VOLKSWAGEN AG

Test instrument box VAS 6356

Operating Manual Hardware V1.07 05/18

Contents

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D-38436 Wolfsburg

Manufacturer:

AVL DiTEST GmbH
Alte Poststrasse 156
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Associated Documents:

Along with this operating manual, which is to be used by the user in the workshop, there are also the following technical documents for the VAS 6356:

- /1/ Unpacking instructions, start-up, brief instructions VAS 6356
  with important information on start-up and registration of the device.
  This documentation is a component part of the scope of delivery.

- /3/ Operating manual VAS 6356 software.
  Description of the software with detailed information on the functioning of the test instruments. Operating manuals can be called up on the tester via the administration. They are located on the CD/DVD.

- /4/ VAS 6356 service information
  contains important information, addresses and telephone hotllines in case of a fault.

In the running text a reference to the applicable documents appears as follows:
Text....(for further information see /4/).

Safety Instructions

Meaning of symbols

The safety instructions in the operating manuals, the Unpacking Instructions or in other documentation provided, on screen displays on the tester during operation and on the products themselves use symbols with the following meanings:

Warning!

Text with this symbol contains information for your safety and how you can reduce the risk of severe or fatal injury.

The **WARNING**  symbol warrants particular attention for your safety.

Caution!

Text with this symbol contains information about how you can avoid damage to the vehicle and the tester.

The **Caution**  symbol tells you that if the information is ignored, damage to the vehicle and/or the tester could result (e.g.: Ensure that the touch screen is not touched with sharp, edged objects.).

Note

Text with this symbol contains additional, useful information.

A **Note**  symbol contains other, special instructions for using the device, and related information.

Note on further safety instructions

The general safety instructions, which are valid for the VAS 6356, are listed in the following. Further safety instructions are to be found in the operating manuals. Therefore, please read the operating manuals before use. Safety instructions may also appear on the screen of the tester. Follow all the instructions displayed.

IMPORTANT SAFETY INSTRUCTIONS

1. Warning!

Risk of explosions

The VAS 6356 has internal parts which emit sparks and therefore must not be exposed to flammable fumes. The VAS 6356 should be operated at least 460 mm (18 inches) above the floor surface since fumes from fuels and other materials accumulate at floor level.

2. Warning!

All measurement cables may only be used within the measurement ranges stipulated in the technical specifications and the descriptions in the operating manual. All measurement pick-ups may only be used on cable whose casing is undamaged. Do not carry out measurements on damaged cables.

3. Warning!

The devices connected to electrical power supply correspond to protection class 1 and are fitted with a safety-tested mains cable. They may only be connected to electrical networks with an earthed protective conductor (TN networks) or electrical outlets with earthed protective conductors.

4. Caution!

Fluctuations and deviations in the power supply beyond the permitted range of tolerance can lead to malfunctions and damage.

5. Warning!

Electrical ignition systems carry voltages of up to approx. 30 kV. Observe general safety guidelines for workshops at all times.

6. Warning!

If you open the VAS 6356 or its accessories without authorisation or carry out improper alterations to them, considerable risk to you and to the device may result.

7. Caution! VAS 6556 workshop trolley - ventilation

When operating the VAS 6556 workshop trolley, ensure sufficient ventilation of the table power adapters of the printer and of the test instrument box VAS 6356. Remember that the printer remains switched on even when the tester is switched off and even if it has entered the energy-saving mode.

- Open the roll-up door fully during operation.
- The heat dissipation of the table power adapter must not be blocked by articles placed on top (cables, rags, etc.).
- Pull the power cable from the workshop trolley to switch off the complete device.

8. Caution! When connecting non-VW vehicles

The VAS 6356 has been developed for vehicles from the Volkswagen group. Connecting the VAS 6356 directly to vehicles from other manufacturers can therefore result in damage to the vehicle.

9. Caution! When cleaning the VAS 6356

Pull out the DC supply plug before cleaning the VAS 6356.
Clean the VAS 6356 **only** with a dry cloth.
Do **not** use cleaners or solvents.

10. Caution! When using magnetically sensitive objects

Do not bring any magnetically sensitive objects in the vicinity of the magnetic clamps at the upper or lower side of the VAS 6356.

IMPORTANT SAFETY INSTRUCTIONS

1. Read all instructions.
2. Care must be taken as burns can occur from touching hot parts.
3. Do not operate equipment with a damaged cord or if the equipment has been dropped or damaged – until it has been examined by a qualified service person.
4. Do not let a cord hang over the edge of the table, bench, or counter or come in contact with hot manifolds or moving fan blades.
5. If an extension cord is necessary, a cord with a current rating equal to or more than that of the equipment should be used. Cords rated for less current than the equipment may overheat. Care should be taken to arrange the cord so that it will not be tripped over or pulled.
6. Always unplug equipment from electrical outlet when not in use. Never use the cord to pull the plug from the outlet. Grasp plug and pull to disconnect.
7. Let equipment cool completely before putting away. Loop cord loosely around equipment when storing.
8. To reduce the risk of fire, do not operate equipment in the vicinity of open containers of flammable liquids (gasoline).
9. Adequate ventilation should be provided when working on operating internal combustion engines.
10. Keep hair, loose clothing, fingers, and all parts of body away from moving parts.
11. To reduce the risk of electrical shock, do not use on wet surfaces or expose to rain.
12. Use only as described in this manual. Use only manufacturer’s recommended attachments.
13. ALWAYS WEAR SAFETY GLASSES. Everyday eyeglasses only have impact resistant lenses, they are not safety glasses.

SAVE THESE INSTRUCTIONS

1 General Information

1.1 General Notes

This operating manual contains the information required for the intended use of the test instrument box VAS 6356, in the following referred to as "VAS 6356".

It is intended for qualified technical personnel who have the appropriate knowledge in the field of vehicle self-diagnosis and test instruments.

Knowledge and technically correct implementation of the safety instructions and warnings contained in this operating manual are the prerequisites for the safe starting-up of the VAS 6356 as well as for safety during operation and maintenance.

Due to space limitations, this operating manual cannot cover all possible details regarding the ↗ Hardware[1], nor does it cover every conceivable circumstance of start-up, operation, care or maintenance.

Due to the overlapping validity of much of the information for the VAS 6356, the operating manual has been divided into the following sections:

- "Operating manual for VAS 6356 Hardware" (this document) and
- "Operating manual for VAS 6356 Software" (description of the tester modes and the application on the vehicle), /3/.

1. The glossary arrow ↗ refers the reader to an explanation for the marked term in chapter 8.

1.2 Safety Notes

Please observe the safety instructions for the VAS 6356.
They are located on the rear of the device, in the operating manual (hardware and software) following the table of contents and at respective locations where they are relevant. Safety instructions specific to applications are also displayed directly at the VAS 6356.

1.3 Certificate of Calibration

The manufacturer hereby declares (fig 1-1) that the device delivered with this operating manual does not require any calibration within the first 3 years after its delivery. Subsequent calibrations should be carried out every 24 months, also refer to section 6.4.

AVL DITEST

PRÜFZERTIFIKAT
TEST CERTIFICATE

Messtechnik-Box VAS 6356
Bestellnummer: BO7286

Die Messtechnik-Box VAS 6356 wurde unter Einhaltung aller Vorgaben nach der jeweils gültigen Prüfvorschrift erfolgreich getestet und hat in einwandfreiem Zustand unser Haus verlassen.
In den ersten 36 Monaten nach der Auslieferung des Geräts ist keine Kalibrierung erforderlich.
Siehe mitgeliefertes Dokument „*Calibration Protocol VAS 6356*“

The test instrument box VAS 6356 was tested successfully with compliance to all specified values and under the actual test procedure and left our facilities in perfect condition.
During the first 36 month after delivery of the device, calibration is not required.
Please see attached document „*Calibration Protocol VAS 6356*“

AVL ist nach ISO 9001 zertifiziert!
AVL is accredited according to ISO 9001!

AVL DiTEST Fahrzeugdiagnose GmbH - Alte Poststrasse 152 - A-8020 Graz

Fig. 1-1 Certificate of Calibration

1.4 Designated Use

- The VAS 6356 may only be used at a vehicle.
- The product described has been developed, manufactured and checked according to the relevant safety standards. If the safety instructions are observed, the start-up is carried out as stipulated, the device is used for the intended purpose and the recommended maintenance and care is also observed, then in normal cases there is no danger regarding damages to property or for the health of persons associated with the VAS 6356.

1.5 Area of Application

The VAS 6356 is used in conjunction with the diagnosis tester VAS 5052A, as well as the specified notebook to perform all current test instrument tasks in the course of guided fault finding.
It is similar to the ↗ test instrument technology and the test instrument scope of delivery of the VAS 5051B diagnosis tester.

Special features:

- Modular test instrument module especially for applications in the field of vehicles
- Brands can be used globally
- robust, small, compact
- Unique and easy assembly/accommodation on the equipment trolley (super magnetic clamps)
- Power supply via external power adapter
- Power supply via vehicle electrical system*

* Not available in USA!

Advantages:

- future-proof test instruments, measurement of quick signal patterns (e.g. CAN Bus)
- simultaneous use of two rapid ↗ DSO-channels and a highly accurate, high-resolution ↗ multimeter (current, voltage, resistance, continuity and diode test)
- galvanic isolation of voltage supply, multimeter and DSO channels allow "high" measurements at various sources (earth tap not required)
- prepared for measuring microvolts via special sensor head (e.g. smallest currents through the fuse)
- High storage volume facilitates secure and targeted diagnosis by adequate signal recording before and after the fault event
- Special patented data reduction algorithm enables long-term recording over extremely long periods (days)
- Complex trigger links across all input channels for diagnosis of complex processes
- Automatic setting of all parameters through sensor selection makes operation easy (concentration on measurement task)
- Specification graph curve library for specified/actual comparison

The main features of the VAS 6356 are:

- Modular and easy-to-maintain assembly
- Test instrument box with functionality and connection options similar to VAS 5051B
- The resolution of the measurement ranges and error tolerances corresponds to the VAS 5051B test instrument
- Combination of the test instrument box with the diagnosis tester VAS 5052A or a specific notebook
- Interface between the application and test instrument as per ↗ ASAM-GDI specification
- Multimeter functions: Min and max function, ↗ Calibration of measured values
- ↗ Oscilloscope functions (DSO): Min and max function, long-term measurement, firing voltage measurement, cursor function
- Interface (specification): USB 2.0
- Calibration is carried out with the help of the available VAS 5143 calibration device
- Galvanic isolation of URDI against DSO, mains adapter and USB interface
- DSO1 and DSO2 are used as differential inputs

Software:

- Independent user software "*Software VX.X Test instrument box*"
- Offboard Diagnose Information System service: Diagnosis software for service partner operations with the test instrument functionality. Automatic data copying of the measured values is possible only after the installation of Offboard Diagnose Information System.

