

Kertas Kerja Eksekutif

***TEACHING AND LEARNING APPARATUS FOR PRESSURE AND
TEMPERATURE BASED SYSTEM***

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Teaching and Learning Apparatus for Pressure and Temperature Based System.

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Abstract

The present invention describes an improved teaching and learning apparatus for refrigeration and air conditioning system as part of the teaching module as a subject in schools polytechnics, community college, universities and other technical institution to overcome the difficulties of teaching and also to improve the student knowledge and skills in the field of refrigeration and air conditioning. The present invention has figured out some important components that need to be included into the existing air conditioner simulator to overcome the above problems. The teaching and learning apparatus system of the present invention provides more benefits to the learners as compared to the existing air conditioner simulator. It is very user friendly. It provides

easier understanding to the learners in the conceptual aspect of air conditioner. The lecturer can teach the more easily and the teaching time will be shortened. Hence, the teaching of refrigeration and air conditioning subject becomes more effective. It is also a good example in showing the real air conditioning system to the learner. Beside, the learner can also do some homework exercise such as experimenting with the present teaching and learning apparatus.

1 Introduction

The present invention relates to a teaching and learning apparatus. More specifically, the present invention relates to improved the apparatus of refrigeration and air conditioning as part of the teaching and learning module in technical schools, polytechnics, community college, universities or other technical institution to overcome the difficulties of teaching and learning in the field of refrigeration and air-conditioning and also to improve the student knowledge and skills.

2 Background of the Invention

Each individual has different learning style and taste. This become the main purpose for the research task in finding the new strategic to overcome the problem in educational field. At the same time the result of the research can produce a group of intelligent and knowledgeable student. The process of teaching and learning in this new era need media like this invention . It can help up in transferring data and give

information to achieve of the study that are getting complex nowadays. Further more this study kit can teach the students become more independence and solve the problem of having difficulties in finding reference book. (Baron & Orwing 1997).

The statement of the result of engineering students are not very good compare to the students who are not in engineering field need to be finalize again. This might be cause by the teaching style which are not suitable with the condition of the students. With this purpose this research is form by using study kit as a media in the process of teaching and learning in the classroom. By using this study Kit the students can understand the content of study more easily compare to the formal study. This is because this study kit is module based and was created to upgrade the skill of the engineering students especially in the higher education.

The idea of air conditioning started before a machine was created to produce the cooling effect desired. The first attempt at building an air conditioner was made by Dr. John Gorrie (1803-1855), an American physician, in Apalachicola, Florida. During his practice there in the 1830s, Dr. Gorrie creating an ice-making machine that essentially blew air over a bucket of ice for cooling hospital rooms of patients suffering from malaria and yellow fever.

In 1881, when President James Garfield was dying, naval engineers constructed a box-like structure containing cloths saturated with melted ice water , where a fan blew hot air overhead. This contraption was able to lower a room by 20 degrees Fahrenheit but consumed half a million pounds of ice in two months" time.

A close ancestor to the modern air conditioner units was first made in 1902 by an American engineer by the name of Willis Carrier. The machine at that time called "Apparatus for Treating Air" and was build for the Sackett-Wilhehns Lithographing anf Publishing Co. in Brooklyn, New York. Chilled coils were used in the machine to cool air and lower humidity to 55%, although the apparatus was made with enough precision that the humidity level desired was adjustable.

After the invention by Carrier, air conditioners began to bloom. They first hit the industrial building such as printing plants, textile mills, pharmaceutical manufacturers, and a few hospitals. The first air-conditioned home was that of Charles Gates, son of gambler John "Bet a Million" gates, in Minneapolis in 1914. However, during the first wave their installation, Carrier's air conditioner unit were large, expensive, and dangerous due to the toxic ammonia that was used as coolant.

Today, air conditioners have been said to be a partial cause for the changes in the south, and for most of us who have experienced it cooling benefits in times of searing heat waves, it is an invention that is hard to live without.

The increasing demand of air conditioners has also created many job opportunities in the market. Today, there are so many air conditioners manufacturers like Hitachi, Carrier and etc which employs thousands of technicians and engineers. In fact, refrigeration and

air conditioning is now one of the important subject offered in schools, colleges, polytechnics and even universities.

Normally, the refrigeration and air conditioning simulator and troubleshooting training system are designed for student and service technicians. The simulator is an invaluable tool for teaching and learning students the basics of air conditioner troubleshooting and operation, as well as improving the service skills of experienced technicians. However, the existing simulator being used is too simple and is not fully equipped with the important parts such as pressure reading meter and etc which makes the teaching and learning of refrigeration and air conditioning subject not very effective.

