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Safety precautions

CAUTION

Observe the following precautions to prevent personal injury as well as possible damage to the ignition system components.

- do NOT disconnect the CIS-E III control units until at least 20 seconds after switching off the ignition
- switch **OFF** the ignition before connecting or disconnecting components or test equipment
- connect and disconnect battery **ONLY** with ignition switched **OFF** otherwise the control unit could be damaged
- if the engine must be cranked but not started (for compression testing etc.) disconnect power output stage of ignition coil
- after each start attempt wait at least one minute before trying again
- do NOT crank engine with injectors removed
- do **NOT** use battery booster longer than one minute nor should 16.5 volts be exceeded
- do **NOT** wash engine unless ignition is switched **OFF**
- disconnect **BOTH** battery terminals whenever arc or spot welding
- before towing, vehicles with a defective ignition system (or where this is suspected) must have terminal **1** (green) of the ignition coil disconnected
- do **NOT** connect a condenser of any kind to terminal **1** of the ignition coil
- when installing noise suppressors, **ONLY** use 1000 ohms for high tension wires and 5000 ohms for spark plug connectors
- do **NOT** replace distributor rotor (marked **R1**) with a different type
- if the vehicle is heated up (e.g. in a painting booth) do **NOT** start the engine until it has had sufficient time to return to room temperature

CAUTION

Before disconnecting a customers battery; **ALWAYS** ask for the radio code (if equipped with an anti-theft radio).

Note

A variety of electrical connectors are used on this vehicle, **ALWAYS** use the **VW 1594** adaptor kit to connect test instruments to these connectors.

Fault memory, general information

There are **two** versions of CIS-E III fault memory:

49 state version

distinguishing feature:

Temporary fault storage which is erased each time the ignition is switched **OFF**.

You can identify **49 state** versions by control unit part numbers:

49 state fuel injection control unit:

443 906 264 **C**

49 state ignition control unit:

443 907 397 **C**

California version

distinguishing feature:

Permanent fault storage which is **not** erased each time the ignition is switched **OFF**.

Operational characteristics:

The **California** version causes the fault warning light to come **ON** whenever an emissions related fault occurs. The light remains **ON** while you drive for as long as the fault exists.

The light will go out after the problem is repaired or no longer exists. The fault code, however, will remain in memory until intentionally erased, section D2-125.

If **NON**-emission related faults occur, they will be stored in fault memory, but the fault warning light will **NOT** come on until you activate the fault display.

You can identify **California** versions by control unit part numbers:

California fuel injection control unit:

443 906 264 **B**

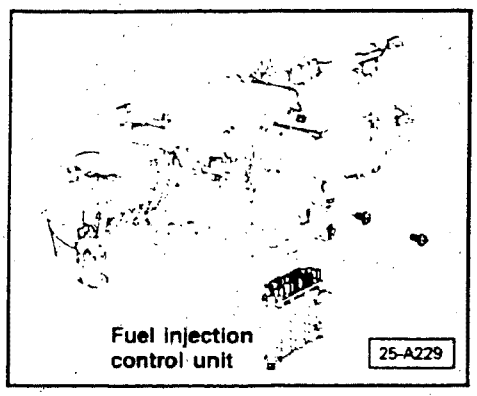
California ignition control unit:

443 907 397 **E**

CAUTION

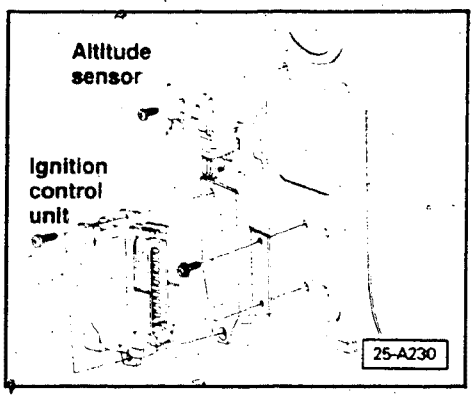
None of the control units can be interchanged between the two versions.

- display operation is the same for both versions
- control unit location is the same for either version



Fuel injection control unit, location

Located behind the A/C evaporator in the passenger footwell.

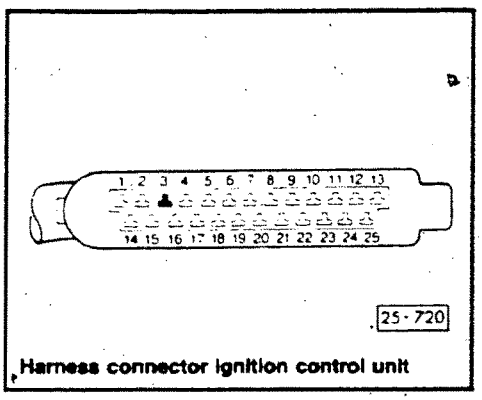


Ignition control unit, location

Located behind the right front kick panel in the A-pillar.

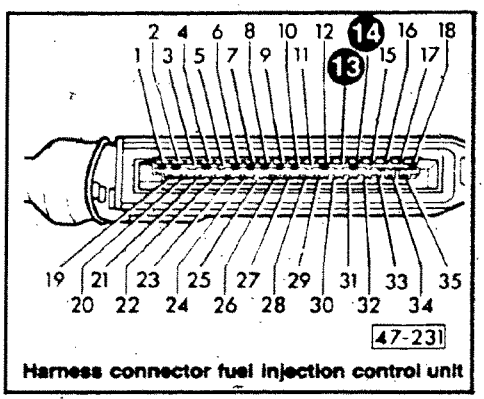
Note

Each control unit can store faults in the system as they occur. Stored faults can be displayed by activating the fault warning lamp in the instrument cluster.



Harness connector ignition control unit

If the fault lamp does **NOT** light up with "ignition **ON**," but only after bridging the top of the fuel pump relay terminals, check wiring between terminal **3** of electronic ignition control unit and terminal **13** of fuel injection control unit according to wiring diagram.



Harness connector fuel injection control unit

If **NO** break in wiring

- connect LED tester **US 1115** between terminals **13** and **14** of the disconnected fuel injection control unit harness connector using **VW 1594** adaptor

  - each time the ignition is switched **ON**, the LED tester must blink approximately 3 times

If **NO**

- replace electronic ignition control unit.

