

# RENAULT

## Technical Note 3504A

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### PETROL INJECTION FAULT FINDING

COMPUTER TYPE: SIRIUS 32  
PROGRAM N°: E1  
VDIAG N°: All

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*This note cancels and replaces the fault finding section of Technical Notes:  
2960A - 3056A - 3069A - 3079A - 3107A - 3177A - 3182A - 3194A - 3214A - 3286A - 3287A - 3307A*

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EDITION ANGLAISE

"The repair methods given by the manufacturer in this document are based on the technical specifications current when it was prepared.

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# List of vehicles concerned

<i>Vehicle</i>	<i>Type</i>	<i>Engine</i>
Twingo	CO6Y CO6G - CO68 - SO68	D7D D7F
Kangoo	XCOY XCOF - XCO1 XCOM XCOO XCOB - XCOM XCOB - XCOM	D7D D7F E7J K7M K4J K7J
Clio	XBOY XBOF - XB1K - XB1O XBOS XBOB - XB17 - XBO3 - XBOL - XBOP XBOB - XBO3 - XB17 XBOO - XBO1 - XB1J - XBOM - XBOT XBOM - XB1C - XB1S - XB15	D7D D7F E7J K4J K7J K4M F4R
Mégane	XAOV XAOD - XAOW - XA1O XA1C XAOB - XAO4 - XA11 - XAOO - XA1K XA1M - XA12 - XA1D - XA1L	E7J K4J K7M K4M F4P
Scénic	JAOD - JAOW - JA1O JAOB - JAO4 - JA11 - JAOO JA1A - JA1M - JA12 JA1B - JA1D - JA1L - JAOC - JA13	K4J K4M F4P F4R
Laguna	X568 X563 - X564 X56A	K4M F4P F4R
Espace	JEON - JEOL	F4R

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### SPECIAL NOTES FOR MULTIPOINT INJECTION

- \* **90 track SIRIUS 32** computer controlling the injection and the ignition.
- \* Uses CLIP and NXR diagnostic tools.
- \* Multipoint injection operating in sequential mode without cylinder position sensor or camshaft position sensor. This means that phasing is carried out by software using the TDC sensor.
- \* Installation (in some models) of a specific warning light (On Board Diagnostic warning light) which comes on for three seconds when the ignition is switched on. This is because an On Board Diagnostic (On Board Diagnostic) fault finding system is fitted.
- \* Idling speed corrected according to:
  - air conditioning,
  - electrical consumers in operation.
- \* Canister bleed solenoid valve controlled by opening cyclic ratio (**OCR**) according to engine speed and operating conditions.
- \* Use (on some models) of two oxygen sensors positioned upstream and downstream of the catalytic converter.
- \* Automatic configuration when the **AC** is operating by exchange of signals between the computers. However, it is not possible to deconfigure it (even with the diagnostic tool).
- \* Gear change indication light comes on about 300 rpm before maximum speed (on the Clio fitted with an F4R engine without downstream oxygen sensor).
- \* Inlet camshaft (hydraulic) dephaser controlled by a solenoid valve (only on some engines).

These vehicles are fitted with 2<sup>nd</sup> generation engine immobiliser systems. The injection computers **MUST** have been programmed with the immobiliser code for them to work.

### REPLACING AN INJECTION COMPUTER

The computers are supplied uncoded. When a computer is replaced it must be programmed with the vehicle code, then checked to ensure that the immobiliser function is working properly.

To do this, simply switch on the ignition for a few seconds and then switch it off.

### TESTING AN UNCODED INJECTION COMPUTER ON LOAN FROM A PARTS STORE IS STRICTLY FORBIDDEN

### IT IS NOT POSSIBLE TO USE A CODED COMPUTER FITTED TO ONE VEHICLE TO PERFORM A TEST ON ANOTHER VEHICLE

### CHECKING THE STATE OF THE COMPUTER (coded or uncoded)

It is possible to check the injection computer state using the diagnostic tool.

- \* Connect the diagnostic tool to the diagnostic socket,
- \* Select and confirm the vehicle type,
- \* Select and confirm the Petrol Injection option,
- \* Choose the State option:
  - if the **ET099: Immobiliser code installed** state is inactive, this indicates that the injection computer has not been coded.
  - if the **ET002: Engine immobiliser** state is active, starting will be impossible.

### THE COMPRESSOR IS OF VARIABLE OR FIXED DISPLACEMENT TYPE

#### INJECTION COMPUTER/AC COMPUTER CONNECTION

The injection computer is connected to the **AC** computer by two wires:

- one wire from the injection computer to the **AC** computer track 10. The compressor operation authorisation or inhibition signal is transmitted through this wire.
- one wire from the **AC** computer to the injection computer track **23** (in the case of a power absorbed signal) or track **46** (in the case of a logical link).

When the **AC** button is pressed, the **AC** computer requests that the compressor is switched on. The injection computer engages or disengages the compressor clutch, and, if necessary, sets a fast idling speed of up to 150 rpm faster than the nominal engine speed (it may take several seconds for the engine speed to stabilize).

This computer can work with five types of air conditioning.

#### For Vdiags 4 and 8:

- \* Twingo = Logical link with variable displacement compressor.
- \* Espace = Logical link with fixed displacement compressor.
- \* Laguna = Reduced power absorbed signal link with fixed displacement compressor.
- \* Clio / Kangoo / Mégane / Scenic = Complete power absorbed signal link with variable displacement compressor.

#### For Vdiags 0C and 10:

To identify the exact type of air conditioning fitted in the vehicle, refer to configuration information **LC060: Type of air conditioning->injection connection** and read:

- \* State 1 = Logical link with variable displacement compressor.
- \* State 2 = Complete power absorbed signal link with variable displacement compressor.
- \* State 3 = Reduced power absorbed signal link with fixed displacement compressor.
- \* State 4 = Logical link with fixed displacement compressor.
- \* State 5 = Logical link with air conditioning pressure acquisition.

**NOTE:** Only air conditioning systems with power absorbed signal links can reset an injection computer connection fault.

#### COMPRESSOR OPERATION PROGRAMMING

During certain stages of operation, the injection computer stops the compressor from functioning.

The compressor is prevented from operating:

- for **16 seconds** after the engine is started, according to the demands made of the engine by the driver, if the full load is not detected, if the engine speed is lower than 550 rpm (it is re-started if the engine speed reaches 1800 rpm), if the coolant temperature is more than **110°C** and if the engine speed is faster than **6000 rpm**.

### POWER STEERING PRESSOSTAT / INJECTION COMPUTER LINK

(If fitted)

The injection computer receives a signal from the power steering pressostat (which can be displayed on the diagnostic tool). This depends on the pressure in the hydraulic circuit and on the fluidity of the power steering fluid. The higher the pressure, the more energy is absorbed by the power steering pump.

The idling speed can be about **100 rpm**. faster on some versions.

### ELECTRICAL CORRECTION ACCORDING TO BATTERY VOLTAGE AND ELECTRIC POWER BALANCE

The purpose of this adjustment is to compensate for the drop in voltage due to switching on a power consumer when the battery is not well charged. To achieve this, the idle speed is increased, which increases the speed of rotation of the alternator, and this increases the battery voltage.

The lower the voltage, the more significant the correction. Correction of the engine speed is therefore variable. It begins when the voltage drops to below **12.8 volts**. Correction begins at the nominal engine idling speed and may reach a maximum of **150 rpm** more.

### PRINCIPLE

Under normal warm engine operating conditions, the idle speed **OCR** signal varies between a high value and a low value, so that the nominal idle speed is obtained.

In the case of variations in the operation of the vehicle (such as running in, engine wear etc.) the idle speed **OCR** value may be close to the high or low value.

Adaptive correction of the idle speed **OCR** signal makes it possible to determine slow variations in the engine's air requirements, in order to reset the **OCR** signal to an average nominal value.

This correction only takes effect if the coolant temperature is greater than **80°C**, **20 seconds** after the engine is started and if the nominal idle speed regulation phase is active.

### IDLE SPEED OCR VALUES AND ADAPTIVE CORRECTION

PARAMETERS	E7J	D7D / D7F	K4J / K4M / K7J / K7M	F4P / F4R (except Clio F4R)	Clio F4R
PR006: Engine speed	750 rpm.	750 rpm.	750 rpm.	750 rpm.	800 rpm.
PR022: Idle speed OCR signal	$5 \% < X < 12 \%$	$5 \% < X < 15 \%$	$6 \% < X < 22 \%$	$5 \% < X < 26 \%$	$2 < X < 25 \%$
PR031: Idle speed richness adaptive	$80 < X < 176$	$64 < X < 192$	$64 < X < 160$	$32 < X < 224$	$64 < X < 160$

Every time the engine is switched off the computer resets the stepper motor to its lower limit. This resetting function lasts for eight seconds.

### INTERPRETATION OF THESE PARAMETERS

In the event of excess air (air leak, incorrectly adjusted throttle stop etc.) the idle speed increases, the idle speed **OCR** value decreases to the nominal idle speed; the adaptive correction value of the idle speed **OCR** signal decreases in order to realign idle speed regulation operation.

In the case of insufficient air (contamination, etc.), the process is inverted, the idle speed **OCR** and the adaptive correction both increase by the same amount, to realign the idle speed operation to an average nominal value.

**IMPORTANT:** after the computer memory has been cleared, the engine must be started and then switched off to allow the stepper motor to be re-adjusted. Start the engine again and leave it running at idle speed until it reaches nominal idle speed, so that the adaptive correction can reset.



Some engines operating with the **SIRIUS 32** computer are fitted with two oxygen sensors (one upstream sensor and one downstream sensor).

### HEATING THE SENSORS

The sensors are heated by the computer:

- when the engine is started for the upstream sensor,
- after the engine has been running for a certain length of time, mapped according to the top dead centre and the coolant temperature outside the no load position for the downstream sensor.

The oxygen sensors are heated constantly until the engine is switched off.

### UPSTREAM SENSOR VOLTAGE

The value displayed on the diagnostic tool reading: parameter PR009: Upstream oxygen sensor voltage, indicates the voltage sent to the computer by the oxygen sensor placed upstream of the catalytic converter. It is expressed in millivolts.

When the engine is operating in a closed loop, the voltage must vary rapidly between two values:

- **20 mV  $\pm$  50** for a lean mixture,
- **840 mV  $\pm$  70** for a rich mixture.

The smaller the gap between the upper and lower values, the poorer the information from the sensor (the gap is usually at least **500 mV**).

### DOWNSTREAM SENSOR VOLTAGE

The value displayed on the diagnostic tool reading: parameter PR010: Downstream oxygen sensor voltage indicates the voltage sent to the computer by the oxygen located downstream of the catalytic converter. It is expressed in millivolts.

The function of this sensor is to locate faults on the catalytic converter and to perform a second more precise check on the richness (slow regulation loop). This function only starts operating after the engine has been running at normal operating temperature for a while and does not operate at idle speed.

When the engine is operating in a closed loop, at stabilized speed, the voltage should vary within the range **600 mV  $\pm$  100**. When the engine is decelerating, the voltage should be less than **200 mV**.

The voltage read on the control unit at idling speed should be ignored.

### MIXTURE ADJUSTMENT

The value displayed on the diagnostic tool PR035: Richness correction value parameter represents the average value of richness corrections made by the computer according to the richness of the burnt mixture as detected by the oxygen sensor located upstream of the catalytic converter (the oxygen sensor actually analyses the oxygen content of the exhaust gases).

The correction value has an average of **128** and limits of **0** and **255**:

- value less than **128**: leaner mixture required,
- value greater than **128**: richer mixture required.

### ENTRY INTO RICHNESS REGULATION MODE

The richness regulation phase begins following a delay from start-off if the coolant temperature is higher than **22°C** and following a delay of 28 seconds after the engine has been started.

When the mixture regulation is complete the value displayed is **128**.

### Unlooping phase

In the mixture regulation phase, the stages of operation during which the computer does not take into account the value of the voltage supplied by the upstream sensor are:

- at full load: variable and greater than **128**,
- during sharp acceleration: variable and greater than **128**,
- whilst decelerating with no load signal (injection cut): **128**,
- in the event of an oxygen sensor fault: **128**.

### DEFECT MODE IN THE EVENT OF AN OXYGEN SENSOR FAULT

If the voltage sent by the oxygen sensor is incorrect (varying very slightly or not at all) during richness regulation, the computer will only enter defect mode (value = **128**) if the fault has been detected for 10 seconds. Only in that case will the fault will be stored.

If an oxygen sensor fault is present and detected and if the fault has already been stored, the system enters the open loop mode directly. In this case, the "PR035: Richness correction value parameter = **128**.

### PRINCIPLE

In loop mode (see section **17 Richness regulation**), the richness regulation corrects the injection timing in order to obtain a mixture as close as possible to richness 1. The correction value is near to **128**, with limits of **0** and **255**.

However, variations can affect the components of the injection system, and cause the correction to reset to **0** or **255**, to obtain richness **1**.

Adaptive correction allows the injection mapping to be adjusted to recentre the richness regulation to 128 and to ensure a constant authority of correction to make the mixture leaner or richer.

Adaptive correction of richness regulation can be broken down into two parts:

- adaptive correction focusing on average and heavy engine loads **richness adaptive operation**,
- adaptive correction focusing on idle speed and low engine loads **idle speed richness adaptive**.

Adaptive corrections take **128** as the average value after initialisation (clearing the memory) and have the following threshold values:

PARAMETERS	E7J	D7D / D7F	K4J / K4M / Clio F4R	F4P / F4R (except Clio F4R)	K7J / K7M
PR030: Richness adaptive operation	$80 < X < 176$	$64 < X < 192$	$64 < X < 160$	$82 < X < 224$	$100 < X < 255$
PR031: Idle speed richness adaptive	$80 < X < 176$	$64 < X < 192$	$64 < X < 160$	$32 < X < 224$	$0 < X < 208$

Adaptive correction only takes place when the engine is warm in loop phase and in a given manifold pressure range.

The engine must have been operating in loop mode and in a given manifold pressure range.

The engine must have operated in the loop mode for several pressure ranges for adaptive correction to begin to change to compensate for the variations in engine operating richness.

A special road test must therefore be carried out after the computer has been reinitialized (adaptive corrections return to **128**).

### ROAD TEST

Conditions:

- warm engine (coolant temperature > 80 °C),
- do not exceed an engine speed of **4000 rpm (4800 rpm for the F4R and 3400 rpm for the D7F engines)**.

For this test, it is advisable to start from a fairly low engine speed, in 3rd or 4th gear and apply progressive acceleration **to stabilize the required pressure for 10 seconds in each range** (see table).

**Pressure ranges to be scanned during the test according to engine type (PR001: Manifold pressure parameter)**

#### D7D, D7F, K7J ET K7M

Range no.1 (mbar)	Range no.2 (mbar)	Range no.3 (mbar)	Range no.4 (mbar)	Range no.5 (mbar)
260-----315-----445-----595-----745-----845				
Average 287	Average 380	Average 520	Average 670	Average 795

#### K4J and K4M

Range no.1 (mbar)	Range no.2 (mbar)	Range no.3 (mbar)	Range no.4 (mbar)	Range no.5 (mbar)
260-----457-----535-----613-----691-----813				
Average 358	Average 496	Average 574	Average 652	Average 752

#### E7J, F4P and F4R

Range no.1 (mbar)	Range no.2 (mbar)	Range no.3 (mbar)	Range no.4 (mbar)	Range no.5 (mbar)
250-----399-----517-----635-----753-----873				
Average 325	Average 458	Average 576	Average 576	Average 813

Following this test the adjustments will be operational.

The idle speed richness adaptive varies more noticeably on the idle speed and low loads, and the operating richness adaptive on the average and high loads, but both across all the manifold pressure ranges.