The present invention has figured out a plurality of important aspects that need to be included onto the existing simulator. The present invention is the improved teaching and learning apparatus for refrigerating and air conditioning which can overcome the above problems.

It is a specific object of the present invention to provide an additional teaching and learning apparatus to assist the teaching and learning refrigeration and air conditioning subject so that the teaching time will be reduced and hence more effective.

It is also a specific object of the present invention to provide a practical method of teaching and learning the air conditioner subject as the teaching and learning apparatus of

the present invention can always be a reference materials and it is convenient to use for revision.

3 Brief Description of the Engineering Drawings

Figure 1:

Full circuit model of the present invention of refrigeration and air conditioning apparatus for pressure and temperature based system.

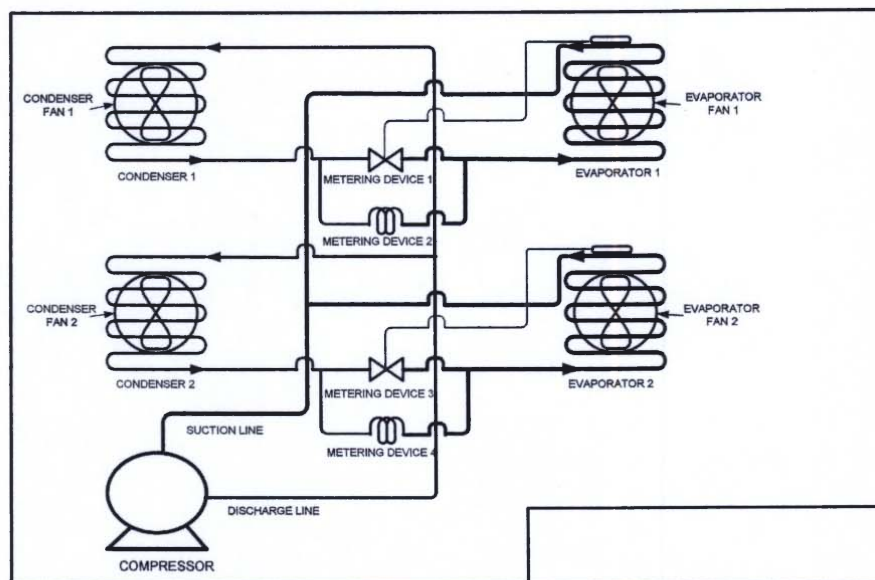


Figure 1

Figure 2:

Show the pressure gauge and sight galasses installed in the system.

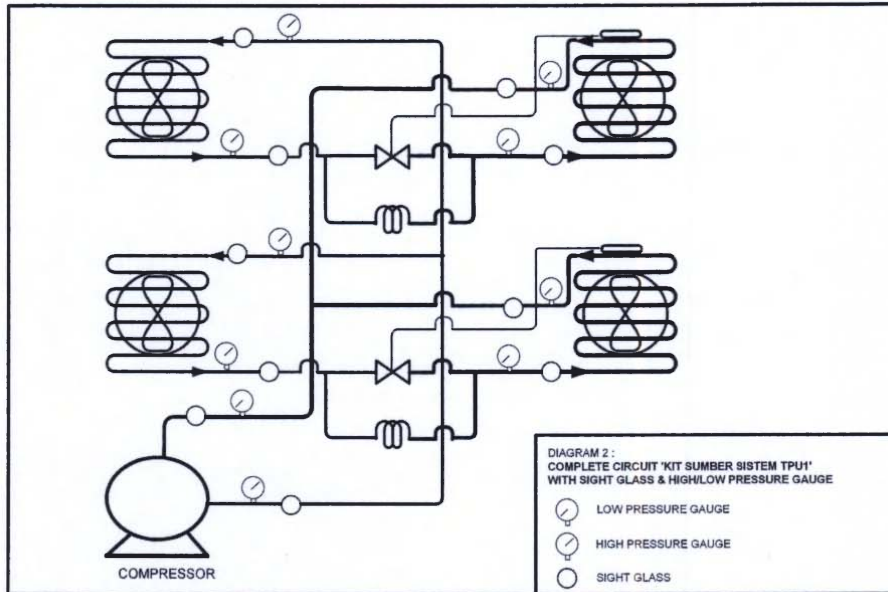


Figure 2

Figure 3:

Show the Low and High pressure cut out and cut in installed in the system.

