Contents

SAFETY INSTRUCTIONS ........................................................................................................... 4
SAFETY INSTRUCTIONS FOR CARBON DIOXIDE CO₂ (R744) ........................................ 6
SAFETY INSTRUCTIONS FOR NITROGEN N₂ ...................................................................... 8
SAFETY INSTRUCTIONS FOR WORKING ON AIR CONDITIONING SYSTEM ........................................... 10
GENERAL OBLIGATIONS OF THE PERSONNEL ................................................................. 12
WORKING ON/IN ELECTRICAL COMPONENTS .................................................................... 12
OPERATING AND AUXILIARY MATERIALS ............................................................................ 12
GENERAL SAFETY INSTRUCTIONS .................................................................................... 13

1 GENERAL INFORMATION ............................................................................................... 14
  1.1 General information ........................................................................................................ 14
  1.2 Safety instructions .......................................................................................................... 15
  1.3 EC Declaration of Conformity / CE marking ................................................................. 15
  1.4 Acceptance report ......................................................................................................... 16
  1.5 Intended use .................................................................................................................. 16
  1.6 Other applicable documents ........................................................................................ 16
  1.7 Scope of application ..................................................................................................... 16
  1.8 Software licence .......................................................................................................... 16

2 DESIGN ........................................................................................................................... 17
  2.1 Front view ...................................................................................................................... 17
  2.2 Side view, right ............................................................................................................. 18
  2.3 Rear view ..................................................................................................................... 19
  2.4 Quick connectors ......................................................................................................... 20
  2.5 Refrigerating agent cylinder CO₂ (R744) ................................................................ 21
  2.6 Controls ....................................................................................................................... 23
  2.7 User interface operation ............................................................................................. 24
  2.8 User prompts ............................................................................................................... 25
  2.9 Text and number inputs .............................................................................................. 26
  2.10 Overview of operating modes .................................................................................... 27
  2.11 Scope of delivery ....................................................................................................... 28
      2.11.1 System delivery ................................................................................................... 28
      2.11.2 Available accessories ....................................................................................... 29
3 AUTOMATIC MODE "AIR CONDITIONING SERVICE"......30

4 MANUAL MODE.................................................................33
  4.1 Drain hose .................................................................35
  4.2 Customer data ............................................................35
  4.3 Draining .................................................................36
  4.4 Generating vacuum ....................................................37
  4.5 Filling .................................................................38
  4.6 Pressurecheck ..........................................................39
  4.7 HP/LP pressure test ..................................................40
  4.8 External pressure test .................................................41

5 SETTINGS .....................................................................43
  5.1 Units ........................................................................43
  5.2 Date and time ...............................................................43
  5.3 Firmware update ........................................................44
  5.4 Workshop data ..........................................................44
  5.5 Balance sheet ..............................................................44
  5.6 Language ......................................................................44
  5.7 Printout text size ........................................................45

6 MAINTENANCE ................................................................46
  6.1 Maintenance schedule ..................................................46
  6.2 Regular maintenance ..................................................48
  6.2.1 Change vacuum pump oil .........................................48
  6.2.2 Check oil level (vacuum pump oil) .............................51
  6.2.3 Refrigerating agent cylinder CO₂ (R744) ..................51
  6.2.4 Cylinder adapter .......................................................52
  6.2.5 LP and HP filling hoses ............................................52
  6.2.6 LP and HP quick connectors ....................................53
  6.2.7 Cylinder heater (heating band) .................................53
  6.2.8 Inspect device ..........................................................53
  6.3 Ad-hoc maintenance, as required .................................54
  6.3.1 Refrigerating agent cylinder CO₂ (R744) ..................54
  6.3.2 Pressure zeroing .......................................................70
  6.3.3 Oil/UV additive scales zeroing .................................71
  6.3.4 Oil regeneration ......................................................72
  6.3.5 Save logs .................................................................72
  6.4 Add new printer paper ..................................................73
  6.5 Replacing fuses ............................................................74
  6.6 Other maintenance information ...................................75
  6.6.1 System information ..................................................75
  6.6.2 Operating hours .......................................................75
  6.6.3 Replacing quick connector seals ...............................76
Subject change. Therefore, no rights can be derived from the specifications, figures and descriptions in these instructions. Reprinting, reproduction or translation for third parties, in part or in whole, are not permitted without the written permission of Volkswagen AG/the manufacturer. Volkswagen AG / the manufacturer expressly reserves all rights under the German Copyright Act.

VOLKSWAGEN AG  
Publisher: AVL DiTEST GmbH
KD-Werkstattausrüstung
Alte Poststraße 156
D-38436 Wolfsburg
A-8020 Graz
AUSTRIA

VAS 581 009/2
AVL ID No.: AT7913EN Rev. 02

ASE 581 009 00 000
SAFETY INSTRUCTIONS

Sign and symbols

Symbols with the following meanings are used in the safety instructions of the operating instructions, unpacking instructions or other supplied instructions as well as on the display of the tester during operation and on the products themselves:

![DANGER](image)

Indicates an **extreme** danger that can lead to death if not avoided.

![WARNING](image)

Indicates an imminent danger that can lead to death or severe injury if not avoided.

![CAUTION](image)

Indicates a danger that can lead to moderate or minor injuries.

Prohibition signs

![Fire and open flames prohibited](image)

Warning signs

![General](image)  ![Risk of electric shock](image)  ![Hazardous gases](image)  ![Warning of gas cylinders](image)  ![Danger of suffocation](image)
Mandatory signs

- Wear protective goggles
- Wear gloves
- Refrigerating agent cylinder Secure CO₂ (R744)
- Wear protective shoes
- Wear respiratory protection
- Wear protective clothing

Other symbols

- Observe operating instructions
- Fuse
- First aid
- Gas cylinder

Notices:

**NOTICE**
This text points to situations or mal operations that can lead to damage or data loss.

**Information**
This text indicates important information or instructions. Failure to comply with these instructions will prevent or significantly hinder the successful implementation of the actions described in this documentation.
SAFETY INSTRUCTIONS FOR CARBON DIOXIDE CO₂ (R744)

Always observe the manufacturer’s safety data sheet!

**WARNING**

Contact with the product can cause cold burns or frostbite. Gases/vapours are heavier than air. High concentration due to accumulation in closed rooms, work pits, cellars, etc. can cause asphyxiation, among other things. Symptoms: Loss of motor ability and consciousness. Affected persons do not realise that they are suffocating.

Do not allow carbon monoxide to enter sewage systems, pits or similar enclosures where gas accumulation may be dangerous.

**Precautions and behaviour rules**

**WARNING**

**Storage:** Store container in a well-ventilated place at a temperature below 50 °C. Protect container against impacts and falls (secure with chain).

**Handling:** Avoid contact with eyes and skin. Do not inhale the gas. Ensure that no water enters the gas cylinder/container. Prevent the gas from flowing back into the gas tank. Only use equipment that is suitable for this product and the intended pressure and temperature. Check fittings, connections and lines for leaks. Eating, drinking and storing food in the working area are prohibited.

**Respiratory protection:** Self-contained breathing apparatus.

**Eye protection:** Tightly fitting protective goggles.

**Hand protection:** Protective gloves (material: leather).

**Body protection:** Protective clothing.
Behaviour in the event of danger


In case of fire: Wear protective gear and self-contained breathing apparatus. Stop gas leak if possible. Cool cylinders with a water jet from a secure position and remove them from the fire zone if possible to prevent explosion! The product itself is non-flammable.

Extinguishing agents: All known extinguishing agents can be used.
Escape routes: Escape routes must be known to staff.
Accident phone: The accident phone must be known to staff.

First aid

Please observe the instructions for use and safety of your refrigerant supplier.
SAFETY INSTRUCTIONS FOR NITROGEN N₂

Always observe the manufacturer's safety data sheet!

**WARNING**

High concentrations of the gas can cause suffocation.  
Loss of motor ability and consciousness.  
Rapid release of large quantities creates cold and fog.  
Gas may accumulate in cellars, pits, etc., because it is about as heavy as air.  
Container may burst or explode in the event of a fire.

---

**Precautions and behaviour rules**

**WARNING**

Employees must be instructed in the use of the gas before being allowed to work with it.  
Do not inhale cylinder gas.  
Secure cylinders from falling over.  
Ensure good ventilation when working.  
Filter masks do not protect against asphyxiation!  
Wear protective gloves when transporting the cylinder.  
Use the cylinder trolley.  
Never open valves forcibly (no pliers, etc.)  
Store cylinder in well-ventilated location at a temperature <50 °C.  
Only use suitable equipment (pressure/temperature/product).  
Ensure that no water can enter or flow back into the gas cylinder.  
Always close cylinders, even if they are empty, before transporting them and secure with lock not and protective cap.  
Lash down cylinders when transporting them in a vehicle. The loading space should be separate from the driver's cab and have vents in the ceiling and floor areas.
Behaviour in the event of danger

**WARNING**

Exposure to heat and fire may cause cylinders to burst/explode.
All extinguishing agents can be used.
If gas is escaping, close valve is possible.
Make sure that the gas does not enter cellars, recesses, pits, etc. where gas accumulation might be dangerous (danger of suffocation).
Fire: Remove container from the danger zone or, if this is not possible, cool it with water from a safe distance.
Ensure good ventilation.
In case a large quantity is released or in confined spaces: Evacuate area and enter only with self-contained breathing apparatus. Re-entry only after verification of safe level.

