International Journal of Scientific Research in Engineering and Management (IJSREM)
Volume: 08 Issue: 04 | April - 2024 SJIF Rating: 8.448 ISSN: 2582-3930

Air Conditioning

Mr. Lokesh Kumar, 20ME38CL, Student, B.Tech. Mechanical Engineering (Evening), School Of Mechanical Engineering, Lingaya's Vidyapeeth, Faridabad, Haryana
Mr. Vinay, 20ME37CL, Student, B.Tech. Mechanical Engineering (Evening), School Of Mechanical Engineering, Lingaya's Vidyapeeth, Faridabad, Haryana

Guide: Mr. DK Bhalla

Abstract: The working principles and the basic features of air conditioning systems are introduced in this paper. With the improvement of standard of living, air-conditioning has widely been applied. The increasing demand for comfort air-conditioning has brought within the need for greater numbers of practical, technical and sales personal who have should training in basics principles and applications of modern air-conditioning. The technical information presented in this work is intended to satisfy the immediate and fundamental concepts and relevant principles in the field of air-conditioning. The subject of air-conditioning has come to stay with the universities in the country.

Keywords: Air-conditioning, Technology, Cooling system

Introduction: The science and practice of creating a controlled climate in indoor spaces is called air conditioning. Man, inhabitants all the parts of the world-from Antarctica to the African deserts. Only in a very few favoured areas of the earth's temperate zone can people live and work comfortably round the year without any air conditioning. From the earliest times, artificial cooling has been recognized as desirable. In every era people have invented primitive methods for cooling strictly as a luxury rather than as a necessity-snow, ice, and cold water when available were used for small-scale cooling. Atmospheric evaporation of water was also used crudely without much understanding of the underlying principles. The primitive method of heating for comfort, was building open fires in caves and tents. Fireplaces in medieval Europe were hardly an improvement. Ancient Romans circulated warm air in hollow floors or walls to provide radiant heating. This was an improvement over the localized radiation from a fireplace. Around 2500 BC, the method of ice making by radiative cooling by sky at night time from water kept in shallow earthen pots was popular in dry climates in India, Egypt, and China. Until the 20th century, Americans dealt with the hot weather as many still do around the world: They sweated and fanned themselves. Primitive air-conditioning systems have existed since ancient times, but in most cases, these were so costly and inefficient as to preclude their use by any but the wealthiest people. In the United States, things began to change in the early 1900s, when the first electric fans appeared in homes. But cooling units have only spread beyond American borders in the last couple of decades, with the confluence of a rise ng global middle class and breakthroughs in energy-efficient technology. Attempts to control indoor temperatures began in ancient Rome, where wealthy citizens took advantage of the remarkable aqueduct system to circulate cool water through the walls of their homes. The emperor Elagabalus took things a step further in the third century, building a mountain of snow—imported from the mountains via donkey trains—in the garden next to his villa to keep cool during the summer. Marvellously inefficient, the effort presaged the spare-no-cost attitude behind our modern-day central air-conditioning systems. Even back then some scoffed at the concept of fighting heat with newfangled technologies. Seneca, the stoic philosopher, mocked the "skinny youths" who ate snow to keep cool rather than simply bearing the heat like a real Roman ought to. Such luxuries disappeared during the Dark Ages, and large-scale air-conditioning efforts didn't resurface in the West until the 1800s, when well-funded American engineers began to tackle the problem. In the intervening centuries, fans were the coolant of choice. Hand fans were used in China as early as 3,000 years ago, and a second-century Chinese inventor has been credited with building the first room-sized rotary fan (it was powered by hand). Architecture also played a major role in pre-modern temperature control. In traditional Middle Eastern construction, windows faced away from the sun, and larger buildings featured "wind towers" designed to catch and circulate the prevailing breezes. Air Conditioning System An air conditioning system, including a condenser for condensing a refrigerant,

