

Omitec

OmiGas

Operating Instructions

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Introduction

OmiGas is an exhaust gas analyser (EGA) for spark ignition vehicles and is available as both a stand-alone and PC-based unit. OmiGas has been designed and approved for use in Vehicle Inspectorate MOT emissions testing.



OM0377

Spark ignition vehicles includes both catalyst and non-catalyst, supercharged and lean-burn engines, and vehicles that are fuelled by Liquid Petroleum Gas (LPG) and Compressed Natural Gas (CNG).

NOTE: Diesel engined vehicles are specifically excluded from testing using the OmiGas system.

The OmiGas system enables the measurement of the four main exhaust gases emitted from a spark ignition engine. The gases measured are: Carbon Dioxide (CO₂), Carbon Monoxide (CO), Hydrocarbons (HC) and Oxygen (O₂). The measurement of these gases meets the class 0 requirements of the OIML R99:2000 specification.

In addition to exhaust gas analysis and measurement, OmiGas provides the facilities to measure engine speed (in RPM) and engine oil temperature. Enhanced facilities for data capture and graphing are an additional feature for PC based systems.

Among many other features, OmiGas also comes equipped with a PC compatible PS2 keyboard port, a serial computer port, a printer port, a memory card slot, a USB computer port and a serial port ready for Vehicle Inspectorate computerisation. The memory card slot enables manufacturer's vehicle exhaust emissions limits data to be down-loaded from a data card, which allows OmiGas to perform UK MOT emissions tests on both catalyst and non-catalyst vehicles.

Safety Precautions



Exhaust gases are poisonous and contain carbon monoxide, which can cause unconsciousness and can be fatal - NEVER start or leave the test vehicle engine running in an unventilated area.

- ***DO NOT handle the OmiGas exhaust probe tip, or place the exhaust probe on plastic or combustible surfaces after the test procedure. The probe may become extremely hot during the test and could cause burns and a risk of fire.***
- ***Take care when handling the Oil Temperature probe after the test procedure. The probe's metal sheath may become extremely hot during the test and could cause burns.***
- ***Prolonged contact with engine oil may cause serious skin disorders, including dermatitis and cancer of the skin. Avoid unnecessary contact with engine oil and wash thoroughly after contact.***
- ***When fitting or removing the engine speed measuring device, ensure that the engine is switched off and allow the engine to cool. Be aware that on some vehicle's the engine cooling fan may commence operating AFTER the engine has been switched off.***
- ***Ensure that any test leads will not foul any moving part of the engine. Also keep leads away from engine cooling fans and any hot engine components.***
- ***Take care with the vehicle electric systems when using an Ignition Pulse Speed measurement probe, as many modern high energy ignition systems are potentially dangerous.***

Electrical Safety Precautions

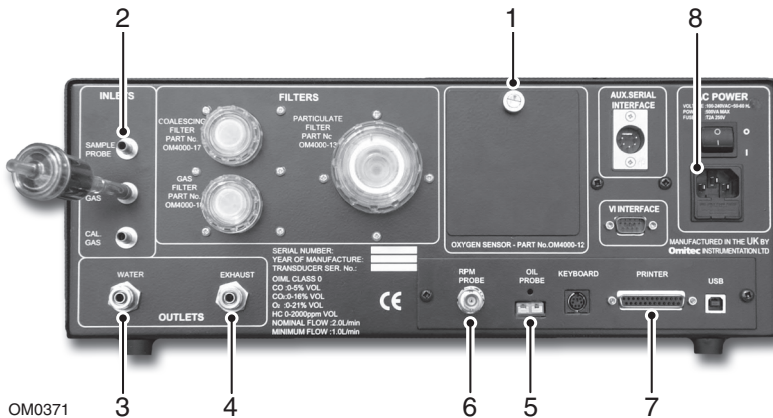


During operation the OmiGas unit must be earthed.

- ***Any power or extension cord must have an earth conductor.***
- ***When replacing fuses make sure the correct type and rating are used.***
- ***Any adjustment, maintenance or repair must be carried out by an approved service engineer.***

Assembling The OmiGas Analyser

Unpack the unit carefully, checking off each item and component against the itemised packaging list included. If any component is missing or damaged, contact your supplier immediately.



- Open the oxygen sensor cover (1) and check that the sensor has not become loose during transit. The sensor should be screwed in to hand tightness. Ensure that the flying lead to the sensor is securely connected, then close the oxygen sensor cover.
- Attach the exhaust sample probe to the Sample Gas Input fitting (2).
- Attach the water outlet pipe to the Water outlet (3), ensuring that the pipe runs downward from the unit throughout its entire length. Ensure that the water is discharged well away from any other equipment, especially electrical equipment.
- Attach the exhaust outlet pipe to the Exhaust Gas outlet (4). The exhaust outlet pipe is used to expel the sampled exhaust gases from the test vehicle well away from the active working area, to prevent technicians inadvertently inhaling the gases. Run the outlet pipe to a well ventilated area.
- Connect the engine temperature sensor probe to the Oil Temperature Probe socket (5) and ensure the earth tag is securely connected to the earth terminal next to the socket.
- Connect the engine speed (RPM) probe to the RPM Probe connector (6).
- Assemble and install the printer in accordance with the instructions provided by the printer manufacturer.
- Attach the printer lead to the printer port (7) and fully tighten the securing screws.
- Place filter cover over the filters and secure using the 4 quarter-turn screws.

Before connecting the unit or the printer to the mains, ensure that you have read and fully understand the operating instructions given in this document.

- Before powering-up the unit, ensure that the power switch is in the 'Off' position (pointing to '0'), then connect the power cable to the power socket (8) and then to the mains supply.

NOTE: If fitting OmiGas to an emissions trolley (Part No. OM 2500), then please refer to instructions supplied with the trolley.

OmiGas Sample Probes

! *Before attaching any OmiGas probe to the test vehicle, ensure that you have read and understand the safety precautions listed earlier on in this manual.*

Engine speed (RPM) probe



OM0493

The RPM probe connects between the OmiGas analyser (see 'Assembling The OmiGas Analyser' on page 8) and the appropriate ignition lead on the engine of the test vehicle (either plug lead, king lead or CB lead) and keeps an accurate measure of the current engine speed during testing.

NOTE: In addition to the conventional RPM probe, Omitec offer a new simple non-intrusive RPM measuring system, the OmiSpeed (OM1600), for use on direct ignition and difficult to access engines. Simply place the magnetically mounted sensor on to the engine and RPM will be measured a few seconds later. The OmiSpeed is compatible with all petrol and diesel engines. Contact your local sales representative for further information.

! *Do not attempt to attach the engine speed (RPM) probe while the engine is running. Moving engine parts may cause personal injury or come in contact with the probe, or its cable, resulting in damage to the probe and to the engine.*

! *Take care not to come into contact with hot engine parts when attaching the engine speed (RPM) probe - serious burns may occur.*

Exhaust probe



The exhaust probe collects gas samples from the test vehicle exhaust, which are then analysed by OmiGas.

The probe connects between the Sample Gas Input fitting (item 2 under 'Assembling The OmiGas Analyser' on page 8) and the test vehicle exhaust pipe. Insert the probe as far into the vehicle exhaust as possible and secure by attaching the alligator clip to the end of the exhaust pipe.

⚠ Take care to avoid contact with the exhaust system when inserting or removing the exhaust probe. The exhaust system will be hot and severe burns could occur.

The exhaust probe is supplied with a sealing cap (Part No. OM 4023) which must be fitted over the end of the probe when a leak test is performed. Keep the cap in a safe place when not in use (see 'Leak testing' on page 22, for further details).

Introduction

Engine temperature sensor probe



OM0373

Certain emissions tests require the measurement of the test vehicle's engine temperature.

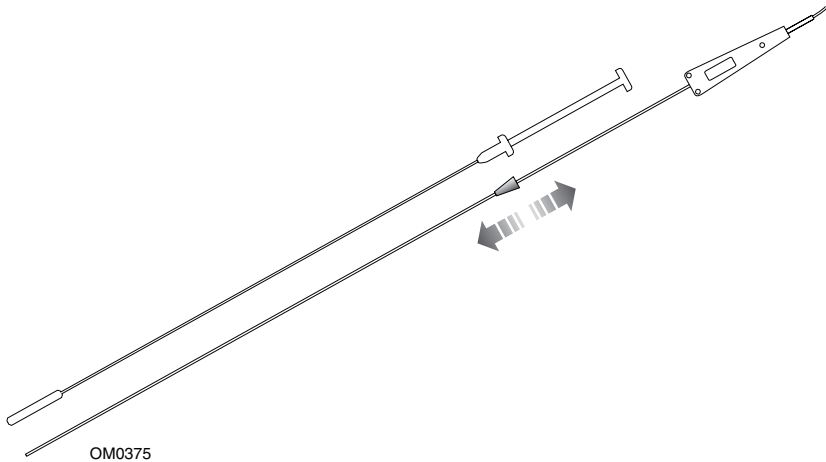
The engine temperature sensor probe measures engine oil temperature in the sump of the test vehicle, providing an accurate reading of the temperature of the engine.

The probe connects to the OmiGas analyser using the Oil Temperature Probe socket (item 5 under 'Assembling The OmiGas Analyser' on page 8).

To monitor the engine temperature of the vehicle during an emissions test, the sensor probe must be inserted into the engine oil dipstick aperture. First remove and clean the engine oil dipstick of the vehicle.

⚠ NEVER insert the probe into the dipstick aperture without first setting the depth gauge, and take care not to insert the probe any further than the gauge allows. Serious damage to the engine could result.

Setting the sensor probe depth gauge



The sensor probe is fitted with a depth gauge to prevent the probe from being inserted too far (which could cause serious damage to the engine). Move the rubber sleeve on the probe, so that the distance between it and the end of the probe, is equal to the length of the dipstick (see illustration). Insert the probe (up to the depth gauge) into the dipstick aperture.

⚠ Do not attempt to insert the engine temperature probe while the engine is running. Moving engine parts may cause personal injury or come in contact with the probe, or its cable, resulting in damage to the probe and to the engine.

⚠ Take care not to come into contact with hot engine parts when inserting or removing the engine temperature probe from the engine oil dipstick aperture - serious burns may occur.

⚠ Take care when removing the engine temperature probe after an emissions test. The probe may be extremely hot and could cause serious burns.

NOTE: Always clean the probe after use and clean the dipstick before re-inserting into the engine.

PC Based Systems

System requirements

The minimum PC system requirements to load the OmiGas Techcenter software are:

- Windows 98, ME, 2000 or XP
- Pentium 133 processor or higher
- 32 MB RAM
- 10 MB of free disk space
- 1024 X 768 minimum screen resolution
- CD ROM drive
- Serial com port capable of 115200 baud rate
- USB 1.1 or USB 2.0

Loading software

Full instructions on loading the software are included with the software CD.

To load the software onto your machine, first insert the CD into the drive. The program should then auto-run. If it doesn't, select 'Run' from the 'Start' menu and browse to the appropriate CD drive and select the file 'Setup.exe' to start the installation process. Follow the on-screen instructions to complete the loading sequence, then reboot when prompted.

Emissions Testing Using the Handset



OM0376

OmiGas emissions testing can be undertaken by using the handset or a PC (using the OmiGas Techcenter software).

Navigating through the emissions test software using the handset is assisted by the on-screen information and prompts which are displayed throughout the testing procedure. Each successive menu displayed on the handset will provide a number of options from which the technician may choose. Selecting an option is achieved by pressing the handset button adjacent to the desired option. For example, if the technician wishes to conduct an MOT emissions test from the menu illustrated above, then button '1' should be pressed; if the extended features need to be accessed, then press button '3'.

The top left and top right buttons on the handset (labelled 'ABORT' and 'RETEST') maintain the same function throughout any testing procedure and can be pressed at any time. Press the 'ABORT' button to abort a test procedure and press the 'RETEST' button to restart a particular procedure.

During a test procedure, the handset will display screens which inform the technician what the OmiGas analyser is currently doing. These screens do not provide options for the technician to select and are simply a commentary on the procedure. The 'ABORT' and 'RETEST' buttons are still active however, and can be used when necessary.

Emissions Testing Using the PC



OmiGas emissions testing can be undertaken by using a PC (using the OmiGas Techcenter software) or the handset.

Navigating through the emissions test software using the PC, is assisted by the on-screen information and prompts which are displayed throughout the testing procedure. Each successive menu displayed on the PC will provide a number of options from which the technician may choose, using the 'virtual' buttons on the screen. Selecting an option is achieved by pointing to the relevant button with the mouse cursor and pressing the left hand mouse button to select. For example, if the technician wishes to conduct an MOT emissions test from the menu illustrated above, then button '1' should be selected; if the extended features need to be accessed, select button '3'.

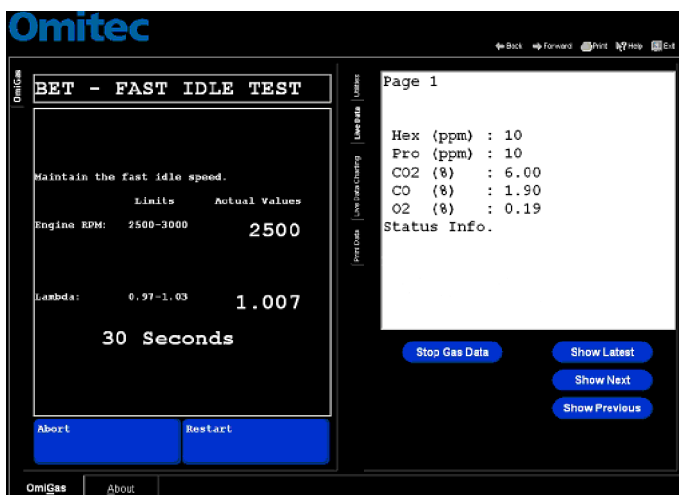
The 'Abort' and 'Restart' buttons maintain the same function throughout any testing procedure and can be selected at any time if displayed. Select the 'Abort' button to abort a test procedure and select the 'Restart' button to restart a particular procedure.

During a test procedure, the PC will display screens which inform the technician what the OmiGas analyser is currently doing. These screens do not provide options for the technician to select and are simply a commentary on the procedure. The 'Abort' and 'Restart' buttons are still active however, and can be used when necessary.

PC Data Screens and Utilities

In addition to the controls used to perform the tests, the PC environment also provides the facility to view the data collected and analysed by OmiGas in data and graph format. On the right-hand side of the PC display, there are four tabs that can be selected to display different facilities. The default display ('Utilities') shows the Communications port information and provides the facility to connect or disconnect the communication link between the PC and the OmiGas analyser. In addition, the technician has the ability to change which printer is used to print the test results or collected data - select 'Select Printer' and browse to find the desired printer.

