



AIR CONDITIONER COACHBUS - CITY BUS

# CC336W - CC356W

Owner's Manual  
Warranty Certificate

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Code: 036-00353-001

**SPHEROS**

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**OBSERVATION:** to get the best air conditioner performance we recommend that you read this manual carefully before starting operation. Keep this manual with your vehicle for reference.

SPHEROS DO BRASIL - S/A offers a full line of equipment for bus air conditioning systems for vans, micro and midi buses, commuter, articulated, coaches and double-deckers.

Air conditioning system that is modern and high quality, the products of SPHEROS DO BRASIL - S/A have been developed looking for comfort and tranquility to passengers that uses the public transport.

However, you need to take care to assure a good use and operation of the air conditioning system, and then you can obtain a better performance of its technology resources.

It is mandatory to do the preventive and corrective maintenance procedures, they must be accomplished by experts or dully technicians. Looking for improving and updating the refrigeration technical teams, this manual describes the fundamentals of our air conditioning system based on the most important thermodynamic formulas.

You can find operation instructions of SPHEROS DO BRASIL - S/A air conditioning too, besides it advises you to follow technical procedures of adequate preventive maintenance obeying environmental and safety rules.

Frequent training for technical team make them able to get right diagnosis from equipment (appliances) to accomplish the servicing.

correctly with quality and responsibility, assuring to the whole fleet a perfect operation of SPHEROS DO BRASIL - S/A equipment.

### Warrant Terms

SPHEROS DO BRASIL - S/A warrants its products for two-years period in accordance with the terms listed below:

1 - The warranty will be valid for the period above specified, counting from the date when the equipment is installed in keeping with the warrant certificate, even after the property there of has ben transferred.

2 - Should the equipment be installed by a third part, SPHEROS DO BRASIL - S/A warrant only the product and not its instalations.

3 - During the stipulated period, the warranty completely covers the workmanship and spare parts used to repair defects duly identified as being: premature failure of material and components defects used on its manufacture.

4 - Only a technician from the SPHEROS DO BRASIL - S/A authorized network of services is qualified to repair the defects covered under the warranty.

5 - The warranty approval is subject to the technical analysis of the defects shown in the components and operational conditions to which the equipment has been subjected.

6 - No claims will be accepted if the vehicle is still in use after the defect is found, even if there is lack of pieces, delay in transportation or any other such incident.

### 7 - The Warrant Loses its Validity

- a) If the installation or use of the product is not in accordance with the SPHEROS DO BRASIL - S/A technical recommendations.
- b) If the product suffers any damage caused by improper use, neglect, accident, failures caused by external agents and even lack of maintenance (see owner's manual) or services performed by unqualified person.

c) If the warranty certificate and/or the serial number of the product are adulterated, overwritten or damaged.

d) If defects or unsatisfactory performance are caused by the use of non original spare parts and in disagreement with the technical specifications from SPHEROS DO BRASIL - S/A.

### 8 - The Warranty Does Not Cover

a) Displacement of the bus for repairing of the equipment. In case the customer

requests to be attended in the same place where products is operating, the collection or not of the visitation charge will be the criterion of the authorized service provider.

b) The attending to the consumer, free or paid, in cities that do not have authorized services providers. So the expenses with displacement are the sole responsibility of the owner.

c) Lack of proper preventive maintenance, as described in the preventive maintenance item in this manual.

d) Replacement of bearings, belts, filters in general and lubricating oil, since they are considered items of natural wear.

Bearings, belts and alternators have limited warranty as follows:

- Bearings in general: 60,000km or 2 years, whichever occurs sooner.
- Belts in general: 20,000km or 3 months, whichever occurs sooner.
- SEG Alternators: 1 year with no mileage limit.
- Prestolite Alternators: 2 years without mileage limit.

For the items listed above, the conditions established in these warranty terms and the technical specifications of the respective manufacturer must be respected.

e) Loss or loss of profits caused by the stoppage of the vehicle due to non-operation of the equipment.