First aid

Please observe the instructions for use and safety of your refrigerant supplier.
SAFETY INSTRUCTIONS FOR WORKING ON AIR CONDITIONING SYSTEM

**WARNING**

The device must not be used if the heating band or cable is damaged. Contact the respective AVL DiTEST branch / AVL DiTEST partner in your country!

**NOTICE**

The oil level of the vacuum pump must be checked regularly. Top up if necessary. After 60 operating hours a regeneration of the pump oil is necessary (user notification). The regeneration can be performed from the maintenance menu. After 500 operating hours or one year, the pump oil must be changed (user notification). Oil changes can also be performed via the maintenance menu. The pump oil will also be changed as part of the annual servicing of the device by the service partner.

**NOTICE**

A device check is performed automatically once a week. It can also be triggered manually in the maintenance menu. The device check ensures that the system is sealed and all components are operating correctly. In case of a malfunction, the device will have to be serviced.

**NOTICE**

The filling levels of the oil/additive containers must be checked at regular intervals. Full used-oil containers must be emptied. Empty clean-oil and UV contrast medium bottles must be refilled if necessary.
NOTICE
Check the available printer paper and replace the paper roll if necessary.

NOTICE
We recommend that you have the device serviced by your service partner once a year. As part of every servicing the vacuum pump oil is changed and the calibration checked. If necessary, a recalibration is performed.

NOTICE
The VAS 581 009 may only be operated on a level and solid foundation. The refrigerating agent cylinder must be upright in the device. Any tilting may result in incorrect measurements by the cylinder scales and thus incorrect filling quantities!

NOTICE
Open the manual valve of the connected refrigerating agent cylinder before switching on. If the VAS 581 009 is not being used, shut off the gas supply by closing the manual valve.

NOTICE
The VAS 581 009 performs a self-test when it is switched on. This is indicated by the brief sounding of the siren.

NOTICE
If the VAS 581 009 is not used for a prolonged period, the manual valve must be closed.
GENERAL OBLIGATIONS OF THE PERSONNEL

WORKING ON/IN ELECTRICAL COMPONENTS
Before working on electrical components, the following minimum requirements must be observed:
1. Make sure that the system is fully de-energized
2. Secure against accidental re-activation
3. Check de-energized state
4. Earth and short
5. Cover adjacent live parts.
After the work has been carried out, perform these five steps in reverse order.

OPERATING AND AUXILIARY MATERIALS
Before using operating and auxiliary materials, the material safety data sheets for the product and the manufacturer's instructions must be read.

An appropriate safety concept must be developed and adhered to based on these material safety data sheets.
GENERAL SAFETY INSTRUCTIONS

⚠️ WARNING
Read all instructions carefully!

⚠️ DANGER
Danger of life due to electrical voltage
The cylinder heater is operated via the mains voltage!
Only connect/disconnect the VAS 581 009 when it is switched off.

⚠️ CAUTION
The weight can result in persons or body parts being trapped. Ensure wheel brakes are applied during operation. Ensure that there is a minimum distance of 1.5 m to walls.

KEEP THESE INSTRUCTIONS IN A SAFE PLACE!
1 General information

1.1 General information

The VAS 581 009 is intended for filling vehicle air conditioning systems with CO₂ (R 744).

The VAS 581 009 is intended for repair/service workshops or similar institutions. It is intended solely for professionals who are familiar with the basic concepts of cooling, cooling systems, the refrigerating agent and the relevant regulations for pressure equipment and the damage it may cause.

Observe the regulations in force in your country!

Read and observe these operating instructions, especially the safety instructions.

The VAS 581 009 was subjected to extensive tests before it was placed into service and must be checked at regular intervals (in accordance with the relevant laws and regulations in force in the country) while in use.

It is the responsibility of the user to ensure that the air conditioning system is used in accordance with the national regulation in force.

Fig. 1-1
1.2  Safety instructions

Observe the safety instructions for the VAS 581 009. They can be found below the table of contents.

1.3  EC Declaration of Conformity / CE marking

The manufacturer hereby declares that the VAS 581 009 is in conformity with the provisions of the following EC directives, including all applicable amendments.


The VAS 581 009 is in conformity with:

SAFETY:
EN 61326-1:2013
IEC 61010-1:2010
1.4 **Acceptance report**

A device-specific acceptance report is included in the delivery.

1.5 **Intended use**

The VAS 581 009 may only be used as prescribed in the operating instructions.

The described product has been developed, manufactured, tested and documented, taking into account the relevant safety standards. When observing the safety and prescribed placing into service instructions, using the device as intended and maintaining it as recommended, the VAS 581 009 normally does not pose a risk to property or health.

1.6 **Other applicable documents**

In addition to these operating instructions, the following other technical documents pertaining to the VAS 581 009 exist:
- unpacking and placing into service instructions, quick start guide VAS 581 009

1.7 **Scope of application**

The VAS 581 009 is intended for filling vehicle air conditioning systems with CO₂ (R 744).

1.8 **Software licence**

The software licence is available here: [https://www.avlditest.com/index.php/de/ads-310-830.html](https://www.avlditest.com/index.php/de/ads-310-830.html)
2 Design

2.1 Front view

Fig. 2-1

1 Display
2 Multi-functional dial
3 Hand rail
4 Printer
5 Wheel brakes
2.2 Side view, right

Fig. 2-2

1. Extractable collection container for drained vacuum pump oil
2. Socket screw for draining the vacuum pump oil
3. Gauge glass for vacuum pump oil
2.3 Rear view

Fig. 2-3

1  Chain for securing the carbon dioxide CO₂ (R744) refrigerating agent cylinder
2  Container for clean oil 250 ml
3  Container for UV additive 250 ml
4  Container for used oil 250 ml
5  Quick connector HP red
6  Connection VAS 584 003, tightening torque 16 ... 18 Nm
7  USB port cover
8  Mains switch with fuse link
9  Quick connector LP blue
2.4 Quick connectors

Your VAS 581 009 is equipped with a quick connector system. These connectors offer the following safety features:

- No mechanical disconnection of connectors while under pressure.
- The connectors are self-ventilating.

**WARNING**

The quick connectors may only be unscrewed by authorised personnel!

Fig. 2-4
2.5 Refrigerating agent cylinder CO2 (R744)

Fig. 2-5 Example

**NOTICE**
The VAS 581 009 is suitable for standard CO₂ (R744) refrigerating agent cylinders with a built-in riser tube. The following cylinder sizes can be used: 5 kg, 6 kg, 10 kg or 20 kg. Required purity equal or better than carbon dioxide 3.0 (99.9 % purity).

**WARNING**
Frostbites caused by refrigerating agent
Cylinders may only be replaced by professional staff. Follow step-by-step instructions on VAS 581 009.

**CAUTION**
Injuries to body parts.
Depending on the size, cylinders can weigh up to 50 kilograms.
Load the cylinder onto the VAS 581 009 with the help of another person.
**NOTICE**

Only use the VAS 581 009 if the filling hoses are correctly connected. Filling with incorrectly connected hoses will damage the VAS 581 009.

**NOTICE**

The VAS 581 009 is supplied with a CO₂ (R744) refrigerating agent cylinder.

**Definition: Quick connector "screwed in" / "screwed out"**

- **Screwed in:**
  - Screwed clockwise
  - Valve open

- **Screwed out:**
  - Screwed counter clockwise
  - Valve closed

Fig. 2-6  
Fig. 2-7
2.6 Controls

Fig. 2-8

1 Mains switch
2 Adjustable display
3 Multi-functional dial
2.7 User interface operation

The user interface is controlled via a multi-functional dial. The individual functions (buttons) are selected by turning the dial. To start a function, the dial must be pressed.

Fig. 2-9

1. **HP High Pressure**  
   High pressure HP display of the refrigerating agent circuit

2. **LP Low Pressure**  
   Low pressure LP display of the refrigerating agent circuit

3. **Multi-functional dial**  
   To select and start a function

4. **Operating modes**
   - Automatic mode ⇒ Sec. 3 "Automatic mode"
   - Manuel mode ⇒ Sec. 4 "Manuel mode"
   - Settings ⇒ Sec. 5 "Settings"
   - Maintenance ⇒ Sec. 6 "Maintenance"
   - Service ⇒ Sec. 7 "Service"
   - Overview ⇒ Sec. 8 "Overview"
2.8 User prompts

<table>
<thead>
<tr>
<th>Action</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Up</td>
<td>Selects previous function</td>
</tr>
<tr>
<td>Down</td>
<td>Selects the next function</td>
</tr>
<tr>
<td>Back</td>
<td>Goes back one step</td>
</tr>
<tr>
<td>Start</td>
<td>Starts functions</td>
</tr>
<tr>
<td>Cancel</td>
<td>Cancels an ongoing operation. Confirms questions with &quot;No&quot;.</td>
</tr>
<tr>
<td>RESET</td>
<td>Resets values</td>
</tr>
<tr>
<td>OK</td>
<td>Confirms questions with &quot;Yes&quot; or &quot;OK&quot;.</td>
</tr>
<tr>
<td>Next</td>
<td>Continues to the next step</td>
</tr>
<tr>
<td>Print</td>
<td>Prints logs</td>
</tr>
</tbody>
</table>
2.9 Text and number inputs

If a number or letter is expected as an input, turning the dial will show the letters and numbers in sequential order. Pressing the dial will select the letter or number.

