USER MANUAL
AVL DITEST ADS 110
AIRCONDITION DIAGNOSTIC SYSTEM

FUTURE SOLUTIONS FOR TODAY
Warning and Safety Instructions

This user manual contains important warning and safety instructions that must be observed by the user.

The product is intended only for the highly specific use described in the user manual. The most important prerequisites and safety measures for the use and operation of the product are also described to ensure faultless operation.

No warranty can be given and no liability is assumed for applications exceeding the described intended use, irrespective of observance of the necessary prerequisites and safety measures.

The product must only be used and operated by personnel who, based on their qualifications, are capable of adhering to the necessary safety measures during use and operation. Only accessories and consumables supplied by AVL DiTEST or approved by AVL DiTEST must be used. The measurement results obtained from the product in question depend not only on the correct functioning of the product, but also on a series of general conditions. The results delivered by the product must therefore be evaluated by a specialist (e.g. plausibility check) before further action is taken on the basis of a delivered measurement.

Adjustment and maintenance works on open live devices may only be performed by trained specialists who are aware of the associated danger.

The product may only be repaired in the factory of origin or by specialists specifically trained to perform such repair.

When using the product, it must be ensured by a specialist that the test object or test system is not brought into any operational state that could result in damage to goods or endangerment of people.
GENERAL SAFETY INSTRUCTIONS

WARNING
Read all instructions carefully!

DANGER
Danger of death due to electrical voltage on vehicles with high-voltage systems
Deadly high voltages are present on the HV energy store (HV battery) and on parts connected to it!
Make sure no-one can come into contact with the connections on the HV battery, connecting cables of the HV battery or other parts under high voltage!

WARNING
Danger to life by electric potential on the ignition system
The ignition system carries a deadly high voltage!
Do not touch the ignition system while the motor is running!

WARNING
Danger to life by electric potential on vehicles with Xenon light
A lighting system that uses a xenon light carries a deadly high voltage!
Do not touch the components of the xenon light while the lighting is turned on!

WARNING
Danger from harmful or irritating substances
When performing measurements on the running motor in closed rooms (workshops, test halls, etc.),
extract the vehicle exhaust gases and ventilate the rooms thoroughly!
WARNING

Danger of burns from hot parts
Measurements must be performed at normal motor operating temperature or in accordance with the test specification! Do not touch hot parts such as the motor, motor components or any of the entire exhaust system! Use cooling fans if necessary!

WARNING

Danger of injury due to rotating parts
Wherever possible, any work in the engine compartment should be performed while the engine and ignition are off!
Do not touch any rotating parts such as alternator, radiator fan or their drives (e.g. drive belts)!

WARNING

Risk of explosions due to pyrotechnical setups and restraint systems
- Testing and assembly work may only be performed by trained personnel!
- Never test the igniter with a multimeter!
- Only perform system tests with approved testing equipment!
- Disconnect the battery when working on the airbag system!
- When reconnecting the battery, the ignition must be turned off and there must be no person inside the vehicle.
- Always store the airbag unit with the discharge side facing upwards or according to the storage specifications!
- Never leave the airbag unit lying around unattended!
- Protect the airbag unit against flying sparks, open fire and temperatures above 100°C (212°F)!
- Do not transport the airbag unit in the passenger space!
- Do not allow the airbag unit to come into contact with oil, grease or cleaning agents!
- An airbag unit that has been dropped from a height greater than 0.5 m (19.7 in.) must be renewed!
- Dispose of untriggered airbag units!
- Do not open or repair the airbag unit!

NOTICE

When maintaining the cut-off speed of diesel engines, observe the applicable manufacturer's specifications!

NOTICE

Always turn off the ignition before connecting or disconnecting the OBD connector or the various AVL DiTEST vehicle adapters!
Safety Conditions

Definitions

DANGEROUS AREAS
Any area within or close to the equipment implying risk for the safety and health of exposed persons.

EXPOSED PERSON
Any person completely or partially standing in a dangerous area.

OPERATOR
The person/s in charge of operating the appliance for the set purpose.

CLASSIFICATION OF OPERATORS
The operator can be classified according to two main categories, which, in some cases, refer to one single person:

- The operator charged with the equipment operation has the duty to:
  - Start and check the machine automatic operation
  - Carry out simple setting operations
  - Remove the causes of equipment stop not implying breakings of members but simple operation anomalies

- The operator charged with the machine maintenance is a qualified technician who can intervene on the machine, with guards open, and on mechanic and electrical members to carry out setting, maintenance and repair operations.

USER
Body or person legally responsible for the equipment.
Personal Safety Information

**WARNING**
Risk of injury from toxic fumes and gases!

**PERSONAL SAFETY:**
Use coolant R134a / R1234yf only. The mixture with other types of coolant causes severe damage to the A/C and cooling systems and to the service equipment. It is advisable to wear suitable protections such as goggles, gloves and protective clothing, the contact with the coolant may cause blindness and other body injuries to the operator. Avoid the contact with skin; the low boiling temperature (about –30 °C) may cause burns. Avoid inhaling of the coolant fumes. Do not expose it to the direct sunbeams and rain. Use the station in ventilated rooms. Do not smoke near the station and during the operations. Use the station clear of heat sources, open flames and/or sparks. Further medical and safety information may be obtained from the lubricants and coolants producers.

**AVL DITEST ADS 110:**
Before carrying out connections between the unit and an A/C system or external tank, be sure that all the valves are closed. Before disconnecting the unit, be sure that the phase is completed and all the valves are closed so that the coolant is not dispersed in the atmosphere. Do not change the calibration of the safety valves and control systems. Do not use external tanks or other storage containers that are not homologated or without safety valves. Do not leave the unit live unless it is used in the near future; cut off the power supply before a long period of inactivity of the unit. The unit shall have to be always attended. The unit shall have not to be used in an explosion-risk environment.

**HOSES:**
Hoses may contain pressurised refrigerant.
Before connecting or disconnecting the car A/C system hoses, make sure the vehicle is switched off and that you have the keys with you (so as to prevent it from being accidentally switched on by third parties). Do not leave the vehicle’s keys in the ignition.
Always connect the AVL DITEST ADS 110 hoses with quick coupler of RED colour on the HP side (high pressure) of the A/C system. Always connect the AVL DITEST ADS 110 hoses of BLUE colour on the LP side (low pressure) of the A/C system. Disconnect the hoses with extreme caution.
Never direct the quick couplings (taps) towards your face or other persons or animals.
When they are not used on the vehicles, hoses shall be repositioned in the hose reels on the AVL DITEST station’s side and the quick couplers taps shall be closed

**REFRIGERANT:**
The unit must operate in open places or rooms with a good ventilation (at least 4 changes of air per hour). Work away from open flames and hot surfaces; the coolant breaks down at high temperatures releasing toxic and aggressive substances which are harmful to both the operator and the environment.
Avoid inhaling the system coolants and oils. The exposure can irritate eyes and the respiratory tract.
The tool has not to be used in explosion risk environments (potentially explosive atmospheres)
WARNUNG
Risk of injury from toxic fumes and gases!

WORKING ENVIRONMENT:
The unit must operate in open places or rooms with a good ventilation (at least 4 changes of air per hour). Work away from open flames and hot surfaces; the coolant breaks down at high temperatures releasing toxic and aggressive substances which are harmful to both the operator and the environment. Avoid inhaling the system coolants and oils. The exposure can irritate eyes and the respiratory tract. The tool has not to be used in explosion risk environments (potentially explosive atmospheres).

STOP FOR LONG PERIOD:
Store the equipment in a safe place, disconnected from the mains, away from excessive temperatures, humidity and the risk of damaging impact. Contact the Technical Service for equipment stop and securing, empting and recycling of R134a / R1234yf gas, in compliance with the laws in force in the country where the equipment has been commissioned.

TRANSPORT:
Contact the Technical Service for empting and recycling of R134a / R1234yf gas, in compliance with the laws in force in the country where the equipment has been commissioned, as well as for locking of the load cell of the inner vessel (gas vessel).

Precautions For Operators Safety

WARNING

General Precautions
All the operators shall not be under the effect of tranquillizers, drugs or alcohol when performing their job. Before starting their job, operators shall be perfectly aware of the position and operation of all the controls of the equipment and of the user manual content. Always pay attention to any danger sign affixed on the installation and within the company of the user. The employer is responsible for the spreading of this document to the whole personnel that is going to work on the equipment. Besides the obligation to strictly comply with the instructions contained in this manual, the operators shall inform their heads on any deficiency or potentially dangerous situation that might occur. In case of equipment malfunctioning, check the procedures outlined in the various chapters. Always refer to the safety standards adopted by the company employing the equipment with a view to avoiding useless risks.
WARNING

Risk of injury from toxic fumes and gases!

ATTENTION: for HAZARDS related to handling, use and storage of R134a / R1234yf gas and PAG/POE oils of vehicle A/C systems, you shall ask your refrigerant supplier for the technical and safety data sheets and comply with the requirements included therein.

