Omitec

OmiScan Gas

Operating Instructions

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Introduction

OmiScan Gas is an exhaust gas analyzer for spark ignition vehicles and comprises a fully portable handset with a base station and optional software to install on a PC.
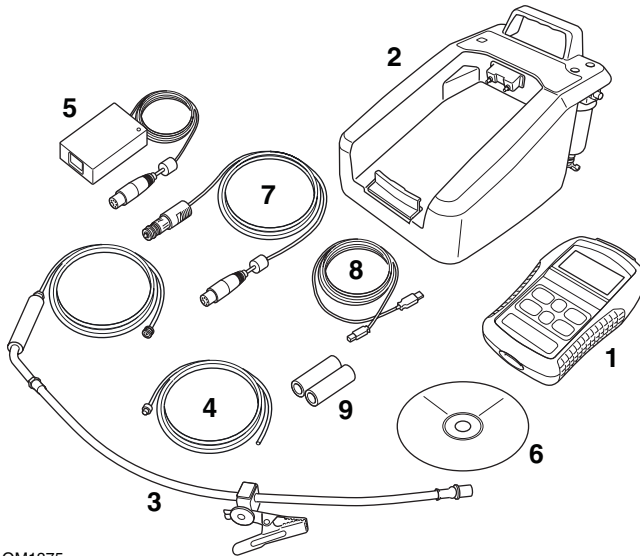
OM1375

1. Handset
2. Base unit
3. Exhaust Probe attachment
4. Base unit exhaust pipe extension
5. Mains power converter supply
6. CD ROM with PC software
7. Vehicle power supply cable (optional)
8. USB cable handset to laptop
9. Filters

Spark ignition vehicles includes both catalyst and non-catalyst, supercharged (including Turbo) and lean-burn engines, vehicles that are fuelled by Petrol, Liquid Petroleum Gas (LPG) and Compressed Natural Gas (CNG) and also injection or carburettor fuel control.

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

Introduction

There are two options available:

1. OM4720/5G
- Measures 5 gases, provides live readings of all gases and λ
- PC software to graph and/or diagnose emissions faults from gas readings

2. OM4720/4G
- Measures 4 gases, provides live readings of all gases and λ
- PC software to graph gas readings

The OmiScan Gas system enables the measurement of four or five of the main exhaust gases emitted from a spark ignition engine. The gases measured are: Carbon Dioxide (CO_2), Carbon Monoxide (CO), Hydrocarbons (HC), Oxygen (O_2) and Nitric Oxide (NOx) (optional). Measurement accuracy meets or exceeds requirements for OIML Class 0 and BAR97:

- CO:Range - 0% to 15%; accuracy typically 3% relative
- CO_2: Range - 0% to 20%; accuracy typically 3% relative
- O_2: Range 0% to 25%; accuracy typically 1% relative
- HC n-hexane: 0 to 2000ppm; accuracy typically 3%
- HC n-propane: 0 to 30000ppm; accuracy typically 5%
- NOx :Range - 0 to 5000ppm, accuracy typically 3% relative (optional)

The optional PC based system provides enhanced facilities for data capture and graphing as an additional feature.

The OmiScan Gas handset communicates with the base station using *Bluetooth*® Wireless Technology and with the PC option, the handset communicates with a PC via a USB port.

Power Management

The handset monitors both itself and the base station for the charge status of the battery packs. If either battery pack voltage falls below a predetermined level the handset will display a warning to cease testing and recharge the units. Approximately five minutes before the batteries reach the automatic shutdown point, a message is flagged to warn you of the low battery state and thus the imminent shutdown.

1. Low Base Station Battery
   - Indicated by the handset battery symbol flashing 'empty' and the green LED on the base station flashing

2. Low Handset Battery
   - Indicated only by the battery symbol on handset display flashing empty.

NOTE: Once the units have been put on charge, both LED and battery symbol will stop flashing.

Safety Precautions

⚠️ *WARNING: 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.*

⚠️ *WARNING: DO NOT handle the OmiScan Gas 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.*

Electrical Safety Precautions

⚠️ *WARNING: Any power or extension cord must have a ground conductor.*

⚠️ *WARNING: When replacing fuses make sure the correct type and rating are used.*

⚠️ *WARNING: Any adjustment, maintenance or repair must be carried out by an approved service engineer.*

Introduction

Assembling the OmiScan Gas Analyzer

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

- The batteries in the base unit and the handset will need to be installed and charged before either unit can be used (see *'Power Management', page 7*).

- The base station battery compartment is on the underside of the unit, secured by two cross-headed bolts. Unscrew the cover, and secure the bigger battery pack into the cover tray with the velcro strap; connect the in-line connector to the base station. Refit the cover and tighten the two screws (do not over tighten).

- Remove the handset rubber protection cover to access the underside of the case cover; remove the four cross-headed screws and place to one side. Lift off the bottom cover and place to one side. Connect the smaller of the battery packs to the in-line connector and place the battery pack in the recess through the PCB; taking care to keep the supply cables from catching the cover. Position the cover and replace the four screws (do not over tighten). Refit rubber protection cover.

- Place the handset in the base station ensuring that it is pushed firmly into place and clips into the bottom securing clip.

  IMPORTANT: BATTERY PACKS SHOULD ALWAYS BE FITTED BEFORE THE CHARGER UNIT IS CONNECTED.

- Connect the mains charging unit into the round connector at the rear of the base station and the mains plug into a wall socket. With the mains switched on, the middle red LED on the top surface of the base station should illuminate to indicate that the base station is charging. The handset display will switch ON automatically and the battery symbol in the top right hand corner will indicate progressive charging.

- If applicable, while the batteries are charging, install the Analyzer software onto your PC (see *'Installation', page 46*).

- When fully charged the red base station LED will extinguish and the lower amber LED will illuminate to indicate the base station battery is on trickle charge until the charging unit is disconnected. Likewise, the battery symbol on the handset will remain static showing a fully charged battery, which will be on trickle charge until mains charging unit is disconnected.

⚠ **CAUTION: Before connecting the base station to the mains, ensure that you have read and fully understand the operating instructions given in this document.**

- Attach the exhaust sample probe to the water trap fitting (2) at the rear of the base station.

- 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.

Safe Removal and Disposal of Batteries
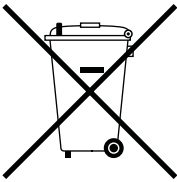
Ni-MH

Both the Base station and the handset use rechargeable Nickel Metal Hydride battery packs. The expected working life for each pack should be in excess of 18 months. Both packs are consumable spare parts and are designed to be replaced by the user. See *'Assembling the OmiScan Gas Analyzer', page 8* to see how to access the batteries.

CAUTION: Ensure both Handset and Base station are powered OFF and disconnected from charger Power supply BEFORE replacing battery packs!

LI-ION

The Handset also contains a Lithium button cell for time and date back up. This battery's life expectancy is in excess of 5 years. This battery should not be replaced by the user. This should be carried out by an Omitec Inc. authorized Service Agent.

⚠ CAUTION: DO NOT DISPOSE OF BATTERIES IN HOUSEHOLD REFUGE. SOME COMMUNITIES OFFER RECYCLING OR THE COLLECTION OF USED BATTERIES. CONTACT YOUR LOCAL GOVERNMENT FOR DISPOSAL PRACTICES IN YOUR AREA.

Introduction

OmiScan Gas Sample Probe

⚠️ *WARNING: Before attaching any OmiScan Gas probe to the test vehicle, ensure that you have read and understand the safety precautions listed earlier in this manual.*

Exhaust probe

The exhaust probe collects gas samples from the test vehicle exhaust, which are then analyzed by OmiScan Gas.

The probe connects between the Sample Gas Input fitting (item 2 under *'Assembling the OmiScan Gas Analyzer', 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.

⚠️ *WARNING: 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 4700/23) 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 *'System Checks', page 35*, for further details of a leak test).

Emissions Testing

Before attempting to test vehicle emissions levels, ensure that the base station and handset are fully charged (see *'Power Management', page 7*) for remote operation.

For on-road testing if the base station batteries are low, connect the base station to the vehicle supply cable (optional). With this configuration the batteries will not charge but the supply to the base station is maintained.

OmiScan Gas emissions testing can be undertaken by using the handset separated from, or in position on, the base station.

Handset Navigation

Press the 'Power up' buttons ⏻ on the base station and then on the handset, the handset screen displays the 'Main Menu' and lists the functions available:

- Gas Analyzer
- PC/USB Mode
- Settings
- Language

```
                MAIN MENU
        ▶Gas Analyzer
         PC/USB Mode
         Settings
         Lang. Idioma

                                  ✓
```

The handset will automatically start searching for the *Bluetooth*® Wireless Technology address specific to the base station. The handset and the base station are 'paired' together to prevent any interference or acquisition from other *Bluetooth*® Wireless Technology devices such as laptop PCs or mobile telephones. After a few seconds an antenna icon will appear in the top LH corner of the screen indicating that the *Bluetooth*® Wireless Technology link has been established. This icon will always be displayed whilst the link is made.

The battery icon in the top RH corner reflects the charge status of the handset battery pack.

NOTE: The battery icon will flash empty to indicate a low battery charge for either the handset or the base station - see 'Power Management', page 7.

The Main Menu has four options:

- Gas Analyzer - *Emission testing and analyzer system checks*
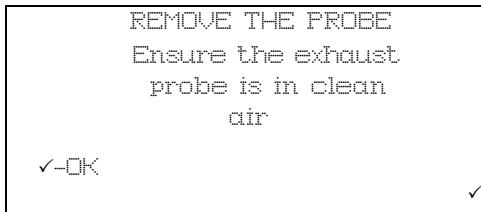- PC/USB Mode - *Used for down loading test result and updating handset*

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- Settings - *Results record, clock and general system settings*
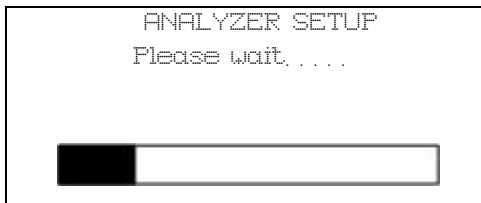- Language - *Allows the user to configure handset in English, French or Spanish*

Gas Analyzer

```
            MAIN MENU
  ▶Gas Analyzer
   PC/USB Mode
   Settings
   Lang. Idioma
                              ✓
```
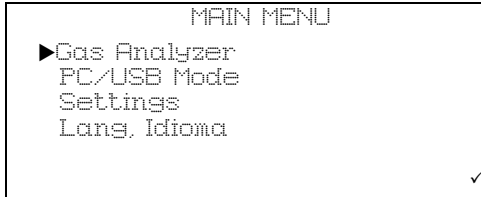
To access Emission Menu press the ✔ button with the ▶ pointing at Gas Analyzer.

```
        REMOVE THE PROBE
        Ensure the exhaust
         probe is in clean
               air
  ✓-OK
                              ✓
```

Follow the instructions and press the ✔ button.

```
        ANALYZER SETUP
        Please wait....


  ▮▮▮▮▮▯▯▯▯▯▯▯▯▯▯▯▯
```

The handset will display 'Analyzer SetUp - Please Wait' and a progress bar. On completion the progress bar will be replaced briefly by 'Passed'.

During this time the analyzer is initializing settings ready to conduct emissions testing. Once completed the display screen will change back to the 'Main Menu'.

The handset has an automatic power saving facility, if no action is taken after one minute the display backlight powers down. Pressing any button will turn the backlight back on. If the handset does not detect a button press for more than 15 minutes it will assume that the OmiScan Gas is not in use and the Base Station and the Handset will automatically power down.

NOTE: The automatic shutdown feature is disabled during 'Live Reading' test.
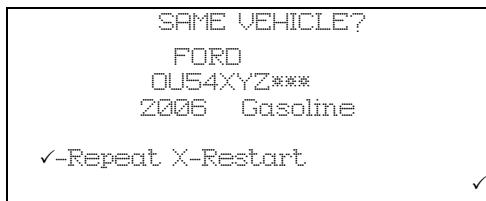

Manual Power Down

To power down both Handset and Base station at the same time, simply press and hold power button on handset for >1 second.
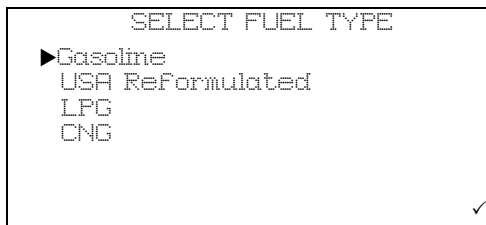
Live Readings

```
              GAS ANALYZER
        ▶Live Readings
         Simulated Tests
         System Checks


                                    ✓
```
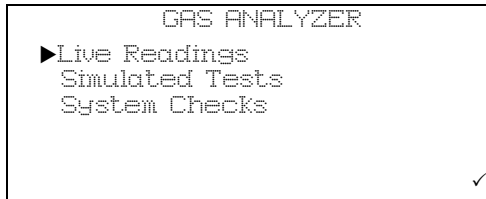
Press the ✓ again to enter the 'Gas Analyzer' menu and again to start 'Live Readings'.

```
             SAME VEHICLE?
               FORD
               OU54XYZ✻✻✻
               2006  Gasoline

        ✓-Repeat X-Restart
                                    ✓
```

The screen momentarily displays 'Live Readings', then 'Please wait' then asks the technician to 'Repeat' ✓ or 'Restart' ✗ a test, displaying the vehicle data from the last test: Manufacturer, Licence plate, year and fuel type.

NOTE: When using for the first time, there will not be any previous tests stored, therefore the handset will proceed directly to the series of screen reminders before starting a test.

For 'Repeat' see page 18, 'Restart' sequence follows.

```
            SELECT FUEL TYPE
        ▶Gasoline
         USA Reformulated
         LPG
         CNG


                                    ✓
```
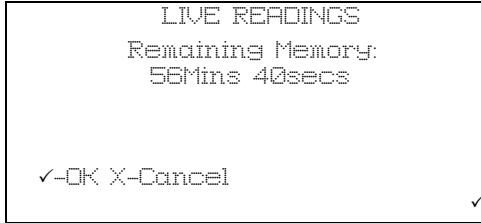
Other fuels offered are:

- Ethanol E85
- Methanol M85

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- Gasohol E10
- Gasohol E20

Pressing Restart ✗ will display a screen asking for fuel type.

```
        LIVE READINGS
      Remaining Memory:
        56Mins 40secs



 ✓-OK X-Cancel
                              ✓
```

The remaining memory will be shown. On pressing ✔-OK the series of screens and procedures will be displayed.
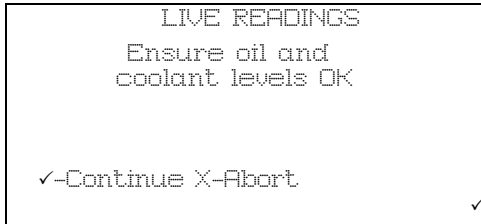
```
        LIVE READINGS
        Ensure oil and
       coolant levels OK



 ✓-Continue X-Abort
                              ✓
```

A series of screen reminders are displayed: 'Ensure oil and coolant levels OK', press ✔ to continue, or press ✗ to abort'.

```
        LIVE READINGS
      Ensure brake on and
        in neutral/park



 ✓-Continue X-Abort
                              ✓
```

'Ensure brake on and in neutral/park, press ✔ to continue, or press ✗ to abort'.

```
        LIVE READINGS
        Ensure engine is
        running and up to
             temp.

 ✓-Continue X-Abort
                              ✓
```

'Ensure engine is running and up to temp., press ✔ to continue, or press ✖ to abort'.

```
                HC HANGUP
         Ensure the exhaust
           probe is in clean
                   air


  ✓-OK
                                    ✓
```
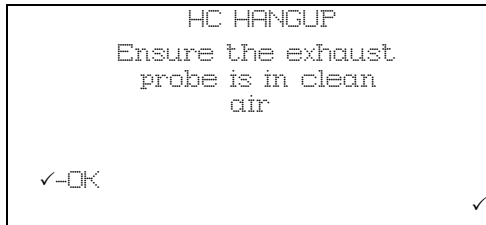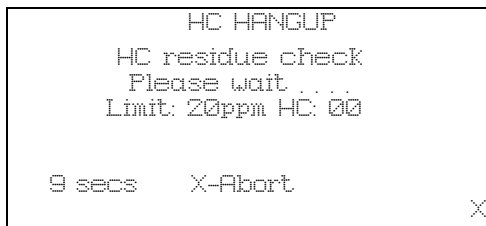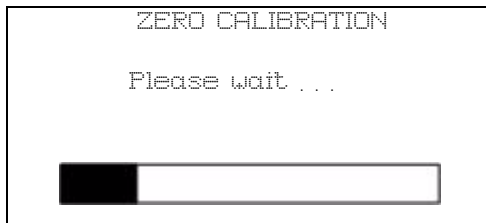
'HC HANGUP Ensure the exhaust probe is in clean air, press ✔ to continue.

```
                HC HANGUP
         HC residue check
          Please wait . . .
        Limit: 20ppm HC: 00


  9 secs    X-Abort
                                    ✕
```
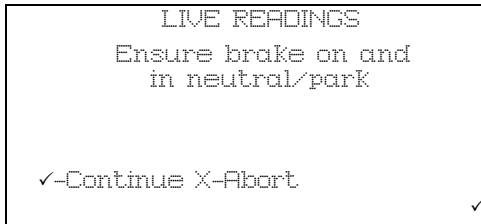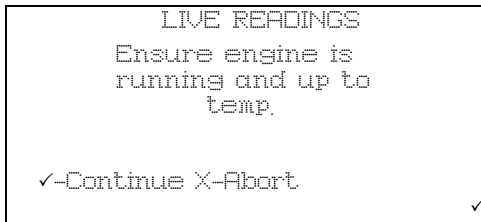
HC HANGUP' 'HC residue check', 'Please wait', 'Lim: 20ppm HC: XX', 'XXsecs', press ✖ - to abort. On completion of the countdown the screen will briefly display 'HC residue check passed.'

```
             ZERO CALIBRATION

           Please wait . . .


        ▮▮▮▮▮
```

The base station will automatically carry out a ZERO CALIBRATION, on completion the progress bar will be replaced briefly by 'Passed'.

```
               INSERT PROBE
         Exhaust probe check.
          Please wait . . . .


  ✓-Continue X-Abort
                                    ✕
```
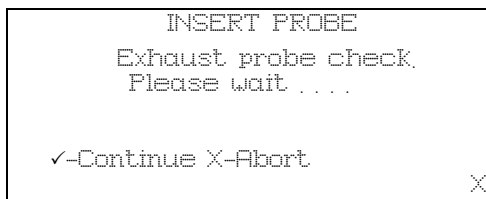
On completion there is a prompt to 'INSERT PROBE'.

