Screw Air Compressor

Installation, Maintenance & User Handbook

I. Safety Precautions

1. The new machine must be commissioned by personnel designated or approved by the company for commissioning.

2. Air switches, fuses, and other safety devices should be installed on the power supply line that leads to the compressor. To ensure the reliability of electrical equipment, it is essential to connect a suitable grounding wire and, if necessary, install a lightning protection device in compliance with relevant safety regulations. It is recommended to leave a certain amount of maintenance space around the compressor unit during installation.

3. When switching on the compressor for the first time or after changing the power cable, it is important to ensure that the unit is functioning properly. To do this, briefly turn on the compressor for a short period of time (approximately 1 second) before starting and check the direction of rotation.

4. The compressor should not be operated at a discharge pressure higher than what is specified on the nameplate. Doing so may overload the motor, which could cause both the motor and compressor to stop working.

5. Compressed air and electricity are both hazardous, and it is crucial to disconnect the power supply and release all compressed air from the entire compressor system before performing any maintenance or servicing. When disconnecting the compressor for maintenance, it is important to lock the electrical box and display the maintenance sign and the no-closing sign at the power supply. This will prevent others from accidentally closing the switch and sending power while maintenance is being performed.

6. Only use safe solvents to clean the compressor and auxiliary equipment.

7. Before conducting any mechanical maintenance on the compressor, please perform the following preparations.

7. 1 After the unit has stopped and cooled down;

7. 2 Disconnect the manual cut-off switch from the power supply and make sure that the compressor is powered off.

7.3 Make sure to discharge the compressed air from the unit.

8. The safety valve and shutdown protection system must be regularly checked to ensure their sensitivity and reliability. Typically, they should be inspected at least once a year.

9. Appropriate fire extinguishers should be provided near the compressor unit to ensure safety in case of a fire.

10. If the compressor is under remote control, the machine may start at any time. A sign must be hung to remind others.

II. Precautions for Inverters

1. Do not touch the heat fins or varistor while they are hot. Otherwise, it may get scalded.

2. Do not modify the factory-set parameters of the inverter without proper authorization. Improper changes may cause damage to the inverter.

3. Do not touch the terminals of the inverter as they carry high voltage and can cause electric shock. Touching them may result in an electric shock.

4. Before carrying out any checks or maintenance, the mains supply circuit must be disconnected, and the charging indicator must be turned off. It is dangerous to perform any work when there is residual voltage present in the inverter.

5. Only qualified personnel may carry out inspections, repairs, or parts replacements. Remove all metal objects, such as watches and bracelets, before beginning work. Use insulated tools to prevent electric shock.

6. Our frequency converters come equipped with DC reactors as a standard feature. When installing radio or other electronic devices nearby, it is recommended to place a filter on the input power side to reduce interference.

7. Failure to observe these rules can result in electric shock.

Contents

Chapter I General Directions and Specifications for Screw-type Air Compressors

1) Introduction to Micro Oil Screw Compressors

Micro-oil screw compressors are known for their reliable performance, low wear and tear, low vibration, low noise, and high efficiency. During the compression process, the compressor constantly senses the shrinkage chamber and sprays lubricant onto the bearings due to its own pressure difference. The lubricant plays four main roles:

A) Lubrication role: lubricant can form a thin oil film between the rotor and stater, preventing direct contact and reducing friction.

B) Sealing role: the oil film that can improve the volumetric efficiency of the compressor by sealing compressed air.

C) Cooling Effect: The lubricating oil absorbs a significant amount of compression heat, resulting in a compression process that is close to isothermal compression. This reduces the compressor power ratio.

D) Role in environmental protection: Lubricating oil can help reduce the noise generated by high frequency compression.

2) Structure of Micro Oil Screw Air Compressor Body

A) Basic Structure

Our company produces micro oil screw compressors with a two-axis volume type (two-shaft positive displacement) transition compressor. The inlet port is located at the top end of the casing, while the exhaust port is located at the bottom. Inside the casing, a pair of high-precision main and secondary rotors have been installed horizontally and parallel to each other. The main rotor has five shaped teeth that face the second rotor, which has six shaped teeth. The main rotor has a larger diameter, while the secondary rotor has a smaller diameter. The teeth are arranged in a spiral pattern along the outer edge of the rotor, and they interlock with each other. The main and secondary rotors are supported by bearings at both ends. There is one roller bearing at the inlet end and two symmetrically mounted tapered roller bearings at the exhaust end. There are two types of machines: belt-driven and direct-driven. The direct-drive

type utilizes a coupling to connect the motor power source to the main body, followed by a set of high-precision speed-increasing gears to enhance the speed of the vehicle. The belt-driven type does not have speed gears. Instead, it uses two pulleys with the same speed ratio to power the compressor through the belt.

B) Engagement

The main rotor is driven by the motor via a coupling, a gear, or a belt. As the two rotors mesh with each other, the main rotor drives the secondary rotor to rotate simultaneously. The cooling oil is sprayed directly from the lower part of the compressor housing through a nozzle into the rotor's anastomosis section. It mixes with the air to dissipate the heat generated by compression, achieving a cooling effect. At the same time, an oil film forms to prevent direct metal-to-metal contact between the rotors and to seal the gap between the rotors and the casing, as well as between the rotors themselves. The injected oil also reduces the noise caused by high-speed compression. The weight of the injected oil is approximately 5 to 10 times greater than the weight of the air, depending on the exhaust pressure.

3) The Principle of Compression in Screw Compressors

A) Suction Process

The screw-type intake on the suction port must be designed to allow the compression chamber to fully absorb air. Unlike other compressors, screw-type compressors do not have an air intake and exhaust valve group. Instead, air intake is regulated by a valve that opens and closes. When the rotor runs, the teeth grooves of the main and second rotor turn towards the inlet end wall opening. At this point, the rotor teeth grooves allow free air to enter while the exhaust air is discharged in full. After the exhaust process is complete, the grooves are left in a vacuum state. When the air inlet rotors turn again, outside air is drawn in and flows axially into the grooves of the main and secondary rotors. Once the tooth groove is completely filled with air, the rotor's air inlet side will turn away from the housing's air inlet, blocking the air between the tooth grooves and moving on to the next step.

B) Closure and Transport Processes

By the end of the suction process, both the main and second rotor's teeth close with the casing. At this stage, the air in the teeth groove

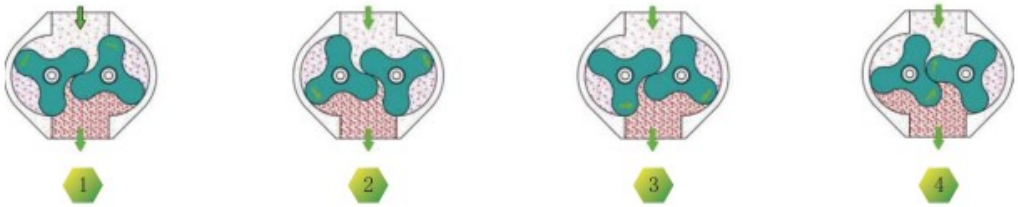
is blocked inside the casing, which is known as the Closure Process. The two rotors continue to rotate, with their tooth peaks and grooves interlocking. The surfaces where they interlock gradually move towards the exhaust end, which is known as the Transport Process.

C) Compression and Oil Injection Process

During the conveying process, the anastomosis surface gradually moves towards the exhaust end, causing the space between the anastomosis surface and the exhaust port to gradually decrease. As a result, the gas in the tooth groove is compressed, leading to an increase in pressure. This is known as the compression process. At the same time, lubricating oil will be injected into the compression chamber to mix with the air.

D) Exhaust Process

When the anastomosis surface of the rotor aligns with the exhaust port of the casing, the pressure of the compressed gas reaches its maximum and the gas begins to exhaust. This continues until the tooth peak and the tooth groove of the anastomosis surface reach the exhaust end surface. At this point, the anastomosis surface of the two rotors and the casing exhaust port space are completely closed, completing the Exhaust Process. At this stage, the length of the groove between the rotor's anastomosis surface and the casing air inlet reaches its maximum, and the Suction Process begins again.



1. Suction Process
2. Closing and Transport Process
3. Compression and Oil Injection Process
4. Exhaust Process

Parameters of Fixed Speed Screw Air Compressor

Parameters for Kaiba Fixed Speed Screw Air Compressor (Air-cooled and Water-cooled models)

型号		KB-7.5A	KB-10A	KB-15A	KB-20A	KB-25A	KB-30A	KB-30AZ	KB-40A	KB-50A	KB-50AZ
排气量/排气压力 (m³/min/Mpa)		0.85/0.7	1.2/0.7	1.7/0.7	2.4/0.7	3.1/0.7	3.8/0.7	3.3/0.7	5.2/0.7	6.4/0.7	6.2/0.7
		0.78/0.8	1.1/0.8	1.6/0.8	2.2/0.8	2.9/0.8	3.5/0.8	3.2/0.8	5.0/0.8	6.1/0.8	6.1/0.8
		0.65/1.0	0.95/1.0	1.4/1.0	2.0/1.0	2.7/1.0	3.2/1.0	——	4.3/1.0	5.7/1.0	——
		0.5/1.3	0.8/1.3	1.2/1.3	1.7/1.3	2.2/1.3	2.9/1.3	——	3.7/1.3	5.1/1.3	——
电动机功率（KW）		5.5	7.5	11	15	18.5	22	22	30	37	37
噪音DB(A)		65±2	66±2	70±2	70±2	72±2	73±2	73±2	74±2	74±2	74±2
出口管径（Inch）		G3/4	G3/4	G3/4	G3/4	G11/4	G11/4	G11/4	G11/4	G11/2	G11/2
外形尺寸	长L(mm)	750	750	950	950	1000	1000	1380	1000	1300	1600
	宽W（mm）	650	650	800	800	1100	1100	850	1100	1000	1000
	高H(mm)	825	825	1130	1130	1240	1240	1145	1240	1350	1250
重量（kg）		200	240	400	410	590	630	620	680	840	840