Note

If you replace the control unit, check the ignition timing. Adjust if necessary. (see repair Group 28)

If the fault warning blinks while driving, knock regulation is at its maximum control limit.

Fault memory, activating

When a problem in either fuel or ignition systems occurs while driving the car, the fault warning lamp will light up.

When the engine is stopped (ignition turned off) the fault warning lamp will be off and the fault memory erased (49 states only).

To bring the fault warning back, drive the car for at least five minutes. Engine speed must be up to 3000 RPM and throttle opened fully, once (49 states only).

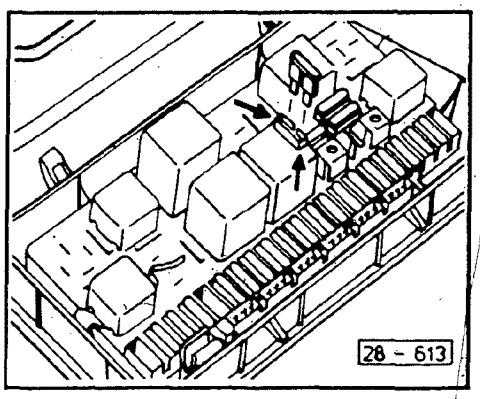
Use the fault memory system for troubleshooting even if fault warning light did NOT come on. Always start checking engine performance by going through the following procedure.

Fault memory, ignition system, checking

Check these first:

- Fault warning lamp **OK**
- Fuel pump relay **OK**
- Fuses **13, 24** and **28 OK**
- Fuse **19 OK** (California only)
- A/C switched **OFF**
- Ground connection between engine compartment, intake manifold, ignition coil power stage and compartment **OK**

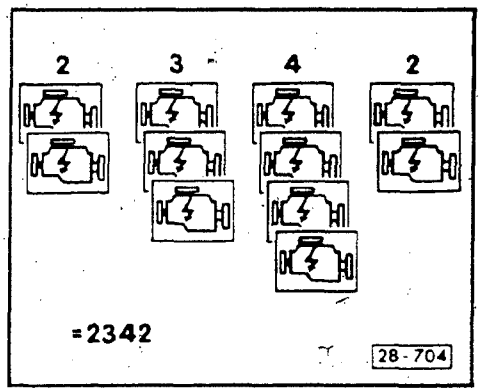
■ drive car for at least five minutes



Do NOT turn the ignition off.

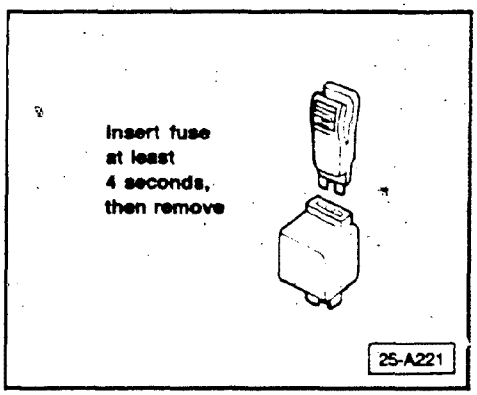
- insert any spare fuse in the fuel pump relay for at least four seconds, then remove fuse

  Fault warning lamp in instrument cluster will flash a code consisting of groups of one, two, three or four flashes



- Count the flashes and write them down. If you miss the sequence the first time, the code will repeat until you are ready for the next code. See example of **2342**

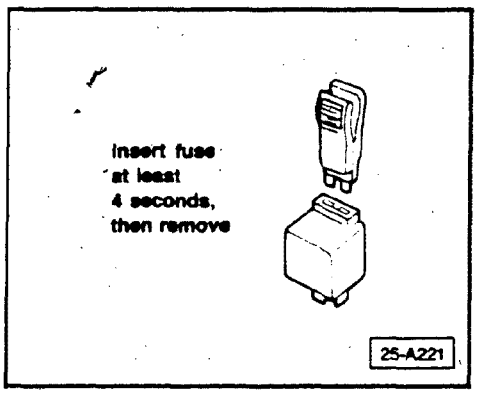
  If you get a **4444** signal it means that no faults were stored in the ignition control unit



Note

You will read faults in two steps: first for the ignition system, second for the fuel injection system.

- insert fuse again in fuel pump relay for four seconds and write down next code
- Repeat until you see a signal that comes on the 2.5 seconds and then goes off for 2.5 seconds repeatedly. Write this code down as 0000. This is the end of the ignition system check.



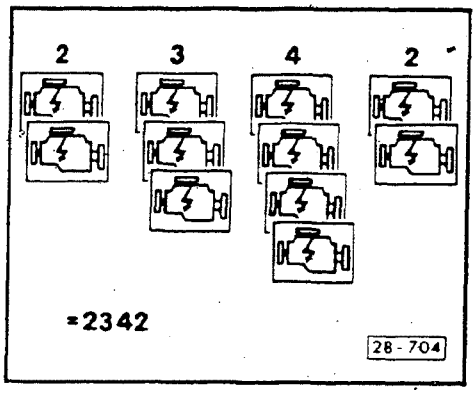
Fault memory, fuel injection system, checking

When you have finished checking the ignition system for possible codes, you can begin checking the fuel injection system.

Note

The engine idle speed may increase slightly when the fuel injection signal is activated.