Live data



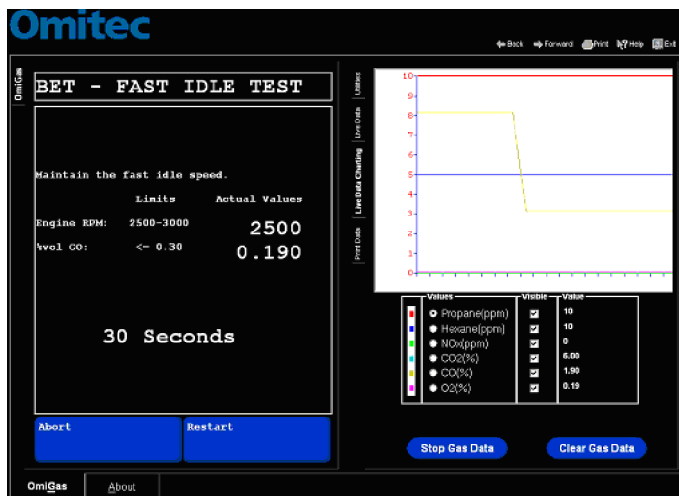
OM0277

If 'Live Data' is selected, the test data collected, along with the exhaust gas analysis and results, will be displayed alongside the main menu display. This data is displayed 'as it happens', thus permitting the technician to view exactly what results are being achieved during the test.

OmiGas provides the facility to view earlier data screens from the test, to make a comparison or to view different data. Use the 'Show Previous' to scroll back through the data screens and 'Show Previous' to scroll forward. Select 'Show Latest' return to the most recent screen. To stop data from being displayed, select 'Stop Gas Data'.

Getting Started

Live data charting



OM0278

'Live Data Charting' allows the technician to view the live data being obtained from the emissions test. This data is represented in chart or graph format, which provides a better visual indication of different emission levels during the test procedure. To change the active gas reading that is displayed, click on the relevant check-box along side the list of the gases under the graph display.

To stop the data display, select 'Stop Gas Data' and to clear the graph display, select 'Clear Gas Data'.

Printing data



OM0307

The 'Print Data' option allows the technician to print off the collected test data, so that if necessary, a study of the results can be made after the test is completed, allowing a more detailed analysis.

The information stored by the 'Print Data' facility can be cleared by selecting 'Clear'.

PC Navigation Short-cut Buttons

In the top right of the PC display, there are five short-cut buttons to aid the technician with software navigation. These buttons function as follows:



Select to view the screen last displayed.



Select to return to the current screen if you have used the 'back' button to view a previous screen.



Select to print the data for the current emissions test.



Select to access the OmiGas help files, if you need assistance or clarification during an emissions test.



Select to close the OmiGas Techcenter program. An emissions test can still be carried out, but only by using the handset.

Starting Up

After switching on, OmiGas performs a daily start-up procedure to ensure that the analyser is fully functional and, if necessary, inform the technician when the unit is due recalibration.

Warm-up procedure

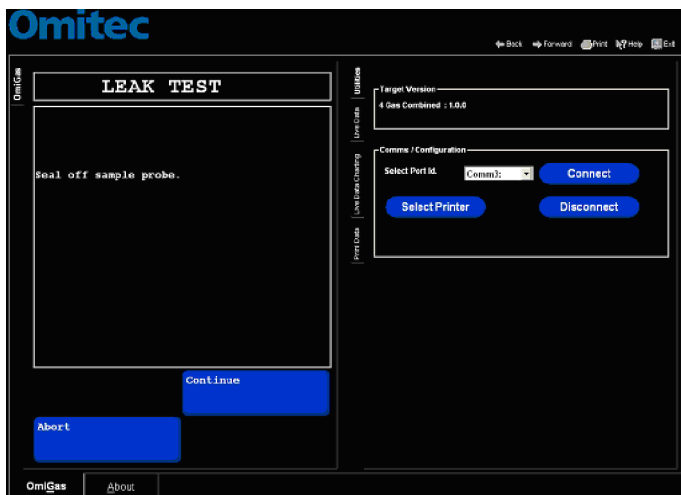
When the OmiGas analyser is first switched on, it enters a five minute warm-up period. The screen (either handset or PC) displays a countdown showing the remaining warm-up time and the current date and time.

Calibration reminder

Due to the highly sensitive equipment within the OmiGas unit and the accuracy of analysis required to satisfactorily perform emissions testing, the analyser must be calibrated regularly at 6 month intervals to conform with MOT regulations. If it is 14 days or less until the next calibration is due, a reminder will be displayed during the start-up procedure. Once the calibration due date is reached, OmiGas will not allow emissions testing to be carried out until the calibration has been performed.

Leak testing

The first time OmiGas is switched on each day, a 'Leak test' is performed automatically when a measurement test has been selected from either of the main menus. This is to ensure that there is no compromise to the integrity of the analysis and sampling equipment housed within the OmiGas unit. If the leak test is failed, OmiGas will not carry out any emissions testing until the fault is rectified and the leak test is subsequently passed.



At the beginning of the leak test procedure, the technician will be prompted to seal off the exhaust sample probe. Seal the probe using sealing cap provided (see '*Exhaust probe*' on page 11), the test will then continue automatically.

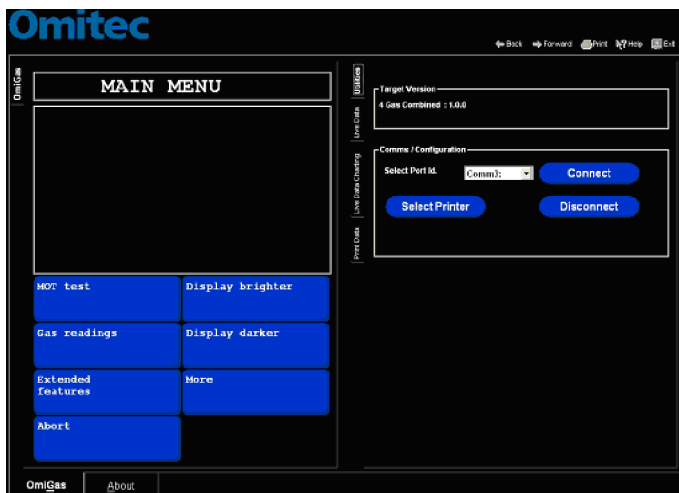
Once the leak test is completed successfully, OmiGas will prompt the technician to remove the sample probe sealing cap. Once the cap is removed, the Main menu screen is displayed (handset and PC) and testing may proceed.

If a leak is suspected during the course of a day's testing, a manual leak test may be performed. For further information, see 'Leak test', under '*Main menu 2*' on page 29.

Main Menus

Main menu 1

Main menu 1 is the default screen on both the handset and on the PC, once the OmiGas analyser has completed its start-up procedure, and can be used to access all of the various functions and sub-menus utilised by the analyser.



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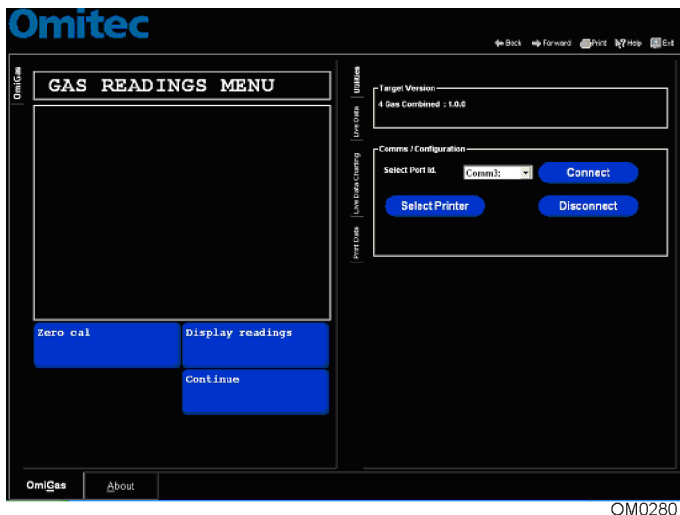
MOT test

For further information, please refer to the 'MOT Test Procedure - Catalyst Vehicles' on page 35, the 'MOT Testing Procedure - Non-Catalyst Vehicles' on page 64, or the 'MOT Testing Procedure - Visual Procedure' on page 75.

Routine Procedures

Gas readings

Select to view the Gas readings sub-menu.



NOTE: Selecting 'Continue' will return you to Main menu 1.

Zero cal

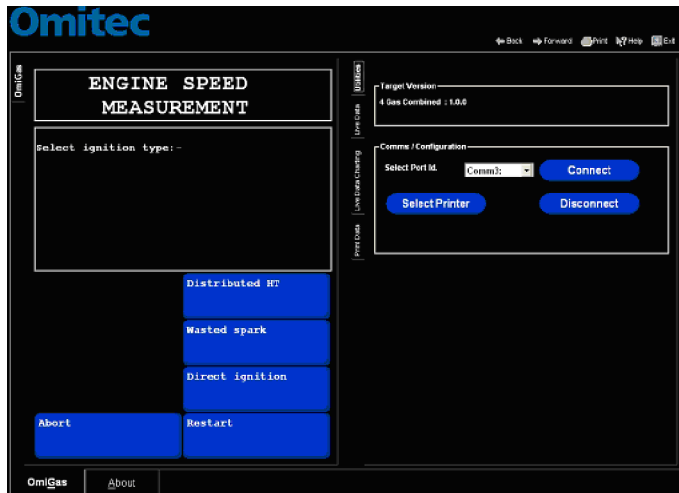
Select to perform a zero calibration on the analyser. Once selected, the screen will confirm that the calibration is occurring and, once the calibration is complete, the display returns to the Gas readings menu.

If Calibration fails, the analyser will report failure results and prevent further testing until zero calibration has been completed successfully.

Display readings

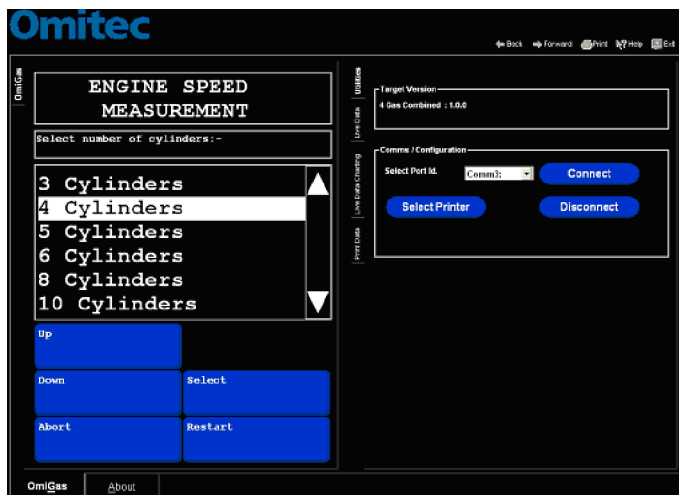
This facility enables the technician to check the emission readings for a vehicle, without performing a complete MOT emissions test. Once selected, OmiGas requests confirmation of the fuel type of the vehicle (Petrol, LPG or CNG) - select the correct fuel option to continue.

The next stage requires the technician to confirm whether or not engine speed is to be measured for the calculation of the emission readings. Select 'Yes' or 'No' accordingly.



OM0281

The technician is then prompted to select the ignition type of the test vehicle. Select the correct option to continue, then on the next menu, identify the connection point that is to be used for the engine speed (RPM) probe.



OM0282

If 'King lead' is selected as the connection point (distributed HT ignition only), the technician must identify the number of cylinders the test vehicle has. Click on 'Up' or 'Down' until the correct number of cylinders for the vehicle is highlighted, then click on 'Select' to proceed.

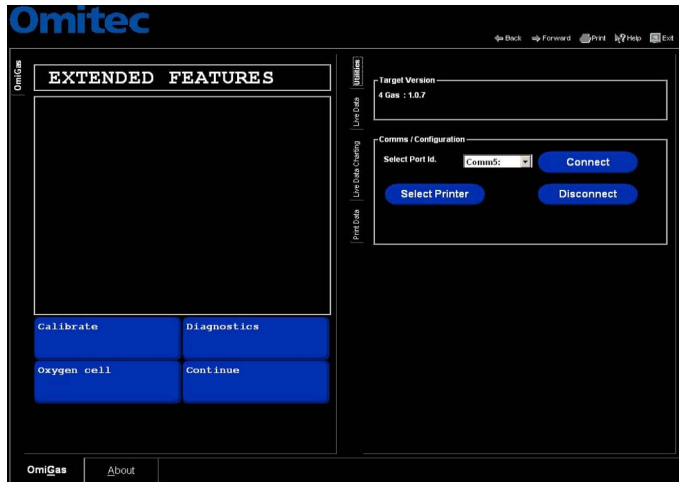
After the connection point and (if applicable) the correct number of cylinders are selected, OmiGas will then prompt for the engine speed (RPM) sensor to be attached to the chosen connection point.

OmiGas will now perform an HC (Hydrocarbon) hang-up check, to ensure HC residue is < 20 ppm. If this is completed successfully, the following data will be displayed:

- Engine speed (RPM).
- Percentage of volume made up of Carbon Monoxide (%vol. CO).
- Parts per million for Hydrocarbons (ppm HC).
- Lambda reading.
- Percentage of volume made up of Carbon Dioxide (%vol. CO₂).
- Percentage of volume made up of Oxygen (%vol. O₂).
- Engine temperature (° C).

Select 'Continue' to return to the Gas readings menu.

Extended features

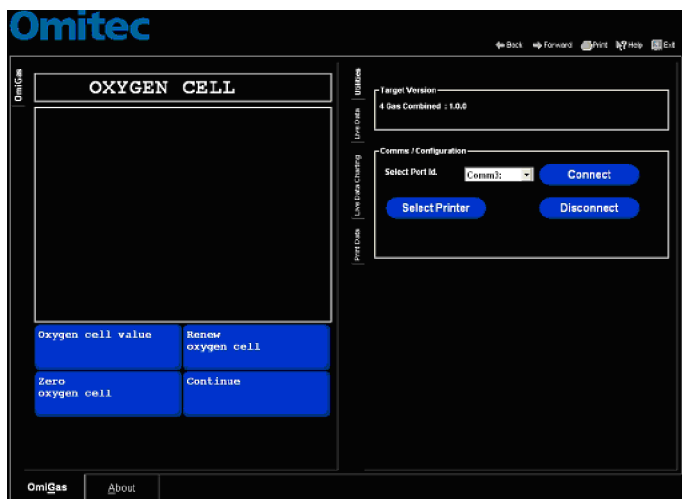


OM0308

Calibrate

This function is available to authorised calibration engineers only.

Oxygen cell



- **Oxygen cell value:** - shows the Oxygen cell value in Millivolts (mV).
- **Zero oxygen cell:** - function available to authorised calibration engineers only.
- **Renew oxygen cell:** - clears Oxygen cell error codes and performs a zero calibration.
- **Continue:** - select to return to the Extended features menu

Display brighter

Select repeatedly to increase the brightness of the handset display only.

