

Screw compressor

User Manual



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The trademarks on the products belong to their registrants.

Product description

The manufacturer has the right to design changes of products and is not responsible for obligation to modify and improve the products that have been shipped. We may make modifications to the specifications or components of certain products in the future without prior notice.

Matters needing attention

Before using the equipment, be sure to read this manual and understand various contents, so as to correctly install, debug, operate, and maintain the equipment. This manual should be kept in the hands of the actual end user.

Be sure to keep this manual and the supporting documents with the air compressor together until the equipment is scrapped.

Scope of application of this manual

This manual is applicable to the installation, commissioning, operation, maintenance, and repair of screw air compressors. This manual does not include the operating instructions for the permanent magnet motor drive frequency converter. For its operating instructions and maintenance, please refer to the user manual for the frequency converter supplied with the air compressor.

Knowledge required to read this manual

If you have specialized knowledge in mechanical and electrical aspects, you can better understand the contents of this manual.

Preface

Welcome to purchase and use our company's products, we will wholeheartedly serve you, and please carefully read and understand the various contents of this operation manual to be able to use it correctly!

1.1 Description of the compressor

1.2 The compressor of our company is the result of years of research and development. These prerequisites, combined with high quality standards, can ensure that the manufactured screw compressor has a long service life, high reliability, and high operating efficiency, and the product can meet all environmental requirements.

1.2 Scope of use

This series of machines are manufactured according to mature technology and recognized safety rules. However, if the following situations occur, they may still pose a threat to the lives and limbs of users or third parties, or cause damage to machines and other property:

- Incorrect range of use**
- Operated by unqualified personnel**
- Unreasonably modify parameters or modify the machine**
- Failure to comply with safe rules**

Therefore, any person authorized to operate, maintain, or repair the machine must read and comply with safety regulations. If necessary, you can request a signature to confirm this.

In addition, it is also necessary to comply with:

- Relevant accident prevention rules**
- Recognized safety regulations**
- National regulations**

This series of machines and units must be used under perfect technical conditions, must be used in accordance with the scope of use specified in the operation manual, and the users must have safety awareness and be able to fully understand the dangers in the operating machine. If any functional failure occurs, especially a failure that affects safety, it must be repaired in time (or contact our after-sales service for repair)!

The meaning of operating the machine within the scope of use also includes complying with various requirements in the operating manual, and conducting inspections and maintenance as required.

1.3 Maintenance, service, and warranty

Maintenance

This machine must be carefully maintained to enable screw compressors or compressor units to meet various requirements. Therefore, it is necessary to carefully maintain the machine according to the specified maintenance period, especially in harsh working conditions.

Service

Please contact the manufacturer in case of failure or need for spare parts. If the equipment is damaged, our company's trained maintenance personnel will definitely provide prompt and good maintenance services using original accessories. Genuine original spare parts are manufactured using the most mature technology, thereby ensuring the reliable operation of the

machine.

Warranty

Before operating this machine, it is necessary to accurately understand the machine and relevant instructions, and carefully read the operating instructions.

If the use of this machine does not conform to the applicable scope or the purpose of use exceeds the scope mentioned in this instruction, the company will not be responsible for the safety of operation. Our company will not accept warranty claims under the following circumstances:

- Operational errors**
- Improper maintenance**
- Misuse of excipients**
- Our original accessories are not used**
- Modify or modify this device**

The company will not expand the warranty and indemnity conditions of the general terms due to the above description.

The manufacturer will not accept claims or warranty requirements for any unauthorized modifications to the compressor or compressor station, or the installation of components not approved by the manufacturer.

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Safety instructions

Before installing, debugging, operating, and maintaining the air compressor, please carefully read the "Safety Instructions" and use the screw air compressor in the correct way. This "Safety Instructions" contains important information that can enable you to use this product safely, correctly, and efficiently, and prevent personal injury and property damage to you or others. Please keep this user manual properly after reading it so that the operator of this product can consult it at any time. If the provisions in these instructions, especially those related to safety, do not comply with local regulations, the stricter of the two shall prevail.

For "Caution", "Warning", and "Danger"




 Be Careful	Indicates that failure to follow this instruction or improper handling can cause hazardous conditions, such as minor personal injury, and equipment malfunction.
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 Warning	Indicates that failure to follow this instruction or improper handling can result in hazardous conditions such as moderate personal injury, minor injury, and equipment failure.
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 Danger	Indicates that failure to comply with this instruction or improper handling can cause hazardous conditions such as serious personal injury, even death, and equipment damage.
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Sometimes, even if matters such as "attention" are handled improperly or not observed, significant accidents may occur depending on the situation. It is recommended that the important contents proposed in this manual must be observed.

About Operations





 Be Careful About Operations	
	Operating instructions must always be available at the operating site of the machine (such as in a tool room or storage guide box for reference)! In addition to the operating instructions, you must also comply with all other applicable laws and regulations on accident prevention and environmental protection, and require others to also comply.
	Frequently check whether the work of the operators conforms to the operating procedures and whether they pay attention to safety



	requirements.
	All safety notices and warning signs on the machine must be observed. The safety instructions and warning signs posted on the machine must always be complete and clearly visible.

About uses



 Danger About uses	
	Do not use compressed air in closed rooms or tunnels. It is prohibited to use compressed air for respiratory purposes without professional equipment processing.



About Installation







 Warning About Installation	
	The air compressor room must be well ventilated to allow the compressor to absorb fresh and clean air. Avoid installing the machine in places full of microparticles and toxic and corrosive.
	The incoming power line of the air compressor must match the rated power of its equipment, and safety devices such as circuit breakers or fuses must be installed to ensure the safety and reliability of electrical equipment.
	The power supply of the air compressor should be isolated from other precision equipment. If necessary, a line filter should be added to the front end of the frequency converter to prevent the interference of higher harmonics generated by the frequency converter on precision equipment.

 Danger About Installation	
	The body and motor housing of the air compressor must be reliably grounded, and reliable lightning protection devices must be installed if necessary. Unreliable grounding can cause fire or personal injury.

About Operations





 Warning About Operations	
	When the air compressor is stopped from use when the ambient temperature may be lower than 0 °C, drain the water in the oil





	gas separator and pipeline to avoid freezing and cracking the pipeline or damaging the compressor.
	During machine operation, ensure smooth ventilation of the compressor room. During the operation of the frequency converter, the parameters of the frequency converter shall not be modified without permission.
	Before starting the machine, confirm that there is no one in the machine, check whether there are any remaining items and tools, and close the air compression chassis. When turning on, the personnel around the machine should be notified to pay attention to safety.

 Danger About Operations	
	When starting the machine for the first time or changing the power cord, it is necessary to pay attention to whether the motor rotates in the direction indicated by the arrow. If the rotation direction of the motor is inconsistent with the arrow direction, any two phases of the motor input terminal wiring should be changed. Note: Changing the incoming power supply of the frequency converter cannot change the rotation direction of the motor.
	Do not operate above the exhaust pressure specified on the nameplate of the air compressor, otherwise it may cause the motor or frequency converter to overload and burn out.
	When the air compressor fails or unsafe factors exist, do not forcibly start it. At this time, cut off the power supply and make a prominent mark.
	Keep your fingers and clothes away from rotating motors, belts, and heating components such as oil gas separators, pipelines, and compressor housings. Do not touch any exposed electrical parts with your hands to avoid electric shock.
	Do not remove various protective cover and components when the machine is running. High temperature liquid and pressurized air in the machine may cause personal injury. Do not open the front cover of the inverter or disassemble the power supply or inverter output terminal ground wiring. Failure to heed the above warnings may result in serious personal

	injury or even death.
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Regarding maintenance

 Warning Regarding maintenance	
	When maintaining and overhauling the machine, attention must be paid to sharp parts of the machine to avoid scratching the body.
	It is prohibited to use the compressor host, frequency converter, and pipelines as support points for the human body. Failure to pay attention to this warning may damage the equipment.
	<p>After the maintenance and repair of the machine, be sure to clean the garbage and dust inside and around the machine to avoid affecting the air quality or causing clogging of the inverter air inlet.</p> <p>Please regularly clean the heat dissipation components according to the user manual of the general inverter to ensure smooth ventilation.</p>




 Danger Regarding maintenance	
	<p>During maintenance or repair, it is necessary to confirm that the power supply has been cut off and hang warning signs such as "Repair" or "Do Not Switch On" at the power supply, otherwise incorrect operation by others may cause disability or death of the maintenance personnel.</p> <p>When performing maintenance or repair on the main circuit, make sure all electrical parts of the machine are fully discharged.</p>
	During shutdown and maintenance, it is necessary to confirm that the compressed air in the machine has been released, that the machine has been isolated from other air sources, and that the machine has cooled down.
	<p>The assembly of the compressor host and the maintenance of the controller and frequency converter require highly skilled personnel and special tools. Users are not allowed to disassemble and maintain the main engine, controller, and frequency converter of the air compressor by themselves.</p> <p>The installation of a permanent magnet synchronous motor is completed in a dust-free workshop. Users should not attempt to</p>

	disassemble the permanent magnet synchronous motor, otherwise the motor will be damaged.
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About modifications

 Warning About modifications	
	The complete air compressor has been strictly tested before leaving the factory, and any form of modification may affect the performance and service life of the machine. Without the permission of the manufacturer, the machine shall not be modified in any form.
	Users' self modification of the air compressor may cause machine failure and even personal injury! Without the permission of the manufacturer, users can modify the air compressor by themselves, which will lead to the early end of the warranty period of the machine.

About lubricating oil

 Warning About lubricating oil	
	Be sure to use the special lubricating oil for the air compressor of our company, otherwise the efficiency of the compressor will be reduced, and even the main engine of the compressor will be damaged.
	Please dispose of lubricating oil in accordance with relevant national or local laws and regulations. Incorrect handling of lubricating oil may cause serious environmental pollution.

1 Overview of air compressor

1.1 Working principle of air compressor

The main engine of this compressor is a screw type air compressor, which filters the dust from the air filter at atmospheric pressure and then enters the screw engine through the intake valve for compression. The compressed gas mixed with oil enters the oil-gas separator through the exhaust pipe for rotational separation. After separation, the compressed air is filtered through the oil-gas separator filter element and cooled by the minimum pressure valve and aftercooler before being discharged for use by the user terminal.

After using the frequency converter, it is possible to change the rotation speed of the motor according to the air supply pressure of the machine to achieve a balance between the air compressor production and the end user gas consumption, achieving maximum energy saving.