		KB-60A/W	KB-60AZ	KB-75A/W	KB-75AZ	KB-100A/W	KB-100AZ	KB-125A/W	KB-125AZ	KB-150A/W
排气量/排气压力 (m³/min/Mpa)		8.0/0.7	8.0/0.7	10.5/0.7	9.7/0.7	13.6/0.7	12.5/0.7	16.3/0.7	16.3/0.7	20.8/0.7
		7.7/0.8	7.7/0.8	10.7/0.8	10.7/0.8	13.0/0.8	12.0/0.8	15.6/0.8	15.6/0.8	20.8/0.8
		7.0/1.0	7.0/1.0	8.7/1.0	——	11.6/1.0	——	13.6/1.0	13.6/1.0	17.0/1.0
		5.8/1.3	——	7.5/1.3	——	9.8/1.3	——	12.3/1.3	12.3/1.3	14.2/1.3
电动机功率（KW）		45	45	55	55	75	75	90	90	110
噪音DB(A)		74±2	74±2	75±2	74±2	75±2	75±2	75±2	75±2	75±2
出口管径（Inch）		G11/2	G11/2	G2	G2	G2	G2	G2	G2	DN65
外形尺寸	长L(mm)	1300	1600	1550	2050	1550	2050	1800	2100	2250
	宽W（mm）	1000	1000	1270	1200	1270	1200	1400	1250	1600
	高H(mm)	1350	1250	1500	1500	1500	1500	1600	1700	1800
重量（kg）		860	900	1600	1700	1750	1800	2000	1980	3130

		KB-180A/W	KB-220A/W	KB-250A/W	KB-300A/W	KB-340A/W	KB-380A/W	KB-420W	KB-480W	KB-540W	KB-600W
排气量/排气压力 (m³/min/Mpa)		24.0/0.7	28.5/0.7	32.5/0.7	40.0/0.7	43.9/0.7	50.5/0.7	56.0/0.7	64.0/0.7	74.0/0.7	85.0/0.7
		23.0/0.8	27.0/0.8	30.2/0.8	36.4/0.8	42.5/0.8	50.0/0.8	53.0/0.8	62.0/0.8	72.0/0.8	82.0/0.8
		20.0/1.0	23.2/1.0	27.0/1.0	33.1/1.0	38.8/1.0	42.0/1.0	49.0/1.0	57.6/1.0	62.0/1.0	70.0/1.0
		18.0/1.3	19.7/1.3	22.5/1.3	30.5/1.3	34.6/1.3	38.0/1.3	43.0/1.3	49.0/1.3	56.5/1.3	60.5/1.3
电动机功率（KW）		132	160	185	220	250	280	315	355	400	450
噪音DB(A)		75±2	75±2	78±2	78±2	78±2	80±2	80±2	82±2	83±2	84±2
出口管径（Inch）		DN65	DN80	DN80	DN100	DN100	DN100	DN125	DN125	DN150	DN150
外形尺寸	长L(mm)	2250	2250	2250	3000	3000	3400	3000	4300	4300	4650
	宽W（mm）	1600	1650	1650	1864	1864	2120	1864	2050	2050	2050
	高H(mm)	1800	1800	1800	1980	1980	2400	1980	2000	2000	2120
重量（kg）		3330	3500	3700	4800	5200	6700	7300	7900	8400	9000

Parameters of Inverter VSD/VFD Air Compressor

		KB-7.5AV	KB-10AV	KB-15AV	KB-20AV	KB-25AV	KB-30AV	KB-40AV	KB-50AV	KB-60AV	KB-75AV/WV
排气量/排气压力 (m^3/min/Mpa)		0.25-0.85/0.7	0.36-1.2/0.7	0.51-1.7/0.7	0.72-2.4/0.7	0.93-3.1/0.7	1.14-3.8/0.7	1.56-5.2/0.7	1.92-6.4/0.7	2.4-8.0/0.7	3.1-10.5/0.7
		0.23-0.78/0.8	0.33-1.1/0.8	0.48-1.6/0.8	0.66-2.2/0.8	0.87-2.9/0.8	1.05-3.5/0.8	1.5-5.0/0.8	1.83-6.1/0.8	2.3-7.7/0.8	2.9-9.8/0.8
		0.19-0.65/1.0	0.28-0.95/1.0	0.42-1.4/1.0	0.6-2.0/1.0	0.81-2.7/1.0	0.96-3.2/1.0	1.29-4.3/1.0	1.71-5.7/1.0	2.1-7.0/1.0	2.6-8.7/1.0
		0.15-0.5/1.3	0.24-0.8/1.3	0.36-1.2/1.3	0.51-0.7/1.3	0.66-2.2/1.3	0.87-2.9/1.3	1.11-3.7/1.3	1.53-5.7/1.3	1.7-5.8/1.3	2.3-7.5/1.3
电动机功率（KW）		5.5	7.5	11	15	18.5	22	30	37	45	55
噪音DB(A)		65±2	66±2	70±2	70±2	72±2	73±2	74±2	74±2	74±2	74±2
出口管径（Inch）		G3/4	G3/4	G3/4	G3/4	G1 1/4	G1 1/4	G1 1/4	G1 1/2	G1 1/2	G2
外形尺寸	长L(mm)	770	770	950	950	1260	1260	1260	1360	1360	2100
	宽W（mm）	650	650	800	800	860	860	860	960	960	1250
	高H(mm)	850	850	1130	1130	1280	1280	1280	1480	1480	1700
重量（kg）		202	245	405	415	610	650	690	840	890	1740

		KB-100AV/WV	KB-125AV/WV	KB-150AV/WV	KB-180AV/WV	KB-220AV/WV	KB-250AV/WV	KB-300AV/WV	KB-340AV/WV
排气量/排气压力 (m^3/min/Mpa)		4.1-13.6/0.7	4.9-16.3/0.7	4.1-20.3/0.7	4.8-24.0/0.7	5.4-27.0/0.7	6.5-32.5/0.7	8.0-40.0/0.7	8.7-43.5/0.7
		4.1-13.3/0.8	4.5-15.0/0.8	3.8-19.0/0.8	4.6-23.0/0.8	5.3-26.5/0.8	6.2-31.1/0.8	7.3-36.8/0.8	8.4-42.0/0.8
		3.5-11.6/1.0	4.3-14.6/1.0	3.4-17.0/1.0	4.0-20.0/1.0	4.5-22.5/1.0	5.6-28.0/1.0	6.4-32.2/1.0	7.6-38.1/1.0
		2.9-9.8/1.3	3.7-12.3/1.3	2.9-14.6/1.3	3.6-18.0/1.3	4.0-20.1/1.3	5.0-25.1/1.3	5.7-28.5/1.3	6.9-34.6/1.3
电动机功率（KW）		75	90	110	132	160	185	220	250
噪音DB(A)		75±2	75±2	75±2	75±2	75±2	78±2	78±2	78±2
出口管径（Inch）		G2	G2	DN65	DN65	DN80	DN80	DN100	DN100
外形尺寸	长L(mm)	2100	2100	2800	2800	2800	2800	2900	2900
	宽W（mm）	1250	1250	1650	1650	1650	1650	1860	1860
	高H(mm)	1700	1700	1850	1850	1850	1850	2000	2000
重量（kg）		1810	1920	3110	3230	3350	3570	4550	4700

Chapter 2 Receiving and Installation of Air Compressors

1) Receiving and Installation

(i) Receipt of Goods

1. Upon receiving the air compressor, please verify the quantity, type, specifications, and accompanying documents.

2. Inspect the air compressor and its accessories thoroughly to check for any possible damage that may have occurred during delivery.

3. Please inform the sales staff of any shortages or damages by providing written notice.

(ii) Installation

Selection of the Installation Site.

The selection of the installation site for an air compressor is often overlooked by users. Random installation without prior planning can lead to future breakdowns, maintenance difficulties, and poor air quality. Therefore, selecting an appropriate installation site is a prerequisite for the proper functioning of the air compressor system.

1. A spacious and well-lit area is essential to facilitate operations and maintenance.

2. The relatively low humidity, minimal dust, clean air, and good ventilation are desirable. The ambient air quality must not fall below the National Tertiary Standard, which is less than 0.5mg/m^3.

3. The ambient temperature should be lower than 40℃. This is because the higher the ambient temperature, the lower the air output of the compressor will be. Moreover, it can easily lead to high temperature shutdown.

4. If the factory environment is poor and dusty, a filter should be installed at the air inlet of the machine room. Additionally, a pre-filtration device should be added to maintain the service life of the air compressor system parts in dusty environments. The air compressor is especially used for sandblasting.

5. Reserve an access road and install overhead cranes, particularly for high-power compressors, to facilitate maintenance.

6. Allow enough space for maintenance, ensuring there is at least 80cm of clearance between the compressor and the wall.

7. If the compressor is placed in an airtight room, it is necessary to install an exhaust fan at a height of no less than 2 meters from the roof. The air volume of the fan must be greater than the air volume of the compressor circulation, and the inlet air must be sufficient. A deflector can also be installed at the exit of the air compressor exhaust fan to direct hot air away from the room and outside, thereby reducing the room temperature.

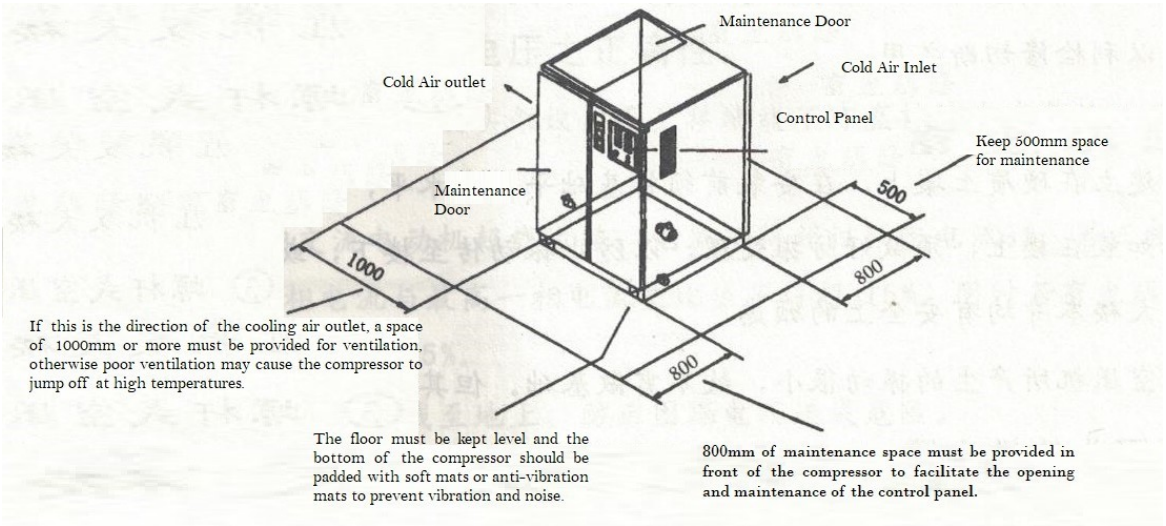
8. The quality of water used for cooling water in water-cooled machines (if applicable) should meet the following standards:

(1) The total hardness, measured in $CaCO_3$, should be less than 100 ppm (100 mg/L).