2 Design and Mode of Operation

2.1 Overview

The VAS 6356 consists of the following components

- Test instrument box VAS 6356/1 (1)
- URDI measurement cable, VAS 6356/2 (2)
- 2x DSO measurement cables, VAS 6356/3 (3)
- 100 A current pick-up, VAS 6356/4A (4)
- kV pick-up, VAS 6356/5 (5)
- Trigger clamp, VAS 6356/6 (6)
- external table power adapter (7)
  and power cable for the country of delivery VAS 6356/8 (not shown)

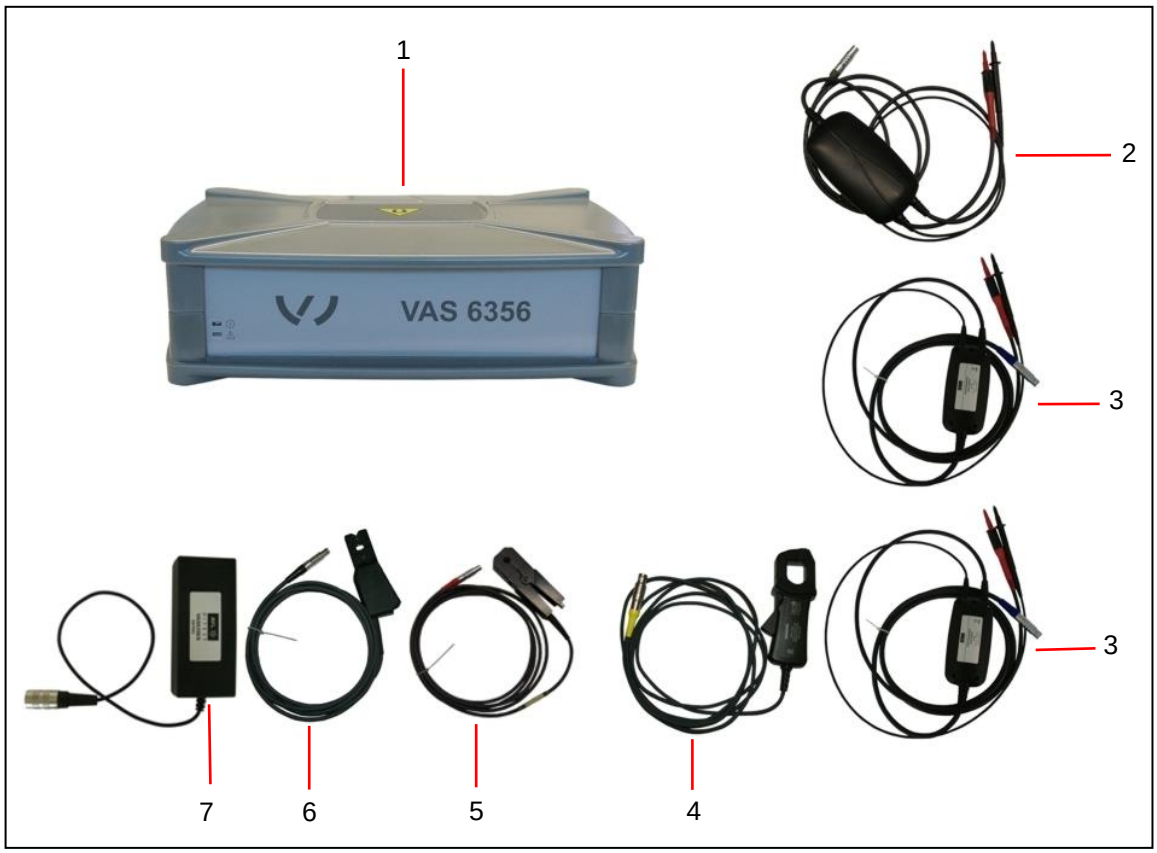

Fig 2-1 VAS 6356 with accessories

2.2 Scope of Delivery

There are several types of delivery. These are:

- System delivery
- Accessories delivered
- Deliverable accessories

Table 2-1 VAS 6365 scope of delivery

Components	Delivery of a system	Accessories delivered	Deliverable accessories
Test instrument box VAS 6356/1	●		
URDI measuring leads, 6356/2		●	
2x DSO measuring cable VAS 6356/3		●	
Current pick-up 100A, VAS 6356/4A		●	
KV pick-up, VAS 6356/5		●	
Trigger pick-up, VAS 6356/6		●	
USB cable, 611 001		●	
Table power adapter for the country of delivery, VAS 6356/8		●	
Software, operating manuals (multilingual), on CD/DVD, VAS 6356/9		●	
Unpacking instructions, start-up and brief instructions on paper, VAS 6356/10		●	
Storage case as means of packaging and transport, VAS 6356/14		●	

Table 2-1 VAS 6365 scope of delivery

Components	Delivery of a system	Delivered accessories	Deliverable accessories
Current pick-up: 1800A, VAS 6356/11			●
Test probes (5 pieces), VAS 5051B/17			●
Battery connecting leads, Connecting lead extension for cigarette lighter, VAS 6356/16*			●
Workshop Trolley, VAS 6556			●
Temperature sensor (oil), VAS 5051/70			●
Pressure measuring device (400 bar), VAS 6394			●
Pressure measuring device (60 bar), VAS 6550			●
Pressure measuring device (60 bar), VAS 6330			●
Cord, VAS 5051/66			●

2.3 Power Supply

The VAS 6356 can be supplied with power:

- with a table power adapter (110 to 240 V alternating voltage)
- from the vehicle electrical system (7 to 33 V DC voltage, with adapter for cigarette lighter and battery)*

* Not available in USA!

2.4 Front Panel

The following components are located on the front panel:

1.	LED „ ⏻“,	lights up blue:	Device is ready for operation
		flashes blue (slow):	Device is in the update/loader mode
		flashes blue (fast):	Fault; The device is restarted
2.	LED „ ⚠“,	lights up green:	Firmware/test instrument OK
		flashes green:	Data traffic with PC
		lights up red:	Bootloader in operation, neither firmware nor update can be loaded
		lights up yellow:	Firmware update is started
		flashes yellow:	Data traffic (firmware update) with PC

Fig. 2-2 Front Panel of the VAS 6356

2.5 Right side

On the right side there are:

1. Connection "**7-33V DC / IN**", DC input, connection for table power adapter
2. Connection " ", USB connection for VAS 5052A or for the specified notebook

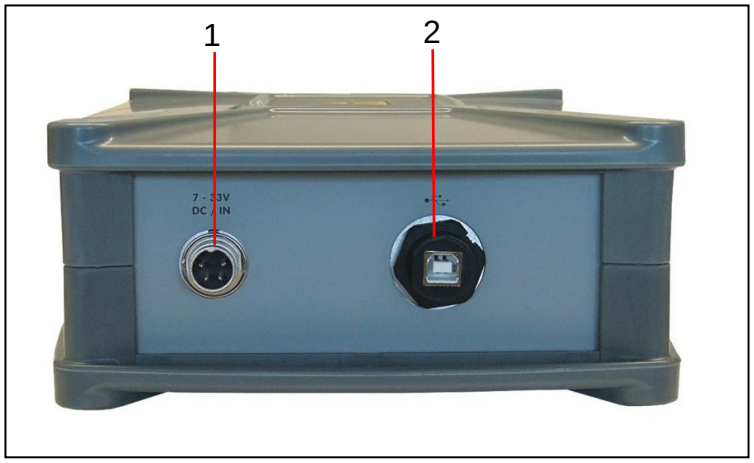

Fig. 2-3 Right side of the VAS 6356

2.6 Rear

On the rear of the tester are:

1. "**URDI**" measurement cable for measuring the voltage, current and resistance, and for diodes and continuity test
2. "**SZ**" connection, current pick-up 100A
3. "**KV**" connection, kV pick-up
4. "**TZ**" connection, trigger pick-up
5. "**T/D-2**" connection, temperature or pressure sensor 2
6. "**T/D-1**" connection, temperature or pressure sensor 1
7. "**DSO2**" connection, DSO measuring lead 2
8. "**DSO1**" connection, DSO measuring lead 1

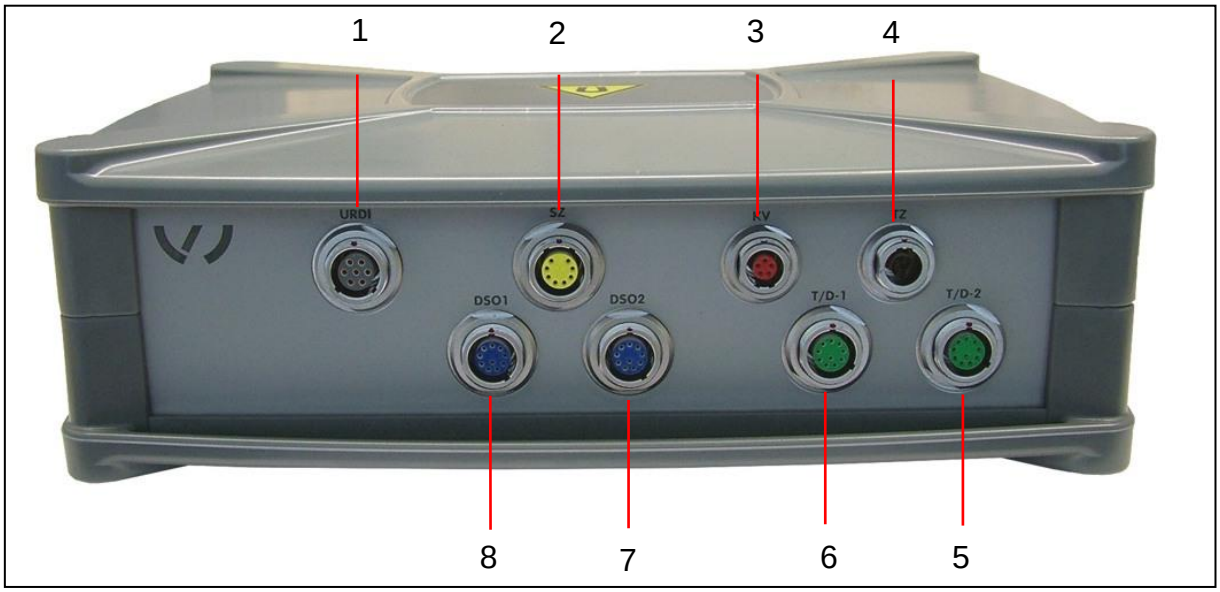

Fig. 2-4 Rear of the VAS 6356

2.7 Table power adapter

The table power adapter is incorporated into the VAS 6556 workshop trolley and is connected there at the mains end via a power cable with power plug to the power outlet strip

It is connected at the "7-33V DC / IN" input at the right side of the VAS 6356 via a 4 pin connector (fig 2-3, 1).

Fig. 2-5 Table power adapter

2.8 Workshop Trolley

The VAS 6356 can be attached to the VAS 6556 workshop trolley with the help of magnetic clamps.

Caution!

Do not bring any magnetically sensitive objects in the vicinity of the magnetic clamps.

Caution!

When operating with the workshop trolley, make sure that there is sufficient ventilation of the table power adapter for the VAS 6356.

- Heat-dissipation of the table power adapter must not be impaired by objects on top of it (cable, cloth, etc.).
- Pull the mains cable from the workshop trolley to switch off the complete device.

Fig. 2-6 Workshop Trolley VAS 6556 with VAS 6356

2.9 Measurement cables

2.9.1 URDI measurement cable VAS 6356/2

The 3 m long active URDI measurement cable consists of a 7-pole pin plug (identification: purple), the cable with a housing and integrated signal processing, and the red/black and black probe tips.

