USER MANUAL
FORD OTOSAN VCI 4.0

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FUTURE SOLUTIONS FOR TODAY

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1 General

This document describes the VCI 4.0 (VCI: **V**ehicle **C**ommunication **I**nterface) and how to use it. This document is an essential part of the device. Keep it for the entire useful life of the device and pass it on to any subsequent owner or user.

1.1 Intended use

Using the VCI 4.0 and the diagnostic software, control unit diagnostics can be performed on vehicles. Communication with the PC is wireless using Bluetooth or WLAN. Alternatively, a USB cable can be used as well.

1.2 Target Group

The VCI 4.0 is intended for vehicle repair/service workshops or similar institutions.

It is intended for professionally trained staff.

2 Safety

This documentation contains important warnings and safety instructions to be observed by the user. Failure to observe these hazard warnings may lead to death or serious injuries.

2.1 Safety Notices and Symbols

The following safety notices and symbols are being used in this documentation:

DANGER

DANGER indicates a hazardous situation which – if not avoided –results in death or serious injury.

WARNING

WARNING indicates a hazardous situation which – if not avoided – MAY result in death or serious injury.

CAUTION

CAUTION indicates a hazardous situation which – if not avoided – MAY result in minor or moderately serious injuries.

NOTICE

This text makes you aware of situations or improper operation that may cause material damage or loss of data.

Information

This text refers to important information or instructions. Failure to follow these instructions will significantly prevent or hinder the successful execution of the actions described in this documentation.

Additional Safety Symbols

 Danger due to high voltage

 Danger due to explosion

 Danger due to hot surfaces

2.2 General Safety Instructions

Observe the following safety instructions:

- Read all instructions.
- Do not operate the device with a damaged cable or if the device has been dropped or damaged – have it checked by a qualified service technician before using it again.
- Do not hang the supply line and measuring lines over sharp edges.
- Do not touch hot parts or moving fan blades.
- Always disconnect the device from the socket when it is not used. Never grab the cable to pull the plug out of the socket. Grab the plug and pull to disconnect.
- Allow the device to cool down fully before putting it away. Place the cable loosely around the device for storage.
- To reduce the risk of fire, do not operate the device close to open containers with flammable liquids (petrol).
- Provide enough ventilation when working on combustion engines.
- Keep hair, loose clothing, fingers and all body parts away from moving parts.
- To reduce the risk of electric shock, do not use the device on a wet surface or expose it to rain.
- Always wear safety goggles. Everyday glasses only have impact-proof glass, they are not protective goggles.
- Only operate the device as described in this manual. Only use accessories recommended by the manufacturer.
- Testing and assembly work may only be performed by trained staff.
- Never test the igniter with a multimeter.
- Only perform system tests with approved testing equipment.

- When reconnecting the battery, the ignition must be turned off and there must be no person inside the vehicle.
- Should your vehicle have an airbag unit, adhere to the safety instructions related to it in the vehicle's manual.

2.3 Safety Concept

DANGER

Danger to life due to electric potential 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 due to electric potential on the ignition system

The ignition system carries deadly high voltage.
Do not touch the ignition system while the motor is running.

WARNING

Danger to life due to electric potential on vehicles with Xenon light

A lighting system that uses xenon light carries deadly high voltage.
Do not touch the components of the xenon light while the light is turned on.

WARNING

Risk of injury due to 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

Risk of injury due to hot parts

Measurements must be performed at normal motor operating temperature or according to 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

Risk of injury due to rotating parts

Only perform work in the engine bay while the motor is not running, and the ignition is turned off.
Do not touch any rotating parts such as the alternator, radiator fan or their drives (e.g. drive belts).
Make sure measurement cables are laid safely while the motor is running.

WARNING

Risk of injury due to an unsecured vehicle

Apply the handbrake or shift the gearshift to P (on automatics).
Adequately secure the vehicle against rolling away.

WARNING

Risk of injury due to chemical burn hazards through battery ingestion

Swallowing the battery may lead to burns, perforation of soft tissue, and death. Severe burns can occur within 2 h of ingestion.
Do not swallow the battery.

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.

NOTICE

These devices are intended for indoor use only.

NOTICE

Plug the OBD connector of the VCI 4.0 as straight as possible into the OBD socket of the vehicle to avoid contact problems or mechanical wear on the VCI 0.4 and OBD socket.