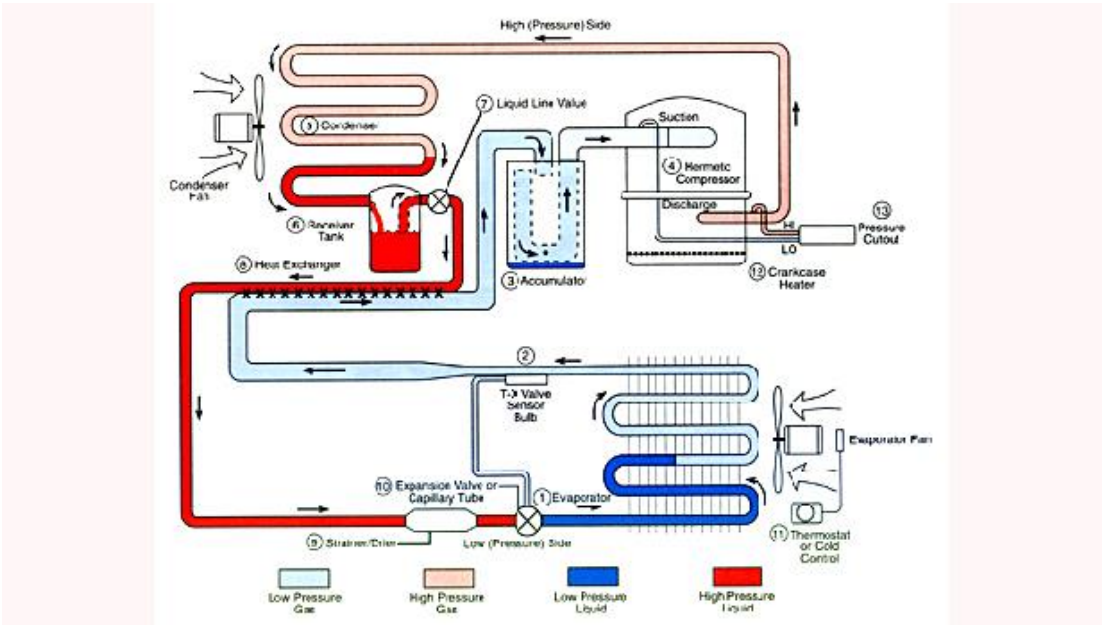
a first expansion device for throttling the refrigerant passed through the condenser, a second expansion device for throttling the refrigerant passed through the first expansion device, an evaporator for evaporating the refrigerant passed through the second expansion device, a compressor for compressing the refrigerant passed through the evaporator and the refrigerant injected after branched between the first expansion device and the second expansion device, and a control unit for detecting a value of at least one operating parameter and determining a target opening degree of the first expansion device on the basis of a stored set value corresponding to the detected value of the operating parameter. Background 1. Field of the invention the present invention relates to an air conditioning system, and more particularly, to an air conditioning system, w hitch can improve the performance and stability of the system. 2.Discussion of the Related Art Generally, an air conditioning system is a device for cooling or heating an indoor space by performing compression, condensation, expansion and evaporation of a refrigerant. The air conditioning systems are classified into a normal air conditioner including an outdoor unit and an indoor unit connected to the outdoor unit and a multi-type air conditioner including an outdoor unit and a plurality of indoor units connected to the outdoor unit. Moreover, the air conditioning systems are classified into a cooling air conditioner supplying a cool air only to an indoor space by driving a refrigerant cycle in one direction only and a cooling and heating air conditioner supplying a cool or hot air to an indoor space by driving a refrigerant cycle selectively and bi-directionally. The air conditioning system includes a compressor, a condenser, an expansion valve, and an evaporator. The refrigerant discharged from the compressor is condensed in the condenser, and then expands in the expansion valve. The expanded refrigerant is evaporated in the evaporator, and then sucked into the compressor. In a cooling operation or heating operation, a gaseous refrigerant is injected into the compressor, thus improving performance.

What is a Refrigeration Ton?

The term refrigeration ton is a little bit confusing to many people. It has nothing to do with the weight of the machine. It only relates to the amount of cooling that the machine can produce.

So a ton of refrigeration is how much heat needs to be removed from a ton of water (US short ton) to turn it into ice within 24 hours. This is only for the latent heat, so the water would need to be at zero degrees Celsius, 32 degrees Fahrenheit, and the ice would then also still be at zero degrees Celsius, 32 degrees Fahrenheit.

Refrigeration Cycle



Types of Air-Conditioners

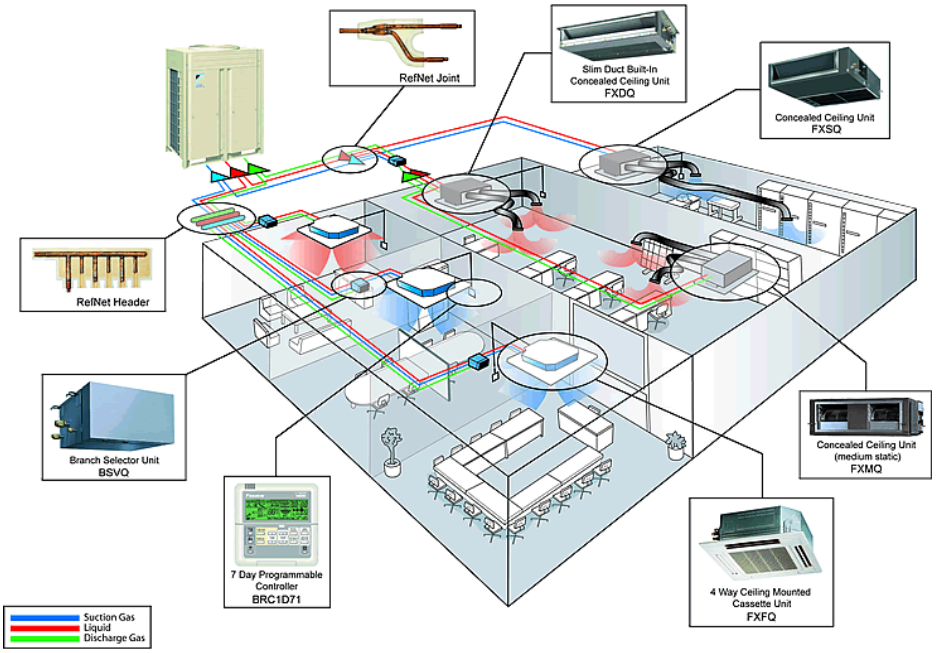
Willis Carrier developed the earliest version of our current air conditioning technology in 1902. He created a mechanical unit that blew air over coils filled with cold water. The invention was designed to control humidity more than temperature. Cold air can hold less moisture than warm

1. Unitary Type Air Conditioning Systems (Self Contained)

   a) Room AC : Window and Split

   b) Commercial AC : Ductable, Cassette, Roof tops, Package

2. Variable Refrigerant Flow Air Conditioning Systems



3. Central Air Conditioning Systems

The differences between VRF and split AC are

- VRF systems are typically better for commercial buildings with more square footage, while split AC units are ductless systems used more often in residential settings.
- VRF systems with heat recovery can simultaneously heat and cool different parts of a building.
- Split air conditioners are generally ductless and thus better for residential spaces with less infrastructural space.