IMPLEMENTACIÓN DEL SISTEMA DE CLIMATIZACIÓN AL VEHÍCULO CHEVROLET ESTEEM

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Abstract. The objective of this project was carried out with research methodology recognition of the components that make up the air conditioning system for the respective operation, and the need to implement this air conditioning system in the vehicle Chevrolet esteem in which give us to know a priority of the elements of the air conditioning system, so that students have a sample to see how the climate system works.

In the study of air-conditioning system is optimal for the realization of implementation in the system is to use to better conditioning and comfort to the driver and occupants and to provide better comfort.

This project is performed in order to understand the functioning of the system air conditioning for the study and practice of students in order to have more knowledge thoroughly for the study of heat exchange it occurs in the air conditioning system components that comprise it.

Keywords

Adaptation, Arduino, Programming

Resumen. El objetivo de este proyecto se realizó con una metodología de investigación del reconocimiento de los componentes que componen el sistema de climatización para su respectivo funcionamiento, y la necesidad de implementar este sistema de climatización en el vehículo Chevrolet esteem en el que nos dé a conocer una prioridad de los elementos que componen el sistema de climatización, para que los estudiantes tengan una muestra de ver cómo funciona el sistema de climatización.

En el estudio realizado del sistema de climatización se determina si es óptimo para la realización de la implementación el cual tiene como fin principal es dar un mejor acondicionamiento y comodidad al conductor, ocupantes y poder brindar un mejor confort.

Este proyecto se realiza con el fin de dar a conocer el funcionamiento del sistema de climatización para el estudio y como un material didáctico para la realización de las prácticas de los estudiantes para tener más conocimiento a fondo en el proceso del intercambio de calor que se produce en el sistema de climatización por medio de los componentes que utiliza este sistema.

Palabras Claves

Adaptación, Arduino, Programación

Introduction

In this work on the implementation of the "implementation of the air conditioning system to Chevrolet Esteem", a brief explanation of the air conditioning system can be given in which starts from the air conditioning of the car, at the beginning of the evolution of the The interior is very hot and uncomfortable for the driver and occupants for which the air conditioning equipment was a basic option, in which later the basic parts of the air conditioning system are defined.

It also explains briefly the operation of the heating and its components comprising the air conditioning system, its preventive and corrective maintenance service to diagnose and detect their respective faults.

Therefore, this project is carried out in order to make known its different parts and functions of work in the vehicle and to provide better comfort to the driver, occupant, and for the study of students in learning the recognition of the elements Which make up the air conditioning system

Materials and Methods

2.1. Materials:

The automotive tools used are very important and necessary for assembling and assembling the components of the air conditioning system in the Chevrolet Esteem vehicle.

Multimeter

This tool was used for the measurement of sensors, direct current, and actuators, and for checking the fuse box of the vehicle.

Gas loading and unloading tools

For this purpose, measurement and pressure gauges, pipes, for gas charging and air discharge in the vehicle are used.

Arduino

It is a plate that performs the function of a module in which it receives data, processes and gives an activation signal by means of a program to disconnect and to turn off the compressor; it is a plate of easy advice for any programming software

Proteos Software

It is a measurement program that is used for programming on the arduino board for the simulation of the work of the sensor and the arduino that comes to make the module of the system of air conditioning in the vehicle.

2.2. Methods

Analytical - Synthetic. As the analysis is carried out not only of theoretical and scientific aspects, but also of the results obtained in the research process of this project, the great variety of theoretical information that we necessarily obtain would have to be synthesized, without losing its Value, quality and didactics.

Adaptation.- How is the assembly and installation performed and the different elements that make up the air conditioning system in the vehicle.

The use of a software proteos, for the programming of the arduino plate in determined ranges of temperature in the system of air-conditioning.

Techniques and instruments

- Preparation of plans in computer programs of which we have previous knowledge

- Sizing of components in the Chevrolet esteem.

- Assembling the components in the Chevrolet Esteem vehicle.