In general, refrigerant fluids may cause ASPHYXIA, FROSTBITE, BURNS, ARRHYTHMIA (irregular heart activity) and even DEATH.

Refrigerant gases within the vessel are stored in liquefied and pressurized form, IF WARMED UP, THEY MAY EXPLODE /CATCH FIRE. Always use the equipment within the temperature range identified on the CLIMA station data plate.

ENSURE SUITABLE VENTILATION OF WORKING PREMISES; do not use in areas with or close to pits (ex. Vehicle service pits), excavations, sewers, cellars; any outflow /leaks of R134a / R1234yf gas (heavier than air) may lead to hazardous concentrations and reduce the amount of oxygen (cause of asphyxia).

PPE (Personal Protective Equipment): use GOGGLES /EYESHADE, GLOVES AND PROTECTIVE CLOTHING specifically suitable for R134a / R1234yf and the additional PPE required by the safety data sheet of the gas manufacturer.

WARNING

Risk Of Asphyxia

DURING THE ACTIVITIES WITH THE CLIMA STATION, SMOKING AND APPROACHING WITH/TO OPEN FLAMES, SPARKS AND HEAT SOURCES IS ABSOLUTELY FORBIDDEN.

REFRIGERANT GAS
High concentrations of refrigerant gases may cause asphyxia, they are heavier than air and may cause suffocation by reducing the oxygen available for breathing. The requirements stated in the safety data sheet of the manufacturer of the refrigerant being used shall compulsorily be read and complied with.

GASOLINE ENGINES
Exhaust gases of gasoline vehicles contain carbon monoxide, a colourless and odourless gas which, if inhaled, can cause serious physical problems.

Special attention is always required when working within pits, as exhaust gases components are heavier than air and consequently deposit on the bottom of the pit.

Attention shall be paid to natural gas vehicles as well.

DIESEL ENGINES
Diesel engine exhaust gas composition is not always the same. It can change according to: type of engine, intake, conditions of use and fuel composition.

Diesel exhaust is made up of gases (CO, CO2, NOX and HC) and particulate (soot, sulphates, etc.); the small particles of carbon making up soot remain suspended in the air and can thus be breathed. Toxic components, albeit in small quantities, are present as well.

SAFETY MEASURES:
Always ensure good ventilation and air aspiration (especially in the pits).
In closed premises, always start the exhaust gas aspiration system.
WARNING

Risk Of Fire Or Explosion!

When carrying out operations on the fuel system (injectors, fuel and gasoline pump, etc.) there is risk of fire or explosion due to the fuels employed and/or vapours formed by them.

SAFETY MEASURES:
- Disable start.
- Let the engine cool down.
- Do not use free flames or sparks sources.
- Do not smoke.
- Collect the outflowing fuel.
Start the aspiration units in closed premises.

WARNING

Dangerous Voltage Hazard!

Civil or industrial electric power distributions, as well as vehicles electric systems, do imply dangerous voltages. When an operator is in contact with testing tools or live parts of the engine, risk of electrocution exists. For instance, this might be caused by cables with damaged insulation (ex. Bites of animals on power cords).
This is especially true of the vehicle starting system and testing tools connections.

SAFETY MEASURES:
Connect the testing tools to an electric socket safety relay and correctly grounded.
- For the testing tool connection, use exclusively the cables provided with the tool itself, making sure insulation is not damaged.
- Make sure the testing tool is grounded before turning it on.
- When carrying out interventions on the electrical system of a vehicle (connection of testing tool, replacement of starting system parts), supply voltage shall be unplugged (ex. battery).
During checks and setting operations with the engine turned on, attention shall be paid to avoid touching those vehicle live components (for instance the starting system) without the suitable precautions (for instance insulating gloves).
WARNING

Risk Of Burn!

When intervening on the engine, protect face, hands and feet with suitable protective devices, avoid contact with hot surfaces, such as sparking plugs, radiators, pipings of the cooling system and electromechanic sensors. Catalytic mufflers reach extremely high temperatures and can cause burns or fires. Attention shall thus be paid to avoid touching these objects without suitable precautions.

SAFETY MEASURES:
- Wear protective gloves.
- Let cool down the engine and other independent accessories, if any.
- Do not install testing tools connection cables over or close to hot parts
- Do not keep the engine turned on once checks have been completed.

WARNING

Risk Of Intoxication!

The pipes that are used for exhaust gases sampling if subject to high temperatures (exceeding 250 °C or due to fires) release a highly toxic gas which, in case of inhalation, can be harmful for health.

SAFETY MEASURES:
- In case of inhalation, immediately contact a doctor.
- To remove combustion residues wear neoprene or PVC gloves.
- Fire residues can be neutralized with a calcium hydroxide solution. This leads to the formation of calcium fluoride that can be removed with water.
WARNING

Risk Of Contact With Vehicle Battery!

ELECTRICAL CONTACTS:
Never allow the positive and negative terminals of the battery to be connected by metal parts. In particular, contact with quick couplers of the AVL DiTEST ADS 110 or other tools or metal personal objects shall be avoided.
In case of contact and short-circuit a significant quantity of current might flow through the metal, thus leading to the risk of battery explosion, heat emission, smoke emission and fire, as well as burning of the metal object connecting the two terminals, with emission and projection of splinters and hazardous chemicals.

CONTACT WITH FLUIDS:
Never allow for fluids used for the AVL DiTEST ADS 110 to be in contact with the vehicle battery. Such fluids might damage the battery and cause hazards for the operator.

INTERNAL FLUID:
In case the batteries fluid comes in contact with your eyes, do not rub them. Rinse with tap water and then see a doctor immediately. In case the fluid is not completely removed, this can seriously damage the eyes.

DISASSEMBLY: Never try to disassemble the batteries container or to modify it. The container has safety and protective devices ensuring safe operations. By damaging these devices, there is the risk of heat emissions, smoke emission, fluids leak, batteries container explosion and fire.

WARNING

Risk Relating To Noise Level!

During measurements on the vehicle, noise levels can exceed 90 dB. Such noise levels can be reached with ultrasonic cleaning or with the vehicle’s engine high rpm.
If a person is exposed to such noise sources for a long period of time, this can cause irreversible hearing damage.

SAFETY MEASURES:
- The operator shall adopt personal protective equipment (safety ear muffs).
- The operator shall also protect from noise the working stations close to the areas where test on the vehicle
WARNING

Risk Of Injury!

Engines, both working and in standstill, include moving parts (belts or other parts) which might injure hands and arms. In the vehicles, the cooling fan starts automatically by means of a temperature sensor even when the engine is off; always pay attention when operating close to it and disconnect it if needed.

SAFETY MEASURES:
- When the engine is turned on, do not put hands into the moving parts area.
- When operating close to electrically started fans, let the engine cool down beforehand and then remove the fan plug from the engine.
- Keep the testing tools connection cables far from the engine moving parts.

WARNING

Risk Of Smashing!

If the vehicles are not correctly secured by means of mechanic devices, the operator might get smashed against a working bench or against a wall. Even the equipment placed on unstable supports might fall and squash the operator's limbs.

SAFETY MEASURES:
- Make sure the vehicle has been secured by pulling the hand brake and locking the wheels.
- Make sure the equipment has been positioned on a stable support and, in case of trolley, that its wheels have been locked before use.
Storing Refrigerants

Carry out any refrigerant-related service work with utmost care to avoid mixing different refrigerants. **This equipment is for separate (not simultaneous) use of R134a and R1234yf refrigerants.** The external bottles used for storing refrigerants must be clearly designated to avoid mixing different refrigerants. The bottles must be free from oil and other contaminations and clearly marked so that the contained refrigerant can be identified.

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**WARNING**

Risk of chemical burns from refrigerants!

For information on handling, using and storing the R-123a or R1234yf refrigerant and on emergency situations it is ESSENTIAL to follow the safety data sheet for the refrigerant. Request it from the refrigerant manufacturer and follow the instructions it provides!

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**Fac-Simili R134a:**

**Fac-Simili R1234yf:**

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Condition of Refrigerant and System

The condition of the refrigerant in the vehicle air-conditioning system is very important to ensure that the vehicle’s air-conditioning system works flawlessly. Correctly performed repair work in the event a fault or damage occurs ensures the quality of the refrigerant (particle, acid and water contents).

Recyclability

Regularly replace the filter systems of the AVL DiTEST ADS 110 (see Chapter "Maintenance") to ensure recycling efficiency.
Closing/Opening the quick couplings

Close (disconnect from vehicle)
- counter-clockwise

Open (connect to vehicle)
- clockwise

General maintenance/cleaning

The AVL DiTEST ADS 110 must be serviced in the specified intervals.
The AVL DiTEST ADS 110 must be serviced in accordance with the instructions provided by AVL DiTEST.
Use AVL DiTEST parts only.
In particular, make sure to exchange the humidity filter and the oil of the vacuum pump when necessary.
Any repair work on the AVL DiTEST ADS 110 must be performed by AVL DiTEST Service personnel or by
AVL DiTEST-authorized service personnel only.
To clean the air-conditioning device, do not use any chemicals that could damage its material or surface.