**- Preventive Maintenance Frequency Check List**

|                   |   |
|-------------------|---|
| <b>WEEKLY</b>     | 1 - Clean or change the return air filter.  |
|                   | 2 - Check out the belt stretchiness condition and compressor with alternator alignment, observing the wear and tear of them.  |
|                   | 3 - Check the water level of the radiator reservoir. See note (*)   |
| <b>MONTHLY</b>    | 1 - Accomplish the weekly check list.   |
|                   | 2 - Clean the condenser capillary tube coil (Apply only water and neutral non-aggressive soap to copper and aluminum). See note (**)  |
|                   | 3 - Check if the evaporator hatches are closed to avoid air intake into the equipment.  |
|                   | 4 - Check the refrigerant charge: wait 15 minutes, it has to flow through the liquid display without bulb formation.  |
|                   | 5 - Check the compressor oil level: wait 15 minutes, it must be 3/4 up to 1/4 full at oil display.  |
|                   | 6 - Test the equipment operation functions: cool / fan (high and low speed) / heat / dry (air renewing) modes.  |
|                   | 7 - Lubricate the components of the compressor support. It includes articulation (elbows), axles, bushing and pulleys, if necessary.  |
|                   | 8 - Operate the heating system (if any) for at least 30 minutes.  |
| <b>TRIMESTRAL</b> | 1 - Accomplish the monthly check list.  |
|                   | 2 - Measure the exhaust suction pressure, temperature and suction line condition.   |
|                   | 3 - Check the tightening of alternator potency cables fuses in general, electric board and start motor.   |
|                   | 4 - Measure the condenser and evaporator fan flow consumption (check their air outflow).  |
|                   | 5 - Measure the electromagnetic clutch coil.  |
|                   | 6 - Measure the Voltage and Current from alternator.  |
| <b>SEMESTER</b>   | 1 - Accomplish the trimestral check list.   |
|                   | 2 - Clean the evaporator capillary tube coil (Apply only water and neutral non-aggressive soap to copper and aluminum). See note (**)   |
|                   | 3 - Clean the evaporator drain.   |
|                   | 4 - Check out the oil retainer felt of the compressor sealing part.   |
|                   | 5 - Look carefully, if there is any leakage at coupling spots: oil leakage, refrigerant leakage.  |
|                   | Check if there are any loose, free, damaged, broken, worn parts, rusty, melting, cracked or bad fractioning to the bus body.  |
| <b>YEARLY</b>     | 1 - Accomplish the semester check list.   |
|                   | 2 - Test the compressor efficiency at 1500 RPM.   |
|                   | 3 - Make notes about the compressor oil pressure at 1000 RPM.   |
|                   | 4 - Check the opening and closing pressures of high and low pressure switches.  |
|                   | 5 - Check the screws or bolts that attach the compressor support and equipment, checking the right torque.  |
|                   | 6 - Clean the air conditioning body getting rid of any dust/scrap at components: evaporator, condenser, clutch compressor, alternator, alternator, relay and control board. See note (**) |

**IMPORTANT:** If you do not accomplish the preventive maintenance check list as above, it implies to total or partial loss of warranty coverage. The actions of preventive maintenance written in this manual have been based on normal conditions. Just in case of environment contaminated and bad weather conditions, then you must do the maintenance more frequent.

**NOTES (\*):** if necessary, fill it in with water and additives, follow the recommendations of the OEM Body Builder.

**(\*\*):** when cleaning using water, protect electrical and electronic components to prevent damage.

**- Refrigerant Gas R134a**

SPHEROS DO BRASIL - S/A products apply for R 134a. The use of different type of gas, low quality or from unknown brands will cause low performance from the refrigeration and damage the equipment components.

**ATTENTION:** under no circumstances, refrigerant cannot be spoiled at the atmosphere.

**- Dry Filter**

We recommend that you shall preventively change the drier filter every 3 years. Just in case, you need to refill in the equipment with gas, we recommend you replace to a new filter to extinguish any dirt out of the system.

**- Compressor Sealing Part**

In order to avoid leakage at the sealing part of the compressor due to lack of lubrication, then the air conditioning must be working at cool mode for at least 15 minutes, once every 15 days.

The sealing part is lubricated by the compressor oil and in its normal operation allows a small leakage of 0.05 ml per hour under operation.

Check frequently the reservoir and/or felt then remove the excess of it.

Dispose the old oil as your Country regulations and laws.

**- Heating system**

We recommend that you enable the heating system frequently (once a month) to prevent the buildup of solid system particles that lodge in the hot air shutoff valve seat.

**IMPORTANT:** check reservoir water level. If necessary, fill it in with water and additives, follow the recommendations of the OEM Body Builder.

**- Oil**

We recommend you that you shall preventively change the air system oil every two years or 10.000 working hours, whatever becomes first.

**- Ducts**

The cleaning of the air ducts must be done every three months, it can be earlier, depending on: the frequency of operation of the air conditioning system, quantity of passengers and resistivity of the environment where it is driven. This cleaning is the responsibility of the vehicle owner's only, he is in charge of this cleaning in order to offer good air quality to his passengers.

**NOTE:** ducts are components of the bus body.

**- Pulley Belts**

In order to increase the lifetime of the belts, the strength/stretchiness must be as low as possible, but working, not leaving them skidding without any friction.

Too low stretchiness on the pulley belts can cause overheat and too much skidding, causing early break.

Too much stretched belts diminish their lifetime and from roll bearing and from sleeves, this problem can cause engine interior and compressor damage.

After changing the belts, check their stretchiness back again after 48 working hours.

It is recommended not use different brands. Install assemblies with the same diameter/length of the series and do not apply new belts beside old ones. Putting the assembly into action without one or two belts for a long time can cause a damage inside the "v" groove of the pulley. It will cause wear in that "v" groove, so the new belt may not be stretched accordingly.

**SAY NO TO RECONDITIONED PARTS**

The application of reconditioned parts will diminish the air conditioning efficiency, will overcharge the electric system causing early brake of the compressor and set a fire!

**IMPORTANT:** the vehicle owner must do preventive maintenance actions. If you do not do the preventive maintenance as described in this chapter, it implies you lose partially or full warranty coverage.

**ATTENTION:** Just in case a problem happens in the refrigeration system, then it must be repaired in an authorized shop or qualified professional. If a third party installs the equipment, SPHEROS DO BRASIL - S/A, guarantees only the product, not the installation of it.

The following items are in charge of the OEM Plant (Bus Body Builder).

**• Driver´s evaporator:**

Problems with any driver´s air conditioning component, leakage, bad working or operation.

