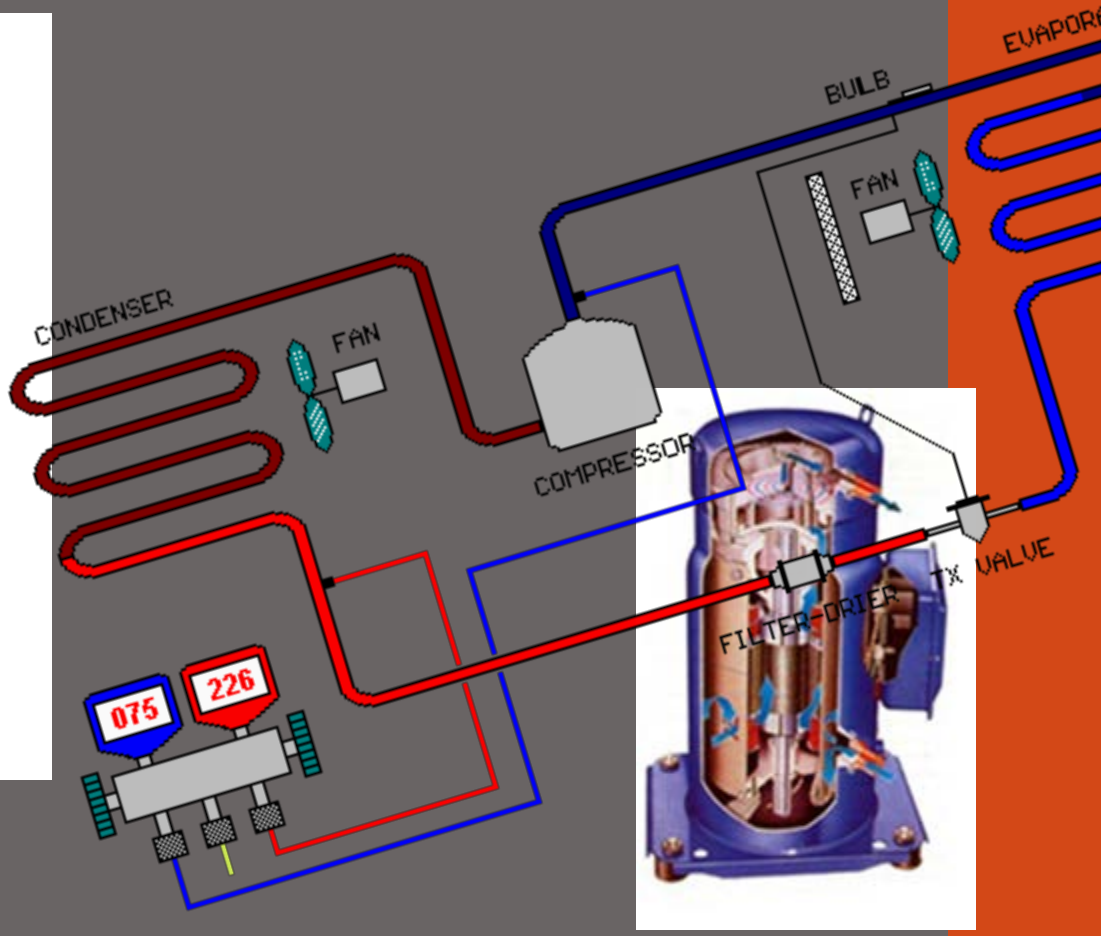
Refrigeration System

Onboard of M.V. SEAFDEC 2



INTRODUCTION

The history of artificial refrigeration began when Scottish professor William Cullen designed a small refrigerating machine in 1755. Cullen used a pump to create a partial vacuum over a container of diethyl ether, which then boiled, absorbing heat from the surrounding air. The experiment even created a small amount of ice but had no practical application at that time.