Fig. 2-10 Example input

The multi-functional dial is equipped with an indicator.

<table>
<thead>
<tr>
<th>Meaning</th>
<th>Indicator state</th>
</tr>
</thead>
<tbody>
<tr>
<td>System start</td>
<td>Blue</td>
</tr>
<tr>
<td>Status OK / completed</td>
<td>Green</td>
</tr>
<tr>
<td>Ongoing process</td>
<td>Yellow</td>
</tr>
<tr>
<td>User information</td>
<td>Yellow flashing (1-2 Hz)</td>
</tr>
<tr>
<td>Error</td>
<td>Red flashing (1-2 Hz)</td>
</tr>
<tr>
<td>System error</td>
<td>Red fast flashing (10 Hz)</td>
</tr>
</tbody>
</table>
## 2.10 Overview of operating modes

<table>
<thead>
<tr>
<th>Operating mode</th>
<th>Function</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Automatic cycle</strong></td>
<td>Automatic cycle:</td>
<td>See Sec. 3</td>
</tr>
<tr>
<td></td>
<td>1. Preparing device</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2. Draining</td>
<td></td>
</tr>
<tr>
<td></td>
<td>3. Generating vacuum</td>
<td></td>
</tr>
<tr>
<td></td>
<td>4. Pressure test (if activated)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>5. Filling</td>
<td></td>
</tr>
<tr>
<td><strong>Manual cycle</strong></td>
<td>Drain hose</td>
<td>See Sec. 4.1</td>
</tr>
<tr>
<td></td>
<td>Draining</td>
<td>See Sec. 4.3</td>
</tr>
<tr>
<td></td>
<td>Generating vacuum</td>
<td>See Sec. 4.4</td>
</tr>
<tr>
<td></td>
<td>Filling</td>
<td>See Sec. 4.5</td>
</tr>
<tr>
<td></td>
<td>Pressure test</td>
<td>See Sec. 4.6</td>
</tr>
<tr>
<td></td>
<td>HP/LP pressure test</td>
<td>See Sec. 4.7</td>
</tr>
<tr>
<td></td>
<td>External pressure test</td>
<td>See Sec. 4.8</td>
</tr>
<tr>
<td><strong>Settings</strong></td>
<td>Units</td>
<td>See Sec. 5.1</td>
</tr>
<tr>
<td></td>
<td>Date/time</td>
<td>See Sec. 5.2</td>
</tr>
<tr>
<td></td>
<td>Firmware update</td>
<td>See Sec. 5.3</td>
</tr>
<tr>
<td></td>
<td>Workshop data</td>
<td>See Sec. 5.4</td>
</tr>
<tr>
<td></td>
<td>Balance sheet</td>
<td>See Sec. 5.5</td>
</tr>
<tr>
<td></td>
<td>Language</td>
<td>See Sec. 5.6</td>
</tr>
<tr>
<td></td>
<td>Printout text size</td>
<td>See Sec. 5.7</td>
</tr>
<tr>
<td><strong>Maintenance</strong></td>
<td>System info</td>
<td>See Sec. 6.6.1</td>
</tr>
<tr>
<td></td>
<td>Operating hours</td>
<td>See Sec. 6.6.2</td>
</tr>
<tr>
<td></td>
<td>Vacuum pump oil</td>
<td>See Sec. 6.2.1</td>
</tr>
<tr>
<td></td>
<td>Cylinder replacement</td>
<td>See Sec. 6.3.1</td>
</tr>
<tr>
<td></td>
<td>Pressure zeroing</td>
<td>See Sec. 6.3.2</td>
</tr>
<tr>
<td></td>
<td>Oil/UV/additive scales zeroing</td>
<td>See Sec. 6.3.3</td>
</tr>
<tr>
<td></td>
<td>Device check</td>
<td>See Sec. 6.2.8</td>
</tr>
<tr>
<td></td>
<td>Save logs</td>
<td>See Sec. 6.3.5</td>
</tr>
<tr>
<td><strong>Service</strong></td>
<td>Password-protected</td>
<td>---</td>
</tr>
<tr>
<td></td>
<td>Only for authorised service</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Staff</td>
<td></td>
</tr>
<tr>
<td><strong>Overview</strong></td>
<td>Display of status information</td>
<td>See Sec. 8</td>
</tr>
</tbody>
</table>
## 2.11 Scope of delivery

### 2.11.1 System delivery

<table>
<thead>
<tr>
<th>No.</th>
<th>VAS No.</th>
<th>Components</th>
<th>Item number</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>VAS 581 009</td>
<td>Basic device VAS 581 009 cplt.</td>
<td>VS9155</td>
</tr>
<tr>
<td>2</td>
<td></td>
<td>Operating instructions on CD</td>
<td>BO7960</td>
</tr>
<tr>
<td>3</td>
<td></td>
<td>Unpacking instructions, placing into service instructions, quick start guide, printed</td>
<td>AT7912EN</td>
</tr>
<tr>
<td>4</td>
<td></td>
<td>Inspection log book, printed</td>
<td>AT7914EN</td>
</tr>
<tr>
<td>5</td>
<td></td>
<td>Quick connector CO2 HP red</td>
<td>GE7520</td>
</tr>
<tr>
<td>6</td>
<td></td>
<td>Quick connector CO2 LP blue</td>
<td>GE7522</td>
</tr>
<tr>
<td>7</td>
<td></td>
<td>Filling hose CO2 HP red</td>
<td>SS7520</td>
</tr>
<tr>
<td>8</td>
<td></td>
<td>Filling hose CO2 LP blue</td>
<td>SS7521</td>
</tr>
<tr>
<td>9</td>
<td></td>
<td>Cover</td>
<td>MK7532</td>
</tr>
<tr>
<td>10</td>
<td></td>
<td>Acceptance report</td>
<td></td>
</tr>
<tr>
<td>11</td>
<td></td>
<td>Cylinder adapter W21.8x1/14&quot; incl. seal for connecting R744 cylinder to the VAS 581 009</td>
<td>DN7469</td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>Notice:</strong> It is possible that the supplied cylinder adapter is not compatible with a cylinder available in your country. This is why we offer a variety of different adapters. See &quot;Available accessories&quot;.</td>
<td></td>
</tr>
<tr>
<td>12</td>
<td></td>
<td>Protective goggles</td>
<td>GE7432</td>
</tr>
<tr>
<td>13</td>
<td></td>
<td>Protective gloves</td>
<td>GE7435</td>
</tr>
<tr>
<td>14</td>
<td></td>
<td>Cylinder adapter seal</td>
<td>DA7451</td>
</tr>
<tr>
<td>15</td>
<td></td>
<td>Printing paper</td>
<td>HP7003</td>
</tr>
<tr>
<td>16</td>
<td></td>
<td>Power cable EU</td>
<td>EX7075</td>
</tr>
<tr>
<td>17</td>
<td></td>
<td>Heating tape</td>
<td>BV8313</td>
</tr>
</tbody>
</table>
### 2.11.2 Available accessories

<table>
<thead>
<tr>
<th>No.</th>
<th>VAS No.</th>
<th>Components</th>
<th>Item number</th>
</tr>
</thead>
<tbody>
<tr>
<td>18.</td>
<td></td>
<td>Vacuum pump oil 500 ml (2 units per package)</td>
<td>GE7427</td>
</tr>
<tr>
<td>19.</td>
<td></td>
<td>Printer paper 57 mm, (minimum order quantity: 5 units</td>
<td>HP7003</td>
</tr>
<tr>
<td>20.</td>
<td></td>
<td>Cylinder heater (heating band) incl. connector</td>
<td>BV8313</td>
</tr>
<tr>
<td>21.</td>
<td></td>
<td>External pressure test set</td>
<td>BO7948  VAS 584 003</td>
</tr>
<tr>
<td>22.</td>
<td></td>
<td>Cylinder adapter incl. seal: W21.7x1/14&quot;</td>
<td>DN7470</td>
</tr>
<tr>
<td>23.</td>
<td></td>
<td>Cylinder adapter incl. seal: 0.860&quot;x14TPI</td>
<td>DN7471</td>
</tr>
<tr>
<td>24.</td>
<td></td>
<td>Cylinder adapter incl. seal: G3/4&quot;</td>
<td>DN7472</td>
</tr>
<tr>
<td>25.</td>
<td></td>
<td>Cylinder adapter incl. seal: 0.825&quot;x14NGO</td>
<td>DN7473</td>
</tr>
<tr>
<td>26.</td>
<td></td>
<td>Cylinder adapter incl. seal: W27x2 mm</td>
<td>DN7474</td>
</tr>
<tr>
<td>27.</td>
<td></td>
<td>Calibration kit VAS 581 009</td>
<td>BO7972</td>
</tr>
</tbody>
</table>

**WARNING**

Only use accessories approved by AVL DiTEST!
3 Automatic mode "Air conditioning service"

There are a max. of three pre-set configurations available. There are all based on different default values. The default values can be applied or changed. Changes to default values are automatically saved in the configuration. Select Automatic cycle in the main menu.