Getting Started

```
              LIVE READINGS
   ▶Display All
    2 Gas Display
    1 Gas Display
    Exit Test
                                    ✕
```
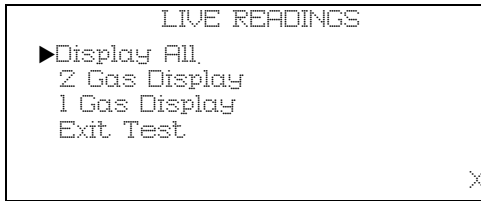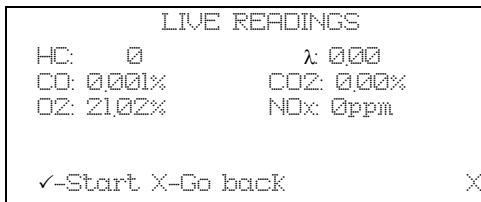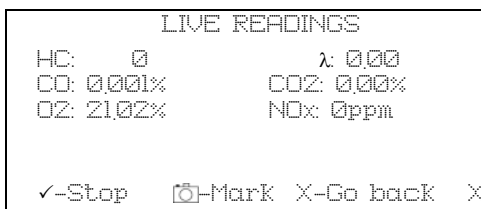
As soon as gas is sensed there is a request for the number of gases to display, all, two or one and also an 'Exit Test'.

If '1 Gas Display' or '2 Gas Display' is selected, an additional menu will be displayed listing the gases or outputs that can be displayed, which are CO, HC, O_2, CO_2, Lambda, NOx, Air Fuel Ratio (AFR) and corrected CO (COK).

To make a selection, scroll up or down and press ✔. In '2 Gas Display' option, the selection will be tagged with an arrow. To deselect press ✔ again. Once the second gas has been selected, the handset will exit the menu and display the selected gases.

```
              LIVE READINGS
   HC:    0            λ: 0.00
   CO: 0.001%        CO2: 0.00%
   O2: 21.02%        NOx: 0ppm

   ✓-Start X-Go back              ✕
```

On selection the screen will display the gas and the gas level in % or ppm, as appropriate.

```
              LIVE READINGS
   HC:    0            λ: 0.00
   CO: 0.001%        CO2: 0.00%
   O2: 21.02%        NOx: 0ppm

   ✓-Stop    📷-Mark  X-Go back  ✕
```

There is no fixed time for this test, however, there is a prompt to 'Start' and 'Stop' using the ✔ button. When sampling, a 'Mark' can be made at a specific point in the test by pressing the 📷 button. This will set a marker in the data that is displayed in the analyzer data graph on the PC.

```
        TEST RESULTS 1

        Live Readings
          Time: 09:11
        Date: Feb 20 08


  ✓-Save  X-Erase          X
```
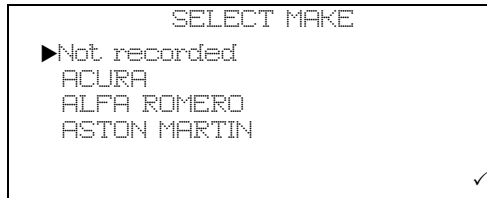
When stop is pressed the screen displays 'Test Result XX' 'Live Readings' 'Time:
XX:XX' 'Date: XX/XX/XX' press ✓ to save, or press ✕ to erase.

```
          SELECT MAKE
   ▶Not recorded
    ACURA
    ALFA ROMERO
    ASTON MARTIN

                          ✓
```

If saving, the next screen displays 'SELECT MAKE' and makes of vehicles can be
scrolled using the ▲ and ▼ buttons. Press ✓ to select the make.

```
         LIVE READINGS
       Enter Vehicle Year


           200X

  ✓-OK X-Cancel 📷- Move
                          ✓
```
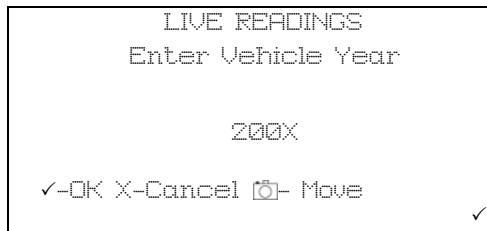
The next screen displays 'ENTER VEHICLE YEAR', 200X (model year) and the ▲
and ▼ buttons will scroll through the years, press ✓ to select the year, the bottom
line, i.e. ✓-OK ✕-Cancel 📷-Move will flash until ✓ is pressed to confirm.

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```
        LIVE READINGS
      Vehicle License No:

         *********
         ----------


 ✓-OK X-Cancel 📷- Move
                           ✓
```
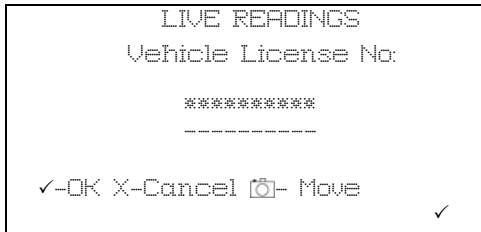
The next screen displays 'LIVE READINGS' 'Vehicle License No:' 'XXXXXXXXXX'. The ▲ and ▼ buttons will set each character from A to Z and 0 to 9, when the first character is correct press the camera 📷 button. Move to the next character and repeat the procedure until the registration number has been added press ✓. The bottom line, i.e. ✓-OK ✗-Cancel 📷-Move will flash until ✓ is pressed again to confirm.

```
        SELECT TYPE
 ▶Not recorded
  Sedan
  Coupe
  Convertible
                           ✓
```
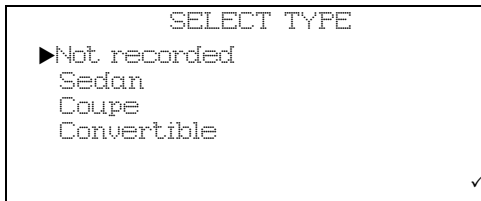
Next screen displays 'SELECT TYPE' and a list of vehicle type, eg. Hatchback, Sedan, Station wagon, Convertible, Coupe and 4x4.

```
        TESTER NAME
 ▶Not recorded
  TESTER 1
  TESTER 2
  TESTER 3
  TESTER 4
                           ✓
```
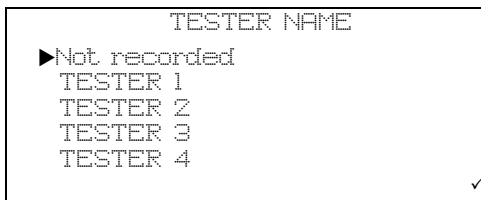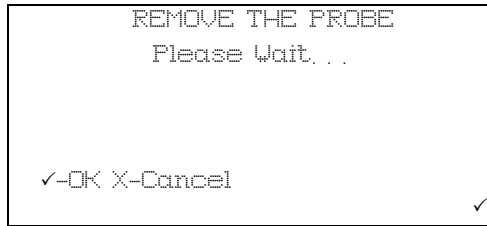
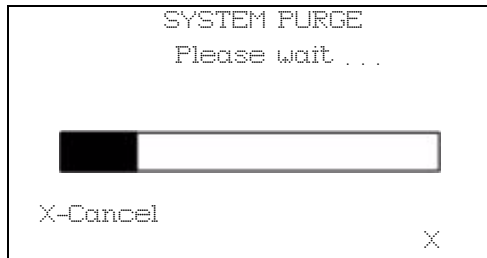The next screen displays 'TESTER NAME' and a list of stored testers, a default list shows 'Tester 1', 'Tester 2' etc.

```
        LIVE READINGS
      Remaining Memory:
        61Mins 43secs


 ✓-OK X-Cancel
                           ✓
```
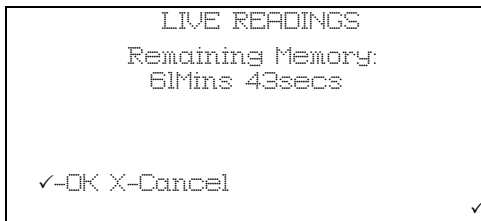
On selection of the tester the remaining memory is displayed.

```
        REMOVE THE PROBE
          Please Wait...




   ✓-OK X-Cancel
                              ✓
```
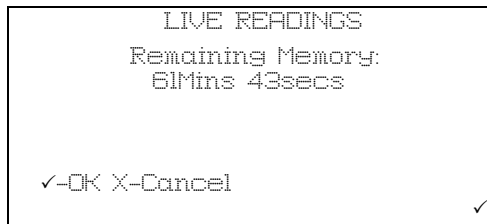
Pressing the ✓-OK will start a 'System Purge' procedure to remove any residual exhaust gases in the probe and pipework.

```
         SYSTEM PURGE
         Please wait ...


     ┌──────────────────────┐
     │████████             │
     └──────────────────────┘

   X-Cancel
                          ✕
```

On completion of the 'System Purge' the display will return to the Gas Analyzer menu.

If pressing 'Repeat' the following sequence will occur:

```
         LIVE READINGS
        Remaining Memory:
          61Mins 43secs



   ✓-OK X-Cancel
                              ✓
```

Pressing ✓ will display 'Remaining memory: XXMins XXsecs' ✓-OK, ✕-Cancel. If there is insufficient time available to complete another test the handset will need to have the existing files deleted (see *'Settings', page 37*). For 'Restart' see page 13.
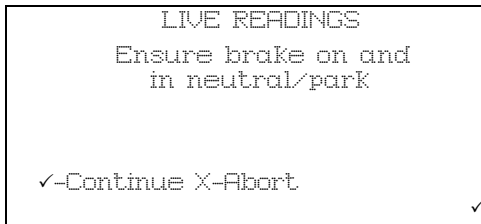
NOTE: If you have the PC option, make sure that any tests you wish to keep/analyze are down loaded to the PC before deleting the files.
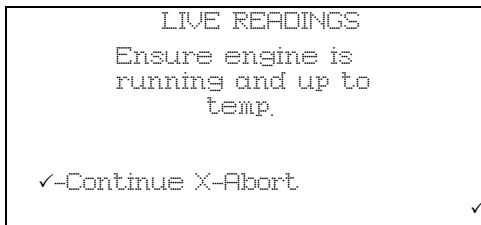
Getting Started
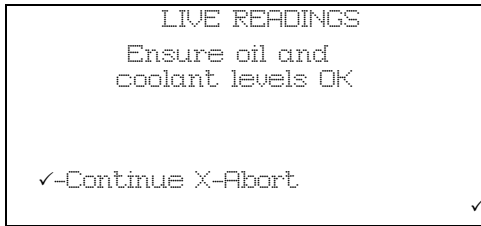
```
         LIVE READINGS
        Ensure oil and
       coolant levels OK



    ✓-Continue X-Abort
                            ✓
```
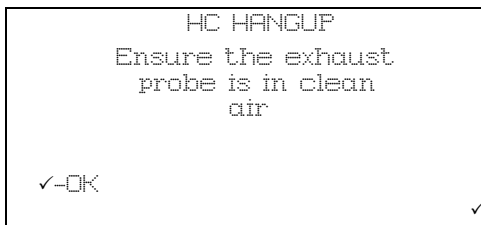
A series of screen reminders are displayed: 'Ensure oil and coolant levels OK', press ✓ to continue, or press ✗ to abort'.

```
         LIVE READINGS
       Ensure brake on and
         in neutral/park



    ✓-Continue X-Abort
                            ✓
```

'Ensure brake on and in neutral/park, press ✓ to continue, or press ✗ to abort'.

```
         LIVE READINGS
        Ensure engine is
        running and up to
             temp.


    ✓-Continue X-Abort
                            ✓
```
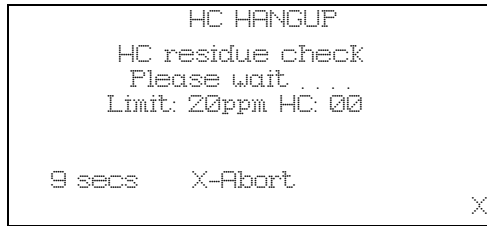
'Ensure engine is running and up to temp., press ✓ to continue, or press ✗ to abort'.

```
          HC HANGUP
       Ensure the exhaust
         probe is in clean
              air


    ✓-OK
                            ✓
```

'HC HANGUP Ensure the exhaust probe is in clean air, press ✓ to continue.

```
              HC HANGUP
          HC residue check
           Please wait . . .
        Limit: 20ppm HC: 00


       9 secs    X-Abort
                                  X
```
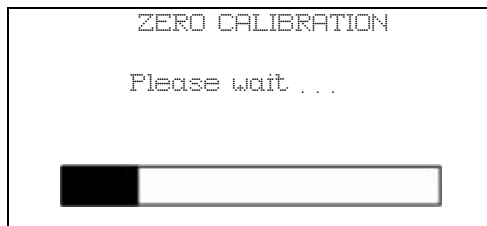
HC HANGUP' 'HC residue check', 'Please wait', Limit: 20ppm HC: XX', 'XXsecs', press ✗ - to abort. On completion the screen will briefly display 'HC residue check passed.'
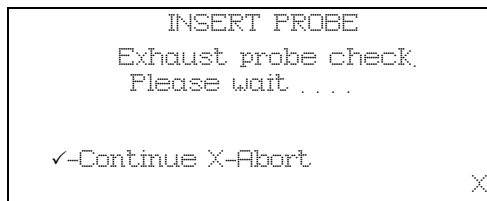
```
            ZERO CALIBRATION

            Please wait . . .


        ███████
```

The base station will automatically carry out a ZERO CALIBRATION, on completion the progress bar will be replaced briefly by 'Passed'.

```
              INSERT PROBE
          Exhaust probe check
           Please wait . . .


        ✓-Continue X-Abort
                                  X
```
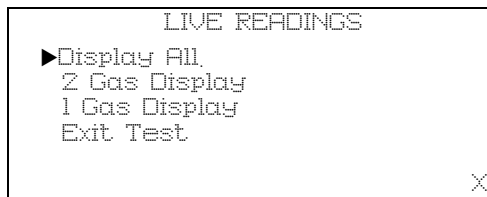
On completion there is a prompt to 'INSERT PROBE'.