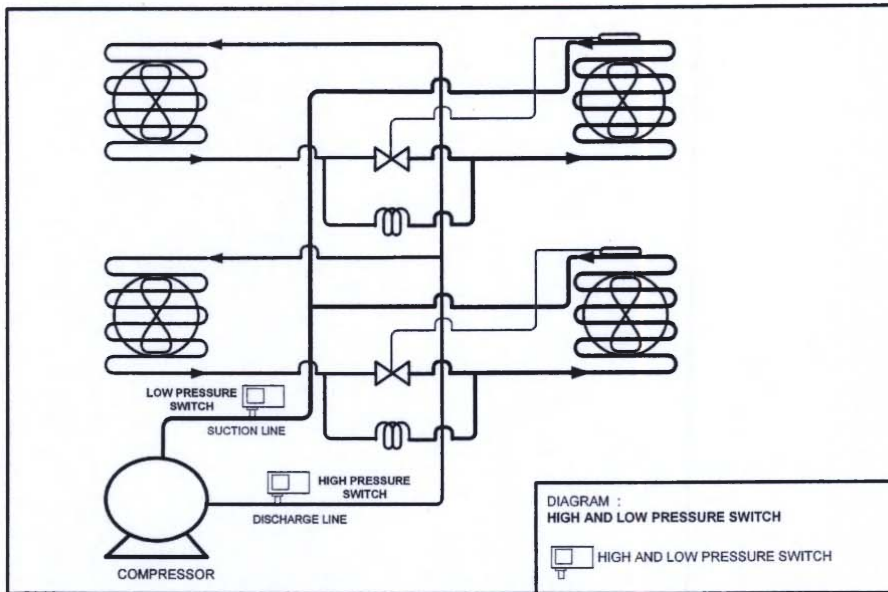


Figure 3

Figure 4 shows the devices portion of the system of the present invention.

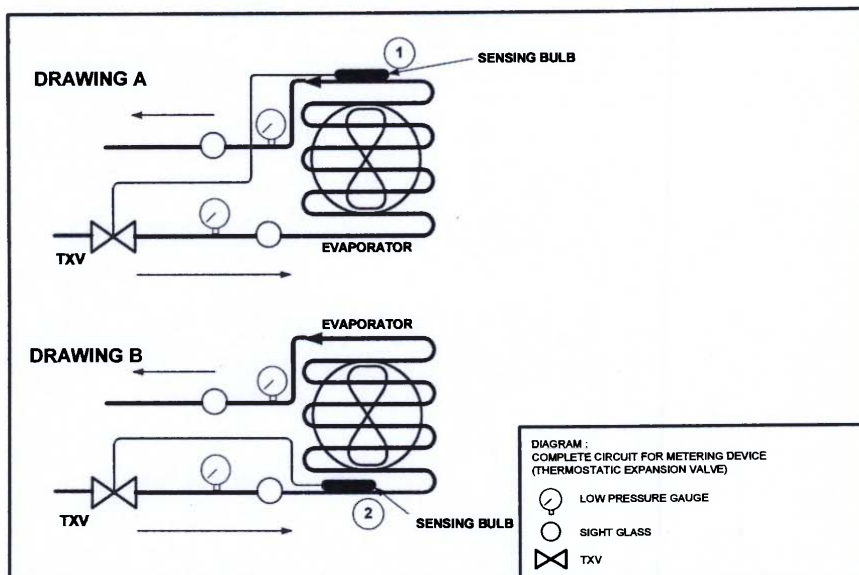
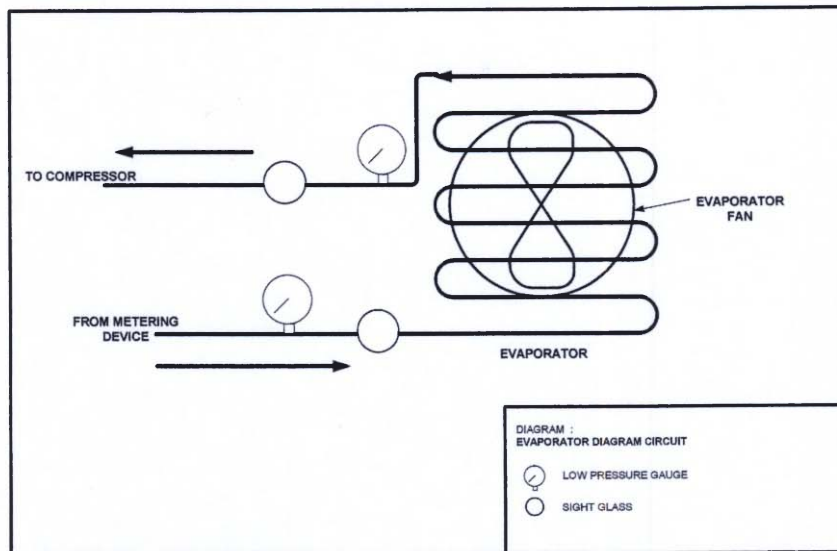