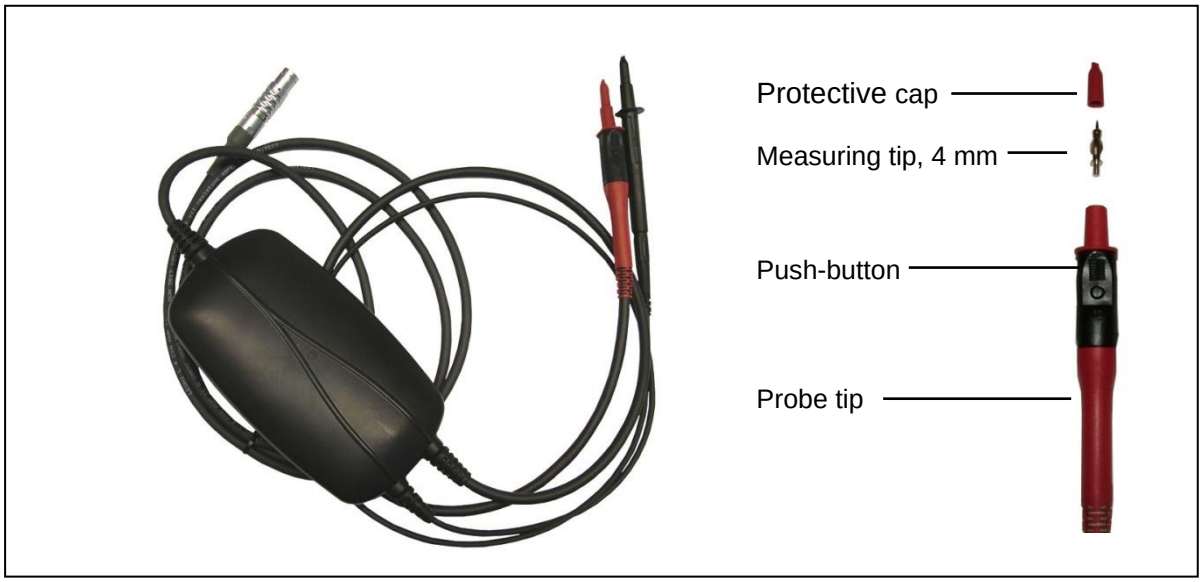

Fig. 2-7 URDI measurement cable (with protective caps on the probe tips)

The URDI measuring lead is used to measure voltage and resistance, for diode and continuity tests as well as ↗ inline current measurement.

Warning! ***When using the URDI measuring lead***

Danger caused by improper use
Without rated measuring category.
Measurements at current circuits that are connected directly to the mains are not permitted! For this reason, use the URDI measuring leads only for measurements on the vehicle.

The button on the red/black probe tip has application-specific functions such as switching on the freeze frame function, triggering a measurement, etc.
The measuring tip in the red/black probe tip can be unscrewed and can be obtained as a spare part.
The black probe tip can be pulled off of the cable together with the handle.

2.9.2 DSO measurement cables VAS 6356/3

The two identically constructed active DSO measuring cables DSO1 and DSO2 consist of a 10-pole pin plug (blue identification), the cable with a housing and integrated signal processing as well as red/black and black probe tips.
To distinguish the leads, a blue clamp marked "DSO1" or "DSO2" is attached on the cable in the direction of the red/black probe tip.

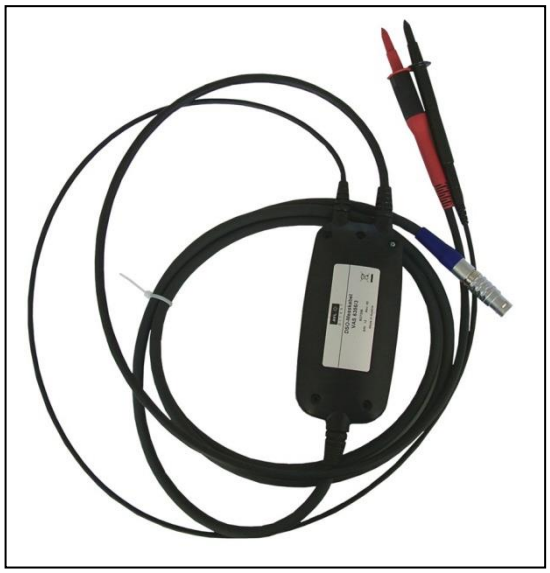

Fig. 2-8 DSO measurement cable (with protective caps on the probe tips)

The two identical DSO1 and DSO2 measurement cables are used together with the two channel digital storage oscilloscope. Both measurement connections must always be adapted for each measurement cable used when measuring. The button in the red/black probe tip has application-specific function such as switching on the freeze frame function, triggering a measurement, etc.
The measuring tip in the red/black probe tip can be unscrewed and is available as a spare part).
The black probe tip can be pulled off of the cable together with the handle.

Warning! ***When using the DSO measuring lead***

Danger caused by improper use
Without rated measuring category.
Measurements at current circuits that are connected directly to the mains are not permitted!
For this reason, use the DSO measuring leads only for measurements on the vehicle.

2.9.3 Current pick-up 100A (VAS 6356/4A) and 1800 A (VAS 5051B/ or VAS 6356/11)

The 100 A and 1800 A current pick-ups (optional) consist of an 8-pin connector (with yellow marking), the cable and the actual current pick-up.

Fig. 2-9 100 A current pick-up

The current pick-up can be opened and can then be laid around the cable whose current is to be measured. Cables can be adapted up to a diameter of 26 mm (100 A current pick-up) or 32 mm (1800 A current pick-up).
The level of measurement accuracy depends to a large degree on being able to close the two halves of the pick-up completely without there being any gap. To avoid measurement errors due, for example, to dirt within the root area, both pick-ups have a locking control mechanism. The software thereby receives a signal that the two halves of the pick-up are closed and that a measurement can now be made.
Furthermore, the 100 A pick-up is also equipped with a control LED in the grip (see fig. 2-9). If the pick-up is not correctly connected then the LED lights up. At the same time, the following message appears in the information window to the right on the tester: ***Current pick-up not closed!***

The measurement result depends on direction.

Warning! ***When using the current pick-up***

Danger caused by improper use
Without rated measuring category.
Measurements at current circuits that are connected directly to the mains are not permitted! For this reason, use the current pick-up only for measurements on the vehicle. Take measurements only at insulated leads! The current pick-up is only permitted for rated voltages up to 300 V!

2.9.4 Trigger clamp VAS 6356/6

The trigger clamp consists of a 5-pin connector (with black marking), the cable and the actual trigger clamp.

Fig. 2-10 Trigger clamp

The trigger clamp can be opened and can then be laid around the ignition cable to be used in triggering. Ignition cables up to 11 mm in diameter can be adapted. The trigger clamp measures the starting pulse of which the course of the signal is to be displayed on the oscilloscope. Clamp the trigger clamp to ignition cable 1, for example, if you want to display a signal from the time of ignition of the first cylinder.

Warning! ***When using the trigger pick-up***

Danger caused by improper use
Without rated measuring category.
Measurements at current circuits that are connected directly to the mains are not permitted! For this reason, use the trigger pick-up only for measurements on the vehicle. Take measurements only at insulated leads!

Note

The trigger clamp is laid around the insulated ignition cable and has no direct contact to the ignition voltage.

2.9.5 kV pick-up VAS 6356/5

The kV pick-up consists of a 5-pin connector (with red marking), the cable and the sensor.

Fig. 2-11 kV pick-up

The kV pick-up is used to detect the ignition voltage amplitude and the course of the ignition voltage in the ignition system. It can be opened and can then be clamped onto one of the vehicle's ignition cables. It functions here as a capacitive voltage divider. Ignition cables from 5 mm to 9 mm in diameter can be adapted.

Warning! ***When using the KV pick-up***

Danger caused by improper use
Without rated measuring category.
Measurements at current circuits that are connected directly to the mains are not permitted!
For this reason, use the KV pick-up only for measurements on the vehicle.
Take measurements only at insulated leads!

Note

The kV pick-up is clamped to the insulated ignition cable and does not have direct contact to the ignition voltage.

2.9.6 Temperature sensor VAS 5051/70

The temperature sensor consists of a 10-pole pin plug (marked in green), the cable and the sensor, which is made up of a hand grip and a 1 m long flexible protective tube made of Teflon with an adjustable conical rubber seal. A PT100 element is located on the tip of the dipstick. The rubber seal performs two important functions:

- Determining the dipstick immersion depth
- Hermetically sealing the measurement point

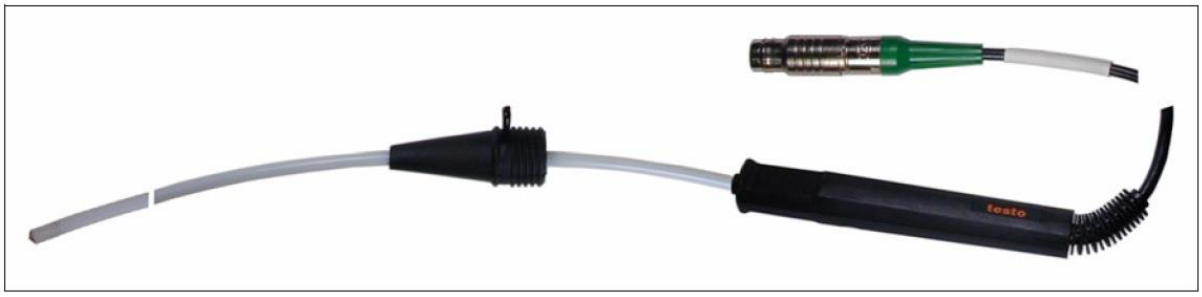

Fig. 2-12 Temperature sensor (example)

Determining the immersion depth of the dipstick
The immersion depth of the dipstick must be set with the rubber sealing according to the length of the oil dipstick.
This thereby limits the immersion depth of the dipstick, e.g. in the oil sump.
The immersion depth can differ depending on the vehicle.

Caution!

If the immersion depth is not set correctly using the rubber sealing, then the temperature sensor may be destroyed and the engine may be damaged!

Air-tight closing of the measurement point

The conical design of the rubber sealing allows the measurement point to be closed in an air-tight manner.

2.9.7 Pressure sensors VAS 6330, VAS 6394 and VAS 6550

At the "T/D-1" respectively “T/D-2” (Fig. 2-2, 6 respectively 7) measurement input, you can optionally connect one of four sensors to detect the relative pressure (with respect to the normal air pressure) of various media (gas, liquids). A pressure sensor is first adapted to the pressure sensor cable and then to the VAS 6356. At the vehicle, you connect the sensor to the measurement point via a special adapter (special tool).

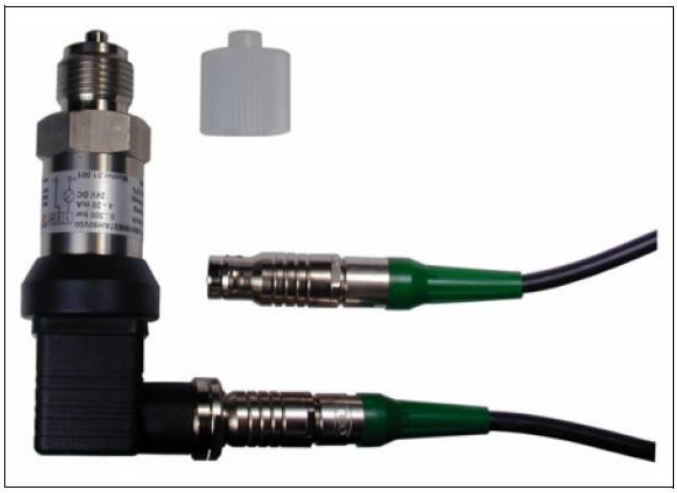

Fig. 2-13 Pressure sensor (example)

3 Operation

This chapter describes the operation of the VAS 6356, provided that it does not concern operating the program via the tester or the specified notebook.