The test must be continued by normal smooth and varied driving over a distance of **3 to 6 miles (5 to 10 kilometres)**.

After the test, read the operation adaptive values. Initially **128**, they may have changed. If not, repeat the test ensuring that the test conditions are observed.

## Features of the On Board Diagnostic system

This vehicle is equipped with the OBD (On Board Diagnostic) system which has the following features: When a fault causing excessive pollution is detected, a warning light lights up on the instrument panel (the On Board Diagnostic warning light). This warning light informs the driver that he must have the vehicle repaired.

The fault finding dealt strategies with by the On Board Diagnostic system are:

- \* electrical fault finding,
- \* misfire fault finding,
- \* upstream oxygen sensor operational fault finding,
- \* catalytic converter fault finding.

Electrical fault finding and misfire fault finding are carried out continuously.

Upstream oxygen sensor operational fault finding and catalytic converter fault finding are carried out only once while the vehicle is being driven, provided that the necessary fault finding conditions are met:

- air/coolant temperature conditions,
- speed condition (range of values),
- engine conditions (manifold pressure, speed, range of values and stability),
- delay since start,

The On Board Diagnostic management program supplements the management of conventional electrical breakdowns. To meet this standard, the requirements are:

- the On Board Diagnostic warning light to come on (or, for some faults, to flash),
- On Board Diagnostic faults to have been stored.

### CONSEQUENCES FOR FAULT FINDING AND REPAIRS

Special care is required when working on the vehicle to prevent the On Board Diagnostic warning light from coming on after the vehicle has been returned to the customer.

Some faults can only appear when the vehicle is being driven, when the adaptive programs have been programmed: **It is therefore essential to confirm the repair.**

**NOTE:** all electrical faults which result in exceeding the pollution limit cause the On Board Diagnostic warning light to come on.

**IMPORTANT:** it is essential that the ignition is not switched off before the result is read on the diagnostic tool at the end of each test. Switching off the ignition will lead to the results being misinterpreted.

## Conditions for the On Board Diagnostic warning light coming on

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### CONDITIONS FOR THE ON BOARD DIAGNOSTIC WARNING LIGHT COMING ON

During a road test, it may be the case that diagnostics for certain functions are not run (e.g. when in a traffic jam).

⇒ **Illumination of the light**

If the same On Board Diagnostic fault is detected during three consecutive journeys or there is an electrical fault.

⇒ **The light flashes**

If misfires leading to destruction of the catalytic converter are detected.

⇒ **The light goes out**

If the On Board Diagnostic fault does not reappear during three consecutive journeys, the warning light goes out (but the fault is still stored in the injection computer).

The fault must not be detected during forty consecutive tests for it to be cleared from the computer (or the fault may be cleared with the diagnostic tool).

**NOTE:** the fault may not be detected as a result of:

- the way the customer drives, which does not include all of the fault detection conditions,
- the sporadic nature of the fault.

### DIAGNOSTIC CONDITIONS

If, when the ignition is switched on and the engine is stopped, the air temperature read by the temperature sensor is not between **-6°C and 119°C**, or if the coolant temperature read by the sensor is not between **-6°C and 119°C**, or if the atmospheric pressure is lower than **775 mbar** (altitude of about 2500 m), then the On Board Diagnostic procedures are not authorized until the next time the ignition is switched on.

#### **When LPG mode is activated, the On Board Diagnostic procedures are inhibited**

In order for the On Board Diagnostic system to function correctly, there must be no electrical faults in the injection system, even if the OBD warning light does not come on.

Catalytic converter and oxygen sensor fault finding can only be carried out consecutively.

The canister bleed is closed and the adaptives are locked on their last value during catalytic converter and oxygen sensor fault finding.

### TEST PROCEDURE

- Rectify the electrical faults.
- Clear all faults.
- Carry out all injection programming (if necessary).

### COMPLETE INITIALIZATION OF THE ON BOARD DIAGNOSTIC SYSTEM BY COMMAND MODE

- Clearing the stored faults.
- Clearing the programming (if work on a component has altered the programming: Idle speed regulation valve, target or flywheel sensor, etc.).

### PROGRAMMING REQUIRED FOR OBD FAULT FINDING.

#### **Torque/gas programming (State: ET014 cylinder 1 recognition = PERFORMED, engine running)**

This is programmed by:

- a deceleration with injection cut-out in 2nd, 3rd, 4th or 5th gear between 3500 and 3000 rpm for at least two seconds,
- a second deceleration with injection cut-out in 2nd, 3rd, 4th or 5th gear between 2400 and 2000 rpm for at least three seconds.

#### **Richness adaptive programming**

To carry out this programming, the car must be driven while complying with the pressure ranges specified in the Injection: Adaptive mixture adjustment section.

**The state ET202: On Board Diagnostic combustion misfire fault finding included, must be ACTIVE.**

The diagnostic can detect, for example:

- clogging or flooding of a spark plug,
- clogging of the injectors or an anomaly in their output,
- a fault in the supply system (pressure regulator, petrol pump, etc),
- a bad connection in the petrol or injection circuits (coil secondary, etc.).

Fault finding is performed by measuring the instantaneous variations in engine speed.  
Observation of a drop in torque detects combustion misfires.

This fault finding is practically continuous while the vehicle is being driven. If it is not carried out, or if a fault is detected, all other On Board Diagnostic fault finding will be inhibited.

This diagnostic strategy makes it possible to diagnose two types of fault:

- Destructive misfires resulting in destruction of the catalytic converter. These cause the OBD warning light to light up immediately and flash,
- Polluting combustion misfires result in the On Board Diagnostic pollution limit being exceeded. If they are detected during three consecutive driving periods.

### DETECTION CONDITIONS

Before starting, the programming must be checked. The conditions prior to switching on the ignition and the current conditions must also be satisfied.

Check that the states:      ET014 Cylinder 1 recognition = PERFORMED and  
   ET202 Combustion misfire On Board Diagnostic procedure included = ACTIVE

Detection is carried out as soon as the coolant temperature is above **75°C**, over three engine working speeds between **idle speed and 4500 rpm**.

The test can also be performed by keeping the engine at idle speed **for 11 minutes**.

**IMPORTANT:** it is essential that the ignition is not switched off before the result is read on the diagnostic tool at the end of this test. **Switching off the ignition will lead to the results being misinterpreted.**

**If, after the test, the diagnostic tool has detected misfires, refer to the fault finding method associated with this symptom.**

### CONFIRMATION OF THE REPAIR

- Check that the states:      ET014 Cylinder 1 recognition = PERFORMED and  
   ET202 On Board Diagnostic combustion misfire fault finding included = ACTIVE
- No fault detected and the On Board Diagnostic warning light goes out



The purpose of catalytic converter fault finding is to detect a malfunction which would cause hydrocarbon pollutant emissions to exceed the On Board Diagnostic limit.

The ability of the catalytic converter to store oxygen indicates its condition. As the catalytic converter ages, its ability to store oxygen reduces along with its ability to treat pollutant gases.

### CONDITIONS FOR STARTING FAULT FINDING

Fault finding of the catalytic converter can only take place after the engine has been running for the time detailed in the following table, if all the conditions prior to switching on the ignition are satisfied and maintained:

- no electrical faults,
- cylinder recognition completed,
- no combustion misfires detected,
- no catalytic converter fault finding performed since the ignition was switched on,
- programming completed,
- main loop and double loop active,
- coolant temperature greater than 75°C.

Engine	Speed mph (km/h)	Engine speed rpm.	Manifold pressure	Stabilization period	Time before authorisation
D7F 702	37 - 50 (60 - 80)	1650 - 2600	430 - 650 mb	11 seconds	17 minutes
D7F 726	37 - 50 (60 - 80)	1900 - 2500	430 - 650 mb	11 seconds	17 minutes
K4J 712/750	38 - 80 (61 - 130)	1856 - 4000	380 - 750 mb	11 seconds	14 minutes
K4J 713	38 - 80 (61 - 130)	1824 - 3904	380 - 750 mb	11 seconds	14 minutes
K7J 700	43 - 62 (70 - 100)	2112 - 3392	320 - 850 mb	11 seconds	14 minutes
K7J 701	37 - 80 (60 - 130)	1792 - 4352	320 - 850 mb	11 seconds	14 minutes
F4P 722	39 - 80 (63 - 130)	1728 - 3740	430 - 650 mb	11 seconds	17 minutes
F4P 760	39 - 48 (63 - 79)	1504 - 2368	430 - 650 mb	11 seconds	17 minutes
F4R 744	38 - 48 (61 - 79)	1696 - 2336	430 - 650 mb	11 seconds	17 minutes
F4R 700/701	39 - 48 (63 - 79)	1500 - 2360	350 - 500 mb	11 seconds	17 minutes

### FAULT DETECTION

Fault finding is performed over a stabilized range in **5th gear at 44 mph (70 km/h)**. When the conditions for starting fault finding are satisfied, richness excitation peaks are applied, which has the effect of sending bursts of oxygen into the catalytic converter. If the catalytic converter is in good condition it will absorb the oxygen and the downstream oxygen sensor value will remain at its average value. If it is ageing, it will reject the oxygen and the oxygen sensor will start to oscillate. The voltage of the oxygen sensor will fluctuate. If the fault is confirmed on three consecutive occasions, the On Board Diagnostic warning light will come on. The test cannot last longer than 52 seconds.

**WARNING:** it is essential that the ignition is not switched off before the result is read on the diagnostic tool at the end of this test. **Switching off the ignition will lead to the results being misinterpreted.**

**If, after the test, the diagnostic tool has found a catalytic converter operating fault, refer to the fault finding method associated with this symptom.**

### CONFIRMATION OF THE REPAIR

- ET103: Catalytic converter fault finding included.....ACTIVE
- ET107: Catalytic converter fault finding performed.....ACTIVE
- no catalytic converter operating fault detected.

# INJECTION

## Oxygen sensor fault finding

The purpose of oxygen sensor fault finding is to detect a malfunction which would cause the On Board Diagnostic limit to be exceeded by hydrocarbon pollutant emissions. It is performed by measuring and comparing oxygen sensor oscillation periods.

There are two types of possible faults on the oxygen sensors:

- mechanical damage to an electrical component (breakage, cut in wire) which leads to an electrical fault,
- chemical damage to the component which causes the response time of the sensor to slow down, thus increasing its switching period.

When the required test conditions are met, the average of the sensor periods read is taken, subtracting the effects of interference, then compared with an average period of the On Board Diagnostic limit.

### TEST CONDITIONS

Fault finding of the oxygen sensor can only take place after the engine has been running for a while and under specific operating conditions, detailed in the table underneath, and if all the conditions prior to the ignition being switched on are satisfied and maintained:

- no electrical faults detected,
- programming and cylinder recognition carried out,
- no oxygen sensor fault finding performed since the ignition was switched on,
- no combustion misfires detected,
- coolant temperature greater than 75°C.

Engine	Speed mph (km/h)	Engine speed rpm.	Manifold pressure	Stabilization period	Time before authorisation
D7F 702	28 - 34 (45 - 55)	1600 - 2100	262 - 558 mb	8 seconds	15 minutes
D7F 726	28 - 34 (45 - 55)	1800 - 2200	199 - 498 mb	8 seconds	15 minutes
K4J 712/750	38 - 80 (61 - 130)	1824 - 4000	380 - 798 mb	8 seconds	14 minutes
K4J 713	38 - 80 (61 - 130)	1824 - 3904	380 - 798 mb	8 seconds	14 minutes
K7J 700	43 - 62 (70 - 100)	2112 - 3392	321 - 850 mb	5 seconds	14 minutes
K7J 701	37 - 80 (60 - 130)	1792 - 4352	321 - 850 mb	5 seconds	14 minutes
F4P 722	39 - 80 (63 - 130)	1728 - 3744	284 - 750 mb	8 seconds	14 minutes
F4P 760	39 - 80 (63 - 130)	1632 - 4000	284 - 750 mb	8 seconds	14 minutes
F4R 744	40 - 80 (65 - 130)	1750 - 4000	330 - 750 mb	8 seconds	14 minutes
F4R 700	39 - 80 (63 - 130)	1632 - 4000	330 - 750 mb	8 seconds	14 minutes
F4R 701	39 - 80 (63 - 130)	1632 - 4000	351 - 750 mb	8 seconds	14 minutes

FAULT DETECTION

Fault finding is performed while the vehicle is being driven in one gear, travelling at a steady speed and for the minimum period of time specified in the following table:

engines	gearbox ratio	speed	maximum amount of time.
K4J 712/713/750 - K7J 700/701	5th	43 mph (70 km/h)	52 seconds
F4P 722/760	5th	43 mph (70 km/h)	40 seconds
F4R 744	4°	50 mph or 80 km/h	40 seconds
D7F 702/726	4°	31 mph (50 km/h)	40 seconds

For this test, the computer inhibits the canister bleed.  
The computer displays sensor fault finding included.

**WARNING:** it is essential that the ignition is not switched off before the result is read on the diagnostic tool at the end of this test. **Switching off the ignition will lead to the results being misinterpreted.**

**If, after the test, the diagnostic tool has found an oxygen sensor fault refer to the fault finding method associated with this symptom.**

CONFIRMATION OF THE REPAIR

- ET102: Sensor fault finding included.....ACTIVE
- ET106: Sensor fault finding complete.....ACTIVE
- No fault detected and the On Board Diagnostic warning light out.

This document introduces the fault finding strategy applicable to all Sirius 32 computers with program No. E1 and Vdiag No.'s 4, 8, 0C et 10.

In order to implement fault finding on this system, it is essential to have the following items available:

- The Generic Fault Finding Technical Note
- The wiring diagram of the function for the vehicle concerned,
- The following tools:
  - NXR or CLIP diagnostic tool.
  - Bornier part no.: Elé.1497.
  - Multimeter.

### GENERAL APPROACH TO FAULT FINDING:

- Use one of the fault finding tools to identify the system equipping the vehicle (to read the **Sirius 32** computer family of the **E1 program** and **Vdiags 4, 8, 0C and 10**).
- Locate the Fault finding documents corresponding to the system identified.
- Take note of information contained in the introductory sections.
- Read the faults stored in the computer memory and use the Fault interpretation section of the documents.

### **Do not clear faults without reading the following.**

\* Make a note of the faults reset by the computer in order to deal with them if they clear themselves.

1 Rectify all faults present.

2 Stored faults:

Follow the instructions in this note relating to each fault to confirm them.

A fault characterized as present must be remedied.

3 For vehicles fitted with On Board Diagnostic system.

If the fault is stored with the On Board Diagnostic warning light on, check the state corresponding to the instruction to switch on the On Board Diagnostic warning light in the fault context section to determine whether it is the reason for the warning light coming on.

If this is the case, treat it as a present fault.

**NOTE:** the list of states regarding the instruction to switch on the On Board Diagnostic warning light, and their position (YES or NO) can be consulted by selecting FUNCTIONS, then OBD WARNING LIGHT LIGHTING UP.

- Perform the conformity check (appearance of possible incorrect operations not yet declared by the system's self diagnosis procedure) and apply the associated fault finding strategy according to results.
- Confirm the repair (disappearance of the problem reported by the customer).
- Use the fault finding strategy for each Customer complaint if the problem persists.

<b>DF002 PRESENT OR STORED</b>	<b>THROTTLE POTENTIOMETER CIRCUIT</b> 1.DEF : Open circuit or short circuit
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<b>NOTES</b>	<b>If fault DF345: Sensor or potentiometer 5 volts supply is present or stored, deal with it as a priority.</b>
	<b>Conditions for applying the fault finding procedure to stored faults:</b> – Leave the vehicle with the ignition on for ten seconds in no load position. – Vary the pedal potentiometer gently from no load to full load. – Keep at full load position for 10 seconds. (The fault should appear present, but may be stored again once the instruction has been followed).
	*If the fault is stored with the On Board Diagnostic warning light on, check the context section if state ET284: Throttle potentiometer circuit which corresponds to the instruction to switch on the OBD warning light is at YES. If this is the case, follow the method below.

