

Natural coolant, the first choice for refrigeration

Smart Modularized NH₃/CO₂ Secondary Refrigerant Units

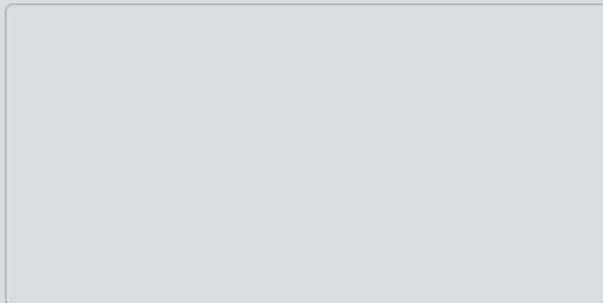
SRM · Sweden

Address: No.120, Farr Murdo Fagan, Nacka District, Stockholm City, Sweden
Tel: +46 (0)8 466 45 00
Fax: +46 (0)8 466 45 01

SRM · China

Address: Cave West Road, Min jiang kou Industrial District of Fuzhou, Fujian, China
Tel: +86 (591) 28701111
Fax: +86 (591) 28709222
Website: www.snowman.cn
Email: service@snowman.com
Service hotline: +86 (591) 28675500

Distributors



Snowman reserves the right to change its products without notice in advance. The technical parameters shall be subject to order contract or technical appendix of the contract.

SRM Sweden

The inventor and leader of screw compressor
100-year legacy of technical quality & energy efficiency

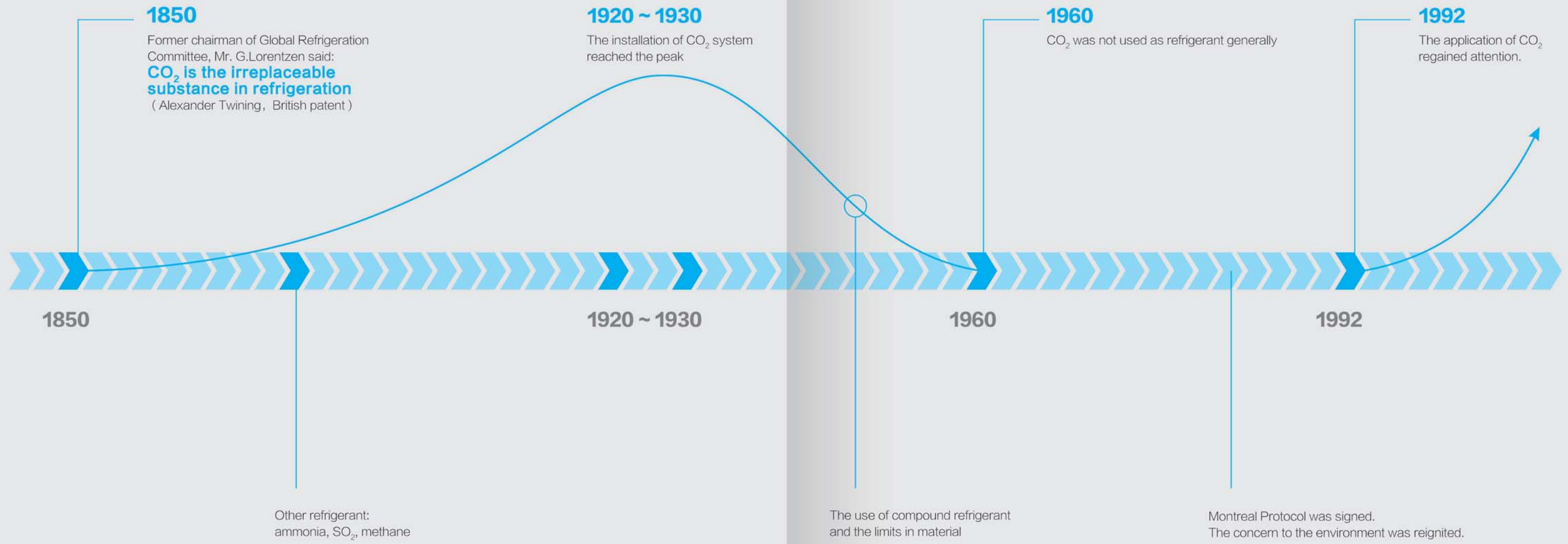
Nature



To protect ozone and phase out the use of HCFCs, the semi-hermetic VSD NH₃/CO₂ screw compressor developed by our company has become the exemplary project designated by UN Montreal Multilateral Foundation. By participating this project, we take our responsibility to phasing out HCFCs and preserving mother nature.