Its working principle:

(1) Preset the required variable frequency pressure value in the operation screen. When the air supply pressure of the machine fluctuates around the set of variable frequency pressure value, the controller adjusts the output frequency of the frequency converter, thereby adjusting the rotational speed of the motor, making the air supply pressure of the machine close to the variable frequency pressure value, achieving the effect of constant pressure air supply.

(2) The end user's gas consumption continues to decrease, and the motor speed continues to decrease. When the motor frequency drops to the lower limit frequency, the motor maintains the lower limit frequency operation. If the gas consumption continues to decrease and the unit supply pressure increases, the machine adjusts the supply and demand balance through loading and unloading.

(3) Starting, loading, variable frequency speed regulation, unloading, stopping when the vehicle is empty for a long time, and automatically restarting and stopping are the operating states of variable frequency compressors.

1.1.1 Working principle of oil-injected screw air compressor (power frequency machine)

Starting, loading, unloading, stopping empty for too long and automatically restarting, and stopping are the operating states of the oil-injected screw air compressor.

1.1.2 Working principle of frequency conversion fuel injection screw air compressor (frequency conversion machine)

After using the inverter, the motor speed can be changed according to the air supply pressure of the machine, so as to achieve the balance between the air compressor gas production and the end user's gas consumption, and achieve maximum energy saving.

1.2 Permanent magnet synchronous motor(Inverter screw air compressor)

The air compressor is equipped with a permanent magnet synchronous motor. The permanent magnet synchronous motor adopts high-performance neodymium iron boron permanent magnets, which do not lose excitation at 150 °C. The stator structure and working principle of the permanent

magnet synchronous motor are the same as those of the AC asynchronous motor. The difference between the permanent magnet synchronous motor and the AC asynchronous motor is the rotor structure, on which permanent magnet poles are installed.

Advantages of permanent magnet synchronous motors:

- High power density;
- Compared to three-phase asynchronous motors, it has high efficiency and small size;
- The rotational inertia of the rotor is small.

1.3 Advantages of permanent magnet variable frequency air compressor

(Inverter screw air compressor)

(1) Constant pressure air supply

The gas supply pressure of the stabilized unit is near the frequency conversion pressure value, extending the service life of the terminal customer equipment. Setting an appropriate frequency conversion pressure can maximize energy saving.

(2) Low load, low current startup

The frequency converter adopts a soft start method to start the unit, with large starting torque and small starting current, reducing the impact of air compressor startup on the power grid.

(3) Energy Saving


The unloading process of non variable frequency units is a process of energy consumption. Variable frequency units reduce the unloading process of units through frequency conversion and speed reduction, thereby achieving the effect of energy conservation and consumption reduction; According to the principle of constant pressure gas supply by frequency converters, set appropriate frequency conversion pressure values (just enough to meet the pressure values used by terminal equipment), reduce high pressure losses, and achieve further energy conservation.

1.4 Inverter Overview (Inverter screw air compressor)

The universal frequency converter is mainly used to control and adjust the rotational speed of the motor. It has user programmable functions, background software monitoring, and communication bus functions. Its combination functions are rich and powerful, and its performance is stable. For details, please refer to the operating instructions of the matching frequency converter.

(1) Before performing maintenance operations on the frequency converter, please carefully read the supporting operating instructions of the frequency converter and operate in strict accordance with the requirements of the instructions.

(2) After the inverter cuts off the power supply, there is still residual voltage in the internal capacitor. Residual voltage can cause injury to operators. When operating the frequency converter, wait for more than 10 minutes and confirm that the charging indicator light is off.

	Danger During the wiring operation of the frequency converter, the incoming power supply of the air compressor should be cut
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	<p>off. Even if the power supply is turned off, there is still residual voltage in the internal capacitor. After switching off the power, please wait at least 10 minutes.</p>
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2 Installation of air compressor

2.1 Equipment arrival acceptance

When you receive the equipment, you should carefully inspect the air compressor. If you do not immediately unpack and inspect, you should check for any signs of improper shipping. If any defects are found, it is necessary to obtain the carrier's signature for recognition, which will facilitate your future insurance claims.

When checking the air compressor, please check the following items:

(1) The nameplate of the machine should be checked to confirm the specifications of the product you ordered.


Product Model: Please refer to the technical parameters in Item 1.6 of this user manual to confirm that it is consistent with the product you need.

Motor power: Convenient for you to choose power cables and circuit breakers.

Weight and overall dimensions: It is convenient for you to design the foundation of the air compressor. For the design drawing of the air compressor station, please refer to the outline dimension drawing in item 1.5 of this user manual.

(2) Visually inspect for any damage that occurred during transportation, such as pipe breakage, shell deformation, and component damage or detachment.


(3) In addition to the machine body, there should also be attached user manuals and other accompanying accessories. Please check whether the attached accessories are complete according to the packing list attached to the machine.

 <p>Be Careful</p>	<ul style="list-style-type: none"> ● After unpacking, please properly store the user manual and other accompanying accessories. ● The top frame of the packaging box (if any) can be used to lift the air compressor. Do not discard it randomly.
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2.2 Handling of air compressor

2.2.1 Lift the air compressor with a crane

Pass the lead through the forklift hole of the equipment, and support the air compressor with the top frame (if any) or support frame of the packaging box to prevent the rope from crushing the equipment shell.

 <p>Be Careful</p>	<p>The crane and rope used for lifting should meet the load bearing requirements, otherwise it may cause equipment damage or casualties.</p>
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2.2.2 Handling the air compressor with a forklift

Forklift holes are reserved for the air compressor for users to transport the air compressor with a forklift. During transportation, soft pads should be used to protect the air compressor from bumps.

2.2.3 Handling the air compressor by rolling wood

The air compressor can also be transported in place with load-bearing rollers.

2.3 Installation of air compressor

2.3.1 Requirements for installation site of air compressor

The air compressor should be installed in a clean, well-lit, well ventilated place with sufficient maintenance space around it. A good computer room is a prerequisite for the correct use of the air compressor system.

2.3.1.1 Ventilation, lighting, ambient temperature, maintenance space.

(1) Air compressor operation can generate a large amount of heat, therefore, the air compressor must be placed in a well ventilated room, and the cooling air inlet area must be sufficient.

(2) The installation site should have good lighting, and each side of the air compressor machine should be more than 1.5 meters away from the wall, with a top space distance of more than 1.5 meters, and the top of the air-cooled machine should be more than 2.5 meters away for easy operation and maintenance.

(3)) The ambient temperature should be lower than 40 °C to avoid unnecessary high-temperature tripping. The higher the ambient temperature, the less air output from the air compressor. In addition, the ambient temperature must be higher than 0 °C, controlled above the condensation point temperature of water and lubricating oil.

(4) The environment around or near the air compressor must be considered. The selected air compressor room should have a low relative humidity and be free of dust, chemicals, paint odor, and painting operations. If the working environment is harsh, pre filtration equipment should be installed in front of the intake port, and a ventilation duct should be installed to guide the intake end to a place where the air is relatively clean.

2.3.1.2 Foundation requirements

A flat foundation can reduce the vibration of the machine and extend the service life of the machine.

(1) The air compressor should be placed on a concrete floor that can support its weight, and the floor should be horizontal and flat. The air compressor should be installed horizontally. If there is vibration from outside, vibration isolation slots should be provided on the floor.

(2) It is recommended to use anchor bolts to fix the air compressor.

(3) To connect the inlet and outlet pipelines, the length and width of the cement platform are 100mm larger than the overall size of the machine. The height of the cement platform shall be 150 mm, and grooves shall be opened around the platform to facilitate the shutdown of the machine. During oil change and maintenance, oil and water can flow away from the grooves and be collected for disposal by relevant departments.



Warning

The oil and water leaked from the machine should be collected and submitted to the environmental protection department for treatment to prevent environmental pollution.

2.3.2 Pipe installation

2.3.2.1 When piping the main pipeline, the pipeline must have an inclination of 1 ° to 2 °. It is conducive to the discharge of condensed water in the pipeline.

2.3.2.2 The diameter of the pipeline should be greater than or equal to the diameter of the

compressor exhaust pipe. The use of elbows and various valves in pipelines should be minimized to reduce pressure losses. The pressure drop of the pipeline should not be greater than 5% of the set pressure. **Excessive pressure loss is not conducive to energy conservation.**

2.3.2.3 The main pipe should not be arbitrarily reduced. If it is necessary to reduce or enlarge the pipe, use a tapered pipe, otherwise there will be turbulence at the joint, resulting in significant pressure loss and a significant impact on the life of the pipe.

2.3.2.4 If the air consumption is large and the time is short, it is best to install a buffer tank, which can reduce the loading and unloading times of the air compressor and extend the service life of the air compressor.

2.3.2.5 When multiple screw machines share a common exhaust pipeline, each machine should install a stop valve on its own exhaust pipeline to isolate each other. If a screw unit and a reciprocating compressor are brought together, an air storage tank must be installed between the two machines. When installing an air storage tank, a stop valve and a maintenance evacuation valve must be installed between the air storage tank and the machine (during shutdown, the compressed air between the minimum pressure valve in the system and the stop valve must be discharged).

2.3.2.6 The branch pipeline should be led out from the top of the main pipeline to prevent the condensed water in the pipeline from flowing down to the working machine. An overflow valve should be installed on the compressor pipeline.

2.3.2.7 If there are air storage tanks and dryers after the air compressor machine, the best piping order is air compressor + air storage tank + dryer.

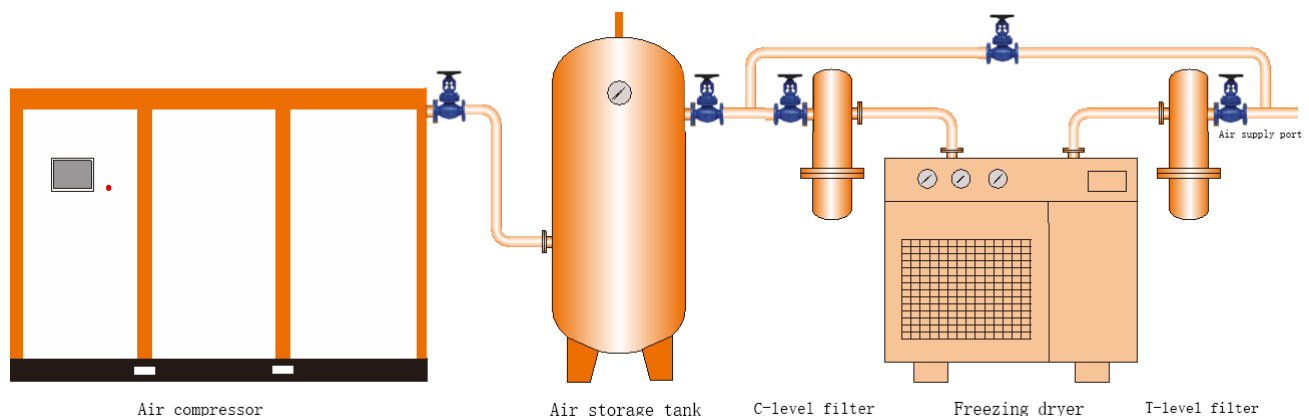



Figure 2-1 Air compressor + air storage tank + dryer system

2.3.3 Cooling system installation

2.3.3.1 Installation of air-cooled cooling system

(1) The air-cooled screw air compressor should be installed in a well ventilated machine room, and installed with an air guide hood to guide the heat generated by the air-cooled cooler to the outside.