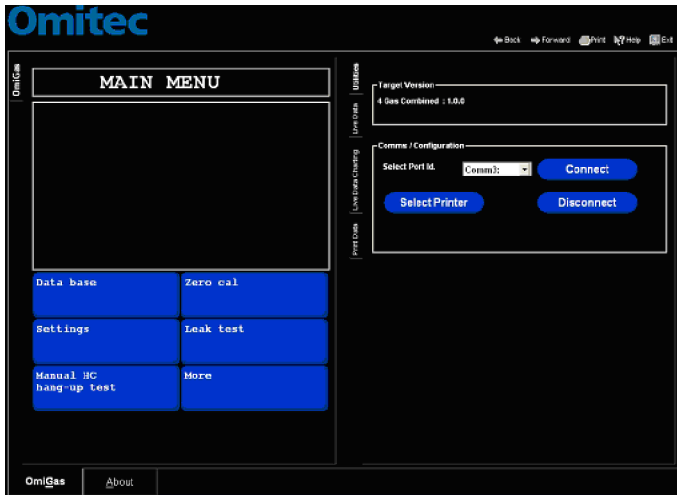
Display darker

Select repeatedly to decrease the brightness of the handset display only.

More

Select to view Main menu 2.

Main menu 2



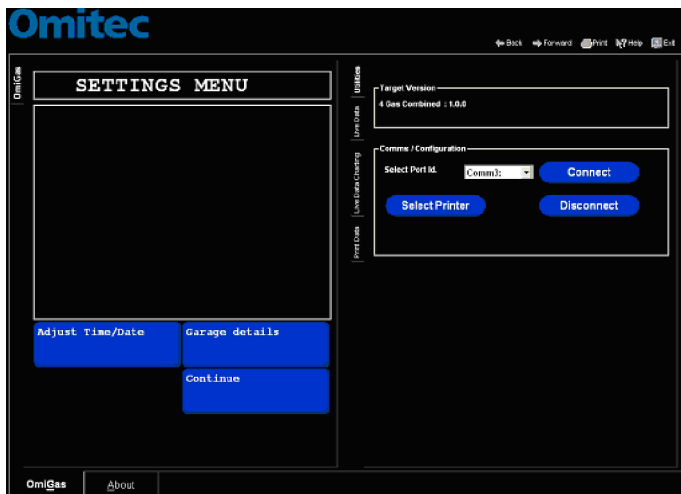
OM0284

Data base

Select to view the version number of the currently loaded Vehicle Emissions database memory card.

Settings

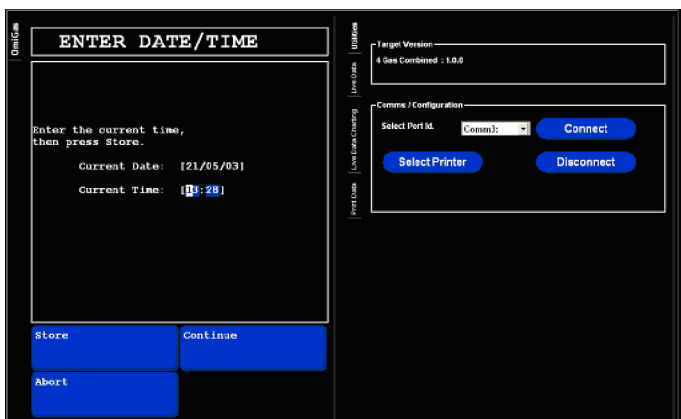
NOTE: To return to Main menu 2, select 'Continue'.



OM0285

- Adjust Time/Date: - Select to adjust the clock settings.

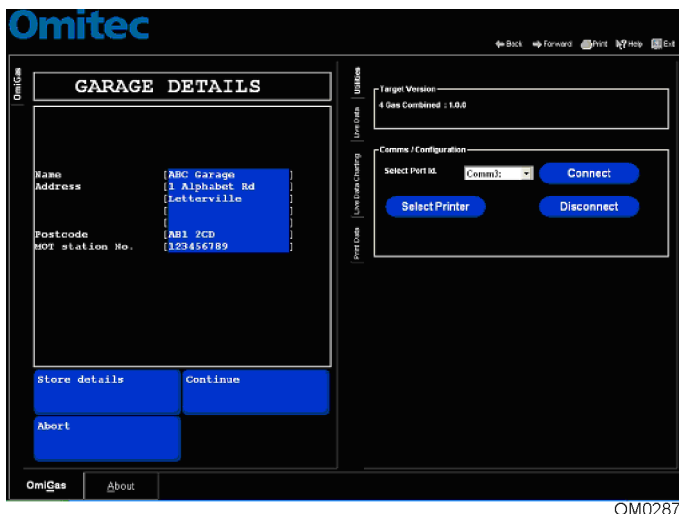
NOTE: As a security precaution, only authorised calibration engineers are able to modify date settings.



OM0286

To alter the time, use the arrow keys on the keyboard to move the cursor, then use the number keys to type in the correct time. Select 'Store' to save the new time settings - a confirmation screen is displayed, select 'Continue' to return to the 'Settings' menu.

- **Garage details:** - Select to input or modify garage details.



Use the arrow keys on the keyboard to select the appropriate line. Use the keyboard to type in the new details. Once complete, select 'Store' to save the information, then select 'Continue' to return to the 'Settings' menu.

NOTE: The garage details will be included in any print-out of an emissions test.

Manual HC
hang-up test

Select to perform an HC (Hydrocarbon) hang-up and residue check. This identifies if there is an unacceptable level of residual HCs within the analyser or probe (which would adversely affect emissions test results). If test is passed, select 'Continue' to return to Main menu 2.

Zero cal

Select to perform a zero calibration on the analyser. Once the calibration is complete, the display returns to the Main menu 2.

Leak test

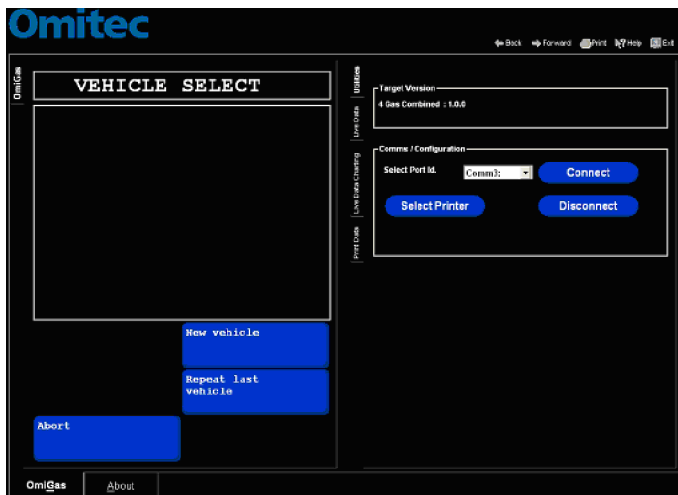
Select to perform a manual leak test. This should be done if a leak is suspected during testing. OmiGas prompts for the exhaust sample probe to be sealed before the test can be started. Seal off the probe using the sealing cap provided and select 'Continue' - the test will proceed. Once the test is successfully completed, select 'Continue' to return to the Main menu 2. For further information regarding leak testing, please refer to 'Leak testing' on page 22.

More

Select to return to Main menu 1.

OmiGas MOT Emissions Testing

To begin the MOT emissions testing procedure, select 'MOT test' (either on the handset, or on the PC). If a leak test, or zero calibration is required, they will initiate automatically. Follow the on-screen instructions.



OM0288

You will then be prompted to select whether it is a new vehicle to be tested or if it is a retest on the vehicle most recently tested. Select the appropriate option.

The next menu requests information concerning the age of the vehicle to be tested. Select the correct option for the vehicle.

IMPORTANT!
If the test vehicle was first used on or after 1 August 1992, please read the information on the following page, then refer to <i>'MOT Test Procedure - Catalyst Vehicles'</i> on page 35.
If the test vehicle was first used 1 August 1975 - 31st July 1986, or 1 August 1986 - 31 July 1992, please refer to the <i>'MOT Testing Procedure - Non-Catalyst Vehicles'</i> on page 64.
If the test vehicle was first used prior to 1 August 1975, please refer to <i>'MOT Testing Procedure - Visual Procedure'</i> on page 75.

Vehicles first used on or after 1 August 1992

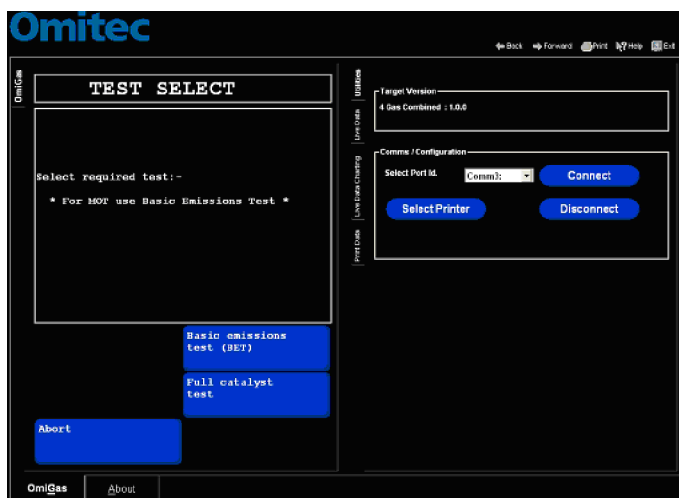
You will now be prompted to select whether or not the vehicle has a petrol engine. Select the appropriate option.

If 'No' is selected, the Non-Catalyst procedure section appears (see section '*MOT Testing Procedure - Non-Catalyst Vehicles*' on page 64).

If 'Yes' is selected, OmiGas requests confirmation that the vehicle is a passenger car. Select the correct option.

NOTE: If 'No' is selected, the next menu requires you to select the correct date range for the first use of the test vehicle.

Test selection



OM0290

From the menu, select either the Basic emissions test (BET) or the Full catalyst test, as applicable. If the emissions test is being undertaken as part of an MOT test, then select the BET test. For the relevant test procedure, please refer to '*Basic Emissions Testing*' on page 35, or '*Full Catalyst Testing*' on page 49.

Basic Emissions Testing

Omittec

Back Forward Print Help Exit

BASIC EMISSIONS TEST

Registration: [AB01CDE]
Testers Name: [A. B. Onymous]

Continue
Abort

OmiGas About

Utilities
Target Version: 4 Des Combined : 1.0.0

Comms / Configuration
Select Port Id.: [Com1]
Connect
Select Printer
Disconnect

OM0291

The first menu requires the entry of the registration number of the test vehicle and the test technicians name. Once these details are entered, select 'Continue' to proceed.

Omittec

Back Forward Print Help Exit

OIL CHECK

Ensure the engine contains sufficient oil before proceeding.

Continue
Abort

OmiGas About

Utilities
Target Version: 4 Des Combined : 1.0.0

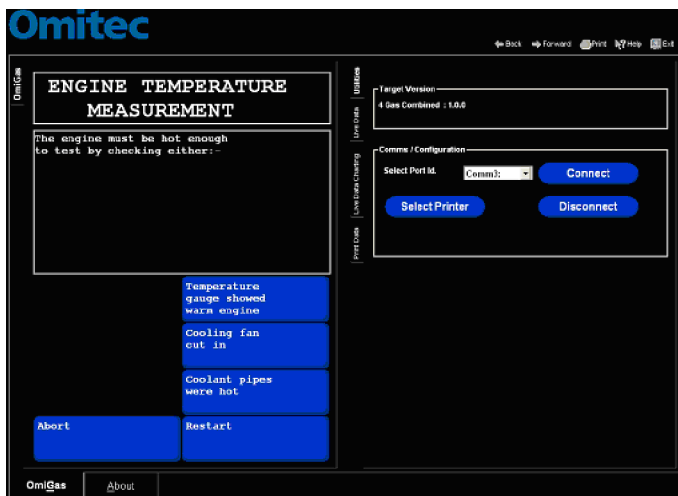
Comms / Configuration
Select Port Id.: [Com1]
Connect
Select Printer
Disconnect

OM0292

OmiGas then prompts for the oil level of the test vehicle to be checked before proceeding. Check the oil level, top-up if necessary, then select 'Continue' to proceed.

Engine temperature

It is of utmost importance that the engine is running at normal operating temperature when the emissions test is undertaken. OmiGas prompts you to check that the engine is running at normal operating temperature before the test can be performed. Select 'Continue' once correct temperature is confirmed and switch off the engine.

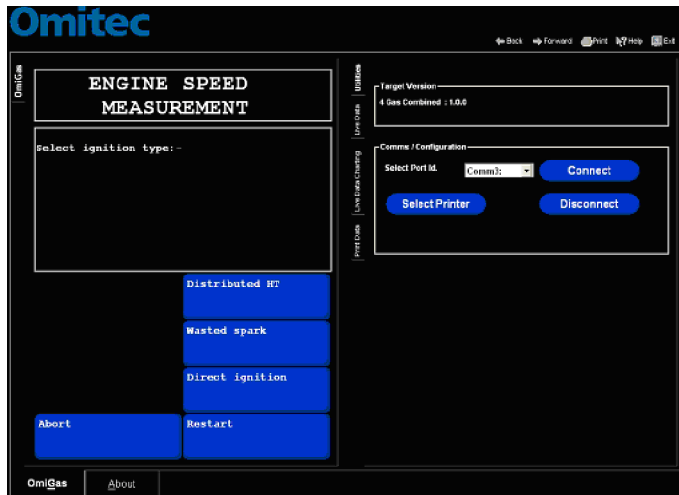


OM0293

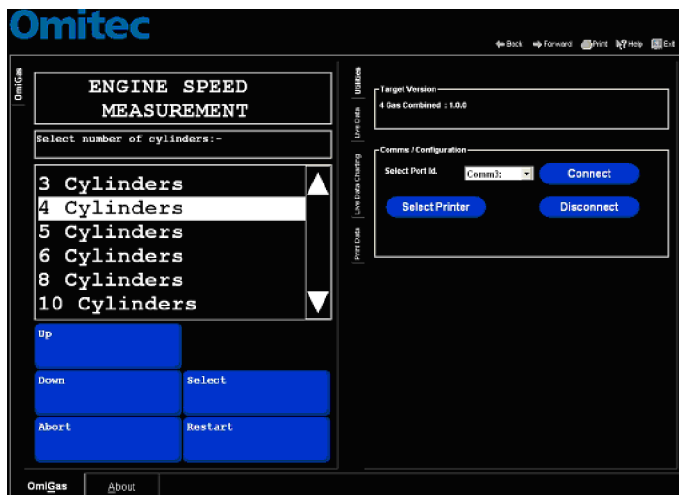
The next menu asks you to confirm how the engine temperature was checked and gives three options; 'Temperature gauge showed warm engine', 'Cooling fan cut in' and 'Coolant pipes were hot'. Select the relevant option to continue. The selected method of engine temperature measurement will be included in the final test print-out for future reference.

Engine speed measurement

Whenever possible, it is preferable to carry out the emissions test while accurately measuring engine speed, using the RPM probe available. OmiGas prompts for confirmation as to whether or not engine speed can be measured. If measurement is possible select 'Yes' (select 'No' if measurement is not possible).



If measurement is possible, OmiGas will then prompt for the details of the test vehicle ignition type, giving three options; 'Distributed HT', 'Wasted spark' and 'Direct ignition'. Select the appropriate option to continue, then on the next menu, identify the connection point that is to be used for the engine speed (RPM) probe.