Long-term storage

Disconnect the AVL DiTEST ADS 110 from the power supply and place it at a secure location protected from
high temperatures, air humidity and any risk of colliding with another object that could damage it.
To take the AVL DiTEST ADS 110 out of service, to secure it for emptying and to recycle the R134a or
R1234yf gas, observe the regulations applicable in the country where it is operated. Contact AVL DiTEST
Service if necessary.
Prior to being taken back into service, the AVL DiTEST ADS 110 must be inspected in accordance with the
laws and regulations applicable in the country where it is used.
IMPORTANT INFORMATION

During the use of the AVL DiTEST ADS 110, the following work and activities are not permissible because under specific circumstances they may endanger persons and can cause permanent damage to the AVL DiTEST ADS 110:

- Do not remove or render unreadable any labels, signs and/or danger signals that are on the AVL DiTEST ADS 110 or in its direct proximity!

- Do not manipulate any safety devices on the AVL DiTEST ADS 110!

- Only use original fuses or identical fuses as specified on the technical data label and do not perform any unauthorized interventions and repairs. If there are any known or unforeseen changes in the power supply exceeding the specified limits, immediately disconnect the device from the power supply!

- The electrical system the AVL DiTEST ADS 110 is connected to must comply with the regulations applicable in the country of use!

- For maintenance, the AVL DiTEST ADS 110 must be opened by qualified and certified personnel only! The AVL DiTEST ADS 110 includes parts that can cause electric shocks. Prior to opening the AVL DiTEST ADS 110 for any repair or service work, disconnect it from the power supply!

Protective Devices

The AVL DiTEST ADS 110 has the following protective devices:

Safety pressure switch
- stops all processes when the pressure in the machine is too high.

Safety valve
- opens when the pressure in the machine reaches a level above the specified limits.

Switch
- disconnects the AVL DiTEST ADS 110 from the power supply. Nevertheless, always pull the power plug from the power outlet before you open the housing!

The above safety instructions must not be altered in any way!

If any of the above safety instructions are disregarded, all claims under the warranty for the AVL DiTEST ADS 110 are forfeit.
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1 General

1.1 General Description

The purpose of the AVL DiTEST ADS 110 (ADS: AirCondition Diagnostic System) is to recover and recycle the R1234yf / R134a refrigerant in vehicle air-conditioning systems. It was designed for vehicles containing a refrigerant amount of up to 2-3 kg (11.02 lb). Of course, given the bottle capacity of up to 10 kg (36.4 lb), vehicles with a larger refrigerant amount can be processed as well.

The AVL DiTEST ADS 110 is designed for automotive workshops and garages or comparable institutions. It is to be exclusively used by professionals who are familiar with the basics of cooling, cooling systems, refrigerants, pressure equipment-related regulations and the associated potential damages. Follow the applicable regulations in your country! Read and observe this user manual, particularly the safety instructions contained therein!

Prior to its commissioning, the AVL DiTEST ADS 110 was inspected carefully, and it needs to undergo regular inspections (in compliance with relevant laws and regulations applicable in the country where it is used) during its operation period.

It is the user's responsibility to use the A/C diagnostic system in accordance with the regulations applicable in their country.

Fig. 1-1
1.2 Frontal View

Fig. 1-2

1. Bottle of oil “to be injected” 250 cc
2. Bottle of “recovered” oil 250 cc
3. Castor wheels, with brake
1.3 Right Side View

Fig. 1-3

1. Non condensible gases manual vent valve
2. 3 m HP hose with quick coupler
3. 3 m LP hose with quick coupler

WARNING

Use the AVL DITEST ADS 110 only when the filling hoses (HP-LP) are connected correctly!
1.4 Left side view

Abb. 1-4

1 Main switch with 230 VAC MAINS SUPPLY FUSES (5x20 T 10 A 250 V) and connector for 2.5 m mains cable with shuko plug.
1.5 Internal view front side

Abb. 1-5

1 Filter dryer  
2 Compressor  
3 Vacuum pump  
4 Distiller  
5 Oil separator  
6 Ventilated condenser  
7 Refrigerant vessel
1.6 Top front view

Fig. 1-6

1  LP gauge
2  HP gauge
3  Graphic Display
4  Multifunction keyboard
5  Designed slot for thermal printer (option)
6  USB type-B connector for connection to PC
7  USB type-A connector for connection to USB stick / USB storage device

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**WARNING**

The USB type-A connector can only be used with USB 2.0 portable memory devices with mass storage service for reports export and station update. Do not connect other types of devices, such as USB keyboards or other units.
1.7 User interface

The selection menu has a tree structure where different functions can be selected through a 6-key keypad.

Details for the user are displayed on a graphic LCD transflective display, with a 240x64 resolution, which guarantees excellent performance even in case of direct lighting. The first line shows the menu title, while the lines below show the operations available for that menu: the selected function flashes.

**Key functions:**

- **Arrow keys “Up/Down”:**
  - navigation within the menus

- **Arrow keys “left/right”:**
  - parameters setting

- **Key “Stop/Exit”:**
  - pressed once within the menu:
    - cancels the operation;
  - holding it down for more than 1s:
    - the system exits the database and goes back to the main menu.

- **Key “Start”:**
  - pressed once within the menu:
    - confirms the operation;
  - holding it down for more than 1s:
    - will start the database (from the main menu)
1.8 ECO Protect ® Quick Couplings

ECO Protect is an INTELLIGENT COUPLING, which, based on the automated software system, allows for the following:

1. Reduce the non-condensable gas formation inside the vessel
2. Avoid refrigerant dispersion into the air during disconnection.
3. Check for possible SCHRADER valve leaks during disconnection.

![ECO Protect Quick Couplings](image)

Fig. 1-8

1.9 Safety Instructions

This document contains important warnings and safety instructions that must be observed by the user. Faultless and safe operation can only be guaranteed if the prerequisites and safety measures are adhered to.
1.10 Typographic Conventions

Safety Instructions

WARNING

Refers to an immediate threat that, if not avoided, could lead to death or severe injuries.

Notes

NOTE

This text refers to situations or incorrect conditions that could result in material damage or loss of data.

Information

This text refers to important information or instructions. Failure to observe these instructions will prevent or significantly encumber successful completion of the actions described in this documentation.

Additional Warning Symbols

Danger! Electrical voltage!

Warning of toxic substances

Warning of explosive materials

Warning of flammable materials

Warning of hot surfaces

Warning of noise with high sound pressure level

Warning of crushing from rotating parts

Warning of crushing

Do not try to remove the cover!
(This must be done by AVL DiTEST Service personnel or AVL DiTEST-authorized companies/technicians only!)
Refer to the user manual!

Wear protective gloves!

Wear protective glasses!

Wear a face mask!

Wear protective clothing!

Wear safety shoes

Wear hearing protection

Do not smoke!

No open fire!

**Other Symbols**

Alternating current

Grounding
2 Commissioning

WARNING
The machine must be taken into service by expert personnel strictly complying with these instructions.

2.1 Unpacking

1. Cut the packing tape and remove the carton.

2. Cut the cable ties which additionally hold the AVL DiTEST ADS 110 to the pallet.

3. Take the AVL DiTEST ADS 110 from the pallet. To do this, 4 people need to lift it using special handles.
   Keep the carton and the protective film for possible returns.
   The two small wheels can be blocked.

NOTE
The AVL DiTEST ADS 110 is shipped with an empty device tank.
This is to avoid any shipping damage.
2.2 Setup Location

**WARNING**

Make sure that the AVL DiTEST ADS 110:
- is in a horizontal and stable position (if necessary, fasten fixing wheels)
- is in a room with adequate ventilation and/or air exchange
- has a minimum distance of 10 cm to other objects
- is protected from rain, humidity, direct sunlight and/or excessive dust
- is not operated in an explosive environment

2.3 Connection to the Power Supply

**WARNING**

Only use the supplied power cable!
When servicing the machine, only use original AVL DiTEST spare parts!
Observe the specifications on the data plate!
Install the AVL DiTEST ADS 110 in such a way that the user has easy access to the power outlet!
2.4 Initially Filling the Refrigerant Bottle

Perform a guided startup check by following the instructions on the touch screen. You can interrupt the startup check and print out a report using the device printer to which the status of the checks is transmitted. The air-conditioning device does not work without positive completion of the startup check.

---

**WARNING**

*Fire hazard from refrigerant!*

Do not smoke! No open fire or heat!

---

**WARNING**

*Risk of chemical burns from refrigerant!*

Wear protective gloves! Wear protective glasses! Wear a face mask! Wear protective clothing!

---

Initial filling is the filling during the startup check, using the external refrigerant bottle, to fill the vessel in the interior of the machine, which does not contain any refrigerant yet. Set the refrigerant weight to be filled (at least 3 kg (6.61 lb)), and follow the instructions on the touch screen.

Ensure that the hoses of the machine are not connected and are on the hose reel. Start the process that is provided for vacuum generation in the interior refrigerant bottle. This phase takes approx. 15 minutes.