```
            LIVE READINGS
        ▶Display All
         2 Gas Display
         1 Gas Display
         Exit Test
                                  X
```

As soon as a gas is sensed there is a request for the number of gases to display, all, two or one and also an 'Exit Test'.

Getting Started

If '1 Gas Display' or '2 Gas Display' is selected, an additional menu will be displayed listing the gases and outputs that can be displayed, which are CO, HC, O_2, CO_2, Lambda, NOx, Air Fuel Ratio (AFR) and corrected CO (COK).

To make a selection, scroll up or down and press ✔. In '2 Gas Display' option, the selection will be tagged with an arrow. To deselect press ✔ again. Once the second gas has been selected, the handset will exit the menu and display the selected gases.

```
              LIVE READINGS
   HC:    0           λ: 000
   CO: 0001%        CO2: 000%
   O2: 2102%        NOx: 0ppm


   ✓-Start X-Go back           X
```
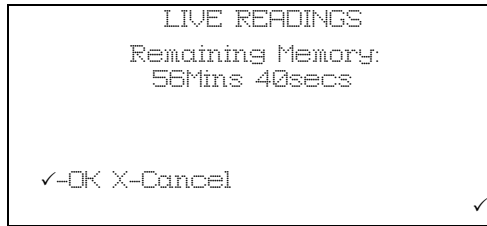
On selection the screen will display the gas and the gas level in % or ppm, as appropriate.

```
              LIVE READINGS
   HC:    0           λ: 0.00
   CO: 0001%        CO2: 000%
   O2: 2102%        NOx: 0ppm


   ✓-Stop   📷-Mark  X-Go back  X
```

There is no fixed time for this test, however, there is a prompt to 'Start' and 'Stop' using the ✔ button. When sampling, a 'Mark' can be made at a specific point in the test by pressing the 📷 button. This will set a marker in the data that is displayed in the analyzer data graph on the PC.

```
              TEST RESULTS 1
             Live Readings
               Time: 09:11
             Date: Feb 20 08


   ✓-Save  X-Erase               X
```

When stop is pressed the screen displays 'Test Result XX' 'Live Readings' 'Time: XX:XX' 'Date: XX/XX/XX' press ✔ to save, or press ✗ to erase.

```
        LIVE READINGS
       Remaining Memory:
        56Mins 40secs



  ✓-OK X-Cancel
                           ✓
```
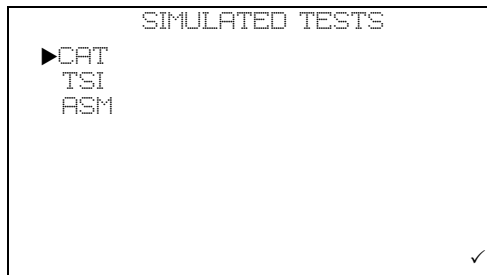
Pressing ✓ -Save will store the results and the screen will change to live readings available memory. Pressing ✓-OK will display the Gas Analyzer menu, after the 'remove probe' and system purge' screens.

Simulated Tests

```
        GAS ANALYZER
   Live Readings
 ▶Simulated Tests
   System Checks


                           ✓
```
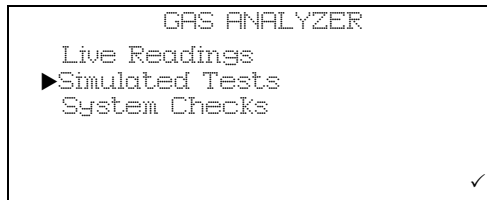
Simulated tests has three test procedures:

- CAT
- TSI
- ASM

```
        SIMULATED TESTS
 ▶CAT
  TSI
  ASM




                           ✓
```
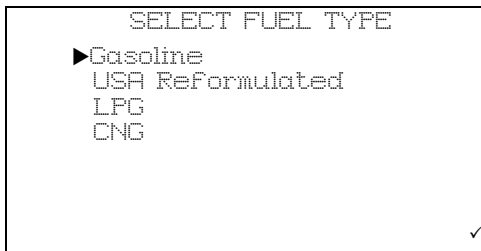
Note: The 4 Gas version of OmiScan Gas only offers TSI as NOx is not fitted. CAT and ASM require NOx readings.

Getting Started

CAT

In this test all five gases HC, CO, CO2, NOx and O2 are analyzed to gauge the performance of a Catalytic convertor. The test will report that the Catalytic convertor is good, suspect or if the gas readings suggest there may be another fault which may not be related to the Catalytic convertor (only available for 5-gas option).

```
                    CAT
              Please Wait . . .



```

```
           SELECT FUEL TYPE
         ▶Gasoline
          USA Reformulated
          LPG
          CNG


                                  ✓
```

Selecting petrol will start a sequence of screens, remaining memory, oil and coolant levels, hand brake and engine running and up to temperature. HC Hangup sequence will be started ending with a Zero Calibration and a prompt to insert probe into the exhaust pipe. The process will continue with fast idle.
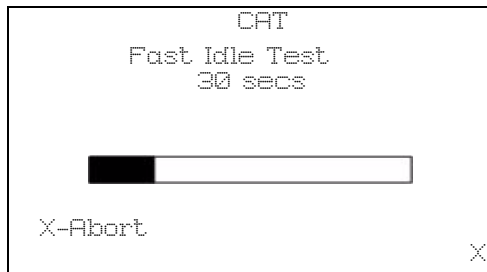
```
                    CAT
            Run engine between
              2500 - 3000 RPM



         ✓-OK X-Abort
                                  ✓
```

Open the throttle to increase engine speed to within the indicated RPM range.

```
              CAT
         Preconditioning
            5 secs

    ██████░░░░░░░░░░░░░░░░

    X-Abort
                          X
```
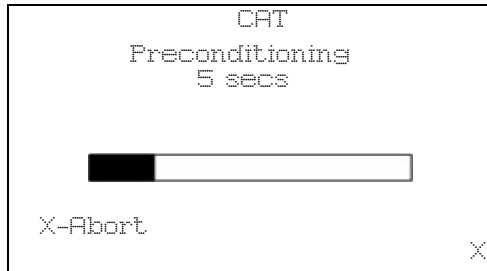
A short preconditioning before continuing the fast idle test.

```
              CAT
         Fast Idle Test
            30 secs

    ██████░░░░░░░░░░░░░░░░

    X-Abort
                          X
```

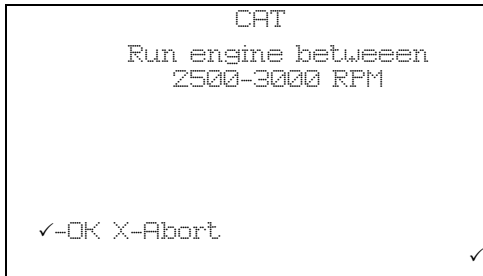If the gas level is within the limits the test will be complete and a report of 'Within Limits' will be displayed.

```
              CAT
        Outside Limits
          X = Quit
          ✓ = Extended test



                       ✓ or X
```
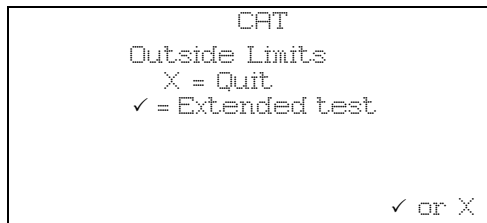
If the test fails an extended test can be started.
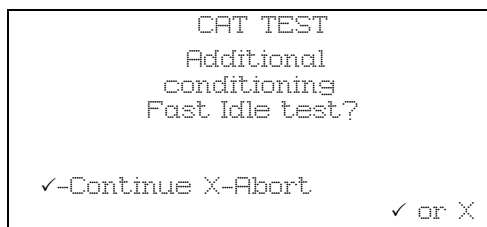
```
           CAT TEST
          Additional
          conditioning
         Fast Idle test?


    ✓-Continue X-Abort
                       ✓ or X
```
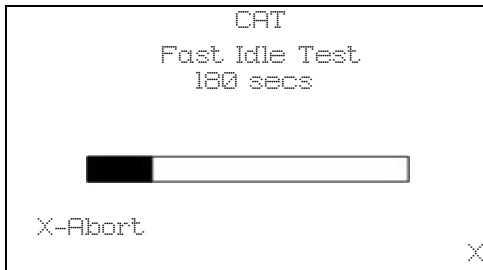
The additioning conditioning comprises an extended period at fast idle to ensure that the catalyzer is at the correct temperature to start and maintain the catalytic reaction.
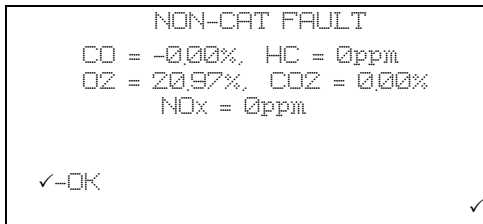
Getting Started

```
                    CAT
           Run engine betweeen
             2500-3000 RPM




     ✓-OK X-Abort
                                      ✓
```

The vehicle engine speed must be set to within the range indicated.

```
                    CAT
             Fast Idle Test
               180 secs


     ███████░░░░░░░░░░░░░░░░░

     X-Abort
                                      ✗
```

If the cat fails again a results page is displayed.

```
               NON-CAT FAULT
       CO = -0.00%,  HC = 0ppm
       O2 = 20.97%,  CO2 = 0.00%
             NOx = 0ppm

     ✓-OK
                                      ✓
```
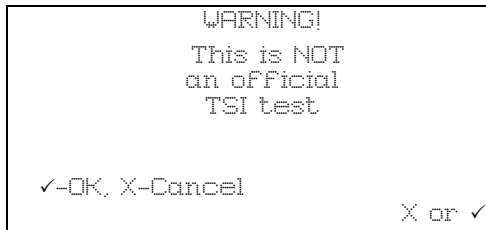
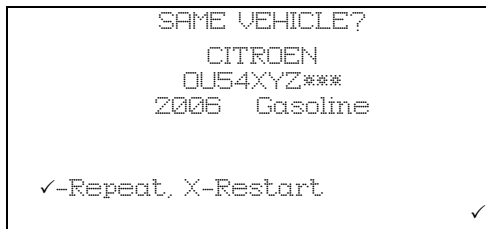The test results can be saved or erased as required.

TSI Test

This test simulates the 'first chance' IDLE and HIGH SPEED modes outlined in the EPA91 Two Speed Idle emissions test. The test is designed to allow the user to evaluate how a vehicle may perform when tested officially.

Note: This is not an official test.

```
              WARNING!
            This is NOT
            an official
             TSI test


  ✓-OK, X-Cancel
                        X or ✓
```

A warning screen displays the fact that this test routine is not an official test and can be used only as a guide to see if gas levels pass/fail the preset gas limits.

```
            SAME VEHICLE?
               CITROEN
               OU54XYZ***
            2006  Gasoline


  ✓-Repeat, X-Restart
                           ✓
```

The option to carry out the test on the last vehicle tested or a new vehicle will be offered. If a new vehicle is selected, you will be prompted for fuel type at the start of the test, so that the correct parameters can be set. At the end of the test, before saving the results you will be prompted for vehicle make, year etc. If the test is being carried out on the last vehicle tested then fuel type, vehicle make and year etc. will have already been saved by the handset and will be automatically added to the test result if it is chosen to be saved.

Getting Started

```
               TEST LIMITS
   TSI (Default)
   TSI (Custom 1)
   TSI (Custom 2)
```

The test limits to be applied can be selected from the next menu screen. Simply scroll down and press to select. Note TSI (Custom 1) and TSI (Custom 2) limits can be edited to suit testing requirements using PC Gas Analyzer Software – see *'Tests', page 61*' detailed in the PC Analyzer Software section of this manual.

```
               TEST LIMITS

   HC = 200ppm
   CO = 100%

   ✓-OK, X-Cancel
```

Test limits are displayed. Press ✔ to proceed or X to go back to Limit Menu screen to select other limits.

```
                   TSI

           Remaining Memory:
            59 mins 44 secs

   ✓-OK, X-Cancel
                           X or ✓
```

Remaining memory screen will be displayed. Note the TSI can require up to approximately 3 minutes to complete.

The handset will then detail the same preconditioning, HC hang, Zero Calibration and Insert Probe Screens as in other test routines before displaying:

```
            TSI TEST


    ALLOW VEHICLE SPEED TO IDLE
       BETWEEN 350 - 1100 RPM



    ✓-OK,    X-ABORT
```

Press ✓ to Start test.

```
            IDLE MODE

HC (200) = 54ppm
CO (100) = 0.05%



    77 Secs     X-ABORT
```

The test readings will be displayed along with a test countdown. Maximum duration of test mode is 90 seconds.

```
          WITHIN LIMITS

HC (200) = 54ppm
CO (100) = 0.05%


    ✓-OK,    X-ABORT
```

At the end of the IDLE Mode test the result will be displayed. Press ✓ to proceed to the HIGH Speed Mode part of the test.

```
            TSI TEST


      RUN ENGINE BETWEEN
        2200-2800 RPM


    ✓-OK,    X-ABORT
```

Screen prompts for the vehicle idle speed to be raised and maintained between an upper and lower limit for the duration of the HIGH Speed Mode of the test. Press ✓ to proceed.

Getting Started

```
            HIGH SPEED MODE

HC (200) = 54ppm
CO (1.00) = 0.05%


77 Secs    X-ABORT
```

The test readings will be displayed along with a test countdown. Maximum duration of test mode is 90 seconds.

```
            WITHIN LIMITS

HC (200) = 54ppm
CO (1.00) = 0.05%


✓-OK,    X-ABORT
```

At the end of the HIGH SPEED Mode test the result will be displayed. Press ✓ to proceed.

```
            TSI TEST RESULT

              WITHIN LIMITS


✓-OK,    X-ABORT
```

The overall result of the TSI test will be displayed. Press the 'Camera' button to see a summary of both modes of the test. Press ✓ to proceed.
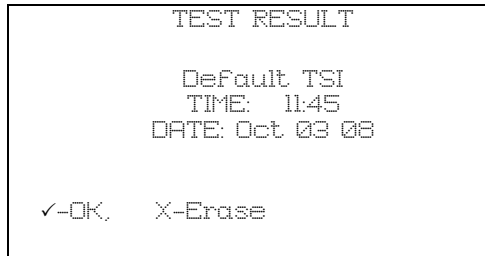
```
          TEST RESULT


          Default TSI
          TIME:   11:45
        DATE: Oct 03 08


    ✓-OK.   X-Erase
```

Press ✓ to save or X to discard. If the test was carried out on a new vehicle the screen will prompt for make, year etc. before returning to the Simulated Test Menu. If the test was carried out on the last vehicle tested then the screen will revert straight back to the Simulated Test Menu.

ASM Test

This test simulates measurement and analysis carried out during a 'Acceleration Simulation Mode' Test as outlined in specification EPA420-B-04-011. The gases measured are CO, HC and NOx. The test is designed to allow the user to evaluate how a vehicle may perform in an official test.

Note: This is not an official test.
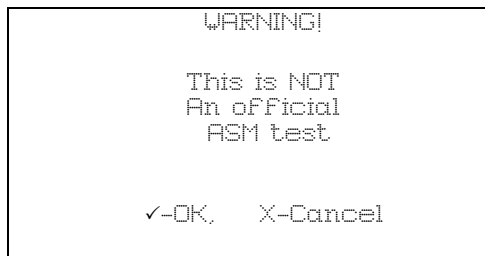
```
          WARNING!


          This is NOT
          An official
           ASM test


    ✓-OK.    X-Cancel
```

A warning screen displays the fact that this test routine is not an official test and can be used only as a guide to see if gas levels pass/fail the preset gas limits.

```
        SAME VEHICLE?
          CITROEN
          OU54XYZ***
        2006  Gasoline


    ✓-Repeat, X-Restart
                          ✓
```

The option to carry out the test on the last vehicle tested or a new vehicle will be offered. If a new vehicle is selected, you will be prompted for fuel type at the start of

Getting Started

the test, so that the correct parameters can be set. At the end of the test, before saving the results you will be prompted for vehicle make, year etc. If the test is being carried out on the last vehicle tested then fuel type, vehicle make and year etc. will have already been saved by the handset and will be automatically added to the test result if it is chosen to be saved.

```
        TEST LIMITS


        ASM (Default)
        ASM (Custom 1)
        ASM (Custom 2)
```

The test limits to be applied can be selected from the next menu screen. Simply scroll down and press ✔. Note ASM (Custom 1) and ASM (Custom 2) limits can be edited to suit testing requirements using PC Analyzer Software – see *'Tests', page 61'* detailed in the PC Analyzer Software section of this manual.