Check <b>the connection and condition</b> of the throttle potentiometer connector. Replace the connector if necessary.
Check <b>the throttle position potentiometer resistance</b> (the resistance is zero or equal to infinity in the event of a permanent fault). Check that the resistance of the potentiometer <b>is progressive by moving the throttle</b> from no load position to full load position. <b>(Refer to the HELP section to compare the resistance values).</b> Check <b>that the throttle is driving the potentiometer</b> . Repair or replace the potentiometer, if necessary.
Connect the bornier in place of the computer and check <b>the insulation and continuity, and ensure that there is no interference resistance on lines:</b> <div>Computer track 75 —————&gt; Track A throttle potentiometer</div> <div>Computer track 74 —————&gt; Track B throttle potentiometer</div> <div>Computer track 43 —————&gt; Track C throttle potentiometer</div> Repair if necessary.
If the problem has still not been solved, use the method for DF345.

<b>AFTER REPAIR</b>	Follow the instructions to confirm repair. Deal with any other possible faults. Clear the fault memory. Carry out a conformity check.
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<b>DF003 PRESENT OR STORED</b>	<u>AIR TEMPERATURE SENSOR CIRCUIT</u> 1.DEF : Open circuit or short circuit
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<b>NOTES</b>	<b>If fault DF345: Sensor or potentiometer 5 volts supply is present or stored, deal with it as a priority.</b>
	<b>Conditions for detecting the fault by computer:</b> Switch on the ignition. If the fault is only stored, start the engine to vary the temperature (wait for the fan to run). (The fault should appear present, but may be stored again once the instruction has been followed).
	*If the fault is stored with the On Board Diagnostic warning light on, check the context section if state ET274: Air temperature sensor circuit, which corresponds to the instruction to switch on the OBD warning light is at YES. If this is the case, follow the method below.

Check the <b>connection and condition</b> of the air temperature sensor connector. Replace the connector if necessary.
Check that <b>the air temperature sensor resistance is not zero or equal to infinity</b> (permanent sensor fault). (Refer to the <b>HELP</b> section to compare the resistance values). Replace the air temperature sensor, if necessary.
Connect the bornier in place of the computer and check <b>the insulation, continuity and ensure that there is no interference resistance on lines:</b> <b>Computer track 77    —————&gt;    Track 1 Air temperature sensor</b> <b>Computer track 49    —————&gt;    Track 2 Air temperature sensor</b> Repair if necessary.
Check that <b>the sensor resistance changes according to the temperature.</b> If necessary replace the sensor.
If the problem has still not been solved, deal with the other faults and then proceed to the conformity check.

<b>AFTER REPAIR</b>	Follow the instructions to confirm repair. Deal with any other possible faults. Clear the fault memory. Carry out a conformity check.
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<b>DF004 PRESENT OR STORED</b>	<b>COOLANT TEMPERATURE SENSOR CIRCUIT</b> 1.DEF : Open circuit or short circuit
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<b>NOTES</b>	<b>If fault DF345: Sensor or potentiometer 5 volts supply is present or stored, deal with it as a priority.</b>
	<b>Conditions for detecting the fault by computer:</b> Switch on the ignition. If the fault is only stored, start the engine to vary the temperature (wait for the fan to run). (The fault should appear present, but may be stored again once the instruction has been followed).
	*If the fault is stored with the On Board Diagnostic warning light on, check the context section if state ET275: Coolant temperature sensor circuit, which corresponds to the instruction to switch on the OBD warning light is at YES. If this is the case, follow the method below.

Check the <b>connection and condition</b> of the coolant temperature sensor connector. Replace the connector if necessary.
Check that <b>the coolant temperature sensor is not at zero or equal to infinity</b> (permanent sensor fault). Refer to the <b>HELP</b> section to compare the resistance values. Replace the coolant temperature sensor, if necessary.
Connect the bornier in place of the computer and check <b>the insulation, continuity and ensure that there is no interference resistance on lines:</b> <b>Computer track 73      ───►      Track B1 Coolant temperature sensor</b> <b>Computer track 13     ───►      Track B2 Coolant temperature sensor</b> Repair if necessary.
Check that <b>the sensor resistance changes according to the temperature.</b> If necessary replace the sensor.
If the problem has still not been solved, deal with the other faults and then proceed to the conformity check.

<b>AFTER REPAIR</b>	Follow the instructions to confirm repair. Deal with any other possible faults. Clear the fault memory. Carry out a conformity check.
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<b>DF006 PRESENT OR STORED</b>	<u>PINKING SENSOR CIRCUIT</u> 1.DEF : Open circuit or short circuit
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<b>NOTES</b>	<b>Conditions for applying the fault finding procedure to stored faults:</b> Carry out a road test with a warm engine under load.
	*If the fault is stored with the On Board Diagnostic warning light on, check the context section if state ET289: Pinking sensor circuit, which corresponds to the instruction to switch on the OBD warning light is at YES. If this is the case, follow the method below.

Check the <b>connection and condition</b> of the pinking sensor connector. Change the connector if necessary.
Check <b>clamping of the pinking sensor</b> on the engine block. Repair if necessary.
Connect the bornier in place of the computer and check <b>the insulation, continuity and ensure that there is no interference resistance</b> on lines: Computer track 20 —————> Track 1 Pinking sensor Computer track 79 —————> Track 2 Pinking sensor Computer track 19 —————> Pinking sensor screening Repair if necessary.
If the problem has still not been solved, deal with the other faults and then proceed to the conformity check.

<b>AFTER REPAIR</b>	Follow the instructions to confirm repair. Deal with any other possible faults. Clear the fault memory. Carry out a conformity check.
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<b>DF009 PRESENT OR STORED</b>	<b><u>ACTUATOR CONTROL RELAY CIRCUIT</u></b> 1.DEF : Open circuit or short circuit CO : Open circuit CC.0 : Short circuit to earth CC.1 : Short circuit to + 12 volts
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<b>NOTES</b>	<b>Conditions for applying the fault finding procedure to stored faults:</b> Switch the ignition on and enter into dialogue.  <b>NOTE:</b> This fault is a priority. It should therefore be dealt with before those that follow.
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Check <b>the condition of the battery and the vehicle earths.</b> Repair if necessary
Check <b>the connection and condition of the actuator relay connector.</b> Change the connector if necessary.
Check for the presence of <b>+ 12 v on track 1 of the actuator relay.</b> Repair if necessary.
<b>Check the actuator relay coil.</b> Replace the actuator relay, if necessary.
Check the <b>insulation and continuity</b> of the line: <b>Computer track 39 —————&gt; Track 2 Actuator relay</b> Repair if necessary.
If the problem has still not been solved, deal with the other faults and then proceed to the conformity check.

<b>AFTER REPAIR</b>	Follow the instructions to confirm repair. Deal with any other possible faults. Clear the fault memory. Carry out a conformity check.
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DF012 PRESENT OR STORED	<u>INJECTION AND CAMSHAFT —————&gt; CONNECTION</u> Fault not interpreted
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NOTES	<b>Conditions for applying the fault finding procedure to stored faults:</b> The fault is declared present following a timed period of 10 seconds with the engine running and air conditioning on, ET009: <b>active</b> (during the test, the battery voltage should not be lower than 11v).
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Check <b>the connection and condition of the air conditioning computer</b> . Change the connector(s), if necessary.
Connect the bornier in place of the computer and check the <b>insulation, continuity and ensure that there is no interference resistance on computer line 23</b> . Repair if necessary.
refer to the air conditioning fault finding strategy if the fault persists.

AFTER REPAIR	Follow the instructions to confirm repair. Deal with any other possible faults. Clear the fault memory. Carry out a conformity check.
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DF013 PRESENT OR STORED	<u>INJECTION CONNECTION —————&gt; Automatic transmission</u>
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NOTES	*If the fault is stored with the On Board Diagnostic warning light on, check the context section if state ET015: Injection connection —————> Automatic Transmission, which corresponds to the instruction to switch on the OBD warning light is at YES. If this is the case, follow the method below.
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Test the <b>multiplex network</b> , if the vehicle is fitted with this option.
Check <b>the connection and condition of the automatic gearbox computer connector</b> . Change the connector if necessary.
Connect the bornier in place of the computer and check <b>the insulation, the continuity and ensure that there is no interference resistance on lines 27 and 57 of the computer</b> . Repair if necessary.
Refer to the <b>Automatic Gearbox</b> fault finding section if the fault continues.

AFTER REPAIR	Perform a road test and then recheck with the fault finding tool. Deal with any other possible faults. Clear the fault memory. Carry out a conformity check.
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<b>DF014 PRESENT OR STORED</b>	<b>CANISTER BLEED SOLENOID VALVE CIRCUIT</b> 1.DEF : Open circuit or short circuit CO : Open circuit CC.0 : Short circuit to earth CC.1 : Short circuit to + 12 volts
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<b>NOTES</b>	<b>Conditions for applying the fault finding procedure to stored faults:</b> Switch on the ignition or run the <b>"AC016: canister bleed solenoid valve command.</b> <b>If multiple faults occur, deal with the DF009 actuator relay control fault first.</b>
	*If the fault is stored with the On Board Diagnostic warning light on, check the context section if state ET117: Canister bleed command, which corresponds to the instruction to switch on the OBD warning light is at YES. If this is the case, follow the method below.

Check <b>the connection and condition of the canister bleed solenoid valve connector.</b> Change the connector if necessary.
Check <b>the resistance of the canister bleed solenoid valve.</b> Replace the valve if necessary.
With the ignition switched on, check for a <b>+ 12 v feed on track 1 of the canister bleed valve.</b> Repair if necessary.
Connect the bornier in place of the computer and check <b>the insulation and continuity of the line:</b> <b>Computer track 4 —————▶ Track 2 Canister bleed solenoid valve</b> Repair if necessary.
Replace the canister bleed valve, if necessary.
If the problem has still not been solved, deal with the other faults and then proceed to the conformity check.

<b>AFTER REPAIR</b>	Follow the instructions to confirm repair. Deal with any other possible faults. Clear the fault memory. Carry out a conformity check.
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DF017 PRESENT OR STORED	<u>FLYWHEEL SIGNAL INFORMATION</u> 1.DEF : Flywheel target fault 2.DEF : Absence of tooth signal
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NOTES	The pressure sensor should not be faulty when performing this fault finding test. <b>Conditions for applying the fault finding procedure to stored faults:</b> Switch the ignition off and wait for loss of dialogue with the computer. Switch the ignition back on, go into dialogue with the computer and clear the stored faults, turn the starter motor for 10 seconds or run the engine at idle speed.
	*If the fault is stored with the On Board Diagnostic warning light on, check the context section if state ET276: flywheel target fault, which corresponds to the instruction to switch on the OBD warning light is at YES. If this is the case, follow the method below.

Check the <b>connection and condition of the</b> target sensor connector. Replace the connector if necessary.
Check that <b>the target sensor is clean and correctly mounted</b> . Repair if necessary.
Check the <b>resistance of the target sensor</b> . If necessary replace the sensor.
Connect the bornier in place of the computer and check <b>the insulation, continuity and ensure that there is no interference resistance on lines:</b> <b>Computer track 54</b> ————> <b>Track A Target sensor</b> <b>Computer track 24</b> ————> <b>Track B Target sensor</b> Repair if necessary.
If 1.DEF, check <b>the condition of the flywheel</b> .
If the problem has still not been solved, deal with the other faults and then proceed to the conformity check.

AFTER REPAIR	Check that state ET202: On Board Diagnostic combustion misfire fault finding included, is ACTIVE. If this is not the case, programming must be reinitialized. Deal with any other faults and carry out a conformity check.
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<b>DF018 PRESENT OR STORED</b>	<u>UPSTREAM OXYGEN SENSOR HEATER CIRCUIT</u> 1.DEF : Open circuit or short circuit CO : Open circuit CC.0 : Short circuit to earth CC.1 : Short circuit to + 12 volts
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<b>NOTES</b>	<b>Conditions for applying the fault finding procedure to stored faults:</b> – Start the engine and ensure that state <b>ET030: upstream oxygen sensor heating</b> is <b>active</b> . – Or run the <b>AC261: Upstream oxygen sensor heating</b> command. <b>If multiple faults occur, deal with the DF009: actuator relay control fault first.</b>
	*If the fault is stored with the On Board Diagnostic warning light on, check the context section if state ET286: Oxygen sensor heating circuit, which corresponds to the instruction to switch on the OBD warning light is at YES. If this is the case, follow the method below.

Check the <b>connection and condition</b> of the oxygen sensor connector. Replace the connector, if necessary
Check <b>the oxygen sensor heating resistance</b> . Refer to the <b>HELP</b> section <b>resistance values</b> . Replace the sensor if necessary.
Check for <b>a + 12 v feed on track A of the oxygen sensor</b> . Repair the connection between track A of the oxygen sensor and the actuator relay.
Connect the bornier in place of the computer and <b>check the insulation, continuity and ensure that there is no interference resistance on line:</b> <b>Computer track 63 —————&gt; Oxygen sensor track B</b> Repair if necessary.
If the problem has still not been solved, deal with the other faults and then proceed to the conformity check.

<b>AFTER REPAIR</b>	Follow the instructions to confirm repair. Deal with any other possible faults. Clear the fault memory. Carry out a conformity check.
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## Fault finding - Fault Interpretation

<b>DF022 PRESENT</b>	<u>COMPUTER</u> 1.DEF : Replace the computer
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<b>NOTES</b>	None.
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Computer defective or not to specification.  
Check that **the computer is the correct one for the vehicle.**  
**Do not change the computer immediately.**  
Carry out the following procedure:

- Switch the ignition on and enter into dialogue with the computer.
- Clear the computer memory.
- Switch the ignition off and wait for loss of dialogue with the computer.
- Switch the ignition on and enter into dialogue with the computer.

If the fault is still present, replace the computer.

<b>AFTER REPAIR</b>	Perform a road test and then recheck with the fault finding tool. Deal with any other possible faults. Clear the fault memory. Carry out a conformity check.
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<b>DF032 PRESENT OR STORED</b>	<b>COOLANT TEMPERATURE OVERHEATING WARNING LIGHT CIRCUIT</b> 1.DEF : Open circuit or short circuit CO : Open circuit CC.0 : Short circuit to earth CC.1 : Short circuit to + 12 volts
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<b>NOTES</b>	<b>Conditions for applying the fault finding procedure to stored faults:</b> Run the engine at a speed greater than 1500 rpm until the engine cooling fan starts, or run the <b>AC212: Coolant temperature warning light command</b> .
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Check <b>the connection and condition of the overheat warning light line connector</b> . Replace the connector if necessary.
Check <b>the condition of the indicator light</b> (if it is not lit). Change it if necessary.
Check that <b>there is a 12 v supply to the indicator light</b> . Repair the connection between the indicator light and the fuse.
Connect the bornier and check the <b>insulation and continuity of the track 9 line of the computer</b> . Repair if necessary.
refer to the instrument panel fault finding strategy if the fault persists.