The Chronicle Of The Application Of CO2 In Refrigeration

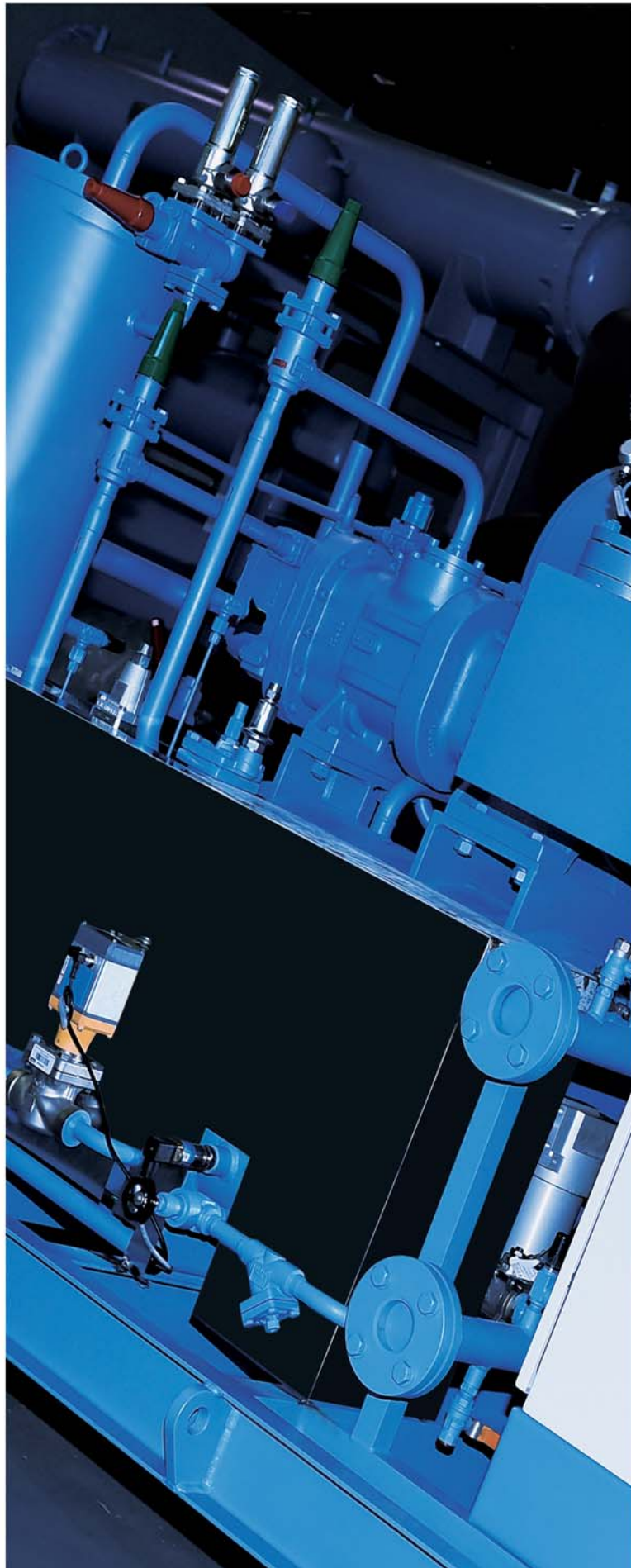


The future of refrigeration



Safe, Efficient, Smart, Modularized Compressor Units

The idea solution for future refrigeration system

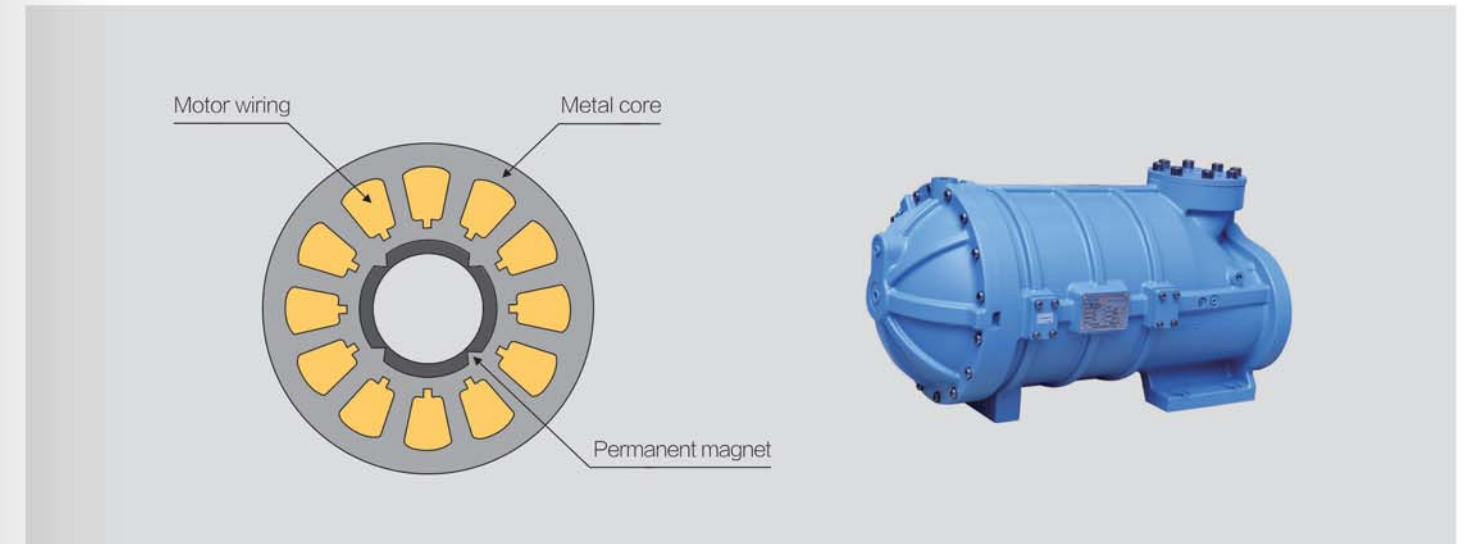


ENERGY SAVING

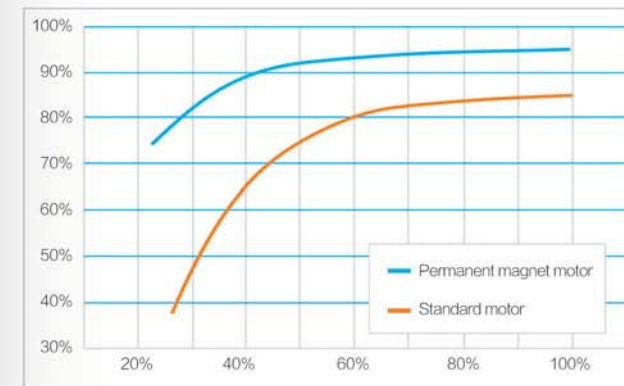
- Refrigeration substance with high efficiency
 NH_3 has the best thermal properties at -35 deg Cas refrigerant. CO_2 has great thermal properties and fluidity under low temp. NATURE compressor unit combines the two in a perfect way and has high efficiency.
- Screw compressor with high efficiency
 The compressor unit adopts the most advanced **semi-hermetic 2-stage screw compressor technology** and **"MEI technology" from SRM** equipped with high speed permanent magnet synchronous motor. The design is innovative and efficiency is high.
- Highly efficient VSD technology
 Compressors coupled with SVPWM control, which distributes torque properly, have improved efficiency.
- Heat exchanger with high efficiency
 The latest plate&shell heat exchangers from VAHTERUS, our global strategic partner has been used. The heat exchangers use specially shaped plate and compact design, which reduces the refrigerant charge significantly;
 Heat exchange through patterned plates with low fouling is highly efficient;
 80% more space is saved compared to traditional shell-tube heat exchangers;
 Round plate and shell design-stronger structure;
 Fully welded plate bundle-no need for gaskets;
 Unique design-resistant to heat and pressure impact;
 Anti-explosive, anti-leaking, anti-corrosive;
 Frozen proof, strong, reliable and never crack.



The illustration of high speed permanent magnet synchronous motor



- High speed VSD permanent magnet synchronous motor
 High power factor, little copper loss, generally 10% more energy saving than standard motors.



- Clean and safe CO_2 system
 CO_2 system is completely clean without refrigeration oil remnant. Its performance under low temperature is significantly better than traditional ammonia or Freon system. Temperature drops faster; operation time is lower; less electricity cost. Meanwhile, there is no refrigeration oil remnant in pipelines, air coolers or drainage pipes.
- Precise control
 Highly precise electrical actuated valves combined with unique PID control mode can adjust load faster and more precisely to improve efficiency further on.
- Industrial grade reliable valve components
 Compressor unit uses valves, filters, transmitters from internationally renowned companies to improve COP and achieve higher precision in control.

