



ANDHRA PRADESH STATE ROAD TRANSPORT CORPORATION
Mechanical Engineering Department
Office of the VC & MD, RTC House, Vijayawada - 13.

No : OP3/462(AC)/2016-MED

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Sub: **A.C System maintenance** -Preventive maintenance of Air conditioning system in High end buses like Amaravathi, Vennela, Garuda plus, Garuda, Indra, Metro Luxury etc -Instructions issued - Reg.

APSRTC has been operating high end A.C buses for the last 10 years under various brand names like Amaravathi, Vennela, Garuda plus, Garuda, Indra, Metro Luxury etc. to meet the growing demand of the travelling passengers. There are 250 A.C buses in the corporation which constitute to about 3% of the total fleet of the Corporation. The operational profitability of these buses is satisfactory.

It is our prime responsibility to offer the best service to high end bus passengers to sustain their goodwill and patronage. The most vital elements in A.C buses are saloon ambience and its comfortable temperature. Too low or a too high saloon temperature of A.C bus will be uncomfortable to the passengers and often leads to criticism. It is therefore essential to maintain a reasonably comfortable saloon temperature throughout the journey.

Trainings have been conducted to the mechanics, electricians and garage supervisors on preventive maintenance on A.C system to prevent breakdown of A.C and to improve A.C comfort in buses. But certain lapses in maintenance of A.C system are observed at depots during recent inspections done by MED.

Therefore, for the sake of all maintenance staff, supervisors and managers the working system and maintenance of A.C in buses along with schematic layout is reiterated at Annexure 'A'.

The Depot Managers shall take necessary action to educate the Maintenance staff and Drivers suitably to ensure that comfortable saloon temperature and pleasant ambience are maintained in all the AC buses without giving scope for passenger complaints.

EXECUTIVE DIRECTOR (E&IT)

Encl: Annexure A

To
All Depot Managers

Copy to: All EDs (Zones) for necessary action
Copy to: All RMs for necessary action
Copy to: All Dy.CMEs for necessary action
Copy to: All Maintenance incharges for necessary action
Copy to: Principals, ZSTCs & TA/GVRM for necessary action

Layout of A.C System

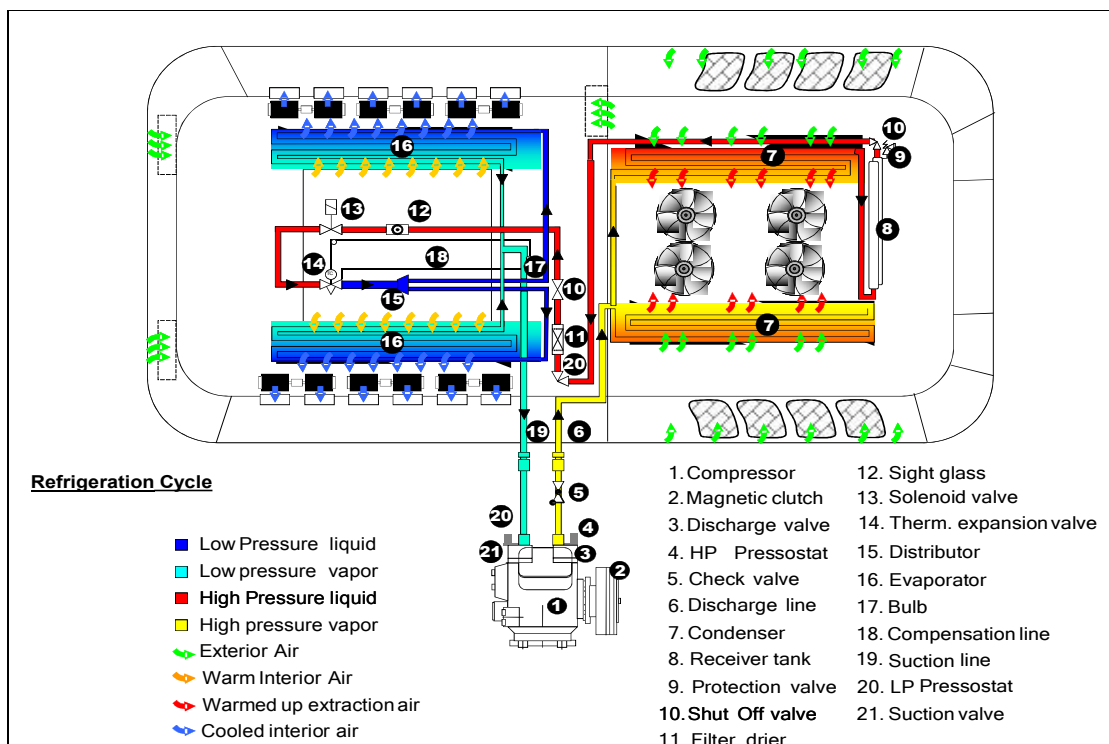
The main components and their working.

1. Compressor Assy.

It is located adjacent to the engine. Low pressure, low temperature vaporised refrigerant (R-134 gas) enters through suction pipe and get compressed in the compressor and converts into high pressure, high temperature vaporised refrigerant. It is discharged through the discharge pipe to the condenser.

2. Condenser coil Assy.

It is located on the roof top of the bus covered with FRP covers and wire mesh. The high pressure, high temperature vaporised refrigerant from the compressor discharge pipe enters into condenser coil Assy. wherein the refrigerant transforms from gas to liquid state. The condensed liquid refrigerant passes through liquid solenoid, filter dryer and enters into **Expansion valve**.



3. Expansion Valve

The liquid state refrigerant after passing through the expansion valve wherein the pressure and temperature gets reduced and enter Cooling Coil Assy. at chilled temperature.