2.4 Battery Safety

If batteries are treated wrongly, there is a danger of burns or bursts. Batteries must not be heated above 100 ◦C or incinerated. The battery contents must not get in contact with water. If the negative electrode gets in contact with water or humidity, hydrogen gas is formed, which may inflame spontaneously.

The device is battery powered. Adhere to the following guidelines to safely handle the battery:

- Always follow the warning information on the batteries and in the manuals of devices. Only use the recommended battery types.
- Unpacked batteries shall not lie about in bulk.
- In case of battery change, always replace all batteries with new ones of identical type and brand.
- Do not swallow batteries. Swallowing may lead to burns, perforation of soft tissue, and death. Severe burns can occur within 2 h of ingestion. In case of ingestion of a cell or battery, seek medical assistance promptly.

- Do not throw batteries into water.
- Do not throw batteries into fire.
- Avoid deep discharge.
- Do not short-circuit batteries.
- Do not recharge primary batteries.
- Do not open or disassemble batteries

In Case of Fire

If the battery catches fire, use metal fire extinction powder, rock salt or dry sand to put the fire out. Carbon Dioxide (CO2) is not suitable. Water may only be used in large quantities if nothing else is available.

WARNING

Risk of injury due to hydrofluoric acid and hydrogen

At contact of electrolyte with water, traces of hydrofluoric acid may be formed. In this case avoid contact and take care for good ventilation. At contact of charged anode material with water extremely flammable hydrogen gas is generated.

Don’t let the battery come into contact with water.

Use suitable extinguishing media to put out a burning battery. Use water only in large amounts to put out a burning battery.

In Case of Rupture

The battery is sealed hermetically. Thus, the ingredients have no hazard potential, except in case the battery is violated or dismantled. If in case of mistreatment the ingredients are released, a spontaneously flammable gas mixture may be released under certain circumstances. To handle the ruptured battery, wear personal protective equipment adapted to the situation (protection gloves, face protection, breathing protection). Prevent skin contact and collect all released material in a plastic lined container. Bind released ingredients with powder (rock salt, sand). Dispose of according to the local law and rules. Avoid leached substances to penetrate into the earth, canalization or water. If battery casing is dismantled, small amounts of electrolyte may leak. Package the battery tightly including ingredients together with lime, sand or rock salt. Then clean with water.

First-Aid

Should you come into contact with released ingredients adhere to the following first-aid measures:

After inhalation	Fresh air. Seek medical assistance.
After skin contact	Remove solid particles immediately. Flush affected areas with plenty of water (at least 15 min). Remove contaminated cloth immediately. Seek medical assistance.
After getting ingredients in the eye	Flush the eye gently with plenty of water (at least 15 min). Seek medical assistance.
After ingestion of battery components	Drink plenty of water. Avoid vomiting. Seek for medical assistance. No trials for neutralization.
After ingestion of battery:	In the event of battery ingestion, seek immediate medical attention at a hospital emergency room. Do not let the person who ingested the battery eat or drink until an X-ray can determine if a battery is present. If you still have the battery packaging or the device containing the battery take this with you to help the physician identify the battery type and chemistry.

3 Overview

The following figure illustrates the device and its controls:

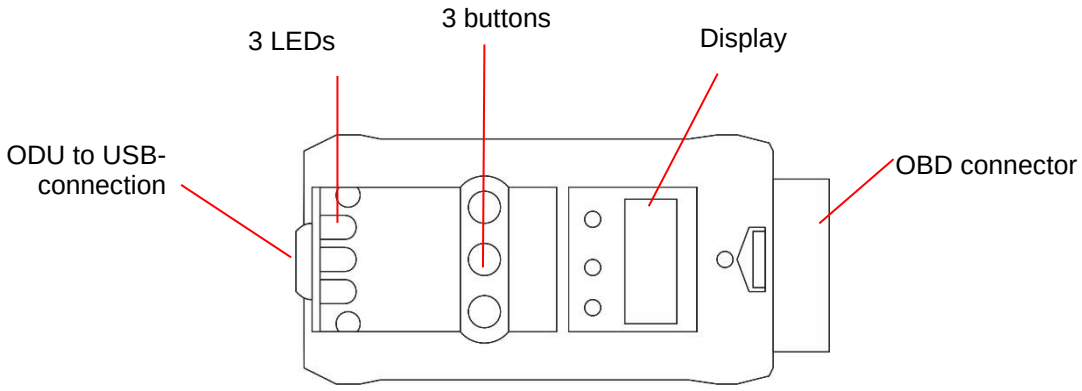


Fig. 1

3.1 Display Elements

LED	Status	Description
	Off	Power off
	Flashes slowly blue	While booting
	Lights up blue	Connection with WLAN / Bluetooth or USB is established
	Flashes quickly yellow	While communication
	Lights up red	Error detected

All 3 LEDs are lit at the same time and in the same way, there is no single activation of the LEDs.