Do not connect the quick couplings to the external refrigerant bottle until a message appears prompting you to connect the external refrigerant bottle.

- **HP** quick coupling (red) for R134a
- **LP** quick coupling (blue) for R1234yf

Use the adapter included in the shipping package to do so.

Open the adapter by turning the turning handle clockwise.
Open the valve of the external refrigerant bottle.
Shortly before reaching the programmed refrigerant amount, the machine stops and prompts you to close the external refrigerant bottle.

Close the external refrigerant bottle.

The hoses are now being emptied and the process completed.

Open the LP or HP quick coupling by turning counter clockwise and disconnect it from the bottle.

There are two types of external refrigerant bottles for filling:

- with riser
- without riser

The refrigerant bottles with a riser must be in an upright position to be able to transfer the liquid refrigerant.

For this container type, use the L connection (for liquids).

![Refrigerant bottle with riser](image1)

The refrigerant bottles without riser have only have one valve.

They must be put upside down to be able to transfer the refrigerant.

![Refrigerant bottle without riser](image2)

The LP or HP pressure gauge indicates the pressure inside the external container. After a few minutes, the machine automatically turns off this function.
2.5 Filling the New-Oil Container

The new-oil container is on the left side of the device from a front-view perspective.

To fill it, remove it.
For that purpose, the head of the container has a quick connector.
Slightly push down the groove nut on the quick connector and pull out the container.

Fig. 2-3

Carefully fill the container. Note the "oil care" valve.

Fig. 2-4

This valve consists of a polymerized silicone membrane.
Its purpose is to equalize the pressure change in the container and to avoid contamination due to humid air, in order to protect the new oil inside.
At the end of the filling process, close the container and reconnect it using the quick connector.
2.6 Non-Use

**WARNING**

Risk of chemical burns from refrigerant
Keep the quick couplings closed if you do not use the AVL DiTEST ADS 110 for an extended time and also after each use!
3  Filling the Air-Conditioning System

3.1 Preliminary Operations

This method used for recovering and filling (injecting) is ideal for air-conditioning systems in vehicles that have been running for a while. Nevertheless, make sure that the air-conditioning system is not too hot because the subsequent filling phase might be affected by excessive pressures.

Quick Couplings

Your AVL DiTEST ADS 110 is equipped with the new ECO PROTECT quick couplings. These couplings provide the following functions:

1. Venting not into the environment but into the machine (environmental friendly and saves on refrigerants)
2. Automatic check of the vehicle valve at the end of the A/C service.

Refrigerant and Oil Type

For filling the air-conditioning system, the right refrigerant and the oil type must be known. This data can be found:

- in the database
- in the vehicle operating instructions
- on the identification plate in the engine compartment
- in the manufacturer's repair/service guide

Please note that the total oil amount of the A/C system is indicated here. The amount of oil extracted from the refrigerant during recovery is normally very small, and only that must be replaced.
3.2 Purging Non-Condensable Gases

If there is air in the bottle, it can be purged using the electrical discharge valve for non-condensable gases.

Air in the bottle can only be determined after the AVL DiTEST ADS 110 was at idle for a specific time, e.g. in the morning.

3.3 Quick Mode and Zero-Tolerance Mode

Two AVL DiTEST ADS 110 has two different modes for refrigerant filling:
- Quick Mode
- Zero-Tolerance Mode

Quick Mode
In Quick Mode, the refrigerant is introduced into the air-conditioning system via the HP connector. A part of the refrigerant remains in the lines, which, however, is considered by the software. Sometimes, the Quick Mode cannot be ended; if that happens, the AVL DiTEST ADS 110 automatically starts the Zero-Tolerance Mode.

Zero-Tolerance Mode
The Zero-Tolerance Mode allows for more precise filling and always ensures successful filling. However, it requires more time, and user input is required as well.

Air-Conditioning Systems with HP Connection
If only an HP connection is available, the Zero-Tolerance Mode cannot be used.

Air-Conditioning Systems with HP and LP Connection
The set refrigerant amount is fully injected into the vehicle's air-conditioning system through the HP connection. After the HP line is closed and disconnected, the running engine and compressor draw any left-over refrigerant in the hoses into the air-conditioning system.

Air-Conditioning Systems with LP Connection
While the vehicle compressor is off the AVL DiTEST ADS 110 fills the air-conditioning system with 50% of the desired amount and waits 10 minutes before it outputs a message. This wait time allows for evaporation of the refrigerant injected near the compressor, on the LP side, which prevents damage to the compressor. After the vehicle and the air-conditioning system have been turned on the load is transferred, by electronically controlled refrigerant injection, from the LP pipe. This is only done if the LP pressure is lower than 3 bar.
4 Automatic Mode

**NOTE**
Follow the regulations applicable in your country!
The Automatic Mode may not be used in every country!

4.1 Preliminary Operations

It is necessary to connect both the LP (low pressure) – and HP (high pressure) couplers to the vehicle A/C system (connect the valves only when prompted by the AVL DiTEST ADS 110). Select the service mode (manual or automatic) and follow instructions.

4.2 Automatic cycle

Upon running on the AVL DiTEST ADS 110, the menu of the database storing vehicles divided by make, model, and type of A/C system is displayed.

The selected car flashes, press \[\text{to change selection and } \square\text{ to confirm selection.} \]
Press \[\times\text{ to go back to the previous field.} \]

4.2.1 Vehicle selection from the database

AVL DiTEST offers customers purchasing an AVL DiTEST ADS 110 the possibility of enhancing potentials of the UNIT through the database. This database contains all data related to the A/C system of most vehicles. Hence, it will be possible to speed up the recharge operations of the system with the aid of the data provided by the database.

- Type of vehicles
  - European and Asian
  - America
  - Australian (optional)
  - Agri&Work (optional)
- Make
- Model
- Version / engine capacity
- Year
- System

4.2.2 Last cycle

It loads the parameters of the last automatic cycle.

4.2.3 User-defined cycle

It allows loading the parameters of the automatic cycle previously saved by the user.
4.2.4 Automatic cycle parameters configuration

After selecting the type of A/C system the main page is shown with the following pre-set values:

- amount of refrigerant that will be charged into the system and the amount of refrigerant contained in the inner tank of the UNIT.

- AUTOMATIC oil injection mode
  - OIL: <value> ml. It injects the quantity of oil that has been set in timed mode

- MANUAL oil injection mode
  - OIL: YES / NO
    - YES: Before the refrigerant injection, the operator injects the desired quantity of oil, by visually checking the level in the bottle
    - NO: The cycle disables the oil injection phase

- Oil type: It sets the oil type being used. PAG (ISO46/100/150) or POE

- Injection type: It allows selecting from which hose the service is carried out, according to the type of system.
  - Injection from HP hose (red)
  - Injection from LP hose (blue)
  - Injection from HP hose (red) and LP hose (blue)
  - Injection from HP hose (red) on the system low pressure side. Specific for some Renault models.

- Vacuum phase
  - Vacuum duration
  - Leak test duration

The value of each selected field (flashing) can be either increased or decreased.

Through the selected value is confirmed and the next field is entered.

Press to go back to the previous field.

At the end of the setup press on the “START” option to start the automatic cycle.

4.3 Changing the Oil Type

If a different oil type than in the previous cycle is used, the AVL DiTEST ADS 110 must be cleaned using the Hybrid Function.

To do this, the "Hybrid Function Pro" kit is required. See Chapter "Available Accessories".

Connect the HP and LP quick coupling as shown in fig. 2-5.

Once the connections are established follow the automatic procedure.

Fig. 4-1
5 Manual Cycles

5.1 Preliminary Operations

It is necessary to connect both the LP (low pressure) – and HP (high pressure) couplers to the vehicle A/C system (Screw the valves only when required by the AVL DiTEST ADS 110).

Select the service mode (manual or automatic) and follow instructions.

From the main menu use keys until selection of MANUAL CYCLES and then Press.

Through keys select the desired phase and press .

5.2 Recovery

In the MANUAL CYCLES menu, position on RECOVERY through the keys , then push to start the phase.

In case of problems or errors during this phase, a message will be displayed, identifying the type of error.

It is possible to interrupt the phase in progress at any time, by pushing .

At the end of the process the display will show the quantity of recovered oil, together with a message stating that the phase is over.

5.3 Vacuum

In the MANUAL CYCLES menu, position on VACUUM through the keys , then push to start the phase.

By means of the keys , you can set the vacuum time and the test duration.

Push to confirm the entered values and start the phase.

In case of problems or errors during this phase, a message will be displayed, identifying the type of error.

It is possible to interrupt the phase in progress at any time, by pushing .
5.4 Injection

In the MANUAL CYCLES menu, position on INJECTION through the keys , then push to start the phase. The main page will be displayed with the following preset values:

amount of refrigerant that will be charged into the system and the amount of refrigerant contained in the inner tank of the UNIT.

