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Focus Professionalism Dedication

User Manual for Three Filters of Screw Compressors



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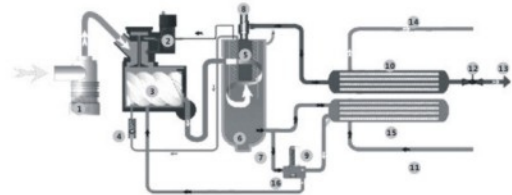
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Preface

To promptly guide and resolve faults of users' units, we have compiled this guide. It can be used not only as a maintenance reference for service representatives but also for spare parts sales staff to provide telephone guidance when answering users' fault reporting calls. The guide lists possible causes of faults, but not all of them. We hope you will continuously provide us with new findings and methods during use, so that we can constantly improve this guide and make it an effective tool for us.

Working Principle Diagram of Air Compressors



- | | | | |
|--------------------------|---------------------------|----------------------|-------------------------------|
| 1. Air Filter | 5. Air-Oil Separator | 9. Oil Filter | 13. Air Outlet |
| 2. Air Intake Valve | 6. Oil | 10. Aftercooler | 14. Water Outlet |
| 3. Compression Main Unit | 7. Air-Oil Tank | 11. Water Inlet Tank | 15. Oil Cooler |
| 4. Check Valve | 8. Minimum Pressure Valve | 12. Ball Valve | 16. Temperature Control Valve |

Product Features

Features and Parameters of Air-Oil Separator

- 1.The filter material of the air-oil separator is made of ultra-fine glass fiber composite filter material produced by HV (USA) and Lydall (USA). When the mist-like oil-air mixture in compressed air passes through the air-oil separator, over 99.9% of the oil mist can be filtered out. The application of precise roll welding, spot welding processes and the newly developed two-component adhesive ensures that the air-oil separation filter element has high mechanical strength and can work normally at a high temperature of over 120°C
- 2.The maximum operating temperature is not more than 120 . Under the design flow rate, when medium-load (DAH) lubricating oil specified in GB/T7631.9-1997 is used, and under the working conditions where the intake air temperature is not higher than 110 and the pressure is 0.7MPa~1.0MPa, the oil content of compressed air after filtration is not more than 5mg/m³ (with the oil content before filtration not more than 3000mg/m³).
- 3.Under rated working pressure and rated flow rate, the initial saturated pressure drop is not more than 0.02MPa.
- 4.Under normal working conditions, the oil mist particles in compressed air can be controlled below 0.1μm.
- 5.Under normal working conditions, the service life of the air-oil separator is not less than 4000 hours when the pressure drop is not more than 0.1MPa.

Features and Parameters of Air Filter:

1. The filter material of the air filter is made of pure imported wood pulp filter material from HV (USA) and Ahlstrom (South Korea). It filters out impurities such as dust, sand particles, moisture, and oil mist suspended in the ambient air, preventing premature wear of screw rotors and premature clogging of oil filters and air-oil separators
2. Filtration precision < 10μm, filtration efficiency ≥ 99.8%.
3. Under normal working conditions, the service life of the air filter is approximately 2000 hours, and the working environment has a significant impact on its service life.

Features and Parameters of Oil Filter:

- 1.The filter material of the oil filter is made of ultra-fine glass fiber composite filter material from HV (USA) or pure imported wood pulp filter material from Ahlstrom (South Korea). It filters out solid particles, impurities, carbon deposits and metal chips in the lubricating oil, so as to protect the main engine and other moving parts.
- 2.Filtration Precision: 5μm ~ 15μm
3. Initial Pressure Difference: ≤0.03 MPa
- 4.Maximum Operating Pressure: 1.4 MPa ~ 2.5 MPa
5. The service life of the oil filter is approximately 2000 hours, and the quality of the lubricating oil and the environment have a significant impact on its service life.

Functions of Other Components:

1. Inlet Valve: Mainly controls the air compressor's loading by opening/closing the internal valve plate, with two control modes: on-off control and capacity control.
2. Temperature Control Valve: When the oil temperature is too high (higher than 45°C), it switches into the cooler; under normal conditions, oil flows into the rotor.
3. Water Separator: Separates water and gas, and discharges condensed water.
4. Minimum Pressure Valve: The minimum pressure of the oil cylinder is generally set at 0.45MPa to prevent the oil from flowing back into the air cylinder after the air compressor stops.
5. Aftercooler: The cooling fan draws in cold air and blows it through the aftercooler. The temperature of the cooled compressed air is generally below 15°C of the ambient temperature.
6. Oil Cooler: Cools the hot oil.
7. Oil Stop Valve: Supplies oil when starting up and prevents the oil from flowing back into the rotor after shutdown.