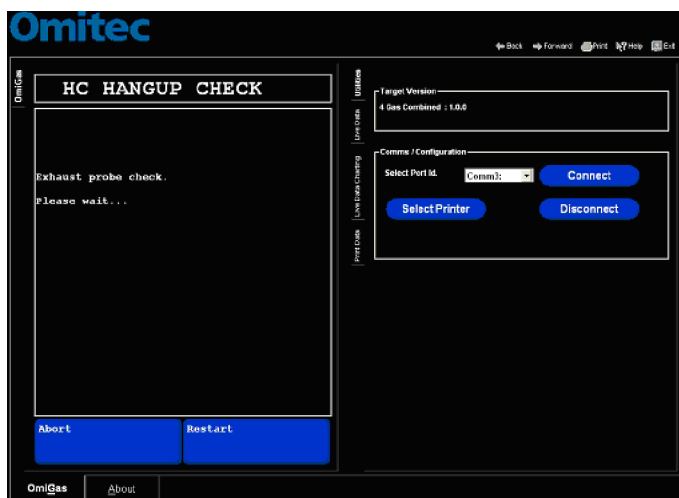


If 'King lead' is selected as the connection point (distributed HT ignition only), the technician must identify the number of cylinders the test vehicle has. Click on 'Up' or 'Down' until the correct number of cylinders for the vehicle is highlighted, then click on 'Select' to proceed.

OmiGas prompts for the RPM probe to be attached. Ensure that the probe will not contact moving engine parts once the engine is running (cooling fans, for example). Once the probe is securely connected, select 'Continue' to proceed and start the engine of the test vehicle.

! Do not attempt to attach the engine speed probe while the engine is running. Moving engine parts may cause personal injury or come in contact with the probe, resulting in damage to the probe and to the engine.

Hydrocarbon residue test

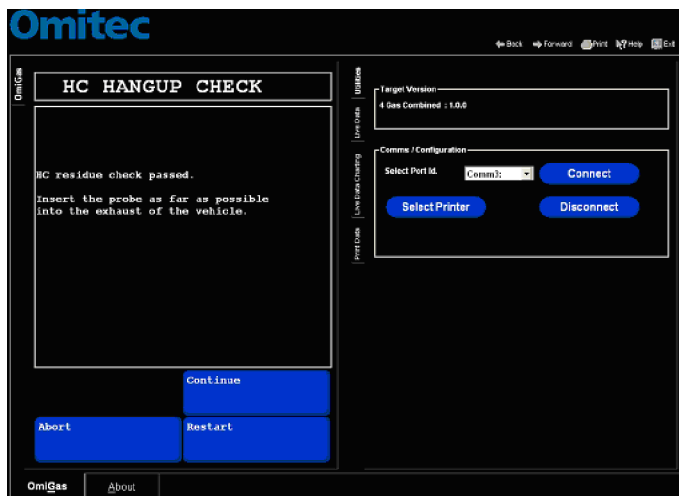


OM0295

Once it has been confirmed that the engine speed probe is correctly connected, OmiGas automatically carries out a check for residual Hydrocarbons (HCs) in the exhaust probe and within the gas sampling unit. Residual hydrocarbons will compromise the accuracy of any emissions measurement taken, so it is important to ensure that there isn't an unacceptable quantity of these residual gases present before an emissions test is undertaken. Please wait for a few moments while this test is completed.

NOTE: If the hydrocarbon residue test is failed (Hydrocarbon gases exceed 20 ppm), the option will be given to re-attempt the hydrocarbon residue test, or to abort the emissions test. Further testing will not be possible until this test is successfully completed.

Inserting the exhaust probe



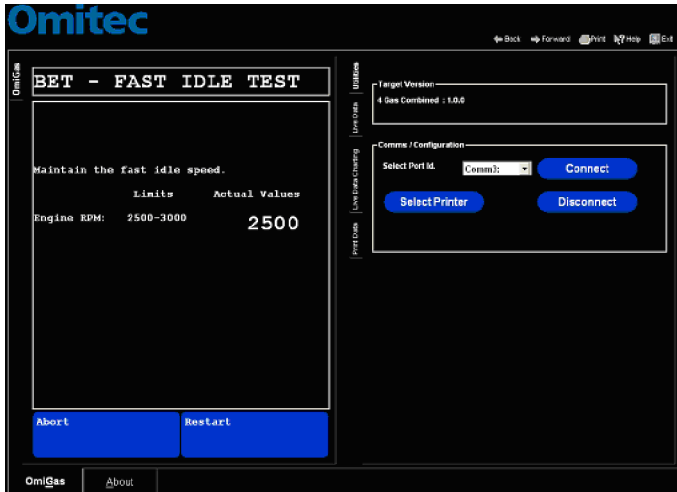
Once the hydrocarbon residue test is successfully completed, OmiGas requests that the exhaust probe is inserted as far as possible into the test vehicle's exhaust.

⚠ Take care to avoid contact with the exhaust system when inserting the exhaust probe. The exhaust system will be hot and severe burns could occur.

Insert the exhaust probe into the test vehicle exhaust pipe and ensure that it is secure. OmiGas checks a sample reading from the exhaust probe, to ensure that it is operating within set parameters.

The fast idle test

Once the hydrocarbon residue and exhaust probe tests are complete, OmiGas automatically initiates the Basic Emissions Test. The first part of the test requires the engine to be running at fast idle.



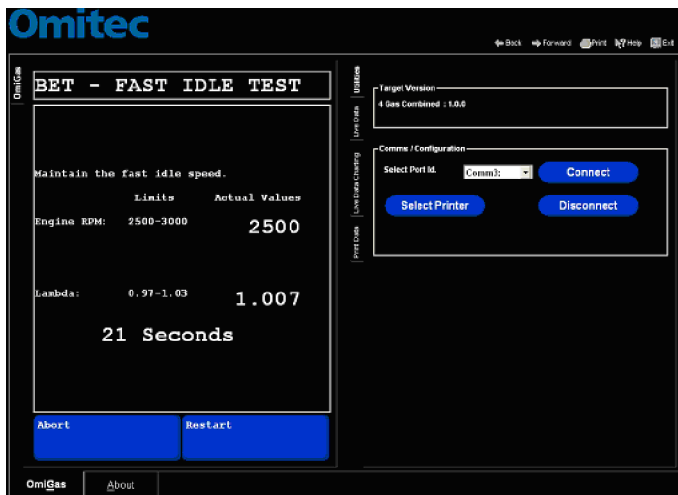
OM0297

The initial display will identify the engine RPM range that must be maintained throughout this part of the test (A) and this engine speed should be achieved as soon as possible after the test commences. The active display also show the current engine speed (B), so that the required test speed can be accurately maintained.

NOTE: If an RPM probe is not connected, the engine speed must be carefully monitored using the tachometer of the test vehicle.

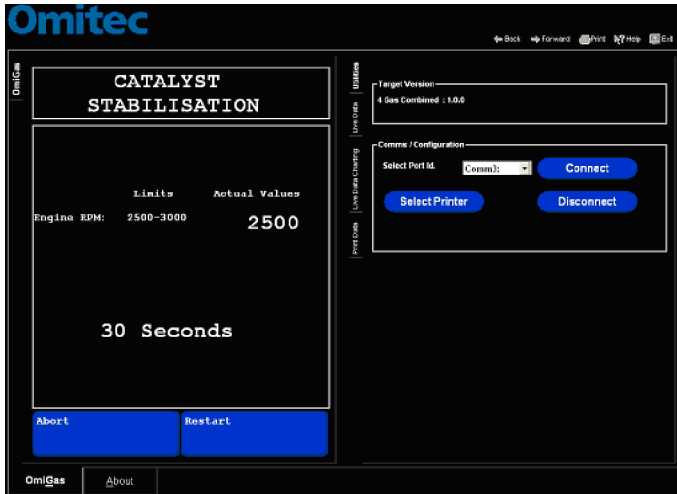
After a few seconds, all of the gases tested are displayed, along with the engine speed, showing the test limits in the centre of the active display and the actual readings from the test on the right. If any of the results fall outside the test limits, the reading will be highlighted in red.

MOT Test Procedure - Catalyst Vehicles



OM0298

At the bottom of the active screen, a countdown is displayed, indicating the remaining time left for this part of the test. Ensure that engine speed is maintained within the test parameters throughout the duration of the test (if engine speed falls outside test parameters for 2 seconds or more, the countdown will reset to 30 seconds and start again).

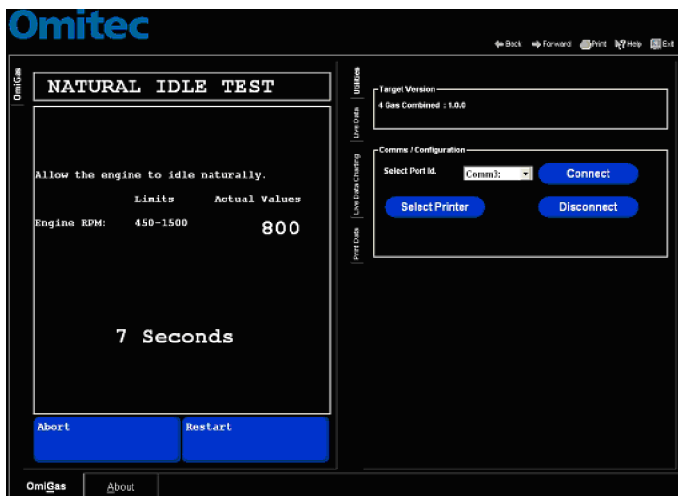


OM0299

When the fast idle test is successfully completed, do not release the accelerator pedal. Keep engine speed at fast idle for up to 30 seconds whilst the catalyst stabilises. If engine speed falls outside test parameters, the catalyst stable test countdown is reset to 30 seconds.

The natural idle test

Once the countdown for the catalyst stabilisation process is complete, the initial natural idle test screen is displayed. The engine speed parameters are shown on the left side of the PC active display, with the current engine speed reading given alongside.



OM0300

A period of approximately 10 seconds is given for the engine speed to be reduced so that it is within test parameters, this is shown as a countdown on the active display. If the required engine speed is not achieved within this time limit, the BET test is aborted and a full catalyst test is initiated.

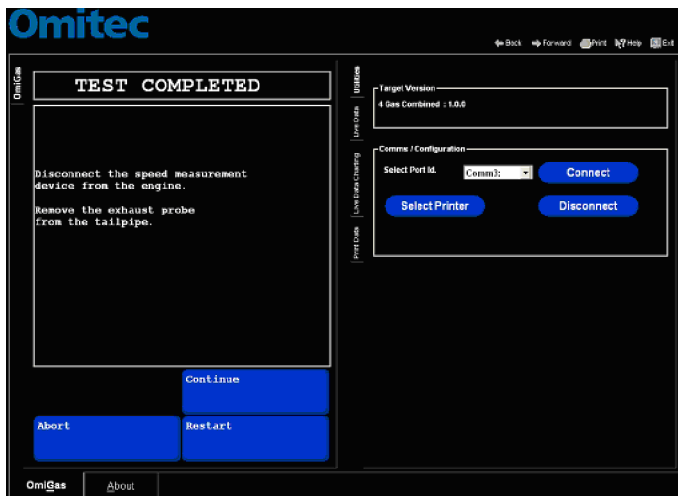


OM0301

Once the countdown is complete and the correct engine speed range is achieved, the main natural idle test screen is displayed, giving the engine speed and carbon monoxide content parameters on the left and the actual readings on the right side of the active display.

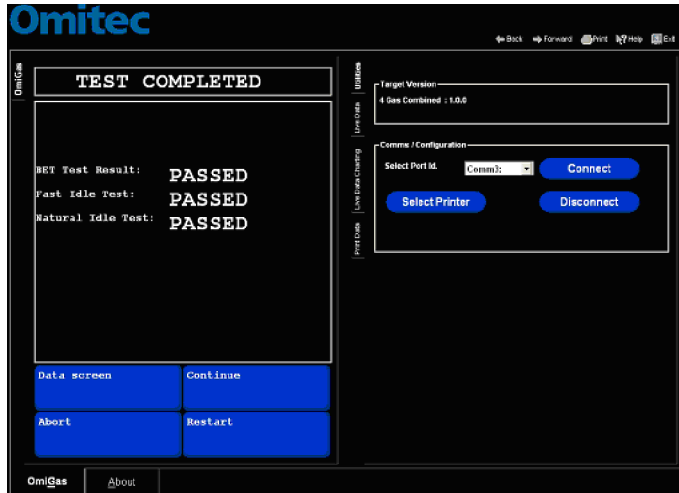
The engine speed must not exceed or fall below the given limits during the test period, which lasts for up to 30 seconds (maximum remaining test duration shown as a countdown). If either reading fails to fall within test parameters, the display will highlight the relevant reading in red. If the engine speed exceeds or falls below the test parameters, it must be rectified within 2 seconds or the test is aborted and a full catalyst test is initiated automatically.

Completing the test



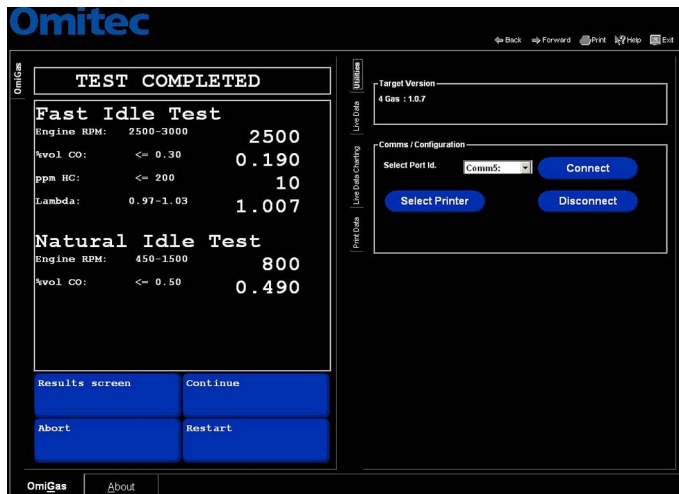
OM0302

Once the test is complete, OmiGas prompts for the engine speed (RPM) probe to be removed from the engine, the exhaust probe removed from the exhaust and, if applicable, the engine temperature sensor probe to be removed from the dipstick aperture. Switch off the engine of the test vehicle and remove the probes (if either probe is left connected, OmiGas will issue another reminder requesting their removal).



OM0303

Once the probes are removed, OmiGas displays the results, indicating whether the fast idle test, the natural idle test or the overall basic emissions test have been passed or failed.



OM0309

At this point, the Data screen can be accessed, to view the test results in more detail (select 'Data screen'). Select 'Continue' to proceed.

MOT Test Procedure - Catalyst Vehicles

Printing the test results

Two copies of the test results are printed automatically: One copy for the customer and the other to be kept as a record by the MOT testing facility. The results are also displayed to the right of the PC active display.



OM0307

Additional printouts can be made by selecting 'Yes' or 'No', accordingly.