3.2 Display

The VCI 4.0 has a display with 3 areas:

- Status bar
- Application area
- Function key assignment.

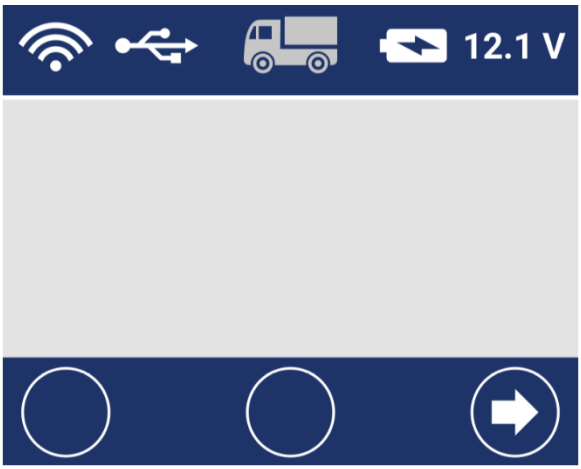


Fig. 2

Status Bar

The status bar provides information about the communication mode / status, the connection status to the vehicle and the charge status of the battery.

⇨ Communication WLAN

Communication activated ⇨ symbol gray

Communication active ⇨ symbol white

⇨ Communication Bluetooth

Communication activated ⇨ symbol gray

Communication active ⇨ symbol white

⇨ Communication USB

⇨ Communication Vehicle

No communication ⇨ symbol gray

Communication active ⇨ symbol white

⇨ State of charge, battery

Function Key Assignment

The function key assignment is context-dependent and changes dynamically with the function. It displays which function is currently assigned to the physical buttons. Additionally, the middle button has the function “torch” which ignites two LEDs in the OBD connector.


⇨ No function key


⇨ Navigate right/left


⇨ Navigate upwards


⇨ Delete


⇨ Start/stop recording


⇨ Confirm


⇨ Cancel


⇨ Delete


⇨ Scroll line by line

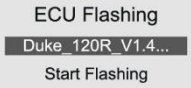
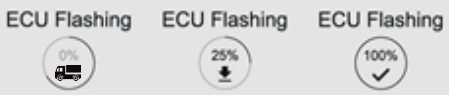
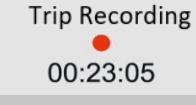

⇨ Scroll by page

Function

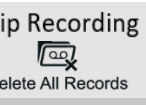
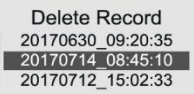
Functions are described by an icon and text placed below and partially above them.

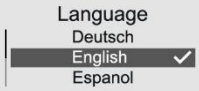
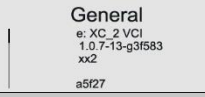
Information

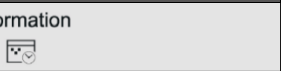
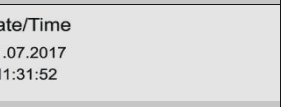
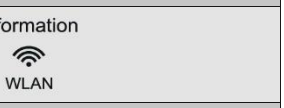
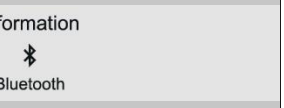
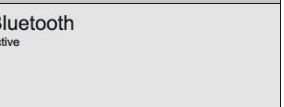
The country setting (if requested) at the first start up is only used to setup the WLAN and Bluetooth module according to the national regulations for allowed frequency bands and transmission powers.

