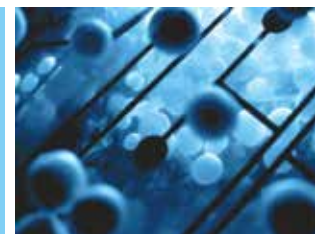


Innovative Technology to Improve the Quality of Human Life

SmartCryo™ Ultra Low Temp. Freezer with SHFS™ System



Innovation of Freezing System

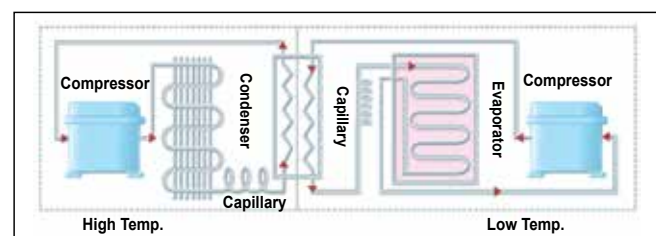
witeg SHFS™ System (Simplified Hi-Efficiency Freezing System)

Most of the Ultra-Low Temperature Freezers has two compressors cooperating with each other to drop the internal temperature down to -86°C as shown in the following figure and its overall freezing mechanism is very complicated.

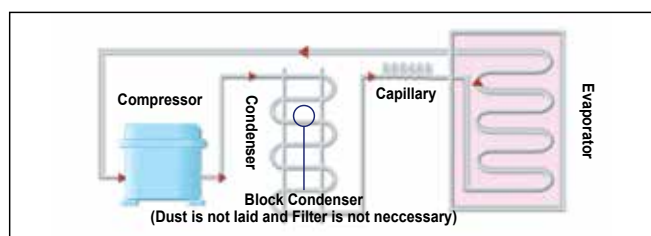
However, our new SHFS™ uses only single compressor. Even though, single set of a compressor, a capillary tube, a condenser and an evaporator is incorporated, it ensures the temperature down to -86°C by an advanced control technology of the compressor and the process of specially mixed refrigerants. SHFS™ overcomes technical complexity of the typical cascaded double compressor system. Simplification of the freezing mechanism and electricity minimizes the noise, power consumption and failure of operation.

High-Efficiency! User Safety! Energy Conservation! Long Life time of "The New Generation SHFS™"

Simplified Hi-Efficiency Freezing System Mechanism : Easy Maintenance



Typical Cascaded Compressor System
Two Freezing cycles contribute Complicated mechanism



New Simplified Hi-Efficiency Freezing System
Single freezing cycle works only!!
(Dust is not laid and Filter is not necessary)

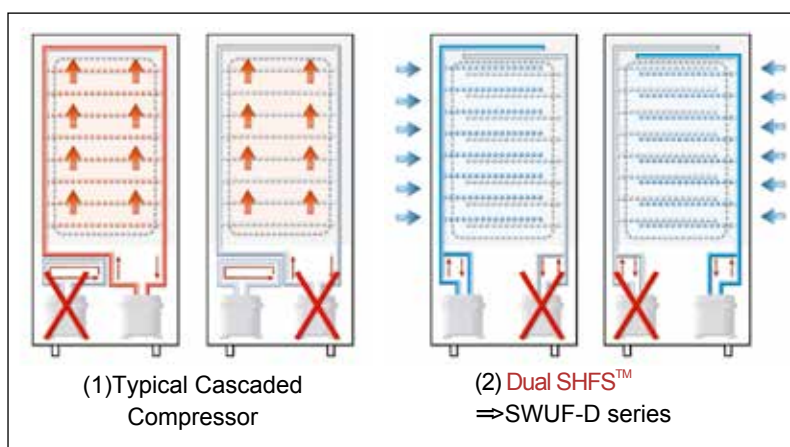
Doubled Stability and Robustness! Dual SHFS™ (SWUF-D models)

We offer an extraordinary high-stability system powered by two Simplified Hi-Efficiency Freezing System (SHFS™) operating independently. Normally, both of the two compressors are running, and it drops the temperature inside the storage chamber down to -95°C. Even if one SHFS™ fails in operation by a certain unexpected problem, the other SHFS™ still works and maintains ultra-low temperature down to -80°C. It means one SHFS™ works as a 'backup' of the other SHFS™. This innovative mechanism realizes doubled stability, robustness and fault tolerance, which are the most important feature of the ULT freezer needed by all the customers.

- ▶ The lowest temperature of -95°C is ensured by Dual SHFS™ system running independently and simultaneously

- ▶ Fault Tolerance System
- Realization of doubled stability and robustness

- ▶ Incomparable Fast and Powerful Freezing
- Fast Recovery of Target Temperature



- (1) Complicated mechanism
⇒ If one of compressor fails, temperature would go up

- (2) Even if one of the two SHFS™ fails to run, the other one is still running properly
⇒ Minimum - 80°C

Fastest Freezing by SHFS™



Comparison Data of Freezing Speed between competing products



Time Taken to Reach Down to Ultra Low Temperature

Model	Dual SHFS™			SHFS™ Simplified Hi-Efficiency Freezing System				
	SWUF-D300 308Lit.	SWUF-D500 503Lit.	SWUF-D700 683Lit.	SWUF-300 308Lit.	SWUF-500 503Lit.	SWUF-80 82Lit.	WUF-41 375Lit.	WUF-51 438Lit.
Temp.				Upright Type			Chest Type	
	-80°C	-86°C	-90°C	-80°C	-86°C	-90°C	-80°C	-86°C
	160min.	180min.	240min.	240min.	330min.	150min.	120min.	150min.
	270min.	300min.		270min.	420min.	270min.	210min.	270min.

× Tested with the room temperature of 30 ~ 33°C

Eco-Friendly Green Freezer

Dual SHFS™ models offer "Eco-mode", in which the freezer activates the two compressors by turns based on the preset period (8 to 99 days), after reaching down to the set temperature. This specially programmed operation results in dramatically lower energy consumption and much longer lifespan of the compressor.

	Start	X day	24hr	X day	24hr	
COMP.1	ON	ON	ON	OFF	ON	ON
COMP.2	ON	OFF	ON	ON	ON	OFF

< Compressor Cycle for Eco Mode >

Simple Mechanism for high-efficiency and safety.

- It is not requested to have oil separator which separates oil from the compressor, Although oil separator is equipped, it is not possible to completely separate oil from the compressor, which possibly cause oil frozen problem in capillary.
- Not necessary to have expansion tank as temporary storage of high-pressure gas
- Using Block condenser without typical pins : Dust Free, Filter Free, more users friendly from maintenance and safety perspective, no need for filter cleaning

Configuration for user's convenience

- With the adoption of thermal temperature sensor through cable port, it is possible to monitor and check the temperature using separate instruments
- Equipped signal terminal to enable user to easily connect external temperature alarm system
- Automatic Vacuum Breaker to easily open the door against pressure difference between the chamber inside and outside