Full Catalyst Testing

The screenshot shows the OmiGas CATALYST PROCEDURE software interface. The main window has a title bar with 'OmiGas' and standard window controls. The interface is divided into several sections:

- Registration Information:** A form with fields for Registration, Manufacturer, Model, Engine Capacity, Odometer, and Testers Name. Each field has a blue button next to it for data entry.
- Buttons:** At the bottom left, there are three large blue buttons: 'Select vehicle', 'Continue', and 'Abort'.
- Configuration:** On the right side, there is a 'Comm / Configuration' section with a 'Select Port Id.' dropdown menu (currently showing 'COM1') and two buttons: 'Connect' and 'Disconnect'.
- Target Version:** A section at the top right showing '4 Res Combined : 1.0.0'.
- Navigation:** A vertical sidebar on the left contains buttons for 'Back', 'Forward', 'Print', 'Help', and 'Exit'.

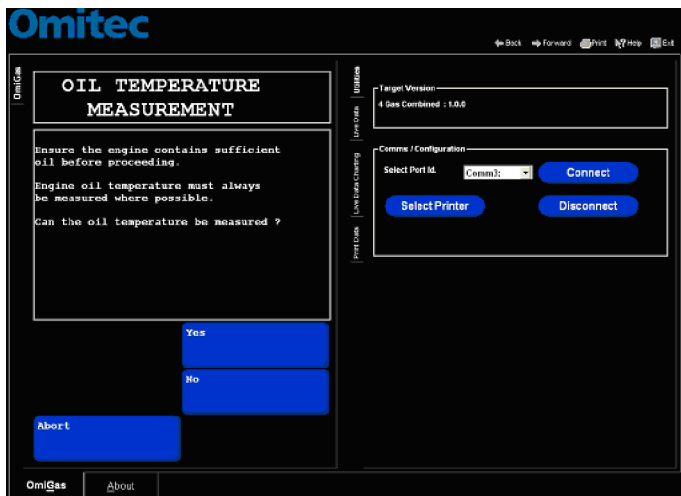
OM0304

The first menu requires the entry of the registration number, the manufacturer, the model, engine capacity and odometer reading of the test vehicle and the test technicians name. Once these details are entered, select 'Continue' to proceed and select whether or not the test vehicle is a passenger car.

If the test vehicle is listed on the memory card database, the emissions limits for the vehicle are automatically set and the Oil Temperature Measurement menu is displayed.

If the vehicle is not listed on the database, "Emission limits not available" is displayed. To continue the test, select whether or not the test vehicle was first used on or after August 1st 1995. This enables OmiGas to calculate the relevant emissions limits for the vehicle.

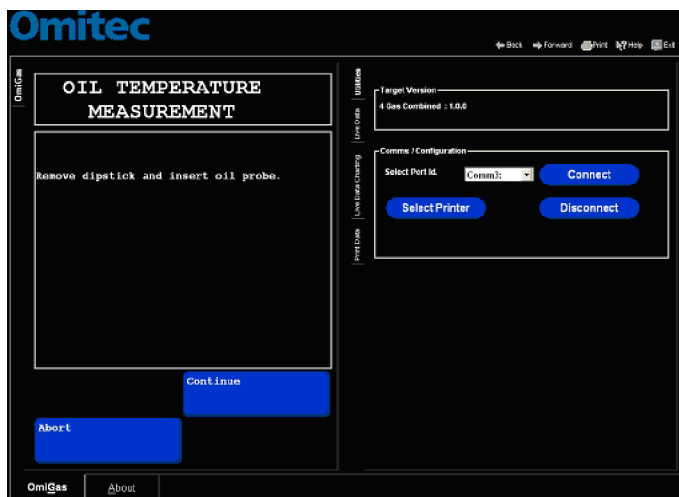
Oil temperature measurement



OM0305

OmiGas prompts for the oil level of the test vehicle to be checked before proceeding. Check the oil level and top-up if necessary.

Ideally, engine oil temperature should be measured during the emissions test, using the probe available. If the engine oil temperature is to be measured, then select 'Yes' to proceed.



OM0306

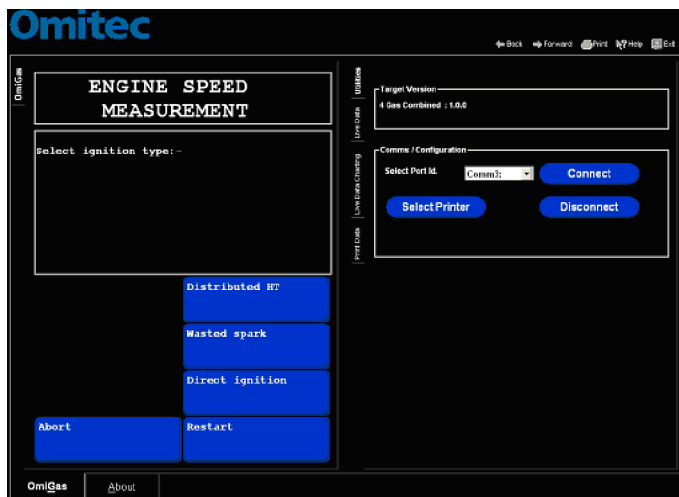
OmiGas prompts for the engine oil dipstick to be removed and for the engine oil temperature to be inserted. Make sure that the probe depth gauge is set accordingly before inserting the probe (see 'Setting the sensor probe depth gauge' on page 13, for further information).

! Do not use the temperature probe without first setting the depth gauge. If the probe is inserted too far, serious damage to the engine may be caused when the engine is running. If the probe is not inserted far enough, the temperature reading will be inaccurate.

NOTE: If oil temperature is not to be measured during the test, a 40 second countdown screen is displayed. Please wait until the next screen is displayed.

Engine speed measurement

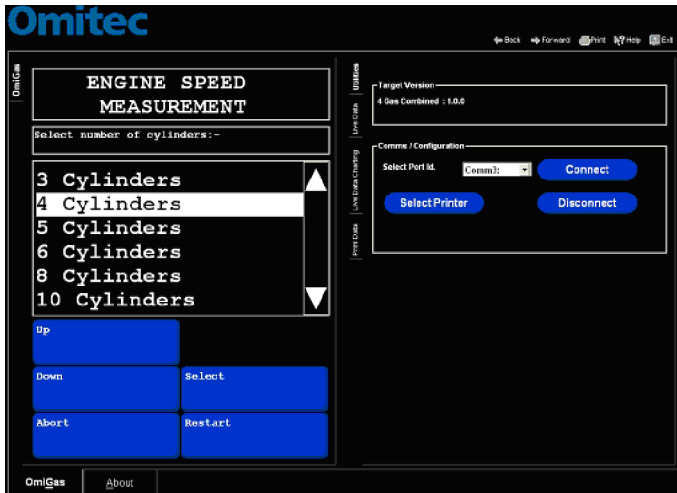
Whenever possible, it is preferable to carry out the emissions test while accurately measuring engine speed, using the RPM probe available. OmiGas prompts for confirmation as to whether or not engine speed can be measured. If measurement is possible select 'Yes' (select 'No' if measurement is not possible).



OM0294

If measurement is possible, OmiGas will then prompt for the details of the test vehicle ignition type, giving three options; 'Distributed HT', 'Wasted spark' and 'Direct ignition'. Select the appropriate option to continue, then on the next menu, identify the connection point that is to be used for the engine speed (RPM) probe.

NOTE: If engine speed is not to be measured during the test, a 40 second countdown screen is displayed. Please wait until the next screen is displayed.



OM0282

If 'King lead' is selected as the connection point (distributed HT ignition only), the technician must identify the number of cylinders the test vehicle has. Click on 'Up' or 'Down' until the correct number of cylinders for the vehicle is highlighted, then click on 'Select' to proceed.

OmiGas prompts for the RPM probe to be attached. Ensure that the probe will not contact moving engine parts once the engine is running (cooling fans, for example). Once the probe is securely connected, select 'Continue' to proceed and start the engine of the test vehicle.

⚠ Do not attempt to attach the engine speed probe while the engine is running. Moving engine parts may cause personal injury or come in contact with the probe, resulting in damage to the probe and to the engine.

Once the RPM probe is connected, OmiGas carries out an Exhaust Probe check. The test is to ensure that the probe is functioning correctly and is not contaminated with gas residue from a previous emissions test. The probe should NOT be inserted into the exhaust of the vehicle for this test.

MOT Test Procedure - Catalyst Vehicles

Engine pre-conditioning

It is of utmost importance that the engine is running at normal operating temperature when the emissions test is undertaken. OmiGas prompts you to check that normal operating temperature has been achieved, before the test can be performed.

If the engine temperature is to be measured using the engine temperature sensor probe, the temperature will be displayed on-screen until the correct temperature is reached, at which point the temperature sensor probe should be removed and the dipstick replaced. Select 'Yes' to confirm.

Select 'Continue' to proceed with the test, once correct temperature is confirmed.

Omitec

ENGINE
PRE-CONDITIONING

Run the engine at fast idle
(2000-3000 RPM) until the minimum
oil temperature is reached.

	Limits	Actual Values
Engine RPM:	2000-3000	2500
Oil Temp °C:	>= 60	62

Abort Restart

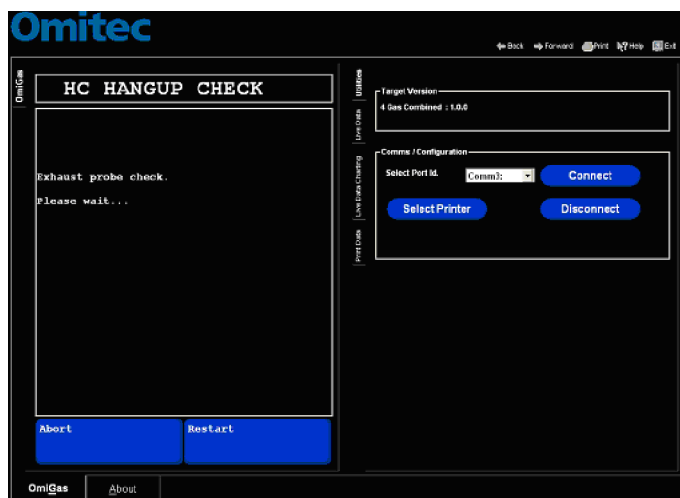
Target Version
4 Gas : 1.0.7

Comm5 / Configuration
Select Port Id: Comm5: Connect
Select Printer Disconnect

OmiGas About OM0310

If the engine temperature sensor probe is not used for the test, the next menu asks you to confirm how the engine temperature was checked and gives three options; 'Temperature gauge showed warm engine', 'Cooling fan cut in' and 'Coolant pipes were hot'. Select the relevant option to continue.

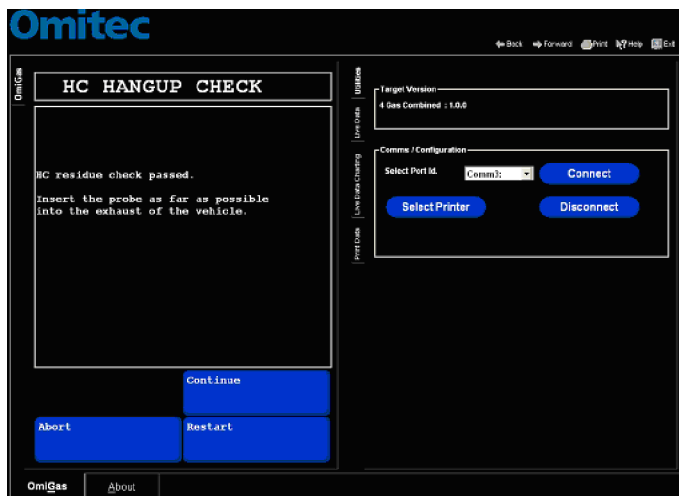
Hydrocarbon residue test



Once it has been confirmed that the OmiGas probes are correctly connected, a check for residual Hydrocarbons (HCs) in the exhaust probe and within the gas sampling unit is carried out. Residual hydrocarbons will compromise the accuracy of any emissions measurement taken, so it is important to ensure that no such residual gases are present before an emissions test is undertaken. Please wait for a few moments while this test is completed.

NOTE: If the hydrocarbon residue test is failed (Hydrocarbon gases exceed 20 ppm), the option will be given to re-attempt the hydrocarbon residue test, or to abort the emissions test. Further testing will not be possible until this test is successfully completed.

Inserting the exhaust probe



OM0296

Once the hydrocarbon residue test is successfully completed, OmiGas requests that the exhaust probe is inserted as far as possible into the test vehicle's exhaust.

⚠ Take care to avoid contact with the exhaust system when inserting the exhaust probe. The exhaust system will be hot and severe burns could occur.

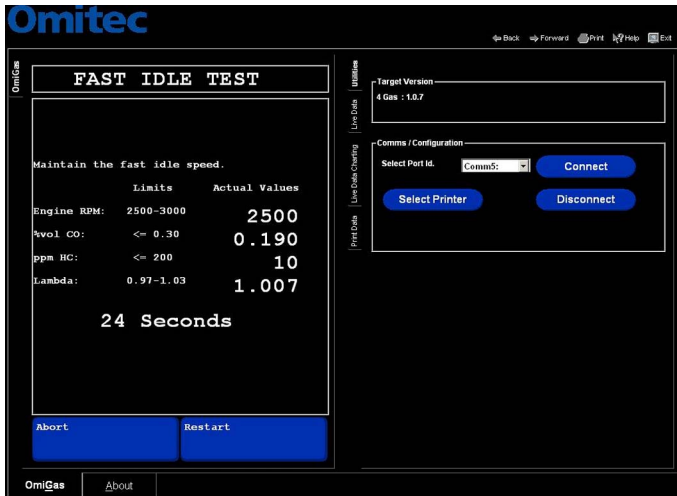
Insert the exhaust probe into the test vehicle exhaust pipe and ensure that it is secure. OmiGas checks a sample reading from the exhaust probe, to ensure that it is operating within set parameters.

The fast idle test

Once the hydrocarbon residue and exhaust probe tests are complete, OmiGas automatically initiates the full catalyst emissions test. The first part of the test requires the engine to be running at fast idle.

The initial display will identify the engine RPM range that must be maintained throughout this part of the test (A) and this engine speed should be achieved as soon as possible after the test commences. The active display also show the current engine speed (B), so that the required test speed can be accurately maintained.

NOTE: If an RPM probe is not connected, the engine speed must be carefully monitored using the tachometer of the test vehicle.



After a few seconds, all of the gases tested are displayed, along with the engine speed, showing the test limits in the centre of the active display and the actual readings from the test on the right. If any of the results fall outside the test limits, the reading will be highlighted in red on screen. If the fast idle test does not meet the required limits within 30 seconds, an additional pre-conditioning sequence is activated. This additional test can take up to 3 minutes, after which a second fast idle test is performed. If the second fast idle test fails, the MOT test will record a failure.

At the bottom of the active screen, a countdown is displayed, indicating the remaining time left for this part of the test. Ensure that engine speed is maintained within the test parameters throughout the duration of the test.

NOTE: If engine speed falls outside test parameters for 2 seconds or more, the countdown resets to 30 seconds.