Fig. 3-1

The following functions are performed during the automatic cycle:
1. Preparing device
2. Draining
3. Generating vacuum
4. Pressure test (if activated)
5. Filling

Default values:

<table>
<thead>
<tr>
<th>Button</th>
<th>Parameter</th>
<th>Unit</th>
<th>Selection</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Configuration name</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Refrigerating agent quantity</td>
<td>g</td>
<td>0 ... 1500</td>
</tr>
<tr>
<td></td>
<td>Oil quantity</td>
<td>g</td>
<td>0 ... 20</td>
</tr>
<tr>
<td></td>
<td>Oil filling mode*</td>
<td>g</td>
<td>REC+/ABS/NO</td>
</tr>
<tr>
<td></td>
<td>UV additive quantity</td>
<td>g</td>
<td>0 ... 20</td>
</tr>
<tr>
<td></td>
<td>Vacuum time</td>
<td>min</td>
<td>5 ... 60</td>
</tr>
<tr>
<td></td>
<td>Vacuum test time</td>
<td>min</td>
<td>5 ... 120</td>
</tr>
<tr>
<td></td>
<td>Connection type</td>
<td></td>
<td>LP / HP+LP</td>
</tr>
<tr>
<td></td>
<td>Pressure test</td>
<td></td>
<td>OFF / 10 % / 75 g / 20 % / 75 g / 100 g / 150 g / 200 g / 250 g / 300 g</td>
</tr>
</tbody>
</table>
**Pressure test time**  
**min**  
1 ... 30

**Pressure loss**  
**mbar**  
100 ... 1000

**Customer data**

---

**Oil filling mode:**

- **NO:** No oil is pumped into the air conditioning system of the vehicle. The set oil quantity is ignored.

- **ABS:** The set quantity of oil is pumped into the air conditioning system of the vehicle.

- **REC+:** Depending on the quantity of used oil recovered, this quantity of oil plus the set quantity of oil is pumped into the air conditioning system of the vehicle. For example: Recovered oil quantity = 8 grams used oil, set oil quantity = 10 grams,  
  -> 18 grams of oil are pumped into the vehicle

Check the inputs and confirm with ✅.  
The automatic cycle starts.

Follow the instructions on the screen.

The steps **Preparing device, Draining, Generating vacuum, Pressure test (if enabled)** and **Filling** are performed automatically. Take note of the messages on the screen and follow the instructions. Take note of the colour of the illuminated multi-functional dial, see Sec. 2.6.

Upon completion of the automatic cycle, you can print all results with ✉️.
Results:

- Drained refrigerating agent
- Drained oil quantity
- Pressure during vacuum seal test
- Pressure drop during pressure test
- Injected refrigerating agent quantity during filling process
- Injected oil quantity
- Injected UV additive quantity
4 Manual mode

**NOTICE**

Only connect the quick connectors to the air conditioning system of the vehicle once indicated by the VAS 581 009 on the display.

During a manual cycle, the following functions can be started and executed separately.

- **Drain hose**
  The filling hoses are completely emptied. To do so, disconnect the filling hoses from the vehicle.

- **Customer data:**
  To log the following processes, customer data can be retrieved from the database.

- **Draining**
  This function drains the CO₂ refrigerating agent from the vehicle in a controlled manner.
  The sub-function **Oil separation** takes place at the same time.
  **Oil separation:**
  The oil quantity drained out of the air conditioning system is transported away. The quantity of used oil is weighed and saved for logging purposes.

- **Generating vacuum**
  A vacuum is generated inside the air conditioning system. This reveals any leaks inside the air conditioning system of the vehicle.
- **Filling**
  This process compensates the oil quantity removed during draining with clean oil according to the selected settings. Then the air conditioning system of the vehicle is filled with the refrigerating agent CO₂ (R744).

- **Pressure test**
  With this function, the vehicle's air conditioning system is filled with a set quantity of 70 to 300 grams of refrigerating agent. The pressure loss over the selected time period is determined. This reveals any leaks inside the air conditioning system of the vehicle.

- **HP/LP pressure test**
  With this function, the pressure of the vehicle's air conditioning system while in operation is measured and displayed.

- **External pressure test**
  With this function, a pressure of 90 to 100 bar is applied to the vehicle's air conditioning system from a nitrogen cylinder. The pressure loss over the selected time period is determined.
4.1 Drain hose

Select Manual → Drain hose in the main menu. With the "Drain hose" function you can completely drain the external filling hoses.

4.2 Customer data

For all selectable processes (except for "Drain hose"), customer data can be entered for logging purposes.

Fig. 4-2
4.3 Draining

Select Manual Drain hose in the main menu. With this function, the CO₂ (R744) refrigerating agent is drained from the vehicle.

![Fig. 4-3](image)

Default values:

<table>
<thead>
<tr>
<th>Button</th>
<th>Parameter</th>
<th>Unit</th>
<th>Selection</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Customer data</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Results:

- Drained refrigerating agent
- Drained oil quantity
- Draining time
4.4 Generating vacuum

Select Manual │ Vacuum in the main menu. A vacuum is generated inside the air conditioning system. This reveals any leaks inside the air conditioning system of the vehicle.

Fig. 4-4

Default values:

<table>
<thead>
<tr>
<th>Button</th>
<th>Parameter</th>
<th>Unit</th>
<th>Selection</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Vacuum time</td>
<td>min</td>
<td>5 … 60</td>
</tr>
<tr>
<td></td>
<td>Vacuum test time</td>
<td>min</td>
<td>5 … 120</td>
</tr>
<tr>
<td></td>
<td>Customer data</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Results:

- Vacuum pressure minimum value
- Pressure increase
- Number of repetitions
- Vacuum test time
- Vacuum test evaluation ok/not ok only on printout!

Note:

If vacuum is used to check for leaks inside the device (no air conditioning system connected), we recommend you set the vacuum time to at least 60 minutes. After effects of the refrigerating agent CO₂ may result in the misinterpretation of the result due to too excessive pressure increase.
4.5 Filling

Select Manual Filling in the main menu. In the first step, the set oil and UV additive quantities are injected into the air conditioning system of the vehicle. Then it is filled with the set quantity of refrigerating agent $\text{CO}_2$ (R744).

Fig. 4-5

Default values:

<table>
<thead>
<tr>
<th>Button</th>
<th>Parameter</th>
<th>Unit</th>
<th>Selection</th>
</tr>
</thead>
<tbody>
<tr>
<td>✨</td>
<td>Refrigerating agent quantity CO$_2$ (R744)</td>
<td>g</td>
<td>0 … 1500</td>
</tr>
<tr>
<td>⚧</td>
<td>Oil quantity</td>
<td>g</td>
<td>0 … 20</td>
</tr>
<tr>
<td>🌞</td>
<td>UV additive</td>
<td>g</td>
<td>0 … 20</td>
</tr>
<tr>
<td>🛠️</td>
<td>Connection type</td>
<td></td>
<td>LP / HP+LP</td>
</tr>
<tr>
<td>🛠️</td>
<td>Pressure test</td>
<td></td>
<td>OFF / 10% /75 g / 20% /75 g</td>
</tr>
<tr>
<td>🛠️</td>
<td>Duration of pressure test</td>
<td>min</td>
<td>1 … 30</td>
</tr>
<tr>
<td>🛠️</td>
<td>Pressure loss</td>
<td>mbar</td>
<td>100 … 1000</td>
</tr>
<tr>
<td>🛠️</td>
<td>Customer data</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Results:

- Injected quantity of refrigerating agent
- Injected oil quantity
- Injected UV additive quantity
4.6 Pressurecheck

Select Manual | Pressure test in the main menu.
The air conditioning system of the vehicle is applied with a preset quantity of refrigerating agent. After a stabilisation period, the pressure change can be determined based on the set length of the test. The actual pressure loss is determined and compared with the set max. permissible pressure loss.

Fig. 4-6

Default values:

<table>
<thead>
<tr>
<th>Button</th>
<th>Parameter</th>
<th>Unit</th>
<th>Selection</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Refrigerating agent quantity</td>
<td>g</td>
<td>70 … 300</td>
</tr>
<tr>
<td></td>
<td>Duration of pressure test</td>
<td>min</td>
<td>1 … 30</td>
</tr>
<tr>
<td></td>
<td>Pressure loss</td>
<td>mbar/min</td>
<td>100 … 1000</td>
</tr>
<tr>
<td></td>
<td>Customer data</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Results:

- Injected quantity of refrigerating agent
- Pressure at the end of the injection process
- Pressure loss during pressure test
4.7 HP/LP pressure test

Select Manual | HP/LP pressure test in the main menu. With this function, the pressure of the air conditioning system while in operation is measured. This allows you to check the high pressure side and low pressure side during operation.