**IMPORTANT:** Iclean the return filter of the driver´s air conditioning, at least, once a week.

**• Tubes, hoses, drains and wiring harness:**

Bad attachment. Leakage at connections and welding points. Damages due to frictioning / chassis and components frictioning or bad installed.

**• Alternator/Compressor Support:**

Excess or lack of torque at attaching screws/bolts. Assembly is out of project designs. Pulleys are not aligned, excess or lack of stretchiness at the belts and pulleys.

**• Gas Charge Process:**

Leakage test procedure. Vacuum process and refrigerant gas charge.

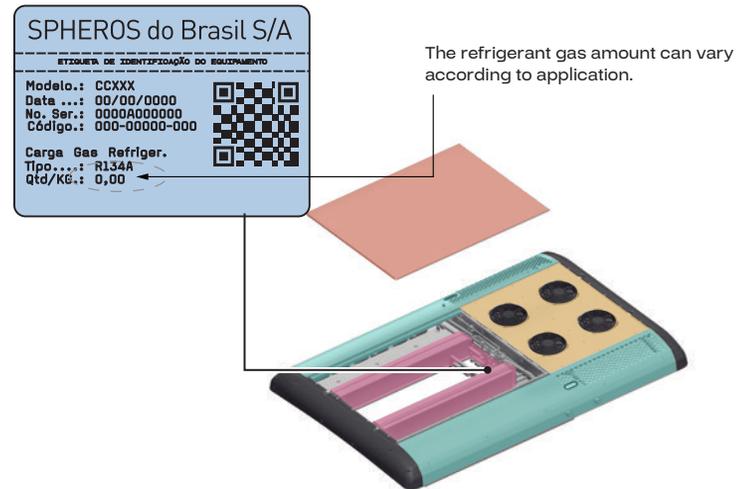
**Note:** in case the installation is bad, SPHEROS DO BRASIL - S/A Agent Authorized Service Net will have to call the OEM Plant first, then get an authorization to do the service, print and issue the Invoice of repairs.

**Identification Tag**

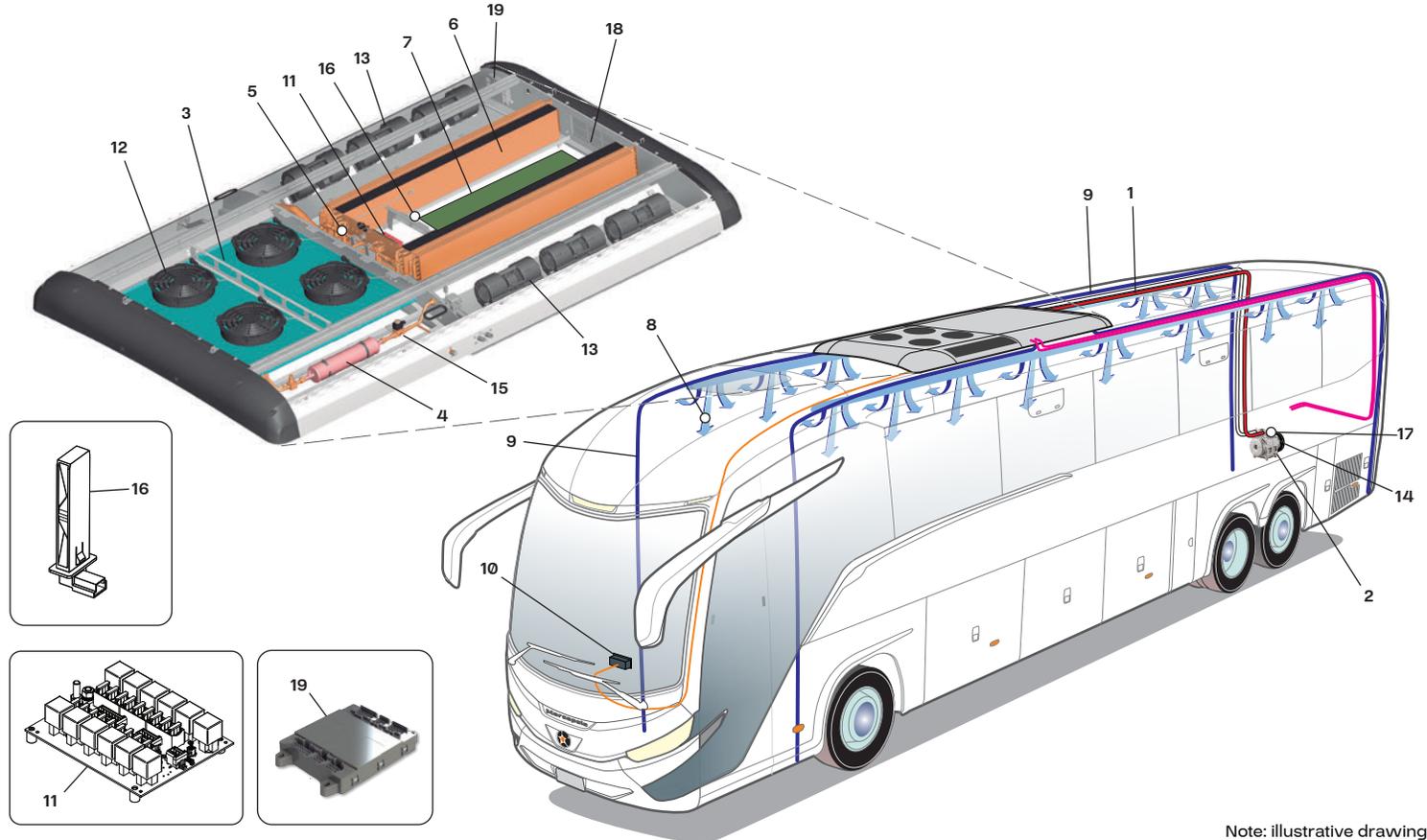
It is very important, when you need to ask for spare parts or after sales parts, and similar ones, customer must identify the model of the air conditioning, telling the series number, model and manufacturing date. This information can be found in the Air Conditioning Warranty Certificate and ID tag.