(2) pH should be between 6.0~8.0

(3) The amount of suspended matter should not exceed 50 parts per million (50 mg/L). Poor quality cooling water can reduce the effectiveness of the cooler, potentially leading to complete cooling failure.

(4) When the ambient temperature drops below 0℃, it is important to completely drain the cooling water from the cooler after shutdown to prevent freezing and potential cracking of the cooler.



2) Precautions for Piping, Foundation, and Cooling Systems

(i) Cautions for Piping Air Lines

① **When installing the main air line, it is important to ensure that it has a slope of 1 to 2 degrees to allow for proper drainage of condensate water.**

② The pressure in the piping line should not exceed 5% of the default pressure of the air compressor. Therefore, it is advisable to use a pipe with a larger diameter than the designed value for piping.

③ The branch line should be connected to the top of the main line to prevent condensate water from flowing down into the working machine or back into the compressor.

④ If it is necessary to adjust the size of the pipeline, use a reducing tube. Otherwise, there will be a mixed flow at the joints, resulting in significant pressure loss and potentially damaging the pipeline's lifespan.

⑤ If there are purification and buffering facilities, such as storage tanks and dryers, after the air compressor, **the ideal piping configuration should be air compressor + storage tank + dryer.** The storage tank serves a dual purpose of filtering out some of the condensate water and reducing the temperature of the gas exhaust. The lower temperature and lower water content of the air that enters the dryer results in a reduced load for the dryer.

⑥ If the air consumption is high and the gap time is short, it is recommended to install a storage tank for buffering purposes. This will reduce the frequency of charging the air compressor, which can greatly benefit its performance.

⑦ For compressed air pressure below 1.5 MPa, the flow rate in the delivery pipe must be kept below 15m/sec to prevent excessive pressure.

⑧ To reduce pressure losses, it is recommended to minimize the use of elbows and valves in the pipeline.

⑨ The ideal mainline pipework is to run around the entire plant so that compressed air is available in both directions at any location. This could reduce pressure drop in the event of a sudden increase in

the volume of air used in a branch line. To install suitable valves in the ring main line for maintenance and shut-off purposes.

(ii) Foundation

① The foundation should be built on solid ground and be level with the ground before installation to prevent compressor vibration.

② If the air compressor is installed on an upper floor, it should be properly placed to prevent vibrations from being transmitted to the lower floors or resonating. This can cause safety concerns for both the air compressor and the building itself.

③ Screw-type air compressors do not require a foundation since they produce minimal vibrations. However, **the surface on which it is positioned must be level and firm.**

（iii）Water-cooling system (if applicable)

① **It is recommended to use soft water for water cooling in water-cooled air compressors** （if applicable)， to prevent the chemical reaction of calcium and magnesium ions in the water due to high temperature. This reaction can lead to the formation of scale in the cooler, which can negatively impact the heat transfer efficiency of the cooler. **If a cooling water tower circulation system is utilized, it is necessary to regularly add softeners to the water to ensure its cleanliness.**

②The automatic replenishment system for the cooling water circulation system must be perfected. Otherwise, after a certain period of operation, the cooling water may become insufficient, leading to high temperatures that can cause the air compressor to shut down.

③The cooling water system of the air compressor should be used exclusively to avoid sharing with other systems to prevent insufficient water from affecting the cooling effect.

④The cooling tower must meet the required cooling water quantity for the compressor, and the power of the pump must be selected accurately. The cooling tower should be placed in a location that allows for easy heat dissipation and proper ventilation. It should also be securely supported and fixed to prevent tipping.

⑤ 0.3-0.45MPa.

⑥ **The temperature of the cooling water outlet should be maintained below 40°C.**

⑦ Special attention should be paid to the ventilation environment for air-cooled compressors. The air compressor should not be placed near high-temperature machinery or in a poorly ventilated closed space to prevent high exhaust temperatures and overheating.

3）General Electrical and Safety Guidelines

(i) **Choose the appropriate power cable diameter based on the compressor's power size.** Otherwise, the power cord may easily overheat and become burnt.

(ii) **It is advisable to use a dedicated power system for the air compressor.** Avoid using it in parallel with other power-consuming systems as this may lead to overloading of the air compressor due to excessive voltage drop or unbalanced three-phase current. Such overloading may cause the protection device to trip.

(iii) Install an appropriate NFB (non-fused switch) based on the power requirements of the air compressors to ensure the safety of the electrical system.

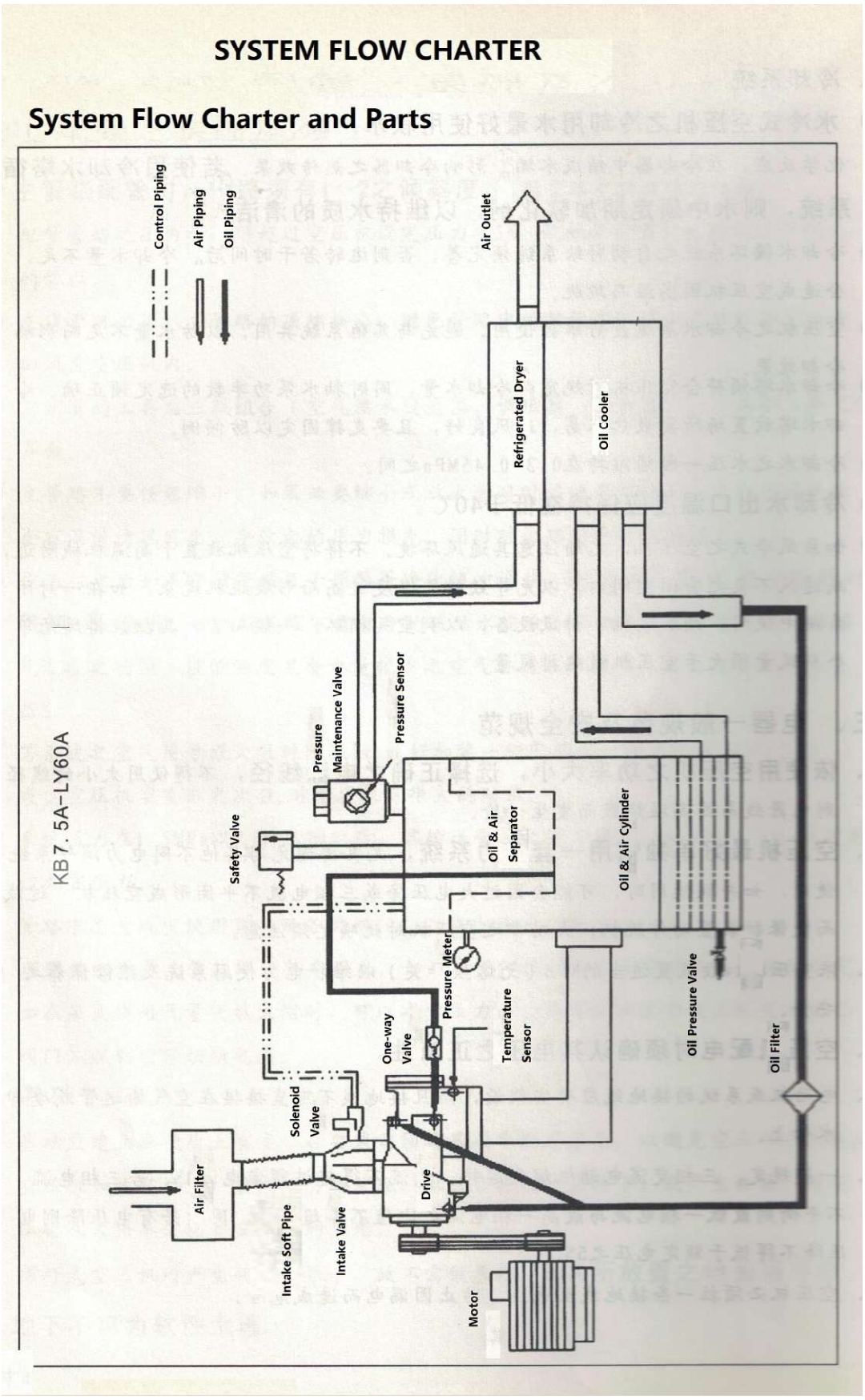
(iv) **Verify the appropriate voltage of the compressor before supplying electricity.**

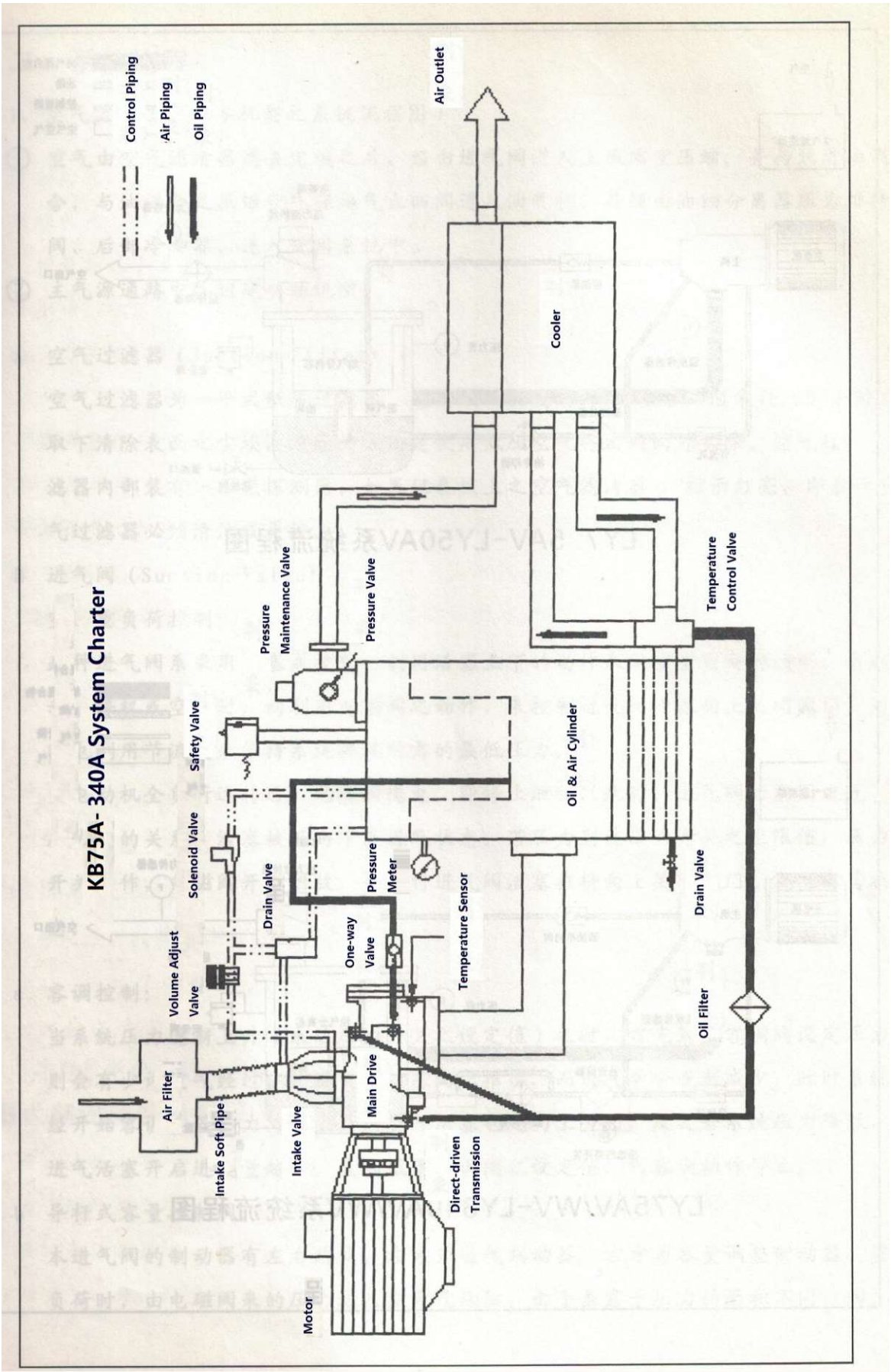
(v) The motor or system should have a grounding wire installed, which should not be directly connected to the air delivery pipe or the cooling water pipe.