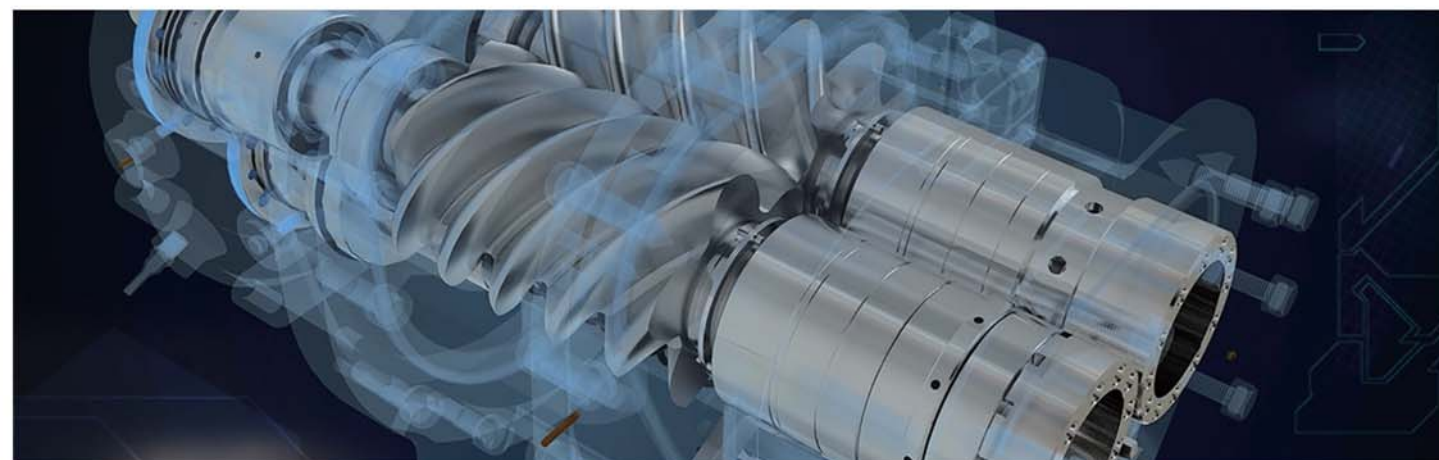
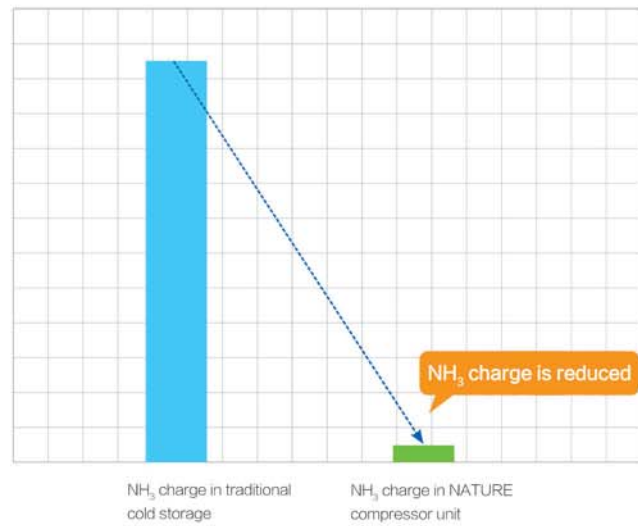