Application information regarding to: series and bus body model, series and chassis model are very important to identify which parts the equipment carries.

In order to identify the bus body and chassis, you need to check the bus body builder manual.



1- Operating the Air Conditioner



Note: illustrative drawing.

MECHANIC SYSTEM

**1 Refrigerant Fluid**

It is inside the air conditioning equipment, inside the system. It works absorbing the heat from the interior / room of the vehicle, at the evaporator, and then it goes to the condenser where the heat is thrown to the outside. SPHEROS DO BRASIL - S/A, products apply refrigerant R134a, according to the Protection Environmental Law.

**2 Compressor**

When it is working, the compressor sucks the refrigerant fluid from evaporator at gaseous state and under low pressure, compressing it, so temperature and pressure increase, then the compressor puts it into the condenser.

**3 Condenser**

Its main goal is dissipate the heat out, which was absorbed by the refrigerant fluid along the refrigeration system.  
At the condenser, the overheat refrigerant fluid is sent to outside losing its force, changing from gaseous state to liquid state.

**4 Dryer filter**

It has the purpose of retaining impurities and/or moisture that can exist in the system, preventing them from leaking into the expansion valve.

**5 Expansion Thermostatic Valve**

Valve hinders the refrigerant inlet that comes from de condenser at high pressure and its goal is adjust the refrigerant gas flow that passed by the evaporator looking for making the pressure steady and temperature at the capillary tubes output.

**6 Evaporators**

Now at evaporators, the refrigerant fluid, at low pressure, turns from liquid to gaseous state, absorbing the interior heat of the vehicle in this process.

MECHANIC SYSTEM

**7 Air filter**

Air return filter retains impurities from air avoiding any block of dirt at evaporator capillary tubes and coil.

**8 Air circulation**

Air being cooled by the evaporator, then it follows to the bus interior through fans.

**9 Drain**

It is a way to get the condensed moisture from evaporator tubes from the condensed tray to putting out.

**10 Controller**

It is installed in the instrument panel, it offers to the driver to set-point of temperature, to see by display the interior temperature, offering full climatic control inside de bus.  
Set point: it is the temperature the driver wishes to set inside the vehicle for passengers.

**11 Relay Board**

Relay board has the controller controls, condenser fan control, evaporator control and compressor control.

**12 Condenser Fan**

Condenser fan and the compressor will only work at "Cool Mode".

**13 Evaporator Fan**

Evaporator fans are working at cool and fan modes, fans can be set in two speeds.  
Sped control can be manual or automatic.

ELECTRIC SYSTEM

**14 Compressor Operation**

It is started up by the vehicle engine though a pulley-and-belt system and put into action by an electromagnetic clutch when air conditioning is operating at "Cool Mode".

**15 Solenoid Valve**

Solenoid valve is applied to stop refrigerant flow through a line. It is a closing valve controlled remotely and under electric operation.

**16 Temperature Sensor**

The interior temperature is measured by the temperature sensor placed at the air return spot.

**17 Pressure Switches**

Pressure switches are electric devices that monitor the air conditioning equipment operation pressure. Every time a strong change happens from the NORMAL temperature, they turn off the compressor immediately to avoid break.  
Observation: pressures are always monitored, even if the air conditioning is turned off.

**18 Air refrechment**

This permits the entry of the external in order to expel unwanted odors and impurities from the vehicle.

**19 ECU module**

ECU (Engine Control Unit), refers to a module which controls the vehicle's electronic systems. Receives signals sent by sensors (input), performs the processing and immediately sends to the appropriate actuators (output).

### 1.1- SCB2000 Controller Operation

This product aims to control the temperature of SD (Single Deck) vehicles. The intelligence of the system and charge activation is done by Smart ECU in conjunction with the relay board, while the panel is used for user interface only.

The following ECU configurations are available:

- SCB2000 - HVAC SD
- SCB2000 - VAC SD

### 1.2- Description of the Control Panel

Below is a description of each of the keys with their respective functions.

- 1- ON/OFF \_\_\_\_\_ Turns the product ON /OFF.
- 2- AC \_\_\_\_\_ Indicates that the compressor is ready for operation.
- 3- Increment of the set-point \_\_\_\_\_ Defines the desired temperature in the room.
- 4- Decrease of the set-point \_\_\_\_\_ Defines the desired temperature in the room.
- 5- Auto \_\_\_\_\_ Activates the automatic fan speed and air renewal mode.
- 6- VENT \_\_\_\_\_ Manual speed control of the evaporator fans.
- 7- Re-Heat \_\_\_\_\_ Turns on / off the passenger window defroster.
- 8- Air recirculation \_\_\_\_\_ Turns on / off air recirculation on the bus.