- insert any spare fuse in fuel pump relay for at least four seconds, then remove fuse



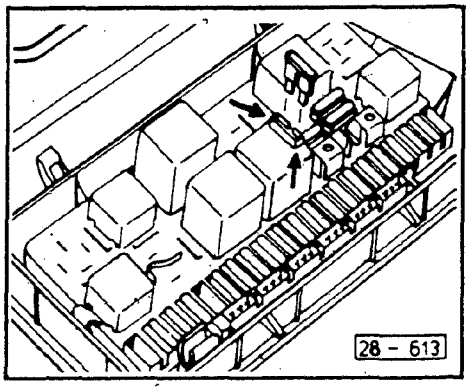
Fault warning lamp in instrument cluster will blink a code consisting of groups of one, two, three or four flashes

- Count the blinks and write them down. If you miss the sequence the first time, the code will repeat until you are ready for the next code. See example **2342**

  If you get a **4444** signal it means that no faults were stored in the fuel injection control unit memory

- Repeat until you see a signal that comes on for 2.5 seconds and then goes off for 2.5 seconds repeatedly. Write this code down as **0000.** This is the end of the fuel injection system check

Permanent fault memory, erasing



To erase the contents of the fault memory on **California** version **ONLY**:

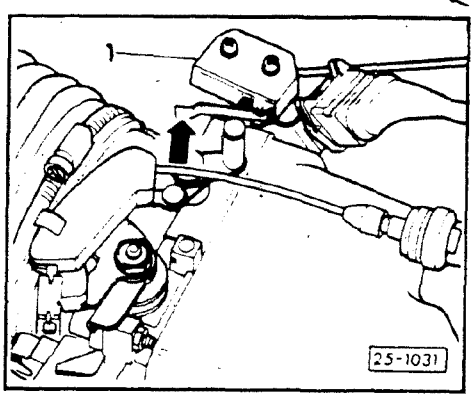
- insert fuse in top of fuel pump relay with ignition **OFF**
- turn ignition **OFF**
- wait at least 4 seconds then remove fuse
- repeat this step 3 times until indicator flashes code **4443**

  - a signal should appear that comes on for 2.5 seconds and then goes off for 2.5 seconds, repeatedly

- reinsert fuse in top of fuel pump relay
- wait at least **TEN** seconds, then remove fuse

  - if the fault warning lamp now stays on continuously, you have successfully cleared the fault memory

Code	Component checked	Operating cycle
4341	Differential pressure regulator	10mA current flow to regulator when full throttle switch is closed
4343	Carbon canister shut-off solenoid	Clicks **ON** and **OFF** when full throttle switch is closed
4431	Idle stabilizer valve	Clicks when full throttle switch is closed
4443	Cold start valve	Clicks **ON** and **OFF** for a maximum of 10 seconds when full throttle switch is closed



Output checks

Note

The control units can also generate output signals to check the operation of certain components. By inserting the fuse in the top of the fuel pump relay with the ignition switched **OFF**, the system to the output checks.

The system will now generate four separate output signals, each one in a separate step, when the ignition is turned **ON**. If the starter is operated of the engine has been run, the system will switch to the input checks.

The fuse **must** be inserted before the ignition is switched **ON**.

- to switch from one step to the next, insert the fuse into the top of the fuel pump relay

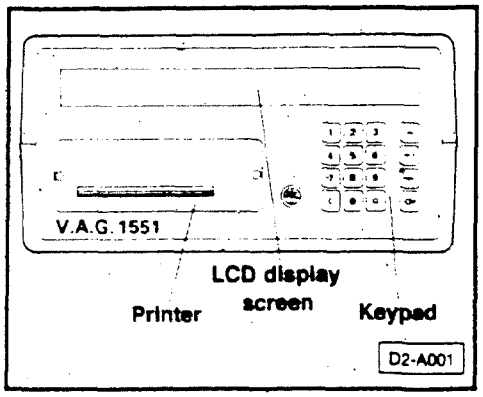
Note

The fault warning light will then flash a code to indicate which test step the system is in.

Output signals will only be generated when the full throttle switch is closed (**arrow**).

If a problem is found, first check the components with multimeter **US 1119** for an open or short circuit, then check the wiring.

VAG 1551 tester, general information



The **VAG 1551** tester is a diagnostic tool that reads system faults recorded by control units equipped with permanent fault memories.

VAG 1551 tester, features and operation

C **Cancel (or Clear) key**

- push this key to cancel an input or to stop the program from running

Q **Q (or Enter) key**

- push this key after making inputs
- push this key anytime a **Q** is displayed in the upper right hand corner of the LCD display

Arrow (or Run) key

- push this key to advance to the next step in your sequence
- push this key anytime the ➡ is displayed in the upper right hand corner of the LCD display

HELP **Help key**

- pushing this key also selects the printer function
- push this key to obtain additional operating instructions or explanations of tester functions
- push this key to obtain hints for possible problems when the **VAG 1551** does not respond the way you think it should
- push this key to obtain a list of the Address Words and Function Words to supply the **VAG 1551** when it asks for them

PRINT **Print key**

- push this key whenever you want a printed copy of the information in the display window

Note

The printer is **ON** whenever the LED in the button is lit.

Printer paper advance key

- push this key to advance the paper **BEFORE** you tear it off of the tester

VAG 1598 Test box, description

The **VAG 1598** test box and adaptor set was introduced in May of 1989. It consists of a main harness with test box (that universally connects to all of the adaptor harnesses) and a set of adaptor harnesses. A hardshell storage case is provided to protect the set when not in use.

The **VAG 1598** is used in conjunction with several other pieces of test equipment consisting of:

- **US 1119** multimeter
- **US 1115** LED tester
- **VW 1594** adaptor wire kit

Note

New adaptor harnesses will be made available for the **VAG 1598** in the future as new applications require them.

VAG 1598 advantages:

- the fragile terminals in the control unit connector no longer risk damage from test leads and probe connections. Connections formerly made on the control unit connector are now made on the **VAG 1598** test box which has large conveniently accessible terminals
- raised, highly visible numbers on the test box eliminate any uncertainty as to connector terminal numbering
- certain components (e.g. Hall sender) can now be checked dynamically (engine running)
- electrically checking miniature and unusual size terminals is now made possible regardless of terminal size
- standard size adaptors are used to make and test all connections resulting in dependable, accurate measurements

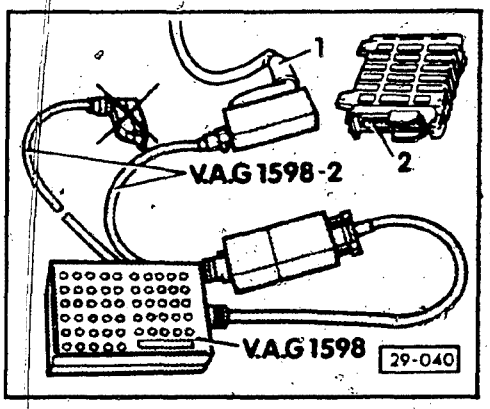
VAG 1598 Test box, connecting

Example: CIS-E III Fuel Injection system control unit

- select the appropriate adaptor harness from the list (based on the connector you wish to connect to) for this example use adaptor harness **VAG 1598/2**
- connect adaptor harness **VAG 1598/2** to main test box harness by joining the two rectangular connectors, then tighten via knobs on main harness connector

Note

The rectangular connector which is on every adaptor cable can only be connected one way. Examine the connector and you will see where the threaded connectors of the test box harness attach to the adaptor connector.