The process starts with the hoses being filled with CO2. This ensures that refrigerating agent loss from the air conditioning system of the vehicle is kept to a minimum. The minimum cylinder pressure must not drop below 50 bar. Next, you will be asked to switch on the air conditioning system of the vehicle. Confirm this on the VAS 581 009. The process must be terminated by the user.

Fig. 4-7

Result:

Upon termination, the test time, highest pressure on the HP side and associated pressure on LP side are printed out.
4.8 External pressure test

With the external pressure test, the air conditioner can be tested for leaks with a pressure of 99 ... 101 bar. This requires a nitrogen cylinder and the external pressure test set VAS 584 003 (AVL ID No. BO7948).

Note the ext. Pressure test set enclosed Quickstart, AVL ID no. 7948.

Select Manual | External pressure test in the main menu.

Fig. 4-8

Default values:

<table>
<thead>
<tr>
<th>Button</th>
<th>Parameter</th>
<th>Unit</th>
<th>Selection</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Save log data</td>
<td></td>
<td>On / Off</td>
</tr>
<tr>
<td></td>
<td>customer data</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Start the external pressure test with .

Follow the instructions on the screen in detail.

Process overview:

a) Close manual valve on the refrigerant bottle.

b) Connect couplings to the vehicle, screw in fittings.

c) Connect nitrogen bottle N2. VAS 584 003 - Note quickstart.

Torque max. 18 Nm 30 ... 32 Nm max. 18 Nm
d) Set test pressure of 14 ... 15 bar.  
   To do this, slowly open the manual valve on the VA 584 003.  
   ⇒ It is measured 2 times for 1 minute each time and the pressure (HP and LP) is displayed.

e) Options:
   ![Cancel]
   ![Uncouple]
   ![Repeat]
   ![Continue]

f) Select **Continue**.

g) Set test pressure of 99 ... 101 bar.  
   To do this, open the manual valve on the VA 584 003.
   ⇒ External pressure test is carried out.  
   The pressure (HP and LP) is displayed.

h) Options:
   ![Cancel]
   ![Uncouple]
   ![Repeat]

i) Exit ext. pressure check with **uncoupling**.
5  Settings

Under the "Settings" menu item you can change various parameters and enable various features.

Fig. 5-1

Select the desired function.
Follow the instructions on the screen.

5.1  Units

With this function, you can select the units for pressure (bar/psi), temperature (°C/°F) and oil quantities (g/ml).

5.2  Date and time

Here you can enter/change the date and time. You can also select a country-specific date/time format, e.g. USA.
5.3 **Firmware update**

Here you can update the firmware of the VAS 581 009.

1. Remove the cover on the right side (below the mains switch) and plug in the USB stick containing the firmware.

![Fig. 5-2](image)

2. Select **Settings | Firmware update** in the main menu.
3. Confirm with ✅.
4. The firmware update starts automatically.
5. Follow the instructions on the screen of the VAS 581 009.

**WARNING**

During the firmware update, you may hear the siren for up to two minutes. The VAS 581 009 must not be disconnected from the power supply during this time.

The VAS 581 009 restarts and performs a self-test after a language has been selected.

5.4 **Workshop data**

Here you can enter/change workshop data (company, address, e-mail, telephone number).

5.5 **Balance sheet**

The balance sheet provides for a key date evaluation of the discharged refrigerating agent and recovered oil as well as the refrigerating agent and clean oil that has been topped up. The evaluation is shown under this menu item and can be printed or reset.

5.6 **Language**

Here you can select the language. Once selected, the VAS 581 009 restarts.
5.7 Printout text size

Here you can choose between small, medium and large font for the printout.

---

**Information**

AVL DiTEST reserves the right to add new parameters to make the VAS 581 009 even more versatile and adapt it to market requirements.
6 Maintenance

6.1 Maintenance schedule

To ensure faultless operation, the VAS 581 009 must be serviced at regular intervals. All maintenance work that has been carried out must be recorded in the inspection log. If necessary, e.g. in case of problems, additional maintenance work can be carried out or information retrieved.

<table>
<thead>
<tr>
<th>Component/assembly/function</th>
<th>Interval</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Regular maintenance</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Change vacuum pump oil</td>
<td>Every 500 operating hours or at least once a year</td>
<td>Sec. 6.2.1</td>
</tr>
<tr>
<td>Check oil level (vacuum pump oil)</td>
<td>Weekly</td>
<td>Sec. 6.2.2</td>
</tr>
<tr>
<td>Check CO₂ (R744) refrigerating agent</td>
<td>Weekly</td>
<td>Sec. 6.2.3</td>
</tr>
<tr>
<td>Check cylinder adapter</td>
<td>Weekly</td>
<td>Sec. 6.2.4</td>
</tr>
<tr>
<td>Check LP and HP hoses</td>
<td>Weekly</td>
<td>Sec. 6.2.5</td>
</tr>
<tr>
<td>Check quick connectors</td>
<td>Weekly</td>
<td>Sec. 6.2.6</td>
</tr>
<tr>
<td>Check cylinder heater (heating band) while switched off</td>
<td>Daily</td>
<td>Sec. 6.2.7</td>
</tr>
<tr>
<td>Inspect device</td>
<td>Weekly</td>
<td>Sec. 6.2.8</td>
</tr>
<tr>
<td><strong>Ad-hoc maintenance (as required)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cylinder replacement</td>
<td>As required</td>
<td>Sec. 6.3.1</td>
</tr>
<tr>
<td>Pressure zeroing</td>
<td>As required</td>
<td>Sec. 6.3.2</td>
</tr>
<tr>
<td>Oil/UV additive scales zeroing</td>
<td>As required</td>
<td>Sec. 6.3.3</td>
</tr>
<tr>
<td>Oil regeneration</td>
<td>As required</td>
<td>Sec. 6.3.4</td>
</tr>
<tr>
<td>Save logs</td>
<td>As required</td>
<td>Sec. 6.3.5</td>
</tr>
<tr>
<td>Printer</td>
<td>Add new printer paper</td>
<td>As required</td>
</tr>
<tr>
<td></td>
<td>Replace fuse</td>
<td>As required</td>
</tr>
<tr>
<td><strong>Other maintenance information</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>System info</td>
<td>---</td>
<td>Sec. 6.6.1</td>
</tr>
<tr>
<td>Operating hours</td>
<td>---</td>
<td>Sec. 6.6.2</td>
</tr>
<tr>
<td>Replace seals</td>
<td>---</td>
<td>Sec. 6.6.3</td>
</tr>
</tbody>
</table>
WARNING

Danger to life from electric current
Make sure that the VAS 581 009 is disconnected from the power supply before opening it!

WARNING

Do not make any modifications to the VAS 581 009 that are not explicitly specified in this chapter.

WARNING

Only use original AVL DiTEST spare parts!
6.2 Regular maintenance

6.2.1 Change vacuum pump oil

Change the vacuum pump oil after 500 operating hours (at least once a year). The VAS 581 009 will inform you when the vacuum pump oil needs changing.

1. Select Maintenance │ Vacuum pump oil.

2. This display will show:
   - Time since last oil regeneration
   - Remaining time until next oil regeneration
   - Time since last oil change
   - Remaining time until next oil change
   - Start regeneration of vacuum pump oil
   - Reset vacuum pump oil meter (when changing vacuum pump oil)

3. Switch the VAS 581 009 off and pull the power plug.

4. Unscrew the socket screw to drain the oil (a).
   The oil drains into the extractable oil container (b).

5. Screw the socket screw back in again (a).

6. Empty the oil container (b).

Fig. 6-1
7. Remove the housing. 
   To do so, unscrew the two screws (c), pull the housing (d) slightly outwards and then press it forwards.

8. Unscrew the cap (e) and fill in the oil; fill quantity 250 ml Only use the vacuum pump oil specified in the 2.11.2 "Available accessories" section. 
   Screw the cap (e) back on again.

9. Check the oil level (f) through the gauge glass.
10. Re-attach the housing (d), see Item 7. Make sure that the three white studs snap into the black plastic parts before screwing the housing back on.

Fig. 6-5

11. Switch the device off again. Navigate to Maintenance | Vacuum pump oil | Reset vacuum pump oil meter. This will reset the values shown under Item 2.
6.2.2 Check oil level (vacuum pump oil)

Check the oil level through the gauge glass weekly. Top up or change the vacuum pump oil if necessary, see Sec. 6.2.1.

Fig. 6-6

6.2.3 Refrigerating agent cylinder CO₂ (R744)

Check the refrigerating cylinder weekly for corrosion, leaks and damage. Under normal operating conditions, the device has a service life of at least 20 years (provided there is no wear or other damage).

Fig. 6-7
6.2.4 Cylinder adapter
Check the cylinder adapter weekly for corrosion, leaks and damage.

Fig. 6-8  (exemplary photo)

6.2.5 LP and HP filling hoses
Check the LP (blue) and HP (red) filling hoses weekly for leaks, defects or damage.

Fig. 6-9
6.2.6 LP and HP quick connectors

Check the LP (blue) and HP (red) quick connectors weekly for leaks, defects or damage.