Figure 5 shows the evaporator portion of the system



5. Detailed Description of the Preferred Embodiments.

Referring now to the several drawing figures in which identical elements is numbered identically through out a description of the preferred embodiment of the present invention will now be provided.

The present invention introduces an improved teaching and learning apparatus for refrigerating and air conditioning system to provide the conveniences of teaching and learning in the subject of air conditioner. Figure 1 shows the front view of the teaching and learning apparatus (1) of the present invention, the teaching apparatus for refrigerating and air conditioning.

The present invention has figure out some important components that need to be included into the existing air conditioner simulator system to make the teaching of air conditioner subject more effective. The new components and their functions will be explained below:

The first component that is added in the present invention is the high and low pressure meter (6). The teaching kit apparatus for refrigerating and conditioning comprising four main components of air conditioner in the present invention namely a compressor (2), a condenser (3), plurality of devices (4) and an evaporator (5) are installed with the high and low pressure meter (6) at their respective inlet and outlet means as shown in figure 2, 3, 4 and 5. The purpose of installing the high and low pressure meter (6) is to obtain the reading of pressure of the cooling material there through which includes the high and low pressure at each of the four main components as mentioned above. Through calculation, the capability of the air conditioner system can be detected.

Next is the need of observation glass (7) to observe the transformation stage of the cooling material (not shown) during the sudden negative action on the air conditioning system. By referring now to figure 2, 3, 4 and 5, observation glass (7) is installed at the inlet and outlet means of each of these four components of the compressor (2), condenser (3), devices (4) and evaporator (5). The observation glasses (7) are connected adjacent the high and low pressure reading meter (6).

In the teaching or training process, it is important to demonstrate the function of pressure based safety system to the students or trainees. Therefore, the air conditioning teaching and learning apparatus system of the present invention has introduced another component, the safety switch (not shown) into the existing simulator. The safety switches are installed at the inlet and outlet of the compressor (2) to help to demonstrate the function of pressure based safety system.

For experimenting purpose during the practical session, the present invention has also designed a pipe (not shown) for attaching at the outwardly curved portions of evaporator (5) at its inlet, center portion and outlet.

These 3 curved portions at inlet, center positions and outlet are used for other experimental applications by attaching an indicator (not shown) at each portion to indicate if there are any effects. This is to observe the changing process especially in the aspect of pressure and temperature at all these four main components of compressor (2), condenser (3), devices (4) and evaporator (5) and hence determine the capability of the air conditioner system

The present invention has also provided a few flexibilities in the present air conditioning teaching and learning apparatus system considering the importance of experimenting among the students and technicians in the teaching process.

The present air conditioning teaching apparatus system allows the change of compressor (2) in different sizes, the change of cooling gas, and also the change of other experimental applications. By using the pipe size built in system, components like compressor (2) and cooling gas can be experimented to detect the system's failure and system's capability.

Lastly is the installation of half cover. In the present teaching and learning apparatus system (1), the half cover is installed on the condenser (3) and evaporator (5). Such installation has the purpose of observing the differences in capability of the system and also the transformation of shapes. In the practicing point of view, by having the installation of half cover, it is possible to obtain the capability of the system when a negative action is performed on the system.

The teaching and learning apparatus system (1) of the present invention provides more benefits to the learner as compared to existing air conditioner simulator. It is very user friendly. It provides easier understanding to the learner in the conceptual aspect of air conditioner. The lecturer can teach the course more easily and the teaching time will be shortened. Hence, the teaching of air conditioner subject becomes more effective.