```
        TEST LIMITS

        HC = 150ppm
         CO = 150%
        NOx= 1000ppm

    ✔-OK,   X-Go back
```

Test limits are displayed. Press ✔ to proceed or X to go back to Limit Menu screen to select other limits.

```
        DEFAULT ASM

        Remaining Memory:
          54mins 56 secs

    ✔-OK,   X-Cancel
```

Remaining memory screen will be displayed. Note the ASM can require up to a minute and a half to complete.

The handset will then detail the same preconditioning , HC hang , Zero Calibration as in other test routines before displaying:

```
               PLEASE ENTER

           Amb. Temp.   68 F

           Rel. Humidity 45%

  ✓-OK.  X-Cancel 'Camera' - Redo
```

The test requires values for both Ambient Temperature and Relative Humidity to be entered. These parameters are required for a Humidity correction factor which is applied to the NOx readings. Use the Up and Down keys to alter each reading then press ✓ enter. When both values have been entered the bottom line of the display will flash. Either press ✓ confirm or 'Camera' to change value.

The Handset will then display the Insert Probe Screen before displaying screens advising on precautions that should be taken if the ASM test is being conducted during a road test.

WARNING – SAFETY PRE CAUTION: ANY ASM TEST CARRIED OUT DURING A ROAD TEST SHOULD BE CONTROLLED BY A PASSENGER AND **NOT** THE DRIVER.

```
              ASM TEST

          If Road Test ensure
            Probe is fitted
               securely

          ✓-OK.    X-Abort
```

```
              ASM TEST

          If Road Test ensure
          Analyser exhaust is
         vented out of vehicle

          ✓-OK.    X-Abort
```

The handset will prompt for the vehicle to be bought to the load or speed for the test.

Getting Started

```
        ASM TEST

       Set vehicle to
     Desired speed/load


     ✓-OK,    X-Abort
```

Press ✔ to Start test.

```
        ASM TEST

     HC (150) = 75ppm
     C0 (100) = 0.30%
    NOx (1000) = 120ppm

     77 Secs    X: Abort
```

The test readings will be displayed along with a test countdown. Maximum duration of test mode is 90 seconds.

```
      WITHIN LIMITS

     HC (150) = 75ppm
     C0 (100) = 0.30%
    NOx (1000) = 120ppm

        ✓-Continue
```

At the end of the test the handset will display the result either 'Inside Limits' or 'Outside Limits'. Press ✔ to enter Save Result screen.

```
       TEST RESULT

       Default  ASM
        TIME: 11:45
      DATE: Oct 03 08

     ✓-OK, X-Erase
```

Press ✔ to save or X to discard. If the test was carried out on a new vehicle the screen will prompt for make, year etc. If the test was carried out on the last vehicle tested then the result will be saved with the previous details. Once the test result has been saved or discarded the handset will display a revised 'Remaining Memory' screen before offering the option to 'Repeat Test'.

```
        WITHIN LIMITS

        Repeat Test?



      ✓-OK, X-Finish
```

```
        REMOVE PROBE

      Ensure vehicle is
        Stationary and
      Parking brake on


           ✓-OK
```
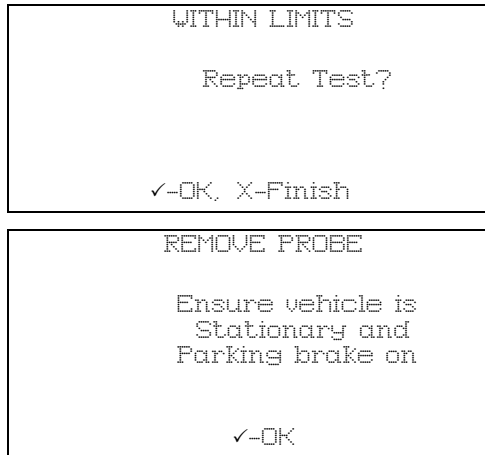
If the option to finish test is taken the handset will display a prompt to remove the probe when the vehicle is stationary.

The Analyzer will automatically detect the probe being removed before conducting a 'System purge' then returning to 'Gas Analyzer' Menu.

System Checks

```
        GAS ANALYZER
   Live Readings
   Simulated Tests
 ▶System Checks


                        ✓
```
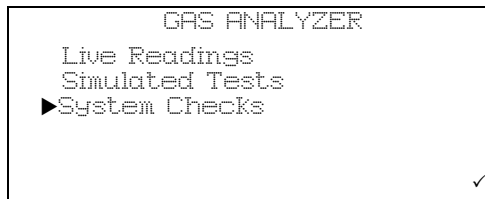
There are eight system checks:

- Leak Test
- Manual HC HangUp
- Display PEF
- Environmental Data
- O_2 Cell Functions
- Zero Calibration
- Base Stn Battery
- Bench Data
- 4/5-gas setup

Getting Started

Leak Test - Follow on screen instruction to check integrity of water trap and probe.

Manual HC Hangup - Follow the on screen instructions to clear the system of residual HC gas.

```
          BENCH PEF VALUE

      0.533



  ✓-OK                         ✓
```
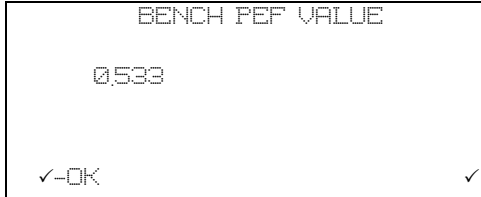
Display PEF - Displays the current Petrol Equivalent Factor.

Environmental Data - This function is for use by a calibration engineer and has no user functionality.

O_2 Cell Functions - There are two items:

- Oxygen Cell Value
    - Displays the output sensor voltage in mV
- Renew Oxygen Cell
    - This resets the cell error code and recalibrates the analyzer with the new cell (see *'Oxygen cell replacement procedure', page 75*)

Zero Calibration - Follow the on screen instructions to zero the measurement gases by reading fresh air.

Base Stn Battery - Displays current base station battery level and whether or not it is being charged 0 for off charge, >200 if on charge.

```
          BENCH DATA
  ID: 01        S/W Rev: X4
        SerNum: 0000196
        Date: Oct 12 2007

  ✓-OK                         ✓
```
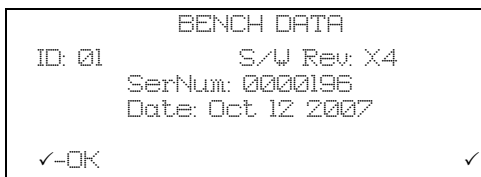
Bench Data - Provides data about the gas bench, has no user functionality.

```
          BUILD STATE
        Bench is 5-Gas
        (NOx cell fitted)


  ✓-OK                         ✓
```

4/5-gas setup - This indicates whether or not a NOx sensor has been fitted, which will determine if the CAT simulated test is activated.

PC/USB Mode

```
        PC/USB MODE
     Ensure USB cable is
     connected to the PC
       and the Handset


  X-Cancel                X
```
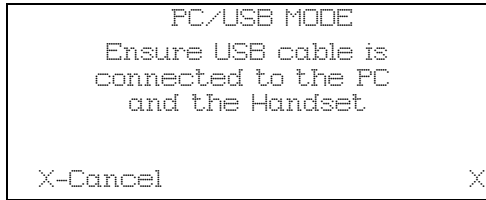
Simply follow on screen instructions.

Settings

```
        SETTINGS
  ▶Manage Files
   Display Clock
   Change Contrast
   View Thresholds
                         X
```

Under 'Settings' there are seven items:

• Manage Files

• Display Clock

• Change Contrast

• View Thresholds

• Wireless Setup

• S/W Version

• Factory Default

Getting Started

Manage Files

```
                MANAGE FILES
        ▶Summary
         List by Date
         List by Plate
         Actions

                                    ✕
```
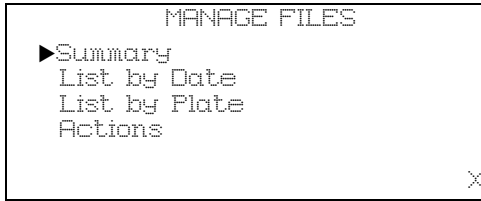
There four items under Manage Files:

- Summary
- List by Date
- List by Plate
- Actions

```
            STORAGE SUMMARY
        2 results
        Mem Left:   61m 43s



        ✓-OK
```
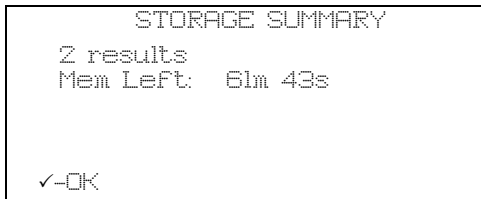
The 'Summary' screen displays the number of results stored and the amount of time left in memory, to exit from the screen press ✓.

```
            ✓-VIEW ✕- GOBACK
        ▶02/05/08   10:50
         01/31/08   14:20



                                    ✓
```
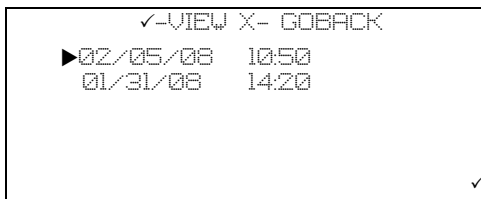
The 'List by Date' screen displays the list of stored tests by date in MM/DD/YY and time of the test. Each result is also listed by 'Last Test First'. Where relevant, a test result will be listed, e.g. CAT test may list 'CAT OK' or 'Suspect CAT'. The integrity of the data saved will also be listed, e.g. if the test is cut short. To select a test use ▲ or ▼ keys, to view the test details press ✓ - VIEW or to return to 'Manage Files' menu press ✕ - GOBACK. When viewing files the following data is displayed: Date and time (of test), Plate (License No.), Type: (live Readings, Simulated tests), Durn: (length of test), Manuf: (vehicle manufacturer), Year (vehicle MY), Fuel: (fuel type), Class: (sedan, station wagon, 4x4 etc.), Opr: (name of the Technician carrying out the test).

```
          ✓-VIEW X- GOBACK
        ▶OU54XYZ***
         __


                              ✓
```
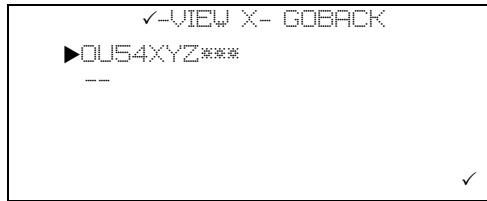
The 'List by Plate' screen displays the list of stored by license plate (Registration N°). Each result is also listed by 'Last Test First'. Where relevant a test result will be listed, e.g. CAT test may list 'CAT OK' or 'Suspect CAT'. The integrity of the data saved will also be listed, e.g. if the test is cut short. To select a test use ▲ or ▼ keys, to view the test details press ✓ - VIEW or to return to 'Manage Files' menu press ✗ - GOBACK. When viewing files the following data is displayed: Date and time (of test), Plate (Registration No.), Type: (live Readings, Simulated tests), Durn: (length of test), Manuf: (vehicle manufacturer), Year: (vehicle MY), Fuel: (fuel type), Class: (sedan, station wagon etc.) and Opr: (name of tester).

```
          TEST RESULTS
        ▶Delete all



                              ✓
```
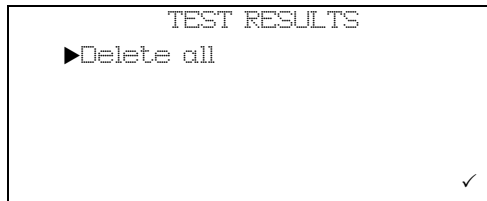
The 'Actions' screen displays 'TEST RESULTS' and 'Delete all' the bottom right of the screen will alternately display ✓ and ✗. Press ✓ and the screen will display 'DELETE FILE' 'Do you really want to delete ALL results?'. Press ✓ to delete and ✗ to return to 'Manage Files' menu.

Display Clock

```
          DATE AND TIME
        Mon 11/02/08   15:05:26

        ✓-OK
        X-Set Clock
                              ✓
```
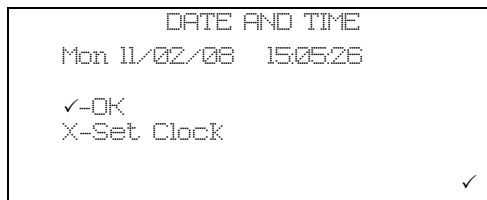
When you select 'Display Clock' the screen displays 'DATE AND TIME' and the day, date, and time in hours/mins/secs. If date and time are correct, press ✓ - 'OK' returns to the 'Settings' menu, press ✗ - 'Set Clock' will allow you to change the year, month, day and time.

Getting Started

```
        SET DATE AND TIME
 YY 200X          DAY Wed
   MM Feb          hh 11
   DD 27           mm 07

 ✓-OK,  X-Cancel
                            ✓
```
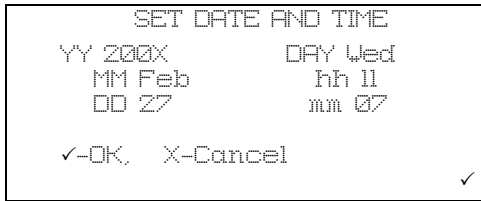
The screen will display 'SETUP DATE AND TIME', 'YY 200X', 'X' will flash to indicate that it can be changed by using the ▲ and ▼ will increase or decrease the number. When the next number needs to be changed, e.g. if the year is 2009 and needs to be changed to 2010, the 9 will flash, when changed to 0, press the ⌷ to move to the preceding number to change that to 1; this procedure is used for days, hours and minutes. When the correct year is set, press ✓ and cursor moves to 'MM' and 'XXX' will flash, month can be set by using the ▲ and ▼ buttons until the correct month is set, press ✓. 'DD', 'Day', 'hh', 'mm' are changed and set in the same manner. On completion of setting 'mm', the bottom line containing ✓ - OK, ✗ - Cancel will flash, press ✓ to accept the settings and return to 'DATE AND TIME' screen, press ✗ to abort settings and return to 'DATE AND TIME ' screen.

Change Contrast

```
        CHANGE CONTRAST
 ↑-Increase
 ↓-Decrease
 ✓-OK
 X-Cancel
                            ✓
```
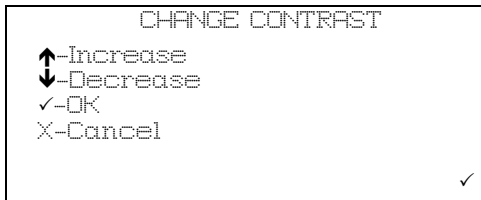
When you select 'Change Contrast', the screen displays 'CHANGE CONTRAST' and there are four options press ▲ to increase, ▼ to decrease, ✓ - OK to retain changes and return to 'Settings' menu, or ✗ - Cancel to exit without saving changes and return to 'Settings' menu.

View Thresholds

```
            CAT DEFAULT
    CO<03%     HC<200
    O2<100%    CO2>14.0%
           NOx<100


  ✓-OK, X-Cancel
```
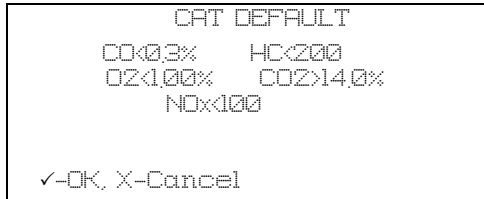
When you select 'View Thresholds' the screen will display the threshold levels of the various gases for all of the simulated test procedures, TSI Default, Custom TSI 1, Custom TSI 2, ASM Default, Custom ASM 1, Custom ASM 2 and CAT. Press ✔ to toggle through thresholds one at a time.

Wireless Setup

```
          WIRELESS SETUP
   ▶Base Station



                              ✓
```

When you select 'Wireless Setup' the screen will display 'WIRELESS SETUP' with item:

- Base Station

```
          WIRELESS SETUP
        Set base station
             address
          008098E5CCBC
  ─────────────────────────────
  ✓-OK X-Cancel ■-Move
                              ✓
```
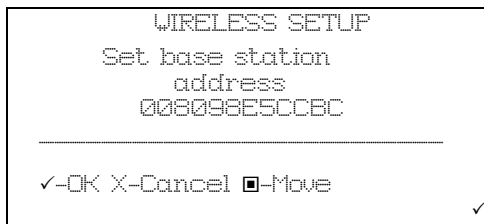
In 'Base Station' the screen displays 'Set base station address', e.g. '008098E5CCBC' (this address is preset on build and would not normally require changing). The address is an alphanumerical address and ensures that the handset talks only to that *Bluetooth*® Wireless Technology address. The *Bluetooth*® Wireless Technology address should be written in the Quick Guide in the area provided. Use the ▲ and/or ▼ on the handset to set each address character; when correct, press the 📷 button to move to the next character. On completion of entering all of the characters, press ✔ to save, the bottom line (✓-OK X-Cancel ■-Move) will flash until ✔ is pressed again to confirm the address and exit. Press ✖ to cancel change and exit.

Getting Started

S/W Version

```
            S/W VERSION

              00:01:31



   ✓-OK
                                      ✓
```

With selection of 'S/W Version' the screen will display the current down loaded handset software version; for example 00:01:31. This is not a user changeable item, press ✓ to exit.

Factory Defaults

```
          FACTORY DEFAULTS

              WARNING:
        Lists downloaded From
           PC will be lost


   ✓-OK, X_Cancel
                                      ✓
```
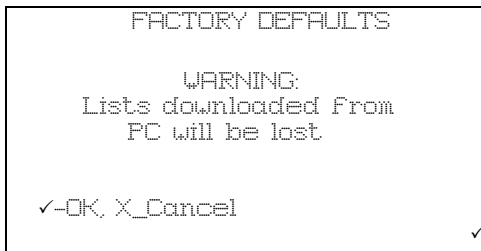
With selection of 'Factory Defaults' pressing ✓ will over write any lists that have been downloaded from the PC. Lists that are affected are: Tester Name, Vehicle Type and Vehicle Make.

Note: Stored test results will not be affected by this function.

Language Selection

```
            MAIN MENU
     Gas Analyzer
     PC/USB Mode
     Settings
   ►Lang. Idioma

                                      ✓
```
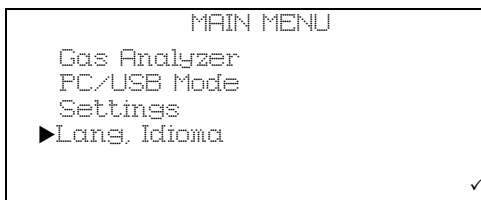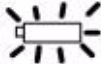
When selected the handset reverts to the Language Select Menu.