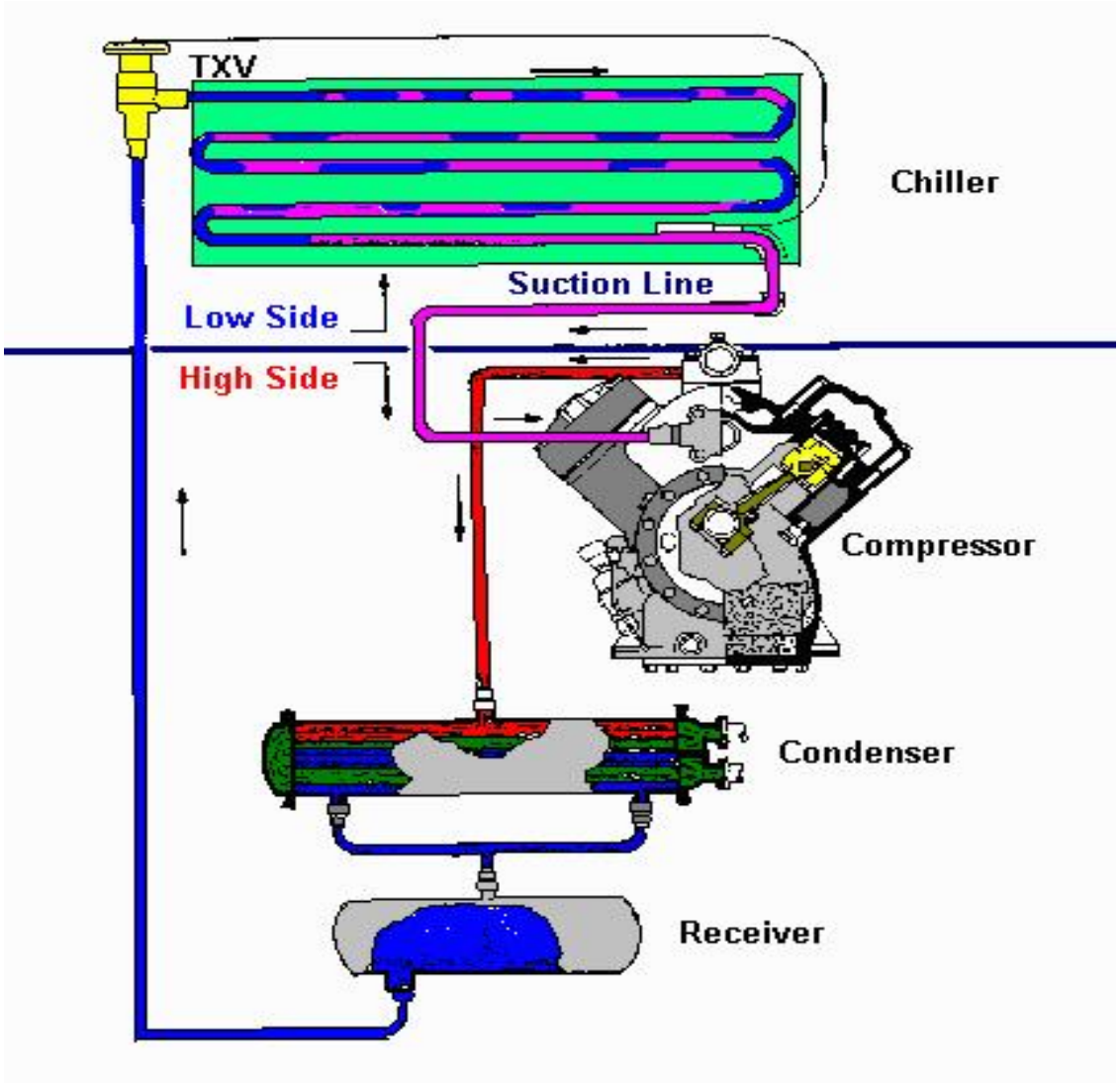
In 1758, Benjamin Franklin and John Hadley, both are professors of Chemistry, confirmed that the evaporation of highly volatile liquids, such as alcohol and ether, could be used to drive down the temperature of an object past the freezing point of water.

In 1805, American inventor Oliver Evans described a closed vapor-compression refrigeration cycle for the production of ice by ether under vacuum.

In 1820, the English scientist Michael Faraday liquefied ammonia and other gases by using high pressures and low temperatures, and in 1834, an American expatriate to Great Britain, Jacob Perkins, built the first working vapor-compression refrigeration system in the world.

Nowadays all over the world, every family had the refrigerator for used in routines like preparation of a cool beverage, and storage of fresh vegetables and meat for daily consumption. The refrigerating machine onboard of M.V. SEAFDEC 2 which is high speed multi-cylinder and open type. This machine is operated automatically by using thermostat in each part such as fish hold, freezing room and provision storage.