(2) Install an air source near the air compressor to regularly clean the cooling fins of the air-cooled cooler. **Regularly clean the air-cooled cooler to prevent the machine from shutting down at high temperatures.**

	<p>be careful</p>	<p>The installation of the wind guide cover should prevent outdoor dust and rain from pouring back into the cooler of the air compressor.</p>
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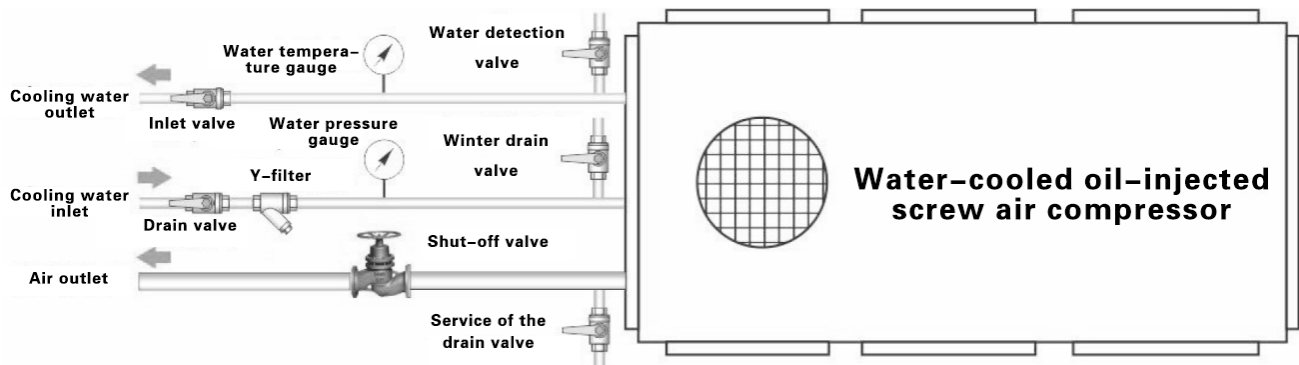
2.3.3.2 Water-cooled cooling system

(1) The cooling water of the air compressor should comply with the provisions of industrial water to avoid the calcium and magnesium plasma in the water from causing chemical reactions due to high temperature, in the cooler

Scale builds, affecting the efficiency of the cooler. The cooling water quality should comply with the following regulations:

- The content of suspended solids should not be greater than 100mg/L;
- The PH value shall not be less than 6.5, and should not be greater than 9;
- Thermally stable

(2)The cooling water system of the air compressor should be used separately, if the cooling water tower circulation system is used, the cooling water tower should comply with the cooling water specified by the air compressor volume, while the selection of pump power should be correct.



(3) The water pressure of cooling but water must generally be maintained between 0.15~0.45MPa; The cooling water outlet temperature should be kept below 40° C.

(4) Cooling water consumption of water-cooled air compressor:

Horse Power	75	150	200	300	380
	100	175	250	350	420
	120				
HP	100	140	180	220	260

(5) Regularly clean the scale in the radiator copper tube to maintain efficient heat dissipation.

2.4 Electrical installation

2.4.1 Selection and installation of circuit breakers

(1) The circuit breaker is mainly used to cut off the main power supply of the air compressor and protect the motor.

Select an appropriate circuit breaker based on the rated current of the host motor. The circuit breaker must have a motor overcurrent protection function.

(2) The circuit breaker must be a motor protected circuit breaker with an instantaneous action setting of 8-15 times the rated current of the motor. Please avoid using a power distribution type circuit breaker, and choose a power distribution type circuit breaker. The circuit breaker may malfunction when the motor is started. For inverter screw air compressors, avoid using circuit breakers with leakage protection.

(3)The circuit breaker should be installed next to the air compressor machine to facilitate maintenance of the air compressor. The installation of circuit breakers should comply with

corresponding safety regulations.

2.4.2 Selection and installation of cables

Select the appropriate cable based on the rated voltage and current of the air compressor, and determine it based on factors such as environmental conditions, laying methods, and product technical data. The type selection and installation shall generally be considered according to the following principles:

(1) Cables should be laid underground or through buried pipes as much as possible to reduce the damage caused by external pressure on the cables. Plastic sheathed cables shall be laid in pipes.


(2) The low-voltage power cable shall be a four-core power cable, and the sheath method of the cable shall be selected according to the laying method.

(3) The cable cross-section should be appropriately increased when the ambient temperature is high, and the cross-section must also be increased to reduce voltage drop when the laying distance is long.

Table 2-1 Recommended power cables and circuit breakers

Model	Power	Max. Electric Current	Air Flow Capacity	Rate Pressure	Include Air Tank	Include Refrigerated Dryer
G-10A-230V	10hp	28.2A	33.9CFM	116PSI	No	No
G-15A-230V	15hp	40.9A	39.2CFM	116PSI	No	No
G-20A-230V	20hp	58A	72.01CFM	116PSI	No	No
G-20A-460V	20hp	27.9A	68.5CFM	116PSI	No	No
G-30A-230V	30hp	81.2A	96.8CFM	116PSI	No	No
G-30A-460V	30hp	40.6A	96.8CFM	116PSI	No	No
G-50A-230V	50hp	133A	208CFM	116PSI	No	No
G-50A-460V	50hp	66.6A	208CFM	116PSI	No	No
GYL-10A-230V	10hp	28.2A	33.9CFM	116PSI	Yes	Yes
GYL-15A-230V	15hp	40.9A	39.2CFM	116PSI	Yes	Yes
GYL-20A-230V	20hp	58A	72.01CFM	116PSI	Yes	Yes

The current parameters in the table are for reference only, and the actual values are subject to the parameters on the product nameplate.

 Danger	<p>Do not use cables with too small cross sections, otherwise the cables are prone to danger due to high temperatures;</p> <p>Do not use cables with voltage that does not meet the requirements, otherwise serious accidents such as fire and electric shock may occur.</p>
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2.4.3 Power Requirements

The user's incoming power supply should be consistent with the rated voltage and frequency of the air compressor.


Power supply voltage requirements:

(1) The voltage fluctuation should not be too large, and the voltage fluctuation should be between - 10% and +10% of the rated voltage of the motor.

(2) The voltage imbalance should meet the standard, and the three-phase imbalance of the three-phase power supply voltage should not exceed 5%. If the fluctuation is too large, a voltage stabilizer must be installed or the power grid must be rectified.

(3) The capacity of the power grid meets the starting requirements of the motor, otherwise it will be difficult to start the motor, and even cause the circuit breaker to trip.


(4) It is best to use a separate power system for the air compressor to facilitate maintenance.

 Danger	<p>Do not use high-voltage power supplies on low-voltage equipment, otherwise the equipment may burn down and cause personal injury.</p>
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2.4.4 Grounding requirements

The body and motor housing of the air compressor should be reliably grounded to prevent static electricity from causing a fire in the oil gas separator and causing hazards due to electrical leakage.

The body and motor housing of the air compressor are connected to the grounding body through yellow and green dual color PE grounding wires or galvanized round steel (flat steel), with a cross-section meeting relevant requirements.


 Danger	<p>Unreliable grounding or non grounding may cause serious accidents such as fire and electric shock.</p> <p>It is strictly prohibited to use gas pipelines and water pipelines as grounding bodies. Otherwise, accidents may occur.</p> <p>It is prohibited to connect the three-phase power supply zero line to the air compressor casing or grounding body, otherwise causing equipment failure.</p>
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2.5 Electrical connections

 Be Careful	<p>The wiring work shall be completed by electricians with electrician certificates.</p> <p>Failure to heed warnings may result in electric shock accidents or damage to equipment.</p>
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2.5.1 Cable connection from user power supply to air compressor control cabinet

Air compressor control cabinet uses three-phase AC power supply AC380V ($\sim 3 \times L+PE$), see Table 1-1 for connecting cables. The user power supply is connected to the R, S, and T terminals of the frequency converter via a circuit breaker.

 Be Careful	<p>The cable connection must be firm and not loose, otherwise it may cause the cable to heat up, burn components, or even cause a fire.</p>
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2.5.2 Ground wire connection

Connect the grounding terminal of the air compressor to the grounding body with yellow and green dual color PE wire. After grounding, use a grounding resistance measuring instrument to measure the grounding resistance, which should be less than 4 ohms.