Functions	Symbol
ECU Flashing Entry screen in the “ECU-Flashing” function.	
ECU-Flashing Display of the “Flash-File”.	
ECU-Flashing 1. Progress indicator (without activated percentage) during the production of the Connection to the ECU of the truck 2. Progress indicator (with percentage) during the “Flash operation” 3. Display of the completed “Flash” operation	
Trip Recording Entry into the “Trip Recording” function	
Trip Recording Progress indicator (without percentage) during establishing the connection to the ECU of the truck	
Trip Recording Ready to receive has been established	
Trip Recording Recording is running	
Trip Recording Display of the number of records and the time for further recordings	

Functions	Symbol

Trip Recording Function to delete all saved recordings.	
Trip Recording Function to delete exactly one stored recording.	
Trip Recording Select the recording to be deleted. The recording (clearly specified by date and time), which is highlighted in dark gray (selection field), is deleted. The scroll bar on the left indicates that there are lines outside the visible area, which are moved into the selection field using the scroll function.	
Settings	
Settings Language	

Functions	Symbol
Settings The language that is stored in the dark grey selection box is selectable. The scroll bar on the left indicates that rows are outside the visible area. Other languages can be moved into the selection box line by line using the scroll function.	
Settings Selection of the radio connection type.	
Settings Selectable is the language that is selected in the selection dark grey is deposited. The choices can be accessed line by line using the scroll function in the selection field.	
Information Selection "Display of information".	
Information Display of general information.	
Information General information such as system data, and licenses.	

Functions	Symbol
Information Selection "Display of date and time".	
Information Display of the date and time.	
Information Selection "Display of USB connection data".	
Information Selection "Display of Bluetooth Connection Data".	
Information Display of Bluetooth connection data (exemplary for all types of connection).	

4 Initial Start-Up

4.1 Adaptions

4.1.1 Diagnostic Socket of the Vehicle

Connect the VCI 4.0 to the diagnosis socket of the vehicle.

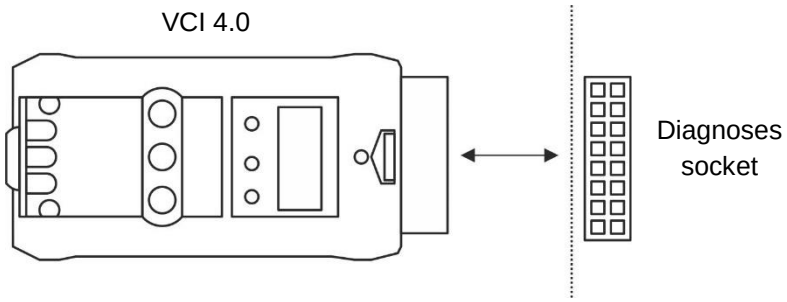


Fig. 3

There is also a 1m OBD2 to OBD2 extension cord available which passes the pinout directly:
EX7548 OBD Extension Cord 1 m.

4.1.2 PC

The preferred connection type is WLAN.
Alternatively, the device can also be connected via a USB cable or Bluetooth.

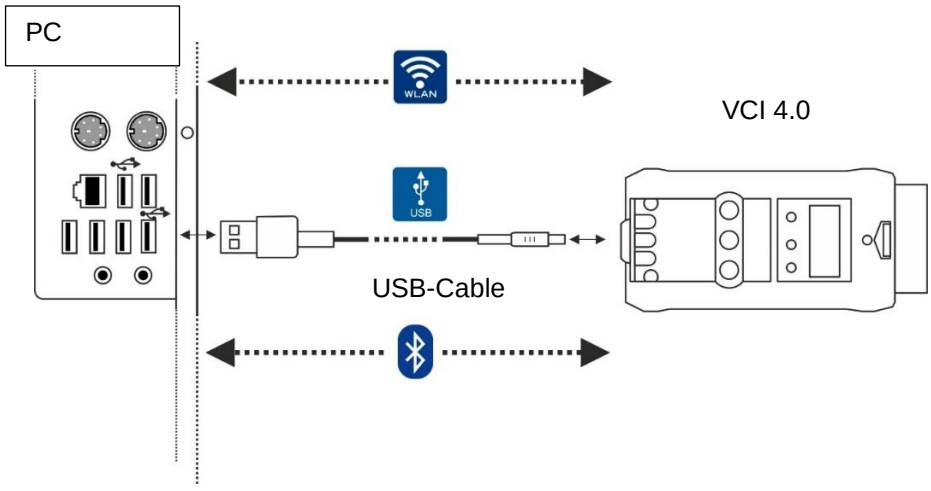


Fig. 4

WLAN

When connecting the VCI 4.0 to WLAN for the first time, a wired connection via a USB cable is necessary.
To connect the VCI via WLAN, proceed as follows:

1. Plug the USB cable into your VCI 4.0.
2. Plug the other end of the cable into your computer.
3. Open the Service Bay Client by clicking the icon on your desktop.
4. In **Service Bay Client**, go to **Settings** and look for available VCIs.