```
              LANG, IDIOMA
    ▶US English
     Français
     Español


                                    ✓
```
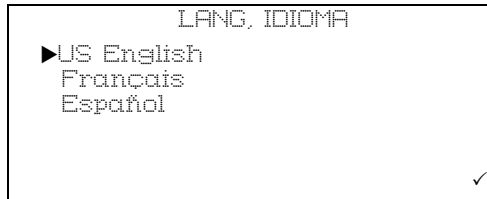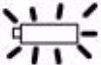
To select language simply scroll down menu then press ✔. The handset will automatically change language and then return to the Main Menu.

Low Battery Indication

Base station Low Battery - *The battery icon* on the handset flashes empty *and the 'POWER/LO BATT' LED on the base station flashes*.

```
    ☀ POWER / LO BATT
    ○ FAST CHARGE
    ○ TRICKLE CHARGE
```

Handset Low Battery - *The battery icon* flashes empty and the 'POWER/LO BATT' LED on the base station is not affected.

```
    ○ POWER / LO BATT
    ○ FAST CHARGE
    ○ TRICKLE CHARGE
```

The low battery warning is five minutes, if the analyzer is not either placed on charge or switched OFF within that time, the base station will power down automatically, in this event the handset will display the following screen.

```
              COMMS LOST
        Test terminated.
         Some data lost.
         Low Battery


    ✓-OK
                                    ✓
```
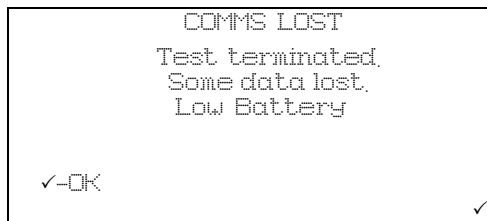
Getting Started

Press ✔ to proceed and the handset will prompt you to save the results and to remove the probe from the exhaust.

Note: Any saved data will state 'Some Data Lost' due to loss in Communications when the base station is powered down. Likewise, if the data is analyzed on the PC software, any data lost will be clearly indicated and all the gas readings for that part of the test will be recorded as zero. After data has been either saved or discarded, the handset will automatically shut down.

Out of Range

The OmiScan Gas should function normally with the handset up to at least 10 metres (30 feet) away from the base station. However, if the handset is taken out of range the display communication icon will disappear and the following text will be displayed:

```
              WARNING

         Base station out of
              range



   X-Abort
                              X
```
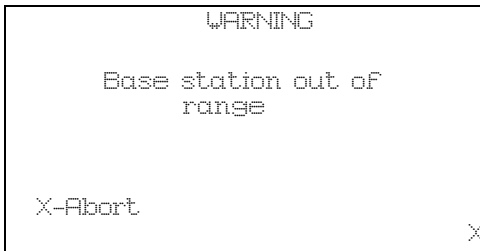
If the handset is taken back within range within a few seconds, the handset will revert to the previous screen shown before it was taken out of range.

```
            LIVE READINGS

           Some data was lost
            during the test
           due to signal loss

   ✓-OK
                              ✓
```
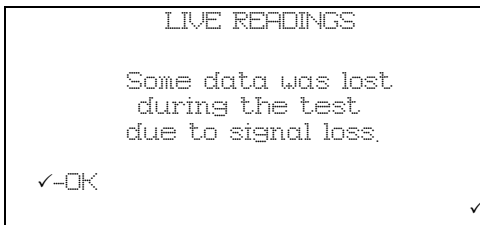
At the end of the test the handset will give a warning 'Some Data Lost' giving the option to save the test.

Note: Any saved data will state 'Some Data Lost' due to loss in communications when the base station is powered down. Likewise, if the data is analyzed on the PC software, any data lost will be clearly indicated and all the gas readings for that part of the test will be recorded as zero.

```
        TEST RESULT 3

        Live Readings
          Time: 14:07
        Date: Feb 21 08

  ✓-Save   X-Erase
                             ✓
```

If, when out of range, the handset stays out of range the message above will be displayed.