- disconnect Fuel Injection control unit harness connector 1 from control unit
- connect test adaptor **VAG 1598/2** male connector to control unit harness connector 1

Note

In this example the wiring up to the control unit is being checked statically, making it un-necessary to connect the control unit to the adaptor harness; however, for dynamic checks you will have to make this connection.

Fault memory, activating

CAUTION

Starting with model year 1989:

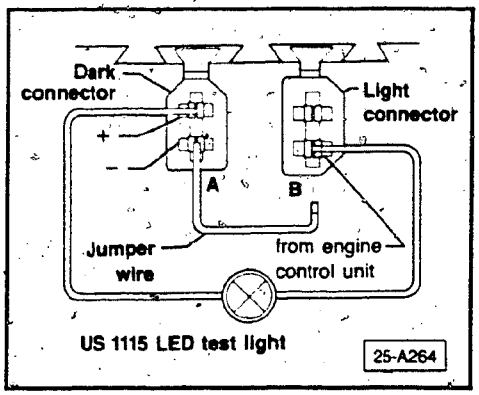
NEW diagnostic test connectors (for fault code activation and display) have been installed in the driver's side footwell.

It will no longer be possible to activate the fault memory by means of the fuel pump relay on these vehicles.

Existing repair procedures that refer to fault code activation via the fuel pump relay **remain the same** with the exception that the **NEW** diagnostic connectors outlined on this page **MUST** be used **INSTEAD** of the fuel pump relay.

The instrument panel fault lamp will remain functional **ONLY** in vehicles with OBD capability.

The fault lamp has been deleted from "**49 States**" vehicles.



US 1115 LED test light

Dark colored connector **A**: contains **two** terminals; power (which is protected via fuse **21**) and ground (observe the shape: angled corners on the short side).

Light colored connector **B**: contains a **single** terminal from the engine control unit (observe the shape: angled corners on the long side).

Use the **NEW** connectors to display the contents of the fault memory (as well as System Output Checks, where installed) by using the **US 1115** LED tester as follows:

- connect positive terminal of **US 1115** LED tester to the positive terminal in connector **A**
- connect negative terminal of **US 1115** LED tester to the (only) terminal in connector **B**

- connect one end of a jumper wire to the negative terminal in connector **A**, touch the other end to the terminal in connector **B** for at least 4 seconds

  - fault codes will now be displayed (as flashing) by the **US 1115**

To advance to the next fault code in the sequence:

- touch the free end of the jumper wire to the terminal in connector **B** again for a minimum of four seconds

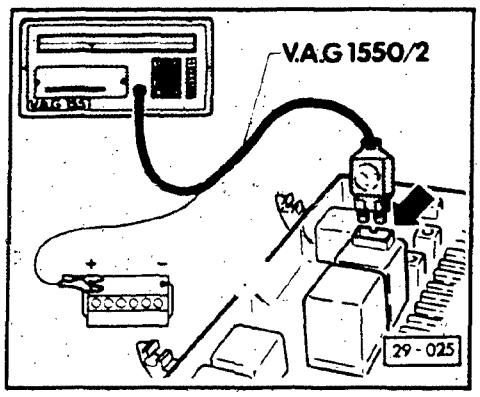
Note

This procedure achieves the same result as installing a fuse in the fuel pump relay for 4 seconds as in the 1988 fault code system.

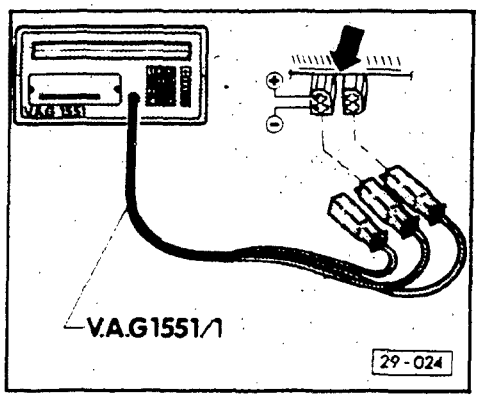
VAG 1551 Diagnostic Tester, connecting

Model year 1988:

- remove central electric cover



- connect **VAG 1551** to fuel pump relay (**arrow**) using adaptor **VAG 1551/2**, connect single wire on adaptor to battery positive (+)



Beginning model year 1989

- connect **VAG 1551** diagnostic tester to diagnostic connectors (above pedal (s) in drivers side footwell) using **VAG 1551/1** connector harness as follows:
  - **BLACK** wire to **BLACK** diagnostic connector
  - **WHITE** wire to **BROWN** diagnostic connector
  - **BLUE** wire – **NOT** connected

Note

Voltage supply is via fuse **21**.

Fault memory, activating/interrogating using VAG 1551

Requirements

- fuses **13**, **21**, **27**, and **28** must be **OK**
- A/C switched **OFF**
- engine ground connection (near ignition distributor) **OK**

Notes

The fault memory must first be interrogated before it can be erased.

Using the **VAG 1551** tester eliminates the possibility of interpretive or written errors because the faults can be both displayed and printed by the tester.

If engine **CANNOT** be started:

- connect **VAG 1551** tester (see section D2-170)
- operate starter for about 6 seconds but do **NOT** switch ignition **OFF** afterwards
- activate fault memory (see next page)

If engine **CAN** be started:

- test drive vehicle for at least 5 minutes

During test drive

- coolant temperature must reach 80°C (176°F) minimum
- engine speed must exceed 3000 rpm
- accelerator pedal must be fully depressed at least once

- after test drive, allow engine to idle for at least 2 minutes
- switch **OFF** ignition
  - engine must **NOT** be re-started

CAUTION

A portion of the fault memory is erased when the engine is started. Adhere to the sequence in the following procedure so that **ALL** faults are recognized. Do **NOT** skip any of the steps.