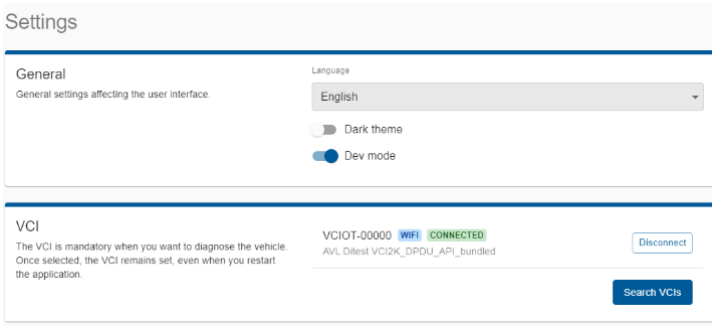


Fig. 5

5. Find you VCI and click **Settings** and connect to your WLAN-hotspot.

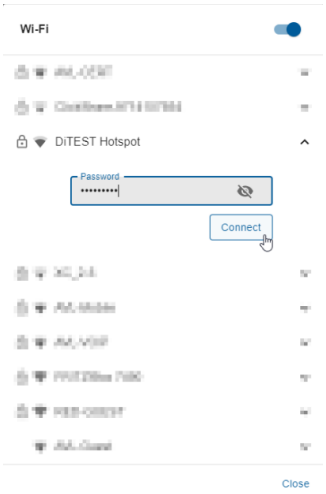


Fig. 6

6. Enter your hotspot's password.
7. Click **Connect**.

The VCI 0.4 is connected. You can unplug the USB cable. After another VCI scan, the VCI 0.4 shows via WLAN connection whenever it is connected to the vehicle.

USB

To connect the VCI 4.0 via USB-cable proceed as follows:

1. Open the cover on the VCI 4.0.
2. Connect the VCI 4.0 and the PC with the USB cable.
3. Open the Service Bay Client by clicking the icon on your desktop.
4. In **Service Bay**, go to **Settings**.
5. Select the VCI 4.0.
6. Click **Connect**.

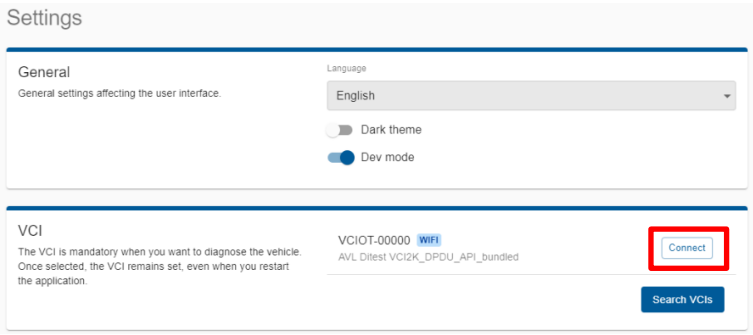


Fig. 7

The VCI 4.0 was successfully connected.

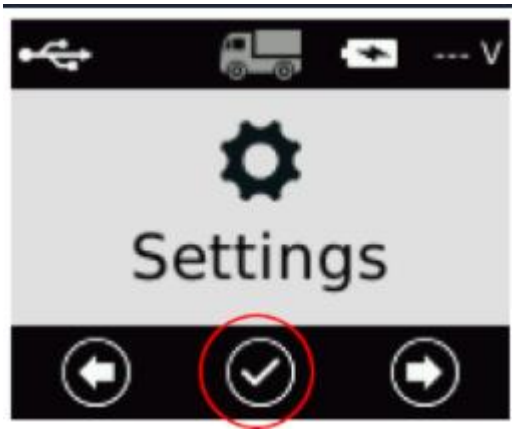
Bluetooth Connections

- If you have a 32 bit Windows system installed:
  `1<<FODIT-INSTALLATION-FOLDER>>\vci\bt_manager.exe`
- If you have a 64 bit Windows system installed:
  `1<<FODIT-INSTALLATION-FOLDER>>\vci\x64\bt_manager.exe`

On the VCI itself, prepare it to connect via BT with the following steps:

1. Press the right Button to open up the menu of the VCI

2. Then navigate to Settings and press the button:



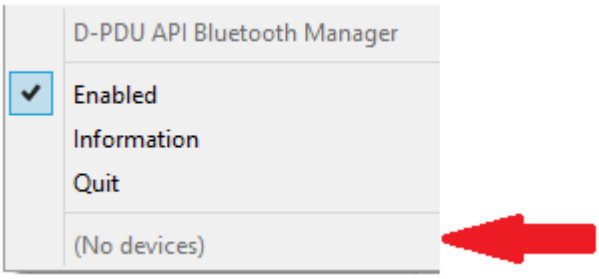
3. Navigate to Connections Settings and press button:

4. Navigate to the BT Symbol and press the button again.

Afterwards you can see the BT Indicator Icon in the top left corner at the status bar:

- Symbol gray → No communication / No connection established
- Symbol white → Communication established and active

Establishing the connection on the windows machine through the BT manager:
Do a right click on the icon at your info corner right next to the clock of windows:



If there is a device reachable you can click on it (see arrow in picture above) to establish the connection.

4.1.3 4. Connect to the device in FODiT:

1. Go to settings page
2. Search for connected VCIs
3. Click Connect for the wanted device.

4.2 Firmware Update

Before each connection, the Service Bay Client checks the current version of the firmware to ensure the latest version is installed. All firmware updates are mandatory. If there is a newer version available, the Service Bay Client will notify you.

To update your firmware, proceed as follows:

1. In the **Service Bay Client**, go to **Settings**.
2. Find your VCI 4.0. If there is an update available, the button **Update** will show next to the VCI 4.0 entry.

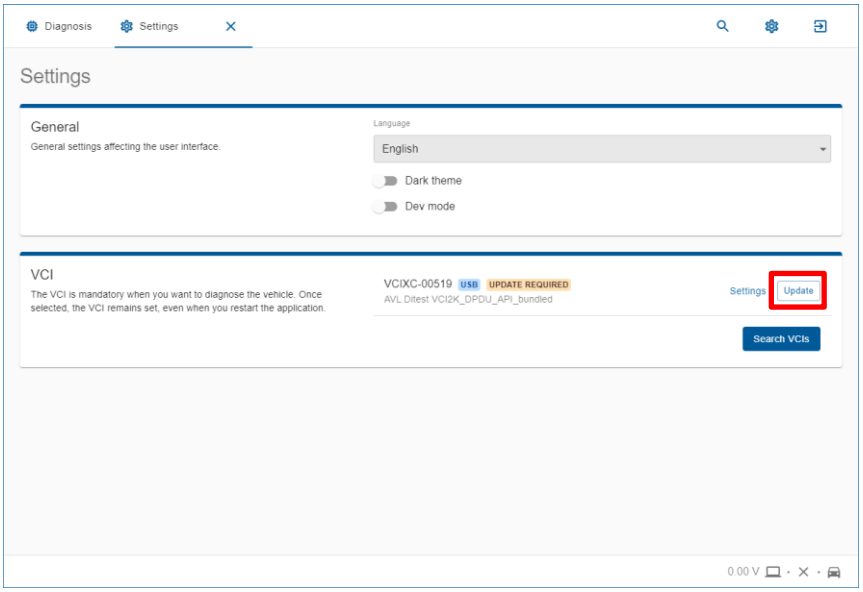


Fig. 8

3. Click **Update**.

   The update is installed. This may take several minutes. Once the VCI 4.0 is rebooted it can be connected again.

5 Operation

Observe the description of the diagnostic program.

To execute a test, proceed as follows:
Start the diagnostic client e.g. the **VEGA Diagnostic Client** to start the program.

For diagnostic operations please follow the instructions of the diagnostic software (e.g. VEGA Diagnostic).

6 Troubleshooting

6.1 In Case of Error

In case an error occurs observe the following steps:

- Observe the indicator elements and the transducer → *Overview*.
- Ensure that the VCI 4.0 was commissioned properly.
- Ensure that the diagnostic software was started properly.
- Check the connection between vehicle ⇔ VCI 4.0 ⇔ PC.

6.2 Guided Diagnostics

With Guided Diagnostics problems can be solved through step-by-step guidance.
After selecting a symptom, the following two options are available:

- **Troubleshooting Process**: Guides the user step-by-step guidance.
- **Remaining Solutions**: Shows an overview of potential solutions with their associated root. This helps experienced users to identify problems in an efficient way without going through the whole trouble-shooting process.

