



Winter Freeze Protection for RV and Train Water Systems

Working Principle

Leveraging the thermal expansion and contraction properties of matter, material scientists have identified temperature-sensitive materials capable of highly responsive thermal detection. Building on this, Beijing Winning Thermo Control Equipment Co., Ltd. has developed the "Winning" anti-freeze valve. This innovative valve precisely monitors ambient and water temperatures, enabling intelligent, fully autonomous control without the need for an external power supply. The frost protection valve features a fail-open safety design. In the event of a malfunction, the valve remains in the open position to prevent system freezing caused by valve failure.

Application of Frost Protection Valves in Trains and RVs

Both trains and recreational vehicles (RVs) are equipped with comprehensive domestic water supply systems to ensure a comfortable and secure travel experience. Given the presence of these plumbing systems, effective freeze protection is essential during winter operations.

During vehicle layovers or power-down periods, self-actuating frost protection valves provide reliable freeze prevention without requiring an external power source. This autonomous operation effectively mitigates the risk of system damage caused by freezing, eliminating potential losses resulting from human error or operational oversights.



Operation

Designed for water system freeze protection, the anti-freeze valve automatically activates as ambient temperatures drop and water temperatures approach the freezing point, initiating a "drip-based" protection mode. As the discharged water cools further, the valve autonomously increases the drainage rate to effectively balance heat loss within the system. Once the water temperature recovers, the valve automatically closes. This mechanism ensures robust freeze protection while minimizing water consumption, offering a truly green and eco-friendly solution.



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Installation Precautions for Anti-Freeze Valves

1. The anti-freeze valve must be installed vertically facing downward, either at the pressure terminal of the pipeline (as shown in the figure) or before the pipeline enters the building. Failure to do so may result in stagnant water downstream, potentially leading to freeze protection failure in the downstream piping.
2. Install the valve at a location where it can accurately sense the lowest system temperature. Avoid installing it near heat sources (such as poorly sealed pipe inlets or adjacent to flue outlets), as this may prevent the valve from detecting the minimum temperature of the water supply system, rendering the freeze protection ineffective.
3. To minimize water discharge, thermal insulation must be applied to both the anti-freeze piping and the valve itself. If a drainage pipe is connected to the valve outlet, ensure smooth water outflow to prevent drainage blockage from interfering with the valve's normal operation.

4. An anti-freeze valve must be installed on every branch of the water piping that requires freeze protection.

(Please read these instructions carefully before installing the anti-freeze valve in your system.)



Frost Protection Valve
Underbody Installation Schematic (RV)

Specifications

Product Name	Model	Port Size	Material	Open/Close Temp. (°C)	Maximum Temp. (°C)	Maximum Pressure (MPa)	Flow Rate (Cv)	Dimensions (mm)
Freeze Protection Valve	FP15-35	DN15(1/2")	Brass	1~4	+95	1.0	0.6	φ25*63

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