Activating fault memory

- connect **VAG 1551** tester (see section D2-170)
- switch **ON** ignition but do **NOT** start engine
  - display should then alternate between the two following displays:

VAG – SELF-DIAGNOSIS HELP
1 – Rapid data transmission

VAG – SELF-DIAGNOSIS HELP
2 – Blink code output

- press **2** to select Blink code output
  - display will appear as follows:

Blink code output HELP
Initiate with the ➡ button

- depress ➡ button
  - display will appear as follows:

*** Blink code output will be initiated!**

- press ➡ button and hold until following display appears

Blink code output, continuous short circuit on permanent ground exciter wire

Note

The asterisk in the upper left hand corner of the display will now start to flash. The asterisk flashes just as LED tester **US 1115** would if it were connected to the system instead.

The **VAG 1551** will count the number of flashes and convert them into a four digit fault code.

If **NO** faults are stored in the memory, the following display will appear:

Blink code 4444 ➡
No fault recognized

- switch **OFF** ignition but do **NOT** erase fault memory

If a fault in the system is found, the **VAG 1551** will display the appropriate fault code, a description of the fault and an alphanumeric code for the faulty component.

This alphanumeric code is the same code used on the wiring diagrams and in the troubleshooting tables. For example:

Blink code 2232
Air flow sensor – G70/G19

- press the ➡ button to advance to the next fault (if any)
  - display will appear as follows:

Blink code XXXX
Blink code signal is continued

If another fault is found it will be displayed as before.

If **NO** additional faults are found, the display will appear as follows:

Blink code 0000 ➡
Output end

If the vehicle being tested features more control units with fault memory, the blink code of the next control unit can be started by pressing the ➡ button.

If no other control units are to be tested, the following display will appear:

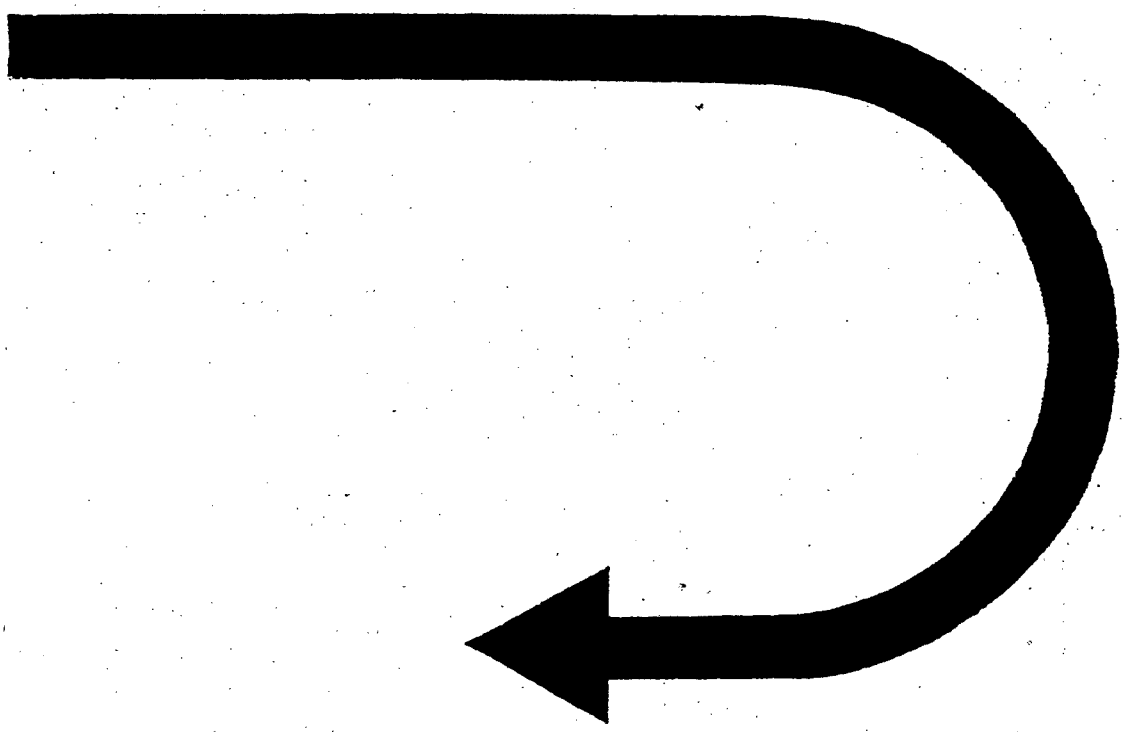
Blink code output ➡
is ended!

- switch **OFF** ignition
- *press* **C** *button once*
- repair the faults and then erase the fault memory, see section D2-190

- take vehicle for another road test (minimum of 5 minutes)
- check fault memory again to verify that **ALL** faults have been corrected

CONTINUED IN THE

BEGINNING OF NEXT ROW



Fault memory, erasing (using VAG 1551 in mode 2, blink code output)

- connect **VAG 1551** tester (if not already connected, see section D2-170)
  - display should then alternate between the two following displays:

    VAG – SELF-DIAGNOSIS **HELP**

    1 – Rapid data transmission

    VAG – SELF-DIAGNOSIS **HELP**

    2 – Blink code output

- press **2** to select Blink code output
  - display will appear as follows:

    Blink code output **HELP**

Initiate with the ➡ button

- depress ➡ button
  - display will appear as follows:

    *** Blink code output will be initiated!**

- press ➡ button and hold until following display appears

Blink code output, continuous short circuit on permanent ground exciter wire

- switch **ON** ignition and push ➡ button briefly
  - following display will appear:

    Blink code 0000

    End output

- press ➡ button
  - ignition still switched **ON** for at least 5 seconds
  - **VAG 1551** connected

  Fault memory is erased.