REFRIGERATION SYSTEM

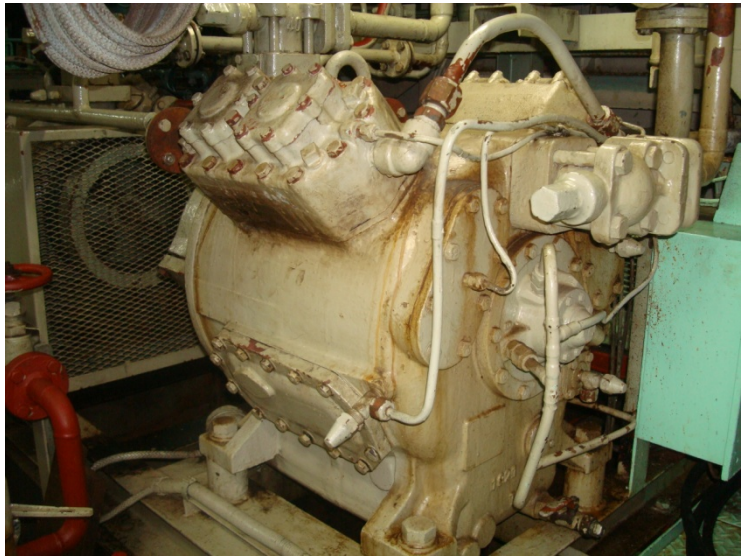


EVAPORATOR

The evaporator is to remove unwanted heat from the product, via the liquid called as refrigerant. This liquid contained within the evaporator is boiling at a low-pressure. The level of this pressure is determined by two.

COMPRESSOR

The compressor is to draw the low-temperature, low-pressure vapor from the evaporator via the suction line. Once drawn, the vapor is compressed. When vapor is compressed, it rises in temperature. Therefore, the compressor transforms the vapor from a low-temperature vapor to a high-temperature vapor, in turn increasing the pressure. The vapor is then released from the compressor into the discharge line.