SCB2000 Controller



### 1.3- Off Mode

The controller can be started by the ON/OFF key or through the auto start function. To turn on the controller, a +15 signal (ignition) is required. With that, the standby light will be on, allowing the visualization of the temperatures if the panel is on.

**Note 1:** If the standby light is off and the Power button is pressed, the standby light will come on and the panel can be turned on. However, if no communication is established, the product will return to sleep mode.

**Note 2:** emergency mode: if the control panel does not establish communication with the panel, after 1 minute the control panel starts to operate automatically.

**Note 3:** when turning on the panel, the Firmware versions of the ECU SU021 and the Panel SCB2000 are informed respectively by the abbreviations SUV xx and SCV xx.



### 1.4- Automatic Mode



- 1- Status indication of the actuators;
- 2- Set-point temperature;
- 3- Return Temperature.

When starting the panel, automatic mode is activated (the corresponding key is illuminated in amber color).

The auto mode activated indicates that the evaporator fan speed and the air recirculation function are operating in automatic mode, as well as the compressor drive. Automatic mode is disabled when any of the following occurs:

- AC key pressed disabling the compressor;
- Changing the fan speed using the key.

#### 1.4.1- Automatic Ventilation

Evaporator ventilation is controlled by the Set-point together with the suction and discharge pressure values. To maintain the appropriate pressure value for the operation and reach the defined Set-point.

#### 1.4.2- Automatic Compressor

The compressor is activated according to the difference between the Set-point and the return temperature.

### 1.4.3- Automatic Heating

The heating mode is controlled by the Set-Point and by parameters P62 and P63. In heating mode, the speed of the evaporators will be at a low level and trigger the valve for heating.

### 1.5- Compressor Operation



By default, the control will always have the AC key in amber color, indicating that the compressor is enabled for operation.

**Disable Compressor:** pressing the AC button when the illumination is amber will disable the compressor. If the compressor is activated, it will be turned off respecting the minimum operating time. The cooling function will be disabled.

**Activate Compressor:** when pressing the AC button when the illumination is white, the compressor will be activated. The air conditioning compressor is enabled and turns on if necessary and if the minimum operating times are maintained. The cooling function will be enabled.

**Note:** the air conditioning compressor must be turned off for at least 1 minute before it can be turned on again. If the AC button is pressed during this time, the device reactivates the air conditioning compressor after 1 minute. The air conditioning compressor runs for at least 1 minute before turning off. If it is disabled right after activation, it will keep working for 1 minute.

### 1.6- Manual Speed Selection



The speed of the evaporator fans can be changed manually using the ventilation key and its value defined using the increment and decrement keys.

Auto key will be disabled.

2 speeds (brush fans) or 5 speeds (electronic fans) are available for manual definition, these speeds are a request to the control system, which depending on its point of operation and control will seek to define the necessary speed.

1.7- Failures

Air conditioning system failures will be classified as critical operational failures and maintenance failures.

The failures are displayed on the digital display of the panel as follows:



- 1- Critical air conditioning malfunction (HA);
- 2- Air conditioning maintenance failure.

The air conditioning compressor will only stop working when a critical fault, triggered by a high or low pressure warning, occurs during three consecutive clutch engagement attempts.

The corresponding fault code, item 1, will appear on the dashboard.

Other faults that do not cause the compressor to stop are classified as maintenance faults. These faults should be checked as soon as the vehicle has a scheduled maintenance stop. The corresponding fault code, item 2, will appear on the dashboard.

· Viewing faults on the dashboard:

To view faults on the dashboard, press the AUTO key. The faults will appear described as in the example below:

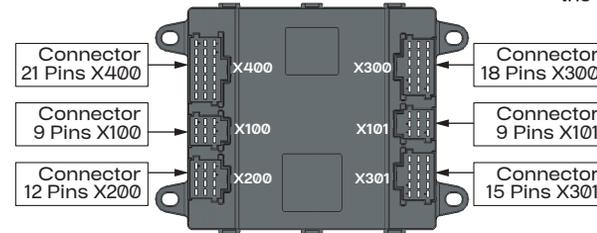


**NOTE:** The faults are the same for both SD and DD controller models, as well as for electric cars that use the same controller.

1.7.1- Interpretation of the Smart ECU Fault

In the fault description, the panel indicates the ECU connector and the pin where the corresponding signal input/output should be checked.

The example below shows how to identify the panel fault in the ECU:



**NOTE:** Consult the Spheros electrical diagram for identification of each connector/pin and its function.

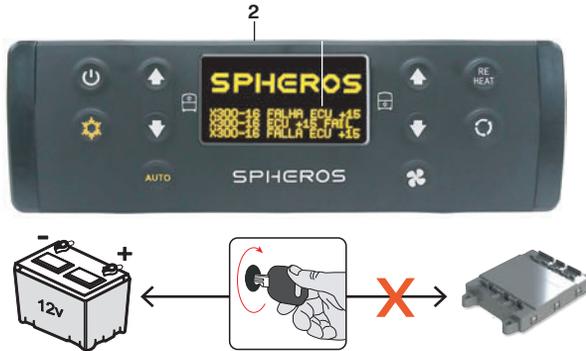
1.7.2- Initialization Failures

When the panel starts up, the display will indicate the corresponding type of fault.