MOT Test Procedure - Catalyst Vehicles

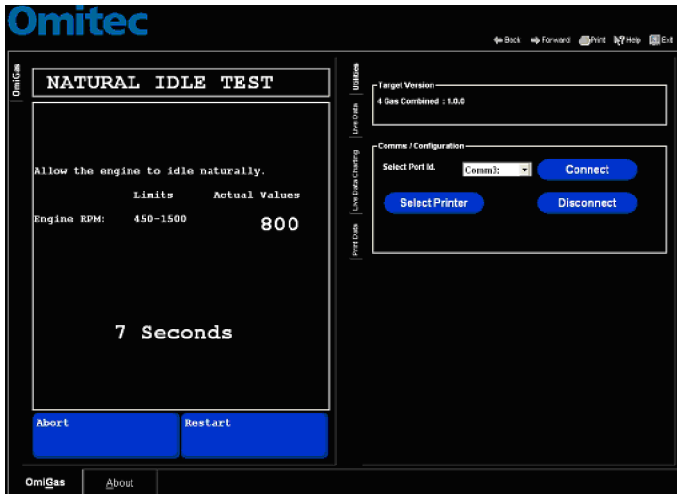


When the fast idle test is successfully completed, do not release the accelerator pedal. Keep engine speed at fast idle for up to 30 seconds whilst the catalyst stabilises.

NOTE: If engine speed falls outside test parameters for 2 seconds or more, the countdown resets to 30 seconds.

The natural idle test

Once the countdown for the catalyst stabilisation process is complete, the initial natural idle test screen is displayed. The engine speed parameters are shown on the left side of the PC active display, with the current engine speed reading given alongside.

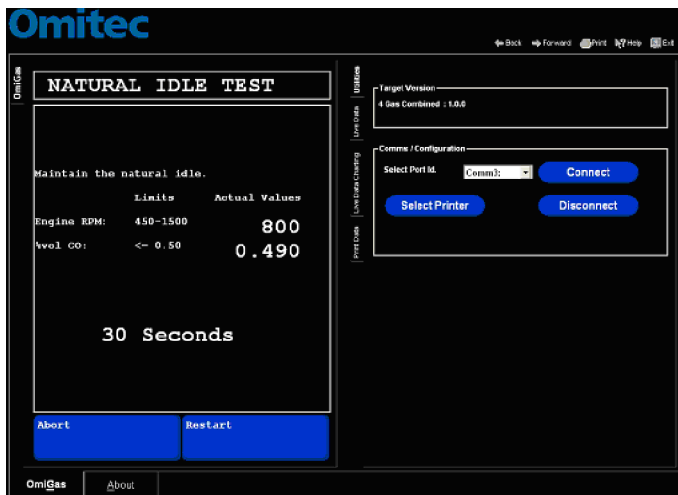


OM0300

A period of approximately 10 seconds is given for the engine speed to be reduced so that it is within test parameters, this is shown as a countdown on the active display. If the required engine speed is not achieved within this time limit, the catalyst test is aborted and must be started again.

If the natural idle speed is measured but out of range, it will be necessary to adjust manually. If it is not possible to manually adjust the idle speed, the test must be aborted.

MOT Test Procedure - Catalyst Vehicles



OM0301

Once the countdown is complete and the correct engine speed range is achieved, the main natural idle test screen is displayed, giving the engine speed and carbon monoxide content parameters on the left and the actual readings on the right side of the active display.

The engine speed must not exceed or fall below the given limits during the test period, which lasts for up to 30 seconds (maximum remaining test duration shown as a countdown). If either reading fails to fall within test parameters, the display will highlight the relevant reading in red.

NOTE: If engine speed falls outside test parameters for 2 seconds or more, the countdown resets to 30 seconds.

Completing the test

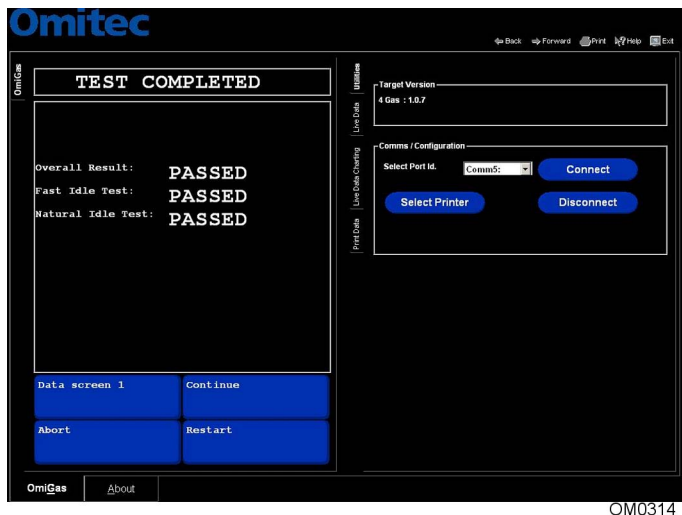


OM0313

Once the test is complete, OmiGas prompts for the engine speed (RPM) probe to be removed from the engine and the exhaust probe from the exhaust. Switch off the engine of the test vehicle and remove the probes (if either probe is left connected, OmiGas will issue another reminder requesting their removal). Also ensure that the engine oil temperature probe is removed from the dipstick housing.

⚠ Take care when removing the OmiGas probes from the test vehicle - the probes will be hot and severe burns could occur.

MOT Test Procedure - Catalyst Vehicles



Once the probes are removed, OmiGas displays the results, indicating whether the fast idle test, the natural idle test or the overall basic emissions test have been passed or failed. At this point, the Data screens can be accessed, to view the test results in more detail. Select 'Data screen 1' to view the results for the fast idle test, then select 'Data screen 2' to view the results from the natural idle test. Select 'Continue' to proceed.

Printing the test results

Two copies of the test results are printed automatically: One copy for the customer and the other to be kept as a record by the MOT testing facility. The results are also displayed to the right of the PC active display.



OM0307

Additional printouts can be made by selecting 'Yes' or 'No', accordingly.

Vehicles First Used Between 1 August 1975 & 31 July 1992 and LPG and CNG Vehicles

IMPORTANT!

Before carrying out the test procedure detailed below, please refer to section 'Vehicle Information' on page 32.

OmiGas

NON-CAT PROCEDURE

Registration [AB03CDE]
Odometer [12345]
Technician Name [A. R. O. Ltd]

Continue

Abort

Target Version
1.0.0.7

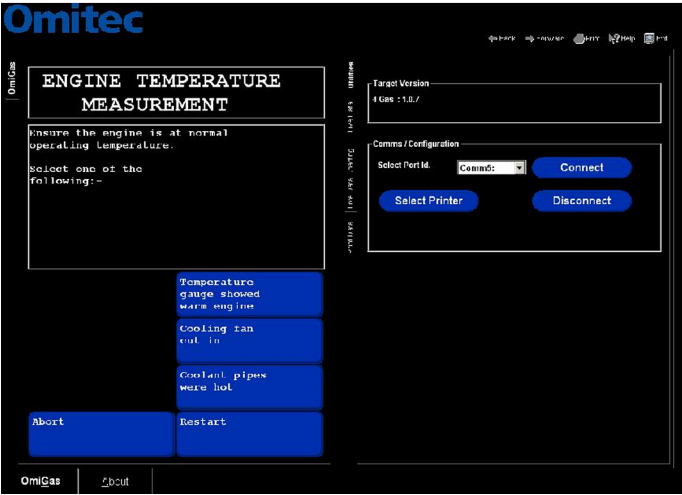
Comms / Configuration
Select Port Id. COM1 Connect
Select Printer Disconnect

OmiGas Abort

OM0315

Having selected the appropriate date that the vehicle was first used, OmiGas requests the vehicle registration and odometer reading, along with the test technician's name. Enter the details and select 'Continue'.

Start the engine when prompted by OmiGas and allow to idle. OmiGas then prompts you to check that the engine is running at normal operating temperature before the test can be performed. Once correct temperature is achieved, select 'Continue'.

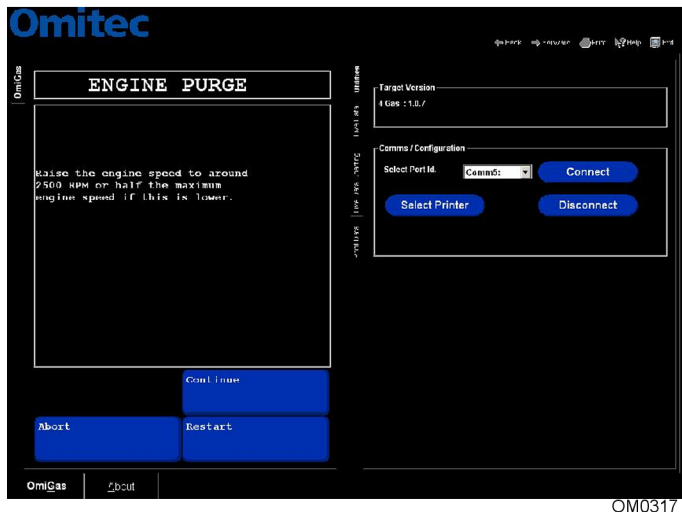


OM0316

The next menu asks you to confirm how the engine temperature was checked and gives three options. Select the relevant option to continue. The selected method of engine temperature measurement will be included in the final test print-out for future reference.

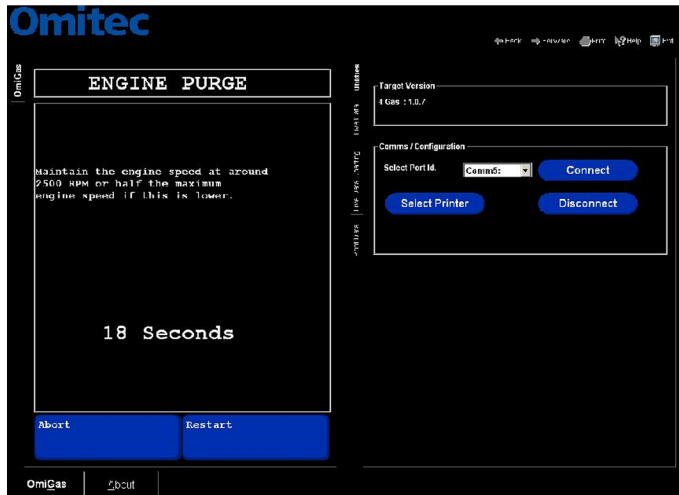
OmiGas performs a check on the Exhaust sample probe, to ensure that gas levels are acceptable, before continuing with the test procedure.

MOT Testing Procedure - Non-Catalyst Vehicles



OmiGas will perform an engine purge which requires you to raise the engine speed to approximately 2500 RPM (or half the maximum engine speed if this is lower). Once the correct engine speed is achieved, select 'Continue'.

Fast idle test

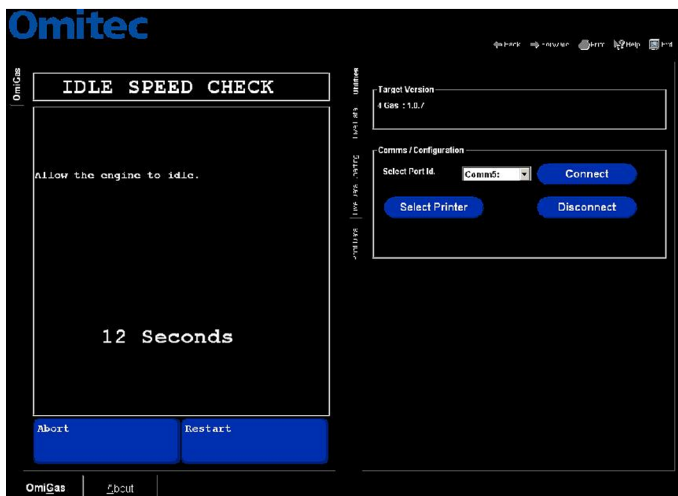


OM0318

The fast idle test requires you to maintain the engine speed at approximately 2500 RPM for 20 seconds, at which point OmiGas prompts for the engine speed to be allowed to drop to idle. Once the engine is idling, select 'Continue' to proceed.

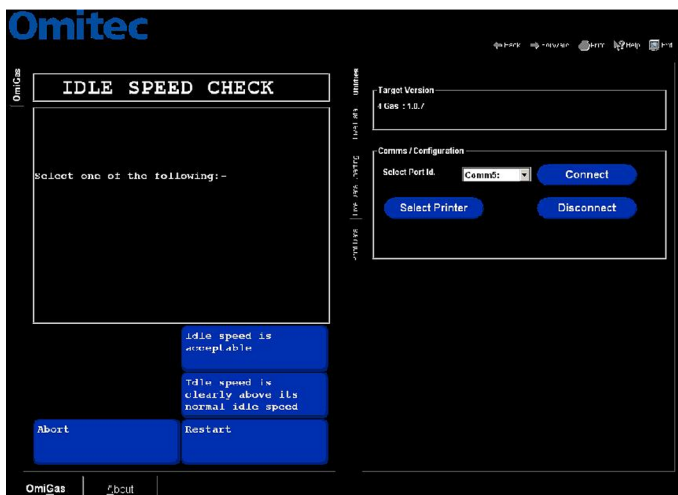
MOT Testing Procedure - Non-Catalyst Vehicles

Normal idle test



OM0319

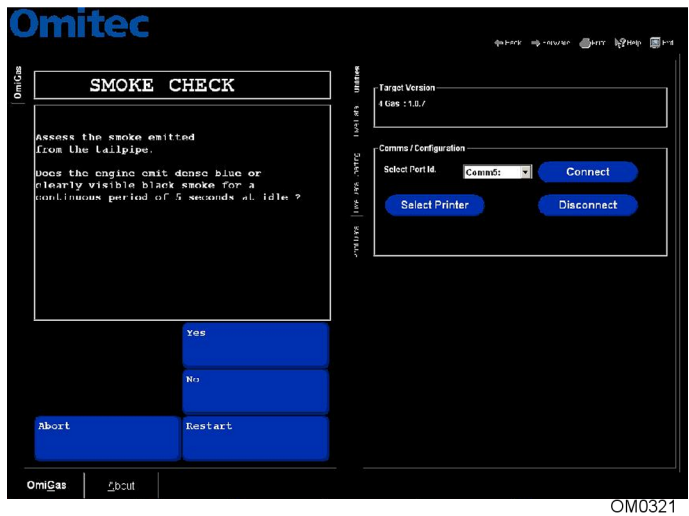
Allow the engine to idle naturally for approximately 15 seconds.



OM0320

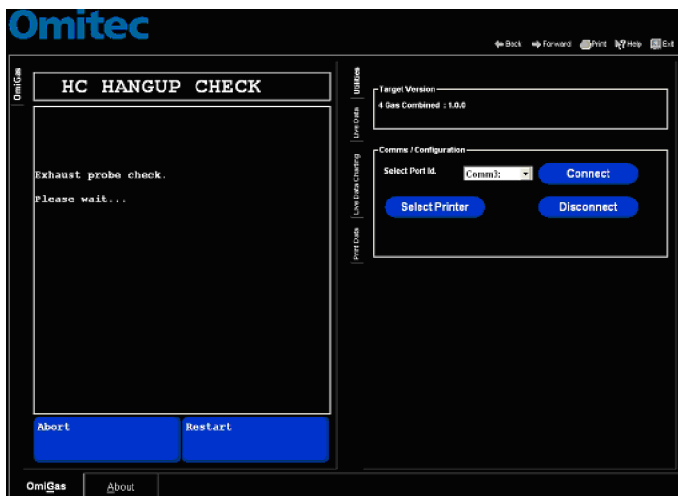
OmiGas requests you to answer whether the idle speed is acceptable, or clearly above the normal idle speed. Select the appropriate answer to continue.