AUTOMATIC oil injection mode
OIL : <value> ml. It injects the quantity of oil that has been set in timed mode

MANUAL oil injection mode
OIL : YES / NO
YES: Before the refrigerant injection, the operator injects the desired quantity of oil, by visually checking the level in the bottle
NO: The cycle disables the oil injection phase

Oil type:
It sets the oil type being used. PAG (ISO46/100/150) or POE

Injection type:
It allows selecting from which hose the service is carried out, according to the type of system.
Injection from HP hose (red)
Injection from LP hose (blue)
Injection from HP hose (red) and LP hose (blue)
Injection from HP hose (red) on the system low pressure side. Specific for some Renault models.

In case of problems or errors during this phase, a message will be displayed, identifying the type of error.
It is possible to interrupt the phase in progress at any time, by pushing .

WARNING
THIS PHASE HAS TO BE CARRIED OUT EXCLUSIVELY ON A/C SYSTEM UNDER VACUUM (AFTER A VACUUM PHASE HAS BEEN PULLED).
5.5 Flushing

After performing a lot of recharge cycles or after replacing components or parts of the A/C circuit on a vehicle it is advisable to carry out a system flushing.

The system washing (Flushing) consists in purifying the vehicle cooling system through several R134a or R1234yf gas flushes, by recovering it each time, so that the impurities can be filtered little by little through the additional filter.

Thanks to its specific design, AVL DiTEST ADS 110 can automatically manage the flushing process so that the process becomes fully automatic.

To carry out the flushing the operator has to purchase the flushing kit. Once that you have installed the flushing kit, in the MANUAL CYCLES menu, position on FLUSHING through the keys then push to start the phase.

You can set the flushing time by pushing .

Push to confirm the entered values and start the phase.

In case of problems or errors during this phase, a message will be displayed, identifying the type of error. It is possible to interrupt the phase in progress at any time, by pushing .
5.6 Pressure check

To check the vehicle A/C system status – for instance in case there is no flow of cold air from vents – pressure values can be checked.

Connect the HP - LP couplers or the single coupler to the vehicle system.

Perform the following preliminary operations on the vehicle:
- Turn on the A/C system
- Set temperature at minimum level.
- Set fan speed at maximum level; close all the vents except the central one and set air distribution to central position.
- Keep engine at accelerated idle at constant speed for at least 2 minutes.
- Check the pressure values within about 3 - 5 minutes.

In the MANUAL CYCLES menu push to select PRESSURE CHECK, then push to confirm.

Open couplers (or the single coupler) rotating knobs clockwise.

After the refrigerant injection, a check of the pressure on HP and LP sides will be requested; make sure that both values on LP and HP gauges fall within the values shown on the display.

WARNING

PRESSURE VALUES CHANGE CONSIDERABLY WHEN AMBIENT TEMPERATURE CHANGES. KEEP THIS IN MIND WHEN CHECKING PRESSURE VALUES.

In case of problems or errors during this phase, a message will be displayed, identifying the type of error.

It is possible to interrupt the phase in progress at any time, by pushing .
5.7 Emptying hoses

To empty the charge hoses completely perform the HOSES EMPTYING phase.

In the MANUAL CYCLES menu push to select HOSES EMPTYING (we refer to the external Blue and Red charge hoses), then push to confirm.

In case of problems or errors during this phase, a message will be displayed, identifying the type of error. It is possible to interrupt the phase in progress at any time, by pushing .

5.8 Nitrogen leak test

This test allows checking for leaks of the vehicle A/C system through nitrogen pressurization. This test requires the NITROGEN LEAK TEST KIT (optional accessory) and a nitrogen cylinder with pressure reducer, not supplied with the accessory.
6  Setup

The **SETUP** menu item allows you to change various parameters and perform various settings and approvals.

6.1 Hybrid function

By selecting this entry, one may change the type of Oil to inject into the A/C system. Attention: the HYBRID KIT PRO (optional accessory) is required in order to run this function.

6.2 ECO Protect®

By selecting this entry, you can enable the ECO Protect® function (the ECO Protect® quick coupler must be present on the car).

6.3 Oil Injection Mode

By selecting this entry, one may decide the oil injection mode during the recharge cycle.

- Automatic: during the recharge cycle, the user will be prompted to enter the quantity of oil to be injected (ml) as well as the oil type, PAG (ISO-46/100/150) or POE.
- Manual : During the recharge cycle, the user will be prompted to select YES in case he wants to proceed with the oil manual injection before the gas injection phase, or NO in case he doesn’t want to inject oil during the recharge cycle.

6.4 Pressures calibration

By selecting this entry, one may carry out calibration of the atmospheric pressure.

6.5 Recharge mode

By selecting this entry, one may decide whether to enable use of the Quick Mode or Zero Tolerance recharge method.

6.6 Gas and Recovered Oil Print-Out

Selecting this entry, you can choose whether you want to enable displaying and printing of the recovered gas quantity. Setting available only with printer installed.
6.7 **Multipass**

By selecting this entry, one may decide whether or not to enable the multipass function, which enables an additional recycling, within the station itself, started in automatic when it is switched on but not in use. This function ensures a higher level of purity of the recycled refrigerant to the advantage of the service quality.

6.8 **Pressure Check**

By selecting this entry, one can enable or disable the pressure check.

6.9 **Hoses Length**

By selecting this entry, it will be possible to change the length of the charge hoses.

6.10 **Unit Of Measurement**

Selecting this entry, you can modify the pressure unit of measurement (switching from Bar to PSI).

6.11 **Clock Adjustment**

By selecting this entry, date and time of the ADS 110 may be changed.

6.12 **Garage Data**

By selecting this entry, one can enter the garage data to be printed on the end of cycle report.

6.13 **Language**

By selecting this entry, any language present in the database may be set. In case you choose a language with unintelligible characters, hold down the button in the starting screen-page and you will directly return to the language setting menu.
6.14 Right-Hand / Left-hand Drive

It allows setting the database for operations on A/C systems of vehicles with right-hand or left-hand drive and return the exact value of gas and oil to be injected.

6.15 Start Up Screen

By selecting this entry, you can decide whether the startup screen of the unit will be the databank page or the main menu page.

6.16 Default Setup

By selecting this entry, you can restore the unit default settings.

6.17 Report Saving Mode

By selecting this entry, you can save the reports of the performed charges (automatic cycles or Reg. 842/2006).

6.18 Report Data

Allows you to determine whether vehicle registration number, mileage, owner and tester name are to be used in the report or not.

6.19 Database Activation

Select whether you want the database to display European/Asian/American, Australian or agricultural vehicles.
Enter the activation code.

6.20 Air Purge System

By selecting this entry, one can enable or disable the AIR PURGE SYSTEM function. If enabled, on a weekly basis, the AVL DiTEST ADS 110, when switched on, will suggest the user to run the procedure. If disabled, execution of the procedure will no longer be suggested.

Information

AVL DiTEST reserves the right to add new parameters to make the AVL DiTEST ADS 110 more versatile and adjust it to market requirements.
7 Maintenance

For maintenance, please contact the AVL DiTEST branch / AVL DiTEST partner in your country. Use original AVL DiTEST spare parts only.

7.1 PED European Pressure Equipment Directive (97/23/EC)

NOTE

The AVL DiTEST ADS 110 includes parts that are subject to the PED. The PED (97/23/EC) defines and regulates all pressurized components by indicating a ratio based on pressure and volume. These components must not be dismantled or manipulated. In the owner's responsibility, the devices and components that are subject to the PED must be tested in accordance with relevant national laws during commissioning and then in regular intervals.

The parts subject to the PED Directive are:

12l RECEIVER
Category II (Dir. 97/23/EC)

SAFETY VALVE GAS VS14NPT20HNB
PED4 20bar R 1/4 NPT
Category IV (Dir. 97/23/EC)
SUCTION UNIT
Art. 3.3 (Dir. 97/23/EC)

Fig. 7-3

PRESSURE SWITCH ACB-2UB506W 13/18bar 1/4SAE
Category IV (Dir. 97/23/EC)

Fig. 7-4

WARNING
BEFORE CARRYING OUT ANY MAINTENANCE OPERATION, MAKE SURE THE EQUIPMENT HAS BEEN DISCONNECTED FROM THE MAINS.
ANY INTERVENTION ON PARTS OF THE UNIT NOT EXPRESSLY OUTLINED IN THIS CHAPTER IS FORBIDDEN.
7.2 Self leak test

In the main menu select MAINTENANCE and then select “SELF LEAK TEST”.

A leak test is carried out on the internal components of AVL DiTEST ADS 110. This test allows checking the leaks of the AVL DiTEST ADS 110 inner circuits.

In case of failed leak test, it is necessary to check the charge hoses conditions and the quick couplers tightness, and make the possible repair and then repeat the test.

7.3 Pressure zero

This function allows to determine and store the atmospheric pressure value. We recommend running this procedure every time an abnormal operation of the AVL DiTEST ADS 110 is detected, such as: recovery phase taking too much time to be completed, or exhaust oil discharge with pressure being either too high or too low. This procedure is run automatically during the first filling of the tank.

7.4 Tank pressure check

This check allows to check the pressure value of the inner tank. To run this check, you must make sure that the HP and LP couplers are disconnected from any system and closed.