3.1 Switch on VAS 6356

The VAS 6356 does not have an on/off switch. As soon as it is supplied with current via the table power adapter, the VAS 6356 begins its "↗ start-up" procedure.
VAS 6356 can be supplied with current even by the vehicle electrical system*.
Adapters with connections for the cigarette lighter or the battery can be delivered on request*.

Note

Do not attempt to operate the VAS 6356 during start-up.

3.2 Switching off VAS 6356

Disconnect the power supply of the VAS 6356.

* Not available in USA!

3.3 VAS 6556 workshop trolley

Fig. 3-1 Workshop trolley

The workshop trolley is used for mobile use of the VAS 6356 in the workshop. It is mounted on four rollers to allow it to be easily pushed within the working environment.
All workshop trolleys are equipped with a dust-protective cover. It can be folded together during operation and stored in the storage compartment of the workshop trolley.

Mobility

Both front wheels of the workshop trolley have been equipped with brakes to allow it to be fixed at its location.
Release the brakes to move the trolley. You can push or pull the trolley to its new location using the grips on the left or right side. You can then lock the brakes at the new location.

3.4 Measurement cables

Diagnostic and measurement cable connections are coded by colour and mechanically. The cable bushing matches the colour of the sockets. The mechanical coding requires that the red point of the connector is aligned with the red point at the plug when establishing a connection. The plugs can easily be inserted into the sockets without using much pressure when so aligned.

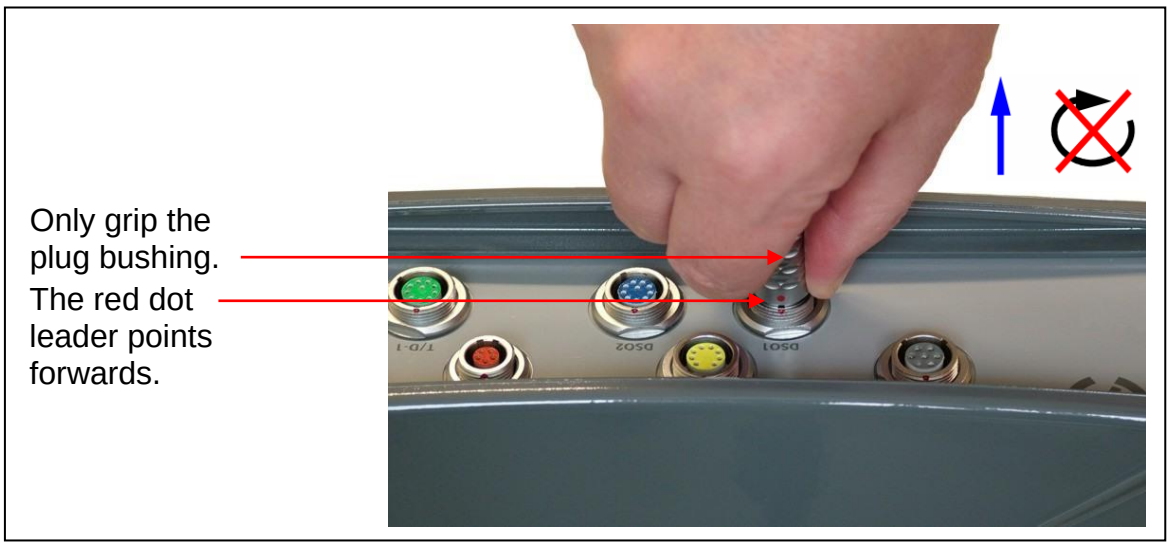

Fig. 3-2 Correct handling of a plug at the VAS 5356

To disconnect a plug from the VAS 6356, pull the locking collar of the plug upwards, thereby also pulling the plug from the socket.

Note

The plugs are not threaded and turning them with force may damage them (see Fig. 3-2).

4 Firmware-Update

Note

After installing or updating the Offboard Diagnose Information System software (or the Independent "Software VX.X Test instrument box" user software), the firmware of the VAS 6356 should be updated (firmware update).

1. Start the firmware update program by clicking “**Start**”, “**Programs**”, “**DiTEST**”, “**VAS6356**” and "**VAS 6356 Firmware Update**".
   The displayed screen will appear (fig 4-1).
2. Select your language and click "**OK**" (1).

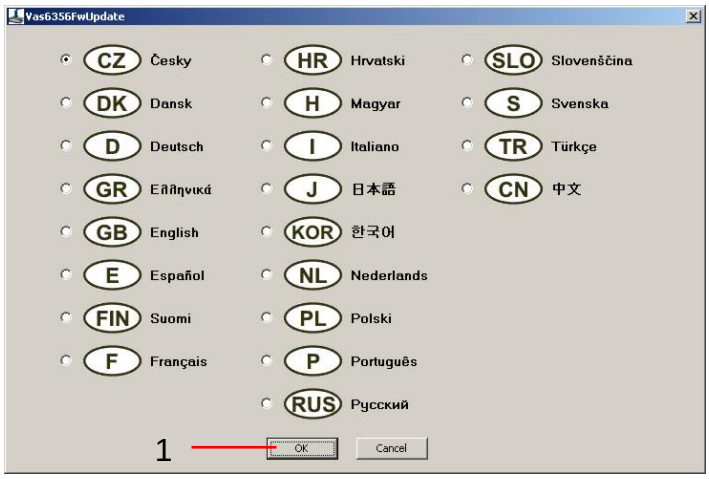

Fig. 4-1 Firmware Update

3. Click "**OK**" (2). The latest data will be searched for.

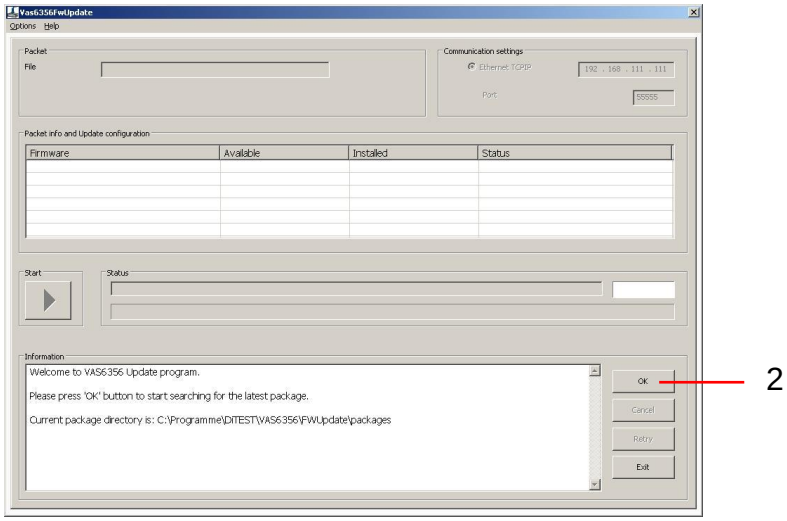

Fig. 4-2 Firmware Update

4. The files to be updated appear in the "*Packet info and Update configuration*" (3) area.
   Pay attention to the notes in the "Information" (4) area:
   - Please connect all your VAS 6356 equipment to your PC.
   - Connect your URDI-module to your VAS 6356 and press ‘OK’ button.
   - Make sure that the power supply of your VAS 6356 doesn’t get interrupted during the entire update-process!

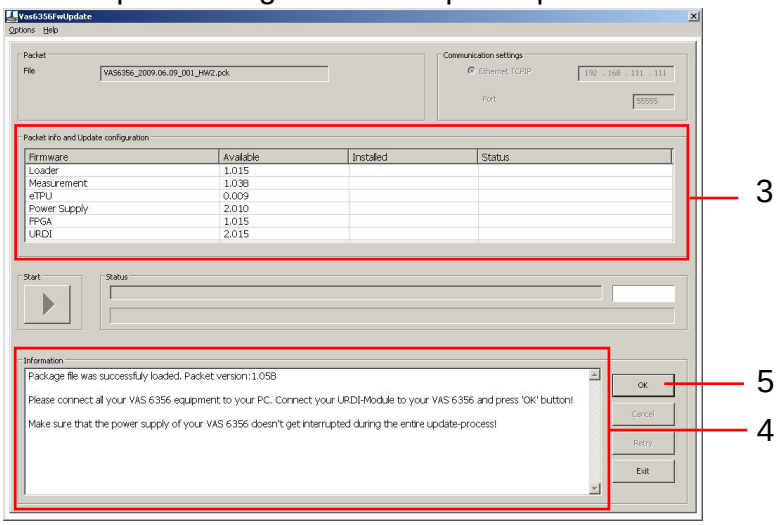

Fig. 4-3 Firmware update, data packages

5. Click "**OK**" (5). Connection with the VAS 6356 is established.

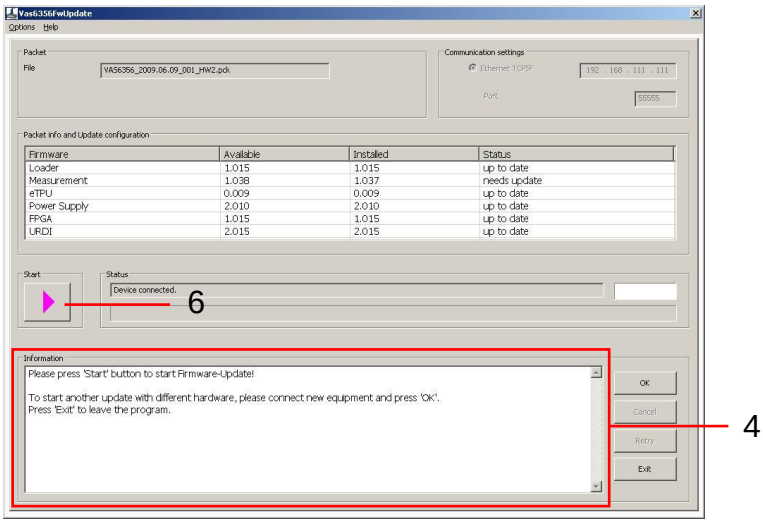

Fig. 4-4 Firmware update, start update

6. Click "**Start**" (6) to start the update.
   The update can take a few minutes.
7. After the update has ended successfully, the "*Update successful*" message appears in the "*Information*" area (4).

5 Troubleshooting

The VAS 6356 has been fully tested before being dispatched from the factory. Carefully chosen components and adherence to numerous quality controls guarantee high reliability for the VAS 6356.
However, if a problem does occur then please read the instructions in this chapter before contacting the appropriate customer service (see /4/).

5.1 Classification

Please try to determine what the fault is and to locate it as exactly as possible. Follow the suggestions for solving the problem and carry out all measures suggested when possible.
If the fault can not be remedied by the measures provided here then follow the instructions in Section 5.3

5.2 Self-test

During the "start-up", the VAS 6356 carries out a self-test.
If you receive error messages after this self-test, please contact customer service. Refer to section 5.3

Note

The self-test of the VAS 6356 does not cover the connected measuring leads. Testing the measuring lead, refer to chapter 5.2.2.