3 Air compressor system

3.1 System flow diagram

The system flow diagram of the air compressor is shown in Figure 3-1

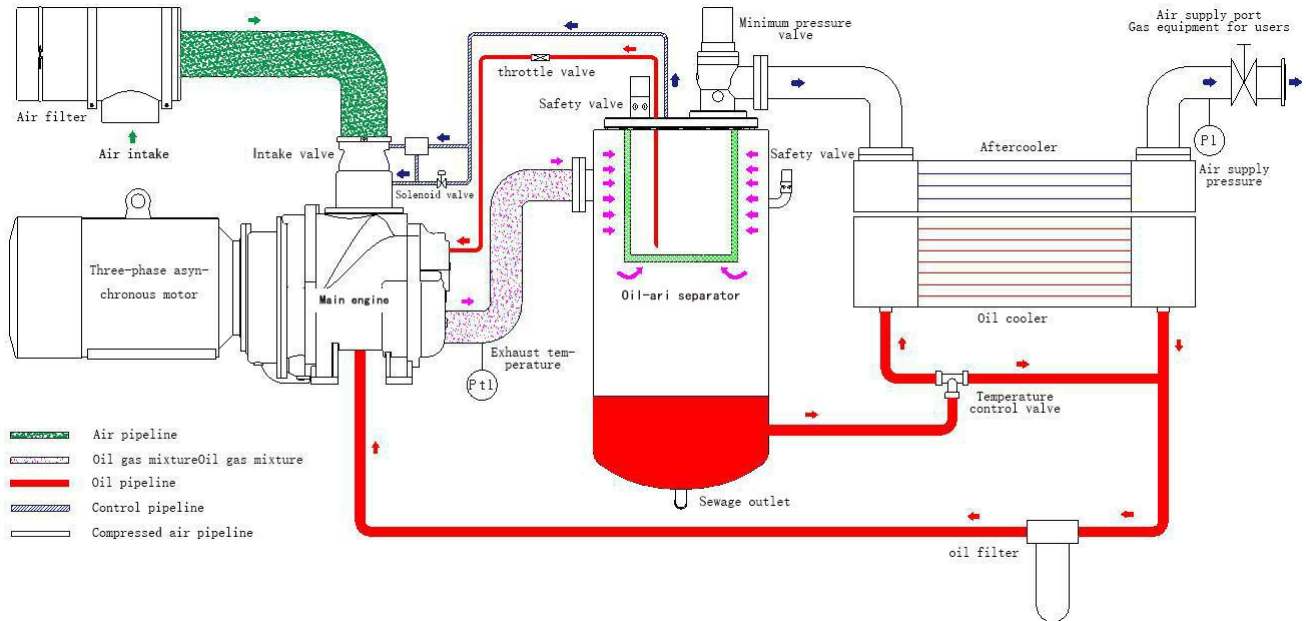
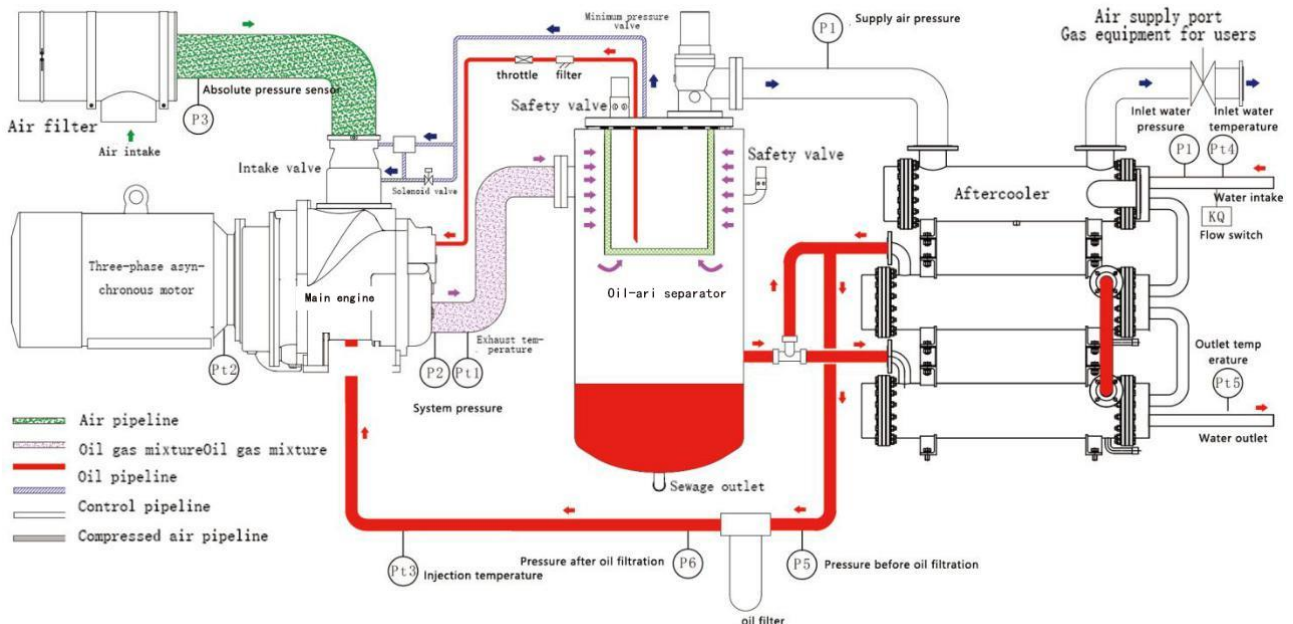


Figure 3-1 System Flow Chart



3.2 Water-cooled air compressor system flow chart

3.2 Air circuit system

The air circuit system consists of an air filter, an intake valve, a main engine, an oil

gas separator, a minimum pressure valve, an aftercooler, and a gas pipe.

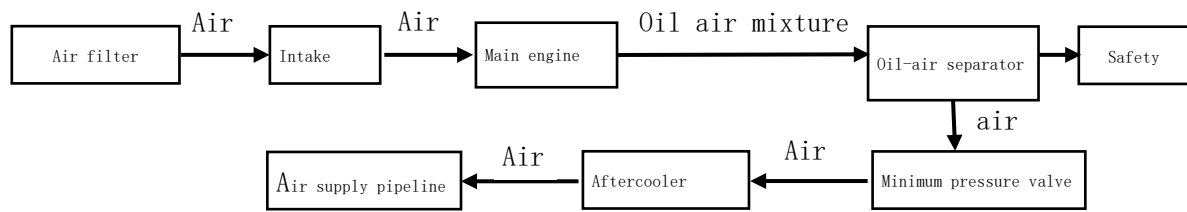


Figure 3-2 Air Path Flow Chart

After dust removal by the air filter, the air flows through the intake valve and enters the intake port of the host machine. The air is compressed inside the host machine and discharged from the exhaust port of the host machine, and then enters the oil gas separator through the exhaust pipe. Oily compressed air is separated by rotary centrifugation in the upper part of the oil gas separator, and the lubricating oil is gathered on the cylinder wall under the action of centrifugal force to condense into droplets, which fall into the oil tank. After centrifugal separation, compressed air enters the filter element in the oil gas separator for fine separation. The finely separated oil accumulates at the bottom of the filter element. Due to the installation of a return pipe inside the filter element, the oil at the bottom of the filter element enters the intake pipe of the host machine through the return pipe under pressure. The compressed air after two separations is very clean. The compressed air flowing from the oil gas separator is supplied to the user through the minimum pressure valve and the aftercooler.

3.2.1 Air filter

The main function of the air filter is to remove dust from the air, to avoid premature wear of the compressor host engagement pair, and to prevent clogging of the oil filter and oil gas separation filter element. .

Generally, the dust on the surface should be removed and removed every 500 hours by using low-pressure air to blow the dust away from the inside out. In dusty areas, the cleaning time should be shortened.

3.2.2 Intake valve

The intake valve has two main functions:

- (1) When starting and unloading the compressor, close the intake valve plate to keep the compressor in an unloaded state, achieving low current starting and unloading time and load operation;
- (2) When the gas consumption changes, balance the intake air of the compressor with the actual gas consumption.

3.2.3 Oil gas separator (see item 3.3.6)

3.2.4 Minimum pressure valve

The minimum pressure valve is located at the outlet above the oil gas separator and has the following functions:

- (1) When starting, priority should be given to establishing the circulation pressure required for lubricating oil to ensure machine lubrication.
- (2) When the pressure exceeds the opening pressure, the valve opens, which can reduce the air flow rate through the oil gas separator. In addition to ensuring the oil gas separation effect, it can also protect the oil gas separator filter element from damage due to

excessive pressure difference.

(3) Prevent system pressure backflow during empty vehicle discharge (unloading).

3.2.5 Aftercooler

An air-cooled cooler uses a cooling fan to draw in cold air and cool compressed air through the cooler. Air cooled air compressors are sensitive to ambient temperature conditions, so it is best to pay attention to the ventilation conditions of the environment when selecting a place to place them.


3.2.6 Safety and relief valves

(1) Safety valve:

When the pressure switch is improperly adjusted or fails, resulting in the pressure at the outlet of the oil-gas separator exceeding the rated exhaust pressure to a certain value (for products with a working pressure of 1MPa or less, the opening pressure of the safety valve is the rated working pressure+0.1MPa, and for products with a working pressure of 1MPa or more, the opening pressure of the safety valve is the rated working pressure \times 1.1), the safety valve will jump open to relieve pressure.

(2) Relief valve:

When the oil gas separator filter element has reached its service life or is clogged, resulting in a large pressure difference, and the pressure in the oil gas separator has exceeded a certain value of the rated exhaust pressure before the safety valve is activated (the opening pressure of the relief valve is the rated working pressure \times 1.2), the relief valve will jump open to relieve pressure. When the relief valve operates, the oil gas separation filter element must be replaced.

 Warning	<p>The safety valve and relief valve have been adjusted before leaving the factory. Please do not adjust them randomly and send them for regular inspection.</p>
--	--

3.3 Lubricating oil system

3.3.1 Lubricating oil flow process (Figure 3-3)

The lubricating oil for screw compressors has four main functions: lubricating the contact surface between the bearing and the screw, sealing the gap between the meshing pairs, cooling the compressed gas, and reducing noise. The lubricating oil in the oil gas separation filter element is compressed into the oil cooler by high-pressure gas for cooling, and then enters the compressor after being cleaned of dirt and impurities through the oil filter. (Machines 75 kW and below are not equipped with temperature control valves)

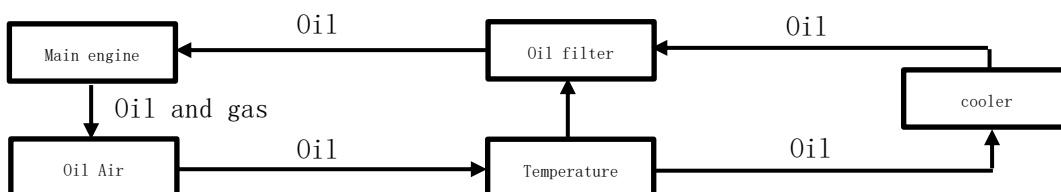


Figure 3-3 Lubricating Oil Circuit Flow


3.3.2 Oil filter

The oil filter is a paper-based filter whose function is to remove impurities in the oil,

such as worn metal particles, dust, oil compounds, etc. The filtering accuracy is between 10u and 15u, providing perfect protection for bearings and screws. The first time the new machine runs for about 500 hours, the oil and oil filter need to be replaced. Afterwards, they will be replaced according to the oil filter timing or pressure difference fault alarm indication. If the oil filter has a large differential pressure and is not replaced, it may lead to insufficient oil intake, causing a high temperature trip, and at the same time, insufficient oil may affect the bearing life.

3.3.3 Oil cooler

The fins of the air-cooled air compressor oil cooler are covered with dust, which affects the cooling effect. The exhaust temperature may be too high, resulting in a trip. Therefore, it is necessary to regularly blow off the dust on the surface of the fins with compressed air.