After starting the function, the tank pressure value is read from the HP gauge. To complete the check procedure, press OK and wait for the procedure to end.
7.5 Long life pump special function – vacuum pump oil change

The AVL DiTEST ADS 110 is equipped with a special function named LONG LIFE PUMP that enables to optimize the vacuum pump oil use by avoiding the replacement every 60 hours of operation.
LONG LIFE PUMP is a patented special function allowing to extend the life of the pump oil used in the device up to 1000 hours.
LONG LIFE PUMP function performance is suggested at the end of 60-hour operation intervals of the vacuum pump and can be manually activated in the MAINTENANCE menu.

LONG LIFE PUMP procedure has to be started only after checking and, if necessary, topping off the pump oil level and lasts 1 hour: during this time the AVL DiTEST ADS 110 cannot be used.
During the procedure the oil is automatically purified from the gaseous polluting residues absorbed during the emptying operations of vehicles air conditioning systems.
At the end of the procedure, the vacuum pump performance check is carried out and a result to the operator is signaled.
In case of negative result you have to replace the vacuum pump oil.
After 1000 hours of vacuum pump operation since the last oil change, the LONG LIFE PUMP procedure cannot be activated anymore and you have to replace the oil according to the following instructions.

Required equipment:

1 Medium-sized Phillips-tip screwdriver
1 Medium-sized flathead screwdriver
1 Hex key (10 mm)

For replacement, comply with the instructions outlined below:

1. Disconnect the unit from the power supply.
2. Remove the screws that fix the front door of the unit and remove it.
3. Place a bowl underneath the machine, right under the pump oil drain hole. Open the upper plug and then the lower plug to drain the exhausted oil contained within the vacuum pump.
4. Once the pump has been emptied, screw the lower plug again.

5. Fill the pump with new oil through the upper opening, using a funnel if needed. Bring new oil level halfway through the sight glass.

6. Once the pump has been filled, close the upper plug.

Once oil has been replaced, switch on the unit and from the **MAINTENANCE** menu select **PUMP OIL REPLACEMENT**: press the **RESET** key to set the counter to zero.
7.6 Filter dryer change

The filter dryer shall be replaced once 45 kg of refrigerant fluid have been dehydrated, because the filter depletes its capacity of retaining the moisture present in the refrigerant.

To replace the dryer filter, from the MAINTENANCE menu select DRYER FILTER REPLACEMENT: press RESET to set the counter to zero and to start the filter replacement procedure.

Now you can replace the filter.

Required equipment:
1. Medium-sized cross-tip screwdriver
2. Hex key (24 mm)

For replacement, comply with the instructions outlined below:
1. Disconnect the unit from the mains.
2. Remove the screws (6) fixing the front part of the unit.
3. Unscrew the 2 connection nuts of the filter by means of the Allen wrenches.
4. Cut the two plastic straps wrapping the filter.
5. Install the new filter paying attention to the position of gaskets and to the direction of the arrow indicating the fluid flowing direction.
6. Screw the two connection nuts of the filter.

7.7 Counters

In the COUNTERS menu, at any time, the vacuum pump and compressor hours of life can be displayed; besides, remaining time before replacement of vacuum pump oil and dryer filter can also be displayed.

To access the COUNTERS menu, from the main menu enter the MAINTENANCE menu and press COUNTERS.
7.8 Storage vessel filling

**WARNING**

STRICTLY COMPLY WITH INSTRUCTIONS BELOW TO AVOID REFRIGERANT DISCHARGE INTO THE ATMOSPHERE

After following the above described procedure, connect the HP quick coupler (red) of the unit to an external tank by using the adapter supplied with it.

Open the coupler by turning the knob clockwise.

Open the valve on the external tank.

There are two types of source tanks: with plunger and without plunger.

Tanks **with plunger** shall remain upright to be able to transfer liquid refrigerant; for this type of bottles connect to the L (liquid) coupler.

Tanks **without plunger** have only one valve, so they must be turned upside down to transfer the liquid refrigerant.

![Fig. 7-7](image)

The HP gauge shows the pressure level into the external tank.

Push to select the submenu VESSEL FILLING, then push to enter it.

In the following screen page set the quantity of refrigerant you wish to charge.

The field **RESIDUAL** shows the quantity of refrigerant being currently present in the vessel. Position the cursor into the field TO CHARGE that will suggest, by default, the maximum quantity of refrigerant to charge.

Push to set the quantity of refrigerant you need to charge.

Push to start the charging phase.
Please note that when the system warns that the maximum selected weight has been reached, after the closing of the external bottle valve, the unit still absorbs a small amount of refrigerant. In case of problems during the internal vessel filling phase, a specific message will appear on the last line of the display.

It is possible to interrupt the phase in progress at any time, by pushing . After some minutes the unit will automatically end the function.

At the end the weight of the charged refrigerant will be displayed.

7.9 Firmware-Update

For this you need the ADS Manager (available as an accessory). Note the User Manual of the ADS Manager, Chapter "Update".
7.10 Maintenance of printer (option)

To change the roll of paper follow instructions below:

Open the printer lid as indicated in the picture.

![Fig. 7-8](image)

Position the roll of paper inside the housing in the rotation direction indicated in the picture.

![Fig. 7-9](image)

Pull the paper out of the housing as indicated in the picture and close the lid.

![Fig. 7-10](image)

The printer is ready for printing.
7.11 Periodic checks

The A/C service stations shall undergo periodical checks, as provided for by relevant national laws. Checks will be performed by competent authorities, in compliance with their procedures. Here below, some possible checks on components subject to the PED directive are outlined. Depending on local legislation, the checks may be extended to other components to verify the metrological characteristics of the integrated instrumentation and the presence of essential equipment and accessories.

12l RECEIVER
Category I (Dir.97/23/EC)
To check the refrigerant vessel date of manufacture, see the vessel plate

![Fig. 7-11](image)

Make sure no corrosion or leakage is present; under normal conditions of use, the vessel life is at least 20 years.
SAFETY VALVE GAS AIRTEK - VS14NPT20HNBPRPD4 20bar R 1/4 NPT
Category IV (Dir. 97/23/EC)

Fig. 7-12

In case of intervention of the automatic safety valve, it is advisable to contact the technical service that will replace the valve.

Fig. 7-13

SUCTION UNIT
Art. 3.3 (Dir. 97/23/EC)
Make sure no corrosion and leakages are present.

Fig. 7-14
PRESSURE SWITCH ACB-2UB506W 13/18bar
1/4SAE Category IV (Dir. 97/23/EC)
Check presence of the device with references indicated above, wholeness of connection cables and connector, and the correct connection to the equipment printed circuit board.

Fig. 7-15

HOSES
Periodically check external charge hoses, red (HP) and blue (LP), to verify their perfect conditions and the lack of damages which could compromise their correct operation.

Fig. 7-16

OTHER CHECKS
Make sure lubricants and filters have been replaced in line with the intervals required to ensure correct operation of the equipment.
8 List of Possible Faults / Troubleshooting

8.1 General

Please try to determine the fault and locate it as precisely as possible.
Follow the introduced approaches and perform all actions offered where possible.
If a fault cannot be corrected, please contact the responsible AVL DiTEST branch/AVL DiTEST partner in your country.

8.2 List of Faults / Error Messages

<table>
<thead>
<tr>
<th>Code</th>
<th>MESSAGE</th>
<th>When can this happen</th>
<th>Possible situations</th>
<th>Actions</th>
</tr>
</thead>
<tbody>
<tr>
<td>W025</td>
<td>TOO MUCH REFRIGERANT</td>
<td>During programming of the load amount in the inner tank.</td>
<td>The amount set for filling is larger than the amount available in the device tank.</td>
<td>Reduce the set amount.</td>
</tr>
<tr>
<td>W026</td>
<td>FILLING VESSEL EMPTY OR NOT CONNECTED.</td>
<td>During filling of the device tank.</td>
<td>Refrigerant bottle for filling empty or hoses/cocks blocked or closed.</td>
<td>Check the refrigerant bottle, hoses, cocks.</td>
</tr>
<tr>
<td>W029</td>
<td>TANK IS ALMOST FULL.</td>
<td>During refrigerant recovery or hose emptying.</td>
<td>The refrigerant bottle is approaching the maximum amount it can take.</td>
<td>Reduce the refrigerant amount by filling (injecting) an appropriate external refrigerant bottle (using safety valve)</td>
</tr>
<tr>
<td>W032</td>
<td>NO PRESSURE - VEHICLE HAS NO REFRIGERANT OR IS NOT CONNECTED.</td>
<td>During refrigerant recovery.</td>
<td></td>
<td>Check connections and A/C system for leakages.</td>
</tr>
<tr>
<td>W036</td>
<td>NO MORE OIL CAN BE FILLED</td>
<td>During oil injection</td>
<td>Vacuum not sufficient</td>
<td>Increase duration of vacuum phase, check A/C system for leakages</td>
</tr>
<tr>
<td>W044</td>
<td>VESSEL EMPTY</td>
<td>During flushing or multipass recycling</td>
<td>The refrigerant level is too low for completion of the process.</td>
<td>Procedure for filling the refrigerant into internal refrigerant bottle</td>
</tr>
<tr>
<td>W047</td>
<td>POSSIBLE LEAK</td>
<td>During refrigerant recovery</td>
<td>Vehicle A/C system may leak</td>
<td>--</td>
</tr>
</tbody>
</table>
The alarm messages are indicated with the Axxx code in the title line of the window.