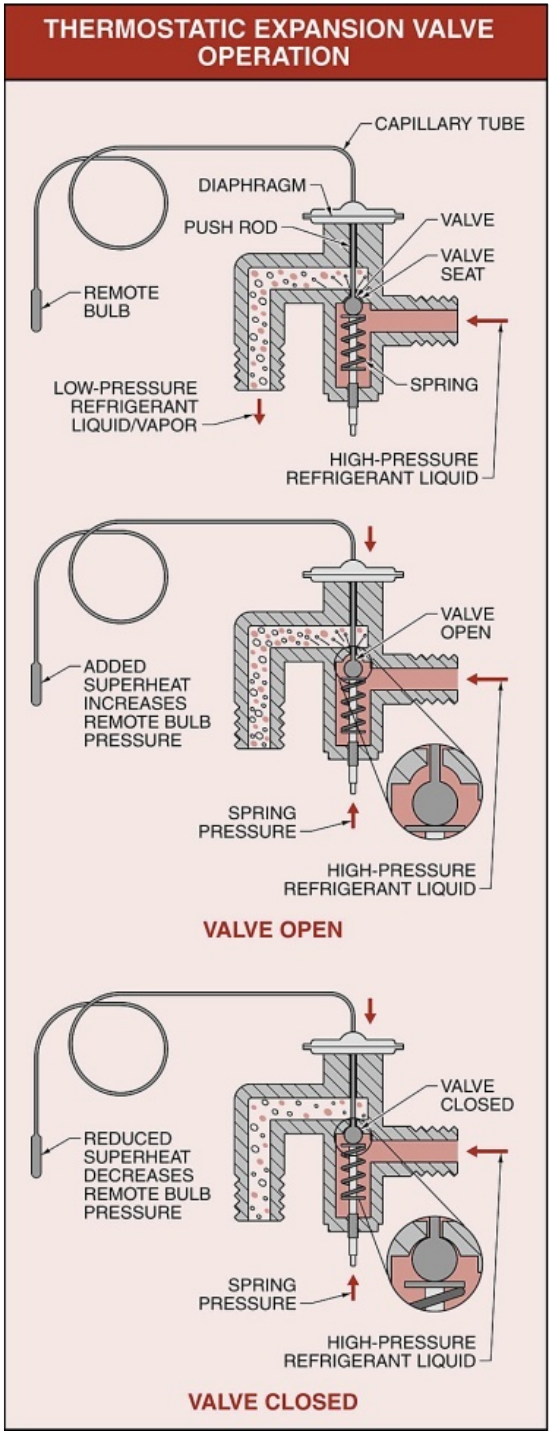


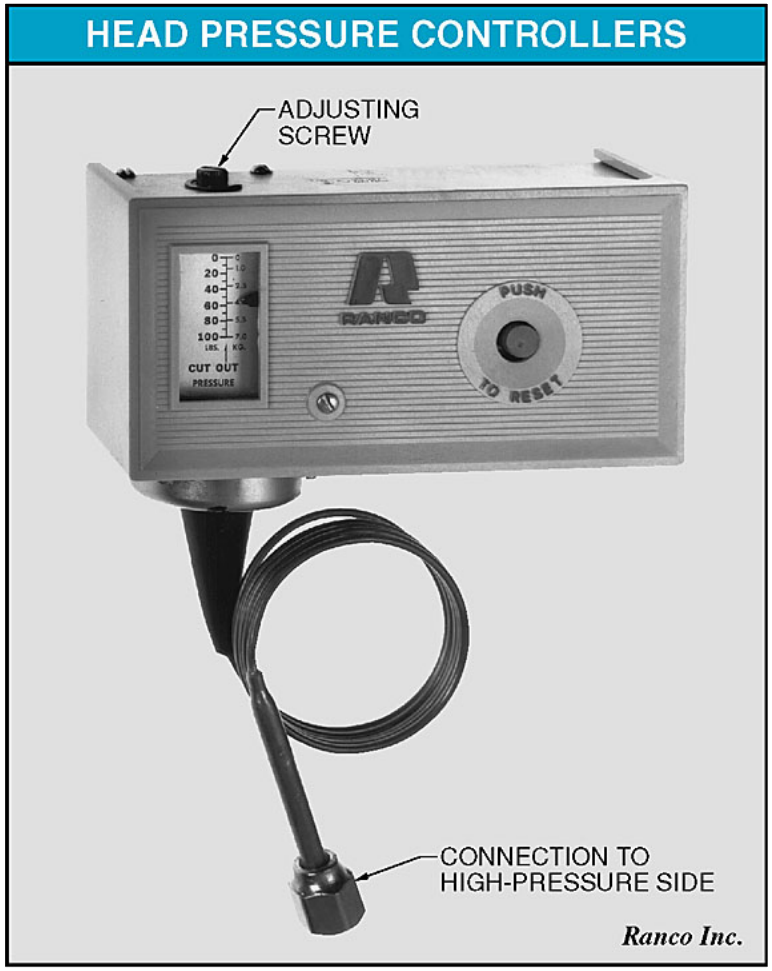
CONDENSER

The condenser is to extract heat from the refrigerant to the outside.

