

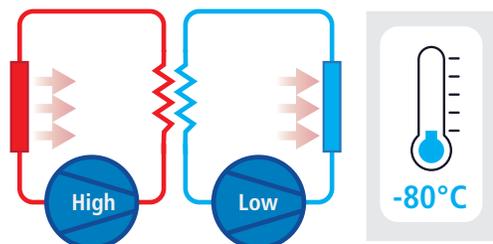


The Value of TwinGuard® Technology

The TwinGuard dual cooling system offers the highest level of sample protection through the use of two independent refrigeration circuits, each capable of maintaining ultra-low temperatures.

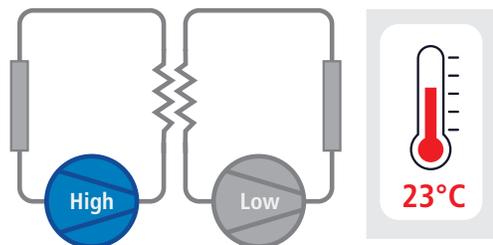
Traditional Cascade System

A conventional cascade refrigeration system uses two compressors that operate together in both high-stage and low-stage circuits to remove heat (energy) from the cabinet interior through the condenser. Each compressor must function for the freezer to achieve and maintain operating temperature.



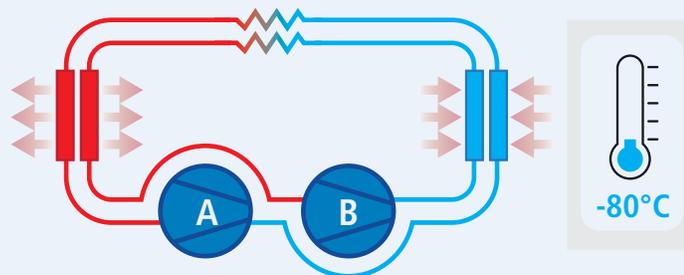
If One Compressor Quits

The two compressors achieve the ultra-low temperature. If either compressor does not operate, the freezer will not work.



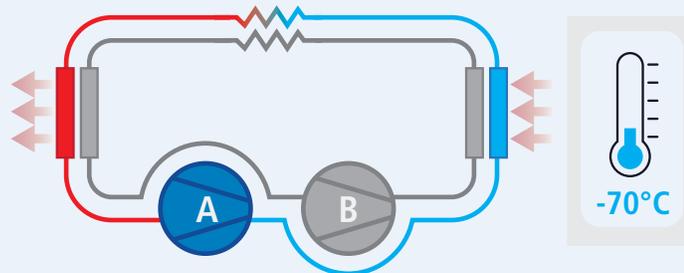
TwinGuard System

The TwinGuard is comprised of two independent refrigeration circuits, each powered by a single compressor and each operating independent of one another. Only one compressor is needed to pump the refrigerant through the circuit. If one circuit has a maintenance event for any reason, the other circuit is activated automatically.



Compressor in TwinGuard

The TwinGuard has two separate circuits each with only one compressor. Each circuit achieves ultra-low temperature by combining high and low-stage functions into a single mixed-refrigerant auto-cascade system. Both circuits can work independently or together to accelerate temperature recovery during door openings, or as automatic back-ups if one circuit has a service event.



Compressor or Engine Function

A refrigeration compressor is an engine that pumps refrigerant through the cooling circuit. The refrigerant absorbs heat and removes it from the cabinet.

Refrigerants must be compressed before they can expand to initiate the cooling function. Therefore, all ultra-low freezers, including those with linear motors, achieve compression. PHCbi brand ultra-low compressors, however, create a positive refrigerant flow with reserve cooling capacity to respond to door openings, added product loads or high ambient temperatures. Because linear motor compressors do not pump refrigerant through the evaporator, their reserved cooling capacity is limited by gravity.