The messages immediately terminate a process without the option to continue.

<table>
<thead>
<tr>
<th>Code</th>
<th>MESSAGE</th>
<th>When can this happen</th>
<th>Possible situations</th>
<th>Actions</th>
</tr>
</thead>
<tbody>
<tr>
<td>A032</td>
<td>DEVICE STILL UNDER PRESSURE</td>
<td>During the vacuum phase, filling the refrigerant bottle or vacuum leakage test</td>
<td>Present pressure in the vehicle A/C system</td>
<td>Recover the refrigerant gas from the vehicle prior to running the vacuum phase.</td>
</tr>
<tr>
<td>A033</td>
<td>SYSTEM LEAK</td>
<td>During the vacuum phase, filling the refrigerant bottle or vacuum leakage test with pressure like in vacuum</td>
<td>Leak in the line or in the connections of the vehicle</td>
<td>Find possible leak in the vehicle or the connected system and have it repaired by trained personnel in compliance with applicable regulations in respective country of use.</td>
</tr>
<tr>
<td>A034</td>
<td>VACUUM LEVEL TOO LOW</td>
<td>During injection phase of the tracer gas and during oil injection</td>
<td>Vehicle A/C system with present pressure despite performing vacuum phase</td>
<td>Find possible leak in the vehicle or the connected system and have it repaired by trained personnel in compliance with applicable regulations in respective country of use.</td>
</tr>
<tr>
<td>A035</td>
<td>VESSEL EMPTY</td>
<td>During refrigerant injection phase and flushing</td>
<td>Refrigerant gas level too low for process completion</td>
<td>Fill up internal refrigerant bottle</td>
</tr>
<tr>
<td>A036</td>
<td>REFRIGERANT LEVEL TOO LOW</td>
<td>During refrigerant injection phase and flushing</td>
<td>Available refrigerant amount in internal bottle below requirement</td>
<td>Fill up internal refrigerant bottle</td>
</tr>
<tr>
<td>Code</td>
<td>MESSAGE</td>
<td>When can this happen</td>
<td>Possible situations</td>
<td>Actions</td>
</tr>
<tr>
<td>------</td>
<td>---------</td>
<td>----------------------</td>
<td>---------------------</td>
<td>---------</td>
</tr>
<tr>
<td>A037</td>
<td>NO MORE REFRIGERANT FILLING POSSIBLE</td>
<td>During refrigerant injection phase</td>
<td>Hoses not connected to vehicle A/C system; cock not open; insufficient vacuum; pressure in the line</td>
<td>Attention. Run Hoses Emptying function prior to any other action. Repeat recovery procedure and increase vacuum phase length.</td>
</tr>
<tr>
<td>A038</td>
<td>LEAK OR BLOCKED CYCLE</td>
<td>During flushing</td>
<td>Leaks or blocks in the lines to be flushed</td>
<td>Check connection to A/C system or find leak or block in the line and have it repaired by trained personnel in compliance with applicable laws and regulations in respective country of use.</td>
</tr>
<tr>
<td>A039</td>
<td>NO MORE OIL CAN BE FILLED</td>
<td>During oil injection</td>
<td>Vacuum not sufficient</td>
<td>Increase vacuum phase length.</td>
</tr>
<tr>
<td>A043</td>
<td>VESSEL FULL</td>
<td>During refrigerant injection and hose emptying</td>
<td>Internal refrigerant bottle is full; has reached its max. capacity</td>
<td>Reduce the refrigerant amount by filling (injecting) an appropriate external refrigerant bottle (using safety valve)</td>
</tr>
<tr>
<td>Code</td>
<td>MESSAGE</td>
<td>When can this happen</td>
<td>Possible situations</td>
<td>Actions</td>
</tr>
<tr>
<td>------</td>
<td>---------------</td>
<td>--------------------------------------------------------------------------------------</td>
<td>--------------------------------------------------------------------------------------</td>
<td>------------------------------------------------------------------------</td>
</tr>
<tr>
<td>A047</td>
<td>LP LEAK</td>
<td>During refrigerant injection and hose emptying</td>
<td>After completion of gas injection in removal phase of ECO LOCK quick connections during leakage test of vehicle connections</td>
<td>Empty vehicle (follow guided procedure on the display)</td>
</tr>
<tr>
<td>A048</td>
<td>HP LEAK</td>
<td>During refrigerant injection and hose emptying</td>
<td>After completion of gas injection in removal phase of ECO LOCK quick connections during leakage test of vehicle connections</td>
<td>Empty vehicle (follow guided procedure on the display)</td>
</tr>
<tr>
<td>A049</td>
<td>LP AND/OR HP LEAK</td>
<td>During refrigerant injection and hose emptying</td>
<td>After completion of gas injection in removal phase of ECO LOCK quick connections during leakage test of vehicle connections</td>
<td>Empty vehicle (follow guided procedure on the display)</td>
</tr>
</tbody>
</table>
9 Warranty

9.1 New Devices

The warranty period for new devices is 12 months.
The agreements made with your supplier apply.
The date on the delivery slip to the end customer applies for handling claims.

The warranty becomes void in the case of:

- unscheduled or improper and/or incomplete maintenance
- mechanical damage (e.g. if dropped, etc.)
- ingress of liquids (e.g. water, oil, acids, etc.)
- unauthorized intervention (e.g. repair attempts by unauthorized persons)
- incorrect operation (e.g. operating the touch screen with sharp or pointed objects, cleaning with compressed air)
- incorrect storage, maintenance and care (e.g. cleaning the device with solvent-based cleaning agents)

The warranty excludes:

- consumables (e.g. paper, filters, oils)
- parts subject to natural wear

9.2 Replacement or Loaned Devices

The agreements made with your supplier apply.
The date on the delivery slip to the end customer applies for handling claims.

9.3 Damage Claims

In the event of a damage please contact the AVL DiTEST branch / AVL DiTEST partner in your country.
10  Shipping Package

10.1  System Delivery

<table>
<thead>
<tr>
<th>Name</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Title</strong></td>
<td></td>
</tr>
<tr>
<td>AVL DiTEST ADS 110 R134A</td>
<td>VS9033</td>
</tr>
<tr>
<td>AVL DiTEST ADS 110 R1234YF</td>
<td>VS9108</td>
</tr>
<tr>
<td>HP bottle adapter R134a</td>
<td>GE7466</td>
</tr>
<tr>
<td>LP bottle adapter R1234yf</td>
<td>GE7503</td>
</tr>
<tr>
<td>Funnel for filling the oil tank/vacuum pump</td>
<td></td>
</tr>
<tr>
<td>User Manual on CD</td>
<td>BO7856</td>
</tr>
</tbody>
</table>
## 10.2 Available Accessories

<table>
<thead>
<tr>
<th>Name</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>A/C flushing kit</td>
<td>GE7417</td>
</tr>
<tr>
<td>A/C UV set</td>
<td>GE7428</td>
</tr>
<tr>
<td>A/C flushing set</td>
<td>GE7429</td>
</tr>
<tr>
<td>Electronic thermometer</td>
<td>GE7433</td>
</tr>
<tr>
<td>Service set for AVL DiTEST ADS 110</td>
<td>GE7436</td>
</tr>
<tr>
<td>UV lamp</td>
<td>GE7437</td>
</tr>
<tr>
<td>Description</td>
<td>Code</td>
</tr>
<tr>
<td>--------------------------------------------</td>
<td>--------</td>
</tr>
<tr>
<td>Nitrogen leakage set</td>
<td>GE7438</td>
</tr>
<tr>
<td>Upgrade set for hybrid vehicles</td>
<td>GE7441</td>
</tr>
<tr>
<td>Quick coupling for BMW</td>
<td>GE7442</td>
</tr>
<tr>
<td>Quick coupling for RENAULT</td>
<td>GE7443</td>
</tr>
<tr>
<td>Valve core removal tool, magnetic</td>
<td>GE7444</td>
</tr>
<tr>
<td>Valve core removal tool</td>
<td>GE7445</td>
</tr>
<tr>
<td>4.5 m (177 in.) hose extension set (HP-LP) for R133A</td>
<td>GE7447</td>
</tr>
<tr>
<td>UV lamp, rechargeable</td>
<td>GE7448</td>
</tr>
<tr>
<td>Thermometer, infrared</td>
<td>GE7451</td>
</tr>
<tr>
<td>Product Description</td>
<td>Code</td>
</tr>
<tr>
<td>---------------------------------------------------------------</td>
<td>--------</td>
</tr>
<tr>
<td>A/C hose shortening tool</td>
<td>GE7053</td>
</tr>
<tr>
<td>Container for new oil or leak detection additive</td>
<td>GE7454</td>
</tr>
<tr>
<td>Container for old oil</td>
<td>GE7455</td>
</tr>
<tr>
<td>SW database update for European, American and Asian vehicles</td>
<td>GE7459</td>
</tr>
<tr>
<td>SW database update for Australian vehicles</td>
<td>GE7460</td>
</tr>
<tr>
<td>SW database update for agricultural and construction vehicles</td>
<td>GE7461</td>
</tr>
<tr>
<td>ECO Protect HD quick coupling R134a</td>
<td>GE7492</td>
</tr>
<tr>
<td>ECO Protect ND quick coupling R134a</td>
<td>GE7493</td>
</tr>
<tr>
<td>Product Description</td>
<td>Part Number</td>
</tr>
<tr>
<td>--------------------------------------------------------</td>
<td>-------------</td>
</tr>
<tr>
<td>ECO Protect HD quick coupling R1234yf</td>
<td>GE7494</td>
</tr>
<tr>
<td>ECO Protect ND quick coupling R1234yf</td>
<td>GE7495</td>
</tr>
<tr>
<td>Printer Upgrade for ADS 110</td>
<td>GE7519</td>
</tr>
<tr>
<td>Consists of:</td>
<td></td>
</tr>
<tr>
<td>Printer</td>
<td></td>
</tr>
<tr>
<td>Cable</td>
<td></td>
</tr>
</tbody>
</table>
### 10.3 Consumables