 <p>Be Careful</p>	<p>In winter, in areas where the normal temperature is below the freezing point, the cooling water in the cooler must be drained after the machine is shut down.</p>
--	--

3.3.4 Temperature control valve

The function of the temperature control valve is to maintain the exhaust temperature above the pressure dew point temperature. When starting up, the lubricating oil temperature is low, and at this time, the bypass ports of the temperature control valve are all open, and the oil enters the engine body without passing through the oil cooler. If the oil temperature rises above 60 °C, the valve slowly closes the bypass port. When the temperature reaches 70 °C, the bypass port is fully closed, and at this time, all the oil passes through the oil cooler before entering the engine. .

3.3.5 Oil gas separator

The oil gas separator has two functions: oil storage and oil gas separation. An oil level gauge is installed on the side, and the lubricating oil pointer should be located in the middle of the upper and lower scale lines of the oil level gauge during operation. The lower part of the tank has an oil filler for refueling. An oil drain valve is installed at the bottom of the oil gas separator. In wet seasons, slightly open the oil drain valve before starting every day to drain condensed water from the bottom of the oil gas separator. The mist like oil and gas contained in the compressed air can be almost completely filtered out through the oil gas separator filter element, with an oil content of less than 3 ppm. The oil filtered by the oil-gas separation filter element is concentrated at the bottom of the filter element. Then, it flows back to the engine body through the filter, orifice, and oil mirror through the oil return pipe. .

 <p>Warning</p>	<p>The company does not recommend users to choose other brands of lubricating oil, as using unqualified oil will damage the air compressor.</p>
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4 Security protection and alarm system

This equipment is equipped with safety warning prompts, safety protection systems, and alarm devices to prevent machine damage or personal injury due to human operations, mechanical failures, and electrical failures. For your safety, please be sure to follow any safety instructions on the machine and in the user manual.

4.1 Safety Warnings and Tips

Safety warning labels and usage reminder labels are posted on the body or components of the air compressor to guide the operation and maintenance of the equipment. Please strictly follow the precautions on the label when operating or maintaining the air compressor to ensure safe and reliable operation.

This user manual also contains safety instructions and safety warnings. Please carefully read and understand them, and strictly abide by them during the use of the equipment.

4.1.1 Safety warning label

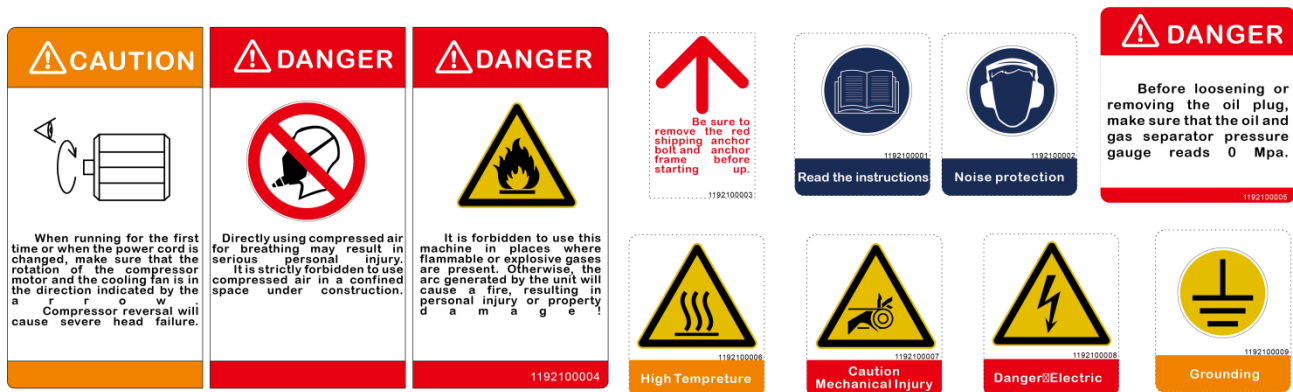


Figure 4-1 Safety Warning Label

(1) Remove the transportation fixing label: Paste it next to the main engine and motor transportation fixing bolts to be removed, with the arrow pointing towards the transportation fixing bolt. When the unit is started up and running, the transportation fixing bolts and transportation fixing seats (racks) here should be removed and properly stored. During the next transportation, the bolts and transportation fixing seats (racks) should be installed and locked tightly. **Failure to heed this warning may result in compressor host and pipeline failures.**

(2) Warning and Maintenance Plan Label: Please carefully read and strictly implement the corresponding contents and operations to ensure that the machine operates in the optimal state.

(3) Determine the steering label (warning level): Please refer to Section 4.1.2.

(4) Do not use it as a respiratory label (hazard level): It is strictly prohibited to use compressed air directly for breathing. Compressed air should be treated with dedicated aftertreatment equipment before being used for breathing. Otherwise, serious personal injury will result.

(5) Label (Hazard Level): It is strictly prohibited to use this machine in flammable and explosive environments. Electric arcs generated during machine operation can cause major accidents. Please use an air compressor with corresponding explosion-proof grade in flammable

and explosive environments. Please consult our company for sales information.

(6) Use caution label (warning level): The operation and maintenance of the air compressor requires fixed professional personnel. Before using the air compressor, it is necessary to carefully read the operating instructions, strictly follow the instructions for operation and maintenance, and use original spare parts. Otherwise, the company cannot fulfill the originally agreed commitment of free warranty and after-sales service.

(7) Air filter maintenance label (warning level): Regularly clean the air filter to keep the machine running in the best energy efficient state. During cleaning, the pressure of compressed air used to clean the filter element should not exceed 0.5MPa. Excessive blowing pressure may damage the filter element.

(8) Full pressure relief warning label (hazard level): When disassembling pressure bearing components, the residual pressure inside the machine may eject the pressure bearing components, causing personal injury. When disassembling pressure bearing components, it is necessary to confirm that the pressure in the oil gas separator is zero.

(9) Pay attention to the high temperature label (warning level): the temperature of the exhaust outlet pipeline of the host and the surface of the oil-gas separator is high. Please do not touch the corresponding parts to avoid scalding.

(10) Beware of hand clamping (danger level): paste it near the rotating parts (host motor coupling, fan rotating parts). Do not touch the corresponding parts or prohibit operation nearby. Be careful not to get involved, which may lead to machine failure or serious personal injury.

(11) Electrical hazard label (hazard level): Posted on the electrical box door and electrical insulation partition. When opening the electrical box door or removing the electrical insulation partition, please cut off the incoming power supply to prevent electric shock.

(12) Be sure to place a grounding label (warning level) near the grounding point. Please connect the air compressor to a reliable grounding body in accordance with the relevant electrical specifications. Do not use gas pipelines or water pipelines as grounding devices, as this may cause serious accidents. **Unreliable grounding may cause electrostatic ignition or electric shock accidents in the oil gas separator filter element.**

4.1.2 Reminder label



Figure 4-2 Reminder Label

(1) Motor steering label: used to determine whether the motor's steering is consistent with this label.

(2) Oil inlet label: posted near the oil inlet of the oil gas separator, indicating that this is the compressor oil inlet.

(3) Sewage outlet label: posted at the outlet position of the air compressor water

distributor, indicating that the outlet is a sewage outlet. (Applicable to some models)

(4) Power supply inlet label: posted at the external inlet of the air compressor, indicating that the inlet is power supply inlet.

(5) Water inlet label: posted at the cooling water inlet of the air compressor, indicating that the inlet is the cooling water inlet. Please note that the water inlet and outlet of the air compressor cannot be installed upside down, otherwise the air compressor will alarm and cannot be started.

(6) Label: posted on the power supply incoming terminal and incoming copper bar, indicating the meaning of each phase. For units with zero line N, it is strictly prohibited to connect the live wire to the N terminal, otherwise it may cause equipment failure.

(7) Oil outlet label: posted at the position of the oil outlet at the lower end of the oil gas separator, indicating that the outlet is an oil outlet. When not using this oil outlet, please plug it with a plug.

(8) Water outlet label: posted at the cooling water outlet of the air compressor, indicating that the outlet is the cooling water outlet.

(9) Air outlet label: posted at the exhaust port of the air compressor, indicating that the port is an air outlet.


4.2 Security protection system and alarm device


The electrical control system of the air compressor is equipped with fault and alarm self-diagnosis functions. When an abnormality occurs in the air compressor, the electrical control system of the air compressor will promptly diagnose and safely protect the shutdown or issue an alarm signal.

The fault and alarm self-diagnosis function of the air compressor is divided into heavy faults and light faults. Any fault that causes the machine to shut down becomes a serious fault. When a serious fault occurs, the machine stops and locks, and the control panel displays fault information or codes.

4.2.1 Air compressor anti reverse protection

Reverse rotation of the air compressor can cause serious damage to the compressor. In order to prevent the compressor from reversing, the controller has a phase sequence protection function. When the controller displays a phase sequence error, switch any two phases of the motor feed line.

 Warning	<p>When debugging a new machine or changing the incoming power supply, even if the controller does not display a phase sequence error, it is necessary to jog the air compressor to determine whether the motor direction is consistent with the marked direction.</p>
--	--

 Be Careful	<p>For machines equipped with frequency converters, the rotation of the motor is not affected by the phase sequence of the incoming power supply. For frequency converters, changes in the phase sequence of the three-phase incoming power supply</p>
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cannot change the direction of the motor's rotation.

To change the direction of the motor, it is necessary to exchange any two phases of the three-phase wires at the output end of the frequency converter (connected to the motor).

The reasons for motor protection shutdown include:

(1) Due to human operation reasons, such as self-adjustment of loading and unloading pressure, incorrect adjustment of system parameters, frequent use of emergency shutdowns, unstable wiring, and untimely maintenance.

(2) Mechanical faults, such as internal loss of the motor, stuck motor bearings, non action of the safety valve, unclosed intake valve, excessive lubricating oil in the main engine, etc.

(3) Electrical faults, such as low power supply voltage, high current caused by loose cable joints, motor out of phase operation, motor winding faults, etc.

4.2.2 Protection against excessive exhaust temperature

The set temperature for overtemperature warning of compressors with a rated pressure of 0.3MPa~1.0 MPa is 105 °C. When the exhaust temperature exceeds this set value, the alarm will not stop; When the exhaust temperature exceeds 110 °C, an over temperature alarm will be triggered and the machine will shut down.

The set temperature for overtemperature warning of compressors with a rated pressure of 1.25 MPa to 1.6 MPa is 115 °C. When the exhaust temperature exceeds this set value, the alarm will not stop; When the exhaust temperature exceeds 120 °C, an over temperature alarm will be triggered and the machine will shut down.