<b>AFTER REPAIR</b>	Follow the instructions to confirm repair. Deal with any other possible faults. Clear the fault memory. Carry out a conformity check.
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<b>DF038 PRESENT OR STORED</b>	<b><u>DOWNSTREAM OXYGEN SENSOR HEATER CIRCUIT</u></b> 1.DEF : Open circuit or short circuit CO : Open circuit CC.0 : Short circuit to earth CC.1 : Short circuit to + 12 volts
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<b>NOTES</b>	<b>Conditions for applying the fault finding procedure to stored faults:</b> <ul style="list-style-type: none"><li>– Start the engine, ensure that state <b>ET031: Downstream oxygen sensor heating, is active</b>, wait for the fan assembly to start then accelerate gently for a minute.</li><li>– Or run the <b>AC262: Downstream oxygen sensor heating</b> command.</li></ul>
	*If the fault is stored with the On Board Diagnostic warning light on, check the context section if state ET288: Downstream oxygen sensor heating circuit, which corresponds to the instruction to switch on the OBD warning light is at YES. If this is the case, follow the method below.

Check the <b>connection and condition</b> of the oxygen sensor connector. Replace the connector if necessary.
Check the <b>oxygen sensor heater resistance</b> . Refer to the <b>HELP</b> section to compare the <b>resistance values</b> . Replace the sensor if necessary.
Check for a <b>+ 12 v feed on track A</b> of the oxygen sensor. If necessary, repair the connection between the oxygen sensor and the actuator relay.
Connect the bornier in place of the computer and <b>check the insulation and continuity of the line:</b> <b>Computer track 65    —————&gt;    Oxygen sensor track B</b> Repair if necessary.
If the problem has still not been solved, deal with the other faults and then proceed to the conformity check.

<b>AFTER REPAIR</b>	Follow the instructions to confirm repair. Deal with any other possible faults. Clear the fault memory. Carry out a conformity check.
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<b>DF044 PRESENT OR STORED</b>	<u>IMMOBILISER CIRCUIT</u> 1.DEF : Open circuit or short circuit
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<b>NOTES</b>	None.
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Check the <b>connection and condition of the connectors of the coded line on track 58 of the injection computer.</b> Replace the connector if necessary.
Connect the bornier in the place of the computer and check <b>the insulation and continuity of the coded line on track 58 of the injection computer.</b> Repair if necessary.
If the fault persists, refer to the immobiliser fault finding procedure.

<b>AFTER REPAIR</b>	Follow the instructions to confirm repair. Deal with any other possible faults. Clear the fault memory. Carry out a conformity check.
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<b>DF045 PRESENT OR STORED</b>	<b>MANIFOLD PRESSURE SENSOR CIRCUIT</b> 1.DEF : Open circuit or short circuit 2.DEF : Change in manifold pressure
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<b>NOTES</b>	<b>If fault DF345: Sensor or potentiometer 5 volts supply is present or stored, deal with it as a priority.</b>
	<b>Conditions for applying the fault finding procedure to stored faults:</b> Switch the ignition off and wait for loss of dialogue with the computer. Switch the ignition on again, and enter into dialogue with the computer. If necessary, run the engine at a speed above 608 rpm for at least 10 seconds.
	*If the fault is stored with the On Board Diagnostic warning light on, check the context section if state ET277: Manifold pressure sensor circuit, which corresponds to the instruction to switch on the OBD warning light is at YES. If this is the case, follow the method below.

<p>If the fault is only present when the engine is running, <b>switch the ignition on and check the consistency of the throttle position under no load conditions and at full throttle.</b> Lightly depress the accelerator pedal (from no load to full throttle) and <b>check that the throttle position increases regularly.</b> If this is not the case, the signal is incorrect. Deal with the fault finding strategy for this parameter.</p>
<p>Check <b>the status of the</b> pressure sensor connector. Replace the connector if necessary.</p>
<p>Check that the pressure sensor is <b>connected pneumatically.</b></p>
<p>Check the <b>resistance</b> of the pressure sensor. Refer to the <b>HELP</b> section to compare the resistance values. Replace the pressure sensor if necessary.</p>
<p>Connect the bornier in place of the computer and check <b>the insulation, continuity and ensure that there is no interference resistance on lines:</b> <b>Computer track 16      —————&gt;      Pressure sensor track B</b> <b>Computer track 15      —————&gt;      Pressure sensor track A</b> <b>Computer track 78      —————&gt;      Pressure sensor track C</b> Repair if necessary.</p>
<p>If the problem has still not been solved, use the method for DF345.</p>

<b>AFTER REPAIR</b>	Follow the instructions to confirm repair. Deal with any other possible faults. Clear the fault memory. Carry out a conformity check.
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<b>DF052 PRESENT OR STORED</b>	<b>CYLINDER INJECTOR CIRCUIT 1</b> 1.DEF : Open circuit or short circuit CO : Open circuit CC.0 : Short circuit to earth CC.1 : Short circuit to +12 volts
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<b>NOTES</b>	<b>Conditions for applying the fault finding procedure to stored faults:</b> Run the engine and <b>make sure to stop it when the fault appears</b> , in order not to cause possible damage to the catalytic converter. If multiple faults occur, deal with the DF009: actuator relay control fault first.
	*If the fault is stored with the On Board Diagnostic warning light on, check the context section if state ET278: Cylinder 1 injector circuit, which corresponds to the instruction to switch on the OBD warning light is at YES. If this is the case, follow the method below.

Check the <b>connection and condition of the injector 1 connector</b> . Change the connector if necessary.
Check the <b>resistance of injector 1</b> . Refer to the <b>HELP</b> section to compare the resistance values. Replace the injector if necessary.
When <b>the ignition is switched on</b> check for a <b>12 v feed on track 1 of injector 1</b> . Repair the <b>the connection line to the actuators</b> if necessary.
Connect the bornier in place of the computer and check <b>the insulation and continuity</b> of the line: <b>Computer track 59 —————▶ Track 2 of injector 1</b> Repair if necessary.
If the problem has still not been solved, deal with the other faults and then proceed to the conformity check.

<b>AFTER REPAIR</b>	Follow the instructions to confirm repair. Deal with any other possible faults. Clear the fault memory. Carry out a conformity check.
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<b>DF053 PRESENT OR STORED</b>	<u>CYLINDER INJECTOR CIRCUIT 2</u> 1.DEF : Open circuit or short circuit CO : Open circuit CC.0 : Short circuit to earth CC.1 : Short circuit to +12 volts
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<b>NOTES</b>	<b>Conditions for applying the fault finding procedure to stored faults:</b> Run the engine and <b>make sure to stop it when the fault appears</b> , in order not to cause possible damage to the catalytic converter. If multiple faults occur, deal with the DF009: actuator relay control fault first.
	*If the fault is stored with the On Board Diagnostic warning light on, check the context section if state ET279: Cylinder 2 injector circuit, which corresponds to the instruction to switch on the OBD warning light is at YES. If this is the case, follow the method below.

Check the <b>connection and condition of the injector 2 connector</b> . Change the connector if necessary.
Check the <b>resistance of injector 2</b> . Refer to the <b>HELP</b> section to compare the resistance values. Replace the injector if necessary.
When <b>the ignition is switched on</b> check for a <b>12 v feed on track 1 of injector 2</b> . Repair the <b>the connection line to the actuators</b> if necessary.
Connect the bornier in place of the computer and check <b>the insulation and continuity</b> of the line: <b>Computer track 90 —————▶ Track 2 of injector 2</b> Repair if necessary.
If the problem has still not been solved, deal with the other faults and then proceed to the conformity check.

<b>AFTER REPAIR</b>	Follow the instructions to confirm repair. Deal with any other possible faults. Clear the fault memory. Carry out a conformity check.
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<b>DF054 PRESENT OR STORED</b>	<b>CYLINDER INJECTOR CIRCUIT 3</b> 1.DEF : Open circuit or short circuit CO : Open circuit CC.0 : Short circuit to earth CC.1 : Short circuit to +12 volts
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<b>NOTES</b>	<b>Conditions for applying the fault finding procedure to stored faults:</b> Run the engine and <b>make sure to stop it when the fault appears</b> , in order not to cause possible damage to the catalytic converter. If multiple faults occur, deal with the DF009: actuator relay control fault first.
	*If the fault is stored with the On Board Diagnostic warning light on, check the context section if state ET280: Cylinder 3 injector circuit, which corresponds to the instruction to switch on the OBD warning light is at YES. If this is the case, follow the method below.

Check the <b>connection and condition of the injector 3 connector</b> . Change the connector if necessary.
Check the <b>resistance of injector 3</b> . Refer to the <b>HELP</b> section to compare the resistance values. Replace the injector if necessary.
<b>When the ignition is switched on, check for a 12 v feed on track 1 of injector 3.</b> Repair the <b>the connection line to the actuators</b> if necessary.
Connect the bornier in place of the computer and check <b>the insulation and continuity of the line:</b> <b>Computer track 60 —————▶ Track 2 of injector 3</b> Repair if necessary.
If the problem has still not been solved, deal with the other faults and then proceed to the conformity check.

<b>AFTER REPAIR</b>	Follow the instructions to confirm repair. Deal with any other possible faults. Clear the fault memory. Carry out a conformity check.
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<b>DF055 PRESENT OR STORED</b>	<b>CYLINDER INJECTOR CIRCUIT 4</b> 1.DEF : Open circuit or short circuit CO : Open circuit CC.0 : Short circuit to earth CC.1 : Short circuit to +12 volts
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<b>NOTES</b>	<b>Conditions for applying the fault finding procedure to stored faults:</b> Run the engine and <b>make sure to stop it when the fault appears</b> , in order not to cause possible damage to the catalytic converter. If multiple faults occur, deal with the DF009: actuator relay control fault first.
	*If the fault is stored with the On Board Diagnostic warning light on, check the context section if state ET281: Cylinder 4 injector circuit, which corresponds to the instruction to switch on the OBD warning light is at YES. If this is the case, follow the method below.

Check the <b>connection and condition of the injector 4 connector</b> . Change the connector if necessary.
Check the <b>resistance of injector 4</b> . Refer to the <b>HELP</b> section to compare the resistance values. Replace the injector if necessary.
<b>When the ignition is switched on, check for a 12 v feed on track 1 of injector 4.</b> Repair the <b>the connection line to the actuators</b> if necessary.
Connect the bornier in place of the computer and check <b>the insulation and continuity</b> of the line: <b>Computer track 89 —————▶ Track 2 of injector 4</b> Repair if necessary.
If the problem has still not been solved, deal with the other faults and then proceed to the conformity check.

<b>AFTER REPAIR</b>	Follow the instructions to confirm repair. Deal with any other possible faults. Clear the fault memory. Carry out a conformity check.
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<b>DF057 PRESENT OR STORED</b>	<u>UPSTREAM OXYGEN SENSOR CIRCUIT</u> 1.DEF : Open circuit or short circuit
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<b>NOTES</b>	<b>If fault DF345: Sensor or potentiometer 5 volts supply is present or stored, deal with it as a priority.</b>
	<b>Conditions for applying the fault finding procedure to stored faults:</b> Switch on the ignition. Start the engine, ensure that state ET030: Upstream oxygen sensor heating, is active and wait for state <b>ET037: Richness regulation</b> to become active, then wait for 5 minutes.
	*If the fault is stored with the On Board Diagnostic warning light on, check the context section if state ET285: Upstream oxygen sensor circuit, which corresponds to the instruction to switch on the OBD warning light is at YES. If this is the case, follow the method below.

Check the <b>connection and condition</b> of the oxygen sensor connector. Check that there is no <b>water present in the connector (probable cause of an engine flat spot)</b> . Replace the connector if necessary.
Check that there is no <b>air leak between the exhaust manifold and the catalytic converter</b> .
If the vehicle is used frequently in town, <b>decoke the engine</b> .
Connect the bornier in place of the computer and check <b>the insulation, the continuity and ensure that there is no interference resistance in lines:</b> (According to the type of sensor) <b>Computer track 45      —————&gt;    Oxygen sensor track C</b> <b>Computer track 80      —————&gt;    Track D of the oxygen sensor (triple-wired sensor)</b> Repair if necessary.
If the problem persists, replace the oxygen sensor.
If the problem has still not been solved, deal with the other faults and then proceed to the conformity check.

<b>AFTER REPAIR</b>	Follow the instructions to confirm repair. Deal with any other possible faults. Clear the fault memory. Carry out a conformity check.
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DF058 PRESENT OR STORED	<u>DOWNSTREAM OXYGEN SENSOR CIRCUIT</u> 1.DEF : Open circuit or short circuit
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NOTES	If fault DF345: Sensor or potentiometer 5 volts supply is present or stored, deal with it as a priority.
	<b>Conditions for applying the fault finding procedure to stored faults:</b> <ul style="list-style-type: none"><li>– A road test whilst driving steadily after operation of the fan and with state ET027: Double richness loop, active.</li><li>– A road test whilst driving steadily after operation of the fan, followed immediately by a deceleration phase (on a hill, for example) with state ET003: Throttle in no load position active, with gearbox ratio and clutch engaged.</li></ul>
	*If the fault is stored with the On Board Diagnostic warning light on, check the context section if state ET287: Downstream oxygen sensor circuit, which corresponds to the instruction to switch on the OBD warning light is at YES. If this is the case, follow the method below.

Check the <b>connection and condition</b> of the oxygen sensor connector. Replace the connector if necessary.
Check that there are no <b>air leaks between the two oxygen sensors</b> .
If the vehicle is used frequently in town, <b>decoke the engine</b> .
Connect the bornier in place of the computer and check <b>the insulation, continuity and ensure that there is no interference resistance on lines</b> : Computer track 44    ➡    Oxygen sensor track C Computer track 76    ➡    Oxygen sensor track D Repair if necessary.
If the problem persists, replace the oxygen sensor.
If the problem has still not been solved, deal with the other faults and then proceed to the conformity check.

AFTER REPAIR	Follow the instructions to confirm repair. Deal with any other possible faults. Clear the fault memory. Carry out a conformity check.
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<b>DF060 PRESENT OR STORED</b>	<b>IDLE SPEED REGULATION CIRCUIT</b> 1.DEF : Open circuit or short circuit CO : Open circuit CC.0 : Short circuit to earth CC.1 : Short circuit to +12 volts
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<b>NOTES</b>	<b>Conditions for applying the fault finding procedure to stored faults:</b> Switch on the ignition.
	*If the fault is stored with the On Board Diagnostic warning light on, check the context section if state ET255: Idle speed regulation circuit which corresponds to the instruction to switch on the OBD warning light is at YES. If this is the case, follow the method below.

Check the <b>connection and condition</b> of the idle speed regulation stepper motor connector. Replace the connector if necessary.
Check <b>the resistance of the idle speed regulation stepper motor. Refer to the HELP section to compare the resistance values.</b> Replace the valve if necessary.
Check <b>the insulation, continuity and ensure that there is no interference resistance on lines:</b> Computer track 12 —————> Idle speed regulation stepper motor track B Computer track 41 —————> Idle speed regulation stepper motor track A Computer track 42 —————> Idle speed regulation stepper motor track C Computer track 72 —————> Idle speed regulation stepper motor track D Repair if necessary.
If the problem has still not been solved, deal with the other faults and then proceed to the conformity check.

<b>AFTER REPAIR</b>	After the regulation valve has been worked on, the vehicle may not start, in which case the programming must be reinitialized (see the richness adaptive correction section). Deal with any other faults and then carry out a conformity check.
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<b>DF061 PRESENT OR STORED</b>	<b>IGNITION COIL 1 - 4 CIRCUIT</b> 1.DEF : Open circuit or short circuit CO : Open circuit CC.0 : Short circuit to earth CC.1 : Short circuit to +12 volts
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<b>NOTES</b>	<b>Conditions for applying the fault finding procedure to stored faults:</b> Run the engine and stop it when the fault appears (possibly harmful to the catalytic converter) or run at starter speed for ten seconds.
	If multiple faults occur, treat <b>DF345: Potentiometer or sensor 5v feed</b> and <b>DF261: Petrol pump relay circuit</b> first, if present.
	*If the fault is stored with the On Board Diagnostic warning light on, check the context section if state ET282: Ignition coil 1-4 circuit which corresponds to the instruction to switch on the OBD warning light is at YES. If this is the case, follow the method below.