Smoke check



OmiGas prompts you to assess the any smoke that may be emitted from the exhaust pipe. Select the appropriate option to continue.

Hydrocarbon residue test



Once it has been confirmed that the OmiGas probes are correctly connected, a check for residual Hydrocarbons (HCs) in the exhaust probe and within the gas sampling unit is carried out. Residual hydrocarbons will compromise the accuracy of any emissions measurement taken, so it is important to ensure that no such residual gases are present before an emissions test is undertaken. Please wait for a few moments while this test is completed.

NOTE: If the hydrocarbon residue test is failed (Hydrocarbon gases exceed 20 ppm), the option will be given to re-attempt the hydrocarbon residue test, or to abort the emissions test. Further testing will not be possible until this test is successfully completed.

Inserting the exhaust probe



Once the hydrocarbon residue test is successfully completed, OmiGas requests that the exhaust probe is inserted as far as possible into the test vehicle's exhaust.

! Take care to avoid contact with the exhaust system when inserting the exhaust probe. The exhaust system will be hot and severe burns could occur.

Insert the exhaust probe into the test vehicle exhaust pipe and ensure that it is secure. OmiGas checks a sample reading from the exhaust probe, to ensure that it is operating within set parameters. Select 'Continue' to proceed.

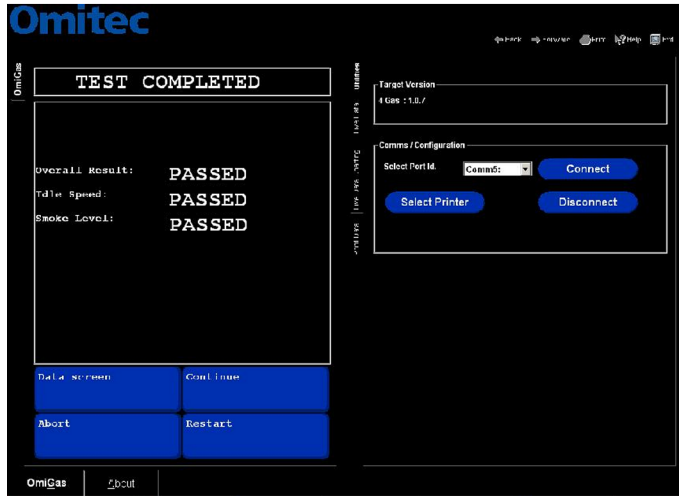
MOT Testing Procedure - Non-Catalyst Vehicles



OM0323

During the test, the Carbon Monoxide and Hydrocarbon content of the emissions are displayed.

Once the test is complete, you will be prompted to remove the exhaust sample probe and the RPM probe. Remove the probes to continue.



Once the probes are removed, OmiGas displays the results, indicating whether the idle test and the smoke test have been passed or failed. At this point, the Data screen can be accessed, to view the test results in more detail (select 'Data screen'). Select 'Continue' to proceed.

MOT Testing Procedure - Non-Catalyst Vehicles

Printing the test results

Two copies of the test results are printed automatically: One copy for the customer and the other to be kept as a record by the MOT testing facility. The results are also displayed to the right of the PC active display.

The screenshot shows the Omitec software interface. The main window has a title bar with 'Omitec' and standard window controls. Below the title bar, there's a menu bar with 'OmiGas', 'About', and 'Exit'. The main area is divided into two panes. The left pane has a title 'TEST COMPLETED' and a large text area asking 'Print results again ?'. Below this are four buttons: 'Yes', 'No', 'Abort', and 'Restart'. The right pane displays the test results in a text format. At the bottom of the right pane is a 'Clear' button. The status bar at the bottom left shows 'OmiGas' and 'About'.

TEST COMPLETED

Print results again ?

Yes
No
Abort Restart

MOT Station Copy
MOT Exhaust Emissions Test Result
Basic Emission Test

Test Station
Omitec Group Ltd, Hopton Ind. Est., London Road, Dev:

Date of Test: 29/05/2003

Vehicle Details
Vehicle Registration Number:
Engine temperature measurement by manual observation

DESCRIPTION	Limits	Actual Value
Page Title Test		

Clear

OM0307

Additional printouts can be made by selecting 'Yes' or 'No', accordingly.

Vehicles First Used Before 1st August 1975

IMPORTANT!

Before carrying out the test procedure detailed below, please refer to section 'Vehicle Information' on page 32.

The screenshot shows the OmiGas Visual Test Proc software interface. The main window has a title bar with 'OmiGas' and standard window controls. The interface is divided into several sections:

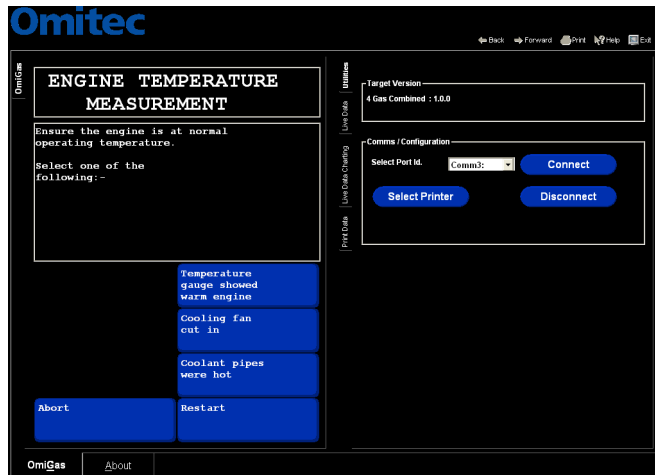
- Top Bar:** Contains navigation buttons: Back, Forward, Print, Help, and Exit.
- Left Panel:** Labeled 'OmiGas' and 'Visual Test PROC'. It contains input fields for 'Registration' (MY CAR 1), 'Odometer' (12345), and 'Testers Name' (A N OTHER). Below these fields are 'Continue' and 'Abort' buttons.
- Right Panel:** Labeled 'Utilities'. It contains a 'Target Version' section with '4 Gas Combined : 1.0.0'. Below this is a 'Comms / Configuration' section with a 'Select Port Id.' dropdown (showing 'Comm1'), 'Connect', 'Select Printer', and 'Disconnect' buttons.
- Bottom Bar:** Contains 'OmiGas' and 'About' buttons.

The status bar at the bottom right of the window displays 'OM0367'.

Having selected the appropriate date that the vehicle was first used, OmiGas requests the vehicle registration and odometer reading, along with the test technician's name. Enter the details and select 'Continue'.

Start the engine when prompted by OmiGas and allow to idle. OmiGas then prompts you to check that the engine is running at normal operating temperature before the test can be performed. Once correct temperature is achieved, select 'Continue'.

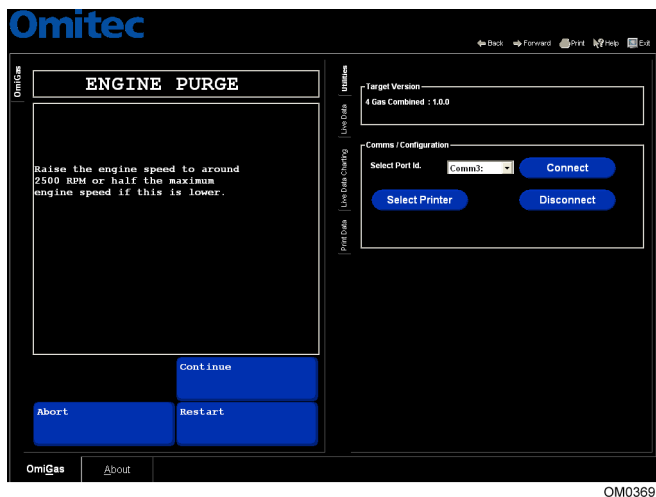
MOT Testing Procedure - Visual Procedure



OM0368

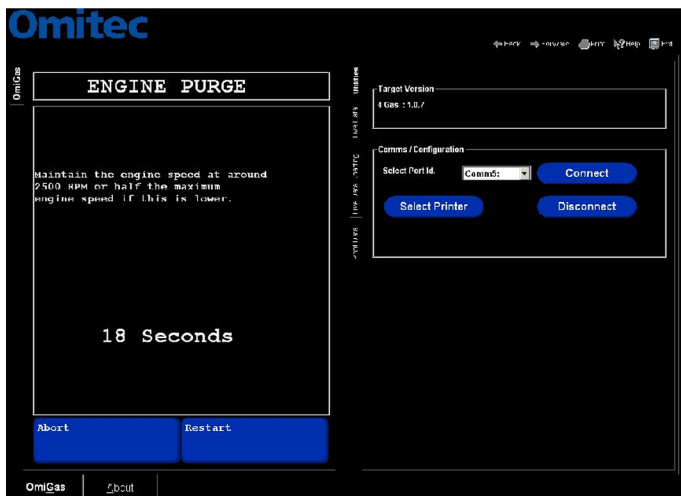
The next menu asks you to confirm how the engine temperature was checked and gives three options. Select the relevant option to continue. The selected method of engine temperature measurement will be included in the final test print-out for future reference.

OmiGas performs a check on the Exhaust sample probe, to ensure that gas levels are acceptable, before continuing with the test procedure.



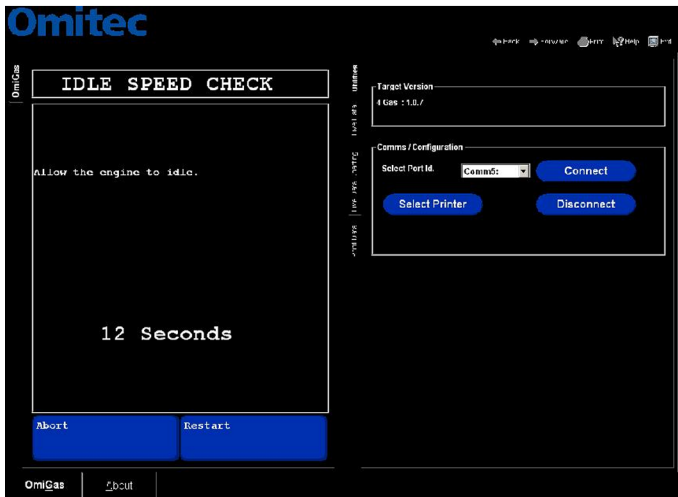
OmiGas will perform an engine purge which requires you to raise the engine speed to approximately 2500 RPM (or half the maximum engine speed if this is lower). Once the correct engine speed is achieved, select 'Continue'.

Fast idle test



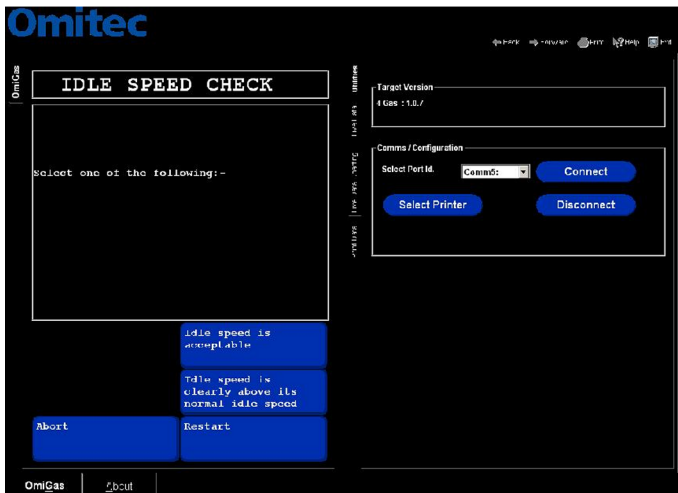
The fast idle test requires you to maintain the engine speed at approximately 2500 RPM for 20 seconds, at which point OmiGas prompts for the engine speed to be allowed to drop to idle. Once the engine is idling, select 'Continue' to proceed.

Normal idle test



OM0319

Allow the engine to idle naturally for approximately 15 seconds.

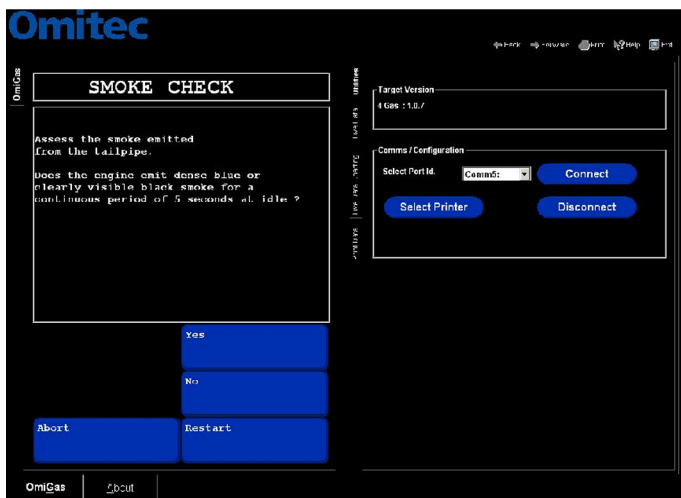


OM0320

Omiga requests you to answer whether the idle speed is acceptable, or clearly above the normal idle speed. Select the appropriate answer to continue.

MOT Testing Procedure - Visual Procedure

Smoke check



OmiGas prompts you to assess the any smoke that may be emitted from the exhaust pipe. Select the appropriate option to continue.

Printing the test results

Two copies of the test results are printed automatically: One copy for the customer and the other to be kept as a record by the MOT testing facility. The results are also displayed to the right of the PC active display.



OM0307

Additional printouts can be made by selecting 'Yes' or 'No', accordingly.

Routine Maintenance

To ensure that the analyser gives long and reliable service, regular cleaning and changing of the filters is necessary. Failure to clean the re-usable filters and change the disposable filter elements regularly may void warranty and service agreements.

To ensure that the analyser maintains its accuracy within the maximum permissible errors, the following procedures must be followed and the analyser must be calibrated at SIX MONTHLY intervals. NOTE THAT NO OPERATOR ADJUSTMENTS ARE POSSIBLE.

Check the cleanliness of the disposable filter (Part No. OM 4000/13) at the start of each day. If the filter shows signs of severe contamination or a build up of deposits has occurred, remove and clean out the housing using a lint-free cloth. Ensure that no deposits are pushed into the exit pipes of the filter housings. Renew the disposable filter if heavily contaminated.

NOTE: Any dismantling of probe tip, sample hose or filters MUST be followed by a manual leak test.



CAUTION: DO NOT run the analyser without the filters in place!

At the beginning of each day, drain any water collected in the sample pipe.