There are many reasons for high exhaust temperature, mainly:

(1) The fins of the air-cooled cooler are covered with dust.

(2) The oil filter is blocked.

(3) The ambient temperature in the air compressor room is too high and the ventilation is not smooth.

(4) The lubricating oil level of the oil gas separator is too low.

4.2.3 Protection against low ambient temperature

The ambient temperature is too low, the lubricating oil thickens, and it is difficult to start the machine; The phenomenon of "ice blockage" is prone to occur in the oil and gas separator, and forcibly starting the machine can easily cause serious faults. When the ambient temperature is below 0 °C, the unit cannot start.



Warning

The air compressor must be started at an ambient temperature above 0 °C. In areas with ambient temperatures below 0 °C, the oil drain valve should be opened before each cold start of the machine to confirm that there is no "ice blockage" in the oil gas separator.


4.2.4 High exhaust pressure protection

After installing the minimum pressure valve, the air compressor is equipped with a pressure transmitter that displays the exhaust pressure of the machine. In addition, the microcomputer controller is equipped with an overpressure protection function. When the exhaust pressure exceeds the rated pressure of the machine by +0.05MPa, the machine will report an exhaust

overpressure shutdown. This action occurs before the action of the safety valve and relief valve.

4.3 Light fault prompt function

After an alarm occurs, an alarm that does not affect the normal operation of the unit in the short term becomes a minor fault. When a minor fault occurs, the unit does not shut down.

 Warning	After a minor malfunction occurs, please promptly notify maintenance personnel to maintain the air compressor. Long term failure to handle may affect the performance of the unit and even lead to the occurrence of serious faults.
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4.3.1 Lubricating oil and wear parts service life alarm prompt

When the service life of lubricating oil, motor lubricating grease, air filter, oil filter, and oil gas separation filter element reaches the prompt, the user should replace the three filters and lubricating oil, and add motor lubricating grease.

4.4 Mechanical protection of the machine

4.4.1 Exhaust overpressure protection

The air compressor oil gas separator filter element is equipped with a relief valve in front of it, and the oil gas separator cover is equipped with a safety valve.

5 Operation of the air compressor

5.1 Check and test run before starting the machine for the first time

Although each screw compressor has undergone testing before leaving the factory and strict inspection before shipment, it cannot be guaranteed that there will be no damage during transportation. Therefore, before debugging, each compressor should be rechecked for damage, and the transportation fixing bolts and transportation fixing seats (frames) should be removed to check whether the red lines of the moving component bolts are consistent. In addition, during the first few hours of operation, attention should be paid to observing the operation of the machine. The screw compressor is fully assembled before leaving the factory and can be directly connected to the compressed air main using a flexible joint.



Be
Careful

The first start-up of a new air compressor after installation, or the first start-up after transportation to another location, must undergo pre start-up inspection and trial operation.

5.1.1 Check before starting the machine for the first time

(1) Check whether the pipeline joints, instruments, circuit connection joints, etc. are loose or detached due to transportation, installation, etc. If any, please tighten it in a timely manner. Confirm that the exhaust valve is open.

(2) Check if the air filter element and oil filter are loose, and if so, tighten them in a timely manner.

(3) Please make sure that the power supply voltage fluctuation range is within $\pm 10\%$ of the rated voltage (380V).

(4) Confirm that an independent circuit breaker is installed for the air compressor, and the capacity of the circuit breaker should be selected according to the requirements of this manual. (5) Check whether all wiring in the electrical box is loose, and if so, please tighten it in time. **Use a screwdriver or wrench to check and tighten the wiring of the main circuit and the control circuit of the AC contactor.**

(6) Check if the components inside the electrical box are damaged and if the wires are damaged. If available, please contact our company's after-sales service.


(7) Check whether the oil level in the oil and gas separator is within the safety line. If not, please add the appropriate amount of lubricating oil. If the oil level is very low, please check whether the blowdown valve is open, or the pipeline is loose and leaking oil. (8) Check the cooling system for damage or damage.

(8) Check the safety valve and relief valve for damage.

(9) If the trial operation is only carried out after a long time of delivery or if the shutdown time exceeds three months before use, approximate lubricating oil should be added to the intake valve and the air compressor should be turned several times by hand to prevent oil shortage and burning in the compressor host during start-up.

(10) According to the safety warning label (1) shown in item 4.1.1 (this warning label is posted on the base near the motor and the host in a prominent position), remove the host and the motor transportation fixed column (frame). It is recommended to retain the removed main


engine, motor transportation fixed frame, and fasteners for use during long-distance transportation.

 <p>Warning</p>	<p>(1) Before operating the machine, the main engine support seat and motor transportation fixing bracket must be removed, otherwise it may damage the compressor main engine.</p> <p>(2) Before long-distance transportation, it is necessary to install the main engine support seat and motor transportation fixing frame to protect the main engine and compressor system.</p>
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(11) Check the cooling system.

5.1.2 test run

(1) Within 1-2 seconds after pressing the start button on the touch screen, immediately press the "Emergency Stop" button to check if the steering is correct (as indicated by the arrow direction). If the steering is incorrect, please switch any two phases of the three-phase wire at the output end of the frequency converter (connected to the motor) to check if the fan steering is correct.

 <p>Be Careful</p>	<p>For machines equipped with frequency converters, the rotation of the motor is not affected by the phase sequence of the incoming power supply. The change in phase sequence of the variable frequency machine, i.e. the three-phase incoming power supply, cannot change the direction of the motor. To change the direction of the motor, it is necessary to exchange any two phases of the three-phase wires at the output end of the frequency converter (connected to the motor).</p>
--	---

(2) After resetting the emergency stop button, press the start button and the air compressor will start running.

(3) Observe if there are any abnormal indications on the display screen; Can the machine load normally; Is there any abnormal vibration in the air compressor. If there is any abnormal sound, vibration, water leakage, oil leakage or other abnormal phenomena, immediately press the stop button, and check after stopping the machine.

(4) Observe whether the motor speed changes when the exhaust pressure rises to the variable frequency pressure setting. When the pressure reaches the sleep pressure, can the machine sleep normally. When the pressure drops to the sleep start pressure, can the machine start and operate normally.

(5) Press the stop button to check if the machine stops normally.

5.2 Inspection before startup

(1) Slightly open the drain valve at the bottom of the oil gas separator to drain the condensate inside, and then tighten it again. Condensate discharge method: as shown in Figure 5-1.

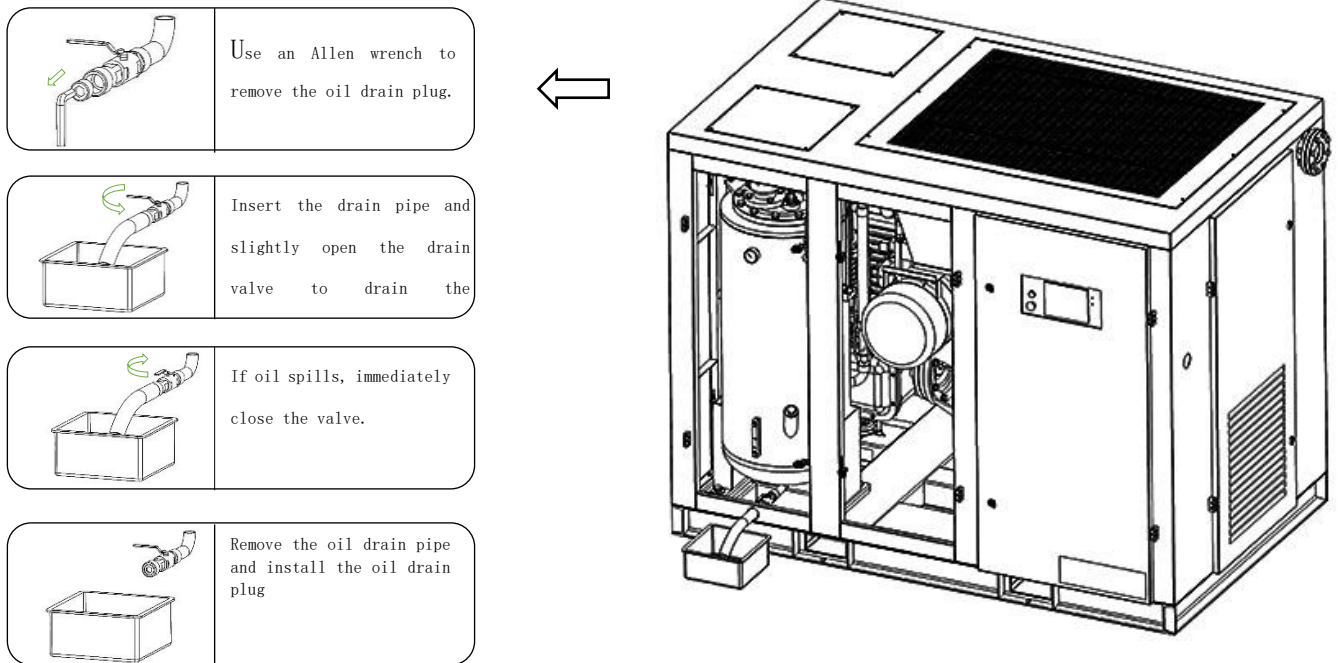
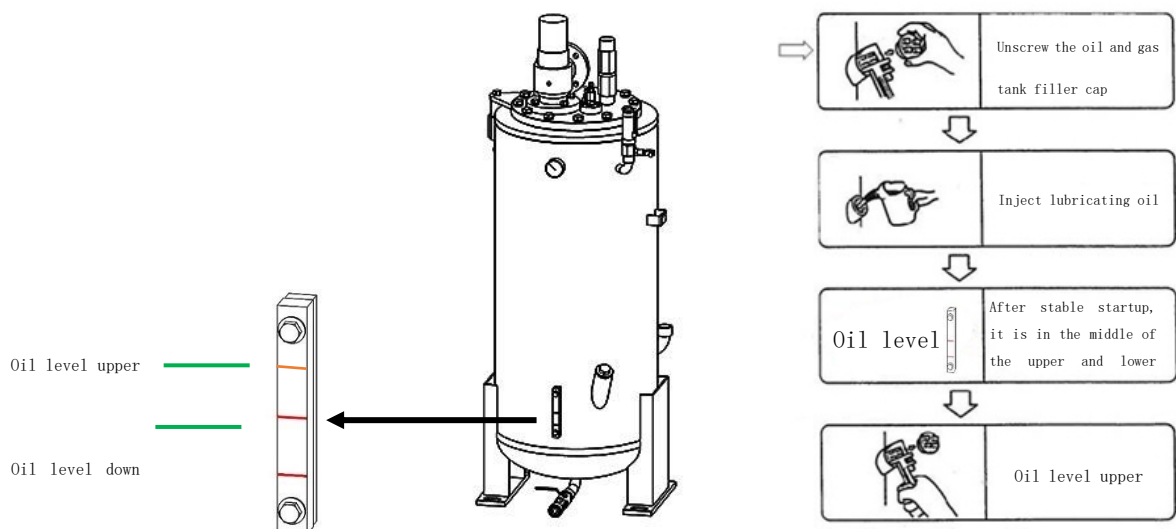



Figure 5-1

	Be Careful	Before discharging condensate, it is necessary to ensure that the pressure inside the system is zero before proceeding.
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(2) Observe the oil level to ensure that the lubricating oil level should be in the middle of the upper and lower scale lines of the oil level gauge when the machine is running. If the lubricating oil is too much, the machine should be closed first, and then the oil drain valve can be opened to discharge a part of the oil; If the lubricating oil is insufficient, stop and press the emergency stop button first, and then open the upper oil cap to refuel. The method of injecting lubricating oil into the air compressor (as shown in Figure 5-2)::




 <p>Be Careful</p>	<p>Before discharging or refueling, it is necessary to ensure that the pressure inside the system is zero before entering.</p>
--	--

(3) Rotate the coupling between the host and the motor by hand, and it should move freely. If there is any jamming, it should be checked before starting.