EXPANSION VALVE

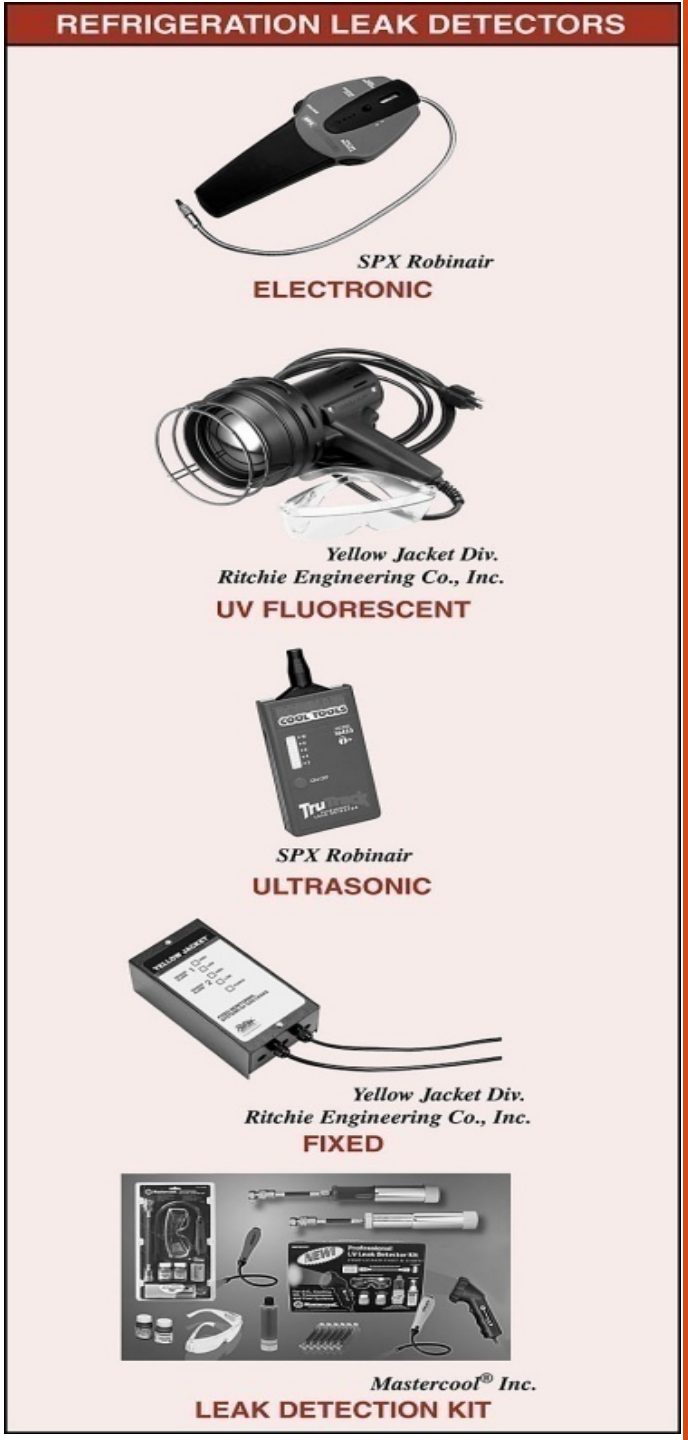
Within the refrigeration system, the expansion valve is located at the end of the liquid line before the evaporator.