Fault codes, troubleshooting chart

Code	Location of fault	Problem	Repair procedures
1111	Ignition control unit or fuel injection control unit	Defective memory circuits in control unit	Replace control unit(s)
2121	Idle switch	Switch stuck closed or problem in wiring to switch	Check idle switch and wiring
2122	Engine speed signal or Hall sender	No engine speed signal from Terminal **17** of ignition control unit to Terminal **30** of fuel injection control unit	Repair break in wiring using wiring diagram or check Hall sender and ignition control unit power according to the wiring diagram
2123	Full throttle switch	Switch stuck closed or problem in wiring to switch	Check full throttle switch and wiring see Repair Group 25
2132*	No data being transmitted from fuel injection control unit to ignition control unit	Disconnected or open wire between ignition control unit Terminal **5** and fuel injection control unit Terminal **1** or Ignition control unit Terminal **3** and fuel injection control unit Terminal **13** or Defective control units	Solution: check wiring Replace control unit(s)
2141	Knock regulation	Engine or ignition knock is causing timing to be retarded the maximum amount	Check ignition distributor basic adjustment, compression, and injection system, check fuel octane Check knock sensor wiring using wiring diagram
2142	Knock sensor	Defective sensor or sensor wiring	Check wiring between knock sensor and ignition control unit according to wiring diagram
2223	Altitude sensor	No signal from sensor	Check altitude sensor and wiring see Repair Group 25

Code	Location of fault	Problem	Repair procedures
2232	Air flow sensor potentiometer	No signal from potentiometer to fuel injection control unit or break in wire between fuel injection control unit Terminal **21** and ignition control unit Terminal **8**	Check potentiometer (on air flow sensor) and wiring see Repair Group 25 Repair break in wiring using wiring diagram
2233	Reference (supply) voltage for air flow sensor potentiometer and altitude sensor	No reference voltage from Terminal **21** of ignition control unit to Terminal **26** of fuel injection control unit	Check wiring between ignition control unit and fuel injection control unit using wiring diagram
2312	Coolant temperature sensor	No signal from sensor	Check coolant temperature sender and wiring see Repair Group 25
2341	Oxygen sensor control	Oxygen sensor control operating at rich or lean limit	Check oxygen sensor and wiring between fuel injection control unit see Repair Group 25
2342	Oxygen sensor	No signal from sensor	Check oxygen sensor wiring. See wiring diagram
4431	Idle stabilizer valve	Problem in wiring to idle stabilizer valve	Check wiring for idle stabilizer valve using wiring diagram or perform differential pressure regulator diagnosis see Repair Group 25
4444	No faults stored in memory	—	—
0000	End of diagnosis	—	—

*California only

Note

If the only fault codes displayed are **2121**, **2123** and **2223** first check the wiring from the control unit to the component.

Output checks

using VAG 1551 in Mode 2 (Blink code output)

Notes

Output checks can only be performed when the engine is NOT running.

Output checks will stop being transmitted if the engine is started or if a speed impulse is recognized.

During the output check diagnosis, the carbon canister solenoid valve, the Idle stabilizer valve and the Cold start valve are checked audibly or by touch. Avoid background noise while audibly checking these components.

The Fuel pressure regulator is checked by measuring the Differential pressure regulator current with the Full throttle switch activated.

To repeat the output checks, switch the ignition **OFF** and then switch it back **ON** but do **NOT** start the engine.

Output checks occur in the following triggering sequence:

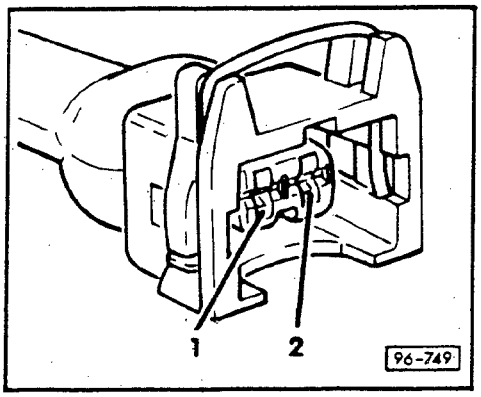
4341	Fuel pressure regulator (**N 73**)
4343	Carbon canister solenoid valve (**N 80**)
4431	Idle stabilizer valve (**N 71**)
4443	Cold start valve (**N 17**)

Output checks requirements

- Full throttle switch **OK**
- Fuel pressure regulator prepared for checking, see below:

Fuel pressure regulator, preparing for output checks

- disconnect differential pressure regulator harness connector
- switch multimeter **US 1119** to 20 volt DC range



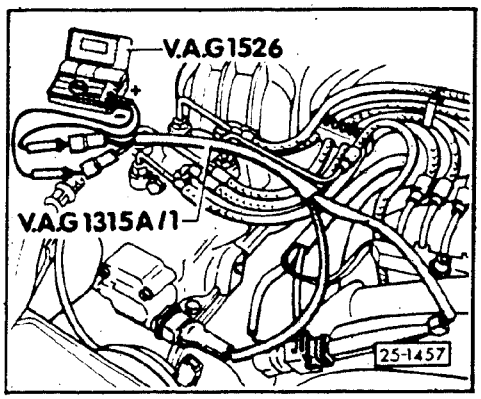
- connect multimeter to terminal **2** of harness connector and ground using **VW 1594** adaptor kit
- switch **ON** ignition
  - must be between 4.5 and 5 volts
- switch **OFF** ignition
- reconnect multimeter between terminals **1** and **2** of harness connector
- switch **ON** ignition
  - must be between 4.5 and 5 volts

If voltage values are **NOT** obtained

- check Differential pressure regulator triggering circuit, using wiring diagram, replace or repair as necessary

If voltage values **ARE** obtained

- switch **OFF** ignition



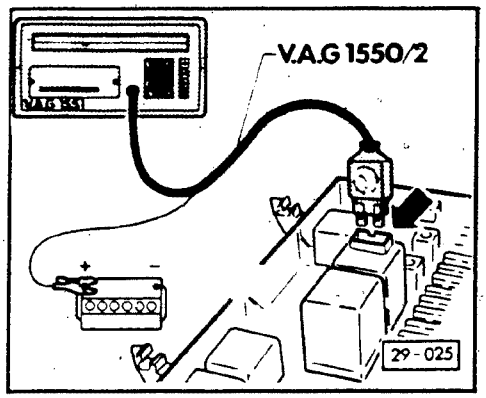
- connect test adaptor **VAG 1315A/1** between Differential pressure regulator harness connector and regulator
- switch multimeter **US 1119** to 200 mA DC range
- connect multimeter to **VAG 1315A/1** adaptor using **VW 1594** adaptor kit