-Functionality test

3. Results

3.1. Determination of the components that make up the air conditioning system.

In the execution of this project we proceed to the analysis of each activity that is performed for the maintenance and assembly and diagnosis for its respective operation we follow through a proposed schedule for the installation of the HVAC system as shown in the diagram below
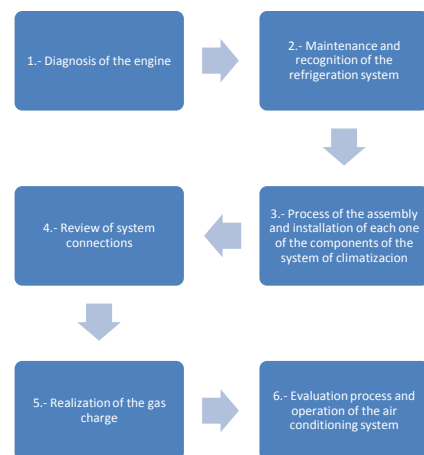
3.2. Recognition of the components of the system and adaptation and installation of the air conditioning system.

This project develops the study of the operation of the air conditioning system in which it was possible to know the different parts that make up this system by means of which the studies and investigation of the different components are carried out, the process of the verification of each one of them The elements, observe the operation and the state for its installation.

In what consist of the following components:

Compressor, condenser, evaporator, expansion valve, dehydrator filter, plumbing, arduino plate "UNO", led display, LM35 temperature sensor, pressure switch, wiring, pressure sensor

3.3. Comparison of a vehicle with air conditioning and without air conditioning.

In the next section a table is focused on a vehicle with air conditioning and without air conditioning followed to this it focuses on the adaptation and installation of the system of air

conditioning to the vehicle diminishing in itself the pollution towards the environment, and the driver giving an excellent comfort in the vehicle

TABLE 1

Comparison of comfort of a vehicle with air conditioning and without air conditioning

	Without air conditioning	With air conditioning
Temperature	There is no temperature control 35ºC	Temperature controlled comfort 18ºC
Percent Humidity	80% uncontrolled	100% controlled
Purity of air	Not pure air is not healthy	Healthy pure air

TABLE 2

Comparison of temperature ranges with air conditioning and without air conditioning

In a circulation time of one hour the ambient temperature may vary		
Area	without air conditioning	With air conditioning
Head	42º C	23ºC
Thorax	40ºC	24ºC
Foot	35ºC	28ºC

3.4. Operation of the air conditioning system.

Operating the compressor temperature

In the operation of the air conditioning the system works mainly when the compressor is activated in which the refrigerant circulates through the system in which it proceeds to remove the heat from the cabin and consequently cooling to a preset temperature range value in the programming of the System by means of the signal of the sensor and the processor that activates in a range of 25ºC, and in its deactivation of 23ºC, in which it is deactivated
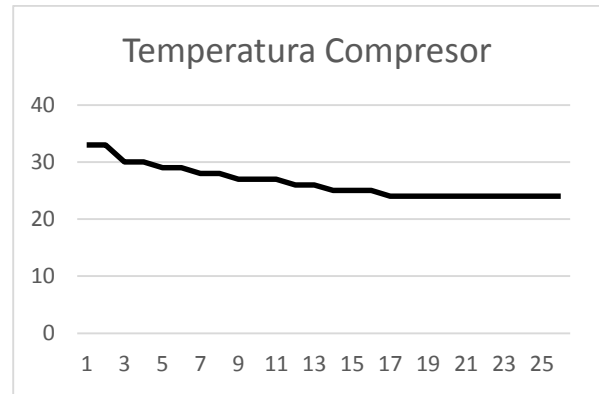

Figure 1. Compressor operation

Fan temperature operation

The operation of the air conditioning system the fan will take care of removing the heat from the cabin of the vehicle, in such a way to cool it, in which the fan can work independently in which is also added to the cooling system that through this system Of control by means of a module that allows to atomize the on and off of the fan in a programming of a pre-established temperature range between 30ºC, at the moment of lighting up to the ambient temperature at 28ºC, it is deactivated
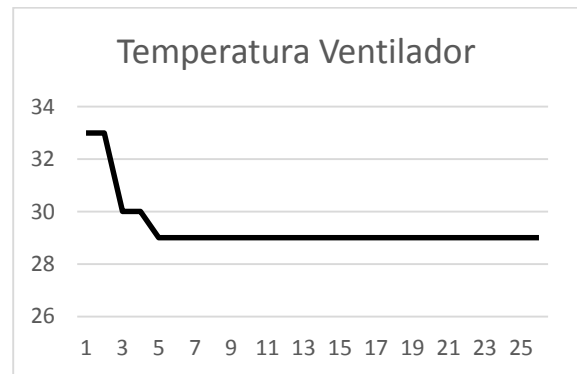

