

# Air cycle system “PascalAir” for ultra-low temperature cold storage

Energy-saving  
**34%** reduction  
as compared to  
conventional systems

## Ultimate natural refrigerant “air” realizes the world of minus 100 degrees Celsius

“PascalAir” is a refrigeration system using the ultimate natural working fluid, air. The system is an open type system circulating air directly in a cold storage as working fluids. It compresses air, removes the compression heat, and expands the air adiabatically to cool in a cold storage using air.



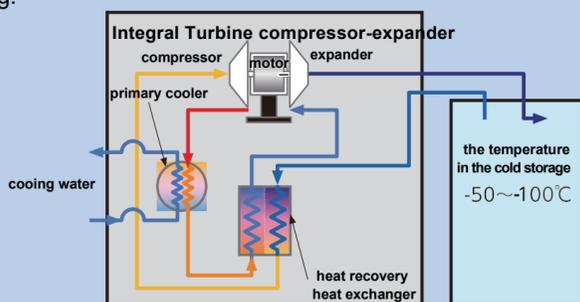
### Technical features

Eco-friendly

#### Direct circulating air

Refrigerant is air which has zero ozone depletion potential (ODP) and zero global warming potential (GWP).

Using the ultra-low temperature air directly in a cold storage as working fluids, the system generates an ultra low temperature compressing, heating, and expanding air after cooling.

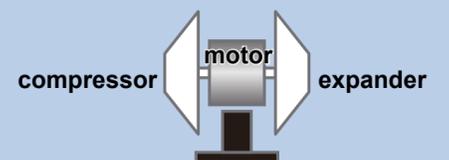


Energy-saving

#### Integral turbine expander-compressor

Utilizing the power generated by expander as compressor auxiliary power

Both compressor and expander are turbine type and this machine has coaxial geometry with a built-in motor in the center. Since the power of expansion is utilized as auxiliary power for the compressor, the required power for the compressor is two thirds of the power of conventional compressors.

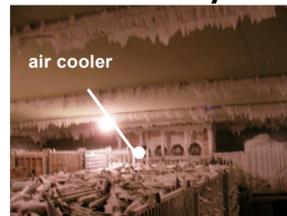


### Benefits

No more air cooler in the cold storage  
Only air ducts of blown-out and intake are needed for installation  
Significant reduction of heat loss from defrosting

- There is no need to provide an air cooler in the cold storage.
- No heat load of fans and no heat exchange loss
- Frost from moisture in the air can be treated in the cooling system.
- Notification application for installation is not required since this system is exempt from the High Pressure Gas Safety Act.
- No need for recovering and recharging refrigerant
- It is possible to renew the cold storage while operating the existing cold storage.

#### Conventional system



Installation of large scaled air cooler  
Heat transfer performance decline with frosting  
Periodical defrosting is required  
Large-scale air circulation  
\* Large air flow

#### PascalAir



No need for installing air cooler  
Only air ducts of blown-out and intake are needed for installation  
No need to defrost  
\* Decreasing heat load of the system  
Air circulation  
\* One tenth as compared to conventional systems

### Application

- Ultra-low temperature cold storage for bonito/tuna
- Food rapid freezing system
- Vacuum Freeze-dry
- Chemical process cooling after chemical reactions
- Medical care/product cooling
- Manufacturing process for semiconductors  
Cryogenic crushing etc.

Ultra-low temperature(-55°C) cold storage with the capacity of 8K ton



PascalAir

In the cold storage

### Specifications

Model	PAS15	PAS30
Refrigerant	Air	
Cooling capacity	15kW	30kW
Compressor brake power	30kW	60kW
Temperature(in the warehouse/blow in from the expander)	-60 / -80 °C	