Output check diagnosis, activation

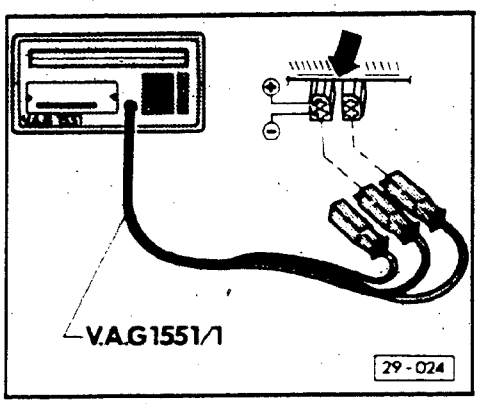
- switch **OFF** ignition

Model year 1988:

- remove covering from fuse relay panel



- connect **VAG 1551** diagnostic tester to fuel pump relay (**arrow**) and battery (+) positive terminal using **VAG 1551/2** adaptor harness



Starting model year 1989:

- connect **VAG 1551** Diagnostic tester to diagnostic connectors in drivers side footwell (above and to left of pedals):
  - black wire to black diagnostic connector
  - white wire to brown diagnostic connector
  - blue wire **NOT USED**
  - voltage supply via fuse **21**

All model years:

- switch **ON** ignition but do **NOT** start engine
  - display should then alternate between the two following displays:

VAG – SELF-DIAGNOSIS HELP
1 – Rapid data transmission

VAG – SELF-DIAGNOSIS HELP
2 – Blink code output

- press **2** to select Blink code output
  - display will appear as follows:

Blink code output HELP

Initiate with the ➡ button

- depress ➡ button
  - display will appear as follows:

* **Blink code output will be initiated!**

- press ➡ button and hold until following display appears

Blink code output, Continuous short circuit on permanent ground exciter wire

- push ➡ button briefly
  - display will appear as follows:

Blink code 4341

Pressure regulator N 73

- actuate full throttle switch and hold in position
  - current must be approx. 10 mA

Note

The current value will be displayed for as long as the full throttle switch is activated

If current value is **NOT** obtained

- check wiring between component and control unit using wiring diagram, replace or repair as necessary

If current value is obtained

- push ➡ button briefly
  - display will appear as follows:

    Blink code 4343 Solenoid valve I for carbon canister N 80

- actuate full throttle switch and hold in position
  - solenoid I for carbon canister is triggered (should vibrate and hum)

If solenoid valve is **NOT** triggered

- check wiring between component and control unit using wiring diagram, replace or repair as necessary
- push ➡ button briefly
  - display will appear as follows:

    Blink code 4431
    Idle stabilizer valve N 71

- actuate full throttle switch and hold in position
  - idle stabilizer valve is triggered (should vibrate and hum)

If idle stabilizer valve is **NOT** triggered:

- check wiring between component and control unit using wiring diagram, replace or repair as necessary
- push ➡ button briefly
  - display will appear as follows:

    Blink code 4443
    Cold start valve N 17

- actuate full throttle switch and hold in position
  - cold start valve is triggered (should vibrate and hum)

If cold start valve is **NOT** triggered:

- check wiring between component and control unit using wiring diagram, replace or repair as necessary

California ONLY:

- push ➡ button briefly
  - fault memory is erased
- switch **OFF** ignition

Fault code, troubleshooting chart

- The following charts list all of the possible faults that can be detected by the CIS-E III fuel and ignition control units. These faults are displayed directly on the **VAG 1551** diagnostic tester.
- If components are indicated as faulty, first check the wiring to the component for shorts or disconnections using the wiring diagram.
- Before correcting a fault or replacing components, check the Fuel and Ignition control units for proper ground connections.
- Check engine ground connections for corrosion or damage. Replace or repair as necessary.
- If Fault codes **2121**, **2123** or **2223** are indicated ALONG with the fault code for a control unit; first check the wiring between that control unit and the fault coded component for a disconnection.
- Engine warning light will flash while driving when knock control is at control limit (model year 1988)
- If idle speed increases in excess of 1200 rpm (engine warm) but lies within the specified range after restarting engine (see fault codes **2122** and **2232**) possible causes include loose terminals in the air flow sensor potentiometer harness connector or between terminal **17** of the Ignition control unit (**J 154**) and terminal **30** of the Fuel injection control unit (**J 21**).

CAUTION

If the ignition control unit (**J 154**) is replaced, **ALWAYS** check the ignition timing (see Repair Group 28), adjust timing if necessary.

Fault code listing

Fault Code (display on VAG 1551)	Description	Fault location	
		Ignition Control Unit	Fuel Injection Control Unit
1111	Control unit faulty	X	X
1231	Speed sensor (G 68)*		X
2121	Idle switch (F 60)	X	X
2122	Speed information missing		X
2123	Full throttle switch (F 81)	X	X
2141	First knock regulation	X	
2142	Knock sensor I (G 61)	X	
2223	Altitude sensor (F 96)	X	X
2232	Air Flow Sensor (G 70/G 19)	X	X
2233	Air Flow Sensor Ref. Voltage (G 70)	X	
2312	Coolant Temperature Sensor (G 62)	X	X
2341	Oxygen Sensor Control		X
2342	Oxygen Sensor (G 39)		X
4431	Idle Stabilizer Valve (N 71)		X
4444	No Fault recognized	X	X

Additional Fault codes for California Vehicles ONLY

2132	Data Wiring Defective		X
2411	Exhaust Gas Recirculation System		X

*The **VAG 1551** displays component **G 68**, this is a software error. It **should** have displayed **G 22**.