	Check <b>the connection and condition of the coil connector(s)</b> . Replace the connectors, if necessary.
	Check <b>the condition of the anti-interference condenser</b> .

<b>Pencil coils</b>	Check <b>the resistance of cylinder coil 1 then 4</b> . refer to the <b>HELP</b> section to compare <b>the resistance values</b> . Replace the coil, if necessary.
	Check <b>the connection between coil 1 on track 2 and coil 4 on track 1</b> . Repair if necessary.
	Check <b>for a + after petrol pump relay feed on track 1 of coil 1</b> . Apply the fault finding procedure for <b>DF261</b> if necessary.
	Connect the bornier in place of the computer and check <b>the insulation and continuity</b> of the line: <b>Computer track 32      —————&gt;      Cylinder coil 4 track 2</b> Repair if necessary.

<b>Quadruple coil</b>	Check <b>the resistance of cylinder coils 1 and 4</b> . Replace the coil if necessary. Check for a <b>+ after petrol pump relay feed on track C of the coil</b> . <b>Apply fault finding procedure for DF261 if necessary</b> . Connect the bornier in place of the computer and check <b>the insulation and continuity of the line</b> : <b>Computer track 32      —————&gt;      Quadruple coil track A</b> Repair if necessary.
	If the problem has still not been solved, deal with the other faults and then proceed to the conformity check.

<b>AFTER REPAIR</b>	Follow the instructions to confirm repair. Deal with any other possible faults. Clear the fault memory. Carry out a conformity check.
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<b>DF062 PRESENT OR STORED</b>	<b>IGNITION COIL 2-3 CIRCUIT</b> 1.DEF : Open circuit or short circuit CO : Open circuit CC.0 : Short circuit to earth CC.1 : Short circuit to +12 volts
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<b>NOTES</b>	<b>Conditions for applying the fault finding procedure to stored faults:</b> Run the engine and stop it when the fault appears (possibly harmful to the catalytic converter) or run at starter speed for ten seconds.
	If multiple faults occur, treat <b>DF345: Potentiometer or sensor 5v feed and DF261: Petrol pump relay circuit first, if present.</b>
	*If the fault is stored with the On Board Diagnostic warning light on, check the context section if state ET283: Ignition coil 2-3 circuit which corresponds to the instruction to switch on the OBD warning light is at YES. If this is the case, follow the method below.

<b>Pencil coils</b>	Check <b>the connection and condition of the coil connector(s).</b> Replace the connector(s), if necessary.
	Check <b>the condition of the anti-interference condenser.</b>
	Check <b>the resistance of cylinder coil 2 then 3.</b> Refer to the <b>HELP</b> section to compare <b>the resistance values.</b> Replace the coil, if necessary.
	Check <b>the connection between coil 2 on track 2 and coil 3 on track 1.</b> Repair if necessary.
<b>Quadruple coil</b>	Check <b>for a + after petrol pump relay feed on track 1 of coil 2.</b> Apply fault finding procedure for <b>DF261</b> if necessary.
	Connect the bornier in the place of the computer and check <b>the insulation and continuity</b> of the connection: <b>Computer track 1      →      Cylinder coil 3 track 2</b> Repair if necessary.
	Check <b>the resistance of cylinder coils 2 and 3.</b> Replace the coil if necessary. Check for a <b>+</b> <b>after petrol pump relay feed on track C of the coil.</b> <b>Apply fault finding procedure for DF261, if necessary.</b> Connect the bornier in place of the computer and check <b>the insulation and continuity of the line:</b> <b>Computer track 1      →      Quadruple coil track B</b> Repair if necessary.
	If the problem has still not been solved, deal with the other faults and then proceed to the conformity check.

<b>AFTER REPAIR</b>	Follow the instructions to confirm repair. Deal with any other possible faults. Clear the fault memory. Carry out a conformity check.
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<b>DF063 PRESENT OR STORED</b>	<b><u>CAMSHAFT DEPHASER</u></b> 1.DEF : Open circuit or short circuit CO : Open circuit CC.0 : Short circuit to earth CC.1 : Short circuit to +12 volts
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<b>NOTES</b>	There must be no faults present or stored. The solenoid valve is only fed when the engine speed range is between 1800 and 6500 rpm and if <b>ET003: Throttle no load position = inactive</b> .
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Check <b>the insulation and continuity between track 64 of the computer and track 2 of the camshaft dephaser solenoid valve</b> . Repair if necessary.
Check for <b>12 v on track 1 of the solenoid valve</b> of the camshaft dephaser. Repair the line if necessary.
Check for <b>an earth on track 2 of the solenoid valve</b> of the camshaft dephaser <b>when ET026 is active</b> .
Replace the solenoid valve, if necessary.
<b>NOTE:</b> the engine idle speed may be unstable if the solenoid valve is jammed open.

<b>AFTER REPAIR</b>	Follow the instructions to confirm repair. Deal with any other possible faults. Clear the fault memory. Carry out a conformity check.
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DF064 PRESENT OR STORED	<u>VEHICLE SPEED SIGNAL</u>
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NOTES	It is essential that the ABS is not defective when carrying out this test. <b>Conditions for carrying out fault finding on a stored fault:</b> Perform a test observing the vehicle speed. Continue the road test on a hill at a constant speed. Continue the road test on a hill in the no load position.
	*If the fault is stored with the On Board Diagnostic warning light on, check the context section if state ET223: Vehicle speed sensor circuit which corresponds to the instruction to switch on the OBD warning light is at YES.If this is the case, follow the method below.

Check <b>the connection and condition of the connector</b> of the vehicle speed line (speed sensor or ABS). Replace the connector if necessary.
Connect the bornier in place of the computer and check the <b>insulation, continuity and absence of interference resistance of the line 53 of the computer.</b>
If the fault persists, replace the speed sensor or refer to the fault finding procedure for the ABS. (If fitted to the vehicle)

AFTER REPAIR	Follow the instructions to confirm repair. Deal with any other possible faults. Clear the fault memory. Carry out a conformity check.
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DF082 PRESENT OR STORED	<u>PETROL → LPG CONNECTION</u>
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<b>NOTES</b>	The procedure follows on from the unexpected change in configuration of the injection computer from petrol mode to LPG mode on a non LPG vehicle.
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<p><b><i>AFTER REPAIR</i></b></p>	<p>Follow the instructions to confirm repair.          Deal with any other possible faults.          Clear the fault memory.          Carry out a conformity check.</p>
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DF083 PRESENT OR STORED	<u>ABS AND INJECTION —————&gt; CONNECTION</u>
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NOTES	It is essential that the ABS is not defective when carrying out this test. Conditions for applying the fault finding procedure to stored faults: Engine running for three seconds.
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Connect the bornier in place of the computer and check the insulation, the continuity and ensure that there is no interference resistance in lines 27 and 57 of the computer. Repair if necessary.	
Run a multiplex network test for vehicles fitted with this option. LC038: Vehicle speed connection through the CAN.	

AFTER REPAIR	Follow the instructions to confirm repair. Deal with any other possible faults. Clear the fault memory. Carry out a conformity check.
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DF102 PRESENT OR STORED	<u>OXYGEN SENSOR OPERATING FAULT</u> Indicates that the signal received by the upstream oxygen sensor is inconsistent.
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NOTES	Apply this fault finding strategy whether the fault is present or stored.
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Check for <b>air leaks on the exhaust system</b> .
If the vehicle is used frequently in town, <b>decoke the engine</b> .
Check the <b>connection and condition</b> of the oxygen sensor connector. Replace the connector if necessary.
Connect the bornier in place of the computer and check <b>the insulation, continuity and ensure that there is no interference resistance on lines</b> : Computer track 45   ————> Track C Oxygen sensor Computer track 80   ————> Track D Oxygen sensor Computer track 63   ————> Track B Oxygen sensor Repair if necessary.
If the fault persists, replace the oxygen sensor.
If the problem has still not been solved, deal with the other faults and then proceed to the conformity check.

AFTER REPAIR	Make a note of any other operating faults. Deal with any other possible faults.
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DF106 PRESENT OR STORED	<u>CATALYTIC CONVERTER OPERATING FAULT</u> Indicates that the signals from before and after the catalytic converter, received by the two oxygen sensors, are inconsistent.
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NOTES	Apply this fault finding strategy whether the fault is present or stored.
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Check for <b>air leaks on the exhaust system</b> . Repair if necessary.
<b>Visually check the condition of the catalytic converter.</b> A deformity may be causing it to malfunction. <b>Check for visual signs of thermal shock.</b>
A warm catalytic converter may be damaged if it comes into contact with cold water.
Check that there has not been any <b>excessive consumption of oil or coolant</b> . Ask the customer if he has used an additive or other products of this kind. Such products can block the catalytic converter, and damage its short or long term performance.
<b>Check if the engine has been misfiring.</b> This could damage the catalytic converter.
Check the <b>driving noise</b> during a road test.
If the cause of the damage is identified, it is possible to change the catalytic converter. <b>If you change the catalytic converter without finding the cause, the new catalytic converter may be damaged very quickly.</b>

AFTER REPAIR	Make a note of any other operating faults. Deal with any other possible faults.
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## Fault finding - Fault Interpretation

<b>DF109</b> <b>DF110</b> <b>PRESENT</b> <b>OR</b> <b>STORED</b>	<u>POLLUTANT MISFIRES</u> <u>DESTRUCTIVE MISFIRE</u>
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<b>NOTES</b>	<p>The state ET014: Cylinder no. 1 recognition must be active, to differentiate each cylinder.</p> <p><b>ET093:</b> Misfiring on cylinder 1  <b>ET094:</b> Misfiring on cylinder 2  <b>ET095:</b> Misfiring on cylinder 3  <b>ET096:</b> Misfiring on cylinder 4</p> <p>Give information on the nature and location of the fault.</p>
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One cylinder is declared faulty **ET093** or **ET094** or **ET095** or **ET096**

For this reason, the problem is probably due to a component associated with one cylinder only:

- **Problem with the injector**
  - **Problem with the spark plug**
  - **Problem with the high voltage wire or the pencil coil (if fitted)**
- Before making a replacement, try the component with another cylinder.

Cylinders 1 and 4 or cylinders 2 and 3 declared faulty **ET093** and **ET096** or **ET094** and **ET095**

This means that the problem is probably due to a component which can only act on this pair of cylinders:

- **Problem with the double coil high voltage side**
- **Problem with the coil control side**

Four cylinders are declared faulty **ET093** and **ET094** or **ET095** and **ET096**

This means that the problem is probably due to a component which can only act on all the cylinders:

- **Problem with petrol filter**
- **Problem with petrol pump**
- **Problem with petrol type**
- **Problem with spark plug type**

**If this method does not solve the problem, refer to the DF109 / DF110 CONTINUED fault finding strategy.**

<b>AFTER REPAIR</b>	<p>Ensure that all the faults have been dealt with. Clear the stored faults.  It is not necessary to clear the programming.  To check that the system has been repaired correctly:</p> <ul style="list-style-type: none"> <li>- There should be no further electrical faults.</li> <li>- programming should have been carried out.</li> <li>- The engine should be warm (minimum 75°C).</li> <li>- Run the engine at idle speed, with all consumers on for 20 minutes. (1 minute DF110).</li> </ul> <p>If the fault resurfaces, continue the fault finding procedure.</p>
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<b>DF109</b> <b>DF110</b> CONTINUED	
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<b>NOTES</b>	<b>ET093:</b> Misfiring on cylinder 1 <b>ET094:</b> Misfiring on cylinder 2 <b>ET095:</b> Misfiring on cylinder 3 <b>ET096:</b> Misfiring on cylinder 4 Give information on the nature and location of the fault.
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Check <b>the ignition system (refer to the HELP section)</b> . Repair if necessary.
Check <b>the engine compression</b> . Repair if necessary.
Check <b>the engine target</b> . Repair if necessary.
If no fault is detected, there is a problem with the fuel circuit. It is therefore necessary to check: – <b>The petrol filter</b> – <b>The fuel flow and pressure</b> – <b>The condition of the petrol pump</b> – <b>The cleanliness of the tank</b> – <b>The condition of the injectors</b> Return the fuel system to service condition.

<b>AFTER REPAIR</b>	Ensure that all the faults have been dealt with. Clear the stored faults. It is not necessary to clear the programming. To check that the system has been repaired correctly: – - There should be no further electrical faults. – programming should have been carried out. – The engine should be warm (minimum 75°C). – Run the engine at idle speed, with all the consumers switched on, for 20 minutes (1 minute DF110).
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DF118 PRESENT OR STORED	<u>COOLANT PRESSURE SENSOR CIRCUIT</u>
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NOTES	On vehicles fitted with a refrigerant fluid pressure sensor (cold loop mode in injection), the computer recalculates the PR044: Power absorbed by the compressor parameter from the refrigerant fluid pressure values. If there is any drift from parameter PR027, the value of PR044 could be incorrect.
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Check the <b>connection and condition</b> of the refrigerant pressure sensor connector. Repair if necessary.
Connect the bornier in place of the computer and check <b>the insulation and continuity of the connections</b> : <b>Computer track 82</b> —————> <b>Track A pressure sensor</b> <b>Computer track 83</b> —————> <b>Track B pressure sensor</b> <b>Computer track 18</b> —————> <b>Track C pressure sensor</b>
Repair if necessary.
If the problem persists, carry out air conditioning fault finding.

AFTER REPAIR	Follow the instructions to confirm repair. Deal with any other possible faults. Clear the fault memory. Carry out a conformity check.
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DF120 PRESENT OR STORED	<u>OBD WARNING LIGHT CIRCUIT</u> 1.DEF : Open circuit or short circuit CO : Open circuit CC.0 : Short circuit to earth CC.1 : Short circuit to +12 volts
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NOTES	Apply this fault finding strategy whether the fault is present or stored. <b>Conditions for applying the fault finding procedure to stored faults:</b> – <b>AC213: OBD warning light</b> command has been run.
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Check <b>the insulation, the continuity and ensure that there is no interference resistance</b> on connection <b>track 34 of the injection computer</b> . Repair if necessary.
Ensure that there is a <b>+ 12 v feed</b> to the OBD warning light. Check the instrument panel fuses. Replace the fuse(s) if necessary.
refer to the instrument panel fault finding strategy if the fault persists.

AFTER REPAIR	Follow the instructions to confirm repair. Deal with any other possible faults. Clear the fault memory. Carry out a conformity check.
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DF253 PRESENT OR STORED	<u>ENGINE EARTH</u> 1.DEF : Single wire type oxygen sensor circuit
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NOTES	<b>Apply this fault finding strategy whether the fault is present or stored.</b> Only on vehicles fitted with <b>single wire upstream sensor</b> . (LC012: Oxygen sensor option reading).
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Check the condition of the <b>engine earths</b> . Repair if necessary.	
Connect the bornier in place of the computer and check <b>the insulation and continuity of line:</b> <b>Computer track 44      —————▶      Engine earth</b> Repair if necessary.	