The sample probe tip can be replaced as a separate item, or may be removed for cleaning. Assembly will require a small quantity of "Loctite 222" to be used on the threads to ensure a good gas seal.

At the start of each day, clean any accumulated deposits from the Sample Probe tip, making sure that the cross-drillings in the tip are clear and check that the analyser outlet pipes are not kinked or blocked in any manner.

Check that the printer has sufficient paper and ensure that the printer is switched on and ready to print. Refer to printer manual for its routine maintenance procedures.

Clean the Oil Temperature Probe and examine the sump seal for serviceability. Make sure that the probe is free from grit and metal filings. Ensure the probe is plugged correctly in to the analyser. NOTE a damaged or worn probe can lead to faulty emissions readings.

Ensure that the analyser is not operated in a dusty environment, especially areas where paint spray and dust spray are present.



CAUTION: Contamination of the analyser by paint spray or excessive dust may void the warranty and/or service agreements!

Oxygen cell replacement procedure

This procedure identifies the way that the user can identify an exhausted oxygen cell and the remedial action necessary to replace the device. Follow this procedure if an oxygen cell error is reported.

1. Ensure there are no leaks or blockages in the gas handling system.
2. Ensure any tubing connected to the output pipe is not within close proximity to the "ZERO GAS" input port.
3. Ensure that any tubing connected to the "ZERO GAS" input port is not in close proximity to any source of contaminated/polluted air, a vehicle exhaust pipe for example.
4. Ensure the Oxygen Cell connection lead is properly mated.
5. Ensure the Oxygen Cell is properly seated in the housing and provides a gas tight seal.
6. Turn on the power to the unit and allow it to warm up. Ensure that the analyser is fully warmed up (i.e. that it has had at least 5 minutes since power on).
7. Go to Main menu 1 and select 'Extended features'.
8. Select 'Renew Oxygen Cell'. If after this test you are returned to the Extended Features menu then the Oxygen Cell does not need to be replaced.
9. If failure occurs (screen displays 'Replace oxygen cell'), select 'Continue' and wait while a zero calibration is performed.
10. If the cell is satisfactory the you are returned to the 'Extended features' menu. If the screen displays 'Replace oxygen cell, then remove the oxygen cell as follows:
11. Ensure power to the unit is switched off, then go to the rear of the unit and locate the oxygen cell cover (see '*Assembling The OmiGas Analyser*' on page 8).
12. Remove the retaining screw and hinge down the cover.
13. Disconnect the cable from the oxygen cell. It may be advantageous to gently prise the locking tab of the connector away from the mating half, to facilitate disconnection.
14. Unscrew the cell by hand (unscrew anti-clockwise). If discarding the cell, place to one side for later safe disposal.
15. With the new cell, ensure the "O" ring is properly seated against the thread abutment. Screw in the cell (clockwise) to hand-tightness but do not over-tighten. Ensure a gas tight seal. Refit the connector.
16. Hinge the cover up, make sure the gas tubing is not crushed or trapped and secure cover to the back of the unit.
17. Repeat steps 2 to 8. If the unit still fails, contact your service engineer.

Routine Maintenance & Cleaning

Cleaning polymer filters

NOTE: The paper filter cannot be cleaned. The following procedure is only applicable to the polymer filters.

Remove the filters from the analyser unit, then place the filters (NOT the caps) into a jar of petrol.



WARNING: DO NOT use brake cleaner or other solvents to clean polymer filters!

Seal the jar and shake well. Remove the filters and brush with a toothbrush or similar instrument. Return the filters to the jar and shake. Remove them from the jar again and wash in warm soapy water to remove the petrol. Dry the filters thoroughly before refitting.

Clean the filter caps and 'O' rings using running waters. Wipe the filter housings with a clean damp cloth.

Ensure all components are dry before re-assembly.

NOTE: Any dismantling of filters MUST be followed by a manual leak test.

Fault Finding

Date incorrect

This cannot be corrected by the user. Contact your dealer.

Gas readings unstable

Try 'Zero cal', to reset unit.

Keyboard

- If the screen fills with one character, check that no key is stuck down.
- If no keys are operating unplug the keyboard, re-insert the keyboard plug and retry.

Lambda reading too high

Ensure that the spigot and hose are fitted to the unit.

Check that the Oxygen Cell is OK.

Leak test failure

Remove sample hose and re-test by placing a finger over the sample probe inlet. If the unit now passes then check hose and probe for splits and joint leaks.

Attach the end of the water outlet tubing to the sample probe inlet and re-test. If the unit still fails then check for cracked filter housings or caps, grit in the O-ring seals etc.

NOTE: Be aware that very small cracks will cause leak test failures.

If none of the above solve the problem, note the vacuum level displayed and telephone your dealer.

Low flow

Low flow is caused by blocked filters. To clean a filter, see '*Cleaning polymer filters*' on page 84.

No data found

This indicates that the vehicle data card is not being read correctly. Switch off power, remove the data card and clean the gold card contacts with a pencil eraser. Refit the card and retry.

NOTE: When replacing the card, the label side must be visible.

Routine Maintenance & Cleaning

Out of calibration

Contact your dealer. This will have been preceded by a warning for the previous fourteen days!

Oxygen cell failure

The Oxygen Cell is a consumable item. It will only be replaced under warranty in the first six months from the date of purchase.

Follow the replacement procedure given under '*Oxygen cell replacement procedure*' on page 83.

RPM reading incorrect

Ensure that the RPM Clamp jaws are not cracked or dirty. Check that the correct ignition system type is selected. Try a different position on the plug lead.

Low Flow

Clean the polymer filters, see '*Cleaning polymer filters*' on page 84.

Test procedure stops after inserting or removing the exhaust probe

Clean the polymer filters, see '*Cleaning polymer filters*' on page 84.

Time incorrect

Correct the time setting (see 'Settings - adjust time/date' under '*Main menu 2*' on page 29).

Printer Error

If the 'PrinterError' warning screen is displayed on power up, ensure that the printer is fully functional and connected correctly.

Garage or Vehicle details not being stored

Ensure 'Store' button is pressed after details have been entered.

Cleaning

OmiGas unit

The surfaces of the cabinet of the analyser can be cleaned with a soft sponge, dampened with a mild soap and water solution.



CAUTION: ENSURE that the unit is disconnected from the mains before cleaning. Be careful not to wipe electrical connections or connectors while cleaning.



CAUTION: On no account use solvents or strong detergents to clean the unit.

Oil temperature probe

The Oil temperature probe can be cleaned in a similar manner to the OmiGas unit. The probe tip and dipstick orifice seal require frequent cleaning as a poor seal can lead to erroneous exhaust readings.

Printer

The printer should be cleaned in accordance with the instructions in the printer manual.

Technical Specification

The OmiGas main unit (Part No. OM 4500/1)

Environmental	
Operational temperature range	2°C to 50°C
Operational temperature (nominal)	20°C
Storage temperature range	-4°C to 70°C
Relative Humidity (operational)	90% RH (non-condensing)
Relative Humidity (storage)	90% RH (non-condensing)
Atmospheric pressure range	813 to 1060 mBar
Atmospheric pressure (nominal)	1013 mBar
Altitude (operational)	-250 m to +250 m
Sunlight	No direct exposure to sunlight
Operating Constraints	Designed for covered use only Not for external use

Mechanical	
Operating Position	Horizontal
Ventilation	Still Air Free from strong drafts
Shock	To OIML 50mm drop of any edge
Weight	8.15 kg
Dimensions of main unit	420 mm wide 245 mm deep 165 mm high (including 10mm feet)
Dimensions of handset	260 mm wide 160 mm deep 60mm high

Power Supply	
Mains voltage range	100 – 240V AC
Mains frequency range	50-60 Hz
Power input	500VA Max

Metrology

The unit is designed and certified to comply to the class 0 limits of OIML R99:2000(E).

The oxygen measurement is designed to comply with the accuracy requirements of the German AU2 specification.

These specifications and the provision of an MOT procedure meet the requirements of the UK VI for MOT testing of catalyst and non-catalyst equipped vehicles.

Measurement range (OIML Class 0)	
Carbon monoxide (CO) range	0 to 5% vol.
CO accuracy	±0.03% abs. or ±5% rel.
Carbon dioxide (CO ₂) range	0 to 16% vol.
CO ₂ accuracy	±0.5% abs. or ±5% rel.
Hydrocarbons as n-hexane (HC) range	0 to 2000 ppm vol.
HC accuracy - 0 to 2000ppm	±10 ppm abs. or ±5% rel.
PEF Factor	0.490 to 0.540

Transducer measurement range	
Carbon monoxide (CO) range	0.00 – 15.00%
CO accuracy: 0.00% to 10.00% 10.01% to 15.00%	±0.02% abs. or ±3% rel. ±5% rel.
Carbon dioxide (CO ₂) range	0.00 to 20.00%
CO ₂ accuracy: 0.00% to 16.00% 16.01% to 20.00%	±0.3% abs. or ±3% rel. ±5% rel.
Hydrocarbons as n-hexane (HC) range	0 to 30000 ppm
HC accuracy: 0 to 2000ppm 2001 to 15000 15001 to 30000	±4ppm abs. to 3% rel. ±5% rel. ±8% rel.

Measurement of Oxygen	
Oxygen range	0.00% to 25.00%
Accuracy	± 0.01% abs.
Response time	< 30s to 95% of final value < 60s for change from 20.9% to < 0.10% vol.

Technical Specification

Lambda Calculation (by Brettschneider formula)	
Lambda range	0.0 to 2.0
Resolution	0.01

Calculation of Lambda value according to Brettschneider (Source: Bosch Technische Berichte, VOL. 6 (1979) No. 4, p177-186) – As listed in OIMLR99 specification.

Simplified Lambda calculation:

$$\lambda = \frac{[\text{CO}_2] + \frac{[\text{CO}]}{2} + [\text{O}_2] + \left(\frac{H_{\text{CV}}}{4} \times \frac{3.5}{3.5 + \frac{[\text{CO}]}{[\text{CO}_2]}} - \frac{O_{\text{CV}}}{2} \right) ([\text{CO}_2] + [\text{CO}])}{\left(1 + \frac{H_{\text{CV}}}{4} - \frac{O_{\text{CV}}}{2} \right) ([\text{CO}_2] + [\text{CO}] + K1 [\text{HC}])}$$

[] Concentration in % vol (ppm vol for HC)

K1 Conversion factor for HC if expressed in ppm vol *n*-hexane (C₆H₁₄) equivalent.
It's value in this formula is 6x10⁻⁴

H_{CV} Atomic ratio hydrogen to carbon (H_{CV} = 1.7261)

O_{CV} Atomic ratio oxygen to carbon (O_{CV} = 0.0176)

Engine Speed Measurement (analyser input only)	
RPM range	100 to 10,000 RPM
System accuracy	± 5%
Resolution	1 RPM

Oil Temperature Measurement (analyser input only)	
Range	60 to 90°C
System accuracy	± 5%
Resolution	1°C
Probe Type	Type "K" Nickel Chromium / Nickel Aluminium Isolated thermocouple

General Data

Real time clock

Features:

- Day and Date, time in hours, minutes and seconds with automatic leap year compensation.
- Time is user adjustable.
- Date is adjustable by authorised calibration engineers only.

Computer communication port (VI interface)

A 9600 baud RS232 serial interface with protocols to suit UK MOT requirements.

Vehicle database

- The vehicle database is supplied on a MIPS memory card of either 1 or 2MB capacity, type E-344 or E-345m respectively.
- Card dimensions: 54mm x 85.6mm z 1.85mm.
- Card connector: MIPS standard for Europe 38 pins staggered.

Handset

- RS232 Comms

PC Interface

- USB 1.1 or 2.0

Ancillary Equipment

HT ignition probe	
Measurement range	100 to 10,000 rpm
For systems giving one pulse per every two engine revolutions	

Acoustic Speed probe (option)	
Measurement range	400 to 8,000 rpm
Operating temperature range	5°C to 45°C
Operating relative humidity	up to 90% RH condensing

Oil Temperature probe	
Type	"K" type Thermocouple Nickel Chromium / Nickel Aluminium. Isolated with stainless steel sheath
Measurement range	0 °C to 200 °C

Keyboard (Standard PC PS/2 type)	
Operating temperature range	0 °C to 40 °C
Storage temperature range	-10 °C to 65 °C

Pneumatic Specifications

Flow Rate	
Water Outlet (nominal)	1.5 l/min
Analyser Outlet (nominal)	2.0 l/min
Sample Inlet	3.5 l/min

Filtration	
Disposable element – Borosilicate	5 µm particle size
Coalescing element	29 mm length
Water filter to pump	37 mm length

Oxygen Cell	
City Technology	CiTiceI AO2

Calibration Gas	
Minimum pressure	700 mBar above atmospheric pressure
Flow rate	1.5 to 6.0 l/min
Composition:	
Carbon dioxide	14% vol.
Carbon Monoxide	3.5% vol.
Propane	2000 ppm vol.
Nitrogen	Balance

Technical Specification

Service and calibration frequency

Calibration

At 6 monthly intervals

Service	
Replace disposable filter element (5 µm) – Part No. OM 4000/13	Weekly – if in continuous use, else as necessary
Cleaning of gas filter (37 mm) – Part No. OM 4000/17	Weekly – if in continuous use, else as necessary
Cleaning of water filter (29 mm) – Part No. OM 4000/18	Weekly – if in continuous use, else as necessary
Cleaning of sample probe and hose	Weekly – if in continuous use, else as necessary
Replace oxygen cell	Annually
Replace activated charcoal filter	Annually, or as needed

Zero-Cal	
Zero-Cal frequency (minimum)	Once every 30 minutes
Zero-Cal frequency (maximum)	Once every 15 minutes

EMC Specification

Complies with BS EN 61326:1998 Electrical Equipment for Measurement and Laboratory use – EMC requirements.

Performance Criteria: No effects greater than half the permitted accuracy limits specified by OIML, unless the effects are self-evident as being erroneous to the operator. The equipment must be self-recovering.

Spare Parts List

Description	Part number
A4 Printer	PE1031A
Printer Lead	LD2018A
Keyboard	CO6008A
HT RPM Clamp	OM 4500/6
Oil Temperature Probe	OM 4500/9
Exhaust Sample Probe - (6m)	OM 4500/11
Oxygen Sensor Cell	OM 4000/12
Disposable Particulate Filter (box of 10)	OM 4000/13
Trolley	OM 2500
Vehicle Data Card	OM 4000/15
Gas Filter (37 mm)	OM 4000/17
Coalescing Filter (29 mm)	OM 4000/18
Sample Probe Tip	OM 4000/19
Sample Probe Hose (8 m)	OM 4000/20
Oil Temperature Probe Dipstick Orifice Seal	OM 4000/22
Sample Probe Cap	OM 4000/23
Instruction Manual	OM 4500/5
Omigas Handset	OM 4500/2
Omigas Handset Mounting Bracket Kit	OM 4500/3
Omigas Handset Cable	OM 4500/4
Omigas USB Lead	OM 4500/8

Please quote the part number when ordering or enquiring about the availability or price of spares for you OmiGas analyser.

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