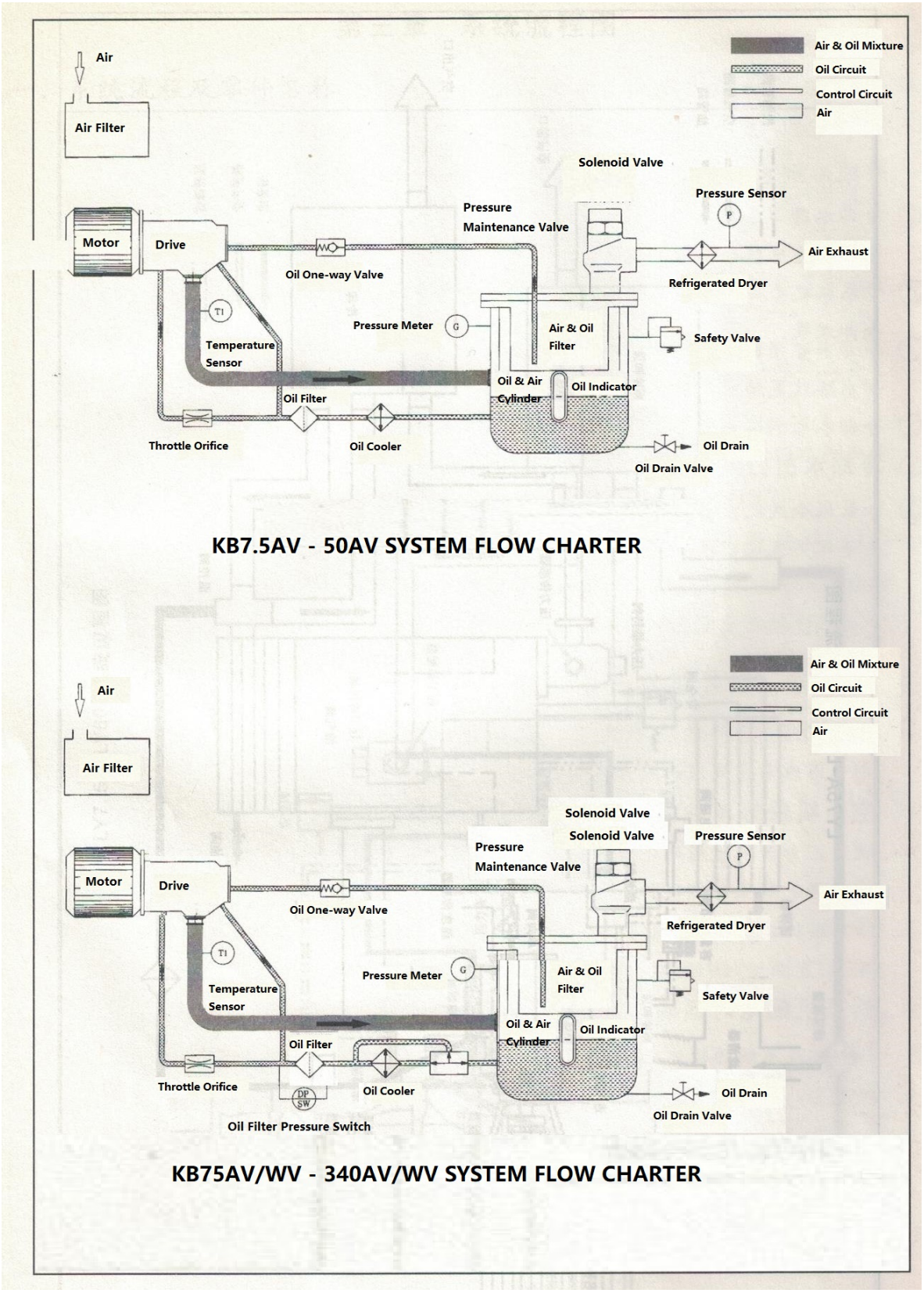
(vi) Generally, the current of a three-phase AC motor should not exceed 3% of the rated current when it is overloaded. If the current in the three phases is unbalanced, the current in the lowest phase should not exceed 5% of the current in the highest phase.

(vii) The compressor must be grounded with a grounding wire to prevent the danger of electric shock caused by electrical leakage.

Chapter 3 System Flow Chart and the Function of Parts




KB75A- 340A System Charter
Control Piping
Air Piping
Oil Piping
Air Outlet
Cooler
Pressure Maintenance Valve
Pressure Valve
Temperature Control Valve
Safety Valve
Solenoid Valve
Drain Valve
Pressure Meter
Oil & Air Cylinder
Volume Adjust Valve
One-way Valve
Temperature Sensor
Drain Valve
Air Filter
Intake Soft Pipe
Intake Valve
Main Drive
Oil Filter
Direct-driven Transmission
Motor



KB7.5AV - 50AV SYSTEM FLOW CHARTER

KB75AV/WV - 340AV/WV SYSTEM FLOW CHARTER

1) Airflow (Please refer to the system flow chart for each model)

① The air is filtered to remove dust and then enters the main compression chamber through the air inlet valve. It is mixed with lubricating oil and enters the oil and gas drum through the exhaust check valve. Then, it passes through the oil-fine separator, pressure maintenance valve, and rear cooler before being sent to the system.

② The functions of each component in the main air supply path are described as follows:

A. The air filter is a dry paper filter with a fine porosity of approximately 10 microns. It should be replaced every 1000 hours to remove dust from the surface. The air filter is equipped with a differential pressure sensor. If the ΔP indicator for the air filter on the control panel illuminates, it indicates that the air filter needs to be cleaned or replaced.

B. Valve (Suction Valve)

Air and Overload Control:

This type of intake valve is controlled by a piston, which moves up and down to regulate empty and overloaded conditions. The solenoid valve is used to control the upward movement of the intake valve piston to close the valve when starting, stopping, or when the system is empty. Additionally, the throttle valve is utilized to maintain the minimum pressure required for the system cycle.

When the motor is operating at full load, the solenoid valve is activated to stop and release the air. At this point, the intake valve piston is pulled down into the intake position by the differential pressure of the intake. If the pressure reaches the upper limit of the pressure switch, the switch will activate and the solenoid valve will open to release pressure. This will cause the inlet valve piston to move upwards and close the valve, resulting in an empty load state.

a) Capacitance Control:

When the system pressure gradually rises (before reaching the pre-set value of the pressure switch), it will first reach the pre-set pressure of the tolerance valve. Then, a small amount of air will pass through and push the inlet valve piston upwards, causing the inlet air volume to gradually decrease. At this point, the system has started to tolerate the pressure. If the pressure continues to rise, the

air intake piston will move upwards and close, while conversely, if the system pressure decreases, the air intake piston will open, allowing for a larger volume of air intake. The capacity adjustment will stop once it falls below the set value of the capacity valve.

b) Guide Rod type Capacity Control Valve:

This intake valve has two flanges, one on the left and one on the right. The brake on the right side is used to adjust the capacity. During overloads, the pressure from the solenoid valve enters the left pneumatic cylinder. Due to the difference in the area exposed to pressure, the pressure from the solenoid valve enters the pressure cylinder on the left. Due to the varying areas exposed to pressure, the valve stem is pushed to the right, causing the inlet valve to open during heavy load operations.

The system pressure is connected to the inlet of the pressure control valve on the right via a pipe that passes through the pressure regulator and into the pressure control chamber. When the system pressure builds up and reaches the pre-set pressure adjusted by the regulating valve, the pressure enters the regulating control chamber. There is a relief hole in the regulating control chamber. If the amount of air entering is greater than the amount of relief, the pressure gradually builds up in the regulating control chamber. The diaphragm is pushed to the left through the push pin, which in turn pushes the valve stem to the left, limiting the amount of air intake. If the system volume increases slightly, causing a decrease in system pressure, the pressure in the control chamber will be reduced or cut off as the pressure source is closed. The initial pressure is reduced or eliminated upon release. The diaphragm on the left side of the throttle is also responsible for reducing air intake. By pushing the valve stem to the right side, the air intake can be increased. This process is known as capacity adjustment.

If the system's volume is significantly reduced, the pressure will increase more rapidly than the system's capacity to adjust. When the pressure switch is activated due to a solenoid valve power failure, the intake brake chamber on the left side experiences a loss of pressure. This causes the valve stem to be pushed back to its closed position by a spring, which cuts off the amount of air intake. At the same time, the air inside the oil and gas drum is released through the relief valve into the air inlet, while the main engine runs without any load. When the system pressure drops below a predetermined

lower limit, the solenoid valve is activated to initiate the resumption of the heavy load procedure.