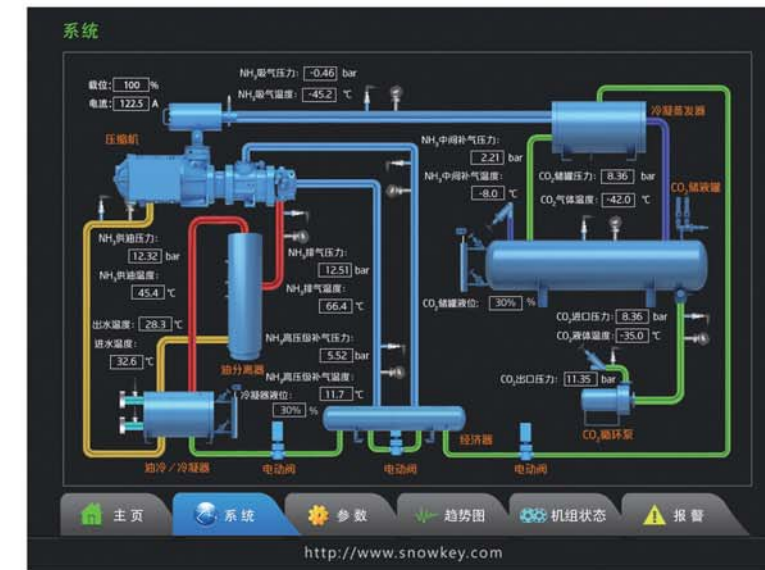
- Natural working substance
CO₂ comes from nature, toxic less, inflammable;
- High standard design
High standard safety design for the continuous operation of CO₂ system, such as bypass on high pressure side, double seat safety valve, vent design and etc.;
- Smart and safe
Smart control system with a multitude of preventive safety protection and alarming functions;
- Factory test guaranteed
Screw compressor units pass factory test in all performance range to assure reliability;
- Reliable oil return
Refrigeration oil is only stored inside compressor units with multiple oil return protection. Except under maintenance, there is no need to add in more oil. It completely solves the oil leakage, oil supplement or oil collection problems of the traditional low temp system;
- Tightly sealed
Integrated design of screw compressor and motor with reliable sealing to eliminate the risk of leakage.

Lower the risk of NH₃ leakage

NH₃ only exist inside the compressor unit, so the amount of charge is low.



- Convenient control
One-button start, humanized UI, multi language support.
- Dynamic tracking
Real-time monitoring, auto logging of operative parameters and failures.
- Safety protection
Equipped with preventative safety protection system, no need for personal.
- Remote communication
Compressor unit can do remote communication, such as remote control, diagnose and alarming.

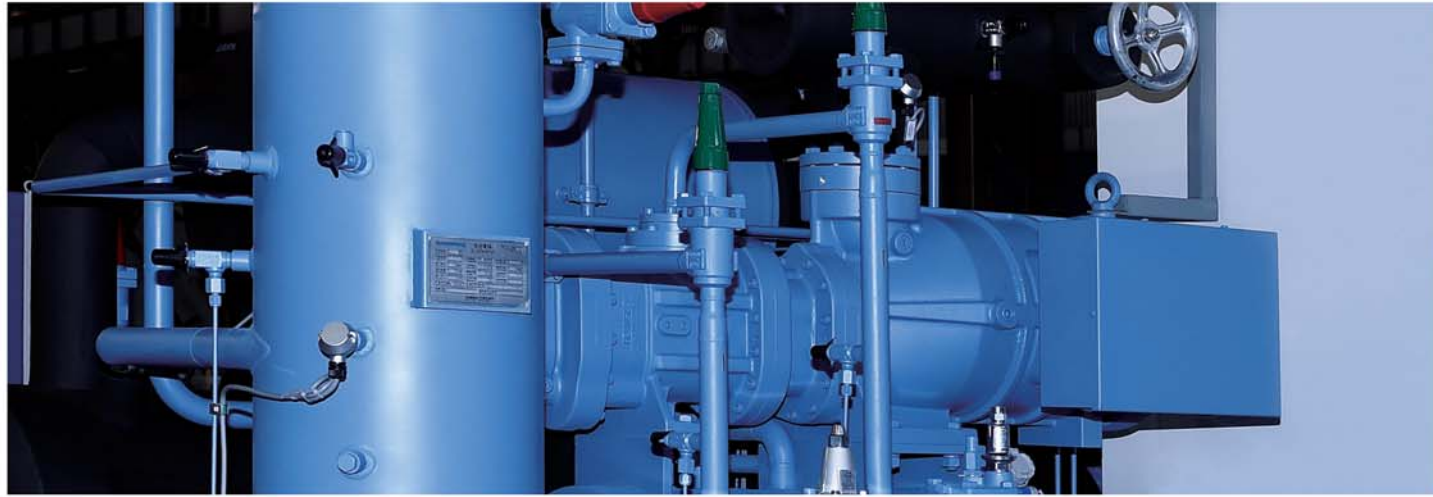


The illustration of smart remote control



Screw Refrigeration Compressor With High-Efficiency

Globally renowned Sweden SRM screw compressor technology, manufactured completely according to European industrial standard, guaranteed stable operation around the clock.