AFTER REPAIR	Follow the instructions to confirm repair. Deal with any other possible faults. Clear the fault memory. Carry out a conformity check.
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## Fault finding - Fault Interpretation

<b>DF261 PRESENT OR STORED</b>	<b>PETROL PUMP RELAY CIRCUIT</b> 1.DEF : Fault on + after relay feed 2.DEF : Open circuit or short circuit
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<b>NOTES</b>	<b>If fault DF345: Sensor or potentiometer 5 volts supply is present or stored, deal with it as a priority.</b>
	<b>Conditions for applying the fault finding procedure to stored faults:</b> Switch the ignition on and enter into dialogue. Or activate the <b>AC010: Petrol pump relay</b> command. <b>NOTE:</b> This fault is a priority. It should therefore be dealt with before those that follow.
	*If the fault is stored with the On Board Diagnostic warning light on, check the context section if state ET241: Petrol pump control circuit which corresponds to the instruction to switch on the OBD warning light is at YES. If this is the case, follow the method below.

<b>1.DEF</b>	<b>NOTES</b>	There is a fault on the petrol pump relay power circuit.
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Check that the inertia switch is engaged. Repair if necessary.
Check <b>the connection and condition of the petrol pump relay connector</b> . Replace the connector if necessary.
Check for a <b>+ 12 v feed on track 3 of the petrol pump relay</b> . Repair if necessary.
With the ignition on and by running the AC010: petrol pump relay command, check for a <b>+ 12 v feed on track 5 of the petrol pump relay</b> . Change the relay if necessary.
Check the <b>insulation and continuity</b> of the connections between: <b>Petrol pump relay track 5</b> ➔ <b>Track C quadruple coil</b> <b>Petrol pump relay track 5</b> ➔ <b>Track 1 coil 1 (pencil type)</b> <b>Petrol pump relay track 5</b> ➔ <b>Track 1 coil 2 (pencil type)</b> <b>Petrol pump relay track 5</b> ➔ <b>Petrol pump</b> Repair if necessary.
If the problem has still not been solved, deal with the other faults and then proceed to the conformity check.

<b>AFTER REPAIR</b>	Follow the instructions to confirm repair. Deal with any other possible faults. Clear the fault memory. Carry out a conformity check.
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DF261 CONTINUED	
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2.DEF	NOTES	There is a fault on the petrol pump relay power circuit.
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Check <b>the connection and condition of the petrol pump relay connector</b> . Replace the connector if necessary.
With the ignition on, check for <b>a + 12 v feed on track 1 of the petrol pump relay</b> . Return to service condition if necessary
Check <b>the petrol pump relay coil</b> . Replace the petrol pump relay if necessary.
Check the <b>insulation and continuity of line</b> : <b>Computer track 68</b> <b>—————&gt;</b> <b>Track 2 petrol pump relay</b> Repair if necessary.
If the problem has still not been solved, deal with the other faults and then proceed to the conformity check.

AFTER REPAIR	Follow the instructions to confirm repair. Deal with any other possible faults. Clear the fault memory. Carry out a conformity check.
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DF271 PRESENT OR STORED	<u>ACTUATOR RELAY OUTPUT VOLTAGE</u> 1.DEF : Open circuit or short circuit
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NOTES	<b>Conditions for applying the fault finding procedure to stored faults:</b> Switch off the ignition and wait for the loss of dialogue. Switch the ignition on and enter into dialogue. <b>NOTE:</b> If the DF009: Actuator relay control circuit fault is present or stored, treat it as a priority because it may be causing your fault to appear.
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Check <b>the condition of the battery and the vehicle earths.</b> Repair if necessary.
<b>Check the connection and condition of the actuator relay connector.</b> Replace the connector if necessary.
With the ignition on, check for a <b>12 v feed on track 3 of the actuator relay.</b> Rectify the line to the fuse.
Disconnect the clip on track 5 of the relay-holder. With the ignition on, check for a <b>12 v feed on track 5 of the actuator relay.</b> Replace the relay if necessary.
Check the <b>insulation and continuity of line:</b> <b>Computer track 66      —————▶      Actuator relay 5</b> Repair if necessary.
One by one, disconnect the components (injector, canister bleed solenoid valve etc.) <b>using the 12 v feed to determine which of them is faulty.</b> Replace the faulty component.

AFTER REPAIR	Follow the instructions to confirm repair. Deal with any other possible faults. Clear the fault memory. Carry out a conformity check.
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<b>DF345 PRESENT</b>	<b>+5 VOLTS SUPPLY TO POTENTIOMETERS AND SENSORS</b> 1.DEF : Open circuit or short circuit
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<b>NOTES</b>	With the ignition on, check the <b>PR004: Computer voltage supply parameter:</b> (measured battery voltage of approximately 12 v) – if it is at the value limit of about 16 v, there is a short circuit to the earth – if it is at the value limit of about 10.7 v, there is a short circuit to the + 12 v feed <b>of one of the 5v supply tracks.</b>
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Check the <b>connection and condition</b> of the connections of the throttle potentiometer, manifold pressure sensor and refrigerant fluid sensor (if fitted). Replace the connector(s) if necessary.
<b>One by one</b> , disconnect the following sensors, to check if the fault has gone from being present to being stored: throttle potentiometer, manifold pressure sensor and refrigerant fluid pressure sensor (if fitted). If necessary, deal with the fault concerned with the sensor.
Check <b>the insulation, continuity and ensure that there is no interference resistance</b> on lines: <b>Computer track 74    —————&gt;    Track B throttle potentiometer</b> <b>Computer track 78    —————&gt;    Track C Manifold pressure sensor</b> <b>Computer track 83    —————&gt;    Track B Refrigerant fluid pressure sensor (if fitted)</b> Repair if necessary.
If the problem has still not been solved, deal with the other faults and then proceed to the conformity check.

<b>AFTER REPAIR</b>	Follow the instructions to confirm repair. Deal with any other possible faults. Clear the fault memory. Carry out a conformity check.
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Throttle potentiometer resistance		Track	= 1200 $\Omega$ $\pm$ 20%
		Cursor	= < 1050 $\Omega$
Idle regulation stepper motor resistance		at 25°C	= 53 $\Omega$ $\pm$ 10%
Ignition coil resistance	DENSO	Primary	= 0.5 $\Omega$ $\pm$ 5%
		Secondary	= 6800 $\Omega$ $\pm$ 15%
	SAGEM	Primary	= 0.5 $\Omega$ $\pm$ 5%
		Secondary	= 11000 $\Omega$ $\pm$ 15%
Injector resistance		at -40°C	= 11.1 $\Omega$
		at 20°C	= 14.5 $\Omega$ $\pm$ 5%
		at 120°C	= 20.16 $\Omega$
Manifold pressure sensor resistance			= 50 k $\Omega$
Upstream oxygen sensor heating resistance			= 3 to 15 $\Omega$
Downstream oxygen sensor heating resistance			= 3 to 15 $\Omega$
Top Dead Centre magnetic sensor resistance		at 23°C	= 200 to 270 $\Omega$
Canister bleed solenoid valve resistance		at 23°C	= 26 $\Omega$ $\pm$ 7%

Temperature in °C	-40	-10	25	50	80	110	120
Air temperature sensor Resistance in ohms	50000 $\pm$ 14%	10000 $\pm$ 10%	2000 $\pm$ 6%	810 $\pm$ 6%	309 $\pm$ 6%	135 $\pm$ 6%	105 $\pm$ 7%
Coolant temperature sensor Resistance in ohms	76000 $\pm$ 9 %	12000 $\pm$ 9%	2000 $\pm$ 5%	811 $\pm$ 5%	282 $\pm$ 3%	115 $\pm$ 2%	88 $\pm$ 2%

### Checking the ignition system:

Check the condition, insulation and continuity of the high voltage wiring loom (quadruple coils).

Change them, if necessary.

Check the condition and correct tightness of the spark plugs, and that the codes or references correspond to the engine.

Change them, if necessary.

Check the condition of the ignition coil connectors.

Change them, if necessary.

Check the condition and the resistance values of the ignition coils.

Change them, if necessary.

Check (on pencil coils) that there is no escaping current (a split in the body, intruding parts etc.).

Check the supplies to the coils:

A + 12 v feed (ignition on).

Check the line between the coils and the actuator relay.

Repair if necessary.

## Fault finding - Conformity check

## NOTES

The values shown in this conformity check are only examples.  
It is therefore essential to refer to the Technical Note which deals with your vehicle.  
**Test conditions:** Engine stopped, ignition on.

Order	Function	Parameter/status checked or action	Display and notes	Fault finding
1	Battery voltage	<b>ET001:</b> + after ignition feed computer <b>PR004:</b> Computer supply voltage	<b>ACTIVE</b> 11.8 < X < 13.2 volts	If there is a problem, refer to fault finding procedure <b>PR004</b> .
2	Computer configuration	<b>LC012:</b> Oxygen sensor option reading  <b>LC017:</b> Control of fan assembly with engine running  <b>LC019:</b> Upstream oxygen sensor <b>LC020:</b> Downstream oxygen sensor <b>LC021:</b> Camshaft dephaser <b>LC022:</b> Gear change indicator light <b>LC036:</b> Reduced flow fuel pump <b>LC038:</b> Vehicle speed through the CAN <b>LC042:</b> Camshaft cold loop mode in injection  <b>LC044:</b> Thermoplunger management <b>LC048:</b> Air conditioning configuration reading  <b>LC054:</b> Gearbox type  <b>LC056:</b> Heated windscreen <b>LC081:</b> LGP and injection. → connection  <b>LC096:</b> Fixed displacement compressor <b>LC098:</b> Pencil type ignition coil	one wire (or three depending on the model)  With (If fitted)  With With (If fitted) With (If fitted) With (If fitted) With (If fitted) With (If fitted) With (If fitted) With (If fitted)  Manual gearbox (Automatic gearbox if fitted)  With (If fitted) With (If fitted)  With (If fitted) With (If fitted)	None.

**NOTES**

The values shown in this conformity check are only examples.  
It is therefore essential to refer to the Technical Note which deals with your vehicle.  
**Test conditions:** Engine stopped, ignition on.

Order	Function	Parameter/status checked or action	Display and notes	Fault finding
3	Immobiliser	<b>ET002:</b> Engine immobiliser	<b>INACTIVE</b>	If there is a problem, refer to fault finding procedure <b>DF044</b> .
4	Throttle position potentiometer	Accelerator pedal not depressed <b>ET003:</b> No load throttle position <b>PR017:</b> Measured throttle position <b>PR008:</b> No load position programming value Accelerator pedal lightly depressed <b>ET003:</b> No load throttle position <b>ET005:</b> Throttle position at full throttle Accelerator pedal fully depressed <b>ET003:</b> No load throttle position <b>ET005:</b> Throttle position at full throttle <b>PR017:</b> Measured throttle position	YES $0 < X < 47$ $0 < X < 47$ NO NO NO YES $170 < X < 255$	If there is a problem, refer to fault finding procedure <b>PR017</b> .
5	Coolant temperature sensor	<b>PR002:</b> Coolant temperature	$X = \text{engine temperature} \pm 5\text{ }^{\circ}\text{C}$	If there is a problem, refer to fault finding procedure <b>PR002</b> .
6	Air temperature sensor	<b>PR003:</b> Air temperature	$X = \text{temperature under bonnet} \pm 5\text{ }^{\circ}\text{C}$	If there is a problem, refer to fault finding procedure <b>PR003</b> .
7	Pressure sensor	<b>PR016:</b> Atmospheric pressure <b>PR001:</b> Manifold pressure	$X = \text{Atmospheric pressure}$ $X = \text{Atmospheric pressure}$	In the event of a problem, refer to fault finding procedure <b>PR001</b> .

## Fault finding - Conformity check

**NOTES**

The values shown in this conformity check are only examples.  
It is therefore essential to refer to the Technical Note which deals with your vehicle.  
**Test conditions:** Engine stopped, ignition on.

Order	Function	Parameter/status checked or action	Display and notes	Fault finding
8	Petrol pump	<b>AC010:</b> Petrol pump relay	You should hear the fuel pump operating	In the event of a problem, refer to fault finding procedure <b>AC010</b> .
9	Fan assembly	<b>AC271:</b> Low-speed fan assembly relay <b>AC272:</b> High-speed fan assembly relay (if fitted)	You should be able to hear the fan turning at low speed You should be able to hear the fan turning at high speed	In the event of a problem, refer to fault finding procedure <b>ET035</b> ( <b>ET036</b> ).
10	Idle speed regulation valve	<b>AC014:</b> Idle speed regulation valve	Place your hand on it to ensure that it is operating	In the event of a problem, refer to fault finding procedure <b>ET039</b> .
11	Bleed solenoid valve	<b>AC016:</b> Canister bleed solenoid valve	The canister bleed solenoid valve should operate	In the event of a problem, refer to fault finding procedure <b>ET032</b> .
12	Climate control	<b>AC003:</b> Air conditioning compressor	The compressor should be creating pressure	In the event of a problem, refer to fault finding procedure <b>ET070</b> .
13	Fault warning lights:	<b>AC212:</b> Coolant temperature warning light <b>AC213:</b> OBD warning light <b>AC005:</b> Gear change indicator light (if fitted)	The warning light should come on The warning light should come on The warning light should come on	If there is a problem, refer to the <b>AC212</b> / <b>DF120</b> ( <b>ET092</b> ) fault finding strategies.
14	Camshaft dephaser	<b>AC491:</b> Camshaft dephaser	The camshaft dephaser solenoid valve should be working	In the event of a problem, refer to fault finding procedure <b>AC491</b> .

**NOTES**

The values shown in this conformity check are only examples.  
It is therefore essential to refer to the Technical Note which deals with your vehicle.  
**Test conditions:** Warm engine at idle speed and **no electrical consumers**.

Order	Function	Parameter/state checked or action	Display and notes	Fault finding
1	Battery voltage	<b>ET001:</b> + after ignition feed computer <b>PR004:</b> Computer supply voltage If <b>PR004</b> = Then <b>PR006:</b> Engine speed	<b>ACTIVE</b>  13 < X < 14.5 volts X < 12.8 volts 750 < X < 910 rpm (800 < X < 960 on Clio F4R)	In the event of a problem, refer to fault finding procedure <b>PR004</b> .
2	Petrol pump control	<b>ET020:</b> Petrol pump relay control	<b>ACTIVE</b>	In the event of a problem, refer to fault finding procedure <b>AC010</b>
3	Actuator control	<b>ET025:</b> Actuator relay control	<b>ACTIVE</b>	In the event of a problem, refer to fault finding procedure <b>DF009</b> .
4	Flywheel signal	<b>ET060:</b> Engine running flywheel signal	<b>ACTIVE</b>	In the event of a problem, refer to fault finding procedure <b>DF017</b> .
5	Cylinder no. 1 recognition	<b>ET014:</b> Cylinder no. 1 recognition	PERFORMED (Unless ET011 is active)	None.
6	Oxygen sensor heater	<b>ET030:</b> Upstream oxygen sensor heating <b>ET031:</b> Downstream oxygen sensor heating (if present)	<b>ACTIVE</b>  <b>ACTIVE</b>	See operating conditions.
7	Throttle position potentiometer	<b>ET003:</b> No load throttle position	YES	In the event of a problem, refer to fault finding procedure <b>PR017</b> .
8	Idle speed regulation	<b>ET039:</b> Idle speed regulation <b>PR006:</b> Engine speed  <b>PR041:</b> Idle speed set point <b>PR022:</b> Idle speed OCR signal	<b>ACTIVE</b>  725 < X < 775 rpm (775 < X < 825 on Clio F4R) =PR006 ± 25 rpm Values detailed in the idle speed adaptive correction section	In the event of a problem, refer to fault finding procedure <b>ET039</b> .
9	Pressure circuit	<b>PR001:</b> Inlet manifold vacuum <b>PR016:</b> Atmospheric pressure	250 < X < 500 mb X = Atmospheric pressure	In the event of a problem, refer to fault finding procedure <b>PR001</b> .



## Fault finding - Conformity check

## NOTES

The values shown in this conformity check are only examples.  
It is therefore essential to refer to the Technical Note which deals with your vehicle.  
**Test conditions:** Warm engine at idle speed and **no electrical consumers**.