③ Temperature Sensor

In the event of water or oil loss, as well as water or oil shortages, the exhaust temperature may increase. When the exhaust temperature reaches the temperature preset by the temperature switch, the main controller will be activated. The stop temperature switch is typically set at 100°C. It has a temperature gauge attached to the instrument panel, which can display the exhaust temperature.

④ Non-return Valve

It prevents the compressed air in the oil and gas tank from flowing back into the machine when it is stopped, which could cause the rotor to reverse.

The expansion joint can alleviate stress caused by heat and unit vibration within the pipeline.

⑤ Oil and Gas Tanks

The level of the static lubricating oil should be maintained between the highest and lowest oil level lines. Additionally, there is a hole on the barrel for refueling. **The oil drum is equipped with an oil drain valve, which should be slightly opened to drain the oil and gas from the drum.**

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

⑥ Oil Separator

Please refer to the following section for more information.

⑦ Safety Valve

When the pressure switch is not properly adjusted or malfunctions, and the pressure in the oil and gas tank exceeds the pre-set exhaust pressure by more than 0.1MPa, the safety valve will open, causing the pressure to drop below the pre-set exhaust pressure. **The safety**

valve has been adjusted before leaving the factory, so do not adjust it arbitrarily.

⑧ Solenoid Valve

The Solenoid Valve is a two-way valve that opens when the compressor is stopped or empty, releasing the pressure from the drum to ensure that the compressor can start without a load or run under no load.

⑨ The pressure maintenance valve, also known as the minimum pressure valve, is located at the outlet of the oil separator above the oil and gas drum. It is designed to open at a pressure of approximately 0.45 MPa. The function of the pressure maintenance valve is to regulate and maintain pressure within a system.

A) To ensure proper lubrication of the machine, it is important to prioritize establishing the required circulation pressure of the lubricating oil when starting up.

B) After the pressure exceeds 0.45 MPa, the valve opens to reduce the airflow rate through the oil separator. This ensures effective oil separation and protects the oil separator from damage caused by excessive pressure differences.

⑩ Cooler

A) For air-cooled coolers, a cooling fan blows cold air through the cooler to cool the compressed air. The exhaust temperature is generally below the atmospheric temperature by (+15°C). **Air-cooled air compressors are susceptible to changes in ambient temperature. When selecting a location, it is advisable to consider the ventilation conditions.**

B) If the compressor is water-cooled, a shell and tube cooler is used to cool the compressed air using water for cooling purposes. The exhaust temperature must be kept below 40°C. It is important to note that the maximum cooling water inlet temperature should not exceed 35°C. Water-cooled compressors are less sensitive to ambient temperature conditions and their exhaust temperature is easier to control. If the quality of the cooling water is poor, the cooler is prone to scaling and blockage. It is important to pay special attention to the low pH value of the water, which indicates high acidity. To avoid corrosion, it is necessary to use special copper materials.

2) Lubricant Flow (referring to the system flow chart of each model)

① Oil Spraying Process

Due to the pressure inside the oil and gas barrel, the lubricant is forced into the oil cooler where it is cooled. After passing through the oil filter to remove impurities, it is then divided into two paths. One path sprays the lubricant into the compression chamber at the lower end of the body to cool the compressed air. The other path is used to lubricate the bearing group and transmission gear at both ends of the body. After lubricating each component, the oil is collected at the bottom of the compression chamber and discharged along with the compressed air.

The compressed air, mixed with oil, enters the oil and gas drum through the exhaust port. A large portion of the oil is separated, while the remaining air containing oil mist passes through the oil fine separator. The separator filters the remaining oil, and the pressure maintenance valve sends it to the rear cooler for cooling. Finally, the oil can be sent to the intended gas applications.

② Control of the oil injection volume

The oil injected into the screw compressor serves primarily to remove the heat generated by the compressed air during the compression process. The quantity of oil sprayed directly impacts the compressor's performance. The amount of oil injection has been set by the factory prior to delivery, so please do not adjust it arbitrarily. **If it is necessary to adjust the amount of oil injection due to exhaust temperature, please contact our service unit in advance to prevent any damage to the compressor.**

③ Description and Function of Each Component in the Oil Circuit:

A) Oil Cooler

The oil cooler can be cooled in two ways: air-cooled or water-cooled, similar to the air cooler.

If the environmental conditions are not optimal, the fins of the air-cooled cooler (radiator) can become easily covered by dust, which can negatively impact the cooling effect. This can result in the

exhaust temperature becoming too high and cause the machine to shut down unexpectedly. For this reason, the dust on the surface of the fins should be removed regularly by blowing it off with low-pressure compressed air or by cleaning it with a solvent if blowing is not possible.

In the case of blockages in shell and tube coolers, the scale must be removed mechanically by soaking it in a special solution and ensuring that it is completely cleaned.

B) Oil Filter

The oil filter is made of paper and is designed to remove impurities from the oil, such as metal particles and oil degradation. The filtration precision is between 10μ~15μ provides excellent protection for the bearings and rotor. By checking the pressure indicators, one can determine when it is time to replace the oil filters. When the pressure indicator is on, it means that the oil filter is blocked and must be replaced. **The oil and oil filter should be replaced after the first 500 hours of operation for a new machine, and subsequently based on the readings of the pressure indicator.** Ignoring this procedure may lead to insufficient oil intake and a significant increase in exhaust temperature, which can ultimately reduce the lifespan of the bearings.

C) Oil Separator

The filter element of the oil fine separator is composed of multiple layers of fine glass fibers. This allows the mist oil gas present in compressed air to be almost entirely filtered out, with the size of oil particles controlled to be below 0.1m and oil content reduced to less than 5PPM. The lifespan of the oil fine separator is greatly affected by the quality of the lubricating oil and the level of pollution in the surrounding environment.

When selecting a lubricant, it is important to use only the grade recommended by the company. The outlet of the oil separator is equipped with a safety valve, a relief valve, and a pressure maintenance valve. Compressed air is then led to the rear cooler.

The oil that has been filtered by the oil separator is concentrated in a small circular groove at the center and is then returned to the inlet side of the machine through a return pipe. This prevents the filtered oil from being discharged with the air again.

Generally speaking, the damage to the oil separator can be determined using the following methods:

a) An increase in the amount of oil present in the air line.

b) There is a Differential Pressure Switch between the oil drum and oil separator with a pre-set pressure value of 0.15MPa. When the differential pressure between the front and rear of the oil separator exceeds the set value, the differential pressure indicator will light up to give an alarm. This indicates that the oil separator is blocked and needs to be replaced.

c) Check whether the oil pressure is high and/or if the current is increasing.

d) Temperature Control Valve

The oil cooler is equipped with a thermal control valve, which functions to keep the exhaust temperature above the pressure dew point. When the machine is first switched on, the temperature of the lubricating oil is low. At this point, the thermal control valve will automatically turn on, preventing the oil from passing through the oil cooler and entering the machine body via the return circuit. If the oil temperature rises to 67℃ or higher, the valve will slowly adjust to 72℃ when fully open. At this point, the oil will be cooled by the oil cooler before entering the machine body.

3) Cooling System

① For Air-cooled models

Cold air is circulated through a fan and blown over the cooling fins of the cooler to exchange heat with the compressed air and lubricating oil, achieving the cooling effect. **The maximum allowable ambient temperature for this cooling system is 40°C.** If the ambient temperature exceeds 40°C, the system may trip, for example, when placed near a high-temperature boiler. etc.

② For Water-cooled models.

The cooling water is designed to be at a temperature of 32°C, therefore, it is crucial to ensure proper circulation of the cooling water system. To ensure optimal performance and longevity of the

cooler, it is crucial that the cooling water meets or exceeds the general industrial water standard. Groundwater should be avoided whenever possible due to potential water quality issues. In the event of poor water quality, regular cleaning of the cooling water tower with appropriate cleaning agents is necessary to remove sediment buildup and prevent any negative impact on the cooler's efficiency and lifespan. **During winter, when the room temperature drops below freezing, it is necessary to drain the cold water from the cooler after shutting down the unit.**

III. Safety Protection System and Warning Device

1. Motor Overload Protection

There are two main motors in the air compressor system: the main compressor drive motor and the cooling circulation fan motor. Under normal conditions, the operating current of the motor should not exceed 3% of its rated current due to factors such as voltage drop, three-phase imbalance, and other similar issues. When the current being drawn by the motor exceeds the upper limit set by the electrical protection device, the over-current protection device will automatically disconnect the power supply. The compressor will stop and cannot be restarted unless it is reset.

① Human error in operation, such as incorrect adjustment of exhaust pressure or system settings.

② Mechanical Failure:

Mechanical faults may include internal wear and tear of the motor, motor under-phase operation, failure of the safety valve to operate, system setting failure, blockage of the oil separator, and other issues.

If the motor is found to be overloaded during operation, contact the manufacturer immediately. If the motor becomes overloaded during operation, it is important to immediately contact the manufacturer and arrange for someone to inspect the cause. Failure to do so may result in the motor burning out.

2. Exhaust Gas Temperature Overload Protection

The maximum exhaust temperature set by the system is 100°C. If the temperature exceeds 100°C, the system will immediately sound an alarm and automatically cut off the power supply. There

are many reasons for high exhaust temperatures, but the most common cause is the failure of the oil cooler. If the air-cooled oil cooler becomes blocked by dust, the cold air cannot pass through the cooler freely. As a result, the lubricant temperature will gradually rise, leading to a high-temperature shutdown. For this reason, it is necessary to use low-pressure air to remove dust from the cooling fins at regular intervals. If the blockage on the fins cannot be cleared by blowing, it is recommended to clean them using a cleaning fluid or solvent.

Water-cooled air compressors can often become blocked by the buildup of scale in the copper cooling tubes. This can lead to decreased heat transfer efficiency and tripping due to high temperatures. The maximum ambient temperature for an air compressor is 40°C. If the ambient temperature is higher, the temperature of the exhaust will also increase.

When the exhaust temperature exceeds the set value, the system's start circuit will be cut off, and the system cannot be restarted until it is reset.

IV. Control System and Electrical Wiring

1) Control System for Fixed-speed Screw-Type Air Compressor

① Motor start (buck or Y connection)

During this period, the air inlet valve is fully closed while the relief valve is fully open. The solenoid valve is in a closed position, causing the air inlet side to reach a high vacuum. The compression chamber and bearing lubricant require this vacuum and the difference in atmospheric pressure in the oil drum to function properly.

The motor is operating at full pressure (full pressure or △ operation).