5.2.1 Error messages

5.2.1.1 DMM-URDI module

The possible error messages and remedy measures are listed below.

- First, always verify that the DMM-URDI module has been connected properly to the URDI input.
- If necessary, loosen the URDI module for a moment and reconnect it.
- If the error is not removed, please contact the responsible hotline and inform the exact error message to the hotline.

Table 5-1 Error messages with respect to the DMM-URDI module

Error message	Corrective measure / description
Unable to communicate with DMM-URDI module	The VAS 6356 was unable to communicate with the DMM-URDI module. The cause can either lie in the DMM-URDI module or in VAS 6356.
DMM-URDI: Error during DC voltage measurement!	Please make sure that the voltage to be measured is less than 50 V =.
DMM-URDI: Error during AC voltage measurement!	Please make sure that the voltage to be measured is less than 40 V ~.
DMM-URDI: Error during direct current measurement!	Please make sure that the current to be measured is less than 2 Ampere.
DMM-URDI: Error during alternating current measurement!	Please make sure that the current to be measured is less than 2 Ampere.
DMM-URDI: Error during resistance measurement!	Please make sure that you contact the measurement point securely.
DMM-URDI: Error during diode measurement!	Please make sure that you contact the measurement point securely.
DMM-URDI: Error reading version information.	Internal error. Please contact the responsible hotline and inform this error.

DMM-URDI: Error reading calibration data.	Internal error. Please contact the responsible hotline and inform this error.
DMM-URDI: Error reading calibration data.	
DMM-URDI: Error reading production data.	
DMM-URDI: Error reading production data.	
DMM-URDI: Error reading serial number.	
DMM-URDI: No measurement software found! Please carry out a software update!	No measurement software found in the DMM-URDI module. Please carry out a software update! Refer to chapter 4 "*Firmware update*".
DMM-UDRI: Caution! Current too high at the input socket!	The current measured by you exceeds the permissible limit considerably! **Taking measurements any longer involves the risk of overloading the DMM-URDI module!**
DMM-URDI: Unable to communicate with DMM-URDI!	The VAS 6356 could not establish a connection with the DMM-URDI module. The cause can either lie in the DMM-URDI module or in VAS 6356.
No DMM-URDI module is connected	The automatic sensor detection system of the VAS 6356 has not detected a DMM-URDI module. Check the connection. Also check whether the other sensors, e.g. a current pick-up, are detected.
DMM-URDI Self-test faulty.	Internal error. Please contact the responsible hotline and inform this error.
DMM-URDI received un-interpretable data.	
This operation is not supported by DMM-URDI.	
DMM-URDI internal error.	

5.2.1.2 Error messages of the DSO multimeter, DMM-DSO

The possible error messages and remedy measures are listed below.

- First, always verify that the relevant sensor has been connected properly to the sensor input.
- Should the occasion arise, it is also useful to disconnect the entire device from the mains for a while and reconnect it.
- If the error is not removed, please contact the responsible hotline and inform the exact error message to the hotline.

Table 5-2 Error messages of the DMM DSO

Error message	Corrective measure / description
DMM-DSO: Internal error during measurement with sensor at input DSO1.	Exchange the sensor at DSO1 with the sensor at DSO2 to locate the fault.
DMM-DSO: Internal error during measurement with sensor at input DSO2.	Exchange the sensor at DSO2 with the sensor at DSO1 to locate the fault.
DMM-DSO: Internal error during measurement with sensor at input SZ.	Make sure that an intact current pick-up has been connected properly at the "SZ" input.
DMM-DSO: Internal error measuring with the connected pressure sensor.	Make sure that an intact pressure sensor has been connected properly at the "T/D1" input.
DMM-DSO: Internal error during measurement with the connected temperature sensor	Make sure that an intact temperature probe has been connected properly at the "T/D1" (or "T/D2") input.
DMM-DSO: An unknown sensor ID for the clamp-on ammeter has been received.	The connected current pick-up is not supported by VAS 6356.
DMM-DSO: An unknown sensor ID has been received for the T/P-1 connection.	The sensor connected at the T\D-1 input is not supported by VAS 6356.
DMM-DSO: An unknown sensor ID has been received for the T/P-2 connection.	The sensor connected at the T/D-2 input is not supported by VAS 6356.
DMM-DSO: An unknown socket ID has been received.	Internal error! Please contact the hotline!

DMM-DSO: Desired measuring range is not supported by the DSO probe.	Internal error! Please contact the hotline!
DMM-DSO: The desired sensor is not supported at the DSO1 connection.	The sensor connected at the DSO1 input is not supported by VAS 6356.
DMM-DSO: Desired measuring range of the clamp-on ammeter (SZ) is not supported!	Internal error!
DMM-DSO: The desired sensor is not supported at the DSO2 connection.	The sensor connected at the DSO2 input is not supported by VAS 6356.
DMM-DSO: The desired sensor is not connected at the DSO1 input.	Please connect the desired sensor at DSO1 input and repeat the process.
DMM-DSO: The desired sensor is not connected at the DSO2 input.	Please connect the desired sensor at DSO2 input and repeat the process.
DMM-DSO: The desired sensor is not connected at the SZ input.	Please connect the desired sensor at SZ input and repeat the process.
DMM-DSO: The desired sensor is not connected at the T/P-1 input.	Please connect the desired sensor at T/D-1 input and repeat the process.
DMM-DSO: The desired sensor is not connected at the T/P-2 input.	Please connect the desired sensor at T/D-2 input and repeat the process.
DMM-DSO: The desired sensor is not connected at the KV input.	Please connect the desired sensor at the KV input and repeat the process.
DMM-DSO: The desired sensor is not connected at the TZ input.	Please connect the desired sensor at TZ input and repeat the process.
DMM-DSO: Error reading version information.	Internal error! Please contact the hotline.
DMM-DSO: Error reading calibration values.	

DMM-DSO: Error reading production information.	Internal error! Please contact the hotline.
DMM-DSO: Error reading serial number.	
DMM-DSO: Un interpretable data received.	
DMM-DSO: Internal error	
DMM-DSO: Function is not supported.	The desired measurement is not supported by VAS 6356.

5.2.1.3 Error messages of the scope module

The possible error messages and remedy measures are listed below.

- First, always verify that the relevant sensor has been connected properly to the sensor input.
- Should the occasion arise, it is also useful to disconnect the entire device from the mains for a while and reconnect it.
- If the error is not removed, please contact the responsible hotline and inform the exact error message to the hotline.

Table 5-3 Error messages with respect to the Scope Module

Error message	Corrective measure / description
Scope Task: Input is not supported / is unknown!	The desired input is not supported by the Scope Module.
Scope Task: TZ (trigger pick-up) cannot be selected as a scope channel!	Internal error! The trigger pick-up cannot be used as a visual signal.
Scope Task: Scope channel is not supported!	Internal error!
Scope Task: Sensor ID is not supported at DSO2 connection.	The desired sensor is not supported at the DSO2 connection
Scope Task: Unknown sensor at SZ (clamp-on ammeter) input.	An unknown sensor was detected at the SZ (current pick-up) connection.
Scope Task: DC measurements at KV sensor are not supported!	DC voltage measurements at the KV sensor are not supported by VAS 6356.
Scope Task: Sensor ID is not supported by KV input.	The sensor connected to the KV input is either defective or is not supported by VAS 6356.
Scope Task: Measuring range is not supported by KV sensor.	Taking measurements is not possible!
Scope Task: Sensor ID is not supported at DSO1 connection.	The sensor connected at the DSO1 input is either defective or is not supported by VAS 6356.

Scope Task: Measuring range is not supported by the DSO probe.	Taking measurements is not possible!
Scope Task: Measuring range is not supported by clamp-on ammeter.	
Scope Task: Measuring range is not supported by pressure sensor.	
Scope Task: Measuring range is not supported by temperature sensor.	
Scope Task: The desired filter is not supported / Unknown filter.	
Scope Task: The desired trigger filter is not supported / Unknown filter.	
Scope Task: The desired sampling rate is not supported.	
Scope Task: The desired sampling mode is not supported.	
Scope Task: Sensor ID is not supported by T/P-1 input.	The sensor connected at the T/D-1 input is either defective or is not supported by VAS 6356.
Scope Task: Sensor ID is not supported by T/P-2 input.	The sensor connected at the T/D-2 input is either defective or is not supported by VAS 6356.
Scope Task: Scope channel 1 has already been parameterised.	Internal error!
Scope Task: Scope channel 2 has already been parameterised.	

Scope Task: A trigger channel has already been parameterised.	Internal error!
Scope Task: Trigger settings overwrite scope channel settings.	
Scope Task: Un-interpretable data have been received!	
Scope Task: Command <prepareForSingleData> has not been received.	
Scope Task: Function is not supported!	This function is not supported by VAS 6356.
Scope Task: Internal error!	Internal error! Please contact the hotline.
Scope Task: No scope channel has been parameterised!	No scope channel was parameterised. Taking measurements is not possible.
Scope Task: No trigger has been parameterised!	Parameterise the trigger.
Scope Task: The desired sensor is not connected at the DSO1 input.	The desired sensor has not been connected to the DSO1 input or it is defective.
Scope Task: The desired sensor is not connected at the DSO2 input.	The desired sensor has not been connected to the DSO2 input or it is defective.
Scope Task: The desired sensor is not connected at the KV input.	The desired sensor has not been connected to the KV input or it is defective.
Scope Task: The desired sensor is not connected at the T/P-1 input.	The desired sensor has not been connected to the T/D-1 input or it is defective.
Scope Task: The desired sensor is not connected at the T/P-2 input.	The desired sensor has not been connected to the T/D-2 input or it is defective.
Scope Task: The desired sensor is not connected at the SZ input.	The desired sensor has not been connected to the SZ input or it is defective.
Scope Task: The desired sensor is not connected at the TZ input.	The desired sensor has not been connected to the TZ input or it is defective.

Scope Task: No trigger could be determined.	AutoSetup not possible! Set the scope manually.
Scope Task: Scope channel settings overwrite trigger setting.	Change the scope channel settings.
TPU task: Timer program not found. Please carry out a software update.	No measurement software found in the TPU module. Please carry out a firmware update. Refer to chapter 4 "*Firmware update.*"
TPU task: Unknown message received.	Internal error!
TPU task: Function is not supported.	

5.2.1.4 Error messages with respect to the internal monitoring module

The possible error messages and remedy measures are listed below.

- First, always verify that the relevant sensor has been connected properly to the sensor input.
- Should the occasion arise, it is also useful to disconnect the entire device from the mains for a while and reconnect it.
- If the error is not removed, please contact the responsible hotline and inform the exact error message to the hotline.

Table 5-4 Error messages of the internal monitoring module

Error message	Corrective measure / description
Caution! Internal voltage supply not within tolerance.	Check the external voltage supplies. Contact the hotline.
Caution! Error in internal supply voltage +12V.	
Caution! Error in internal supply voltage -12V.	
Caution! Error in internal supply voltage +3.3V.	
Caution! Error in internal supply voltage -2V.	
Voltage supply: Input voltage too high! Please check the external voltage supply!	
Voltage supply: Input voltage too low! Please check the external voltage supply!	

