THE TOOL COMPANY

VOLKSWAGEN/AUDI
FAULT CODE READER

■ STOCK No.68081 ■ PART No.FCR-VW/AUDI

• INSTRUCTIONS •

IMPORTANT: PLEASE READ THESE INSTRUCTIONS CAREFULLY TO ENSURE THE SAFE AND EFFECTIVE USE OF THIS TOOL.

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06/2002

GENERAL INFORMATION

This manual has been compiled by Draper Tools and is an integrated part of the product with which it is enclosed and should be kept with it for future references.

This manual describes the purpose for which the product has been designed and contains all the necessary information to ensure its correct and safe use. We recommend that this manual is read before any operation or, before performing any kind of adjustment to the product and prior to any maintenance tasks. By following all the general safety instructions contained in this manual, it will ensure both product and operator safety, together with longer life of the tool itself.

All photographs and drawings in this manual are supplied by Draper Tools to help illustrate the operation of the product.

Whilst every effort has been made to ensure accuracy of information contained in this manual, the Draper Tools policy of continuous improvement determines the right to make modifications without prior warning.

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GUARANTEE

Draper Tools have been carefully tested and inspected before shipment and are guaranteed to be free from defective materials and workmanship for a period of 12 months from the date of purchase except where tools are hired out when the guarantee period is ninety days from the date of purchase.

Should the machine develop any fault, please return the complete tool to your nearest authorized warranty repair agent or contact Draper Tools Limited, Chandler's Ford, Eastleigh, Hampshire, SO53 1YF. England. Telephone: (023) 8026 6355.

If upon inspection it is found that the fault occurring is due to defective materials or workmanship, repairs will be carried out free of charge. This guarantee does not apply to normal wear and tear, nor does it cover any damage caused by misuse, careless or unsafe handling, alterations, accident, or repairs attempted or made by any personnel other than the authorised Draper warranty repair agent.

This guarantee applies in lieu of any other guarantee expressed or implied and variations of its terms are not authorised.

Your Draper guarantee is not effective unless you can produce upon request a dated receipt or invoice to verify your proof of purchase within the 12 month period.

Please note that this guarantee is an additional benefit and does not affect your statutory rights.

Draper Tools Limited.

SPECIFICATION

The Draper Tools policy of continuous improvement determines the right to change specification without notice.

Stock No. ..... 68081 .....

Part No. FCR-VW/AUDI .....

Vehicle
Volkswagen & Audi (Petrol Engines)

SUITABLE FOR:

Petrol vehicles with engine management/injection systems .....

Golf/Vento 1.4/1.8	1991-1995	Audi	
2.0 8V	1991-1995	80 1.6/2.0	<1993
Golf 2.0 16V	1992-1996	100 2.6	<1993
Passat 2.8 VR6: 2.0 16V 1.8	1993-1996	V8 4.2	<1993
		199 2.6 V6	<1993

Engine Codes:
ABM/ABT/AAM9A
ABC/ABF/ABD/AMM/ABS
ABH/VR6/AAA/2E-V6

SAFETY WARNING

Please read the following instructions carefully, failure to do so could lead to personal injury or damage to the vehicle.

1. Avoid a dangerous environment. Do not expose the fault code reader to rain, ensure the work area is well lit. Always store the code reader in its case when it is not in use.
2. When using this code reader on a vehicle it may involve carrying out tests with the engine running and the following points should be followed to avoid injury.

a) Wear proper clothing - do not wear loose clothing, neckties (rings, wrist watches) which could catch in moving parts. Non slip footwear is recommended. Wear a protective hair covering to contain long hair. Roll long sleeves above the elbow.

b) Do not over-reach - keep proper footing and balance at all times.

3. Never leave the code reader unattended when switched ON in a testing mode or when the code reader is carrying out test procedures. Always switch the code reader and vehicle's ignition off.
4. Always switch the engine off before leaving the vehicle.
5. Ensure the code reader is secure before starting any testing.
6. Check that all cables are kept clear of hot/moving parts.
7. Only run the engine in a well-ventilated non confined area. Do not inhale exhaust gases, as they are dangerous and can be fatal.
8. If working on a vehicle that requires jacking up, ensure the vehicle is well supported with suitable axle stands on a level surface and that the wheels are chocked.
9. When starting the vehicle ensure it is in neutral with the handbrake applied. Automatics, ensure the gearbox is in neutral/park and the parking brake is applied.

OPERATION AND USE

INTRODUCTION:

The engine control unit (ECU) fitted to the majority of Volkswagen/Audi vehicles are Bosh type. These include Motronic versions 2.3.2, 2.4, 2.7, 2.9, 3.2 and 3.8.2. Mono-Jetronic, KE-Motronic 1.1, 1.2, Mono-Motronic 1.1, 1.2 and KE-3 Jetronic, Simos, VAG Digifant, VAG MPi, VAG MPFi and Magneti Marelli 1AV.

NOTE: The Mono-Jetronic systems only regulate fuel and idle functions.

Each ECU system has a self test facility which continuously measures the signals from certain sensors and actuators around the engine. It compares the reading to a group of pre-set values, and determines if a fault is present. This fault will then remain logged in the memory, ready to be examined and corrected.

In Volkswagen/Audi systems the control module produces a 4 digit fault code for retrieval with the fault code reader.

The 4 pin self diagnosis connector is Black & White and is located in different locations according to the vehicle. (Refer to the vehicle manufacturer's or Haynes workshop manuals).