Order	Function	Parameter/status checked or action	Display and notes	Fault finding
10	Anti-pinking circuit	<b>PR013:</b> Average pinking signal	$20 < X < 100$	In the event of a problem, refer to fault finding procedure <b>PR013</b> .
11	Richness regulation	<b>ET037:</b> Richness regulation <b>PR009:</b> Upstream oxygen sensor voltage <b>PR035:</b> Richness correction value	<b>ACTIVE</b> $20 < X < 840$ mv $0 < X < 255$ Average value 128	In the event of a problem, refer to fault finding procedure <b>ET037</b> .
12	Heating/ventilation (AC selected) (if fitted)	<b>ET009:</b> Air conditioning request  <b>ET070:</b> Air conditioning compressor	<b>ACTIVE</b> <i>If the injection allows compressor operation</i>  <b>ACTIVE</b> <i>If the injection allows compressor operation</i>	If there is a problem, refer to the <b>ET009</b> , <b>ET070</b> and <b>DF118</b> fault finding strategies or the Injection / AC strategy section.
	According to the conditions and requirements of the injection computer, coolant temperature, electrical consumption and refrigerant fluid pressure	<b>ET035:</b> Low-speed fan assembly* * On some vehicles, the engine start command can be run through a double relay linked to the compressor supply  If <b>ET038:</b> Fast idle speed Then <b>PR006:</b> Engine speed	<b>ACTIVE</b> The fan should run at low speed  <b>ACTIVE</b> $850 < X < 960$ rpm	
	If the complete power absorbed signal or cold loop type is in injection	<b>PR044:</b> Power absorbed by the AC compressor	$300 < X < 5000$ W ( $X < 300$ W <i>If the injection system does not authorize compressor operation</i> )	
	If the cold loop type is in injection	<b>PR027:</b> Coolant pressure	$2 < X < 6$ bar	

NOTES	The values shown in this conformity check are only examples. It is therefore essential to refer to the Technical Note which deals with your vehicle. <b>Test conditions:</b> Warm engine at idle speed and <b>no electrical consumers</b> .
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Order	Function	Parameter/status checked or action	Display and notes	Fault finding
13	Power assisted steering pressure switch (if fitted)	Turn wheels to full lock <b>ET034:</b> Power assisted steering pressure switch	<b>ACTIVE</b>	In the event of a problem, refer to fault finding procedure <b>ET034</b> .
14	Fan	<b>ET035:</b> Low-speed fan assembly <b>PR002:</b> Coolant temperature  <b>ET036:</b> High-speed fan assembly (only if AC fitted) <b>PR002:</b> Coolant temperature	<b>INACTIVE</b>  The fan should cut in when the coolant temperature exceeds 99 °C  <b>ACTIVE</b>  The fan should cut in when the coolant temperature exceeds 102 °C	In the event of a problem, refer to fault finding procedure <b>ET035 (ET036)</b> .

## Fault finding - Conformity check

**NOTES**

The values shown in this conformity check are only examples.  
It is therefore essential to refer to the Technical Note which deals with your vehicle.  
**Test condition:** in road test.

Order	Function	Parameter/status checked or action	Display and notes	Fault finding
1	Canister bleed	<b>ET032:</b> Canister bleed <b>PR023:</b> Canister bleed solenoid valve OCR	<b>ACTIVE</b> X > 1.5 % and variable	None.
2	Vehicle speed	<b>PR018:</b> Vehicle speed	X = speed read on speedometer in km/h	In the event of a problem, refer to fault finding procedure <b>PR018</b> .
3	Pinking sensor	Vehicle under load <b>PR013:</b> Average pinking signal <b>PR015:</b> Anti-pinking correction	X is variable and not zero 0 < X < 7° Crankshaft	In the event of a problem, refer to fault finding procedure <b>PR013</b> .
4	Downstream oxygen sensor	<b>PR010:</b> Downstream oxygen sensor voltage  In full load operation  Decelerating after full load	Do not take into account the voltage at idle speed.  The sensor indicates a rich reading, X increases with a short response time.  The sensor indicates a poor reading, X decreases with a short response time.	None.

**NOTES**

The values shown in this conformity check are only examples.  
It is therefore essential to refer to the Technical Note which deals with your vehicle.  
**Test condition:** in road test.

Order	Function	Parameter/status checked or action	Display and notes	Fault finding
5	Richness adaptive	Programming <b>PR030:</b> Richness adaptive operation Engines: E7J D7F/D7D K4M/K4J/Clio F4R F4P/F4R except Clio F4R K7M/K7J <b>PR031:</b> Idle speed richness adaptive Engines: E7J D7D/D7F K4J/K4M/Clio F4R F4P/F4R except Clio F4R K7J/K7M	80 < x < 176 64 < x < 192 64 < X < 160 82 < X < 224 100 < X < 255  80 < X < 176 64 < X < 192 64 < X < 160 32 < X < 224 0 < X < 208	In the event of a problem, refer to fault finding procedures <b>PR030</b> and <b>PR031</b> .
6	Pollutant emission	2500 rpm after driving  At idle speed, wait for stabilization	CO < 0.3 % CO <sub>2</sub> > 13.5 % O <sub>2</sub> < 0.8 % HC < 100 ppm 0.97 < 1 < 1.03  CO < 0.5 % HC < 100 ppm 0.97 < 1 < 1.03	In the event of a problem, refer to the anti-pollution technical note.

Fault finding - Status interpretation

ET009	<u>AIR CONDITIONING REQUEST</u>
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NOTES	There must be no faults present or stored.
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The injection does not register the air conditioning request.
Check <b>the insulation and continuity of track 23</b> (power absorbed signal type air conditioning) <b>or track 46</b> (logical link type air conditioning) of the injection computer. Repair if necessary.
Refer to the air conditioning fault finding strategy if the fault persists.

AFTER REPAIR	Restart the conformity check from the beginning.
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Fault finding - Status interpretation

ET011	<u>LPG SIGNAL</u>
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NOTES	There must be no faults present or stored.
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Connect the bornier in the place of the computer and check <b>the insulation and continuity of line:</b> <b>Injection computer track 50</b> —————▶ <b>Track 17 LPG computer</b> Repair if necessary.
If the fault persists, refer to the fault finding procedure for LPG equipment.

AFTER REPAIR	Restart the conformity check from the beginning.
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ET034	<u>POWER ASSISTED STEERING PRESSOSTAT</u>
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NOTES	There must be no faults present or stored. When the engine is running, if the state for the power assisted steering pressostat remains active without the steering being used, or inactive when the steering is used.
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Check the connection and condition of the power assisted steering pressostat. Repair if necessary.
Check for <b>an earth</b> on the power assisted steering pressostat.
Check the <b>insulation and continuity</b> of the connection between: <b>Computer track 85</b> —————> <b>Power assisted steering pressure switch track 1</b> Return to service condition if necessary
If all of these points are correct, then replace the power assisted steering pressostat.

AFTER REPAIR	Restart the conformity check from the beginning.
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ET035

LOW-SPEED FAN ASSEMBLY**NOTES**

There should be no fault detected on the coolant temperature sensor circuit when this fault finding strategy is being carried out.

Check:

- The condition of the low speed fan assembly.
- That the low speed fan assembly resistance is correct.
- The cleanliness of the low speed fan assembly.
- The supply to the low speed fan assembly.
- The supply circuit between the low speed fan assembly and the low speed fan assembly relay.

Repair if necessary.

Check **the connection and condition of the low-speed fan relay connector.**

Change the connector if necessary.

Disconnect the low-speed fan relay.

With the ignition on, check for a **12 v feed on track 1 of the relay.**

Repair if necessary.

Check the **resistance of the relay coil.**

Change the low-speed fan relay if necessary.

Connect the bornier in place of the computer and check the **insulation, continuity and absence of interference resistance** on the connection between:

**Computer track 8 —————> Low-speed fan assembly relay**

Repair if necessary.

**AFTER REPAIR**

Restart the conformity check from the beginning.



ET036

HIGH-SPEED FAN ASSEMBLY**NOTES**

There should be no fault detected on the coolant temperature sensor circuit when this fault finding strategy is being carried out.

Check:

- The condition of the high speed fan assembly.
- That the high speed fan assembly resistance is correct.
- The cleanliness of the high speed fan assembly.
- The supply to the high speed fan assembly.
- The supply circuit between the high speed fan assembly and the high speed fan assembly relay.

Repair if necessary.

Check **the connection and condition of the high-speed fan assembly relay connector.**

Change the connector if necessary.

Disconnect the high-speed fan relay.

With the ignition on, check for a **12 v feed on track 1 of the relay.**

Repair if necessary.

Check the **resistance of the relay coil.**

Change the high-speed fan relay if necessary.

Connect the bornier in place of the computer and check the **insulation, continuity and absence of interference resistance** on the connection between:

**Computer track 38 —————> High-speed fan assembly relay**

Repair if necessary.

**AFTER REPAIR**

Restart the conformity check from the beginning.

Fault finding - Status interpretation

ET037	<u>RICHNESS REGULATION</u>
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NOTES	There must be no faults present or stored.
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<p>Check the <b>connection and condition of the upstream oxygen sensor connector</b>. Repair if necessary.</p>
<p>Check ignition. Check the sealing of the canister bleed valve (a leak can disrupt the richness considerably). Check the exhaust system tightness. Check the tightness of the inlet manifold. If the vehicle has only been driven in town, the sensor will be contaminated (try driving under load). Check the fuel pressure. If idle speed is unstable, check the valve clearances and timing. If necessary, replace the oxygen sensor.</p>
<p>Check for a <b>12 v feed</b> to the upstream oxygen sensor. Check <b>the insulation and continuity</b> of the connections between:     <b>Computer track 45</b>   ————→ <b>Upstream oxygen sensor track C</b>     <b>Computer track 80</b>   ————→ <b>Upstream oxygen sensor track D</b> Repair if necessary.</p>

AFTER REPAIR	Restart the conformity check from the beginning.
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## Fault finding - Status interpretation

ET039

IDLE SPEED REGULATION**NOTES**

There must be no faults present or stored.  
Take note of value of the engine idling speed After Sales reference: PR041

Check **the connection and condition** of the idle speed regulation stepper motor connector.  
Replace the connector if necessary.

Check the **resistance of the idle speed regulation stepper motor**.  
Change the idle speed regulation valve if necessary.

Check **the insulation and continuity** of the connections between:

**Computer track 12** —————▶ **Idle speed regulation motor track B**

**Computer track 41** —————▶ **Idle speed regulation motor track A**

**Computer track 42** —————▶ **Idle speed regulation motor track C**

**Computer track 72** —————▶ **Idle speed regulation motor track D**

Repair if necessary.

Idle speed variance  
<minimum stop

**NOTES**

**Idle speed is too slow.**

- Check the operation of the ratio regulation.
  - Clean the air supply circuit (throttle body, idle speed regulation stepper motor), since it is probably contaminated.
  - Check the engine oil level (too high --> splashing).
  - Check the engine compression
  - Check the valve clearances and timing.
  - Check ignition.
  - Check the injectors
- If all these points are correct, replace the idle speed regulation motor.

Idle speed variance  
> minimum stop

**NOTES**

**Idle speed is too high.**

- Check the oil level.
  - Check that the pressure sensor is operating correctly.
  - Check the correctness of the pipes on the manifold.
  - Check the pneumatically controlled solenoid valves.
  - Check the manifold gaskets.
  - Check the throttle body gaskets.
  - Check the brake servo sealing.
  - Check that the restrictions are present in the oil vapour rebreathing circuit.
  - Check the valve clearances and timing.
- If all these points are correct, replace the idle speed regulation motor.

**AFTER REPAIR**

Restart the conformity check from the beginning.

ET070	<u>AIR CONDITIONING COMPRESSOR</u>
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NOTES	There must be no faults present or stored.
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Check <b>the insulation and continuity of the line across track 10</b> of the injection computer. Repair if necessary.
Refer to the air conditioning fault finding strategy if the fault persists.

AFTER REPAIR	Restart the conformity check from the beginning.
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ET092	<u>GEAR CHANGE INDICATOR LIGHT</u>
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NOTES	<p>There must be no faults present or stored.</p> <p>The gear change indicator light comes on for an instant when the ignition is being switched on or 300 rpm before the ignition cut-out threshold engine speed.</p> <p><b>NOTE:</b> If the vehicle is fitted with a downstream oxygen sensor, the computer cannot control the gear change indicator light.</p>
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<p>Check <b>the insulation and continuity of the circuit between track 65 of the injection computer and the indicator light.</b></p> <p>Repair if necessary.</p>	
<p>Refer to the instrument panel fault finding strategy if the fault persists.</p>	

AFTER REPAIR	<p>Restart the conformity check from the beginning.</p>
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## Fault finding - Parameter interpretation

PR001

MANIFOLD PRESSURE**NOTES**

There must be no faults present or stored.

Manifold pressure not correct when ignition is on.

Manifold pressure < minimum at idle speed.

Atmospheric pressure not correct (PR016)

Check the **insulation, continuity and absence of interference resistance** on the connections between:

**Computer track 15** —————> **Pressure sensor track A**

**Computer track 16** —————> **Pressure sensor track B**

**Computer track 78** —————> **Pressure sensor track C**

Repair if necessary.

If all the points are correct, replace the sensor.

Manifold pressure > maximum at idle speed

Check:

- The seal between the manifold and the sensor.
- The valve clearances.
- The canister bleed.
- The cylinder compression.
- If there is no air intake.
- If the exhaust is not blocked.

If all these points are correct, replace the sensor.

**AFTER REPAIR**

Restart the conformity check from the beginning.

Fault finding - Parameter interpretation

PR002	<u>COOLANT TEMPERATURE</u>
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NOTES	There must be no faults present or stored.
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<p>If the reading is inconsistent, ensure that the sensor is correctly following the resistance according to temperature calibration curve: Change the sensor if it drifts (<b>Note:</b> a sensor which drifts is often the result of an electric shock).</p>
<p>Check the <b>insulation, continuity and absence of interference resistance</b> on the connections between: <b>Computer track 13</b>    ➡    <b>Coolant temperature sensor track B2</b> <b>Computer track 73</b>    ➡    <b>Coolant temperature sensor track B1</b> Repair if necessary.</p>

AFTER REPAIR	Restart the conformity check from the beginning.
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Fault finding - Parameter interpretation

PR003	<u>AIR TEMPERATURE</u>
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NOTES	There must be no faults present or stored.
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<p>If the reading is inconsistent, ensure that the sensor is correctly following the resistance according to temperature calibration curve: Change the sensor if it drifts (<b>Note:</b> a sensor which drifts is often the result of an electric shock).</p>
<p>Check the <b>insulation, continuity and absence of interference resistance</b> on the connections between:</p> <p><b>Computer track 49</b>    ➡    <b>Air temperature sensor track 1</b> <b>Computer track 77</b>    ➡    <b>Air temperature sensor track 2</b></p> <p>Repair if necessary.</p>

AFTER REPAIR	Restart the conformity check from the beginning.
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## Fault finding - Parameter interpretation

PR004	<u>COMPUTER SUPPLY VOLTAGE</u>
NOTES	There must be no faults present or stored. No electrical consumers.
Ignition on	<b>If voltage &lt; Minimum, the battery is discharged:</b> Check the charging circuit to determine the cause of this fault.
	<b>If voltage &gt;Maximum, the battery may be overcharged:</b> Check that the charging voltage is correct with and without electrical consumers.
At idle speed	<b>If voltage &lt; Minimum, the charging voltage is too low:</b> Check the charging circuit to determine the cause of this fault.
	<b>If voltage &gt; Maximum, the charging voltage is too high:</b> The alternator regulator is faulty. Repair this fault and check the electrolyte level in the battery.
If the battery and charge circuit are correct	The problem must be dealt with using the method in DF345: 5 volt supplies to the potentiometers and sensors.
AFTER REPAIR	Restart the conformity check from the beginning.