6.2.1 Symptom Selection

To solve a problem using Symptom Selection proceed as follows:

1. In the search bar, type in the symptom of the problem you want to solve.
   A list of suitable symptoms is displayed.

2. Click on the corresponding symptom.

   The Guided Diagnostics start screen opens.

3. Check if the description fits your problem and click **Start Diagnosis**.

   The step-by-step guided diagnostics workflow starts. The left-hand side of the screen offers questions and instructions on how to solve the problem. The right-hand side in the media area information on how to carry out the steps is presented.

4. Follow the instructions on the screen to complete the troubleshooting workflow.

6.2.2 Remaining Solutions

Remaining Solutions shows an overview of potential solutions with their associated root.
This helps experienced users to identify problems in an efficient way without going through the whole trouble-shooting process. Open the Guided Diagnostics menu and click **Remaining Solutions**.

7 Maintenance and Care

7.1 Visual inspection

Perform a visual inspection regularly and check the device for the following:

- Coarse soiling → *Cleaning*
- Wear
- Damage

7.2 Cleaning

NOTICE

Do not use a high-pressure cleaner or caustic cleaning agents to clean the device.

Ensure that the contacts of the USB socket and of the OBD connector are not dirty or damaged. Clean the housing, the USB socket, and the OBD connector with a mild cleaning agent, if required.

7.3 Battery Replacement

When handling the battery, adhere to the safety instructions in *Battery Safety*

WARNING

Risk of injury due to chemical burn hazards through battery ingestion

Swallowing the battery may lead to burns, perforation of soft tissue, and death. Severe burns can occur within 2 h of ingestion.
Do not swallow the battery.

CAUTION

Danger of explosion if the battery is replaced improperly.
Dispose of used batteries according to the following instructions only.

To replace the battery, proceed as follows:

1. Loosen the two screws (1 / 2) and remove the cover (3).

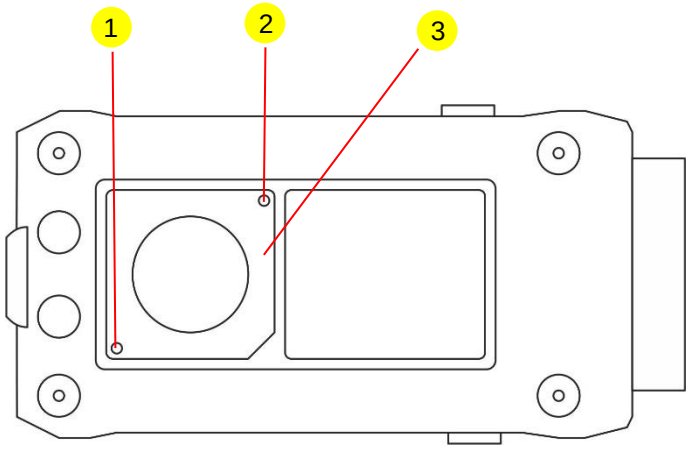


Fig. 9

2. Remove the battery (4) and insert a new battery.
   Observe the polarity of the battery.
   The **positive pole** (5) of the battery must point to the **outside/upwards** as shown.

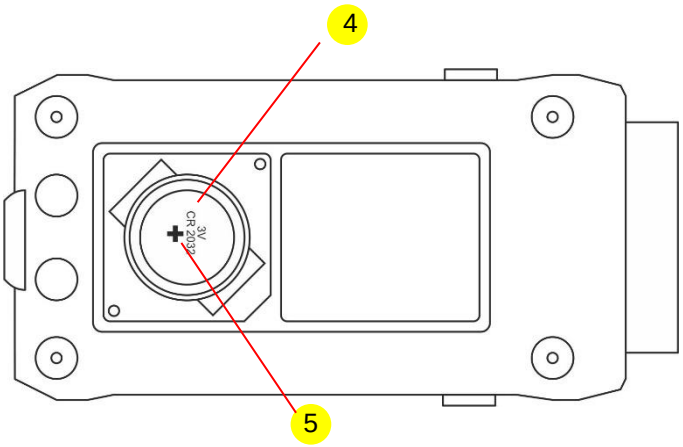


Fig. 10

3. Install the cover (3) and tighten the screws (1) and (2).

8 Warranty

8.1 New Devices

For new devices the warranty period is 12 months.
The agreements with your supplier apply.
Generally excluded from the warranty are wear and tear parts, batteries and accessories.
Valid for the implementation is the date of the delivery document to the final customer.