Fault Code and display on VAG 1551	Problem	Repair
1111 Control unit faulty	Fault in processor section of Fuel injection control unit (**J 21**)	Replace Fuel injection control unit
	Fault in processor section of Ignition control unit (**J 154**)	Replace Ignition control unit
1231 Trans. speed sender (**G 68**)	Disconnected wire between instrument cluster and Fuel injection control unit	check wiring between terminal **29** of Fuel injection control unit and instrument cluster, using wiring diagram
	Disconnected wire or short to (**G 68**)	
Troubleshooting hint: If fault **1231** is indicated, first check if speedometer is **OK**. If speedometer is defective; repair or replace and ignore fault code. If the speedometer is **OK** but the engine stalls during deceleration; first check the Trans. speed sender (**G 68**) and related wiring, then check the Fuel injection control unit (**J 21**) and related wiring. Repair or replace as necessary.		
2121 Idle Switch (**F 60**)	Accelerator cable out of adjustment	Adjust accelerator cable, see Repair Group 20
	Idle switch (**F 60**) out of adjustment	Adjust Idle switch
	Idle switch (**F 60**) wiring shorted or disconnected	Repair as necessary
	Idle switch (**F 60**) hung up mechanically	Repair as necessary
2122 Engine speed signal missing	Disconnection between terminal **17** of Ignition control unit (**J 154**) and terminal **30** of Fuel injection control unit (**J 21**).	Determine disconnection using wiring diagram
	No rpm signal from Ignition control unit (**J 154**) to fuel injection control unit via knock control	
	Hall sender (**G 40**) faulty	Check Hall sender, replace if necessary
	Ignition control unit (**J 154**) or related wiring, defective	Check control unit, repair wiring or replace control unit as necessary

Fault Code and display on VAG 1551	Problem	Repair
2123 Full throttle switch (F 81)	Full throttle switch out of adjustment	Adjust switch, see Repair Group 25
	Short or open in switch	Electrically check switch, replace or repair as necessary
	Switch hangs up mechanically	Check operation, repair or replace as necessary
2132 Data wiring defective (**Code for California ONLY**)	Disconnection between terminal **5** of Ignition control unit (**J 154**) and terminal **1** of Fuel injection control unit (**J 21**)	Determine disconnection using wiring diagram
	or	
	Disconnection between terminal **3** of Ignition control unit (**J 154**) and terminal **13** of Fuel injection control unit (**J 21**). Control unit defective	Determine disconnection using wiring diagram
2141 First knock regulation	Engine knocks or makes rattling sound	Check compression pressure, see Repair Group 15
		Check Fuel injection system, see Repair Group 25
		Check distributor ground
	Ignition timing point set wrong	Check ignition timing and adjust if necessary, see Repair Group 28
	Octane value of fuel too low • 87 AKI minimum	Replace fuel with higher octane; 91 AKI recommended
	Knock sensor shield, disconnected	Determine disconnection using wiring diagram
Troubleshooting hint: This fault code is accompanied by a slight power loss, a slight increase in fuel consumption and maximum power cannot be obtained.		

Fault Code and display on VAG 1551	Problem	Repair
2142 Knock sensor I (**G 61**)	Disconnected wire or short between Knock sensor I (**G 61**) and Ignition control unit (**J 154**)	Determine disconnected wire or short and eliminate using wiring diagram
	Knock sensor I (**G 61**) defective	Replace Knock sensor • 20 Nm (15 ft lb)
	Ignition control unit (**J 154**) fails to recognize knock signals	Replace Ignition control unit
2223 Altitude sensor (**F 96**)	Disconnected wire or short between Altitude sensor (**F 96**) and fuel injection control unit (**J 21**)	Check altitude sensor
	Altitude sensor defective	Replace altitude sensor
2232 Air Flow sensor (**G 70/G 19**)	Disconnected wire or short between Fuel injection control unit (**J 21**) and Potentiometer (**G 19**)	Check Potentiometer
	Disconnected wire between terminal **21** of Fuel injection control unit (**J 21**) and terminal **8** of Ignition control unit (**J 154**)	Determine disconnected wire or short and eliminate using wiring diagram
2233 Air flow sensor reference voltage (**G 70**)	Disconnection between terminal **26** of Fuel injection control unit (**J 21**) and terminal **21** of Ignition control unit (**J 154**)	Eliminate disconnection using wiring diagram
Note The reference voltage for load and altitude signals is monitored by the CIS-E III Fuel injection control unit and **NOT** as indicated on the **VAG 1551** diagnostic tester! The reference voltage is from the Air flow sensor potentiometer. NG engines do **NOT** have an Air mass sensor, using a Potentiometer instead.		
2312 Coolant temperature sensor (**G 62**)	Disconnection or short in sensor wire	Check Coolant temperature sensor
	Coolant temperature sensor (**G 62**) defective	Replace sensor

Fault Code and display on VAG 1551	Problem	Repair
2341 Oxygen sensor control	CO content not within specified range	Check idle and CO content see Repair Group 25, adjust as necessary
	Faulty ground connection to Oxygen sensor	Check wiring, using wiring diagram
	Charcoal canister solenoid valve I always open	Perform Output checks, see section D2-210
	Intake air boot and/or hoses have air leaks	Check system and hoses for air leaks
2342 Oxygen sensor (**G 39**)	Oxygen sensor (**G 39**) disconnected or defective	Check Oxygen sensor control, see Repair Group 25
2411 Exhaust Gas Recirculation system (California **ONLY**)	Vacuum lines disconnected, leaking or pinched	Check EGR system, see Repair Group 26
	EGR temp. sensor (**G 98**) faulty	—
	Driving fault, e.g. vibration, poor idle	—
	EGR valve faulty	—
	EGR system Frequency valve (**N 121**) faulty (poor starting)	—
	Disconnected wire between Speed sensor (**G 98**) or Frequency valve (**N 121**) and control unit	Check wiring using wiring diagram, replace or repair as necessary
4431 Idle Stabilizer valve (**N 71**)	Disconnected wire or short between Fuel injection control unit (**J 21**) and Idle stabilizer valve (**N 71**)	Check Idle stabilizer valve triggering using Output checks, see section D2-210
4444 No Fault recognized	If a fault exists, it was **NOT** recognized by self-diagnosis	—
0000 Output End	—	—