System error! No firmware found! Please carry out a software update!	No measurement software found in the TPU module. Please carry out a firmware update. Refer to chapter 4 "*Firmware update.*"
Unknown sensor at DSO1 input.	The sensor connected at the DSO1 input is either not supported by VAS 6356 or is defective.
Unknown sensor at DSO2 input.	The sensor connected at the DSO2 input is either not supported by VAS 6356 or is defective.
Unknown sensor at URDI/Hybrid input.	The sensor connected at the URDI input is either not supported by VAS 6356 or is defective.
Unknown sensor at KV input.	The sensor connected at the KV input is either not supported by VAS 6356 or is defective.
Unknown sensor at IZNG (clamp-on ammeter) input.	The sensor connected at the SZ input is either not supported by VAS 6356 or is defective.
Unknown sensor at TZ input.	The sensor connected at the TZ input is either not supported by VAS 6356 or is defective.
Unknown sensor at T/D-1 input.	The sensor connected at the T/D-1 input is either not supported by VAS 6356 or is defective.
Unknown sensor at T/D-2 input.	The sensor connected at the T/D-2 input is either not supported by VAS 6356 or is defective.
Sensor detection defective.	VAS 6356 defective!
Caution! Overcurrent detected at the sensors! All sensors have been switched off!	Please remove all sensors and reconnect them individually at intervals of a few seconds. The last connected sensor before this message reappears is defective!

Caution! Overcurrent detected at DSO probe at DSO1 input! Sensor has been switched off!	Please remove the sensor and contact the sensor again. If the fault occurs again, it means that the sensor is defective.
Caution! Overcurrent detected at DSO probe at DSO2 input! Sensor has been switched off!	
Caution! Overcurrent detected at URDI/Hybrid input! Sensor has been switched off!	
Caution! Overcurrent (+12V) at clamp-on ammeter (SZ) input!	
Caution! Overcurrent (-12V) at clamp-on ammeter (SZ) input!	
Caution! Overcurrent (+12V) at T/D-1 input!	
Caution! Over-current (+12V) at T/D-2 input!	
Caution! Error in sensor current monitoring system.	One of the connected sensors consumes more power and is probably defective. Please remove all connected sensors first. Then plug the sensors again individually at intervals of a few seconds. You can thus ascertain which sensor is defective.
Caution! Overtemperature in scope module! Please turn off the device!	Switch the VAS 6356 off for a few minutes.
Caution! Overtemperature in process module! Please turn off the device!	
Caution! Overtemperature in DC/DC converter! Please turn off the device!	

Caution! Overtemperature in the internal mains adapter! Please turn off the device!	Switch the VAS 6356 off for a few minutes.
Service: Input is not supported / is unknown!	The desired input is not supported!
Service: No DSO probe connected / detected at DSO1 input.	Connect the DSO sensor at the DSO1 input. The sensor is probably defective and is not detected.
Service: No DSO probe connected / detected at DSO2 input.	Connect the DSO sensor at the DSO2 input. The sensor is probably defective and is not detected.
Error in the self-test!	Switch the device off for a while and then again switch it on. Repeat the self-test. If the fault continues to exist, contact the hotline.
Self-test: Error in scope channel 1	
Self-test: Error in scope channel 2	
Self-test: Error in KV measuring channel.	
Self-test: Error in TZ (trigger pick-up) channel.	
Self-test: Error in the T/D-1 measuring channel.	
Self-test: Error in the T/D-2 measuring channel.	
Self-test: Error in the SZ (clamp-on ammeter) measuring channel.	
Self-test: Error in DMM-DSO.	
Self-test: Error in the DSO-I2C interface.	
Self-test: Error in the power supply (PS).	
Self-test: Error in communication with URDI module.	

Self-test: Error in communication with front panel.	Switch the device off for a while and then again switch it on. Repeat the self-test. If the fault continues to exist, contact the hotline.
Self-test: Error in communication with power supply.	
Self-test: Error in FPGA.	
Self-test: Error in the FPGA programming.	
Self-test: Error in the SDRAM memory.	
Self-test: Error in the flash memory.	
Self-test: Error in the EEPROM memory.	
Self-test: Error in the scope memory.	
Self-test: Error in the signal trigger.	
Self-test: Error in the universal trigger.	
Self-test: Error in the crossbar switch <signal>.	
Self-test: Error in the crossbar switch <function>.	
Self-test: Error in the crossbar switch <trigger>.	
Caution: Error reading DSO probe calibration values. The measured values could be incorrect!	The DSO sensor head is not calibrated! The measured values could be incorrect!
Caution: Error reading calibration values. The measured values could be incorrect!	The VAS 6356 is not calibrated! The measured values could be incorrect!
Service Task: Unknown message received.	Internal error!
Service Task: Function is not supported.	Desired function is not supported by VAS 6356!
Service Task: Internal error.	Internal error.

Internal mains adapter reports excess temperature! Turn off the device for several minutes!	Turn off the VAS 6356 off for a few minutes. If the fault occurs again, contact the hotline
Internal mains adapter: Software error!	Internal error!
Scope Data: Uninterpretable data have been received.	Internal error!
Scope Data: Function is not supported.	Taking measurements is not possible!
Scope Data: Internal error.	Internal error!
Firmware not found.	Please carry out a firmware update. Refer to chapter 4 "*Firmware update*".
Wrong / invalid version of the TPU software. Please carry out a software update!	
Wrong / invalid version of the FPGA. Please carry out a software update!	
Wrong / invalid version of the firmware. Please carry out a software update!	
Wrong / invalid version of the URDI software. Please carry out a software update!	
Wrong / invalid version of the Power Supply software. Please carry out a software update!	

5.2.2 Measurement cables

5.2.2.1 URDI measurement cable

A function test of the URDI measurement cable is carried out as follows. If the test results do not match the required values then there is a fault in the corresponding URDI measurement cable.
In this case, please submit a fault report in accordance to Section 5.3.

The URDI measurement cable is best checked using a comparative measurement.

Check the "voltage measurement" function, e.g. by connecting the leads to a vehicle battery.

In the "resistance measurement" function, simulate an "open circuit" (Display: +++++ MΩ) and "short-circuit" (near the display of 0.000 kΩ).
You can also measure known resistances, e. g. of a relay coil (normally approx. 90 Ω).

When checking the diodes, you can also simulate an "open circuit" and "short-circuit". However, a diode is required for additional tests.

To check the "↗ inline current measurement" function you must use a circuit of max. 2 A.

5.2.2.2 DSO measurement cables

Carry out a function test of the DSO measurement cables as follows. If the test results do not match the required values then there is a fault in the corresponding DSO measurement cable.
In this case, please submit a fault report in accordance to Section 5.3.

1. Connect a DSO measurement cable to the DSO1 socket.
2. Press the Voltage DSO1 button in Test Instruments operating mode, Multimeter mask. Select DC voltage as the type of measurement and the automatic range selection.
3. Connect the measuring tips of the DSO measuring cable with a charged car battery. The measurement value that is displayed must be the same as the battery voltage (between 11 and 14 V).
4. Check the freeze image selection by pressing the button on the red/black probe tip. The measurement value is frozen, the "freeze frame" button must appear to be pressed on the screen.

Carry out a comparative measurement between URDI and DSO:

1. Release the freeze frame by pressing the button again in order to continue the measurement.
2. Additionally connect the URDI measurement cable to the VAS 6356 and the vehicle battery. Its correct functioning should have been checked before connecting it.
3. Press the Voltage U/R/D button. Select DC voltage as the type of measurement and the automatic range selection.
4. In both displayed measurement functions (DSO1 and U/R/D), the difference in the measured values must be $\leq$ 0.2 V.

Repeat the function test with the second DSO measurement cable.

Note

Both DSO measurement cables are identical and can be exchanged for testing.

5.2.2.3 Current pick-ups

Carry out a function test of the current pick-ups as follows. If the test results do not match he required values then there is a fault in the current pick-up.
In this case, please submit a fault report in accordance to Section 5.3.

1. Connect a current pick-up to the VAS 6356.
2. Press the Current pick-up button in Test Instruments, mask Multimeter. The current pick-up must be automatically recognized. Select DC current as the type of measurement and the automatic range selection.
3. Open and close the current pick-up several times without connecting it to a live cable. The value measured must change considerably between these two states (open and closed). In case of the 100 A pick-up, check whether the LED at the current pick-up correctly displays the conditions "opened (LED is on) / closed (LED is off)".

Now check the calibration of the current pick-up:

1. Press the Calibrate button on the screen. Close the message displayed by pressing the OK button. At most, the measured value displayed after calibration must equal the tolerance in the lowest measurement range (see section 7.3.1).
2. Connect the current pick-up to a battery cable or another cable of a consumer in a vehicle. All consumers and the ignition of the vehicle should be switched off at first. The displayed measurement result should only change marginally (environmental influences).

How to perform a comparative measurement:

1. Switch on a consumer, e.g. the parking light. The power consumption should be known as accurately as possible. Take this value as a starting point. The measured value should be the same as this value.
2. Pull the current pick-up from the cable carrying the current and plug it back in, reversed by 180°. The difference must remain within the stipulated tolerance (see Section 7.3.1).

5.2.2.4 Trigger clamp and kV pick-up

The trigger clamp and kV pick-up can only be tested together. Carry out a function test as follows. If the test results do not match the required values then there is a fault in one of the sensors.
In this case, please submit a fault report in accordance with Section 5.3.

1. Connect the trigger clamp and the kV pick-up to the VAS 6356.
2. Select the DSO mask in operating mode Test Instruments.
3. Connect both pick-ups via the same ignition cable (secondary side of the ignition coil) to a vehicle with a 4 or 6 cylinder engine.
4. Press the Preset measurement button in the DSO mask, select the Secondary ignition voltage curve in the selection list that appears, and confirm with the Display button.
   The DSO mask will appear with the set curve in the background.
   At the same time, all DSO settings will be made automatically.
5. Start the vehicle's engine. The typical ignition signal must be displayed dynamically, i.e. the picture is re-written once or twice per second if the kV pick-up and trigger clamp are working correctly.

If the trigger clamp is faulty then the following message appears in the window at the top right:
No trigger

If the kV pick-up is faulty then a horizontal line may only be displayed or else a signal curve with much too small an amplitude.

Note

Depending on the type of vehicle used, the amplitude of the ignition signal may fluctuate between 4 and 40 kV. The combustion voltage is normally between 600 and 1200 V, and the combustion duration should be between 1 and 6 ms. The shape of the curve may vary depending on the manufacturer of the ignition coil.

5.3 Fault Reports to Customer Service

If the fault that has occurred cannot be remedied then please consult the customer service. Fur further information see /4/.

5.4 Replacement Parts and Accessories

5.4.1 Overview

During the guarantee period, repairs to the VAS 6356 are made by replacing defined components.
In case of submitting a fault report to your appropriate customer service you will be informed which components will be replaced under guarantee conditions. You will then receive one or more replacement parts on the instigation of the guarantor.
These parts are divided into exchange parts, replacement parts and repair parts.

- **Exchange parts:**
  Some components of the VAS 6356 are exchange parts that you must return in exchange for a new or repaired component. You will be told the address to send the defective exchange parts to as required. The components sent can also be replaced by a repaired exchange part. You have no claim to receive new parts.
- **Replacement parts:**
  You can dispose of replacement parts yourself. Please observe your national regulations on the disposal of such parts.