② Motor Full-Pressure Operation (Full-Pressure or △ operation)

After the control is switched to full pressure operation, the energized state opens the solenoid valve and closes the relief valve. As a result, the pressure in the air inlet drum gradually increases, causing the air inlet valve to gradually rise. This leads to a rapid increase in the pressure in the drum, resulting in the full opening of the air inlet valve. The compressor then starts operating at full load.

When the pressure reaches 0.45MPa, the pressure maintenance valve fully opens, and the air is output.

③ Heavy load or no-load operation

When the discharge pressure reaches the upper limit set by the pressure switch, the power supply is cut off, and the solenoid valve closes. As a result, the air inlet valve also closes, while the relief valve fully opens, and the air in the oil drum is discharged into the atmosphere. At this point, the compressor operates under no load, and the required lubricant pressure is maintained by the difference between vacuum and atmospheric pressure.

When the pressure in the pipeline system drops to the lower limit set by the pressure switch, the switch is activated and connected to the power supply. This causes the solenoid valve to open, allowing air to enter the system, and the air inlet valve to fully open. At the same time, the relief valve closes, and the compressor restarts under load.

④ Stop

When the OFF button is pressed, the solenoid valve will turn off, and the relief valve will fully open to release the air in the oil drum into the atmosphere. Once the pressure in the oil drum reaches a certain value, the motor will automatically stop.

⑤ Emergency Stop

When the exhaust temperature exceeds 100℃ or when the motor is overloaded and the over-current protection device is activated, the power supply will be cut off and the motor will stop. At the same time, the solenoid valve and air inlet valve will close, and the discharge valve will fully open.

(6) Automatic shutdown system when idle for too long.

If the compressor continues to run without a load when the amount of air used in the system decreases, it will automatically stop once the set time for no-load operation is exceeded, and the motor will also stop. The time limit for prolonged stopping without load is determined by the principle that the motor should not be started more than twice per hour. This ensures optimal motor performance and longevity. **Do not start the motor more frequently than necessary, as this may result in motor burnout.**

2. Control and Protection System for Inverter Screw Air Compressor

When the user's air consumption is low or suspended, the main inlet valve of the compressor is closed, allowing it to operate in a reduced capacity and enter an unloading state. This achieves the goal of energy conservation. After gas consumption is restored, the microcomputer controller reopens the main inlet valve, allowing the compressor to operate at full load and resume loading. At the same time, the microcomputer controller also monitors the unit and automatically stops the compressor in case of abnormal conditions, such as motor overload or exhaust over-temperature, to protect the compressor from damage.

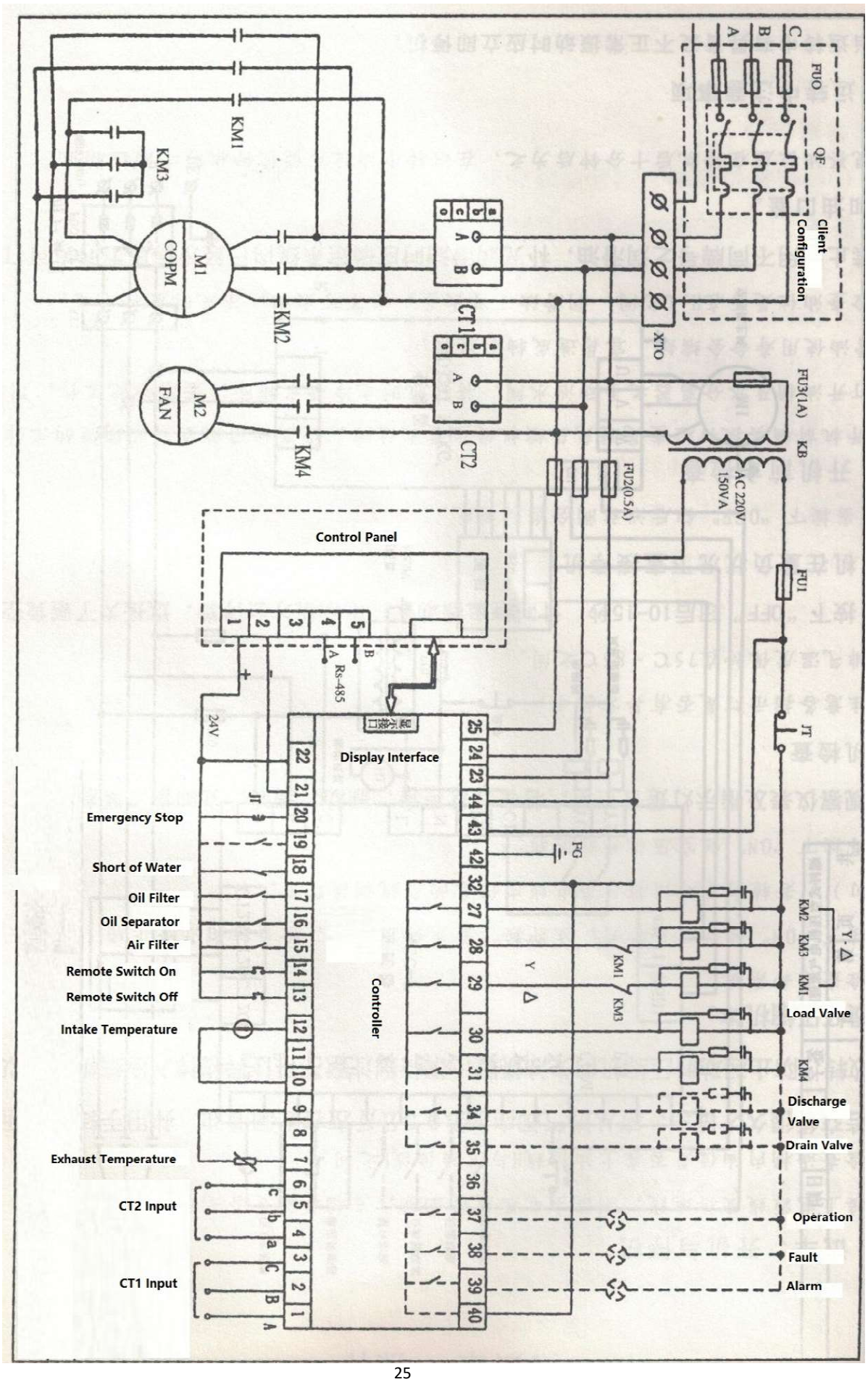
When the pressure inside the cylinder exceeds the predetermined value, the safety valve will automatically open to rapidly release the air and reduce the pressure, ensuring the safety of the equipment.

3. Electrical Circuit of Fixed-speed Screw-Type Air Compressor

The electrical control of an air compressor can consist of two systems: one for the internal control system and the other for the starting plate. The starting plate is a commonly used Y-△ starting control for general machinery. The control section is an electronic component that provides control. The electronic control component is not extensively covered in this chapter due to the intricate nature of its internal wiring and control. However, if it becomes damaged or faulty, please contact our service units directly and replace the circuit board as needed.

4. Electrical Wiring for Inverter Screw Compressor

The electrical system consists of an inverter, a main motor, a fan motor, an electric control cabinet assembly, a solenoid valve, a temperature sensor, a pressure transmitter, a microcomputer controller, and an operation panel. The parameter settings and operation instructions for the inverter compressor can be found in the User Manual.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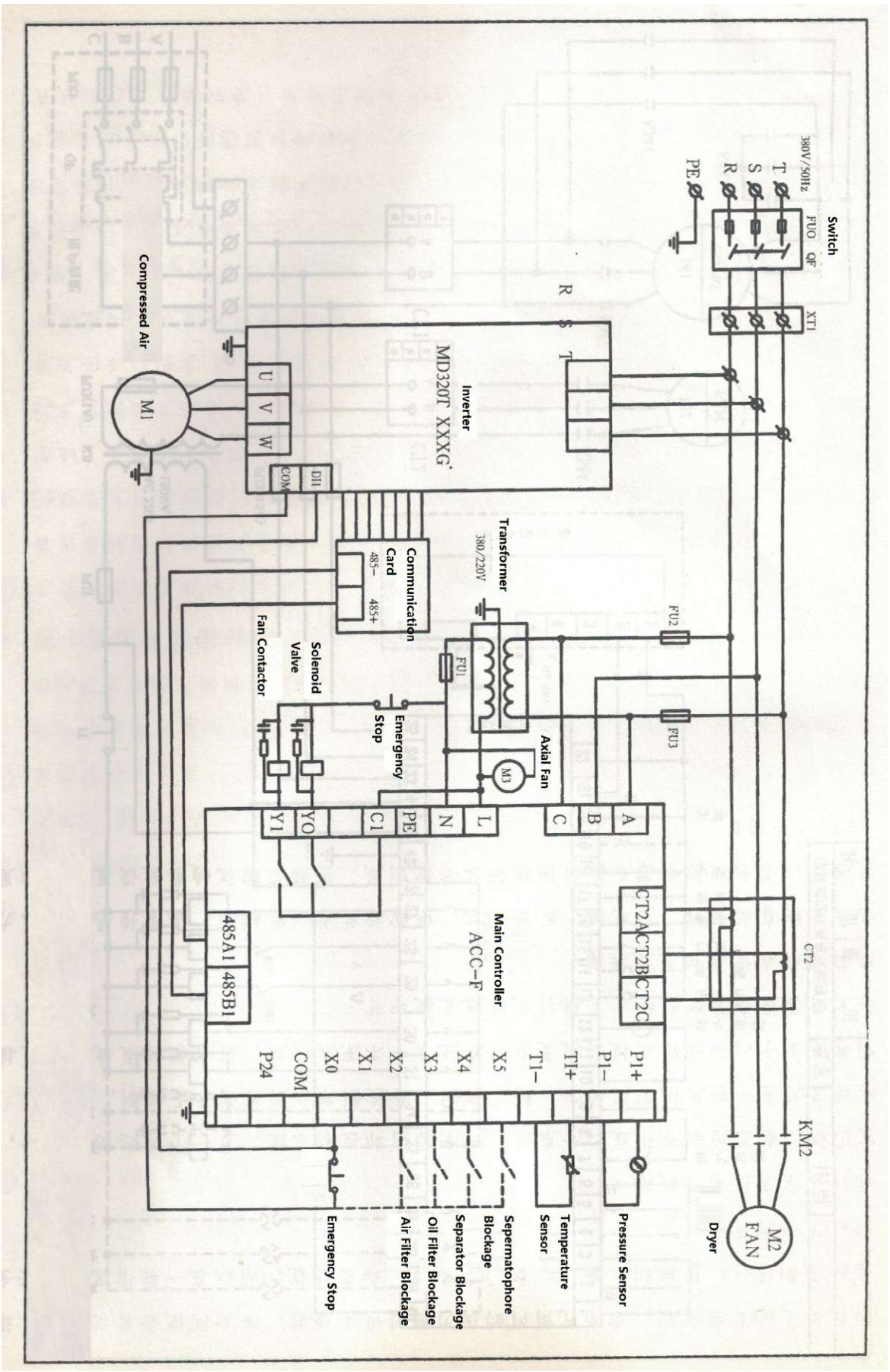
QF
Client Configuration
XTO
KM1
KM3
KM2
KM4
M1
COPM
M2
FAN
CT1
CT2
FU3(1A)
KB
AC 220V
150VA
FU2(0.5A)
FU1
JT
Control Panel
Rs-485
24V
Display Interface
JF
Emergency Stop
Short of Water
Oil Filter
Oil Separator
Air Filter
Remote Switch On
Remote Switch Off
Intake Temperature
Exhaust Temperature
CT2 Input
CT1 Input
Controller
FG
Y-Δ
Load Valve
Discharge Valve
Drain Valve
Operation
Fault
Alarm


