

Maintenance And Repair System Car Air Conditioner (AC)

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ABSTRACT

The air-conditioning feature has become an essential part of a vehicle. a vehicle. The Air Conditioner system is a system in a vehicle that controls temperature, air circulation, controls humidity, and cleans the air. clean the air. The purpose of the research is to find out how to maintain and repair of car Air Conditioner (AC). The method used by doing checking the temperature, refrigerant pressure, air flow rate, humidity and also cleaning dirt / dust attached to components such as evaporators, condensers, electrical components and other components. The results showed that for the results of maintenance and repair, the air temperature is around 30o - 35o, the rotation of the motor engine is 2000 ppm and the maximum cooling setting is sr. 2000 ppm and maximum cooling settings and maximum fan (blower) motor rotation rate. maximum). If at the time of testing the standard conditions are not achieved, then perform the check using the maintenance method.

Keywords: Air Conditioner, maintenance, repair.

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Introduction

Air Conditioner or AC is a tool to turn hot air into cold air with the help of freon. cold with the help of freon. This is the meaning of AC in general. Meanwhile, specifically AC is a machine that regulates the circulation of refrigerant gas. refrigerant. The refrigerant substance is chosen because its shape is able to change rapidly. quickly. In addition, the refrigerant can also experience drastic temperature changes. drastically. Physically, the car air conditioner is not clearly visible because it is covered by the car's body. it is covered by the car body. The car air conditioner will only appear after the cover is opened. Objects that are often mistaken for car air conditioners are only the air grilles. only. Meanwhile, the shape of the original car air conditioner is much more complex and complicated. The basic structure of car air conditioners and home air conditioners are actually the same. It's just that the AC However, car air conditioners are more dynamic. The rotation of the compressor in a car air conditioner follows the RPM of the car. The faster the car is moving, the faster the compressor rotation will be. So that the cabin temperature cools down faster. The car air conditioning system works depending on components in it. And each component of the car air conditioner also has its own function. each. Everything synergizes and in the car air conditioning system and produces coolness in the cabin.

The types of car air conditioners are generally divided into two parts, namely single blower and double blower. A single blower AC has only one blower, which is usually placed at the front. Meanwhile, a double blower AC has two blowers located at the front and rear of the cabin. AC system maintenance is a job to maintain that all equipment/components are in good condition. Based on Based on this situation, good performance of the air conditioning system will be produced and extend the life time of the machine. The maintenance of course must follow the applicable standard procedures and be carried out periodically (regularly). periodically (regularly).

AC system maintenance is a job to maintain that all equipment / components are in good condition. Based on this situation, it will result in good performance of the air conditioning system and extend the life time of the machine. The maintenance must of course follow the applicable standard procedures and be carried out periodically (regularly). The work carried out in maintaining the air conditioner on this vehicle includes checking the temperature, refrigerant pressure, air flow rate, humidity and also cleaning dirt / dust attached to components such as evaporators, condensers, condensers and other components. Components such as evaporator, condenser, electrical components and other components, other components.

Symptoms that arise when there is a lack of maintenance and repair of the vehicle air conditioning system, namely the temperature that comes out is not cold and not fresh / healthy and can damage components in the car air conditioner. Therefore, it is very necessary to maintain and repair the car air conditioning system car air conditioning system in order to maintain air quality in the car, and can maintain the components of the car air conditioner. The air conditioner in this car has an abnormality or damage, which can be felt when turning on the air conditioner where the wind does not come out, and the Auto On / Off system on the air conditioner does not function properly. Based on the description above, the problem formulation is " How is the maintenance and repair of car Air Conditioner (AC)." While the purpose of the study is to find out how to maintain and repair of car Air Conditioner (AC)."

Air Conditioner or commonly also referred to as AC is one of the systems in the vehicle that serves to make the indoor temperature comfortable. Temperature in the room becomes comfortable. If the temperature in the room feels hot, then the AC is activated, this hot air will be absorbed so that the air temperature in the room decreases. The air conditioning feature has become an important part of a vehicle. In a vehicle. Not only in tropical areas, but in sub-tropical areas too. tropics, this device is indispensable. Especially in the hot tropics, the AC device functions more as a cooler. In general, the standard functions of of car air conditioners are temperature control, air circulation control, humidity control, and air purification. air circulation, humidity control, and air purification. In general, the air conditioner system consists of several components, namely:

