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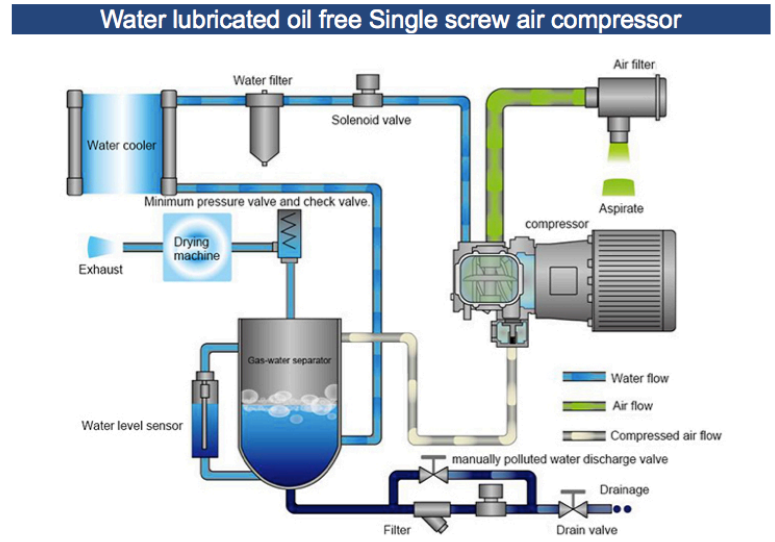
Water-lubricated Oil-free Technology

Adopting pure water as the lubricating medium instead of the oil to achieve the 100% oil free and clean air. (Germany Rhineland TUV Class 0 Certificated)

1 Lubricating water system work principle

- Lubricating (100% oil free);
- Cooling (Ideal isothermal compression <50°C);
- Sealing (high efficient)
- Denoising

Engineering flow chart



2 Advantages for Water-lubricating Oil-free Technology

If you look at total cost of ownership, Class 0 air compressors are well worth the investment.

1. **Cutting the maintenance costs and the treating oily condensate costs**
   Avoiding expensive oil, oil-filter, air oil separator, oil cooler costs.
   Low temperature reduces the stress on components ensuring long life.
2. **Avoiding energy lost due to hot air discharge**
   The superior cooling capability of water removes the heat and gives more air per kw of power.
3. **Avoiding the costs of extra energy to combat pressure drop due to filtering.**
   These costs, although not apparent at the time of purchase, are very high and contribute substantially to the total cost of ownership.

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3. Lubricating Water Quality

3.1 Requirements for Lubricating Water Quantity

The lubricating water circulates in the air compressor system, and the water quality is very important, it will be directly affect the performance, efficiency and service life. In order to prevent the corrosion, scaling and other impure and damage of the screw air end, cooler and pipelines, we use Pure Water as lubricating water, the detailed requirements of water quality can be seen in the following chart.

Generally, barreled drinking pure water can be used. If using tap water or underground water, please add the purify equipment to ensure the lubricating water quality.

Indicator	Unit	Standard	Main effect
Appearance		Clear and colorless	
Turbidity	NTU	≤2	
Total hardness ($CaCO_3$)	mg/l	≤50	Scale
PH (25℃)		6.5-8	Scale \ Corrosion
Electrical conductivity (25℃)	μs/cm	2-150	Scale \ Corrosion
Total iron content (Fe)	mg/l	<0.3	Corrosion
Alkalinity ($CaCO_3$)	mg/l	<50	Scale
Total solid solubility (TDS)	mg/l	1-75	Scale
Chlorine ions (Cl^-)	mg/l	<50	Corrosion
Sulfuric acid ions (SO_4^{2-})	mg/l	<50	Corrosion
Nitric acid (NO_3^-)	mg/l	<0.3	Corrosion
Silicon oxide (SiO_2)	mg/l	<30	Scale
Ammonia ions (NH4+)	mg/l	0	Corrosion
Manganese oxide [(CODMn(O)]	mg/l	<2.5	Slime

Note 1. Do not use ultrapure water or less Electrical conductivity (25℃) 2μs/cm water.
Note 2. The scales are caused by such minerals as calcium, magnesium carbonate, sulfates, phosphates, and silicates.
Note 3. If you use highly saline water, or if the water can't meet the requirements above. We can provide a water purifying system.

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3.2 The detection method for Water quality

One method is to find the third party water testing institutions for professional detection

The other simple detection methods for your reference:

1. Using softened water reagent: 3~4 drops for 20-30ml water sample.
   Blue qualified (0.03mmol/L); Red unqualified (0.3mmol/L).
2. Take a cup of hot sample water, pour the water into the soap, and gently agitated.
   The water bubble on the surface is soft water; a lot of hard scum on the surface is hard water
3. Use a beaker to heat the sample water, in the cup wall leave more scale is hard water.
   Because hard water contains more soluble calcium, magnesium material, after heating, they turn into insoluble material, precipitation impurity is hard water, the more impurities, the hardness of the water.

3.3 Problems of poor water quality:

Poor water quality and the environmental condition have a great influence on the service life of air compressors, especially bad to the water filter, easy to cause the water filter blocking (800 to 1000 hours), resulting in the exhaust temperature is too high.

- **Scaling:** inside of the pipeline is easy to accumulate knot inorganic scale. Due to the water containing high salt condensation and elevated water temperature and pH value increased reduced dissolution capacity, resulting in calcium accumulated: magnesium oxide, sulfate, silicate, inorganic scale.
  Pay special attention in winter, because of the low temperature, it is easy to produce scale. Using the water softener and replace the lubricating water 200 hours. Users must strictly comply with this requirement.
- **Deposition:** Lubricating water circulation pipeline and water filter are easy to accumulate mud. As the bacteria in the water and the dust in the air go into the circulating water system.
- **Corrosion:** although all the air compressor parts have been used anti-corrosion treatment, the poor water quality can also cause corrosion. The regular inspection for water quality and the replacement of spare parts are particularly important.

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4 Lubricating Water Automatic Adjustment System

4.1 Lubricating Water Automatic discharge and replenish

1. **Water level control**

   There is a water level indicator in the air-water separator barrel to show high or low level, and also configured the water drain value, make-up value and make-up pump.

2. **Automatic water discharging**

   When the air humidity is higher than the humidity of compressed air outlet, the water in compressed air will congeal to the air-water separator barrel, then the water level will be higher than the high-level point, so the water drain value is open automatically, and let water discharging until the water level go down.

3. **Automatic water replenishing**

   When the air humidity is lower than the humidity of compressed air outlet, the water in air-water separator barrel will discharge with the compressed air, then the water level will be lower than the low-level point, so the water make-up value is open automatically, and let water replenishing until the water level go up. The user should guarantee continuous water supply.

4.2 Lubricating Water Automatic replacing

The lubricating water quantity depends on different models and environment humidity. For example, the 30bar 10m3/min model, generally, first time about 300L, the automatic water changing period is about 500 hours, the time of water changing process is about 6 minutes. The user should guarantee continuous water supply.

4.3 Manual Replacement method for lubricating water

1. First: Disconnect the power supply of the starter. Ensure the air compressor completely stop and the air-water separator without air pressure.
2. Open the manual drain valve, draining the water in the air-water separator. Close the manual drain valve when there is no water in the separator.
3. Open the manual supply water valve and supply water to the air-water separator. When the water level between the upper and lower limit of the water level gauge, close the manual supply water valve.

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If the operating environment is poor (such as air containing more acid gas and so on), please shorten the water cycle to ensure water quality, avoid influencing the service life of the air compressor.