1- CAN communication failure.



2- Power failure + 15.



### 1.8- Connecting the Panel

The controller can be started by pressing the On/Off key (3) or via the Auto-Start function. To turn on the controller, a +15 signal (car battery) is required. This will cause the On/Off key to be red (4), and when pressed, the panel will initialize and the key will turn white (3).

To activate the cooling or heating system, a D+ signal (car engine running) is required. If the panel is turned on without the D+ signal, a battery symbol (5) will appear in the lower center of the panel, and the loads will be activated for 30 seconds before being switched off.

When the panel starts, Auto mode (6) is activated (the corresponding key will light up in amber).

Auto mode activation indicates that the fan speed and air circulation function (optional) are operating in automatic mode, as is the compressor, allowing visualization of the upper and lower floor temperatures on the digital display.



- 3- On/Off key;
- 4- On/Off key (Battery +15 signal);
- 5- Battery Failure Signal;
- 6- AUTO mode;
- 7- Upper room temperature;
- 8- Lower room temperature;
- 9- Upper floor set point;
- 10- Lower floor set point;
- 11- Indicator icons;
- 12- AC key;
- 13- Ventilation key;
- 14- Recirculation key;
- 15- SET POINT increment key;
- 16- SET POINT decrement key.

Auto mode is deactivated when any of the following occurs:  
 12- AC button deactivated (cooling and heating modes are deactivated);  
 13- Fan speed change via the ventilation button;  
 14- Air recirculation function deactivated via the recirculation button.

### 1.9- Adjusting the Desired Temperature

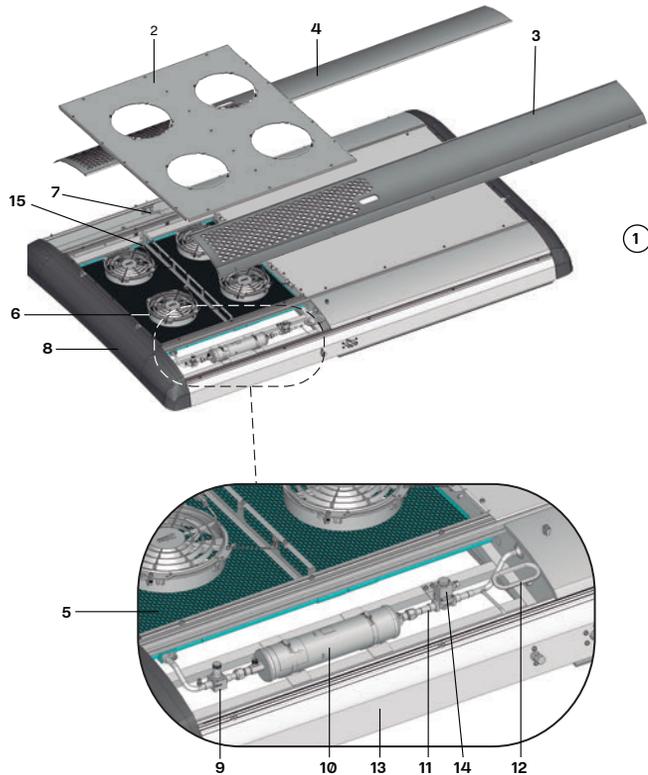
The desired temperature inside the vehicle is called the SET POINT. To adjust the set point temperature, use the increment (15) or decrement (16) keys to set the temperature on the upper and lower floors independently.

## 2- Technical Data Sheet

| Component        | Features                 | CC336W                         | CC356W                         |
|------------------|--------------------------|--------------------------------|--------------------------------|
| AIR CONDITIONING | Maximum Capacity         | 120.000 BTU/h (35 kW)          | 136.500 BTU/h (40 kW)          |
|                  | Heating Capacity         | 136.500 BTU/h (40 kW)          | 136.500 BTU/h (40 kW)          |
| REFRIGERANT GAS  | Type                     | HFC-134a                       | HFC-134a                       |
|                  | quantity (*)             | 5 kg                           | 5 kg                           |
| EVAPORATOR       | Model of blowers         | Centrifugal                    | Centrifugal                    |
|                  | Quantity of blowers      | 6                              | 6                              |
|                  | Air flow (free blowing)  | 6.600 m <sup>3</sup> /h        | 6.600 m <sup>3</sup> /h        |
|                  | Nominal Current          | 90A                            | 124A                           |
| CONDENSER        | Model of Fans            | Axial                          | Axial                          |
|                  | Quantity of Fans         | 3                              | 4                              |
|                  | Air flow                 | 8.700 m <sup>3</sup> /h        | 11.600 m <sup>3</sup> /h       |
|                  | Nominal Current          | 90A                            | 124A                           |
| COMPRESSOR       | Model (Alternative Type) | TM65 (Heavy Oscillating Plate) | TM65 (Heavy Oscillating Plate) |
|                  | Displacement             | 635 CM <sup>3</sup>            | 635 CM <sup>3</sup>            |
|                  | Maximum Rotation Allowed | 4.000 RPM                      | 4.000 RPM                      |
|                  | Lubricant Oil            | 027-00002-000                  | 027-00002-000                  |
|                  | Amount Used              | 1,5 Litros                     | 1,5 Litros                     |
| CLUTCH           | Type                     | Electromagnetic                | Electromagnetic                |
|                  | Voltage/Current          | 24V - 80A                      | 24V - 88A                      |