Figura 2. *Funcionamiento Ventilador*

The operation of the air conditioning system is controlled by means of a module that receives the sensor signal that measures the ambient temperature that is inside the passenger compartment of the vehicle, in which the sensor works by sending a signal to the module in a set programming range Sending an activation signal to the compressor in a range of 25 ° C to about 30 ° C where the fan is turned on to give fresh air into the passenger compartment of the vehicle, where air ventilation ceases to function when the temperature drops below 29 ° C , Just as the compressor is switched off when it comes down from a temperature range of 24 ° C, in which the entire system is deactivated until the

occupant reuses the system, the range at which the entire system works through the work of the Sensor and the module that allows to automate the air conditioning system.
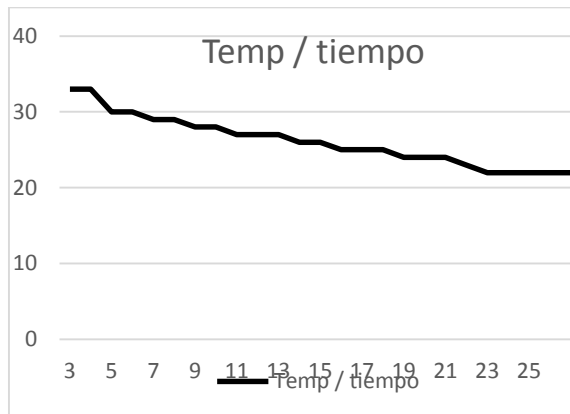

Figure 3. System Operation

In this process the verification and operation of the sensor inside the vehicle is carried out in which this sensor is in charge of notifying the ambient temperature and set in a set and predetermined temperature range in which it emits a signal to the module and proceeds to the activation Of the refrigeration system consisting essentially of a compressor, condenser, evaporator, and by means of an expansion valve, in which the sensor is set at a certain temperature range and therefore the compressor load is activated first and then the ventilation in A set temperature range

Figure 4. Temperature Sensor

In this process is carried out to verify the operation of the entire system of air conditioning in the vehicle, for the operation of all the elements that make up the air conditioning system in the field of work in which in the beginning had some strength In operation because it was rotating in an opposite turn in which for that reason it had to be verified and calibrated for its respective operation.

In that when turning anti-clockwise the blower fan, a necessary adjustment

was made in which it was possible to reverse it to the hour side for its respective operation and the necessary adjustment, that for regulation and operation it is done from the screen the necessary air or Heat required for stable operation of the air conditioning system

Figure 5. Test and Calibration

In this loading process is carried out with the use of tools and equipment for the load in which we checked the plumbing that have no leaks and are in a good condition to proceed to the load by using the equipment we use for the process And suction for the operation of the air conditioning system.

In the case of oil compensation for spare part parts used when replacing parts of the air conditioning system, the following quantity of oil must be added to the system in the table below.

Figure 6. Verification and loading

TABLE 3

Oil for parts and components

1	Evaporador	50 cm3	El aceite debe ser compatible
2	Condensador	30 cm3	con el R- 134ª
3	Filtro	30 cm3	Se recomienda
4	Tuberías- mangueras	10 cm3	-Sanden SP 20
5	Compresor	Se vierte el contenido de aceite retirado en un recipiente y se reemplaza con la misma cantidad en el sistema	-Seltec ZXL 100 PG
			-Capella HFC 68
			-Daphne FD 46 XD
			-Emkarate RL 68/ 100
			-Aceite P.A.G.

4. Conclusions

In the present research that is experimental theoretical, if it was possible to achieve the objectives set out with the plan proposed this is the implementation of the air conditioning system in the Chevrolet Esteem vehicle which is in satisfactory working in the laboratory of the workshop of the race Of automotive mechanics of North Technical University.

In this titration plan the experimental theoretical investigation method is used, the same one that starts out specifying the problem and using the observation could be described around the object in question that is the system of refrigeration and conditioned air, from the facts and using the induction could pose a preliminary solution.

With this preliminary solution and using the deduction it was possible to predict the operation of the air conditioning system and the necessary adaptations that would be needed, once the solution was taken in detail, it was possible to carry out the installation and assembly of the air conditioning system and finally to perform tests and Calibrations.

At the end of the installation and assembly the respective operation of the air conditioning system is performed and that it is in perfect condition to be able to perform the tests and calibrations of the air conditioning system in the Chevrolet Esteem vehicle.

In the present project was fulfilled with quality the realization of the project about the system of air conditioning in the vehicle Chevrolet esteem in the investigation of the realized project of the technical university of the north of the race of engineering in automotive maintenance.

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