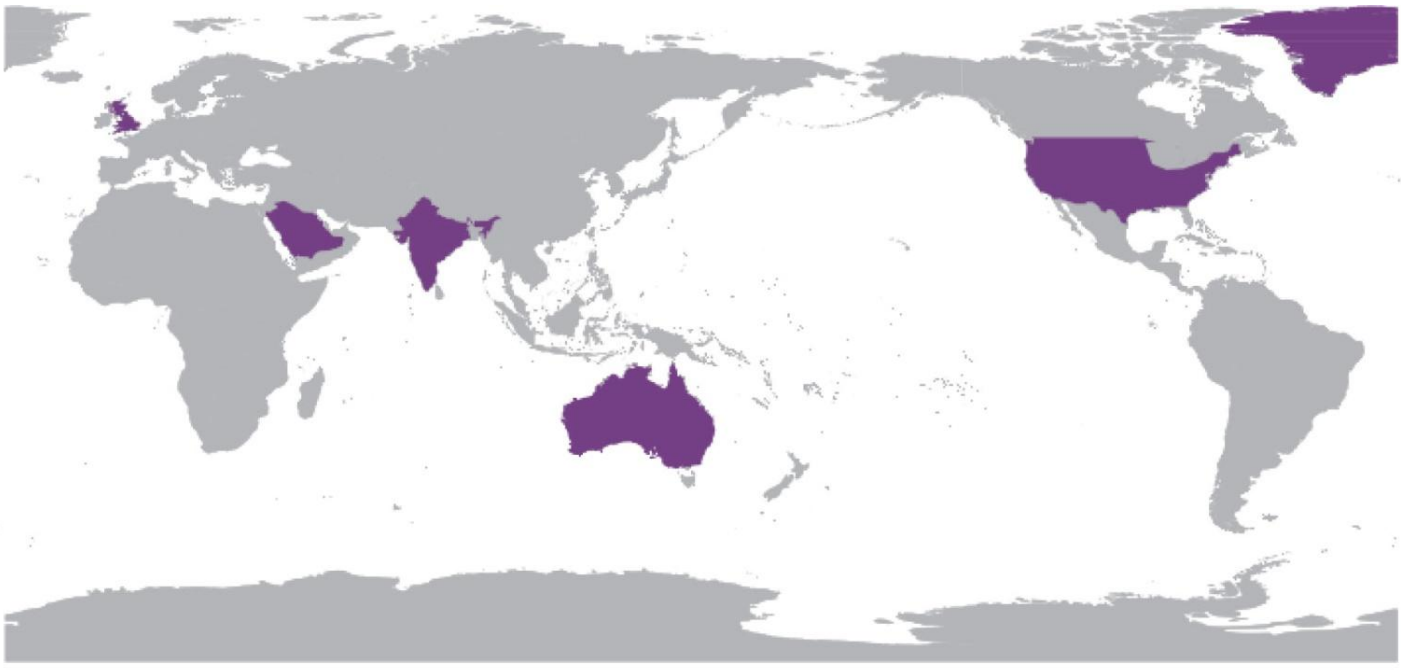
压缩机维护保养记录表

Compressor Maintenance Record Sheet

累计运行时间 Cumulative operationTime **(h)**	**空滤芯** air filter	**油过滤器** oil filter	**油气分离器** oil separator	**更换冷却液** change coolant	**日期** dates	**签字** sign (a signature)

维护内容：空滤芯项可填写：清理、更换、冷却液项可填写：加注XX更XX牌号；其他项可填写：更换。

Maintenance content: air filter element item can be filled in: cleaning, replacement, coolant item can be filled in: filling XX more XX brand number; other items can be filled in: replacement.



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