The warranty expires due to:

- Mechanical damage (e.g. dropping the device, etc.)
- Penetration of liquid (e.g. water, oil, acids, etc.)
- External intervention (e.g. repairs carried out by non-authorized people)
- Improper operation (e.g. cleaning with air pressure)
- Improper storage, maintenance and care (e.g. cleaning the device with solvent-based cleaners)

8.2 Exchange or Loaner Units

The agreements with your supplier apply.
Valid for the implementation is the date of the delivery document to the final customer.

8.3 In Case of Damage

In case of damage, contact your respective AVL DiTEST representation / the corresponding AVL DiTEST partner in your country.

9 Technical Data

Power supply	
Operation voltage range	7 … 36 V$^{\forall}$, 10 W
Internal battery voltage	3 V Type CR2032
Features	Polarity, overcurrent and overvoltage protection
Temperature	
Operating temperature	0°C … +40 °C
Transport temperature	-20°C … +50 °C
Humidity	max. 95 % (not condensing)
Housing	
Weight	ca. 150 g
Dimensions	ca. 126 x 58 x 35 mm
IP class	IP54 (closed connectors)
Interfaces	
Interfaces	- USB 2.0 - 480 Mbit/s high speed interface - WLAN 802.11 a/b/g/n - Bluetooth 4.0, Class 1
Vehicle interfaces	- OBD2 (ISO 15031-4, SAE J1962)
Supported host-protocols	- ISO22900-2 - SAE J2534 - VCI Configuration Interface (CI)
Supported interfaces	- K-Line (1x/2x) ISO 14230-1 - L-Line (1x) ISO 14230-1 - CAN-HS (2x/4x) ISO 11898-2 - DoIP/Ethernet (1x) IEEE 802-3 10BASE-T/100BASE-X - CAN-FD prepared (1x/2x)

Supported vehicle-protocols	- CAN 250 kBit/s, 500 kBit/s, 1MBit/s
	  - KWP2000/ISOTP ISO 14230-3
	  - UDS/ISOTP ISO 15765-3
	  - SAE J1939
	  - Raw
	  - CCP
	- K-Line 10,4 kBit/s, 65,5 kBit/s and others
	  - KWP2000/K-Line ISO 14230-3
	- DoIP ISO13400-2
	  - UDS/DoIP ISO 14229-5

User interface	- OLED multicolor display - Multi-color status LEDs - 3 buttons for interaction
Add. Hardware features	- Real-Time-Clock - 8 GB internal eMMC, 1 GB internal DDR-3 Memory - Buzzer - Load dump protection: 3 V … 100 V continuous (Load Dump / Surge) Functional range: 4 V … 38 V - CE/EAC certified - Ruggedized design shock resistance up to 25 g, up to 2 kHz

Disposal	
	This product by AVL DiTEST is a high-quality electrical and electronic device that must not be disposed with household waste. For disposal, it is essential to comply with local legal obligations.

Supported diagnostic interfaces	**Pins on OBD2**
CAN-HS #1	3, 11 (High/Low)
CAN-HS #2	6, 14 (High/Low)
CAN-HS #3	1, 9 (High/Low)
CAN-HS #4	2, 10 (High/Low)
K-Line #1	7
K-Line #2	13
L-Line	15
J1850	2, 10 (High/Low)
DoIP	12, 13 (Tx+/Tx-), 3, 11 (Rx+/Rx-)
CAN-FD #1*	6, 14 (High/Low)
CAN-FD #2*	1, 9 (High/Low)

Additional	**Pins on OBD2**
Ignition ON	1
DoIP Enable	8
Chassis GND	4
Signal GND	5
Battery Power	16

NOTICE

Only two CAN interfaces are possible at the same time. For CAN-HS and CAN-FD* as well as K-Line and L-Line, the following configurations are possible:

CAN#1 (HS) and CAN#2 (HS / FD*) or
CAN#1 (HS) and CAN#3 (HS / FD*) or
CAN#4 (HS) and CAN#2 (HS / FD*) or
CAN#4 (HS) and CAN#3 (HS / FD*) or

K-Line #1 and L-Line or
K-Line #1 and K-Line #2

*Only Hardware preparation