

Analysis of and solutions for the blockage fault of refrigeration system

It is a matter of great concern to many people who have such problem that how to solve the blockage fault of refrigeration system. The main reasons for the blockage is the ice blockage in capillaries, filth blockage or greasy blockage, or the filth blockage in dry filter. After the refrigeration system is blocked, the refrigerant will not be circulated and the compressor will keep running for a long time, leading to the failure to refrigerate or slow refrigeration. As a result, the condenser is not heated. The following is a detailed introduction of the solutions for the blockage fault of refrigeration system.

(I) Causes and symptoms of ice blockage

The ice blockage is mainly due to the excess water in the refrigeration system. With the continuous circulation of the refrigerant, the water in the refrigeration system may gradually concentrate at the outlet of the capillaries, of which the temperature is so low that the water may be frozen and the generated ice will be gradually extended to a certain extent, to block the capillaries completely. Therefore, the refrigerant may not be circulated, and [the refrigerator fails to refrigerate things](#).

The main source of the water in the refrigeration system: The motor insulation paper inside the compressor contains moisture, which is the main source of water in the system. In addition, due to the inadequate drying, moisture may remain in the components and connecting pipes of the refrigeration system; the refrigerator oil and refrigerant may contain the water out of tolerance; in the process of assembly or maintenance, the pipes may be open for a long time, which causes the moisture in the air to be absorbed by the motor insulation paper and refrigeration oil. Due to the above reasons, the water content in the refrigeration system exceeds its allowable content, so that the ice blockage occurs. On one hand, the ice blockage may impede the refrigerant to be circulated, impacting the normal refrigeration of the refrigerator; on the other hand, moisture may produce chemical reactions with the refrigerant to generate hydrochloric acid and hydrogen fluoride, which will not only corrode the metal pipes and components and damage the insulation of motor winding, but also cause the deterioration of refrigerator oil, affecting the lubrication of the compressor. Therefore, the water in the system must be controlled to a minimum.

The symptom of the ice blockage in refrigeration system is normal operation during the initial stage, with the evaporator frosting, the condenser dissipating the heat, and the machine running smoothly. What's more, the circulation sound of the refrigerant in evaporator is clear and stable. With the formation of ice blockage, the sound of air flow becomes weakened and intermittent; as the blockage is serious, the sound of air flow may disappear, and the refrigerant circulation may be interrupted, leaving the condenser cooling down. Due to the blockage, the discharge pressure may increase, as well as the running sound of the machine, stopping the refrigerant from flowing into the evaporator, with a smaller frosting area and a gradually increased temperature. Meanwhile, the capillary temperature may increase as well, melting the ice. At this

moment, the refrigerant begins to be circulated again. After a period of time, the ice blockage may reoccur, causing a cyclical phenomenon of patency - blockage.

(II) Causes and symptoms of filth blockage

The filth blockage is due to excessive impurities in the refrigeration system. The main sources of impurities in the system are: the dust and metal filing generated during manufacturing the refrigerator, the detached oxide layer of the inner wall when welding pipes, not fully cleaned internal and external surfaces of various components during processing, adherent dust due to the unsealed pipes, impurities in the refrigerator oil and refrigerant, and the inferior desiccant powder inside the dry filter. Most of these impurities and powder will be removed by the dry filter, but when excessive impurities stack in the filter, some fine filth and impurities will be brought into capillaries through the refrigerant with a high flow velocity, and stacked in the bending sections of capillaries where the resistance is relatively high. The higher the resistance is, the more impurities are likely to remain, which will block the capillaries, and stop the circulation of refrigeration system ultimately. Besides, the close distance between the capillary and the filter of dry filter will easily lead to the filth blockage; moreover, the orifice of capillary is easily blocked when the capillary and dry filter are welded.

After the refrigeration system is blocked, the refrigerant will not be circulated and the compressor will keep running for a long time, leading to the failure to refrigerate the evaporator. As a result, the condenser and the housing of compressor are not heated. No sound of air flow in the evaporator may be heard. In the case of partial blockage, the evaporator may be cool or cold, but with no frost on it. It would be cold when touching the external surface of dry filter and capillaries, on which there will be frosting and even a layer of hoarfrost. It is because of the throttling and depressurization caused when the refrigerant flows through the partially blocked dry filter or capillary, which leads the refrigerant to expand, to vaporize and to absorb the heat, resulting in the moisture condensation or frosting on the external surface of the blockage.

The differences between ice blockage and filth blockage: The refrigeration may be restored after a period of ice blockage, resulting in the periodic repetition of patency and blockage. However, the refrigeration will be suspended after the filth blockage.

In addition to the filth blockage in capillaries, excessive impurities in the system will also block the dry filter gradually. Because of the limited capacity of the filter to filter out filth and impurities, the continuous accumulation of impurities will block the filter.

(III) Greasy blockage and other pipe blockages

The main reason for greasy blockage in the refrigeration system is the severe wear of the compressor cylinder or the excessive clearance between the piston and the cylinder.

The exhaust oil of compressor is discharged into the condenser, and then enters the dry filter along with the refrigerant. Due to the high viscosity, the oil will be blocked

by desiccant inside the filter. When the excessive oil blocks in the inlet of the filter, the refrigerant may not be circulated normally, stopping the refrigeration of refrigerator.

The reasons for other pipe blockages: When the pipe is welded, it is blocked by the solder; or when the pipe is replaced, the pipe to be replaced is blocked but not detected. The above blockages are both caused by human factors. Therefore, it is required that the operation and inspection shall be carried out as required when welding and replacing pipes, so as to avoid the blockages caused by human.