(4) Turn on the main power supply, open the shut-off valve, and confirm that the pressure in the system is zero.

 <p>Be Careful</p>	<p>Before starting up, the oil drain valve must be opened to drain the condensed water inside the machine. If there is condensed water inside the machine, it can cause pollution to the unit. Customers can determine the appropriate interval for discharging condensate water based on local usage.</p>
--	--


 <p>Be Careful</p>	<p>When the temperature in the area is below zero degrees Celsius, it is necessary to ensure that there is no "ice blockage" in the oil and gas separator before starting it, otherwise it may cause serious accidents; For these cold regions, the condensate should generally be discharged after the last shutdown before the temperature of the oil gas separator has dropped to zero.</p>
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5.3 Starting operation

5.3.1 This compressor has a high degree of automation and complete safety protection functions, generally without the need for personnel to take care of it.

5.3.2 When there is abnormal sound, vibration, air leakage, oil leakage, etc. during operation, the machine should be immediately shut down.

5.3.3 Check every two hours during operation, record voltage, current, air pressure, exhaust temperature, oil level, etc. for future maintenance reference.


 <p>Warning</p>	<p>During operation, there is high pressure in both the pipeline and the container. Some components have high temperatures, and electrical circuits have high pressure. Therefore, the machine door should be tightly closed and the pipeline should not be loosened or other dangerous operations should be carried out.</p>
---	---

5.4 Shutdown

5.4.1 Press the stop button to automatically complete the entire shutdown program for the compressor machine. The time for complete shutdown will vary depending on the state of the compressor unit at that time, but the maximum time will not exceed half a minute.

5.4.2 Turn off the shut-off valve and the main power supply.

5.4.3 In case of emergency, the emergency stop button can be pressed to stop the machine, but it should not be used under normal circumstances.

 Warning	<p>When using emergency shutdown or sudden power outage, a large amount of lubricating oil may flow into the main engine. If starting again, first jog 2-3 times to allow the lubricating oil to flow out of the main engine before normal operation. If the inching method cannot start the compressor, first turn the engine for a few turns and feel that the engine can be easily cranked before starting. If the engine still cannot be started, open the side cover of the engine, drain most of the lubricating oil and add it to the oil gas separator before running.2. When the water-cooled air compressor is shut down in winter, the accumulated water in the cooler must be drained, otherwise it may cause the cooler to freeze and crack!</p>
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5.5 Handling methods for long-term shutdown

Long term shutdown refers to a shutdown and storage period of more than three months, including long-term storage of new machines for more than three months and long-term storage after operation for more than three months. To ensure that the machine does not damage the air compressor during long-term shutdown and can operate normally and safely when resuming operation.

5.5.1 Handling methods for long-term shutdown and storage

(1) To prevent the influence of humid gases, strict packaging should be carried out and desiccants should be added to keep the relative humidity inside the packaging below 75%.

(2) If the shutdown does not exceed one year, the condensate at the bottom of the oil gas separator should be discharged after a few days of shutdown. If the shutdown time exceeds one year or more, the lubricating oil in the machine should be drained completely.

 Warning	<p>Disposal of waste oil: The waste oil discharged from the air compressor should be disposed of in accordance with Chinese or local laws and regulations.</p>
--	--

(3) Electrical equipment such as electric motors, electronic control panels, solenoid valves, etc. should be wrapped in plastic paper and placed with moisture-proof agents in high and humid areas to prevent moisture intrusion.

(4) The machine should be stored in an environment free from direct sunlight, dust, corrosive gases, flammable gases, steam, dripping water, and vibrations.

5.5.2 Reboot program

(1) Remove plastic paper from the machine or electrical equipment.

(2) Measure the insulation resistance of the motor with a 500V megohmmeter, and each data item should be greater than or equal to 1 megohm.

(3) For machines with a shutdown time of no more than one year, the color or amount of lubricating oil should be checked to see if it meets the start-up requirements. Machines that

have been shut down for more than a year should be injected with new lubricating oil.

- (4) Perform the pre startup inspection and trial run according to item 5.1 of this manual.

6 Maintenance and troubleshooting

6.1 Safety precautions

Maintenance personnel must have a certain level of knowledge and operational skills in mechatronics, have a certain understanding of air compressors, and carefully read all the contents of this manual before maintenance.

6.1.1 Maintenance work must be carried out when the machine is shut down, the shut-off valve is closed, and the power supply is cut off.

6.1.2 Before disassembling any pressurized components, it must be ensured that the pressure inside the system has decreased to zero.

6.1.3 Some components in the system have high temperatures during initial shutdown, so be careful to avoid burns during operation.

6.1.4 After maintenance and repair, it must be confirmed that there are no tools, parts, rags, etc. left inside the compressor.

6.2 Replacement and maintenance of air filter element

The operating conditions determine the maintenance cycle. The air filter element should be replaced after about 500 hours of use for a new machine. The second replacement time should be set at 2000 hours, and the replacement cycle should be shortened in dusty environments. If the air filter alarm message is displayed, the air filter element needs maintenance or replacement.

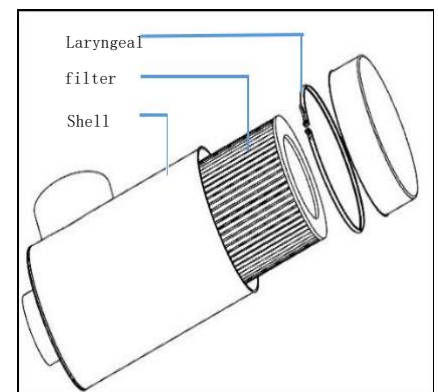


Figure 6-1

6.3 Oil filter replacement

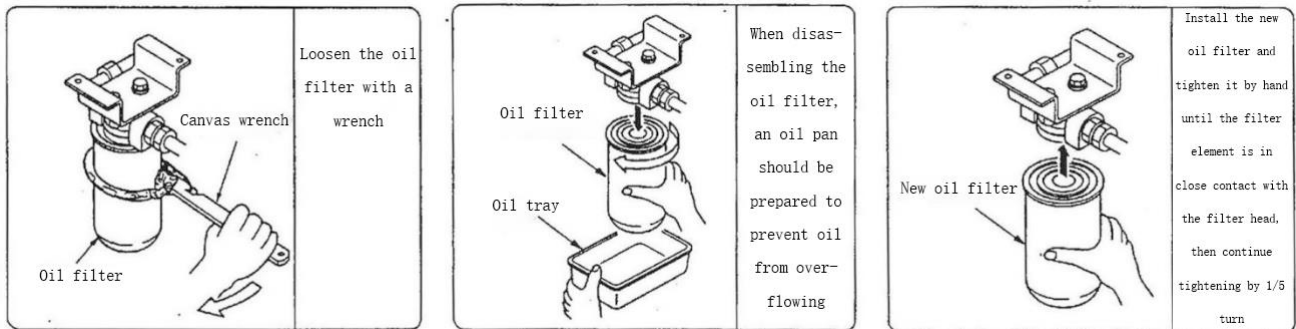
6.3.1 The oil filter should be replaced after the first 500 hours of operation and every 2000 hours of operation or when changing the lubricating oil thereafter. The replacement cycle should be shortened in dirty environments.

6.3.2 The oil filter alarm indicates that the oil filter is blocked and should be replaced in a timely manner. The replacement of the oil filter should be carried out after shutdown and pressure relief. When replacing, use a wrench to rotate the oil filter counterclockwise. To prevent oil from splashing down, prepare a plate to catch the lubricating oil flowing out. Reinstall the new oil filter, do not use a wrench during installation, tighten by hand until the components are in close contact, and then tighten by 1/5 turn with the wrench.

6.3.3 Turn on the machine to check for oil leakage. If there is no oil leakage, it indicates that the replacement is complete.

6.3.4 An example of oil filter replacement is shown in Figure 6-2:

Figure 6-2



6.4 Oil Gas Separation Filter Element Replacement

The operating conditions determine the maintenance cycle, and if the environment is poor, the replacement time should be shortened. The first replacement time of the new machine is 1500 hours; The second replacement time is set to 2000 hours. If the timing alarm message of the oil gas separation filter element is displayed, the filter element must be replaced.

The replacement steps for the oil gas separation filter element are as follows:

1. After the air compressor is stopped, close the air outlet to confirm that the system is not pressurized.
2. Disassemble the pipeline above the oil and gas separator and at the same time put the outlet of the minimum pressure valve. The flange bolt is removed.

3. The big machine should be disassembled back into the oil pipe, and the small machine should directly remove the cover, without dismantling.

4. Remove the fixing bolt on the upper cover of the oil and gas separator.

5. Turn the lid bolt to move the upper cover up for a distance and turn the upper cover (Figure 6-3).

6. Remove the return tubing. (According to the actual situation, some machines can be removed directly without dismantling.)