Filter Replacement Steps for Air Compressor:

1. Replacing the Air Filter:

- ①. Stop the air compressor and cut off the power supply.
- ②. Remove the cover and clean it.

- ③. Remove the air filter. Be careful not to get dust into the filter body. Clean the filter cavity.
- ④. Check if the air filter is damaged or dusty. Install a new filter and the cover.
- ⑤. Start the air compressor.

Note: Under harsh operating conditions, the air filter needs to be replaced frequently. When the maintenance alarm message appears on the screen or 1 year after installation, the air filter must be replaced.

2. Replacing the Oil Filter:

- ①. Stop the air compressor and cut off the power supply.
- ②. Use a strap wrench to remove the old oil filter.
- ③. Clean the sealing surface.
- ④. Apply a thin layer of oil film on the sealing side of the new oil filter.
- ⑤. Tighten the new oil filter by hand until the seal is tight. (Pay special attention not to use other tools when tightening the new filter, otherwise it will be difficult to remove during the next replacement.)
- ⑥. After starting up, check for oil leakage.
- ⑦. Check if the differential pressure of the oil filter is normal. Set the alarm differential pressure according to the machine model in advance.

3.Replacing the Oil-Gas Separator:

①External Oil-Gas Separator:

(1)Stop the air compressor, close the air outlet, open the drain valve, and confirm that there is no pressure in the system.

(2)Remove the oil-gas separator and replace it with a new one.

②Internal Oil-Gas Separator:

(1)Stop the air compressor, close the air outlet, open the drain valve, and confirm that there is no pressure in the system.

(2)Disconnect the pipeline above the air compressor and the pipeline for pressure relief from the outlet to the aftercooler .

(3)Remove the oil return pipe.

(4)Remove the fixing bolts on the oil-gas barrel and move away the upper cover of the oil-gas barrel.

(5)Remove the old oil-gas separator and install a new one. 6. Install the disassembled components in the reverse order.

Note: When replacing the oil, the oil filter and lubricating oil must be replaced at the same time. When installing the oil-gas separator, ensure that the oil return pipe and the bottom of the oil-gas separation tank have a proper gap. When replacing the oil-gas separator, pay attention to static electricity discharge. Connect the inner metal mesh to the outer shell of the oil barrel. Fasten three staples evenly on the upper and lower stone plates to ensure they are properly fastened, preventing static electricity accumulation from igniting the barrel. Prevent foreign objects from falling into the oil barrel to avoid affecting the operation of the air compressor.

4.Replacing/Supplementing Lubricating Oil:

When the temperature of the lubricating oil is between 30°C and 60°C, its viscosity will decrease and it will not be too hot, and it can also drain the residual oil of the machine set. So when changing the oil, if it is cold oil, first start the machine and run it for 2-3 minutes. The oil change should be carried out when there is no pressure in the machine set. First, open the oil filling port of the oil-gas separator. Use a suitable container to prepare the waste oil. Open the oil drain valve at the bottom. When draining the oil, use your hand to rotate the pulley of the machine head to drain the oil remaining in the machine head. After the waste oil is completely drained, close the oil drain valve. Inject new lubricating oil. When injecting the oil,Use the reverse machine head pulley to slowly suck the oil into the pipeline and the machine head. The oil level should be 2-3cm above the oil level observation port when the machine is running (this is to check the oil level when the machine is running). After adding the oil, tighten the nut, remove the inlet valve, inject a small amount of lubricating oil from the air inlet of the machine head. When the oil level submerges two-thirds of the rotor, install the inlet valve. Clean the surfaces of all components of the air compressor. When the air compressor is running, the oil level should be maintained at the lowest oil level mark. Too much oil will affect the separation effect, and too little oil will affect the lubrication and cooling performance. During the oil change period, if the oil level is lower than the lowest oil level, supplement the lubricating oil in time.

Method:

① Shut down the machine and wait until internal pressure is fully released (confirm system is pressure-free), then pull the main power switch.

② Open the oil filler cap on the air-oil separator tank and add an appropriate amount of cooling lubricant.