Section 5.4.3 lists all parts and informs you of whether a particular part is an exchange part, a replacement part or a repair part.

5.4.2 General Notes

VAS 6356

If the VAS 6356 (without accessories) must be replaced, then you will receive a replacement device in a box that you should also use to send back your defective device in. Return the entire VAS 6356, but first remove the accessories.

Cables

Defective measurement cables are replaced completely. If the mains cable has to be replaced, then observe the technical data in accordance to
Section 7.2 and the assembly instructions (see the start-up instructions).

USB cable

The cable connects the VAS 6356 to the tester VAS 5052A.

1. Check whether the cable is connected to the VAS 6356 and the tester.
2. Check whether the cable is damaged. If it is damaged, then replace the USB cable.

VAS 6556 workshop trolley

To obtain spare parts for the VAS 6556 workshop trolley, please contact the manufacturer (Knürr, see /4/).

5.4.3 Parts List fort the VAS 6356

Table 5-5 Symbols and Abbreviations

ID	Meaning
A	Exchange part
E	Replacement part

no.	Desi-gnation	Model		VAS no.	Order number	Supplier	Type	Comments
		Delivery of the system	accessories					
1	Test instrument box complete VAS 6356	●		6356	405 300 00 000 with "EU" (D) mains plug 405 300 00 004 with "CH" (CH-D) mains plug 405 300 00 011 with "EU" (PL) mains plug 405 300 00 015 with "EU" (CZ) mains plug 405 300 00 016 with "EU" (H) mains plug 405 300 00 020 with "GB" (GB) mains plug 405 300 00 023 with "USA" (USA-GB) mains plug 405 300 00 026 with "AUS" (AUS-GB) mains plug 405 300 00 030 with "ZA" (ZA-GB) mains plug 405 300 00 032 with "EU" (NL) mains plug 405 300 00 037 with "EU" (S) mains plug 405 300 00 038 with "EU" (DK) mains plug 405 300 00 040 with "EU" (F) mains plug 405 300 00 042 with "USA" (CDN-F) mains plug 405 300 00 044 with "CH" (CH-F) mains plug 405 300 00 050 with "EU" (I) mains plug 405 300 00 054 with "CH" (CH-I) mains plug 405 300 00 056 with "GB" (ROK) mains plug 405 300 00 060 with "EU" (E) mains plug 405 300 00 065 with "EU" (P) mains plug 405 300 00 066 with "PR" (PR) mains plug 405 300 00 068 with "EU" (SLO) mains plug 405 300 00 069 with "EU" (HR) mains plug 405 300 00 070 with "J" (J) mains plug 405 300 00 071 with "EU" (FIN) mains plug 405 300 00 072 with "EU" (GR) mains plug 405 300 00 074 with "CN" (CN) mains plug 405 300 00 075 with "EU" (RUS) mains plug 405 300 00 077 with "EU" (TR) mains plug 405 300 00 079 with "IL" (IL-GB) mains plug	AVL DiTEST	A	

no.	Designation	Model		VAS no.	Order number	Supplier	Type	Comments
		Delivery of the system	accessories					
2	Test instrument box VAS 6356	●		6356/1	405 301 00 000	AVL DiTEST	A	
3	URDI measuring lead	●		6356/2	405 302 00 000	AVL DiTEST	E	
4	DSO measuring cable	●		6356/3	405 303 00 000	AVL DiTEST	E	
5	Current pick-up 100 A	●		6356/4A	405 304 01 000	AVL DiTEST	E	

no.	Designation	Model		VAS no.	Order number	Supplier	Type	Comments
		Delivery of the system	accessories					
6	KV pick-up	●		6356/5	405 305 00 000	AVL DiTEST	E	To measure ignition voltages
7	trigger clamp	●		6356/6	405 306 00 000	AVL DiTEST	E	For triggering the DSO
8	USB cable	●		611 001	611 00100 000	AVL DiTEST	E	
9	Table power adapter	●		6356/8	405 302 00 0XX	AVL DiTEST	E	Caution: Specify country code

no.	Designation	Model		VAS no.	Order number	Supplier	Type	Comments
		Delivery of the system	accessories					
10	Software, operating manuals (multilingual), on CD/DVD	●		6356/9	405 309 00 000	AVL DiTEST	E	
11	Unpacking instructions, start-up and brief instructions on paper	●		6356/10	405 310 00 000	AVL DiTEST	E	
12	Storage case as means of packaging and transport	●		6356/14	405 314 00 000	AVL DiTEST	E	

no.	Designation	Model		VAS no.	Order number	Supplier	Type	Comments
		Delivery of the system	accessories					
13	Current pick-up 1800 A		●	6356/11	405 311 00 000	AVL DiTEST	E	
14	Test probes (5 piece)		●	5,051B/17	405 286 00 000	VW	E	
15	Connecting lead Battery/ Connecting lead Replacement for Cigarette lighter *		●	6356/16	405 316 00 000	AVL DiTEST	E	
16	Workshop Trolley		●	6556	465 842 00 000	VW	E	
17	Temperature sensor (oil)		●	5051/70	405 089 00 000	VW	E	

* Not available in USA!

no.	Designation	Model		VAS no.	Order number	Supplier	Type	Comments
		Delivery of the system	accessories					
18	Pressure measuring device (400 bar)		●	6394	404 560 00 000	VW	E	
19	Pressure measuring device (60 bar)		●	6550	404 600 00 000	VW	E	
20	Pressure measuring device (60 bar)		●	6330	404 550 00 000	VW	E	
21	Cord		●	5051/66	404 088 00 000	VW	E	

* Not available in USA!

6 Care and Maintenance

6.1 Optical check of the VAS 6356

Carry out a regular optical check of the VAS 6356.
Examine all parts for damage (e.g. breaks) and for dirt.
Regularly check the device, all cables and the accessories for damage.

Warning!

If the mains cable, the measurement cable, the VAS 6356 or any accessory carrying live current is damaged, you must not use it until a properly qualified specialist has investigated it and approved it.

6.2 Cleaning VAS 6356

Caution!

Before cleaning the VAS 6356, pull out the DC supply plug!
Clean the VAS 6356 **only** with a dry cloth.
Do not use any cleaners or solvents.

If the VAS 6356 is damaged then please contact the AVL DiTEST hotline (see /4/).

6.3 Measurement cables

Regularly check all diagnostic and measurement cables for damage.
Replace damaged cables.

6.3.1 Changing the measuring tips on the red/black probe tip

1. Grasp the front part of the measuring tip with flat-nose pliers and turn the probe tip until the part separates.
2. Insert the new test probe tip.
   The middle section of the test probe tip is hinge-mounted.
   Only the tip at the plus leads (red/black test probes) can be replaced.

6.4 Calibration

According to ISO regulations 9000 ff., the measurement accuracy of all measuring equipment that influences the quality of the work carried out (in this case, maintenance and repair work) must be periodically calibrated.
The VAS 6356 and the measurement cable is calibrated for 3 years on delivery (see section 1.3).
Thereafter, calibration must be repeated every 24 months.
Before this time has expired, please consult your relevant service centre, see /4/.

7 Technical Specifications

7.1 Test instrument box VAS 6356

Warning! ***When using the VAS 6356***

Danger caused by improper use
Sized device without overvoltage category.
Measurements at current circuits that are connected directly to the mains are not permitted! For this reason, use the VAS 6356 only for measurements on the vehicle.

7.1.1 Operating Data

Dimensions (W x L x H)	290 x 200 x 70 mm	
Weight	approx. 2 kg	
Ambient conditions Operating	Ambient temperature Relative humidity Operating height	0 to +40 °C at max. +25 °C 10 to 80 % non-condensing max. 4000 m
Transport and storage	Ambient temperature Relative humidity	-20 to +55 °C at max. +20 °C 10 to 80 %, non-condensing
Electrical protection and safety	**Safety regulations** - Workshop devices: UL 201 GARAGE EQUIPMENT - Testing devices: DIN EN 61010-1 (VDE 0411 Part 1), IEC 1010-1 **Test instrument box VAS 6356/1:** - Protection class III - Degree of protection: IP 40 - Degree of contamination II - Danger caused by improper use Without rated measuring category **Table power adapter VAS 6356/8** - Protection class I (as per DIN EN 60950)	
	This product has been tested to the requirements of CAN/CSA-C22.2 No. 61010-1, second edition, including Amendment 1, or later version of the same standard incorporating the same level of testing requirements.	

Supply from the table power adapter	
Rated voltage	7 - 33 V DC
Power consumption	nominal 12W
Protection	The input is protected against reverse polarity.
External interfaces, wired	
USB interface	1 x USB standard 2.0 (IP 68)
Socket panel (test instruments)	Mini SNAP sockets
URDI	Multimeter, 7-pin, size 2
SZ	Current pick-up, 8-pin, size 2
kV	kV pick-up, 5-pin, size 1
TZ	Trigger pick-up, 5-pin, size 1
T/D-1	Temperature/pressure, 10-pin, size 2
T/D-2	Temperature/pressure, 10-pin, size 2
DSO-1	Storage oscilloscope, 12-pin, size 2
DSO-2	Storage oscilloscope, 12-pin, size 2

7.2 Table power adapter

Table power adapter	The table power adapter supplies the VAS 6356 from the 230 (110) V mains. The table power adapter is housed in the workshop trolley.
Rated voltage range Rated frequencies	AC 100 to 240 V 50 - 60 Hz
DC cable	The DC cable is permanently connected to the table power adapter.

7.3 Test instruments

7.3.1 Multimeter

URDI/ multimeter measurement cable

Warning! ***When using the URDI measuring lead***

Danger caused by improper use
Sized device without overvoltage category.
Measurements at current circuits that are connected directly to the mains are not permitted!
For this reason, use the URDI measuring leads only for measurements on the vehicle.

DC voltage at URDI (Ri ≥ 1 MΩ)	*Range* -2 to +2 V -20 to +20 V -50 to +50V	*Resolution* 0,001V 0,01 V 0,01 V	*Tolerances* ±0,5 % of m.[1] ±2 mV ±0,5 % of m. ±20 mV ±0,5 % of m. ±50 mV
AC voltage at URDI (RMS, 50 Hz to 5 kHz, Crest factor max. 3, (Ri ≥ 1 MΩ)	*Range* 0 to 2 V 0 to 20 V 0 to 40 V	*Resolution* 0,001V 0,01 V 0,01 V	*Tolerances* ±1,5 % of m. ±4 mV ±1,5 % of m. ±40 mV ±1,5 % of m. ±80 mV
AC voltage at URDI (RMS, 5 kHz to 10 kHz, Crest factor max. 3, (Ri ≥ 1 MΩ)	*Range* 0 to 2 V 0 to 20 V 0 to 40 V	*Resolution* 0,001V 0,01 V 0,01 V	*Tolerances* ±1,5 % of m. ±4 mV ±1,5 % of m. ±40 mV ±1,5 % of m. ±80 mV
Direct inline current (Ri ≤ 250 mΩ) via URDI measurement cable	*Range* -0,2 to 0,2 A -2 to 2 A	*Resolution* 0,0001A 0,001 A	*Tolerances* ±1 % of m. ±1 mA ±1 % of m. ±10 mA

1. of measurement value

AC inline current (RMS, 30 to 500 Hz, Crest factor max. 3, Ri ≤ 250 mΩ) via URDI measurement cable

Range	*Resolution*	*Tolerances*
0 to 0,2 A	0,0001A	±1,5 % of m. ±1 mA
0 to 2 A	0,001 A	±1,5 % of m. ±10 mA

Resistance via URDI measurement cable

The measuring current depends on the measurement range and is 5 mA maximum.