```
        LIVE READINGS

       Test terminated
       due to signal loss



  ✓-OK
                             ✓
```

You will be given the option of saving the data that was captured up to the point of lost communications.

PC Gas Analyzer Software

System requirements

The minimum PC system requirements to load the OmiScan Gas Analysis Utility software are:

- Windows Server 2003, Windows Vista Business, Windows Vista Business 64-bit edition, Windows Vista Enterprise, Windows Vista Enterprise 64-bit edition, Windows Vista Home basic, Windows Vista Home Basic 64-bit edition, Windows Vista Home Premium, Windows Vista Home Premium 64-bit edition, Windows Vista Starter, Windows Vista Ultimate, Windows Vista Ultimate 64-bit edition, Windows XP Service pack 2 or later.

  Required software: Windows Installer 3.1 or later is recommended.

  IE 6 or later (required for loading .NET Framework).

- Intel or AMD 1200MHz processor or higher
- 512 MB RAM (This is the recommended requirement by MS for the above operating systems)
- 330 MB (x86), 660 (x64) of free disk space

  1024 X 768 minimum screen resolution

  CD ROM or DVD Combo drive

  USB 2.0

The requirements above are the minimum, the higher the PC specification the better the operation of the analysis software.

Installation

The PC software, including the necessary drivers for the handset USB connection, are on the CD that is supplied as part of the OmiScan Gas PC kit.

Insert the CD into the CD drive of the PC and the installation program should AutoStart, if there is no response, start Windows Explorer, click on the CD drive and identify the setup.exe file. Double click on this file and the installation should now proceed.

Using the Software

Double click on the OmiScan Gas icon on the desktop. The OmiScan Gas application will start to load. You can also use the 'All Programs' menu to access the application; press the start button at the bottom left hand side of the screen, press 'All Programs'. From the displayed list select Omitec\OmiScan Gas\OmiScan Gas Analysis Utility.

Analyzer Software Functions

The OmiScan Gas Analyzer provides the facility to view the data collected by the OmiScan Gas handset, which is transferred to the PC. The data is analyzed in bar or line graph format.
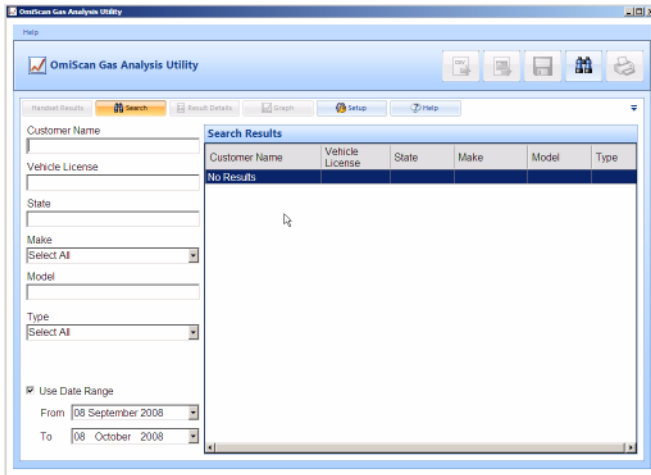
The title bar displays 'OmiScan Gas Analysis Utility' and five 'buttons':

- CSV File 🖼 - Export the current test as a Comma Separated Values (CSV) file
- Bitmap file 🖼 - Export the currently visible graph section as a bitmap
- Save 🖫 - Saves the test currently being quick viewed
- Search 🔍 - Searches the tests saved to PC using the selected search criteria
- Print 🖨 - Prints the test details and the visible graph section

The buttons will be 'disabled' if they are not applicable to the function currently on screen.

There are six tabs to select screens and the default screen is 'Search', which is the second of the tabs:

- Handset Results
- Search
- Results Details
- Graph
- Setup
- Help

Handset Results

When the handset is connected to the PC with the USB cable, communication with the handset is established; the left hand pane displays all of the stored vehicle test results in the handset identified by test type, date, license plate details and manufacturer. The right hand side displays three icons representing the functions of

'Save data' 🖫, 'Display data' 🖵 and 'Delete data' 🏷. To activate any of these functions, click and hold the left mouse button over the data item, drag the item over the desired function, release the left mouse button.

Note: Handset Results tab will be disabled if the handset is not connected.
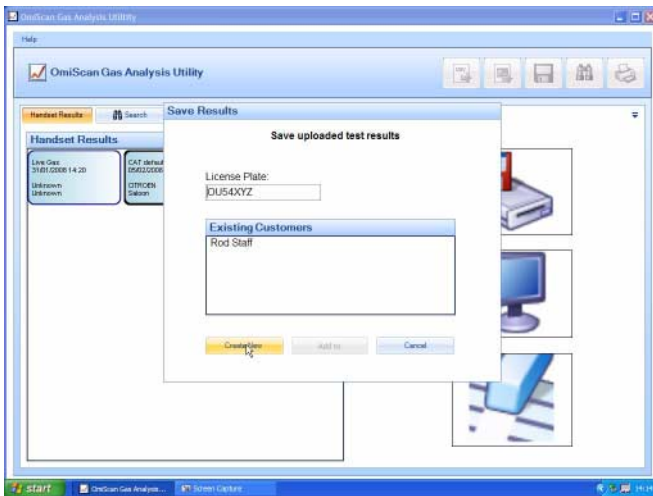
'Save Data' will display a dialog box prompting you to select either 'Create New' or 'Add To' one of the list of existing customers. When the data is saved the screen will automatically change to 'Results Detail'. To use the 'Add To' save option the license number, or part of it, must be entered.
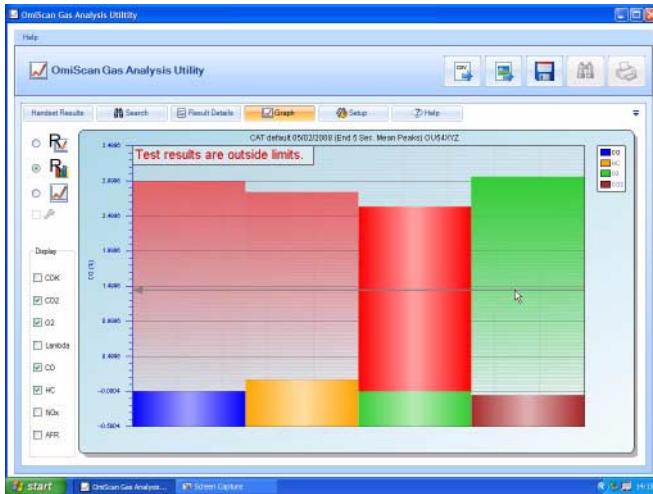
'Display Data' will automatically load the data into the 'Graph' screen. The 'Save' button in the title bar is now activated and when pressed displays the same dialog box as in 'Save Data' above.
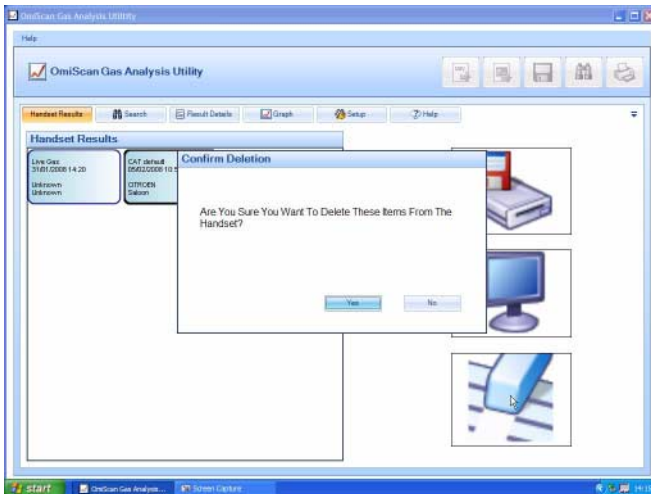
'Delete Data' displays a dialog box asking you to confirm deletion.

PC Gas Analyzer Software

Search
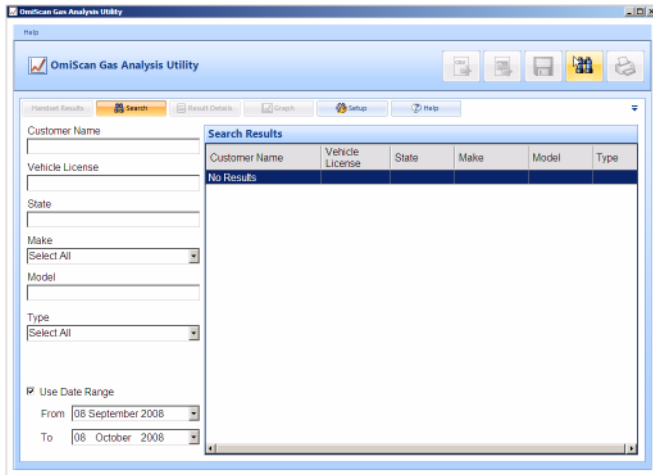
'Search' allows stored data to be retrieved for later analysis, reference, historical recall etc. A general search for all stored data files can be started by pressing the 'Search' button (binoculars).
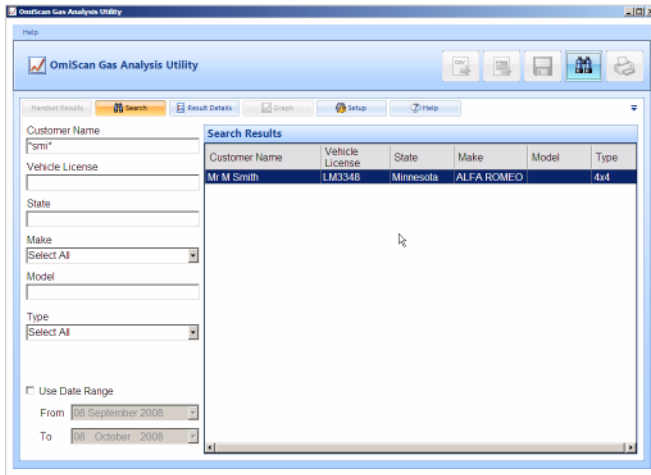
A specific search can be initiated from one or all of the following input cells:

- Customer Name
- Vehicle License
- State
- Make
- Model
- Type
- Use Date Range with 'From' and 'To' date selection

Any text item used as a search parameter can have a 'wildcard' character '*' within it if the whole text is not known. For example, if searching for a vehicle but the whole registration is not known, entering 'OU5*' will match with any registration staring with those characters.

With data input, pressing either 'Enter' on the keyboard or the 'Binocular' button in the title bar will invoke a search with the result/s displayed on the right hand side of the screen.

Select and double click on a file and the screen will change to 'Result Detail'. The left pane will list all of the tests completed on the vehicle; the test list is expanded by double clicking on the '+' sign. Double clicking on a specific test will change the screen to 'Graph' displaying the data from that test. Selecting a test and then clicking on the 'Graph' tab will also display that data in graphical detail.

PC Gas Analyzer Software

Results Detail

The 'Results Detail' saves the test data under the vehicle rather than customer, therefore any new data from an already saved vehicle will be added to the vehicle records. The vehicle records are listed in the left pane in three areas.
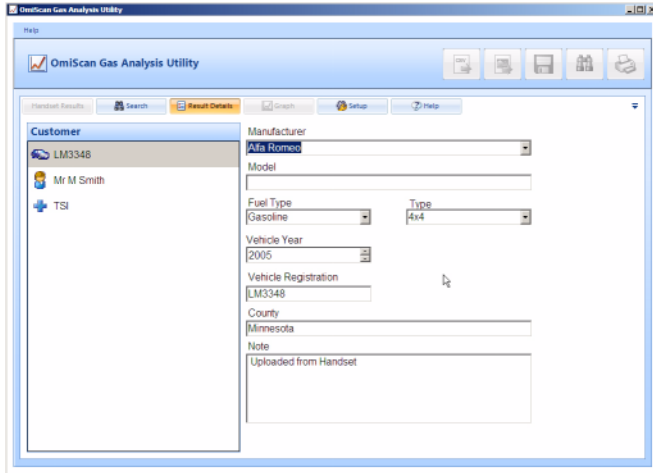
Car Symbol (License)

- This lists details of make, type, year, fuel type, State and an area for you to add notes. (The data is down loaded from the handset but can be edited.)
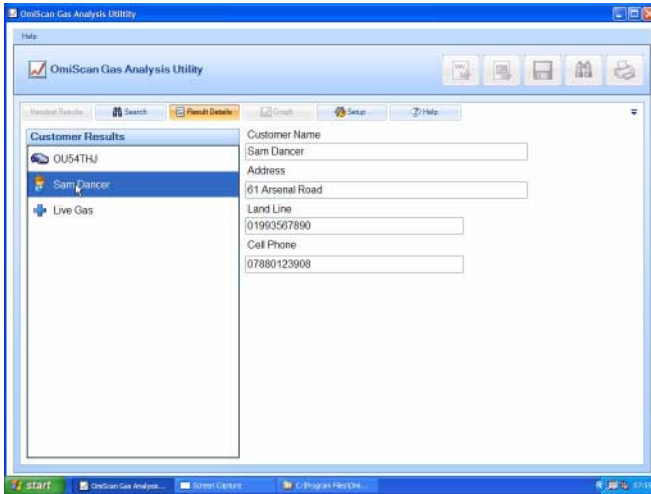
Man Symbol (Customer)

- Cells are available to enter customer's details.
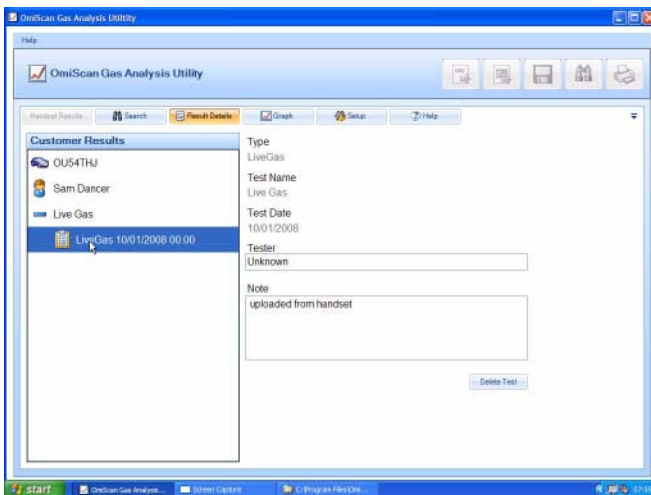
Clipboard Symbol (Test results)

- Each test is identified by type, test name, date, tester's name and notes area.

Note: Selecting any test will enable the 'Graph' tab.

PC Gas Analyzer Software

Graph

Test Result can be presented in raw data line graph format or by test specific bar and line graphs. The available graph views depend upon the type of test carried out but the raw data line graph is always available.
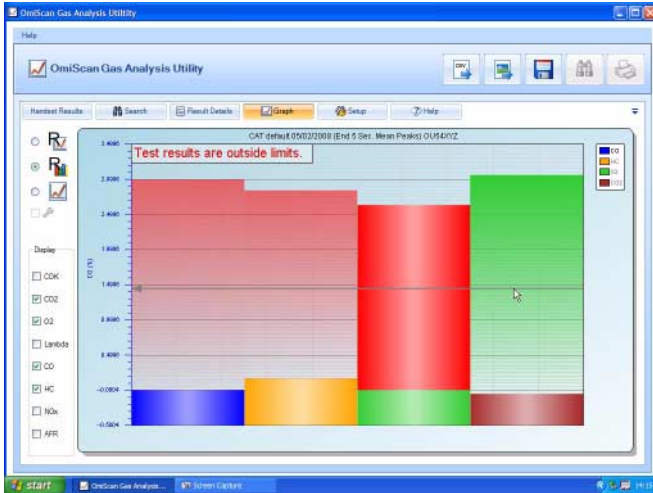
The test specific graphs (identified by 'R' on the graph icons) present a view of the data, but not the raw data, from only a portion of the entire gas recording. This may be, for example, the last 10 seconds of readings as an average. The bar graph option displays the highest levels within this data portion whilst the line graph will plot this data portion against time.
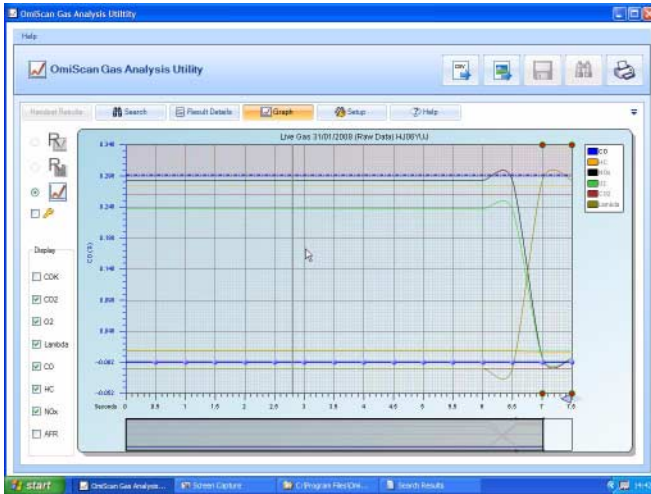
The raw data line graph is available for all tests and is a plot of non-adjusted values against time.

On the graph tab you can export the test results into a CSV file by pressing the file button on the top tool bar. You can also export the graph image as a bitmap by pressing the picture button on the top tool bar.

PC Gas Analyzer Software
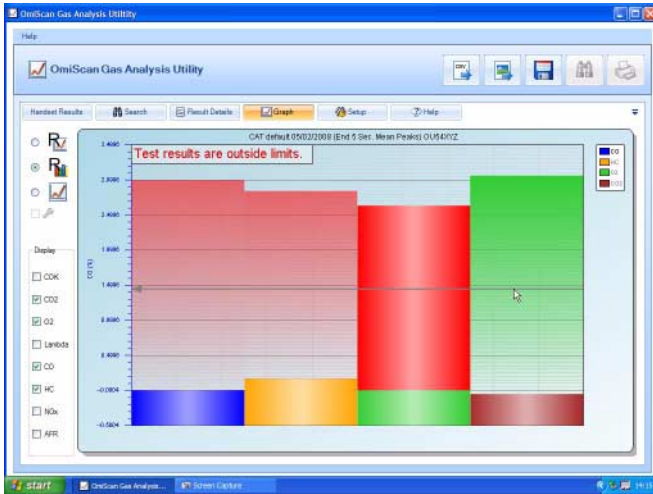
Bar graph: Readings that can be selected are: CO, CO_2, O_2, HC, NOx, MPH, AFR, and LAMBDA. On opening results the displayed readings will default to relevant gases. For example, if the test was a CAT then CO, CO_2, HC, NOx and O_2 will be displayed. Because all gases are recorded during a test they can be added to the graph by clicking on the gases in the DISPLAY bar down the left hand side of the screen.

The scale of the Y axis can be changed to read any gas by selecting from the key down the right hand side of the screen, double click on the gas required.

If preset cut off points are set in test then the gas colour will change to red over the cut off point, therefore any area in red is in excess of the predefined acceptance level.

A horizontal guide line, moveable with the mouse, helps the user to read gas values.

For a print out of result, click on 'Printer' symbol in the top right hand corner of the screen, when pressed you are prompted for language of print out – English, Spanish or French. A prompt will be displayed for which graph is to be printed. The Garage Details, vehicle details and time and date stamp will be added to the print out.
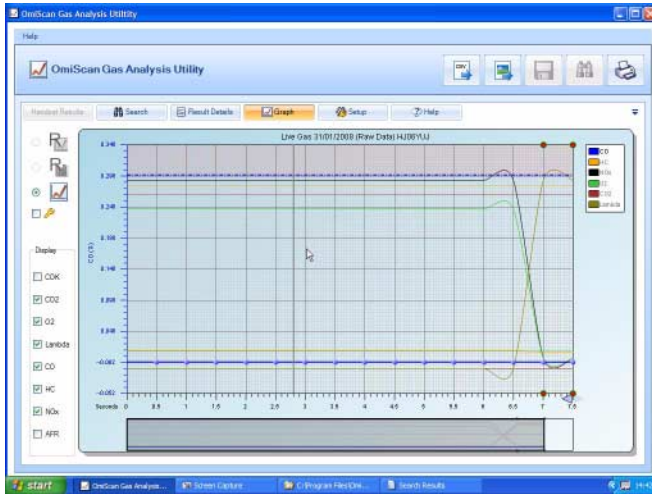
Line graph: CO, CO$_2$, O$_2$, HC, NOx, MPH, RPM, AFR and LAMBDA are plotted against time.

- Gases displayed depend on type of test, but like bar graph mode other gases can be added to plot.
- Y axis scale can be selected to a chosen gas and its graph will become bolder.
- Cut off limits will be shown on plot for the active series.
- A Landscape graph (only available on the raw data graph view), showing a complete record of the gas readings, is under the main display. The Main display seen on the screen will be presented as a window on the landscape graph. To view readings anywhere through out the test sequence simply click and drag landscape window. To zoom in or out further on a reading click on arrows in the bottom right hand corner of the main graph.
- To interrogate gas readings further, hold mouse anywhere in the main graph. A vertical 'Wand' will appear and when held over a reading a 'INFO' box (only available in raw data graph view) will appear. This box will:

1. Display gas values on plot.
2. Give Cut off Status – A green tick indicates all gases are below cut off points, a red exclamation mark will list all gases above limits whether they are on the plot or not.
3. Information speech bubble – based on combination of gas readings a suggested diagnostic hint on what could be wrong with the vehicle will be displayed. Simply click on bubble to revert to a diagnostic guide.

PC Gas Analyzer Software

4. Add 'Snap Shot/View Snap Shot' Camera symbol – Click on camera symbol to add user comment and save. A green circle will be placed top and bottom of both graph displays to tag Snap shot.

   Note: Any Snap shot made during a test by pressing the Camera button on the handset will be automatically tagged on graph. To view a Snapshot, click near the diamond on the landscape graph to set the window over snapshot, place mouse over reading on main graph to bring on the INFO box then simply click on 'VIEW SNAP SHOT'. To delete Snapshot click Delete when viewing Snap shot information.

5. Print out function is the same as Bar graph mode.
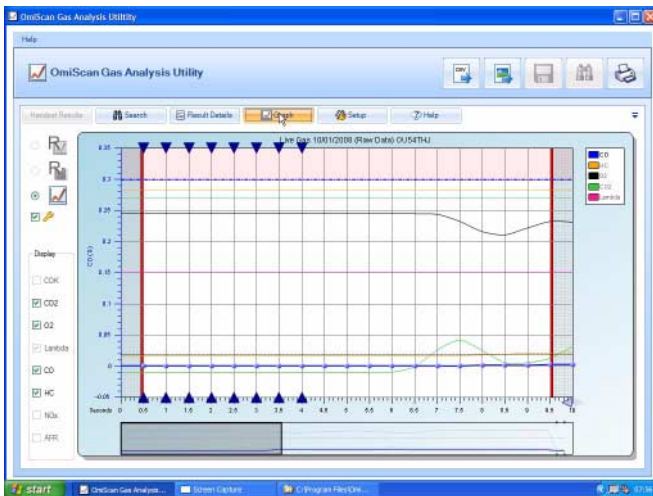
When the graph is in line view you can select the analyze button (below the line graph button), left hand side of screen.
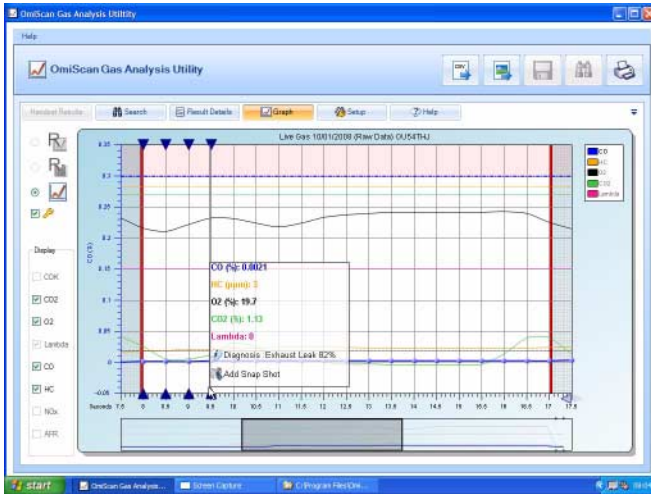
This will activate diagnostics for the current visible frame of graph. Any possible diagnosis made within this section will be displayed as a blue triangle as a prompt to move the cursor to that graph point. Once the mouse is over that point, the 'INFO' box will be displayed as normal. The purpose of this is to be able to quickly check a section of graph for possible diagnosable problems.

PC Gas Analyzer Software

TSI Graph
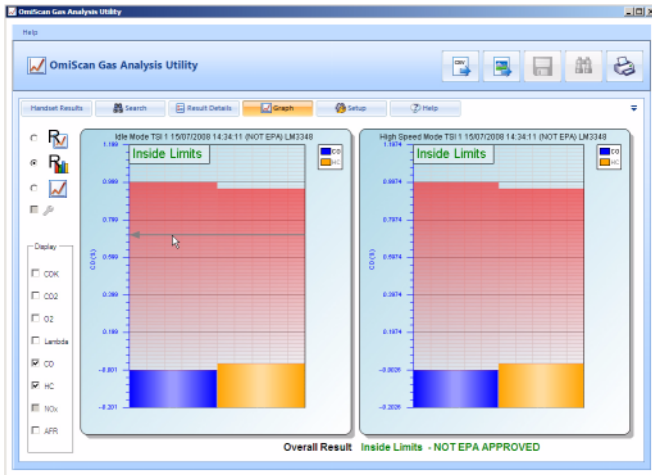