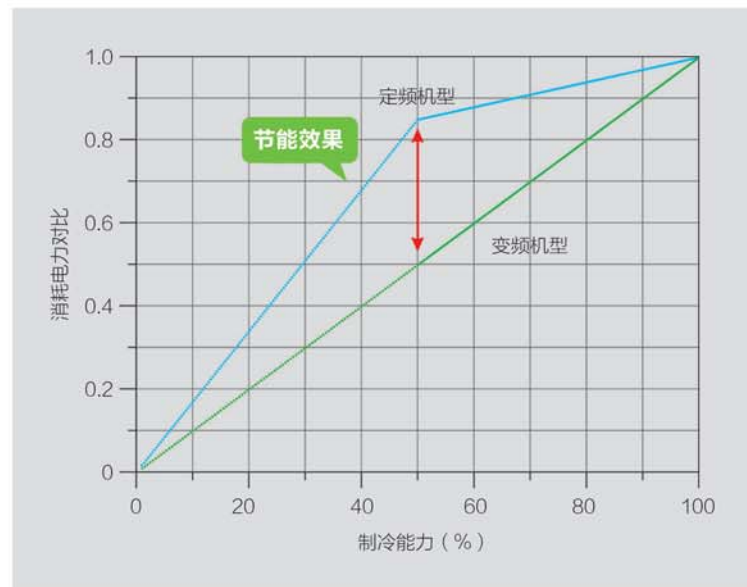


SRS ammonia semi-hermetic 2 stage screw compressor
MEI technology

Advanced SRM "I" type profile line used on rotors,
Optimized 5+7 gear ratio, most energy efficient,
High speed VSD permanent magnet synchronous motor.

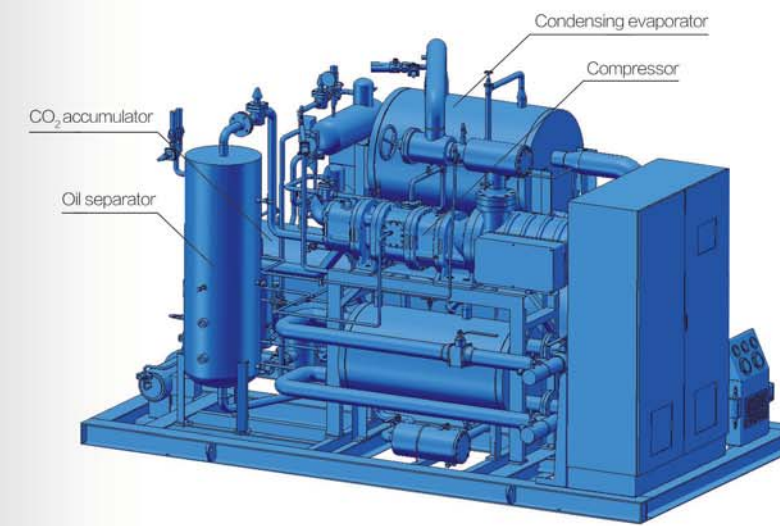
SVPWM VSD control

Compressor combines high speed VSD permanent magnet synchronous motor and MEI technology, adopts SVPWM vector VSD control, distributes motor torque properly, and improves efficiency. **Energy cost saving is up to 38%** in partial loading.



NH₃/CO₂ Compressor Unit System And Structure

NH₃/CO₂ Compressor unit uses CO₂ as secondary refrigerant and combines with NH₃ refrigeration system as cascade system. The high temp system connects with lower stage through condenser and evaporator. The evaporator used in high temp stage is also used as condenser for lower stage.