③ Close the oil filler cap on the air-oil separator tank and start the air compressor.

Note: Replace lubricating oil every 4000 hours. Shorten the replacement interval in harsh environments or with poor oil quality. When replacing lubricating oil, the air-oil separator and oil filter must also be replaced simultaneously.

5. Test Run:

After replacing the filters and lubricating oil, reconnect the power supply and start the air compressor. Listen for abnormal noises, observe for oil leaks, and check the oil level (level should be observed during loading, positioned between 1/2 to 2/3 of the sight glass). Adjust oil level as needed (add more if low, top up if high). After confirming no abnormalities, reinstall the side panels and rear panel.

Recommendation: After replacing the filters, observe the air compressor running for 2 hours. Only leave after confirming normal operation.

Product Storage Environment Requirements:

Unused filter elements should be stored in a warehouse with relative humidity not exceeding 80%, free from corrosive gases, and well-ventilated. Improper storage may cause rust, mold damage, or other issues, rendering the filter elements unusable and potentially causing air compressor malfunctions.

No.	Fault Condition	Possible Cause	Trouble Shooting Method
1	High Unit Exhaust Temperature(Exceeding 100°C)	1.Unit lubricating oil level too low (Should be visible through oil sight glass, but not exceeding half);	1.Shut down and refill to normal oil level (between "H" and "L");
		2.Oil cooler dirty;	3.Replace oil filter;
		3.Oil filter clogged;	4.Replace thermostatic valve;
		4.Thermostatic valve malfunction (component failure);	5.Check solenoid valve for power or replace coil;
		5.Oil cutoff solenoid valve not energized or coil damaged;	6.Replace solenoid valve diaphragm;
		6.Oil cutoff solenoid valve diaphragm ruptured or aged;	7.Replace fan motor;
		7.Fan motor failure;	8.Replace cooling fan;
		8.Cooling fan damaged;	9.Repair exhaust duct;
		9.Exhaust duct obstructed or high exhaust resistance (back pressure);	10.Increase exhaust ventilation to lower room temperature;
		10.Ambient temperature exceeds specified range (38°C or 46°C);	11.Replace temperature sensor;
		11.Temperature sensor failure (Intellisys controlled units);	12.Replace thermometer;
		12.Thermometer failure (relay controlled units);	13.Increase cooling water flow;
		13.Insufficient cooling water flow;	14.Reduce cooling water temperature.
		14.Elevated cooling water temperature.	2.Oil cooler dirty;

No.	Fault Condition	Possible Cause	Trouble Shooting Method
2	High Differential Pressure in Oil Filter	1.Poor lubricating oil quality;	1.Replace with suitable lubricating oil;
		2.Differential pressure gauge not reset;	2.Reset differential pressure gauge;
		3.Contaminated lubricating oil	3.Replace lubricating oil and oil filter;
		4.Oil filter stored or used long-term in humid environment;	4.Replace oil filter and improve storage conditions;
		5.Oil filter has reached end of life.	5.Replace oil filter.
3	Air Filter High differential pressure	1.Poor external environment;	1.Improve external environment and replace air filter;
		2.Differential pressure gauge not reset;	2.Reset differential pressure gauge;
		3.Air filter stored or used in a humid environment for an extended period;	3.Replace air filter and improve storage environment;
		4.Air filter has reached end of service life.	4.Replace air filter.

No.	Fault Condition	Possible Cause	Trouble Shooting Method
4	High oil consumption or excessive oil content in compressed air	1.Excessive lubricating oil;	1.Check oil level and drain to between "H" and "L";
		2.Clogged oil return line;	2.Disassemble and clean oil return line;
		3.Improper installation of oil return line (distance from bottom of oil separator core);	3.Disassemble and reinstall;
		4.Low discharge pressure during unit operation;	4.Increase discharge pressure (adjust pressure switch to set value);
		5.Malfunctioning or damaged safety valve causing sudden pressure spikes exceeding oil-gas separator filter element tolerance, resulting in separator damage;	5.Replace safety valve and air-oil separator;
		6.Oil leakage from unit;	6.Inspect unit piping;
		7.Lubricating oil degraded or used beyond expiration date;	7.Replace lubricating oil;
		8.Pressure maintenance valve spring fatigued;	8.Replace spring;
		9.Air compressor overheating;	9.Inspect equipment;
		10.Lubricating oil too thin (high oil temperature, grade does not meet requirements);	10.Replace lubricating oil;
		11.Damaged oil return check valve;	11.Repair/replace oil return check valve;
		12.Damaged internal baffle in separator cylinder;	12.Repair/replace separator cylinder internal baffle;
		13.Incorrect oil type causing excessive foaming;	13.Replace with correct lubricating oil;
		14.Poor sealing of O-ring on external air-oil separator.	14.Replace external air-oil separator.