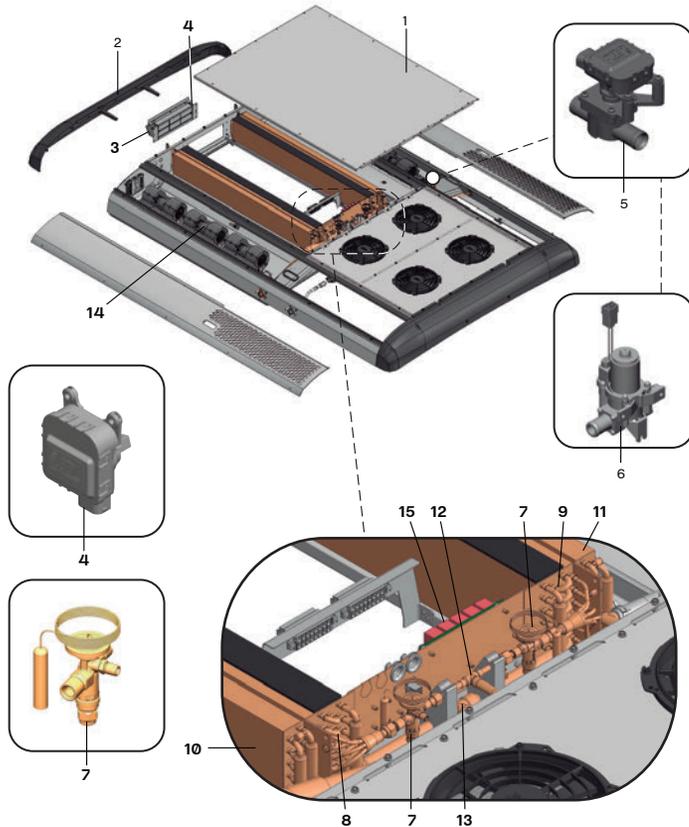
(\*) The quantity of refrigerant gas can vary according to the application and installation. When you have defrost, add 1kg more in the amount of refrigerant.

## 3- Condenser Components

NOTE: visit [www.spheros.com](http://www.spheros.com)

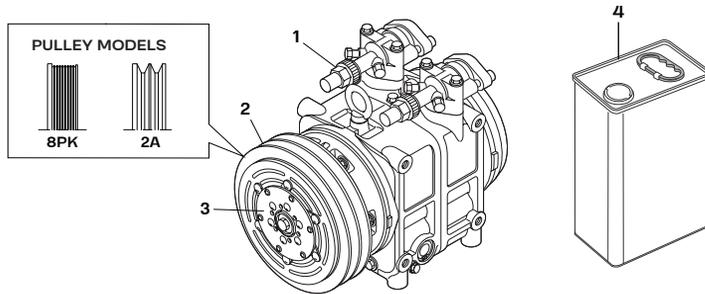
| ITEM | DESCRIPTION                                | QTY. |
|------|--|------|
| 1    | Condenser/Evaporator Module                | 1    |
|      | Condenser/Evaporator Module W/ UV Purifier |      |
| 2    | Central Condenser Closure                  | 1    |
| 3    | C - Structured Aluminum Profile            | 1    |
| 4    | C - Structured Aluminum Profile            | 1    |
| 5    | MPHE Condenser Coil                        | 1    |
| 6    | 24V 12" Electronic Axial Fan               | 4    |
| 7    | Discharge Pipe Assembly                    | 1    |
| 8    | Front Finish Cover                         | 1    |
| 9    | Condenser Liquid Line Tube Set             | 1    |
| 10   | Liquid Tank / Filter Dryer                 | 1    |
| 11   | Tank Liquid Line Tube Set                  | 1    |
| 12   | Finishing Rubber                           | 2    |
| 13   | Condenser/Evaporator Base with Renewal R.1 | 1    |
| 14   | AM2 24VDC 20W CASTEL 91 Coil               | 1    |
| 15   | Condenser Wiring Harness                   | 1    |

## 3.1- Evaporator Components

NOTE: visit [www.spheros.com](http://www.spheros.com)