<table>
<thead>
<tr>
<th>Name</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dryer for AVL DiTEST ADS 110 (2 per package)</td>
<td>GE7431</td>
</tr>
<tr>
<td>UC DYE 250 ml (0.07 gallons)</td>
<td>GE7426</td>
</tr>
<tr>
<td>Protective gloves</td>
<td>GE7435</td>
</tr>
<tr>
<td>Dryer cartridge for flushing set (2 per package)</td>
<td>GE7452</td>
</tr>
<tr>
<td>Paper for printer thermo 57 mm for printer Plus II</td>
<td>HP7406</td>
</tr>
</tbody>
</table>

---

**NOTE**

Use original accessories / original consumables by AVL DITEST only!

Contact the AVL DiTEST branch/AVL DiTEST partner in your country.
## Technical Data

<table>
<thead>
<tr>
<th>General Technical Data</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Refrigerant Type</td>
<td>R134A or R1234yf</td>
</tr>
<tr>
<td>Nominal Voltage</td>
<td>230 VAC</td>
</tr>
<tr>
<td>Frequency</td>
<td>50 Hz</td>
</tr>
<tr>
<td>Consumption</td>
<td>800 W</td>
</tr>
<tr>
<td>Weight</td>
<td>70 kg</td>
</tr>
<tr>
<td>Dimensions (WxDxH)</td>
<td>617x532x957 mm</td>
</tr>
<tr>
<td>Display</td>
<td>4x20 graphic LCD</td>
</tr>
<tr>
<td>Keyboard</td>
<td>Membrane keyboard</td>
</tr>
<tr>
<td></td>
<td>4 cursor, Start and Stop button</td>
</tr>
<tr>
<td>Pressure gauges</td>
<td>2x analog gauges</td>
</tr>
<tr>
<td></td>
<td>Diameter (LP, HP) 80 mm</td>
</tr>
<tr>
<td>PC Interfaces</td>
<td>USB interface trough optional converter</td>
</tr>
<tr>
<td>Max. operation pressure</td>
<td>20 bar</td>
</tr>
<tr>
<td>Hoses length</td>
<td>3 m</td>
</tr>
<tr>
<td>Printer</td>
<td>Thermal 24 columns standard</td>
</tr>
<tr>
<td>Pressure Equipment Directive (97/23/EC)</td>
<td>Class III</td>
</tr>
<tr>
<td>Norms, Regulations</td>
<td>97/23/EC Pressure Equipment Directive</td>
</tr>
<tr>
<td></td>
<td>2014/30/EU Electromagnetic Compatibility Directive</td>
</tr>
<tr>
<td></td>
<td>2014/35/EU Low Voltage Directive</td>
</tr>
<tr>
<td></td>
<td>EN 378-2:2012</td>
</tr>
<tr>
<td></td>
<td>EN 13136:2007</td>
</tr>
<tr>
<td></td>
<td>EN 61326-1:2013</td>
</tr>
<tr>
<td></td>
<td>EN 61010-1:2010</td>
</tr>
<tr>
<td>Refrigerant</td>
<td>R134a or R1234yf</td>
</tr>
<tr>
<td>Vessel capacity</td>
<td>12 liter</td>
</tr>
<tr>
<td>Load cell (kg)</td>
<td>60 kg</td>
</tr>
<tr>
<td>Accuracy of refrigerant load cell</td>
<td>± 30 g</td>
</tr>
<tr>
<td>Recovery rate</td>
<td>&gt;95%</td>
</tr>
<tr>
<td>Vessel heating functionality</td>
<td>Standard</td>
</tr>
</tbody>
</table>

### Oil / UV Tracer

| Oil container                              | 2 (New and Exhaust oil) |
| Oil container capacity [ml]                | 250                      |
| Number of scales                           | N/A                      |
| Accuracy Oil                               | ~ 15g                    |
| Hermetic vessels                           | N/A                      |
### Vacuum pump

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Suction speed (m³/h)</td>
<td>3 m³/h</td>
</tr>
<tr>
<td>Ultimate pressure</td>
<td>0.02 mbar</td>
</tr>
<tr>
<td>Service interval</td>
<td>1000 h</td>
</tr>
</tbody>
</table>

### Compressor

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Displacement</td>
<td>8 cc</td>
</tr>
</tbody>
</table>

### Database

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vehicles (R134a or R1234yf)</td>
<td>European, US and Asian standard, Australian vehicle optional, Agriculture and construction machinery optional</td>
</tr>
<tr>
<td>Vehicle information</td>
<td>Filling quantity of coolant, Technical information and drawings required oil type</td>
</tr>
<tr>
<td>Database update</td>
<td>Optional via USB</td>
</tr>
</tbody>
</table>

### Climatic conditions

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operating Temperature</td>
<td>+5 ... +40 °C</td>
</tr>
<tr>
<td>Storage Temperature</td>
<td>-10 ... +50 °C</td>
</tr>
<tr>
<td>Humidity</td>
<td>10 ... 90 % non condensing</td>
</tr>
</tbody>
</table>

### Functional description

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>R134a and used oil recovery, vacuum, recharge, oil injection</td>
<td>Automatic and manual</td>
</tr>
<tr>
<td>Automatic oil injection</td>
<td>Time injected</td>
</tr>
<tr>
<td>Leakage test</td>
<td>Automatic (vacuum test) Nitrogen Kit optional</td>
</tr>
<tr>
<td>Self test</td>
<td>Internal leakage test</td>
</tr>
<tr>
<td>System pressure diagnose</td>
<td>Visual (LP and HP gauge)</td>
</tr>
<tr>
<td>MAC diagnostic</td>
<td>N/A</td>
</tr>
<tr>
<td>Flushing</td>
<td>With internal solenoid (required Flushing kit optional)</td>
</tr>
<tr>
<td>Hybrid function</td>
<td>Optional with hybrid kit</td>
</tr>
<tr>
<td>Convertible to R1234yf</td>
<td>N/A</td>
</tr>
<tr>
<td>Gas identifier (only R1234yf)</td>
<td>N/A</td>
</tr>
<tr>
<td>Hose compensation</td>
<td>Automatic</td>
</tr>
<tr>
<td>NCG discharge</td>
<td>manual</td>
</tr>
<tr>
<td>Customer database (vehicle)</td>
<td>100 records</td>
</tr>
<tr>
<td>Balance sheet for refrigerant</td>
<td>USB – ADS Manager</td>
</tr>
<tr>
<td>Agriculture and construction machinery</td>
<td>Optional</td>
</tr>
<tr>
<td>“Eco protect” function</td>
<td>Standard</td>
</tr>
</tbody>
</table>

### Disposal

This product of AVL DiTEST is a high-quality electrical and electronic device that may not be disposed of in the household waste. For disposal, it is essential to comply with local legal obligations!
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# 13 Maintenance Cards

AVL DiTEST ADS 110 serial number: ……………………………………………..

**Maintenance card**

**Vacuum Pump Oil Change**

<table>
<thead>
<tr>
<th>Date</th>
<th>Maintenance worker data</th>
<th>Maintenance worker's stamp and signature</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
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</tbody>
</table>
# Maintenance card

## Vacuum Pump Oil Change

<table>
<thead>
<tr>
<th>Date</th>
<th>Maintenance worker data</th>
<th>Maintenance worker’s stamp and signature</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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</tr>
</tbody>
</table>
## Maintenance card

### Humidity Filter Replacement

<table>
<thead>
<tr>
<th>Date</th>
<th>Maintenance worker data</th>
<th>Maintenance worker’s stamp and signature</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
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**Inspection of Loading Cell of Absorber for R123a or R1234yf Gas**

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