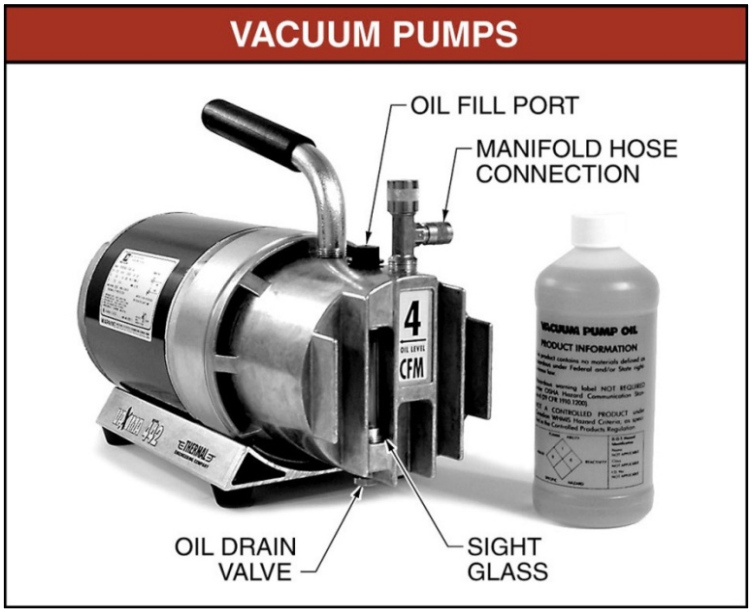




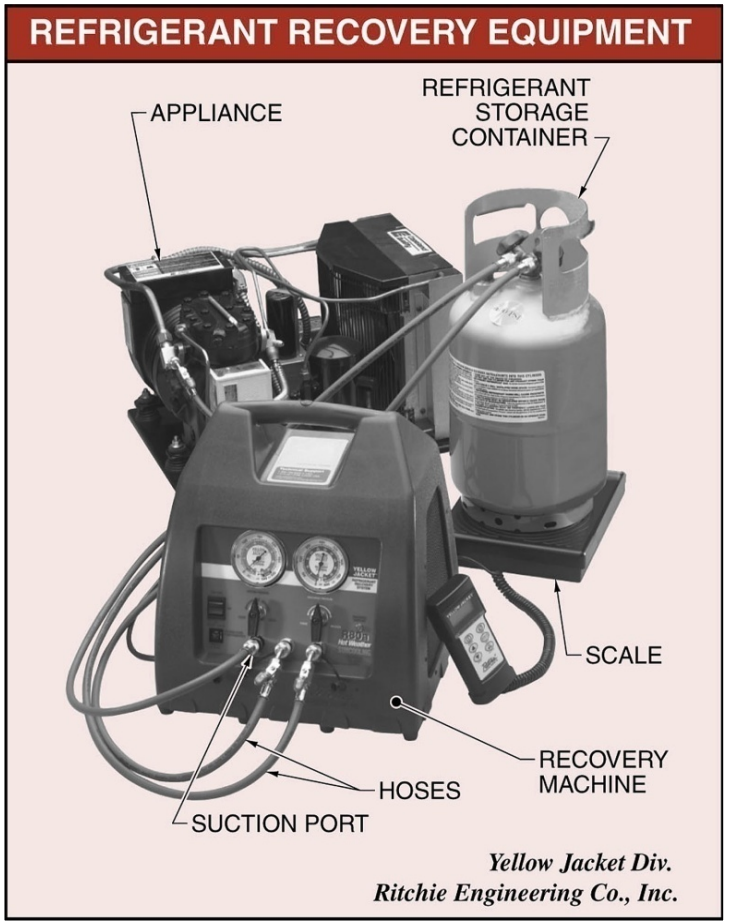
A head pressure controller prevents the condenser pressure from falling too low and starving the evaporator for refrigerant.