7. Remove the filter element and replace it with a new one.

8. Install the oil and gas separator in reverse order of disassembly.

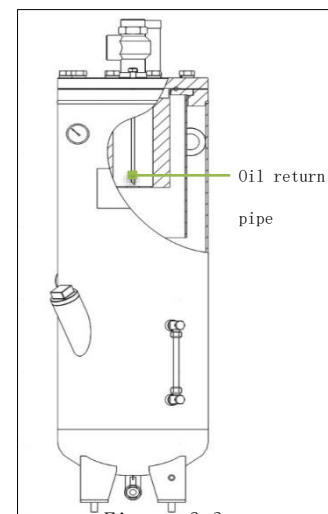


Figure 6-3



Be Careful

When installing the return oil pipe, the distance from the bottom of the oil pipe should not exceed 3mm, otherwise it may cause excessive oil content in the exhaust.



Warning

The sealing gasket equipped with the oil gas separation filter element method has sealing and anti-static functions. If the flange surface is

replaced, a metal soft gasket must be installed. If this regulation is violated, it may cause serious consequences and even burn the entire air compressor.

6.5 Lubricating oil replacement

After 500 hours of operation of the new machine, the lubricating oil alarms in a timed alarm state. The lubricating oil should be replaced. The second lubricating oil set life timer alarm time is 2000 hours.

If the air compressor operates in dusty or high temperature environments, the oil change interval should be shortened.

6.5.1 The oil change steps are as follows:

6.5.1.1 Confirm that the machine is completely shut down and confirm that there is no air pressure inside the oil gas separator. Disconnect the main circuit, mark it, and disconnect the power supply of the starter.

6.5.1.2 Thoroughly drain the lubricating oil from the system:

- a. Disconnect the low point connection and drain oil from the pipeline;
- b. Drain oil from the oil gas separator drain valve;
- c. Pour out the oil from the filter; And reinstall the used oil filter.

6.5.1.3 Inject 50% new oil into the system:

- a. Start the compressor and observe its operation.
- b. Run for 5 minutes or until the exhaust temperature stabilizes, then stop the machine.

6.5.1.4 Thoroughly drain the oil in the air compressor.

6.5.1.5 Replace with a new oil filter.

6.5.1.6 Fill the system with new oil and then reinstall the fuel filler plug.



Warning

Pressurized air and oil can cause serious personal injury or death. Before removing valves, nuts, plugs, installing screws, and filters, turn off the compressor and release all pressure in the system, disconnect the main circuit, mark it, and disconnect the power supply to the starter.



Danger

The compressor, oil gas separator, and all pipelines during and after operation may be in a high-temperature state.



Warning

Our company does not recommend users to choose other brands of lubricating oil, as using unqualified oil will damage the air compressor.



Environment protection

Please dispose of lubricating oil in accordance with relevant national or local laws and regulations. Improper handling of lubricating oil may cause serious environmental pollution.

6.6 Motor maintenance

To ensure the safe and good operation of the air compressor, please regularly maintain the motor. Please refer to the motor manual for specific maintenance methods.



Warning

Excessive or insufficient lubricating grease can cause damage to the motor, so it is necessary to strictly follow the motor manual and the motor's greasing nameplate for greasing.

6.7 Maintenance of frequency converters

Blocking the air inlet of the frequency converter can easily cause poor heat dissipation, and the frequency converter is prone to heating, resulting in failure or reduced lifespan of the frequency converter. To ensure the good operation of the frequency converter, please regularly maintain the frequency converter. Please refer to the inverter manual for specific maintenance methods.





Warning

When maintaining the frequency converter, please cut off the incoming power supply and wait for the charging indicator light of the frequency converter to turn off before operating the frequency converter.

6.8 Maintenance and repair items and maintenance cycle table

Maintenance intervals	Operating hours	Maintenance content
Everyday		Drain the condensate in the oil gas separator before starting up every day
		Check the oil level before startup and during operation
	8	Check the exhaust temperature of the air compressor
	8	Check whether the unloading and loading pressure, return oil sight glass, and return oil are normal
Weekly		Check for oil leaks
Everythree months	500	Check the cooler and clean it if necessary
	500	Clean the air filter and frequency converter cooling air duct
	500	Check if the electrical wiring is securely connected
	500	The first 500 hours of operation of the new machine, replace the oil filter and lubricating oil
Annually		Check the tightness of the oil and gas pipeline connection
	2000	Replace lubricating oil
		Manual inspection of safety valves (annual inspection)
	2000	Replace the air filter element and clean the cooling air duct of the frequency converter
	1000-2000	Replace the oil filter
		Check the motor and electrical system
	2000	Replace the oil-air separator core, clean the radiator,
	4000	Clean the intake valve

 Warning	The content of this table is for users' reference. Customers should change the maintenance cycle appropriately based on the actual operating environment and performance of the machine.
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 Warning	When the air filter element and oil gas separation element are blocked and alarm occurs, they should be replaced.
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7 Troubleshooting Table

Fault	Cause of occurrence	Exclusion method
1. Unable to start	<ol style="list-style-type: none"> 1. The small circuit breaker trips or the fuse blows. 2. The ambient temperature is too low. 3. The phase sequence of the power supply is reversed. 4. Poor contact of the operation button. 5. The emergency stop button has not been reset. 6. Motor malfunction. 7. Loose electrical wiring. 8. Read error messages from the touch screen and frequency converter. 9. Remote contact virtual connection. 10. Host failure. 11. Loose communication line 	<ol style="list-style-type: none"> 1. Electrical personnel inspect the control circuit and switch it on or replace it. 2. Increase the ambient temperature. 3. Electrical personnel adjust the phase sequence. 4. Electrical personnel maintenance and replacement. 5. Reset the emergency stop button. 6. Electrical personnel maintenance and replacement. 7. Electrical personnel shall maintain and connect firmly. 8. Refer to the instructions and take appropriate measures. 9. Replace the switch or jumper. 10. Manually rotate the host. If it cannot be rotated, please contact our customer service center. 11. Electrical personnel maintenance
2. The operating current is too high, causing the motor to overload and stop	<ol style="list-style-type: none"> 1. The exhaust pressure is too high. 2. The lubricating oil specification is incorrect. 3. The oil gas separation filter element is blocked and the system pressure is high. 4. Abnormal power supply voltage. 5. There is strong impact vibration nearby. 6. Host failure. 7. Poor contact of circuit contacts. 	<ol style="list-style-type: none"> 1. Check the pressure gauge and adjust the pressure setting. 2. Check the oil number and replace the oil. 3. Replace the oil gas separation filter element. 4. Electrical personnel adjust the power system. 5. Stay away from vibration sources or take vibration reduction measures. 6. Manually rotate the host. If it cannot be rotated, please contact our customer service center. 7. Electrical personnel maintenance
3. The exhaust temperature is often too high	<ol style="list-style-type: none"> 1. Insufficient or overdue use of lubricating oil. 2. Insufficient cooling water volume. 3. The ambient temperature is high. 4. The dust filter is blocked. 5. The lubricating oil specification is incorrect. 6. The oil filter is blocked. 7. The temperature control valve is faulty. 8. Fan fault 9. The temperature sensor connection wire is loose. 10. The oil cooler is blocked. 	<ol style="list-style-type: none"> 1. Check the pointer of the oil level gauge. During operation, the lubricating oil pointer should be located in the middle of the upper and lower scale lines of the oil level gauge. 2. Check the temperature of the inlet and outlet water pipes and increase the cooling water flow rate. 3. Check the ventilation of the air compressor room and increase the air circulation. 4. Cleaning and dust removal. 5. Check the oil number and replace the oil. 6. Replace the oil filter. 7. Repair the temperature control valve core. 8. Electrical personnel repair and replace the fan. 9. Electrical personnel repair or replace corresponding components. 10. Repair or clean the oil cooler.

(Continued on next page)

Troubleshooting Table (Continued)

Fault	Cause of occurrence	Exclusion method
6. Unable to load normally under low pressure	<ol style="list-style-type: none"> 1.The loading pressure value is not set correctly. 2.The control pipeline is blocked. 3.Leakage pipeline failure. 4.The minimum pressure valve is not functioning properly. 5.The solenoid valve is faulty. 6.Severe leakage in the control pipeline. 7.The intake valve is faulty. 	<ol style="list-style-type: none"> 1.Adjust the loading pressure value. 2.Clean the control pipeline. 3.Adjust the discharge flow rate. 4.Repair, adjust, and replace with new products. 5.Replace solenoid valve. 6.Check the leak location and lock it tightly. 7.Replace the intake valve
7. Unable to automatically unload and operate under high pressure	<ol style="list-style-type: none"> 1.The unloading pressure value is not set correctly. 2.The intake valve is not functioning properly. 3.The control pipeline is blocked. 4.Leakage pipeline failure. 5.The sealing gasket under the intake valve is damaged. 	<ol style="list-style-type: none"> 1.Adjust the unloading pressure value. 2.Replace the intake valve. 3.Clean the control pipeline. 4.Adjust the discharge flow rate. 5.Replace the sealing gasket.
8. High fuel consumption	<ol style="list-style-type: none"> 1.The oil content of gas is high. 2.Device and gasket oil leakage 	<ol style="list-style-type: none"> 1. Refer to "High Oil Content" below. 2.Lock or replace the device and gasket.
9. High oil content in the air	<ol style="list-style-type: none"> 1.The oil in the oil gas separator is too full. 2.The return pipe is blocked, damaged, or loose. 3.The oil gas separation filter element is broken. 4.Loose components 5.The minimum pressure valve is not functioning. 6.Operate at high exhaust temperatures. 7.Using incorrect engine oil 	<ol style="list-style-type: none"> 1.Drain excess oil from the system. 2.Replace damaged pipes 3.Replace. 4.Tighten all devices and gaskets. 5.Clean and replace 6.Reduce the exhaust temperature. 7.Replace with 'Special lubricating oil for screw compressors'.
10. The exhaust volume of the compressor machine is lower than the normal value	<ol style="list-style-type: none"> 1.The air filter element is blocked. 2.The intake valve is not functioning properly. 3.The oil gas separation filter element is blocked. 4.Improper pressure control setting. 5.There is leakage in the system, safety valve, or other pipelines. 6.Host failure. 7.The minimum pressure valve is faulty. 	<ol style="list-style-type: none"> 1.Clean or replace. 2.Disassemble, disassemble, and clean the intake valve. 3.Repair and replacement 4.Adjust the settings. 5.Check and repair. 6.Manually rotate the main engine. If it cannot be rotated, please contact our company's after-sales service center. 7.overhaul
11. Frequent conversion times for loading and unloading	<ol style="list-style-type: none"> 1.Pipeline leakage 2.The set pressure difference for loading and unloading is too small. 3.The air consumption is unstable. 	<ol style="list-style-type: none"> 1.Check the leak location and lock it tightly. 2.Reset (usually with a pressure difference of 0.1MPa or above). 3.Increase the capacity of the gas storage tank