First. The compressor is a component that works to suck and pump refrigerant so that it can circulate throughout the car air conditioning unit, so that there is a pressure difference, either before or after entering the compressor. The working principle of the compressor is similar to the refrigerant "heart" as its blood. The driving force of the compressor to circulate the refrigerant comes from the engine power. With the intermediation of belts, pulleys and magnetic clutch, the compressor can rotate in sync with the engine rotation. With the division of engine power to drive the compressor, the engine load will increase, so that fuel consumption will automatically increase. The compressor itself functions to pumping refrigerant which is in the form of gas so that the pressure increases so that it will also cause the temperature to increase. Compressor designed and designed so that it can provide long-term service even though it is used continuously in the system. service even though it is used continuously in a gas compression refrigeration system. To be able to perform as expected, the compressor must work according to the conditions that are To be able to perform as expected, the compressor must work according to the To be able to perform as expected, the compressor must work according to the expected conditions, especially the temperature and pressure conditions of the refrigerant when it enters and leaves the compressor valve. and leaving the compressor valve.

Second. The condenser functions to absorb heat in the refrigerant that has been compressed by the compressor and converts the refrigerant in the form of the gas becomes liquid and cools.

Third. Condenser Electric Fan, AC requires an electric fan as an sucking air from outside and flowing air to cool the condenser. condenser.

Fourth. Receiver / Dryer, serves to accommodate liquid refrigerant for temporary which then flows the liquid refrigerant to the evaporator through an expansion valve according to the cooling load needed. required. In addition, the dryer / receiver also functions as a filter to filter water vapor and impurities that if left unchecked can be detrimental to the cycle. cycle.

Fifth. Expansion valve, atomizes freon into the evaporator so that it easily evaporate and the cold is absorbed in the evaporator lattice which later will be blown by the blower into the cabin, also serves to regulate the amount of freon flowed into the evap as needed (this depends on the cooling load). needed (this depends on the cooling load in the cabin and is regulated by the capillary tube in the expansion section).

Sixth. Evaporator, is the opposite of the condenser. Evaporator functions absorb heat from the cabin air to be cooled. This cooling is done by blowing the cabin air through the fins of the evaporator pipe so that the air becomes cold. Meanwhile, refrigerant that is in the evaporator pipe boils and turns into vapor / gas.

Seventh. Thermostat, serves to distribute electrical power to the compressor automatically. The sensor on the thermostat detects the temperature in the evaporator according to the settings. If the thermostat is damaged, the evaporator will freeze because the electric circuit breaker does not work. because the electric circuit breaker does not work. Damage to the thermostat is characterized by the release of smoke from the air conditioner grille and the presence of water droplets such as dew dripping from the evaporator. dripping from the evaporator.

Eighth. Blower, berfungsi untuk meniup atau menghembuskan udara melewati sirip- sirip evaporator sehingga udara dingin mengalir searah aliran tiupan blower menuju ke ruangan mobil.

Ninth. Refrigerant, adalah media yang bentuknya senyawa, yang digunakan dalam siklus panas yang mengalami perubahan fasa dari gas ke cair atau sebaliknya.

Research Method

AC system maintenance is a job to maintain all equipment/components in good condition. Based on this situation, it will result in good performance of the air conditioning system and extend the life time of the machine. The maintenance must of course follow the applicable standard procedures and be carried out periodically (regularly). The work carried out in maintaining the air conditioner on this vehicle includes checking the temperature, refrigerant pressure, air flow rate, humidity and also cleaning dirt / dirt. air, humidity and also cleaning dirt / dust attached to components such as evaporator, condenser, electrical components and other components. other components.

Result

Air Conditioner (AC) maintenance can be done regularly and by yourself. at home. There are several steps that must be done before performing maintenance needs to be checked on the air conditioner, including: a. Start the car engine then turn on the AC switch on the regulator panel. B. Check the work of the blower motor, if it does not work check the fuses. C. Check the condenser fan motor, if not working check the fuses. D. Check the piping connection, if the pipe connection looks wet with oil, it indicates a refrigerant leak. indicates a refrigerant leak. E. Run the air conditioner under the following conditions:

Table 1. AC Condition Check

Item	Condition
Doors	Fully open
Temperature settings	Maximum cooling
Blower	High (Hi) position
Engine	Idle Speed
AC Switch	On Condition (ON)

If the ambient air temperature is more than 40 0C and the pressure reading on the high pressure gauge is 1.86 Mpa (19kgf/cm² or 266 Psig) or more with the working conditions as shown in the table above, run the vehicle engine at idle speed to cool the condenser. 1. If the high pressure manifold gauge reading is still too high, perform this check in a shady/cool place, open all passenger room doors and run the blower at low speed (LO position). 2. Check the amount of refrigerant through the sight glass installed between the receiver tank and and expansion valve. Use the following table as a reference, make repairs if necessary.