A leak detector is a device used to detect refrigerant leaks in air conditioning or refrigeration systems.



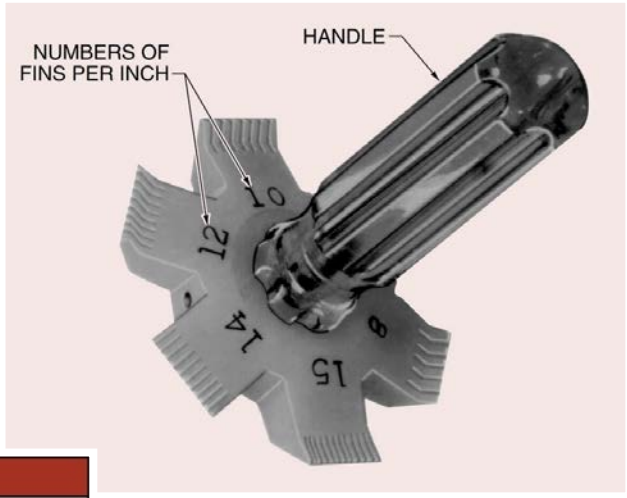


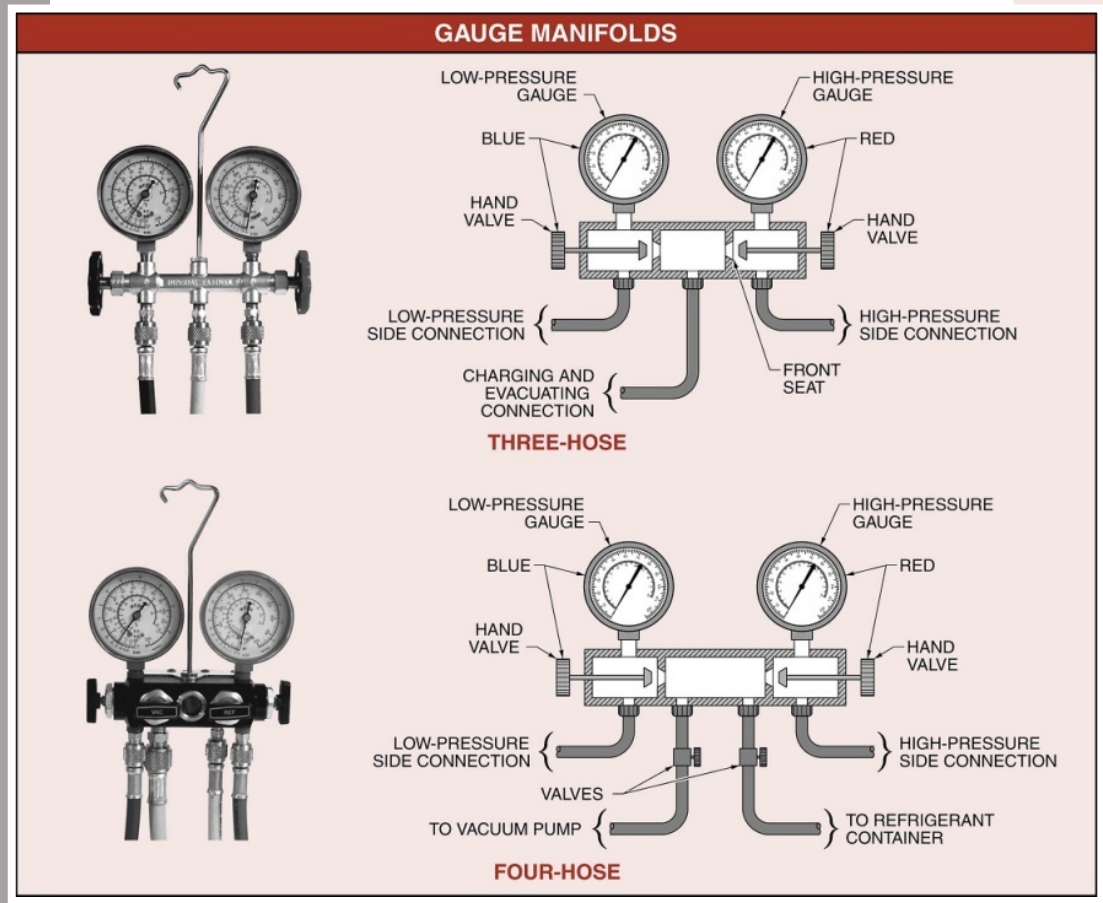
A vacuum pump removes all air from a refrigeration system.