Fault finding - Parameter interpretation

PR017	<u>THROTTLE POSITION</u>
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NOTES	There must be no faults present or stored.
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Programming of end stop <b>PR008</b> or non-detection of no load position <b>ET003</b> or non-detection of full throttle position <b>ET005</b>	Check that the <b>potentiometer mechanical stop has not been altered</b> . Check the accelerator control (friction, blockage etc.).
	Check the <b>resistance of the throttle potentiometer</b> . Replace the throttle potentiometer if necessary.
	Check the <b>insulation, continuity and absence of interference resistance</b> on the connections between: <div>Computer track 43 —————&gt; Throttle potentiometer track C</div> <div>Computer track 74 —————&gt; Throttle potentiometer track B</div> <div>Computer track 75 —————&gt; Throttle potentiometer track A</div> Repair if necessary.

The throttle position is fixed <b>PR017</b>	Check that the sensor is mechanically linked to the throttle. If necessary change the sensor.
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AFTER REPAIR	Restart the conformity check from the beginning.
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## Fault finding - Parameter interpretation

**PR030**  
**PR031**

RICHNESS ADAPTIVE OPERATION  
IDLE SPEED RICHNESS ADAPTIVE

**NOTES**

There must be no faults present or stored.  
Carry out the programming operations.

Ensure the canister bleed valve is sealed.

Clear the computer memory. Examine these parameters when the engine is warm and during idle speed regulation.

- **If one of these parameters goes to maximum stop, there is not enough petrol or too much air in the mixture.**
- **If one of these parameters goes to minimum stop, there is too much petrol or not enough air in the mixture.**

(see the Richness adaptive correction section for the exact values of the stops).

Ensure the correctness, cleanness and proper operation of:

- Petrol filter.
- Petrol pump.
- Fuel circuit.
- Tank.
- Air supply pipe.
- Air filter.
- Plugs.

Check:

- The compressions.
- The valve clearances.
- The ignition.

**AFTER REPAIR**

Restart the conformity check from the beginning.

Fault finding - Command interpretation

AC010	<u>FUEL PUMP RELAY</u>
NOTES	<p>There must be no faults present or stored.</p> <p><b>Before carrying out this check, check that the tracks on the wiring diagram which correspond to the components fitted to your vehicle match.</b></p>
<p>Check that <b>the impact sensor is switched on.</b> Switch on the impact sensor if necessary.</p>	
<p>Check the <b>continuity between tracks 1 and 3 of the impact sensor.</b> If there is no continuity, change the impact sensor.</p>	
<p>When the starter motor is turning, check for <b>a 12 v feed on track 3 of the impact sensor connector.</b> If there are not 12 v present, repair the line from track 3 of the impact sensor to track 5 of the petrol pump relay.</p>	
<p>Check the correctness and presence of earth on track C2 of the fuel pump.</p>	
<p>Check <b>the insulation and continuity</b> of wiring: <b>Impact sensor      —————&gt; track C1 Petrol pump</b> Repair if necessary.</p>	
<p>If the fault persists, change the fuel pump.</p>	

AFTER REPAIR	Restart the conformity check from the beginning.
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Fault finding - Command interpretation

AC212	<u>COOLANT TEMPERATURE WARNING LIGHT</u>
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NOTES	There must be no faults present or stored.
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Check for <b>an earth on the warning light circuit</b> , when the command is activated. Repair if necessary.
If a 12 v short circuit occurs on the warning light circuit, the instrument panel could be heavily damaged.
Refer to the instrument panel fault finding strategy if the fault persists.

AFTER REPAIR	Restart the conformity check from the beginning.
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## Fault finding - Command interpretation

AC491	<u>CAMSHAFT DEPHASER</u>
NOTES	<p>There must be no faults present or stored. The solenoid valve is only fed when the engine speed range is between 1800 and 6500 rpm and if ET003: Throttle no load position = inactive.</p>
	<p><b>NOTE:</b> If the engine is fitted with thermoplungers, fault DF063 and state ET026 (Camshaft dephaser) will not be indicated by the computer. In this case, control of the camshaft dephaser and thermoplungers is ensured by the additional heater unit.</p>
Version without thermoplungers	<p>Check for <b>12 v on track 1 of the solenoid valve</b> of the camshaft dephaser. Repair the line if necessary.</p>
	<p>Check for <b>an earth on track 2 of the solenoid valve</b> of the camshaft dephaser <b>when ET026 is active</b>.</p>
	<p>Check <b>the insulation and continuity between track 64 of the computer and track 2 of the camshaft dephaser solenoid valve</b>. Repair if necessary.</p>
	<p>Replace the solenoid valve, if necessary.</p>
	<p><b>NOTE:</b> the engine idle speed may be unstable if the solenoid valve is jammed open.</p>
Version with thermoplungers	<p><b>With the ignition on</b>, check for <b>12 v on track 1 of the camshaft dephaser solenoid valve</b>. Repair the line if necessary.</p>
	<p>Check for <b>an earth on track 2 of the camshaft dephaser solenoid valve</b> in the following operating conditions:            – <b>PR006: Engine speed of between 1800 and 6500 rpm.</b>            – <b>ET003 Throttle position: No load = Inactive</b></p>
	<p>Replace the solenoid valve, if necessary.</p>
	<p><b>NOTE:</b> the engine idle speed may be unstable if the solenoid valve is jammed open.</p>
	<p>Check <b>the insulation and continuity between track 2 of the camshaft dephaser solenoid valve and track 2 of the additional heater unit</b>. Repair if necessary.</p>
	<p><b>With the ignition on</b>, check the <b>additional heater unit supplies</b>.            Track 9: + 12 v actuator relay            Track 3: earth            Repair if necessary.</p>
	<p>Check <b>the insulation, continuity and ensure that there is no interference resistance between track 64 of the computer and track 1 of the additional heater unit</b>. Repair if necessary.</p>
	<p>Replace the unit if necessary.</p>
AFTER REPAIR	<p>Restart the conformity check from the beginning.</p>

## Fault finding - Command interpretation

LC054

GEARBOX TYPE**NOTES**

There must be no faults present or stored.  
The CAN sends the automatic transmission signal to the injection computer.

ET004: Park/neutral position = YES if:

- The vehicle is fitted with a manual gearbox.
- The vehicle is fitted with automatic transmission and the selector lever is in neutral or park.

ET004: Park/neutral position = NO if the vehicle is fitted with automatic transmission and the selector lever is in a gear position or in D or R.

Vehicle fitted with  
automatic  
transmission

If state ET004 is inconsistent, check **the insulation, continuity and ensure that there is no interference resistance** on the CAN lines:

**Injection computer track 57** —————> **Automatic gearbox**  
**Injection computer track 27** —————> **Automatic gearbox**

If the fault persists, refer to the automatic gearbox fault finding strategy.

**AFTER REPAIR**

Restart the conformity check from the beginning.

LC056	<u>HEATED WINDSCREEN</u>
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NOTES	There must be no faults present or stored.
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Run the engine. Select the heated windscreen. If the state ET071 is not active, check <b>the insulation, the continuity and ensure that there is no interference resistance</b> on line 88 of the computer.
If the fault persists, refer to the air conditioning fault finding procedure.

AFTER REPAIR	Restart the conformity check from the beginning.
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Fault finding - Command interpretation

LC081	<u>LPG AND INJECTION —→ CONNECTION</u>
NOTES	There must be no faults present or stored.
LPG AG Autogas system	Check the <b>insulation, the continuity and absence of interference resistance</b> on the connection between: <b>Injection computer track 50 —→ LPG computer</b> Repair if necessary.
Vehicle not fitted with LPG	If the injection computer configuration is unexpectedly changed to LPG mode, on a non LPG vehicle, refer to the fault finding strategy for DF082.

AFTER REPAIR	Restart the conformity check from the beginning.
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Fault finding - Customer complaints

NOTES	Customer complaints should only be consulted after a complete check using the diagnostic tool.
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No communication with the computer	CHART 1
Problems starting	CHART 2
Idle speed faults	CHART 3
Faults when driving (acceleration flats, jerking etc.)	CHART 4
Additional heater faults: models for extreme cold countries	CHART 5

CHART 1	NO COMMUNICATION WITH THE COMPUTER
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NOTES	None.
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**Ensure that the diagnostic tool is not the cause of the fault** by using it to establish dialogue with a computer on another vehicle.  
Check the connection between the diagnostic tool and the diagnostic socket (condition of the lead).  
Check the injection, engine and passenger compartment fuses.  
Repair if necessary.

Check for **+ 12 v** on **track 16** and for **an earth** on **tracks 4 and 5** of the diagnostic socket.  
Repair if necessary.

Connect the bornier in place of the computer and check the **insulation, continuity and absence of interference resistance** on the connections between:

Injection computer track 28	————>	Earth
Injection computer track 33	————>	Earth
Injection computer track 3	————>	Earth
Injection computer track 56	————>	Track 7 diagnostic socket
Injection computer track 26	————>	Track 15 diagnostic socket
Injection computer track 29	————>	Fuse
Injection computer track 30	————>	Fuse

Repair if necessary.

AFTER REPAIR	Test using the diagnostic tool.
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CHART 2	STARTING PROBLEMS
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NOTES	This customer complaint should only be investigated after a complete check has been run using the diagnostic tool.
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Check the reliability of the starter motor.
Check that there is petrol present (the petrol gauge may be faulty). Check that the petrol is of the proper type.
Check that no hoses are pinched (especially after a removal operation). Check the condition of the petrol filter. Check the condition of the tank. Check that the tank vent is not blocked.
Check the petrol pump electrical supply. Check that the impact sensor is operating correctly.
Check the idle speed regulation valve. Tap gently to release the valve.
Disconnect the pipe connecting the canister bleed solenoid valve to the inlet manifold. Plug the pipe to prevent an air leak. If there is no further fault, the canister bleed is faulty.

Check condition of spark plugs and ignition coils. Check that these elements are correct for the vehicle.
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Check that the exhaust system is not blocked nor the catalytic converter clogged.
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Check the engine compression
Check the condition of the flywheel.
Check the timing.

AFTER REPAIR	Test using the diagnostic tool.
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CHART 3	IDLE SPEED FAULTS
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NOTES	This customer complaint should only be investigated after a complete check has been run using the diagnostic tool.
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Check that there is petrol present (the petrol gauge may be faulty). Check that the petrol is of the proper type.
Check that no hoses are pinched (especially after a removal operation). Check the condition of the petrol filter. Check the condition of the tank. Check that the tank vent is not blocked.
Check the connection and condition of the idle speed regulation stepper motor connector. Replace the connector if necessary.
Check the idle speed regulation valve. Tap gently to release the valve.
Check that the camshaft dephaser solenoid valve is not locked in the open position. (If fitted)
Disconnect the pipe connecting the canister bleed solenoid valve to the inlet manifold. Plug the pipe to prevent an air leak. If there is no further fault, the canister bleed is faulty.
Check condition of spark plugs and ignition coils. Check that these elements are correct for the vehicle.

Check that the exhaust system is not blocked nor the catalytic converter clogged.
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Using the dipstick, check that the oil level is not too high.
Check the brake servo is not leaking (noise).
Check the condition of the inlet manifold.
Check that throttle valve unit is not clogged.
Check the engine compression
Check the condition of the flywheel.
Check the timing.

AFTER REPAIR	Test using the diagnostic tool.
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CHART 4	FAULTS WHEN DRIVING (Acceleration flats, jerking etc.)
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NOTES	This customer complaint should only be investigated after a complete check has been run using the diagnostic tool.
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Check that the air filter is not distorted.
Check that there is petrol present (the petrol gauge may be faulty). Check that the petrol is of the proper type.
Check that no hoses are pinched (especially after a removal operation). Check the condition of the petrol filter. Check the condition of the tank. Check that the tank vent is not blocked.
Disconnect the pipe connecting the canister bleed solenoid valve to the inlet manifold. Plug the pipe to prevent an air leak. If there is no further fault, the canister bleed is faulty.

Check condition of spark plugs and ignition coils. Check that these components are correct for the vehicle.
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Check that the exhaust system is not blocked nor the catalytic converter clogged.
Check the exhaust manifold is not leaking.

Using the dipstick, check that the oil level is not too high.
Check the brake servo is not leaking (noise).
Check the condition of the inlet manifold.
Check that throttle valve unit is not clogged.
Check the engine compression
Check that the calipers, drums and bearings are not seized. Check that the tyres are not under-inflated.
Check the condition of the flywheel.
Ensure that the cooling system is working efficiently.

AFTER REPAIR	Test using the diagnostic tool.
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# INJECTION

## Diagnostic - Fault finding chart

CHART 5	ADDITIONAL HEATER FAULTS MODELS FOR EXTREME COLD COUNTRIES									
NOTES	<p>This customer complaint should only be investigated after a complete check has been run using the diagnostic tool.</p> <p>The additional heater unit controls the thermoplungers and the camshaft dephaser (if fitted).</p>									
<p>Check the <b>connection and condition of the thermoplunger connectors</b>. Change the connector(s), if necessary.</p>										
<p>Check for <b>an earth on the thermoplungers</b>. Repair if necessary.</p>										
<p><b>With the engine running and only under the following conditions, check for +12 v on the thermoplungers:</b> <b>PR002: &lt; 10°C and PR003: &lt; 0°C</b> If necessary, repair the line(s) up to the additional heater relay(s).</p>										
<p>Replace the thermoplunger(s) if the supplies are correct.</p>										
<p>Check the <b>connection and condition of the additional heater relay connectors</b>. Change the connector(s), if necessary.</p>										
<p><b>With the ignition on</b>, check for <b>12 v on track 1 of each additional heater relay</b>. Repair the connection line to the actuator relays if necessary.</p>										
<p>Check for <b>12 v on track 3 of each additional heater relay</b>. Repair the line up to the fuse box if necessary.</p>										
<p>Check the <b>operation of the coil of each</b>. Replace the relay(s) if necessary.</p>										
<p>Check the <b>connection and condition of the additional heater unit connector</b>. Change the connector if necessary.</p>										
<p><b>With the ignition on</b>, check the additional heater unit supplies. <b>Track 3: earth track 9: + 12 v actuator relay</b> Repair if necessary.</p>										
<p>Check the <b>insulation, continuity and absence of interference resistance</b> on the connections between:</p> <table><tr><td><b>additional heating unit track 1</b></td><td>————→</td><td><b>Computer track 64</b></td></tr><tr><td><b>additional heating unit track 7</b></td><td>————→</td><td><b>Relay 1 additional heating track 2</b></td></tr><tr><td><b>additional heating unit track 8</b></td><td>————→</td><td><b>Relay 2 additional heating track 2</b></td></tr></table> <p>Repair if necessary.</p>		<b>additional heating unit track 1</b>	————→	<b>Computer track 64</b>	<b>additional heating unit track 7</b>	————→	<b>Relay 1 additional heating track 2</b>	<b>additional heating unit track 8</b>	————→	<b>Relay 2 additional heating track 2</b>
<b>additional heating unit track 1</b>	————→	<b>Computer track 64</b>								
<b>additional heating unit track 7</b>	————→	<b>Relay 1 additional heating track 2</b>								
<b>additional heating unit track 8</b>	————→	<b>Relay 2 additional heating track 2</b>								
<p>Change the additional heating unit, if necessary.</p>										
AFTER REPAIR	<p>Test using the diagnostic tool.</p>									