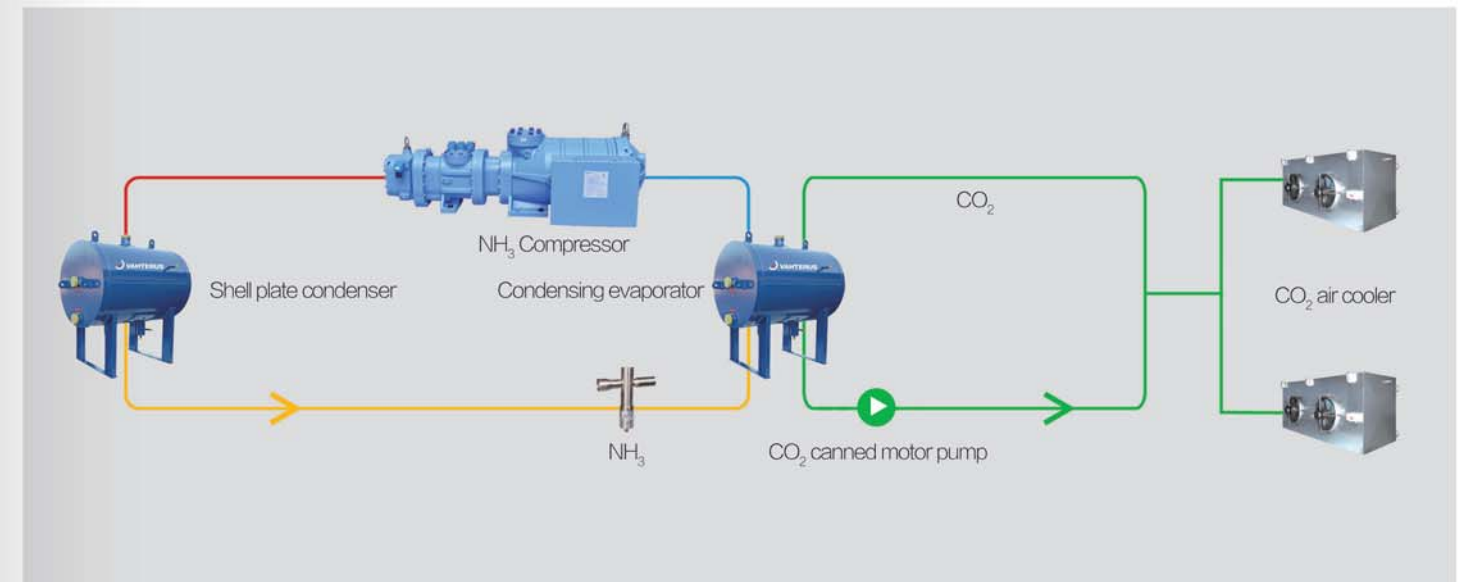


The features of NH₃/CO₂ compressor unit

- The most advanced SRM ammonia screw compressor in the world;
- adopt the vast control strategy to improve IPLV by more than 35%;
- highly integrated shell plate heat exchanger, integrated heat exchanging and oil separation, high heat exchanging efficiency, compact structure, semi-hermetic structure, high pressure resistance, safety assurance;
- Smart system + Internet, safe and convenient, dynamic tracking and remote communication at the same time;
- Equipped with preventative safety system, fully optimized operation, operation crew reduced by 80%;
- Modular design, reduced cost in machine room design, 70% of reduced construction work on-site. Distributed and centralized installation can be chosen freely, which is convenient for transportation and installation;
- **ammonium charge can be greatly reduced, no need to report for potential hazard, suitable for national safety policy.**

NH₃/CO₂ secondary refrigerant system

NH₃/CO₂ compressor units adopt refrigerant as NH₃, which has highest efficiency



High-efficiency Refrigeration Screw Compressor

Engineering data of NATURE Series NH₃/CO₂ secondary refrigerant unit

CO₂ Supply Temp: -5°C (Single stage compressor, -20°C~10°C working condition)

Model	Compressor						NH ₃ Charge level (kg)	Outline dimension LxWxH(mm)	Net weight (kg)
	Working condition (°C)	Model	Type	Cooling capacity (kW)	Power consumption (kW)	COP			
NATURE 235C	-8/35	SRS-12L	Single stage single machine	236.9	64.2	3.69	70	3200×2100×2000	3500
NATURE 355C		SRS-14L		355.6	96.4	3.69	100	3300×2100×2600	4000
NATURE 475C		SRS-16L		473.9	126.4	3.75	120	3600×2200×2800	4500
NATURE 600C		SRS-18L		598.7	159.2	3.76	170	4500×2300×2800	6000
NATURE 790C		SRS-20M		792.3	210.7	3.76	200	4800×2500×3200	7000

CO₂ Supply Temp: -32°C (2-stage compressor, suitable for low temperature storage, freezer application)

Model	Compressor						NH ₃ Charge level (kg)	Outline dimension L×W×H(mm)	Net weight (kg)
	Working condition (°C)	Model	Type	Cooling capacity (kW)	Power consumption (kW)	COP			
NATURE 120R	-35/35	SRS-1210SS	2-stage single machine	118.3	52.8	2.24	30	3200×2100×2000	3400
NATURE 170R		SRS-1210LL		167.4	74.4	2.25	50	3600×2100×2000	4200
NATURE 235R		SRS-1612LS		233.5	103.3	2.26	65	4300×2300×2800	5300
NATURE 465R		SRS-2016LS		464.8	202.1	2.30	140	4800×2500×3200	6300