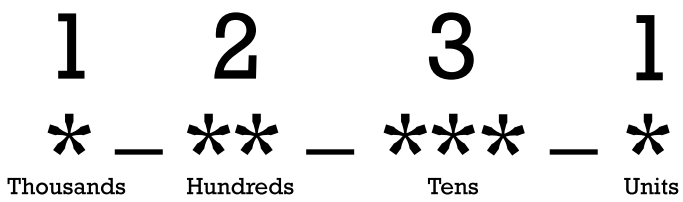
NOTE: It is possible to introduce new faults into the ECU when carrying out certain tests. Care must be taken that these do not mislead during diagnosis. Clear all codes after testing is completed.

LOS (Limited Operating Strategy):

The systems featured incorporate a function which on detection of certain faults, will revert to a set of default values allowing the vehicle to "limp home". Once the fault is cleared the ECM will revert back to the correct values.

UNDERSTANDING A FAULT CODE:

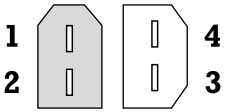
The four digit fault code will be represented by four series of flashes separated by a short pause. The first series indicate the thousands and the second indicates the hundreds and so on. A zero is represented by a three second flash for example;



OPERATION AND USE

READING FAULT CODES:

1. Ensure the vehicle ignition is in the 'OFF' position. Switch the fault code reader to the 'o' position. Securely connect the fault code reader to the self diagnosis connector.
2. Insert the flat connector with the brown/red lead into terminal 1, insert the flat connector with the blue lead into the terminal 2 and insert the flat connector with green/yellow lead into terminal 3. Terminal 4 remains unused.



3. Switch ignition 'ON', but do not start the engine.
4. Switch the fault code reader to the '-' position for 5 seconds and then switch it back to the 'o' position. The fault code will be transmitted and then repeated. Repeat this procedure to display further codes. When all the codes have been displayed the LED will continually flash.

   If the only code transmitted is 4444 there are no faults stored.
5. To finish the test, switch off the vehicles ignition and disconnect the fault code reader.
6. If any fault codes are present refer to page 6 for the diagnosis table.

ERASING THE FAULT CODES:

1. Once all the required repairs have been made, switch the fault code reader to the '-' position for 5 seconds and then switch back to 'o' again.
2. With the fault code reader connected to the vehicle as before. Test to ensure all the codes are cleared.
3. Road test the vehicle and once again test to ensure no codes have been re-introduced.

COMPONENT ACTIVATION:

The fault code reader can perform a function test on a limited section of components.

1. Connect the fault code reader to the 4 pin self diagnosis socket ensuring the reader is in the 'o' position.
2. Switch the ignition to the 'ON' position. Do not start the engine.
3. Switch the fault code reader to the '-' position for 10 seconds, then switch the fault code reader back to the 'o' position.
4. The LED will now transmit the fault codes. After all the fault codes have been transmitted open the throttle up to it's fullest position and back again. When the throttle is shut the test will begin.

   Injector valve 1 will activate 4 x

   Injector valve 2 will activate 4 x

   Injector valve 3 will activate 4 x

   Injector valve 4 will activate 4 x

This will continue through all the injectors. The idle speed control valve will activate and the carbon filter solenoid valve will activate.

5. To finish the test, switch off the vehicles ignition and disconnect the fault code reader.

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FAULT CODE TABLE

FAULT CODE READING	CODE DESCRIPTION
0000	End of fault code output
1111	Internal ECM failure
1231	Vehicle speed sensor (VSS) or VSS circuit
1232	Throttle pot sensor (TPS) or TPS circuit
1232	Idle speed stepper motor (ISSM) or ISSM circuit
2111	Engine speed (RPM) sensor or RPM sensor circuit
2112	Top dead centre (TDC) sensor or TDC circuit
2112	Crank angle sensor (CAS)
2113	Hall-effect sensor (HES) or HES circuit
2114	Distributor
2121	Idle speed stepper motor (ISSM) idle contacts
2121	Ignition control valve circuit failure (alternative code)
2122	No engine speed signal
2123	Throttle switch (TS), full load switch
2141	Knock control 1 (ECM)
2142	Knock sensor (KS) or KS circuit
2142	AT signal missing (alternative code)
2143	Knock control 2 (ECM)
2144	Knock sensor (KS) 2 or KS circuit
2212	Throttle pot sensor (TPS) fault or TPS circuit
2214	Maximum engine speed exceeded
2222	Manifold absolute pressure (MAP) sensor circuit
2223	Atmospheric pressure sensor (APS) or APS circuit
2224	Turbocharger maximum boost pressure
2231	Idle control
2232	Vane airflow sensor (AFS) or AFS circuit
2232	Mass airflow (MAF) sensor or MAF sensor circuit
2233	Vane airflow sensor (AFS) or AFS circuit
2233	Mass airflow (MAF) sensor or MAF circuit
2234	Supply voltage incorrect
2242	CO pot or CO pot circuit
2312	coolant temperature sensor (CTS) or CTS circuit
2314	Engine/gearbox electrical connection
2322	Air temperature sensor (ATS) or ATS circuit
2323	Vane airflow sensor (AFS)
2323	Mass airflow (MAF) sensor (alternative code)
2324	Vane airflow sensor (AFS)
2324	Mass airflow (MAF) sensor (alternative code)
2341	Oxygen sensor (OS) control operative
2342	Oxygen sensor (OS) or OS circuit
2343	Mixture control adjustment, weak
2344	Mixture control adjustment, rich
2413	Mixture control limits
4332	Electronic control module (ECM)
4343	Carbon filter solenoid valve (CFSV) or CFSV circuit
4411	Injector No. 1 or injector circuit
4412	Injector No. 2 or injector circuit
4413	Injector No. 3 or injector circuit
4414	Injector No. 4 or injector circuit
4421	Injector No. 5 or injector circuit
4431	Idle speed control valve (ISCV) or ISCV circuit
4442	Turbocharger boost pressure solenoid valve
4444	No faults found in the ECM, proceed with normal diagnostic methods

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