4. Evaporator Assy. (Cooling Coil Assy.)

This is located on the roof top of the bus covered with FRP covers next to condenser coil Assy. The blower sucks the air from saloon and pushes through the chilled evaporator coils. While passing through the cooling coil filter and fins the air gets cooled and enters saloon through duct and louvers.

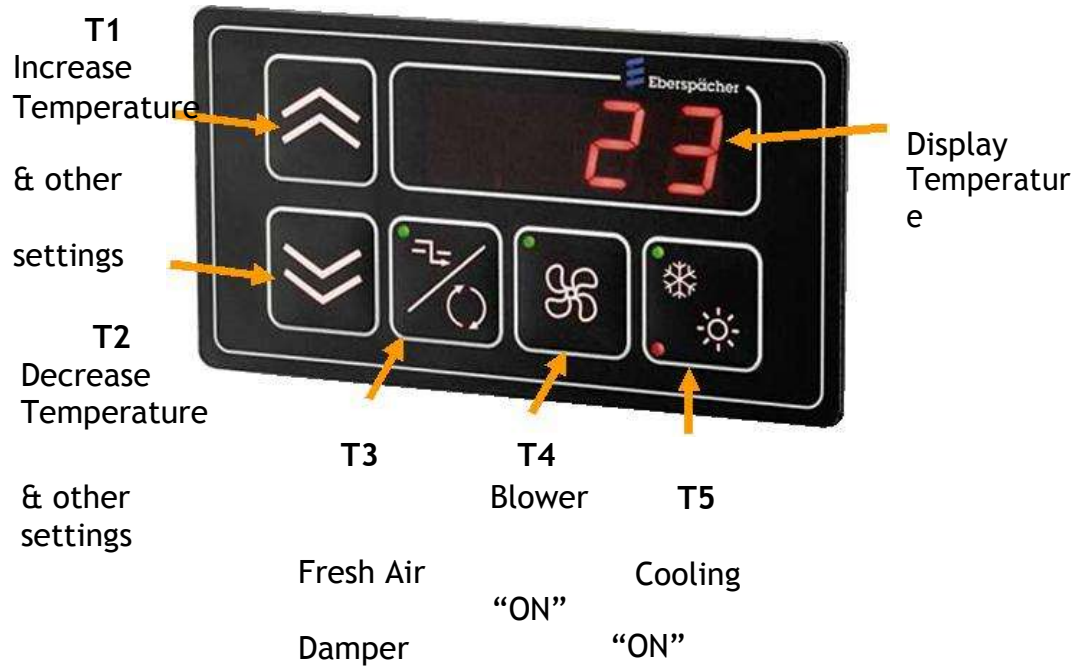
Preventive maintenance




1. Ensure proper sealing to the Saloon to avoid entry of hot air through Door gaps, Window gaps, Floor gaps, Open hatches etc. and to prevent loss of cooling.
2. Ensure proper sealing and locking of FRP covers of Condenser Assy. and Evaporator Assy. to prevent hot air entry into saloon and improve cooling efficiency.
3. Check the condition of A.C compressor belts and it's tension and correct if necessary. Remove the entrapped stones, if any, in the belt groves.
4. Keep the saloon "Return Air Filters (Grill filters)" and "Coil filters (Big filters)" free from dust. Return Air Filters shall be cleaned on every alternate day and Coil (Big) filters shall be cleaned once in 10 days.
5. Check the Refrigerant levels through sight glass (near gas filter) and if air bobbles are noticed check for leakage of gas and entry of air into system.
6. Ensure proper working of A.C Louver knobs. It shall be ensured that there is no leakage of air from the ducts.
7. Ensure free flow of water from the drain pipes from cooling coil.
8. Start the A.C and run for 20 minutes at a setting temperature of 18⁰c before dispatch and replace air freshener provided at cooling coil once in 20 days.
9. The Drivers shall be properly educated about the operation, controls and troubleshooting of the Air conditioning system. They must be familiar with the operation of Cab command, Blower and temperature settings.
10. Keep the hatches & Front Door in open condition during the course of maintenance and while sweeping/cleaning the interiors (Keep the hatches & door in open condition for sufficient time) to vent out the foul smell if any from the saloon.
11. Always lay a good floor mat in the gangway and clean it thoroughly during daily maintenance and avoid dust accumulation in the saloon.

A.C OPERATING PROCEDURE:

1. Start the Engine and allow the engine to run at idling for 3 minutes to facilitate starting of A.C compressor (8 bar air pressure).
2. The Cab command (dash board) gets power supply as soon as the engine is started displaying the desired setting temperature on Display panel.
3. Press the Blower button  (T4) on Control panel to switch on the Blowers. Then the green LED glows on the blower button. Also "b1" symbol appears on the screen indicating that blowers running in 1st speed.
4. To increase the Blower speed, the  button (T1) shall be pressed and to decrease the speed,  button (T2) shall be pressed.
In Indra, the blowers run only on two speeds. Whereas in Garuda, Garuda+ & Vennela the blowers runs in 5 speeds i.e "b1, b2, b3, b4, b5".

The typical layout of Cab command is shown below.



5. After switching the Blowers on, the cooling button  (T5) shall be pressed to engage the A/c compressor clutch. Driver can now feel the engine getting loaded. The green LED glows on the cooling button
To increase or decrease the temperature, press  button (T1) and  (T2).
6. To know the Saloon Temperature, press T2 and T3 simultaneously. Then the interior saloon temperature gets displayed on the panel for 10 seconds
7. Ensure a temperature of 22⁰c in night journey during summer and 24⁰c in winter on Cab command (dash board).
8. If blower speed is to be adjusted from b1 to b2, b3 etc. cooling button (T5) shall be kept in switch off mode. Then, after adjusting blower speed, cooling button (T5) shall be pressed.