The left hand bar graph indicates CO and HC values for the idle mode section of the test. The right hand bar graph indicates the CO and HC values for the High Speed Mode of the test. A window in the top left hand of each graph will state 'Inside Limits' or 'Outside Limits' as the case may be.

Note: ASM graph - Test result will be presented as a single bar graph indicating the CO, HC and NOx values from the test. Again 'Inside or Outside Limits' will be shown as appropriate.

Setup

The setup section has four sub-sections selected by tabs on the right of the screen:

1. Tests
2. Lists
3. Shop details
4. Setup
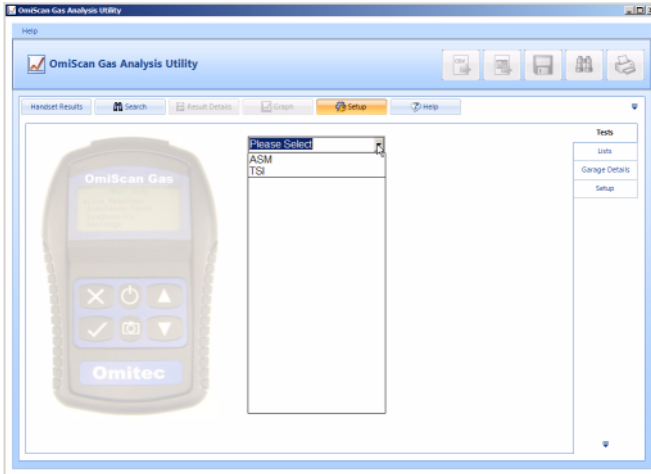
Tests

Both the ASM and TSI simulated tests offered by the OmiScan Gas can be carried out using different limits (Cut points). Each Test offers two sets of Custom limits as well as a set of default limits. The PC analyzer software allows the custom limits to be changed on the handset. Click on Tests Tab then on the drop down menu arrow to list tests.
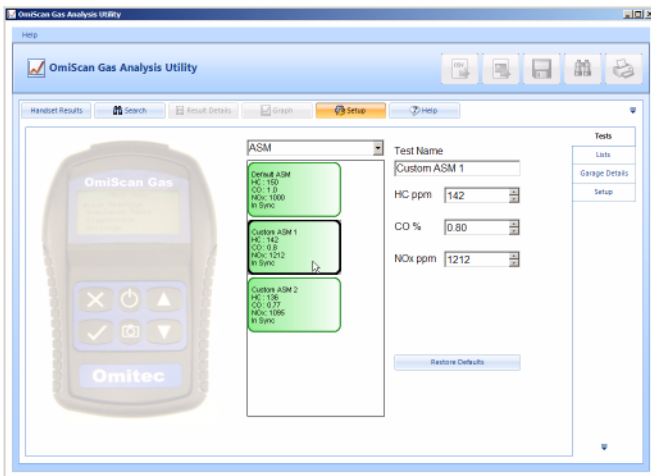
Click on either ASM or TSI to list limits. If the limits on the handset match those on the

PC Gas Analyzer Software

PC Analyzer software the limits will be displayed in green (In Sync). Click on either of the Custom limit boxes to display the individual gases and their limits. To change limits click on up or down arrows for the relevant gas to set the desired value. Click on limit box or press return on the PC keyboard to enter value. The test limit box will change to Red to show the test limits on the handset no longer match those set on the PC Analyzer software (Out of Sync).
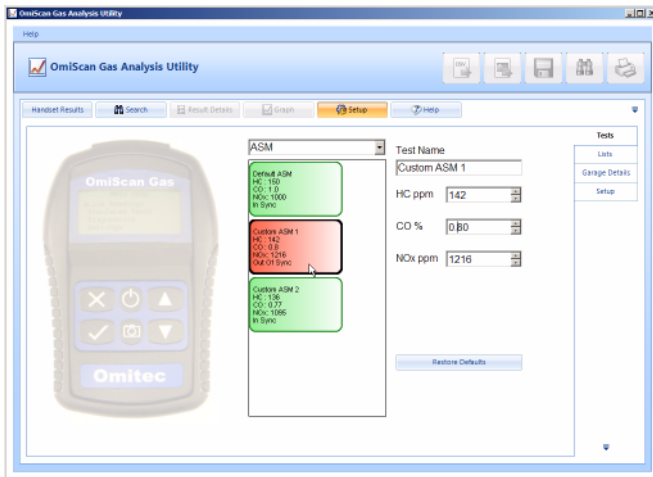
To update the handset with the new edited test held in the PC, click and hold over the specific test to transfer, and drag the test over the handset image and release the mouse button.

On completion of downloading, the list box will change from red to green.

Note: Drag and drop facility will be disabled whilst the handset is disconnected from the PC.

Lists
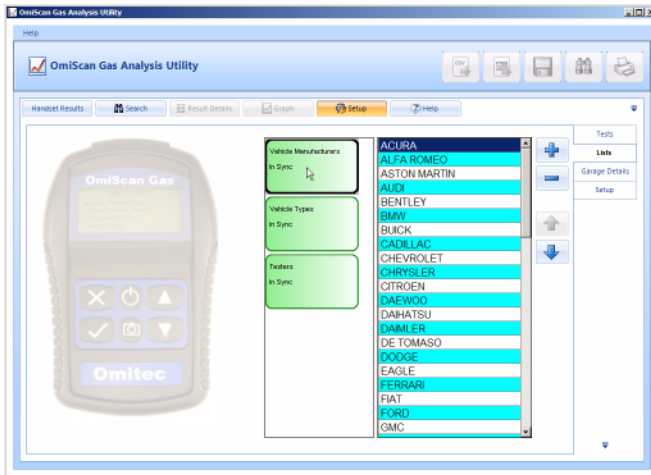
Vehicle make, vehicle types and testers can be edited and saved to the handset by using the drag and drop facility. Double click on any of the lists, 'Vehicle Makes', 'Vehicle Types' or 'Testers' and the current data stored on the handset is shown in the right pane.

The + button can be used to add to a list, likewise, the - button can be used to delete from a list. Any list will be in alphabetical order. To position an item, for instance, a vehicle make towards the top of the list, click on the appropriate make then click on the Up button to move it up the list. This useful feature allows the list to customized to individual requirements.

Like Tests a list will be either green if the list is In Sync with the handset and Red if list is Out of Sync with the handset.

PC Gas Analyzer Software
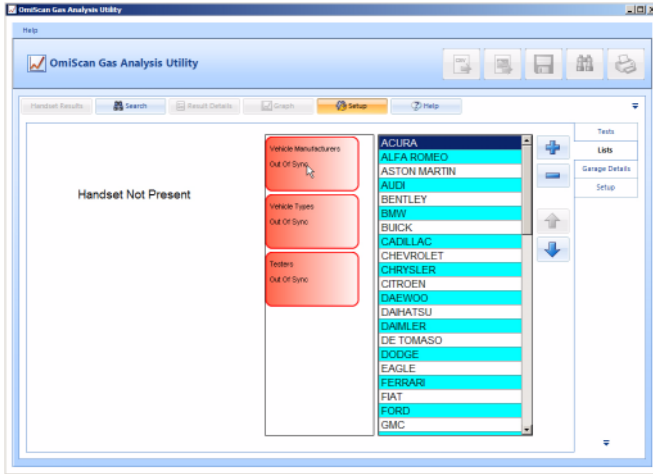
If the Handset is not connected to the PC there will be no picture of the Handset and a warning 'Handset Not Present' will appear in the left pane and the status of any lists or tests will be red.
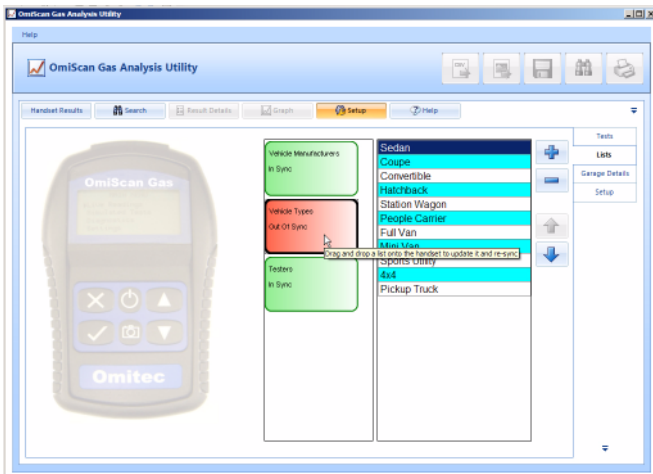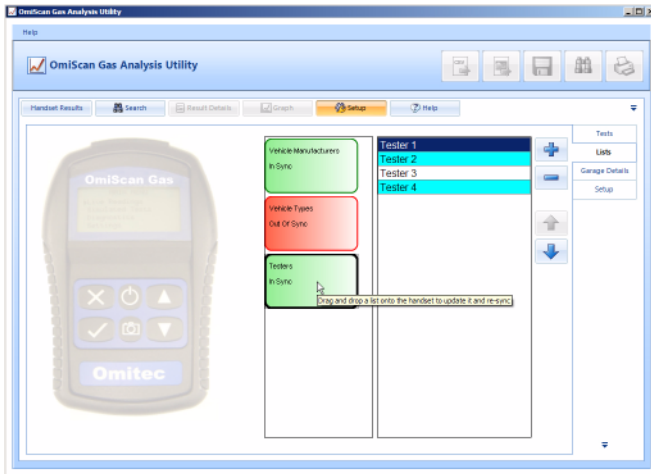
The lists for Vehicle type and Tester can be edited in the same way as Vehicle Make.

Again like Tests to update the handset to the list held in the PC, click and hold over the specific list to transfer, and drag the list over the handset image and release the mouse button.

On completion of downloading, the list box will change from red to green.

Note: Drag and drop facility will be disabled whilst the handset is disconnected from the PC.

PC Gas Analyzer Software
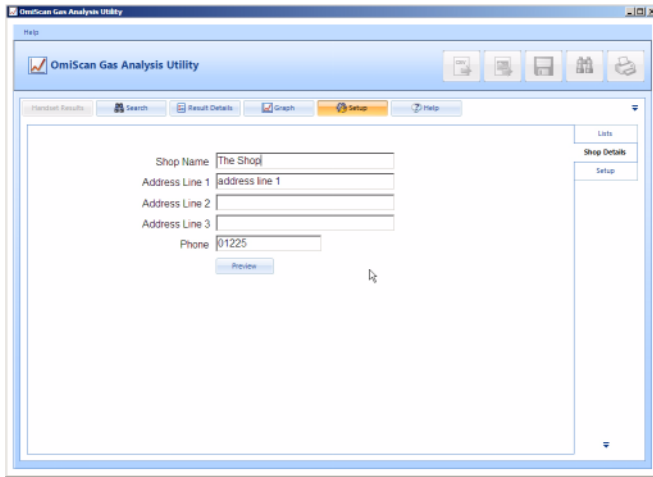
Shop: Contained in the PC and is added to the print out.
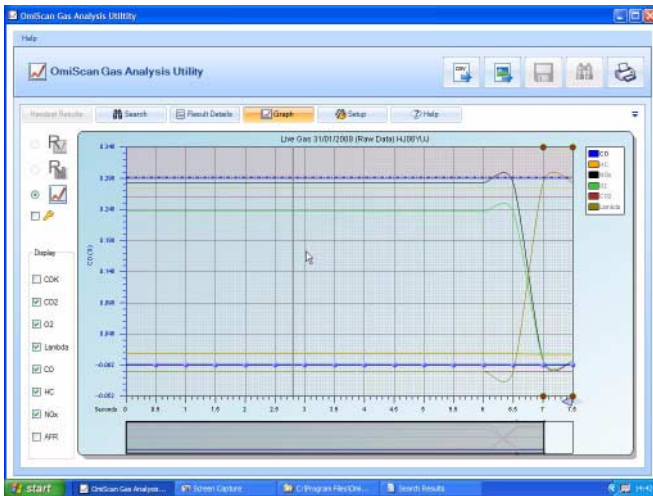
If no printer is installed on the PC a print preview is not available and warning will be shown if the 'Preview' button is pressed.
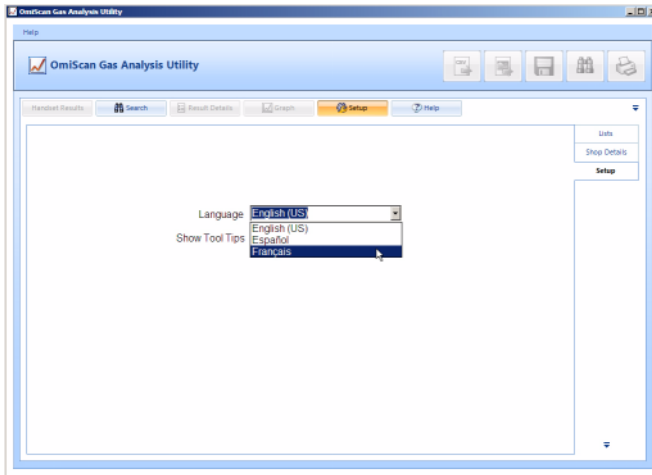
Setup: Sets language and enables/disables tool tips.

Help
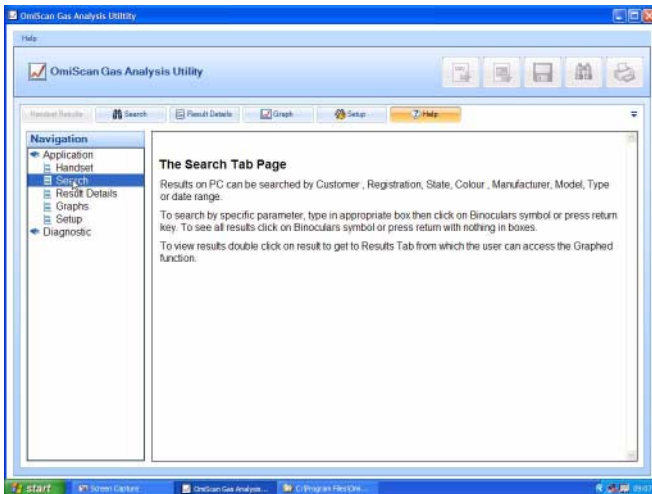
The help tab will link to a document providing a guide to the functionality tabs. The Navigation pane on the left also allows access to the diagnostic documents that are linked from the dialog box in the 'Graph' section if any of the gases are out of limits.

PC Gas Analyzer Software

Communications

The *Bluetooth*® Wireless Technology communications provides connection between the base station and the handset. The base station has a unique addresses and it is advisable to note this address in the data section of this manual, especially if either unit is replaced.

Software Build

Details of the software version and build can be accessed from the 'Help' function in the top bar left hand side. Click on this function and then on 'About' will display a dialog box containing version and build details of the OmiScan Gas PC Analyzer Utility program.

OmiScan Gas Analysis of Results
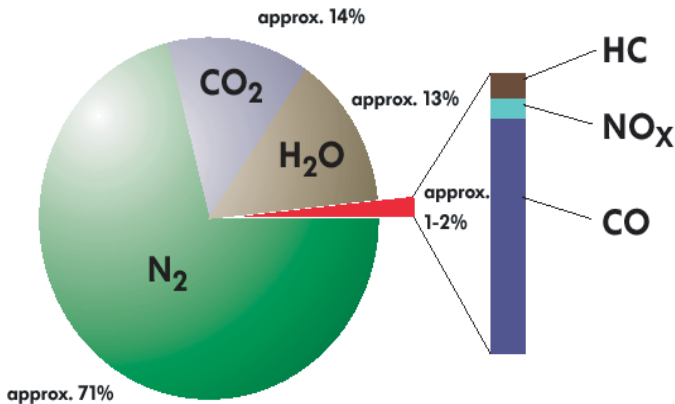
CO -Carbon Monoxide - Carbon Monoxide is the product of incorrectly burned fuel, so the obvious aim is to ensure that the CO level is as low as possible, the better the combustion the lower the CO. However, due to unavoidable inefficiencies with Internal Combustion Engine (ICE) there will always be an output of CO.

CO_2 - Carbon Dioxide - Carbon Dioxide is the result of correctly burned fuel so the obvious aim is to ensure that the CO_2 level is as high as possible, typically 13% - 15% for a catalytic converter vehicle. Non-cat would be typically 11% - 12.5%.

HC - Hydrocarbons - Hydrocarbons are basically unburnt fuel and so the obvious aim is to have HC as low as possible but inefficiencies mean there is always an output of HC.

O_2 Oxygen - Oxygen has to be present for combustion to take place so obviously the aim is to have as little surplus oxygen as possible, typically up to 2%.

NOx - Nitrous Oxide is a gas generated by high combustion temperature and pressure and this can be reduced by design of the exhaust and inlet valve overlap and exhaust gas recirculation where the inert exhaust gas introduced into the inlet will reduce the combustion temperature. NOx can only be measured when the engine is under load.

AFR/Lambda - Air Fuel Ratio (AFR) or Lambda is the ratio of air to fuel and is calculated from the amount of oxygen sensed in the exhaust gases.

From the exhaust gases the following relationships are formed:

- O_2 combines with CO to form CO_2
- CO is an indicator of air fuel mixture richness
- HC is an indicator of fuel mixture leanness or richness and misfires
- CO and O_2 are equal at the stoichiometric air/fuel ratio

Gas Analysis

- CO_2 and O_2 are indicators of the integrity of the exhaust system and/or the sample hose and probe
- CO_2 is an indicator of combustion efficiency that peaks at or near the stoichiometric air/fuel ratio and decreases with rich or lean air/fuel ratios
- If CO_2 increases, O_2 decreases (inversely related)

  If O_2 increase, CO_2 decreases (inversely related)

  During a cold start, and no secondary air injection, CO will be above 1% and the catalytic converter will be O_2 starved and will not 'fire' and the emissions will be the same as pre-cat levels

Corrected CO

The Live Readings test offers the selection of Corrected CO (COK).

Corrected CO takes into account any dilution of the sampled gas, for example leaks in the exhaust pipes and silencers. The formula to calculate COK is:

COK = CO x 15/CO_2

When stoichiometric combustion is achieved and there is no dilution, the CO_2 value drops to approximately 15%, therefore, the correction factor is unity. If the sample is diluted with air, the CO_2 value falls below 15% and the correction factor is <1.

Non-Catalyst Systems

Perfect combustion in an ICE has an AFR of 14.7:1. This is measured by weight, any reading higher than 14.7 indicates a lean mixture and likewise any reading lower than 14.7 indicates a rich mixture. For diagnostics purposes the AFR must be settled at 14.7:1 before analysing any other gas reading. With AFR correct the following table shows how the levels of other gases can indicate a problem with the engine with relation to the time of combustion.

Non-Catalyst System Gases with AFR

		AFR	14.7	
Gas	Perfect	Minimum	Maximum	Problem
CO	In Specification			
CO_2	Highest possible	11%		Before combustion
HC	Lowest possible		400ppm	During combustion
O_2	Lowest possible		2%	After combustion

These readings are typical and reference should be made to the manufacturers' specifications, which usually only refer to CO and HC. Setting the CO level correctly should bring the other gases to high CO_2, low HC and low O_2.

Catalyst Systems

Where AFR is used for Non-Cat systems, Lambda is used for Cat systems and the engine management systems control Lambda to 1. Any value >1 is a lean mixture and anything <1 is a rich mixture.

Catalyst System Gases with Lambda

		Lambda	1	
Gas	Perfect	Minimum	Maximum	Problem
CO	In Specification		0.5	
CO_2	Highest possible	12.5%	15	Before combustion
HC	Lowest possible		50ppm	During combustion
O_2	Lowest possible		2%	After combustion

The catalytic converter converts CO and HC into water (H_2O) and extra CO_2. Cats increase the CO_2 level, therefore they are useful for reducing acid rain rather than the ozone layer. With a good operating system it should be possible to achieve 0 for both CO and HC under normal operating conditions.

Fault Diagnosis

The following tables show various relationships between gases and suggest a possible cause for these gas levels. H = High, VH = Very High, L = Low, VL = Very Low, N = Normal.

5 Gas Relationship

HC	O_2	CO	CO_2	NOx	Possible cause
H	VH				Vacuum leak
H	H			VL	Overactive EGR valve
H	L	H	L	L	Running rich
H	H	H	L	H	Running lean
				H	Increased combustion pressure or VH O_2 after combustion
VH	N	VL	VL	Zero	Blown head gasket
H	H	H	L	H	Faulty CAT

Gas Analysis

High Gas Levels

Gas	Possible cause
High CO	EVAP system problem
	PCV system problem
	Fuel system problem
	Control system problem
High HC/CO	Fuel system problem
	Running rich
	Blown head gasket
High HC	Mechanical system problem
	Electrical system problem
	Fuel system problem
	Running lean
	Warm air intake problem
	Cat problem
	EVAP system leak
High NOx	High combustion pressure
	High combustion temperature
	High O_2 content
High HC/NOx	Cat problem

4 Gas Relationship

CO	CO_2	HC	O_2	Problem
H	L	H	H	Rich mixture with ignition misfire
H	L	H	L	Faulty thermostat or ECT sensor - rich mixture fault
L	L	L	H	Exhaust leak after Cat
L	H	L	H	Injector misfire with Cat at operating temperature
H	L	N	H	Rich mixture
H	H	H	H	Injector misfire, Cat not working - Rich mixture & vacuum leak
L	L	H	H	Ignition misfire; lean mixture; unmetered air leak
L	H	L	L	Good combustion efficiency with Cat at operating temperature

Lambda status

Condition	Result
Too lean	Poor engine power Misfiring at cruise speed Burnt valves Burnt pistons Scored cylinders Spark knock
Slightly lean	High gas mileage Low exhaust emissions Reduced engine power Slight tendency to knock
Stoichiometric	Best all round performance
Slightly rich	Maximum engine power Higher emissions Higher fuel consumption Lower tendency to knock
Too rich	Poor gas mileage Misfiring Increased air pollution Oil contamination Black exhaust

5 Gas - Catalytic Vehicle Typical Readings

These are typical limit values of the 5 gasses for fuel injected vehicles and are not specific to any vehicle:

- CO < 0.3%

  CO_2 > 14%

  HC < 200 ppm

  O_2 <1%

 NOx < 100 ppm

Routine Maintenance & Cleaning

Routine Maintenance

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