It is to be understood that the present invention may be embodied in other specific forms and is not limited to the sole embodiment described above. However modification and equivalent of the disclosed concepts such as those which readily occur to one skilled in

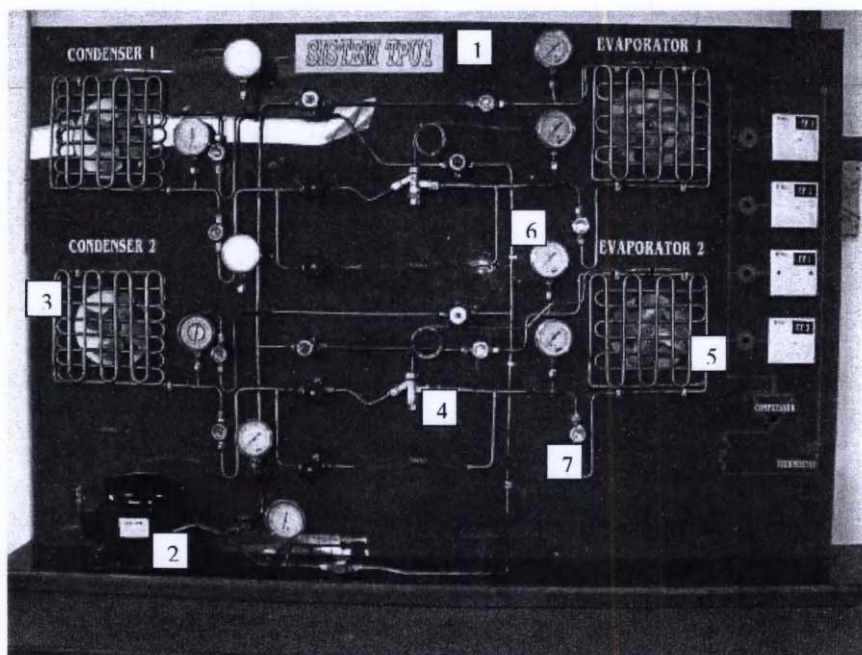
a plurality of components of the system having its size changeable for experimenting purposes;

a pressure meter installed at the inlet and outlet means of each said components of the system; and

an observation glass mounted at the inlet and outlet means of each said components of the system and adjacent said pressure meter to observe the transformation stage of the material during the sudden negative action on the system.

- b. The teaching and learning apparatus as for pressure based systems claimed in claim 1, wherein said plurality of components include any or in combination of the compressor, condenser, devices and evaporator.
- c. The teaching and learning apparatus for pressure based systems as claimed in claim 2, wherein said evaporator is attached with a pipe at the outwardly curved portion of said evaporator at its inlet, center and outlet portions.
- d. The teaching and learning apparatus for pressure based system as claimed in claim 3, wherein said evaporator is installed with a half cover for observing the differences in capability of the system and also the transformation of shapes.

the art are intended to be included within the scope of the claims which are appended thereto.



Actual model.

6. Claims

- a. teaching and learning apparatus for pressure based systems comprising:

- e. The teaching and learning apparatus for pressure based system as claimed in claim 1, wherein said pressure meter is a high and low pressure meter.
- f. The teaching and learning apparatus for pressure based system as claimed in claim 2, wherein said condenser is installed with a half cover for observing the differences in capability of the system and also the transformation of shapes.
- g. The teaching and learning apparatus for pressure based system as claimed in claim 5, wherein said pressure meter is installed to obtain the reading of high and low pressure at each of said components of compressor, condenser, devices, and evaporator for the cooling material where the capability of the system can be detected through calculation.
- h. The teaching and learning apparatus for pressure based system as claimed in claim 1, wherein said apparatus further comprising a safety switch which is installed at the inlet and outlet of said compressor to help to demonstrate the function of said pressure based system to the students or trainees during teaching or training process.
- i. The teaching and learning apparatus for pressure based system as claimed in claim 2, wherein said the curved portion at the inlet, center and outlet portion are used for other experimental applications by attaching an indicator at each portion

to indicate if there are any effects and to observe the changing process said components of the system and hence determine the capability of the system.

- j. The teaching and learning apparatus for pressure based system as claimed in claim 1, wherein said compressor is changeable in different sizes and said cooling gas is be experimented to detect the system's failure and capability by using the pipe size built in system.
- k. The teaching and learning apparatus in claim 1, wherein said pressure based systems include the refrigerating and air conditioning system.

7 Summary of the Invention

The present invention describes an improved of refrigeration and air conditioning simulator apparatus for a purpose of teaching and learning module as a subject in schools, polytechnics, community colleges, universities and other institutions, to overcome the difficulties of teaching and learning as well as to improve the student knowledge and skills. The existing refrigeration and air conditioning simulator being used is too simple and is no fully equipped with the important parts such as pressure reading meter, before and after the components like compressor, condenser, evaporator and etc. The present invention has figured out a plurality of important aspects that need to be included in the

system, Hopfully the present invention can always be a reference materials to fasilitators and also students.

8 References

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