Range	*Resolution*	*Tolerances*[2)]
0 Ω to 10 Ω	10 mΩ	±1 % of m. ±5 mΩ
0 Ω to 100 Ω	0,1 Ω	±1 % of m. ±50 mΩ
0 Ω to 1k Ω	1 Ω	±1 % of m. ±1 Ω
0 Ω to 10k Ω	10 Ω	±1 % of m. ±10 Ω
0 Ω to 100k Ω	100 Ω	±1,5 % of m. ±100 Ω
0 Ω to 1 MΩ	1 kΩ	±2 % of m. ±1 kΩ
0 Ω b to 10 MΩ	10 kΩ	±2 % of m. ±10 kΩ

In case of continuity measurements in the measurement range 10 Ω, an acoustic signal sounds if the test object has a resistance of < 2 Ω.

[2)] The accuracy in the measurement range of 10 Ω and 100 Ω is only valid after a zero adjustment.

Diode test via URDI measurement cable

Measuring current	1 mA
Measuring voltage	max. 5 V

The direction of the flow is indicated by a diode symbol. The polarity of the measuring current is automatically reversed during the measurement.

100 A and 1800 A current pick-up

Warning! ***When using the current pick-up***

Danger caused by improper use

Sized device without overvoltage category.
Measurements at current circuits that are connected directly to the mains are not permitted!
For this reason, use the current pick-up only for measurements on the vehicle.
Take measurements only at insulated leads!
The current pick-up is only permitted for rated voltages up to 300 V!

DC current via 100 A current pick-up	*Range* -5 to +5 A -50 to +50 A -100 to +100 A	*Resolution* 1 mA 10 mA 100 mA	*Tolerances* ±2,5 % of m. ±5 mA[1)] ±2,5 % of m. ±50 mA[1)] ±2,5 % of m. ±200 mA[1)]
	[1)] The accuracy of the current pick-up is only valid after calibration when there has been no change in the position or the temperature.		
AC current via100 A current pick-up (RMS, 30 Hz to 500 Hz, crest factor max. 3)	*Range* 0 to 5 A 0 to 50 A 0 to 100 A	*Resolution* 1 mA 10 mA 100 mA	*Tolerances* ±3 % of m. ±5 mA[1)] ±3 % of m. ±50 mA[1)] ±3 % of m. ±200 mA[1)]
	[1)] The accuracy of the current pick-up is only valid after calibration when there has been no change in the position or the temperature.		
DC current via 1800 A current pick-up	*Range* -900 to +900 A -1800 to +1800 A	*Resolution* 1 A 1 A	*Tolerances* ±3,5 % of m. ±1,5 A[1)] ±5,5 % of m. ±2 A[1)]
	[1)] The accuracy of the current pick-up is only valid after calibration		
AC current via 1800 A current pick-up (RMS, 30 Hz to 500 Hz, crest factor max. 3)	*Range* 0 to 900 A 0 to 1800 A	*Resolution* 0,1 A 1 A	*Tolerances* ±5,5 % of m. ±2,5 A[1)] ±5,5 % of m. ±3 A[1)]
	[1)] The accuracy of the current pick-up is only valid after calibration.		

DSO measuring cable

Warning! ***When using the DSO measuring lead***

Danger caused by improper use

Sized device without overvoltage category.
Measurements at current circuits that are connected directly to the mains are not permitted!
For this reason, use the DSO measuring leads only for measurements on the vehicle.

DC current at DSO (Ri ≥ 1 MΩ)	*Range* -0,4 to +0,4 V -1,6 to 1,6 V -4 to 4 V -16 to 16 V -40 to 40 V -160 to 160 V -400 to 400 V	*Resolution* 0,001V 0,001V 0,001V 0,01V 0,01V 0,1V 0,1V	*Tolerances* ±1,5 % of m. ±1 mV ±1 % of m. ±4 mV ±1 % of m. ±8 mV ±1 % of m. ±20 mV ±1 % of m. ±40 mV ±1 % of m. ±200 mV ±1 % of m. ±400 mV
AC current at DSO (RMS, 30 Hz to 5 kHz, Crest factor max. 2, Ri ≥ 1 MΩ)	*Range* 0 to 0,4 V 0 to 1,6 V 0 to 4 V 0 to 16 V 0 to 40 V 0 to 160 V 0 to 400 V	*Resolution* 0,001 V 0,001V 0,001V 0,01V 0,01V 0,1V 0,1V	*Tolerances* ±4,0 % of m. ±1,5 mV ±3,5 % of m. ±6 mV ±3,5 % of m. ±11 mV ±3,5 % of m. ±55 mV ±3,5 % of m. ±80 mV ±3,5 % of m. ±275 mV ±3,5 % of m. ±550 mV
AC current at DSO (RMS, 5 kHz to 10 kHz, Crest factor max. 2, Ri ≥ 1 MΩ)	*Range* 0 to 0,4 V 0 to 1,6 V 0 to 4 V 0 to 16 V 0 to 40 V 0 to 160 V 0 to 400 V	*Resolution* 0,001 V 0,001V 0,001V 0,01V 0,01V 0,1V 0,1V	*Tolerances* ±4,0 % of m. ±1,5 mV ±3,5 % of m. ±6 mV ±3,5 % of m. ±11 mV ±3,5 % of m. ±55 mV ±3,5 % of m. ±80 mV ±3,5 % of m. ±275 mV ±3,5 % of m. ±550 mV

Temperature sensor

T/D measurement input	The measuring input is designed for connection of a temperature sensor with a PT100 measuring element. Range -20 to 200 °C

Pressure sensors

T/D measuring input	The measuring input is designed for connection of a pressure sensor with a 4 mA to 20 mA interface. Ranges -1000 to 1000 mbar -1 to 4 bar 0 to 60 bar 0 to 400 bar

7.3.2 Digital Storage Oscilloscope (DSO)

Warning! ***When using the measuring leads***

Danger caused by improper use
Sized device without overvoltage category.
Measurements at current circuits that are connected directly to the mains are not permitted!
For this reason, use the measuring leads only for measurements on the vehicle!

Attachable measurement cables	DSO measurement cable kV pick-up Trigger clamp Current pick-up Pressure or temperature sensor
Measurement inputs DSO1, DSO2	Make sure that both measurement connections are always adapted for each cable. Band width 10 MHz (±3 dB) Accuracy of DC up to 10 kHz ±1 %, 100 kHz -3 dB
Measurement range selection	Set manually or automatically in the auto-setup
Measurement ranges DSO1, DSO2	Differential inputs voltage divider *Range* ±0,4 V ±1,6 V ±4 V ±16 V ±40 V ±160 V ±400 V

Measurement channels CH1, CH2	Sampling rate	max. 40 MHz in 1-channel operation
	Input band- - width (±3 dB)	10 MHz (without Sensor)
	Connection	AC, DC, GND
	Measurement channels	2
	Measurement Inputs	DSO1, DSO2, kV pick-up, Current pick-up, Pressure and temperature sensor

Time basis	*Sampling Rate*
1,25 µs/DIV	40 MHz[3)]
2,5 µs/DIV	20 MHz
5 µs/DIV	10 MHz
10 µs/DIV	5 MHz
20 µs/DIV	2,5 MHz
50 µs/DIV	1 MHz
100 µs/DIV	500 kHz
200 µs/DIV	250 kHz
500 µs/DIV	100 kHz
1 ms/DIV	50 kHz
2 ms/DIV	25 kHz
5 ms/DIV	10 kHz
10 ms/DIV	5 kHz
20 ms/DIV	2,5 kHz
50 ms/DIV	1 kHz
100 ms/DIV	500 Hz
200 ms/DIV	250 Hz
500 ms/DIV	100 Hz
1 s/DIV	50 Hz
2 s/DIV	25 Hz
5 s/DIV	10 Hz
10 s/DIV	5 Hz
20 s/DIV	2,5 Hz
50 s/DIV	1 Hz
100 s/DIV	0,5 Hz

[3)] in 1-channel operation

Measurement range kV	*Range*	*Y-deflection*	*Tolerance*
	±8 k V	1 kV/DIV	±15 % of m. ±200V
	±20 k V	2,5 kV/DIV	±15 % of m. ±400V
	±40 k V	5 kV/DIV	±15 % of m. ±800V
	The size of the measurement error depends on the insulation of the ignition cable and is valid for the usage in vehicle systems with mechanical distributors. The kV input and the kV pick-up (ignition voltage adapter) together form a capacitive voltage divider. An adjustment of the VAS 6356 to the ignition system with static high voltage distribution can be made by an external wiring of the respective ignition adapter.		
Input trigger clamp	To determine the time of the ignition at high-voltage cables (secondary side of the ignition coil)		
Trigger functions	Trigger channel	DSO1, DSO2, Current pick-up, Trigger clamp or kV-pick-up	
	Trigger connection	AC, DC, HF, LF	
	Trigger edge	positive, negative	
	Trigger level	automatic or adjustable in 1% Steps from the measurement range	
	Trigger delay	pre-trigger and post-trigger, adjustable in 10% Steps from the deflection	
	Trigger mode	single, normal, Auto, Auto-Level, Auto set-up, Draw mode	

Disposal:

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

8 Terms

Table 9-1 Terms and explanations

Term	Explanation
ASAM-ODX	Association for Standardisation of Automation and Measuring Systems - Open Diagnostic data eXchange. ASAM ODX electronic control units are built in LT3 commercial vehicles in accordance with this standard. The diagnostic procedure and the diagnosis data can differ from those of the electronic control units in the protocols KWP1281/2000/6000, e.g. with the fault memory contents. ASAM ODX electronic control units work in accordance with the UDS protocol.
Direct current measurement	Current measurement, during which the tester is inserted directly in the current circuit like an ammeter. On the contrary: Inductive current measurement via a current pick-up clamped to the cable.
Firmware update	Software modification package for updating an existing firmware to a higher version.
Hardware	Hardware primarily refers to the device itself with its mechanical structure and display and control elements, and also the basic operation.
Start-up	Activity of the VAS 6356 between the switch on and being ready for operation.
Calibration (Test instruments)	Remove the measurement deviation of a testing device (e.g.: current pick-up).
Test instruments	You can use the test instruments to carry out tests yourself, the results of which are then displayed numerically or graphically. There is both a ↗ multimeter and an ↗ oscilloscope (DSO).
Multimeter	Represents measurement results numerically.
Oscilloscope	Measuring and display devices for electrical signals, which represents the timely course of the signal power in the display (e.g. oscillations).
USB	Universal Serial Bus. USB is a standardised interface for connecting, for example, keyboard, USB memory.

9 Index

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V

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VOLKSWAGEN AG

We have checked the contents of the documentation to ensure they correspond to the status described. Nevertheless deviations cannot be entirely excluded and we cannot therefore guarantee complete agreement. The information in this documentation is however regularly reviewed and any corrections necessary will be incorporated in the next edition. We will be grateful to receive suggestions for improvement.

Manufacturer:

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D-38436 Wolfsburg

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