Check the cleanliness of the disposable coalescing filter (Part No. FL5720A or OM 4700/11/10 (Pack of 10)) 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 housing. Renew the disposable filter if heavily contaminated.

REPLACING COALESCING FILTER
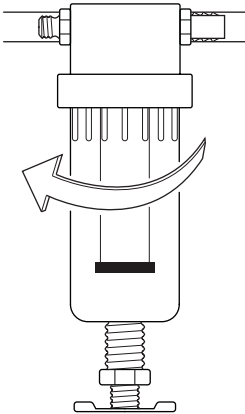
To access Coalescing filter (FL5720A), firstly remove clear catch pot from the water trap by unscrewing it clockwise. Then unscrew black retaining column, again clockwise to release filter.

Once replaced, screw filter back in and refit catch pot.

NOTE: Both filter and catch pot only need to be finger tight. This will ease future filter replacement.

OM1398

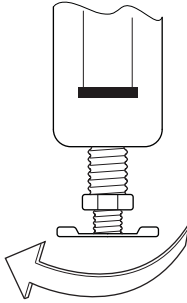*NOTE: Any dismantling of probe tip, sample hose or filters MUST be followed by a manual leak test.*

⚠ *CAUTION: DO NOT run the analyzer without the filters in place!*

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

DRAINING WATER FROM WATER TRAP

To drain water from the water trap simply screw the brass drain fully clockwise.

When the water has drained, screw the brass drain fully counter clockwise to seal water trap.

NOTE: The drain only needs to be finger tight. Do not over tighten as this may deform the rubber seal. Always conduct a Leak Test after draining the water trap to ensure an air leak has not been introduced into the gas sampling chain which will cause false readings. See 'System Checks' in 'Gas Analyzer' Menu.

OM1399

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", or similar thread sealant, 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 two cross-drillings in the tip are clear and check that the analyzer outlet pipes are not kinked or blocked in any manner.

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

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

Oxygen cell replacement procedure

When an exhausted oxygen cell is identified during a zero calibration, the handset automatically links to 'System Checks/O_2 Cell Functions'. Select 'Oxygen Cell Value' to ensure that the O_2 cell output is outside of the expected level of between 9mV and 11mV. If the cell has failed, change the cell as detailed:

1. *Firstly ensure there are no leaks or blockages in the gas handling system. If a blockage is found, clear and retest 'Zero Calibration', else proceed to 2.*

2. *Ensure power to the unit is switched off, then go to the rear of the unit and locate the O_2/NOx cells cover (see 'Assembling the OmiScan Gas Analyzer', page 8).*

3. *Remove the two retaining screws and remove the cover.*

4. Disconnect the cable from the red oxygen cell. It may be advantageous to gently prize the locking tab of the connector away from the mating half, to facilitate disconnection.

5. *Unscrew the cell by hand (unscrew counter-clockwise). If discarding the cell, place to one side for later safe disposal.*

6. *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 and screw the ground lead to the centre post, making sure the NOx cell ground lead is also secured.*

7. *Ensure the Oxygen Cell is properly seated in the housing and provides a gas tight seal.*

8. *Refit the cover, make sure the gas tubing is not crushed or trapped and secure cover to the back of the unit.*

9. *Turn on the power to the unit and allow it to warm up. Ensure that the analyzer is fully warmed up (i.e. that it has had at least 5 minutes since power on).*

10. *Use handset to configure the OmiScan Gas with the new O_2 cell:*
    - *Select 'Renew O_2 Cell'.*
    - *This will reset the error code and recalibrate the Analyzer with the new cell.*

11. *If the unit still fails, contact your service engineer.*

The O_2 cell can be monitored to see if it is approaching the end of its life. This can be done by checking its cell voltage. This should be done with the probe in clean air and accessing the following menu on the handset:

- *Select 'Gas Analyzer' – 'System Checks' – 'O_2 Cell functions' – 'Oxygen Cell Value'*

A good cell should read between 9mV and 11mV. The Analyzer will automatically flag up an error if the cell voltage falls below 7mV. It is recommended that the cell is changed if voltage is nearing the 7mV threshold.

NOx Cell Replacement

In theory the NOx cell should have a life expectancy of 2 years. Unlike the O_2 cell, the OmiScan Gas will not flag an error in the NOx cell.

It is recommended, therefore, that the NOx channel, like the rest of the OmiScan Gas, is regularly tested with calibration gases of known concentration. This can be carried out by an Omitec authorized Service agent.

NOTE: Due to the operating characteristics of the NOX sensor, any necessary replacement will need to be calibrated by an authorized Omitec authorized Service agent using a NOx calibration gas.

Calibration and Accuracy Checks

It is recommended that periodic Calibration and Accuracy testing should be carried out on the OmiScan Gas Analyzer to ensure reliable and accurate testing.

It is also recommended that this be done once every 12 months on average. This can be carried out by an Omitec authorized Service agent

Cleaning

OmiScan Gas unit

The surfaces of the analyzer cabinet 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.*

Technical Specification

Technical Specification

The OmiScan Gas unit (Part No. OM 4720/1)

Environmental	
Operational temperature range	0°C (32°F) to 45°C (113°F)
Operational temperature (nominal)	20°C (68°F)
Storage temperature range	-4°C (24.8°F) to 70°C(158°F)
Relative Humidity (operational)	95% RH (non-condensing)
Relative Humidity (storage)	99% RH (non-condensing)
Atmospheric pressure range	813 to 1060 mBar
Atmospheric pressure (nominal)	1013 mBar
Altitude (operational)	-300 m (-984 ft) to +3000 m (+9836 ft)
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
Weight	Total 2.21 kg (4.9 lbs) Handset 400g (0.88 lbs) Base 1.81 kg (3.97 lbs)
Dimensions of main unit	192 mm wide 283 mm deep 180 mm high (including 10mm feet)
Dimensions of handset	108 mm wide 160 mm deep 38 mm high

Charger Power Supply	
Mains voltage range	100 – 240V AC
Mains frequency range	50-60 Hz
Power input	60 W
Base station battery pack	9.6V Nom. 8 cell rechargeable NiMH
Handset battery pack	2.4V Nom. 2 cell rechargeable NiMH

Measurement range (OIML Class 0)	
Carbon monoxide (CO) range	0 to 15% vol.
CO accuracy	±0.03% abs or ±5% rel.
Carbon dioxide (CO_2) range	0 to 20% 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 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 2000 ppm
HC accuracy: 0 to 2000ppm	±3% rel.
Hydrocarbons as propane (HC) range	0 to 30000 ppm
HC accuracy 0 to 4000 ppm 2001 to 15000 ppm 15001 to 3000 ppm	±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.

Measurement of Nitric Oxide (NOx)	
NOx range	0 to 5000 ppm
Accuracy	±3% rel.

Technical Specification

Response time of analyzer: <15 secs to display 95% of final values (CO, CO_2 & HC)

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:

$$\lambda = \frac{[CO_2] + \frac{[CO]}{2} + [O_2] + \left(\frac{H_{cv}}{4} \times \frac{3.5}{3.5 + \frac{[CO]}{[CO_2]}} - \frac{O_{cv}}{2}\right)([CO_2] + [CO])}{\left(1 + \frac{H_{cv}}{4} - \frac{O_{cv}}{2}\right)([CO_2] + [CO] + K1\,[HC])}$$

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

K1   Conversion factor for HC if expressed in ppm vol *n*-hexane (C_6H_{14}) equivalent. It's value in this formula is 6×10^{-4}

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

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

General Data

Real time clock
The handset has:
- Day and Date, time in hours, minutes and seconds with automatic leap year compensation.
- Time is user adjustable.

Handset
- *Bluetooth*® Wireless Technology Comms

  Range typically 10m (30 feet)

PC Interface
- USB 1.1 or 2.0

Technical Specification

Ancillary Equipment

Vehicle Supply Lead	
Cable length	6 foot
For vehicles with auxiliary socket in the luggage compartment	

Pneumatic Specifications

Flow Rate	
Analyzer Outlet (nominal)	1.0 l/min
Sample Inlet	1.0 l/min

Filtration	
Coalescing element-PVDF Fluorocarbon 95%+ efficiency at particles > 0.1 microns	57 mm length

Oxygen Cell	
City Technology	CiTicel AO2

Calibration Gas	
Minimum pressure	700 mBar above atmospheric pressure
Flow rate	1.5 l/min
Composition (4 Gas):	
Carbon dioxide	14% vol.
Carbon Monoxide	3.5% vol.
Propane	2000 ppm vol.
Nitrogen	Balance
Composition NOx Calibration Gas:	
NOx	1000 ppm
Nitrogen	Balance

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Technical Specification

Service and calibration frequency

Calibration - At 12 monthly intervals

Service	
Replace disposable filter element (0.1 µm) – Part No. OM 4700/11/10 (Pack of 10)	Weekly – if in continuous use, else as necessary
Single disposable coalescing filter (0.1 µm) – Part No. FL5720A	Weekly – if in continuous use, else as necessary
In Line hydrophobic pancake filter – Part No. FL5718A	As necessary
Cleaning of sample probe and hose	Weekly – if in continuous use, else as necessary
Replace oxygen cell - OM4000/12	Two years, or as needed
Replace NOx sensor - OM4700/12	Two years, or as needed

Country Specific Approvals

FCC

OmiScan Gas Handset OM4720/2:

FCC CFR47, Part 15 Subpart B

This device complies with part 15 of the FCC Rules. Operation is subject to the following 2 conditions: (1) This device may not cause harmful interference, and (2) This device must accept any interference received, including interference that may cause undesired operation.

Grantee and Equipment Product Code:

FCC ID: SV4-OM4720

'We hereby declare that product OmiScan Gas Handset OM4720/2 is a class 2 BT device (max 2.7 mW EIRP). Due to the low level of transmit output power the device is not subject to the routine RF exposure valuation as per Section 2.1093 of the FCC rules'.

OmiScan Gas Base Station OM4720/1:

FCC CFR47, Part 15 Subpart B

This device complies with part 15 of the FCC Rules. Operation is subject to the following 2 conditions: (1) This device may not cause harmful interference, and (2) This device must accept any interference received, including interference that may cause undesired operation.

Note: This Product contains FCC ID: PI403B

INDUSTRY CANADA:

OmiScan Gas Handset OM4720/2:

RSS210, RSSGEN

Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) This device must accept any interference received, including interference that may cause undesired operation.

Company Number and UPN Number:

IC: 6220A-OM4720

'We hereby declare that product OmiScan Gas Handset OM4720/2 is a class 2 BT device (max 2.7 mW EIRP). Due to the low level of transmit output power the device is not subject to the routine RF exposure valuation.'

OmiScan Gas Base Station OM4720/1:

RSS210, RSSGEN

Operation is subject to the following 2 conditions: (1) This device may not cause harmful interference, and (2) This device must accept any interference received, including interference that may cause undesired operation.

Note: This Product contains IC:1931B-EUSB.

Technical Specification

Spare Parts List

Description	Part number
Top level kit	OM4720
Base station	OM 4720/1
OmiScan Gas Handset	OM 4720/2
PC Analyzer Application Software CD	OM 4720/3
Instruction Manual	OM 4720/4
Exhaust Sample Probe complete with hose	OM 4700/5
Battery Charger PSU	OM 4700/6
Handset 2 battery pack	OM 4700/7
Base Station 4 battery pack	OM 4700/8
Sample Probe Hose extension	OM 4700/10
Coalescing Filter (box of 10)	OM 4700/11/10
NOx sensor	OM 4700/12
Vehicle power lead	OM 4700/13
Oxygen Sensor Cell	OM 4000/12
Sample Probe Cap	RB4001A
OmiScan Gas USB Lead	CB9166A
In line hydrophobic pancake filter	FL5718A
Coalescing Filter	FL5720A

Please quote the part number when ordering or enquiring about the availability or price of spares for you OmiScan Gas analyzer.