Switch
380V/50Hz
T
S
R
PE
FU0
QF
XT1
R
S
T
Inverter
MD320T XXXG
U
V
W
COM
DI1
Compressed Air
M1
Transformer
380/220V
FU1
FU2
FU3
Communication Card
485-
485+
Solenoid Valve
Fan Contactor
Emergency Stop
Axial Fan
M3
A
B
C
L
N
PE
C1
YO
Y1
CT2A
CT2B
CT2C
CT2
KM2
M2
FAN
Dryer
Main Controller
ACC-F
485A1
485B1
P24
COM
X0
X1
X2
X3
X4
X5
T1-
T1+
P1-
P1+
Pressure Sensor
Temperature Sensor
Sepermatophore Blockage
Separator Blockage
Oil Filter Blockage
Air Filter Blockage
Emergency Stop

Chapter 4 Operation

I. Commissioning, Start-up, and Shutdown

1) Connect the power cord and grounding wire. Test whether the main voltage and three-phase power supply are correct.

2) Check if the oil level in the drum is within the range of the upper oil level line (H) and the lower oil level line (L).

3) **If the compressor has been stored for a long time, it is recommended to add 0.5kg of lubricating oil through the air inlet valve. Turn the compressor by hand for several revolutions to ensure the oil is distributed evenly and prevent the compressor from losing oil and burning during startup.**

4) Check the cooling system.

5) Once you have pressed the "ON" button to start the compressor, immediately press the "emergency stop" button and verify that the steering is correct (such as the direction of the arrow). If the steering is incorrect, swap any two of the three wires.

6) Press the "ON" button again to start the compressor.

7) **If you hear any unusual sounds, feel any vibrations, or notice any oil leakage, press the "emergency stop" button immediately to halt the compressor and conduct an inspection.**

8) Pay attention to the indicator lights to check for any abnormal indications.

9) Keep the exhaust temperature between 75°C and 85°C.

10) **After holding down the "OFF" button for 10-15 seconds, the timing relay will activate and stop the motor. This prevents the compressor from stopping abruptly while under heavy load.**

11) When the "OFF" button is pressed, the relief valve will automatically release.

II. Checking Before Starting the Machine

Checking the compressor before starting it is essential to prevent major compressor failures and improve efficiency.

1) Open the oil drum and water separator of the manual drain valve to stop the condensate removal. If this task is ignored, the lubrication oil's lifespan will be shortened, which can lead to potential issues.

Neglecting this task will shorten the oil's service life and increase the risk of bearing burnout.

2) Check whether the oil level is between the high and low marks. The lubricant should not be overfilled or underfilled, and should be topped up when it is low. **It is prohibited to mix lubricating oils from different brands. Before refilling lubricating oil, ensure that there is no pressure in the system by opening the refueling port cover.**

3) Observation of the oil level should be done 10 minutes after shutdown. The oil level during operation may be slightly lower than the oil level at shutdown.

III. Precautions during operation

1) **Immediately shut down the equipment if there is any abnormal noise or vibration during operation.**

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

3) During long-term operation, if you notice that the oil level on the gauge is low or the oil level indicator light is on, you should immediately stop the machine.

After the system has been stopped for 10 minutes, check the oil level. If it is insufficient, wait for the internal pressure of the system to stabilize before adding more lubricant.

4) **The rear cooler and cyclone separator will produce condensate, which should be discharged daily or an automatic water drain should be installed.** Otherwise, the water will enter the system.

5) During operation, check the meter every two hours to record the voltage, current, air pressure, exhaust temperature, oil level, and other relevant data for future maintenance reference.

4. Long-term shutdown treatment

Long-term shutdowns should be handled carefully, especially in high humidity seasons or areas, in accordance with the following methods.

1) Shutdown for more than three weeks.

① Wrap the motor control panel and other electrical equipment in plastic or oil paper to prevent moisture from entering.

② **Completely drain the water from the oil cooler and rear cooler.**

③ If there are any faults, they should be corrected before future use.

④ Drain the condensate from the oil drum, oil cooler, and after cooler every few days.

2) Shutdown for more than two months.

In addition to the aforementioned procedures, the following treatment is necessary.

① Close all openings to prevent moisture and dust from entering.

② Wrap the safety valve and control panel with moisture-resistant paper to prevent rust and corrosion.

③ Replace the lubricating oil with new oil and run the machine for 30 minutes before shutting it down.

④ **Completely drain the cooling water.**

⑤ Move the machine to a location that is less dusty and dry, if possible.

3) Restarting the machine.

① Remove the plastic or oil paper from the machine.

② Measure the insulation of the motor, which should be above 1 megaohm (1MΩ).

③ Other procedures are as described during the test run.

Chapter 5 Maintenance and Inspection

I. Lubricant Specifications and Maintenance Usage

1. Please use special oil for screw compressors.

2. Steps to Change the Coolant

① Start the compressor and allow the oil temperature to rise to facilitate discharge. Then, press the "OFF" button to stop the operation.

② When there is pressure, open the drain valve. The drain speed will be fast, but it is important to open it slowly to avoid coolant splashing out.

③ After draining the lubricant, close the drain valve and open the filler cap to add new coolant. **Note: To ensure the quality of the coolant, it is important to open all the drain ports of the compressor and drain the residual coolant when replacing it. The coolant left in the compressor can contaminate the entire oil system and reduce the lifespan of the new coolant. Warning: Do not mix different brands or types of coolant together.**

④ Add special coolant.

3. Precautions for Using Coolant

① If you find it difficult to determine when to change the coolant for the first time while using a micro oil screw compressor, you can take a coolant sample after 500 hours of use and send it back to the supplier for an oil test to determine the quality of the coolant. Repeat every 1000 hours thereafter. After a few cycles, the compressor's coolant usage can be determined, and wastage can be minimized.

② **Do not allow the coolant to exceed the oil's service life. The coolant should be replaced on schedule. Otherwise, the quality of the coolant will decrease, and its lubricating properties will diminish. This can lead to overheating and tripping. The lifespan of coolant is dependent on the surrounding environment. If the environment is poor, the coolant may become discolored and contaminated with impurities. In such cases, it is recommended to replace the coolant in advance.**

③ **After using the air compressor for two years, it is best to perform a coolant system cleaning using coolant.** This can be done by replacing the old coolant with new coolant and running the air compressor for 6~8 hours, it is recommended to replace the coolant once more. This will help to clean any remaining organic components in the original system and ensure that the coolant has a longer service life. **Warning: The compressor coolant plays a crucial role in the operation of the compressor. The use of low-quality coolant or mixing different brands of coolant can result in the following consequences:**

II. Routine Maintenance

1. Running for 500 hours.

① Replace the coolant.

② Replace the oil filter.

③ Replace the air filter element.

2. 2000 hours of operation.

1) Replace the lubricating oil.

2) Replace the oil filter carefully.

3) Replace the air filter.

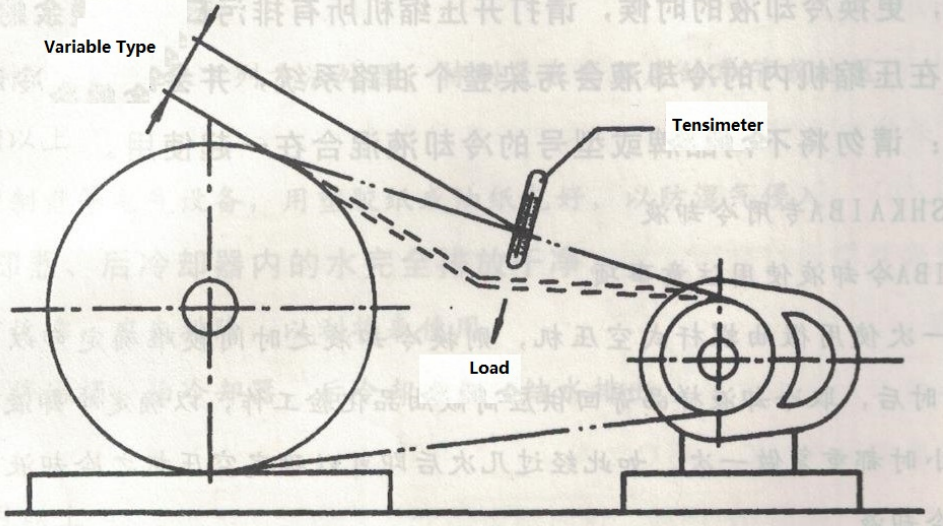
4) Replace the oil ingredient

If the environment is poor and there is a lot of dust, it is advisable to shorten the maintenance time accordingly.

III. Belt Adjustment

If the belt is too loose, it should be adjusted immediately and then every 1500 hours thereafter.

1. Refer to the diagram and use a tension meter and spring balancer to apply load to the belt and measure its deformation. If the deformation is within the standard limit, then the belt is safe and does not require adjustment. However, if the deformation exceeds the standard value, then adjust the belt tension accordingly.



Model	Load (Kg)	Variable (mm)
22KW	3.4	8-10
37KW	3.0	8-10
55-110KW	3.0	9-12

2. When adjusting the belt tension, start by loosening the four fixing screws of the motor seat slightly. Next, use the adjusting screws located next to the belt to adjust its tension. Finally, use a tension meter to measure the tension and then tighten the fixing screws of the motor.