Fig. 6-10

6.2.7 Cylinder heater (heating band)

**WARNING**

Only check cylinder heater (heating band) when it is switched off!
The device must not be used if the heating band or cable is damaged. Contact the respective AVL DiTEST branch / AVL DiTEST partner in your country!

Check the cylinder heating / cables daily for defects or damage.
Make sure that the cylinder heating is connected correctly.

Fig. 6-11

6.2.8 Inspect device

Performs an internal self-test by switching on all valves and checking the system for leaks. This self-test must be performed every seven days.
6.3 **Ad-hoc maintenance, as required**

6.3.1 **Refrigerating agent cylinder CO2 (R744)**

Proceed as follows:

1. Switch on the VAS 581 009.
2. The following message appears after a successful self-test.

![Fig. 6-12](image)

3. Continue with ![Fig. 6-12](image).

4. You are in the main menu. Tap **Maintenance**.

![Fig. 6-13](image)
5. Select *Replace refrigerating agent cylinder* in the maintenance menu.

![Fig. 6-14](image)

6. Now select *Cylinder content*.

![Fig. 6-15](image)
7. Enter the weight of the cylinder content. (= nominal quantity of the content / nominal capacity of the cylinder, not the actual cylinder capacity!). Incorrect entries inevitably result in incorrect calculations of the available/usable cylinder capacity.

Fig. 6-16

8. Select **tare weight**.
9. Refrigerating agent cylinder with protective cap:
   a) In order to read the tare weight, the protective cap must be removed from the
      refrigerating agent cylinder

      ![Fig. 6-18]

   b) Note down the tare weight.
      The tare weight represents the net weight of the used cylinder (empty).
      This weight is usually shown on the cylinder, sometimes embossed.

      ![Fig. 6-19]
a) Mark the location of the outlet valve on the refrigerating agent cylinder.

Fig. 6-20

b) Re-attach the protective cap.

Fig. 6-21
10. Enter the tare weight.

![Fig. 6-22](image)

11. Press to continue replacing the cylinder.

![Fig. 6-23](image)
12. Follow the instruction and release the screw fitting at the connectors.

Fig. 6-24

13. Continue with . The hose is automatically emptied.

14. Disconnect the quick connectors from the vehicle.

Fig. 6-25

15. Continue with .

![Information](image1)

**Fig. 6-26**

17. Follow the instruction.

![Information](image2)

**Fig. 6-27**

a) Disconnect the hose from the cylinder adapter. Spanner width: 14 mm.

![Fig. 6-28]
b) Unscrew the cylinder adapter

![Fig. 6-29]

Unscrew the protective cap

![Fig. 6-30]

d) Release the securing chain and remove the refrigerating agent cylinder from the refrigerating agent scales.

![Fig. 6-31]
e) Place the securing chain on the VAS 581 009 as illustrated.

Fig. 6-32

f) Remove the cylinder heater (heating band).

Fig. 6-33

18. Continue with 

19. The scales are reset to zero. Follow the instructions. Make sure the scales are unladen.

![Information Panel]

Fig. 6-34
20. Continue with .

21. Follow the instruction.

Fig. 6-35

a) Attach the cylinder heater (heating band) around the lower third of the cylinder. **Important:** The closure of the cylinder heater must be located on the opposite side of the outlet valve.

Fig. 6-36

b) Make sure that the cylinder heater (heating band) is connected.

Fig. 6-37
c) Place the new refrigerating agent cylinder onto the refrigerating agent scales. Note that the bottle heating cable is not placed on the balance during the assembly of the bottle. Attach the securing chain.

Fig. 6-38

22. Continue with ✓.

23. Refrigerating agent cylinder with protective cap:
Remove the protective cap.
Make sure that the connection of the refrigerating agent cylinder is facing the device and not away.

INFORMATION
Remove protective cap and connect refrigerating agent cylinder.

Container exchange in progress ...

Fig. 6-39
24. Zeroing and hose emptying are performed automatically.

Fig. 6-40

25. Remove the hose from the plastic cap if necessary.

Fig. 6-41

26. Remove the plastic cap on the outlet valve if necessary.

Fig. 6-42
27. Attach the supplied cylinder adapter.  
   Torque: 30 ... 32 Nm, max. 35 Nm.

Fig. 6-43

28. Connect the hose to the cylinder adapter. Spanner width: 14 mm.  
   Torque: 16 ... 18 Nm, max. 20 Nm.

Fig. 6-44

29. Continue with .
1. Make sure that the hose/hose connection is facing the device. It must not lead away from the rear of the device. This could lead to a faulty measurement of the cylinder weight.

![Fig. 6-45](image)

2. Follow the instructions and open the manual valve of the refrigerating agent cylinder.

![Fig. 6-46](image)
3. End the replacement of the refrigerating agent cylinder with ✔ .

   The system is flushed with CO2, i.e. the filling hoses are first flooded with CO2, then the CO2 is discharged. The VAS 581 009 must not be connected to the vehicle at this time!

4. Exit the menu with ▶ .

5. Select ◀ to return to the main menu.
6.3.2 Pressure zeroing

1. Select **Maintenance** in the main menu.

   ![Maintenance](image1)

   Fig. 6-48 Maintenance

2. Select **Reset to zero**.

   ![Pressure zeroing](image2)

   Fig. 6-49 Pressure zeroing

3. Start pressure zeroing with ➤.

   ![Start](image3)

   Fig. 6-50 Pressure zeroing – Start

   **Pressure zeroing** takes about 60 seconds. The counter is displayed. Wait until the process is complete.

4. "**Pressure zeroing**" is complete.

5. Exit "**Pressure zeroing**" with ➤. 
6.3.3 Oil/UV additive scales zeroing

1. Select **Maintenance** in the main menu.

![Maintenance](image1)

Fig. 6-51 Maintenance

2. Select **Reset Oil/UV additive scales to zero**.

![Oil/UV additive scales zeroing](image2)

Fig. 6-52 Oil/UV additive scales zeroing
3. Start Oil/UV additive scales zeroing.

Fig. 6-53  Scales zeroing

Follow the instructions on the display. (e.g. mount empty oil/UV additive containers, etc.). Note:
The mounted oil containers must be completely empty for zeroing. If this is not the case, an error message may occur during zeroing.

4. "Oil/UV additive scales zeroing" is complete.
5. Exit "Oil/UV additive scales zeroing" with  .

6.3.4 Oil regeneration

Select Maintenance | Oil regeneration | Carry out oil regeneration in main menu.
Oil regeneration is carried out automatically.

6.3.5 Save logs

Data is logged and can be copied to a USB stick in case of an error and sent to AVL DiTEST Service for error analysis.

Logging is started/suspended with  .

Note:
Once data logging is enabled it remains active even when the device is switched off.
6.4 Add new printer paper

Press the black tab outwards and fold the cover up.

Fig. 6-54

Take the empty paper roll out and place a new one inside. Pay attention to the direction of rotation.

Fig. 6-55

Pull the paper out until it is visible from outside. Close the cover.

Fig. 6-56

Press the black tab inwards. The printer is now ready for use.

Fig. 6-57
6.5  Replacing fuses

**NOTICE**

Only use original AVL DITEST fuses with the ID number EV0051 or fuses with the same specification:
Glass tube fuse 5x20 mm, 6.3 A, 250 V, inert.

Pull the fuse unit out and replace with a new fuse.

Fig. 6-58
6.6 Other maintenance information

In case of problems, various maintenance steps can be carried out via the maintenance menu.

Select the desired function.
Follow the instructions on the screen.

6.6.1 System information

The "System info" menu shows the
- software version
- device type
- serial number
- HW revision status

6.6.2 Operating hours

Shows the total operating hours of the device, the total vacuum pump running time and number of switching cycles of the individual solenoid valves of the valve block.
6.6.3 Replacing quick connector seals

Tools required

- 2 slot screwdrivers (2 mm wide)
- Tweezers

Important: The screwdrivers and tweezers must have been carefully deburred and rounded.

Overview

The seal consists of two parts:

- 1 x O-ring
- 1 x supporting ring

Fig. 6-59
Removing the rings

Remove O-ring and supporting ring with screwdrivers. Apply caution to avoid damaging the service connection.

Fig. 6-60

Installing the O-ring and supporting ring

1. Bend the supporting ring slightly in the middle. Do not bend it together completely as otherwise it will be damaged.

Fig. 6-61
2. Insert the supporting ring into the connector with your fingers.

![Fig. 6-62](image1)

3. Push the supporting ring further into the connector and then position it in the O-ring groove. The supporting ring must fit perfectly in the groove without exhibiting any unevenness or damage.

![Fig. 6-63](image2)

4. Press the O-ring together and push it into the connector.

![Fig. 6-64](image3)
5. Position the O-ring as shown in the following figures. The correct position is behind the supporting ring. The correct position is essential to the proper functioning of the connector and must be adhered to.

Fig. 6-65
6. Press one side of the O-ring under the supporting ring and into the O-ring groove.

7. Push the O-ring further into the groove until the O-ring is seated evenly in the groove as shown in the figures.

If you experience problems or have any questions, please contact your AVL DiTEST service partner.
7 Service

The "Service" operating mode is password-protected and may only be used by AVL DiTEST Service staff!
8 Overview

This overview shows all current system values.