No.	Fault Condition	Possible Cause	Trouble Shooting Method
5	Oil and gas separator alarm	1. The differential pressure switch, pressure maintaining valve or safety valve of the air oil separator is damaged;	1. Replace the differential pressure switch, pressure maintaining valve or safety valve;
		2. When replacing the air oil separator, the lubricating oil, oil filter and air filter were not replaced at the same time;	2. Replace the lubricating oil, oil filter and air filter at the same time;
		3. The air oil separator is clogged;	3. Replace the air oil separator;
		4. Exceeded use of lubricating oil (if not replaced in time, long-term use will cause carbon deposits, coking, etc., which will inevitably cause the carbon deposits and colloids to adhere to the surface of the air oil separator filter element, shortening its service life);	4. Replace lubricating oil;
		5. The oil filter is overused;	5. Replace the oil filter;
		6. The air filter is overused;	6. Replace the air filter;
		7. Circuit system failure;	7. Check the circuit system;
		8. The differential pressure gauge did not reset after replacing the air oil separator;	8. Reset the differential pressure gauge;
		9. Pipeline system obstruction	9. Pipeline system dredging

No.	Fault Condition	Possible Cause	Trouble Shooting Method
6	Large unit current	1. Check for loose wiring and signs of heat or burning;	1. Tighten the wire;
		2. The unit pressure exceeds the rated pressure;	2. Adjust the pressure;
		3. The air oil separator is clogged;	3. Replace the air oil separator;
		4. The air filter is clogged;	4. Replace the air filter;
		5. Contactor failure;	5. Replace the contactor;
		6. The ambient temperature is too high;	6. Install exhaust equipment;
		7. Three-phase voltage is unstable, undervoltage, or too low voltage;	7. Improve the power system;
		8. Motor temperature controller failure;	8. Replace the temperature controller;
		9. Overload protector failure;	9. Replace the overload protector;
		10. The motor bearings are not oiled;	10. Add grease to the motor bearings;
		11. Motor bearing is damaged;	11. Replace the motor bearings;
		12. The main engine is faulty (the belt can be removed and turned manually or checked);	12. Repair/replace the host;
		13. Main motor failure (remove the belt and turn it manually or check it, and measure the starting current of the motor)	13. Repair/replace the main motor
7	Oil explosion and fire	1. High temperature (oil);	1. Eliminate the cause of high temperature;
		2. Poor environment (oil carbon deposits, low flash point);	2. Improve the environment;
		3. Fire caused by aging of electrical appliances/circuits;	3. Replace electrical appliances/circuits;
		4. Static electricity	4. Eliminate static electricity

General maintenance precautions

project	content	Inspection or replacement cycle (h) hours					Remark
		500	1000	2000	2500	4000	
air filter	Remove surface dust and impurities	✓ VS 16					The working time can be extended or shortened depending on the dust load
air filter	Replace the air filter			✓ VS 16		✓ VS 16	The working time can be extended or shortened depending on the dust load
Oil filter	Replace the oil filter			✓ VS 16		✓ VS 16	First 500 hours
Oil and gas separator	Replace the air oil separator					✓ VS 16	
lubricating oil	Replace lubricating oil					✓ VS 16	First 500 hours
Warning: If the environment is poor and dusty, the maintenance time should be shortened appropriately.							

Maintenance work recommendations

Weekly inspection items	Monthly inspection items	Quarterly inspection items
1. Check whether there is any abnormal sound or leakage in the unit	1. Check if there is rust or loose parts inside the machine. If there is rust, remove the rust, oil or paint it, and tighten the loose parts.	1.Remove dust from the outer surface of the cooler, fan cover, and fan blades
"2. Check whether the meterreading is correct"	2. Drain condensate	2. Add lubricating grease to the motor bearings"
"3. Check if the temperature display is normal"		3. Check whether the hose is aging or cracked"
		4. Check electrical components and clean the electrical control box"