Table 2. improvement reference

No	Symptom	Refrigerant Quantity	Repair
1	Air bubbles appear on the sight glass	Less	Check for leaks
2	No air bubbles visible	Empty, enough or too much	See no. 3 and 4
3	Temperature between inlet and outlet is the same	Almost empty or completely empty	Perform vacuuming and filling, then check for leaks.
4	Temperature between inlet and outlet is quite different	Enough or too much	See nos. 5 and 6
5	Shortly after the air conditioner is turned on, the sight glass looks clear	Too much	Remove excess refrigerant
6	Shortly after the air conditioner is turned off, the sight glass looks foamy then clear	Empty, just enough or too much	See no.3 and 4

1. Refrigerant Discharging and Charging
 - a. Discharge the refrigerant in the AC system until the low pressure manifold gauge indicates -0.1 Mpa (750 mmHg or 29 inHg) (vacuum).
 - b. Close both the high-pressure and low-pressure taps on the manifold gauge
 - c. Leave the system as it is
 - d. Observe the gauge manifold readings
 - e. If the manifold gauge indicates a decrease in vacuum, perform a leak check and make repairs.
 - f. repair.
 - g. Return to the start emptying step.
 - h. Charge the system with refrigerant until the pressure at the manifold gauge reaches 0.1 Mpa (1 kgf/cm² or 14 psig).
 - i. Never charge liquid refrigerant through the low pressure side of the refrigeration cycle.
 - j. Check all connections with a leak detector.
 - k. Charge the system with the appropriate amount of refrigerant.
 - l. After the Running in period turn off the air conditioner and then turn off the vehicle engine, then check the amount of oil in the compressor through the compressor sight glass. The oil surface line should be visible on the sight glass.
2. System Discharging/Vacuumping
 - a. Attach the center gauge manifold hose to the inlet of the vacuum pump
 - b. Open both high pressure (HI) and low pressure (LO) taps and run the vacuum pump. If the low pressure and high pressure gauges show numbers that are within the vacuuming region, there is no blockage in the refrigeration cycle.
 - c. Leave the system at this condition for more than 5 minutes. After that observe the manifold gauge indication, if there is no change in the indication, proceed to the refrigerant charging step.
 - d. If the manifold gauge indication changes, perform a leak check and make repairs if necessary
3. Attaching the Hose to the Refrigerant Tube
 - a. When finished vacuuming the system, close both taps on the gauge manifold and turn off the vacuum pump.
 - b. Disconnect the center hose from the pump and attach it to the refrigerant cylinder.
 - c. Fully open the taps on the refrigerant cylinder
 - d. Slightly open the center hose on the gauge manifold to remove air in the hose
4. Refrigerant Cycle Leak Check
 - a. Open the high pressure (HI) tap on the manifold to fill the system with refrigerant vapor.
 - b. When the low pressure gauge has shown 0.1Mpa (1 kgf/cm²) close the tap again.
 - c. Using a gas leak detector, check the AC system for leaks.
 - d. Refrigerant charging by closing both taps, starting the vehicle engine and charging as follows, Run the vehicle engine at idle speed and turn on the air conditioning system. Open the low pressure tap and make sure the high pressure tap is closed. Fill the system with refrigerant gas through the low pressure acquisition. Never charge liquid refrigerant through the low-pressure side as this can damage the compressor internals.

After all the procedures have been carried out, it is time to test the performance of the air conditioning system. The standard values for high and low pressure are as follows:

Table 3. C System Performance Testing

Conditions	Pressure Low	Pressure High
Ambient air temperature 300 - 35 0C		
Motor rotation	1,5 – 2,0	14,5 – 15
2000 rpm Setting	Kg/cm ²	Kg/cm ²
cooling setting	or	or
maximum	21 – 28 Psig	203 – 210
Fan (blower) motor rotation rate		Psig
maximum		

If at the time of testing the standard conditions are not achieved, then carry out checks using the methods as described previously.

Conclusion

Air Conditioner or AC is one of the systems in a vehicle that functions to make the temperature in the room comfortable. The air that comes out of the air conditioning system is dry air and has passed through a filter (filter) so that the air is clean and avoid dirt or dust. Caring for the air conditioner on the vehicle includes checking the temperature, refrigerant pressure, air flow rate, humidity, and air quality. refrigerant pressure, air flow rate, humidity and also cleaning dirt/dust attached to components such as evaporators, condensers, electrical components and other components.

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