Fig. 8-1

Explanation of the symbols

Pressure at high-pressure side
Pressure at low-pressure side
Pressure at refrigerating agent connection
CO$_2$ concentration in %
Measured cylinder content
Calculated, usable cylinder content
Measured, available quantity of clean oil
Measured, available UV additive quantity
Measured oil quantity in used-oil container
9 Placing out of / into service / storage

9.1 Taking out of service

Observe the national regulations when emptying the CO₂ (R744) refrigerating agent. Contact your service partner if in doubt.

9.1 Transport

*Information*

When transporting the air conditioning system, all safety instructions specified in applicable national accident prevention regulations must be complied with!

*WARNING*

Transport only without CO₂ cylinder, empty or removed oil container, depressurised VAS 581 009 and in upright position!

9.2 Storage

To store the VAS 581 009, disconnect it from the power supply and place it in a safe location where it is not exposed to high temperatures, humidity and where there is no risk of impacts with other objects that may damage it. Please also take into account the technical data. The device should also be covered with the supplied cover. If stored for a prolonged period of time, we recommend that you remove the refrigerating agent cylinder and store it separately.

*WARNING*

Remove CO₂ cylinder and heating band if stored in an environment where the temperature exceeds 50 °C!

9.3 Placing back into service

Check the VAS 581 009 in accordance with national laws and regulations before placing it back into service.
10  **Error table / in case of error**

Try to determine the cause of the error and pinpoint its location as accurately as possible. Follow the recommended steps on the screen and carry out all suggested measures. If this does not resolve the error, please contact the responsible AVL DiTEST branch / AVL DiTEST partner in your country.

### Warnings:

<table>
<thead>
<tr>
<th>Warnings</th>
<th>Possible cause/s, solution/s</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Warning</strong></td>
<td>A warning indicates a problem during operation. However, the operation continues. LED indicator: flashes yellow</td>
</tr>
<tr>
<td>Insufficient refrigerating agent pressure.</td>
<td>Refrigerating agent cylinder not connected or empty Self-test continues.</td>
</tr>
<tr>
<td>Not enough paper in the printer; replace paper roll.</td>
<td>There is not enough paper in the printer for printing. Please replace the paper roll.</td>
</tr>
<tr>
<td>Device moving; please stabilise device.</td>
<td>The cylinder weight is monitored prior to filling. If a discrepancy is detected (e.g. if the cylinder moves), the filling process does not start. Stabilise the device so that the filling process can start.</td>
</tr>
<tr>
<td>Insufficient refrigerating agent; refrigerating agent cylinder must be replaced. Proceed anyway?</td>
<td>Before a process that depends on the refrigerating agent starts, a check is performed to ensure that a sufficient quantity is available. If no sufficient quantity is available, this message appears. The refrigerating agent cylinder needs to be replaced. Do you want to try to perform the step anyway?</td>
</tr>
<tr>
<td>Refrigerating agent cylinder not connected or nearly empty.</td>
<td>Refrigerating agent cylinder not connected or empty Connect a refrigerating agent cylinder containing a sufficient quantity of refrigerating agent.</td>
</tr>
<tr>
<td>Oil filling incomplete Proceed anyway?</td>
<td>The desired oil quantity could not be injected within the specified time. Do you want to continue with the injection process anyway?</td>
</tr>
<tr>
<td>UV additive injection incomplete Proceed anyway?</td>
<td>The desired quantity of UV additive could not be injected within the specified time. Do you want to continue with the injection process anyway?</td>
</tr>
</tbody>
</table>
## Error messages:

<table>
<thead>
<tr>
<th>Error message</th>
<th>Possible cause/s, solution/s</th>
</tr>
</thead>
<tbody>
<tr>
<td>Error</td>
<td>An error indicates that the current operation needs to be aborted due to a problem. LED indicator: flashing red</td>
</tr>
<tr>
<td>Wrong pressure at CO2 outlet. Maintenance/repair required.</td>
<td>The measured pressure at the CO2 outlet is incorrect. Maintenance/repair by service technician required.</td>
</tr>
<tr>
<td>Leak detected.</td>
<td>Target pressure of evacuation could not be reached within the specified time. Check device for leak.</td>
</tr>
<tr>
<td>Draining failed.</td>
<td>Draining the refrigerating agent has failed. Remaining pressure could not be released within the specified time. Repeat the process.</td>
</tr>
<tr>
<td>Air conditioning circuit still under pressure; termination.</td>
<td>The vehicle cannot be filled with refrigerating agent, because it is already or still filled. If you wish to continue with filling, first drain the refrigerating agent.</td>
</tr>
<tr>
<td>Too high pressure while generating vacuum; termination.</td>
<td>Overpressure with potential of damaging vacuum pump was detected while generating vacuum. The process was therefore aborted. Drain any refrigerating agent from the system and repeat the step.</td>
</tr>
<tr>
<td>Filling incomplete. Replace refrigerating agent cylinder.</td>
<td>Filling could not be completed due to insufficient quantity of refrigerating agent. The refrigerating agent cylinder must be replaced.</td>
</tr>
<tr>
<td>Pressure test failed. Replace refrigerating agent cylinder.</td>
<td>The pressure test cannot be performed due to insufficient quantity of refrigerating agent. The refrigerating agent cylinder must be replaced.</td>
</tr>
<tr>
<td>Pressure test failed. Leak in air conditioning system.</td>
<td>Excessive pressure drop in system during pressure test. The most common cause is a leak in the air conditioning system of the vehicle.</td>
</tr>
<tr>
<td>Draining of hose failed.</td>
<td>Draining of hose taking too long; operation was aborted. Vehicle may still be connected or valve to vehicle leaking.</td>
</tr>
<tr>
<td>Device moving; termination.</td>
<td>The cylinder weight is monitored during filling. If a discrepancy is detected (e.g. if the cylinder moves), the filling process is aborted. Repeat the filling process and don't move the device during this process.</td>
</tr>
<tr>
<td>Manual valve on refrigerating agent cylinder still open; termination.</td>
<td>Following the request to close the manual valve on the cylinder, the system pressure cannot be released. This typically occurs when the manual valve has not be closed correctly. Check.</td>
</tr>
</tbody>
</table>
### Troubleshooting / In case of error

<table>
<thead>
<tr>
<th>Error message</th>
<th>Possible cause/s, solution/s</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Device check failed.</strong></td>
<td><strong>Error detected during device check.</strong></td>
</tr>
<tr>
<td>Maintenance/repair required.</td>
<td>Maintenance/repair by service technician required.</td>
</tr>
<tr>
<td><strong>Device check failed. Please start device check again from maintenance menu.</strong></td>
<td>If an error is detected during the automatic device check, the user must start the device check manually from the maintenance menu. If the error occurs again, more detailed information on the type of error is provided there.</td>
</tr>
<tr>
<td><strong>Device check incomplete. Replace refrigerating agent cylinder.</strong></td>
<td>Device check could not be completed due to insufficient quantity of refrigerating agent. The refrigerating agent cylinder must be replaced.</td>
</tr>
<tr>
<td><strong>Invalid calibration data; calibration failed.</strong></td>
<td>If incorrect calibration data is detected during calibration, calibration is aborted and this error message shown.</td>
</tr>
<tr>
<td><strong>Insufficient refrigerating agent for calibration; refrigerating agent cylinder must be replaced.</strong></td>
<td>The calibration cannot be performed because the quantity of refrigerating agent required for calibration is not available. The refrigerating agent cylinders must be replaced.</td>
</tr>
</tbody>
</table>

### Error message

<table>
<thead>
<tr>
<th><strong>System error</strong></th>
<th>A system error indicates that the device is temporarily or permanently out of service. LED indicator: flashing red quickly</th>
</tr>
</thead>
<tbody>
<tr>
<td>Check pressure sensors.</td>
<td>Invalid signal detected on one of the pressure sensors. All pressure sensors must be checked!</td>
</tr>
<tr>
<td>Check temperature sensors!</td>
<td>Invalid signal detected on one of the temperature sensors. All temperature sensors must be checked!</td>
</tr>
<tr>
<td>Check scales!</td>
<td>One of the scales providing invalid signal. All scales must be checked!</td>
</tr>
<tr>
<td><strong>CO2 concentration limit exceeded! Ventilate room well!</strong></td>
<td>CO2 concentration is above the recommended limit. Make sure that the room is well ventilated and leave the room until the CO2 concentration has dropped to a safe level and the indicator stops flashing red!</td>
</tr>
<tr>
<td><strong>CO2 sensor not connected.</strong></td>
<td>SO2 sensor is not connected. The device can be used for safety reasons. The CO2 sensor must be checked.</td>
</tr>
<tr>
<td><strong>Refrigerating agent cylinder pressure too high.</strong></td>
<td>The pressure of the refrigerating agent cylinder is outside the safety limits. The device cannot be used until the pressure has dropped to a safe level again.</td>
</tr>
<tr>
<td><strong>System pressure too high!</strong></td>
<td>The pressure at the connectors is exceeding the safety limits. The device cannot be used until the pressure at the connectors has dropped to a safe level again!</td>
</tr>
</tbody>
</table>
### Error/error messages, electrical:

<table>
<thead>
<tr>
<th>Error/error message</th>
<th>Possible cause/s</th>
<th>Solution/s</th>
</tr>
</thead>
<tbody>
<tr>
<td>Device does not switch on</td>
<td>No power</td>
<td>Check power supply. Check fuses.</td>
</tr>
</tbody>
</table>

### Error/error messages, mechanical:

<table>
<thead>
<tr>
<th>Error/error message</th>
<th>Possible cause/s</th>
<th>Solution/s</th>
</tr>
</thead>
<tbody>
<tr>
<td>Self-test does not start</td>
<td>No refrigerating agent</td>
<td>Connect or open refrigerating agent cylinder</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Disconnect from vehicle</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Close gas cylinder and discharge manually</td>
</tr>
<tr>
<td>Not enough oil</td>
<td>Oil container empty</td>
<td>Fill oil container</td>
</tr>
<tr>
<td>Check connection</td>
<td>Vehicle not connected or empty</td>
<td>Connect quick connectors to vehicle</td>
</tr>
<tr>
<td>Oil level: oil level too low</td>
<td>Oil container empty</td>
<td>Fill oil container</td>
</tr>
<tr>
<td>Circuit under pressure</td>
<td></td>
<td>Drain</td>
</tr>
</tbody>
</table>
11 Maintenance and care

11.1 Visual inspection

Periodically perform a visual inspection.
Check all parts for damage (e.g. fractures) and dirt.
Check the service adapters regularly for damage.

⚠️ CAUTION
Always replace damaged parts (power cable, quick connectors, connecting hoses, cylinder adapters)!

11.2 Cleaning

Wipe the VAS 581 009 with a lint-free cloth.
You can moisten the cloth with water or non-alkaline detergent. Make sure that the cloth is damp but not wet.

⚠️ CAUTION
Pull the plug before cleaning! The device must not be pressurised!
Make sure that no liquid penetrates into the housing.
12 Technical data:

<table>
<thead>
<tr>
<th><strong>General data</strong></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Refrigerating agent</td>
<td>R744</td>
</tr>
<tr>
<td>Nominal voltage</td>
<td>230 VAC</td>
</tr>
<tr>
<td>Frequency</td>
<td>50 Hz</td>
</tr>
<tr>
<td>Power consumption</td>
<td>1.2 kW</td>
</tr>
<tr>
<td>Weight</td>
<td>approx, 75 kg</td>
</tr>
<tr>
<td>Dimensions</td>
<td>67x100x81 cm</td>
</tr>
<tr>
<td>Display</td>
<td>7-inch graphic TFT colour display</td>
</tr>
<tr>
<td>Controls</td>
<td>Multi-functional dial</td>
</tr>
<tr>
<td>Pressure indicator</td>
<td>Digital (HP and LP)</td>
</tr>
<tr>
<td>PC interface</td>
<td>USB interface</td>
</tr>
<tr>
<td>Max. pressure</td>
<td>HP 140 bar; LP 130 bar</td>
</tr>
<tr>
<td>Hose length</td>
<td>2.5 m</td>
</tr>
<tr>
<td>Printer</td>
<td>Thermal printer, 24 bars</td>
</tr>
<tr>
<td>Interface</td>
<td>USB standard</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Refrigerating agent</strong></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Refrigerating agent</td>
<td>R744</td>
</tr>
<tr>
<td>Cylinder weight</td>
<td>5, 6, 10 or 20 kg</td>
</tr>
<tr>
<td>Cylinder type</td>
<td>Cylinder with integrated riser</td>
</tr>
<tr>
<td>Load cell</td>
<td>max. 50 kg</td>
</tr>
<tr>
<td>Scales accuracy</td>
<td>± 10 g</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Oil/UV additive</strong></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Oil container</td>
<td>3 (1 clean oil container; 1 used oil container, 1 additive container)</td>
</tr>
<tr>
<td>Oil container volume</td>
<td>250 ml</td>
</tr>
<tr>
<td>Load cell</td>
<td>3 kg</td>
</tr>
<tr>
<td>Oil/UV additive accuracy</td>
<td>± 2 g / ± 2 g</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Vacuum pump</strong></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Suction capacity</td>
<td>3 m³/h</td>
</tr>
<tr>
<td>End pressure</td>
<td>0.002 mbar</td>
</tr>
<tr>
<td>Service interval</td>
<td>500 h / 1 year</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Climatic conditions</strong></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Operating temperature</td>
<td>+10 ... +50 °C</td>
</tr>
<tr>
<td>Storage and transport temperature</td>
<td>-25 ... +80 °C</td>
</tr>
<tr>
<td>Humidity</td>
<td>10 ... 90 % non-condensing</td>
</tr>
</tbody>
</table>

**Disposal:**
For disposal, it is essential to comply with local legal obligations!
13 Error reporting fax

Fax no.: __________________

Please fill in all applicable sections (ideally in English or German) and fax to responsible service centre.

1. Registration details

Serial number __________________

Is your device still covered by the warranty (12 months)? Yes ☐

If yes, please include proof of warranty (registration and copy of delivery note).

2. Dealer information

<table>
<thead>
<tr>
<th>Authorised VW workshop ☐</th>
<th>Independent workshop ☐</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sales centre / importer No.</td>
<td>Dealership no.</td>
</tr>
<tr>
<td>Company name</td>
<td>Tax ID No.¹</td>
</tr>
<tr>
<td>Contact</td>
<td>Telephone Fax</td>
</tr>
<tr>
<td>Postal address:</td>
<td>Delivery address (if different from postal address):</td>
</tr>
<tr>
<td>Street</td>
<td>Street</td>
</tr>
<tr>
<td>No.</td>
<td>No.</td>
</tr>
<tr>
<td>Postcode Place</td>
<td>Postcode Place</td>
</tr>
<tr>
<td>Country</td>
<td>Country</td>
</tr>
<tr>
<td>Tel. No.</td>
<td>Tel.-No.</td>
</tr>
<tr>
<td>Fax No.</td>
<td>Fax No.</td>
</tr>
</tbody>
</table>

¹ for EU countries only
Error reporting fax continuation

3. Problem description

Basic problems

Error message/pattern: _______________________________________________________

Is the error reproducible? Yes [x]

Does the error occur sporadically? Yes [x]

What software version is installed?
Software: _______________________________________________________

We hereby acknowledge that we are aware and accept the service conditions for replacing components.

Place__________ Date__________ Signature________________________ Stamp
14 Index

A
Acceptance report 16
Add new printer paper 72
Ad-hoc maintenance, as required 53
Automatic mode 30
Available accessories 29

B
Balance sheet 43

C
Change vacuum pump oil 47
Check oil level (vacuum pump oil) 50
Cleaning 87
Controls 23
Customer data 35
Cylinder adapter 51

D
Date and time 42
Design 17
Drain hose 35
Draining 36

E
EC Declaration of Conformity / CE marking 15
Error reporting fax 89
Error table / in case of error 83

F
Filling 38
Firmware update 43
Front view 17

G
General information 14
Generating vacuum 37

I
Intended use 16

L
Language 43
LP and HP quick connectors 52

M
Maintenance 45
Maintenance and care 87
Maintenance schedule 45
Manual mode 33

O
Oil regeneration 71
Oil/UV additive scales zeroing 70
Operating hours 74
Other applicable documents 16
Other maintenance information 74
Overview of operating modes 27

P
Placing back into service 82
Placing out of / into service / storage 82
Pressure test 39
Pressure zeroing 69
Printout text size 44

Q
Quick connectors 20

R
Rear view 19
Refrigerating agent cylinder CO2 (R744) 21, 50, 53
Regular maintenance 47
Replacing fuses 73
Index

S
Safety instructions 15
SAFETY INSTRUCTIONS 4
Save logs 71
Scope of application 16
Scope of delivery 28
Service 80
Settings 42
Side view, right 18
Software licence 16
Storage 82
System delivery 28
System information 74

T
Taking out of service 82
Technical data: 88
Text and number inputs 26
Transport 82

U
Units 42
User interface operation 24
User prompts 25

V
Visual inspection 87

W
Workshop data 43
We have checked the contents of the documentation for compliance with the described condition. However, deviations cannot be ruled out completely and we offer no guarantee full compliance. The information provided in this documentation is checked regularly and necessary corrections are incorporated in subsequent editions. We are always thankful for suggestions for improvement.

We reserve the right to make changes to the form, equipment and technology of the delivery. No rights can be derived from the specifications, figures and descriptions in these operating instructions. Without the written permission of the Volkswagen Group / the manufacture, reprinting, reproduction and translation, in part or in whole, is only permitted to the extent that every device is provided with its own documentation. Transfer to third parties is not permitted. The Volkswagen Group / the manufacturer expressly reserves all rights under the German Copyright Act.

Subject change.

Manufacturer:

VOLKSWAGEN AG
KD-WERKSTATTAUSRÜSTUNG
D-38436 Wolfsburg

Copyright Volkswagen AG 2018,
AVL DiTEST 2018

AVL DiTEST GmbH
Alte Poststraße 156
A-8020 Graz

All rights reserved.