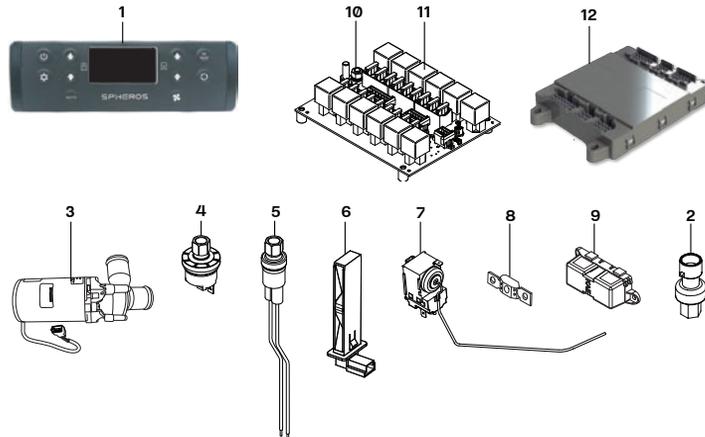
| ITEM | DESCRIPTION                    | QTY. |
|------|--------------------------------|------|
| 1    | Central Evaporator Closure     | 1    |
| 2    | Front Finish Cover             | 1    |
| 3    | Air Renewal Unit with Filter   | 1    |
|      | Air Filter Renewall Assembly   | 1    |
| 4    | 24V Electric Motor Air Renewal | 1    |
| 5    | 7/8" Hot Water Valve           | 1    |
| 6    | 7/8" 24V Solenoid Valve        | 1    |
| 7    | TGEN 3.5 TR Expansion Valve    | 1    |
| 8    | Right Side Evaporator Coil     | 1    |
| 9    | Left Side Evaporator Coil      | 1    |
| 10   | Right Side Heating Coil        | 1    |
| 11   | Left Side Heating Coil         | 1    |
| 12   | Evaporator Liquid Tube Set     | 1    |
| 13   | Suction Tube Set               | 1    |
| 14   | 24V Electronic Radial Fan      | 6    |
| 15   | Evaporator Electric Whip       | 1    |

## 3.2- TM 65 Compressor Components

NOTE: visit [www.spheros.com](http://www.spheros.com)

| ITEM | DESCRIPTION                | QTY. |
|------|----------------------------|------|
| 1    | TM 65 Compressor           | 1    |
| 2    | 2A/2B Pulley<br>8PK Pulley | 1    |
| 3    | Clutch Kit without Pulley  | 1    |
| 4    | Compressor Oil             | 1    |

## 3.3- Electrics Components



| ITEM | DESCRIPTION                  | QTY. |
|------|------------------------------|------|
| 1    | SCB2000 Controller           | 1    |
| 2    | 2CP45-4 Temperature Sensor   | 1    |
| 3    | 24V Water Pump               | 1    |
| 4    | High Pressure Switch         | 1    |
| 5    | Low Pressure Switch          | 1    |
| 6    | External Temperature Sensor  | 1    |
| 7    | EPCOS 3 K Temperature Sensor | 1    |
| 8    | 125A Fuse                    | 1    |
| 9    | Fuse Holder                  | 1    |
| 10   | 24V Electrical Control Board | 1    |
| 11   | Relay                        | -    |
| 12   | ECU Module                   | 1    |

## 4- Safety Precaution

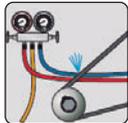
**1- Personal Protection:**

Air conditioning systems offers chemic, mechanic and electric risks.

It is mandatory to wear IPE (Individual Protection Equipment), picture 1 to protect yourself from refrigerant gas, refrigerant oil, battery acid, waste launched, engine high temperature and noise.

**2- High Pressure:**

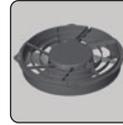
The refrigerant in liquid state and high pressure causes a potential risk. When the refrigerant is sprayed to natural air, it can cause serious injuries to eyes and skin.

**3- Hoses:**

Check if manometer hoses are in good conditions, when holding them; stay far from belts, pulleys and hot surfaces.

**4- Hot Surface:**

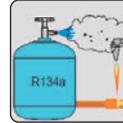
The compressor discharges, exhaust pipes and other engine components can be extremely hot.

**5- Rotation Components:**

The fans, pulleys and belts are not visible under certain conditions. Special care must be taken when putting your hands near them.

**6- Welding:**

Welding must be done carefully; it causes burns and spray toxic gases out. Provide ventilated places to do it.

**7- Toxic Gases:**

The refrigerant gas along with flame becomes into toxic gases and can cause very serious breathing illness. Take special care in closed places, if gases scape somehow (leakage) and then it can cause no toxygen in the air.

**Other Care:**

- When handling and going up and down stairs, ladders and platforms, you can slide or they can break.
- Wear a seat belt always when working over 1.5m high.
- Never apply heat in recipients or pressured lines.
- Never operate the equipment if discharge service valve is closed.
- The refrigeration oil can cause irritation to your skin and eyes.
- Check if every screw are long enough and right tight.
- **Components that are not in good conditions must be replaced by new ones due to safety reasons.**

**5- Product Discard**

Concerned about sustainability at SPHEROS DO BRASIL - S/A guides its customers and its authorized service network to discard products in an environmentally sound and safe manner.

Proper disposal of the product or components at the end of their useful life will contribute with the preservation and pollution reduction of the environment, creating economic growth through the Reverse Logistics Program.

According to Law 12,305 / 2010, the environmentally adequate destination of components (parts, oil, refrigerant) is required.

It is the responsibility of all to ensure that products and components are sent to appropriate treatment to companies approved by the environmental agencies.

For more information about our Reverse Logistics Program, please see our website: [www.spheros.com](http://www.spheros.com)





SPHEROS do Brasil S/A

Av. Rio Branco, 4688 - Bairro São Cristóvão - CEP 95060-145 | Caxias do Sul - RS - Brasil | Tel. +55 (54) 2101.5800  
[www.spheros.com](http://www.spheros.com)