A recovery unit is used to recover refrigerant for reuse.

A Fin Comb is used for condenser maintenance to straighten damaged or bent fins, which limit airflow and reduce condenser efficiency.



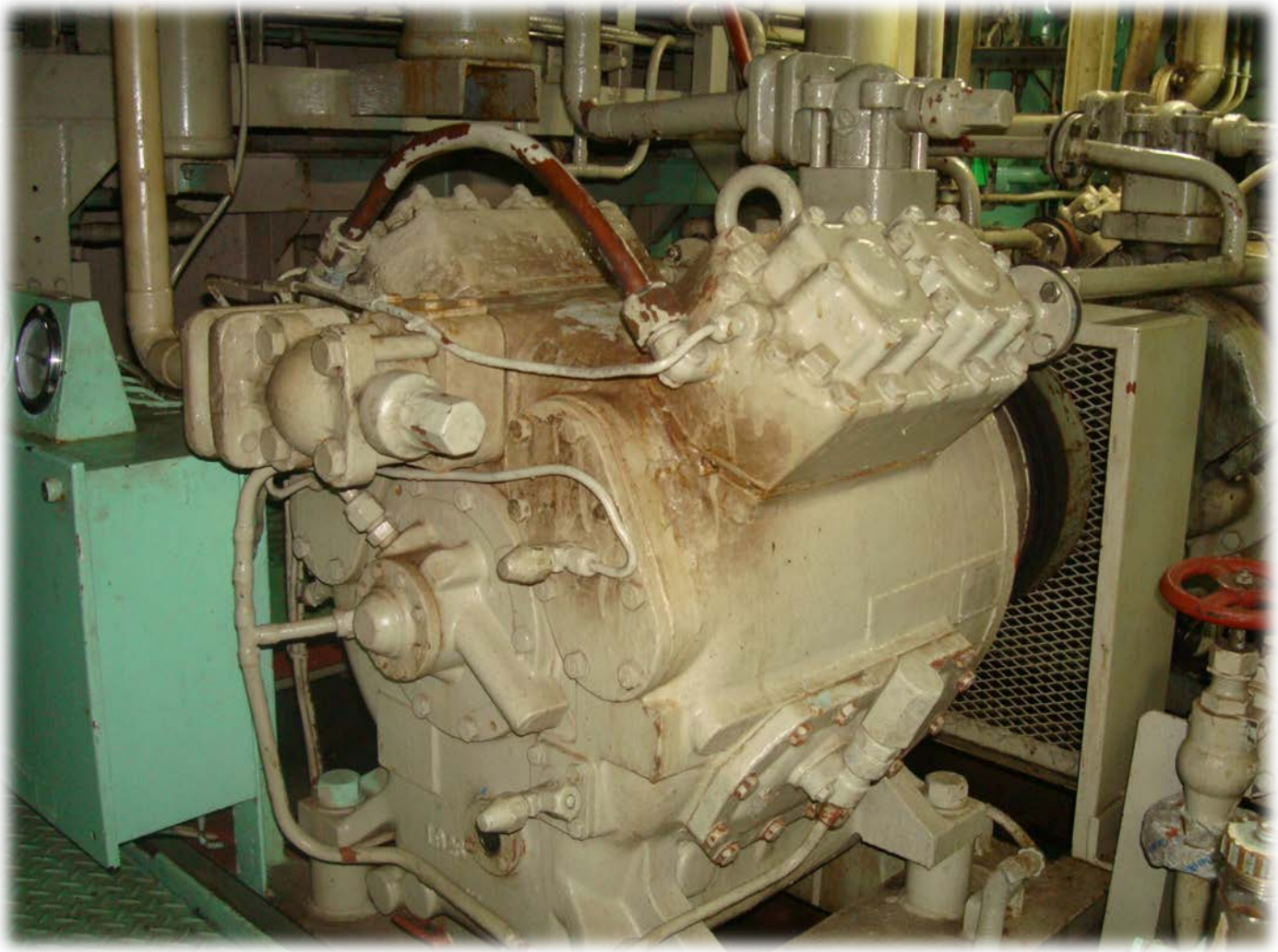


Gauge Manifolds are used to take pressure readings, add or remove refrigerant, and remove air from a system before it is filled with refrigerant.

REFRIGERANT

The refrigerant is to conduct the heat from the product In order for the refrigeration cycle to operate successfully each component must be present within the refrigeration system.

THE REFRIGERATION ONBOARD M.V. SEAFDEC 2



FISH HOLD

- Two (2) compartment of fish hold (heat conduction)
- Each hold value about 10 m^3
- Maintain temperature 0 C^o to - 30 C^o
- 0 C^o (stow ice fish) - 30 C^o (frozen fish)
- Evaporator: Hair pin coil

INSIDE FISH HOLE

FREEZING ROOM

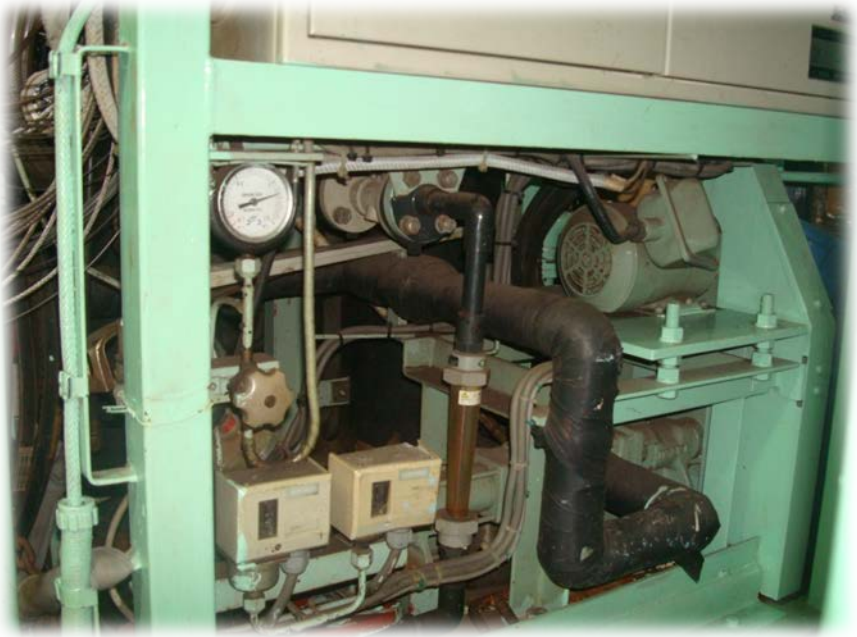
- Freezing method
  - Semi-air blast system

- Freezing capacity
  - Total 290 kg of round tunas (-30 C° in 36 hr)
  - Total 140 kg of 10 kgs pans (-30 C° in 10 hr)
  - 10 kg x 7 shelves x 2 times

INSIDE FREEZING ROOM

SLURRY-ICE MAKER

- Raw water: Mixed seawater and fresh water (heat conduction)
- Slurry ice: 5,000 kg/day (at ice content about.20%)
- Ice making capacity: 1,000 kg/day




407C
134a
408A
R29D
404A
406
R22
R152a
409A
507
R152a
410A
R600a

THANK YOU