3. **When replacing a belt, it is important to replace all belts together to ensure balanced tension. Replacing only one belt can result in an unbalanced tension.**

4. Be careful not to spill any lubricant on the belt or pulley while adjusting or replacing them.

IV. Adjustment of the pressure system

1. Adjustment of System Pressure

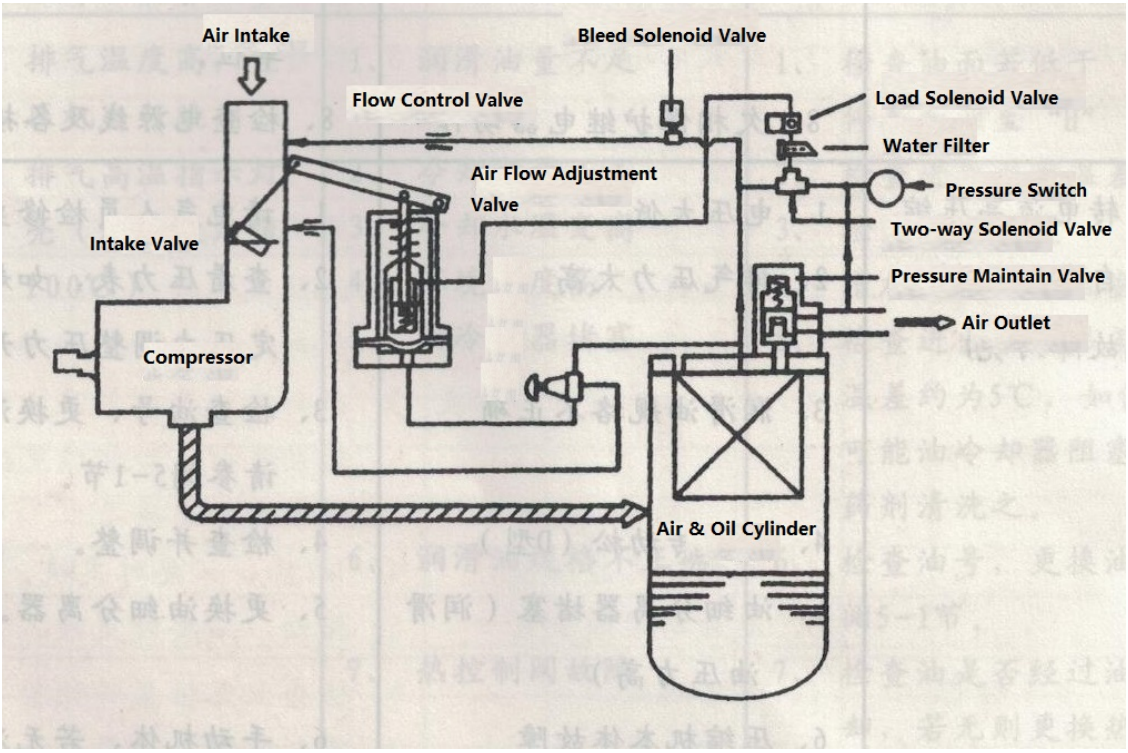
① The pressure adjustment is operated through the keypad on the microcomputer controller. Two pressure points are displayed on the screen. The value of each pressure point can be set using the keypad. The first pressure point is the unloading pressure, which represents

the upper pressure limit. When the air pressure reaches this value, the pressure will be unloaded and lowered.

② The other pressure point is the loading pressure, which refers to the lower pressure limit. When the system pressure drops to this value after unloading, the machine will automatically start loading, causing the pressure to increase.

③ Within the maximum pressure value allowed by the machine's design, both pressure points can be adjusted to suit the on-site usage conditions.

2. Air Volume Adjustment System



If the customer is using a system with a smaller air supply than the compressor, the air flow regulator can automatically adjust the air supply to match the compressor.

① Set the pressure of the air volume regulator in such a way that a small amount of air passes through it and enters the lower part of the air volume adjustment valve before the system pressure rises to the no-load setting pressure. This will push the piston upwards and initiate the air volume adjustment action. The set pressure of the air volume regulator can be adjusted optimally based on the air volume utilized on the site.

② Adjust the flow control valve to regulate the amount of air released and stabilize the pressure of the air volume regulator.

③ If air volume adjustment is not necessary, lock the air volume regulator in place.

Chapter 6 Troubleshooting

Troubleshooting table

No	Fault	Possible Reason	Solution
A	Unable to start (electrical fault light on)	1. Blown fuse	1. Have electrician to repair and replace.
		2. Protective relay in operation	2. Have electrician to repair and replace.
		3. Starting relay failure	3. Have electrician to repair and replace.
		4. Start button contact fauly	4. Have electrician to repair and replace.
		5. Voltage is too low	5. Have electrician to repair and replace.
		6. Motor failure	6. Have electrician to repair and replace.
		7. Machine failure	7. Please contact our service unit.
		8. Under-phase protection relay operates	8. Check the power cord and the contacts.
B	High running current leads to compressor shutdown (electrical fault light on)	1. Voltage too low	1. Have electrician to repair and replace.
		2. Exhaust pressure too high	2. Check the pressure gauge, to adjust the pressure switch to pre-set.
		3. Lubricant specification is incorrect	3. Check the oil grade, replace according to guidance in section 5-1.
		4. Drive Belt loose	4. Check the belt and adjust.
		5. Oil fine separator blocked (high lubricant pressure)	5. Replace the oil separator.
		6. Compressor body failure	6. Please contact our service unit.

No	Fault	Possible Reason	Solution
C	Operating current lower than normal value	1. Air consumption too large (the pressure is running below the set value)	1. Check the consumption and increase the number of compressors if necessary.
		2. Clogged air filter	2. Clean or replace air filter.
		3. Air inlet valve Malfunction (Butterfly-shape valve stuck)	3. Disassemble, clean and lubricate with grease.
		4. Intake air valve adjusted improperly	4. Reset and adjust.
D	Exhaust gas temperature below normal 75°C	1. The cooling water volume is too large	1. Adjust the outlet valve of the cooling water. In a case of air-coolers, reduce the radiator area of the cooler.
		2. Low ambient temperature	2. Adjust the outlet valve of the cooling water. In a case of air-coolers, reduce the radiator area of the
		3. No load for too long time	3. Increase air consumption.
		4. Incorrect exhaust air temperature gauge reading	4. Replace exhaust air temperature gauge
		5. Faulty thermal control valve	5. Replace the thermal control valve
E	Exhaust gas temperature high, the compressor shutdown on its own, the high temperature indicator light on, or cooling water insufficient light on (more than the pre-set value of 100 ℃)	1. Insufficient amount of lubricating oil	1. If the oil level below "L" line, please stop the compressor, and refuel to "H" line.
		2. Insufficient cooling water	2. Compare the water temperature of both intake and outlet, refill the
		3. Cooling water temperature goes high	3. Compare the water temperature of both inlet and outlet, refill the water.
		4. High ambient temperature	4. Increase indoor exhaust air, reduce the room temperature.
		5. Oil cooler blockage	5、Check the temperature difference between the inlet and outlet pipes, if lower than the normal 5℃, the oil cooler may be blocked, remove it and clean it with chemicals.

No	Fault	Possible Reason	Solution
		6. Incorrect specification of lubricating oil	6. Check the oil grade and replace the recommended lubricant, please refer to section 5-1.
		7. Faulty thermal control valve	7. Check whether the oil is cooled by the oil cooler, if not, replace the thermal control valve.
		8. Dirty Air Filter	8. Clean the air filter with low pressure air.
		9. Oil filter blocked	9. Replace the Oil Filter
		10. Cooling fan faulty	10. Replace the Cooling fan.
F	High oil content in the air, lubricating oil addition cycle shortened, smoke from the filter when there is no load	1. Oil level too high	1. Check the oil level and discharge to level between "H" and "L".
		2. Oil return pipe restriction control blockaged	2. Disassemble and clean.
		3. Low exhaust pressure	3. Increase exhaust pressure (adjust pressure switch to pre-set value).
		4. Oil fine separator broken	4. Replace with new one.
		5. Pressure maintain valve spring fatigue	5. Replace a new spring.
G	Unable to run at full loadUnable to run at full load	1. Pressure switch failure	1. Replace with new one.
		2. Three-way solenoid valve failure	2. Replace with new one.
		3. Time-delay relay failure	3. Have electrician to check and
		4. Inlet valve Malfunction	4. Disassemble,clean and fill with lubricating grease.
		5. Pressure maintain valve malfunction	5. Check the valve seat and non-return valve piece, replace when
		6. Leakage in control line	6、Check the position of the leakage and lock it.
H	Unable to empty, when empty the pressure meter still maintains the working pressure or continues to rise	1. Pressure switch failure	1. Check, replace if necessary.
		2. Inlet valve malfunction	2. Disassemble,clean and fill with lubricating grease.
		3. Discharge solenoid valve failure (coil burned out)	3. Check, replace if necessary.
		4. The air volume regulating diaphragm broken	4. Replace it.

No	Fault	Possible Reason	Solution
		5. Small drainage restriction hole	5. Appropriately increase the diameter of the hole.
I	Compressor air volume lower than the normal	1. Clogging of air inlet filter	1. Clean or replace
		2. Inlet valve malfunction	2. Disassemble, clean and fill with lubricating grease.
		3. Pressure maintain valve Malfunction	3. Check the valve seat and valve piece after disassembly. Replace
		4. The oil separator blocked	4. Check and replace if necessary.
		5. Discharge solenoid valve leakage	5. Check and replace if necessary.
J	Frequent empty	1. Pipe leakage	1. Check the leakage position and lock it.
		2. Pressure switch's difference too small	2. Reset to normal pressure difference of 0.1Mpa.
		3. Air consumption unstable	3. Increase the storage cylinder capacity.
K	Oil mist comes out of the air filter when shutdown	1. Leakage of oil stop valve	1. Check and replace if necessary.
		2. Leakage of non-return valve	2. Check the valve seat and valve piece after disassembly. Replace
		3. Heavy pressure stop	3. Check if the intake valve stuck, disassembly, clean and fill with lubricating grease.
		4. Electrical wiring error	4. Have electrician to repair and replace.
		5. Pressure maintain valve leakage	5. Check and replace if necessary.
		6. Discharge valve malfunction	6. Check the discharge valve, replace if necessary.

Compressor Maintenance Record

Cumulative Running Time (Hrs)	Air Filter Replacement	Oil Filter Replacement	Oil & Air Separator Filter	Lubricant Replacement	Date	Signature

Compressor Faulties and Repair Record

Date	Repair Item	Signature

Note: As we are constantly reforming and innovating our products, it could be always one step behind in amending our manuals. Should you have any questions about our products and this Manual Book, please contact our service units.