CO₂ Supply Temp: -42°C (2-stage compressor, suitable for blast freezer application)

Model	Compressor						NH ₃ Charge level (kg)	Outline dimension L×W×H(mm)	Net weight (kg)
	Working condition (°C)	Model	Type	Cooling capacity (kW)	Power consumption (kW)	COP			
NATURE 120F	-45/35	SRS-1210SS	2-stage single machine	70.1	42.5	1.65	30	3200×2100×2000	3200
NATURE 170F		SRS-1210LL		98.4	59.3	1.66	50	3600×2100×2000	4000
NATURE 235F		SRS-1612LS		141.8	83.4	1.70	65	4300×2300×2800	5000
NATURE 465F		SRS-2016LS		281.1	163.4	1.72	140	4800×2500×3200	6000

Note: 1、 Only part of models are listed in the table. Please contact us for more information.

2、 Service condition:

· Ambient temperature: +5°C~+40°C

· Refrigerant oil: only provided or authorized by snowkey

· Cooling water condition: Cooling water quality should meet the requirement of Code For Design Of Industrial Recirculating Cooling Water Treatment

· Entering temperature of cooling water : +15°C~+32°C

Applicable area

Under low temp, CO₂ is widely used in the refrigeration system for different application, different temp zone, because of its great thermal properties and fluidity. CO₂ refrigeration system is suitable for cold storage, low-temperature refrigeration, food blast freezing, brine water ice making, ice storage, chemical pharmaceutical industry, marine refrigeration, sport and other areas. Common CO₂ refrigeration system includes CO₂ secondary refrigerant system, CO₂ cascade system and etc.



CO₂ Cascade System

-50°C

CO₂ Secondary Refrigerant System

-42°C

Glycol secondary Refrigerant System

-5°C

15°C



SRM 100 years

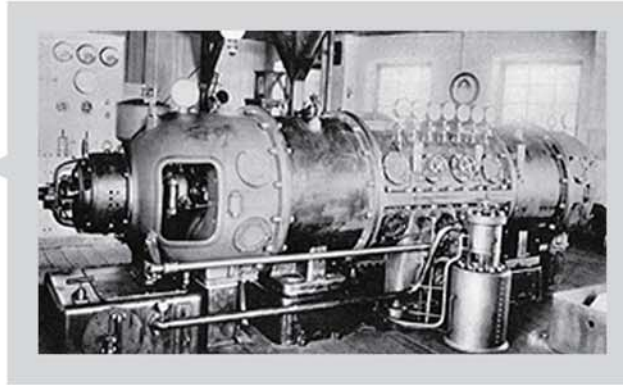
of highly efficient development in industrial technology and systems of resources and energy

In 1908, the founder of SRM invented the first double rotation turbine, which starts its journey to be the pioneer of technical creation and revolution.

In 1930s, SRM invented the first screw compressor, and from then on, SRM have provided screw compressor and screw expander solutions for their clients. Nowadays, almost 90% of screw compressors in the world originated from the patented technologies of SRM.

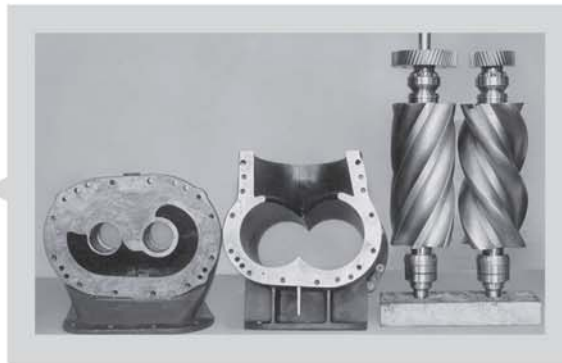


1908



The first double rotating steam turbine in the world.

1934



The first screw compressor in the world.

1946

Sweden SRM company conferred compressor technology license to British Howden company, Howden company became the first licenser for manufacturing screw compressor. Then SRM company authorized technology license to many companies in Europe, America and Asia one after another.
It has developed successively screw compressors for:
Europe: Howden, Atlas, Aerzen, Grasso, Sabro;
America: YORK, TRANE, Carrier, Frick, Ingersoll Rand, Thermoking;
Asia: Snowman, HITACHI, Mayekawa, KOBELCO, MITSUBISHI, IHI, LG.

2000

Sweden SRM company developed successfully the first oil-free refrigeration screw compressor in the world.

SRMTEC