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Boston Garage Equipment

CHAP. 1 - GENERAL INFORMATION

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CHAP. 3 - SAFETY CONDITIONS

3.1 IMPORTANT INFORMATION CONCERNING PERSONAL SAFETY



DANGER OF ASPHYXIATION

PETROL (GASOLINE) FUELLED ENGINES

The exhaust gas of petrol (gasoline) fuelled engines contains carbon monoxide, a colourless and odourless gas which can cause serious physical problems if inhaled. Pay particular attention if you work in a pit as some exhaust gas components are heavier than air and will deposit at the bottom of the pit itself. Great care should also be taken with gas fuelled vehicles.

DIESEL ENGINES

The composition of the exhaust gas produced by a Diesel engine is not always the same. It can change according to: the type of engine, aspiration, the conditions of use and the composition of the fuel used. Diesel exhaust consists of (CO, CO₂, NOX and HC), gas and particulate (soot, sulphates). The tiny particles of carbon that form the soot remain suspended in the air and can therefore be inhaled. Small amounts of toxic components are also present.

SAFETY MEASURES

- Always ensure that the place in which you work is correctly ventilated and that any fumes are exhausted (particularly in pits).
- Always operate an exhaust extraction system in closed rooms.



DANGER OF BEING CRUSHED

You could be crushed against a work bench unless vehicles are correctly locked in place by mechanical means.

SAFETY MEASURES

- Make sure that the vehicle is unable to move by applying the hand brake.
- Allow the engine to cool.
- Do not use naked flames or components that produce sparks.
- Do not smoke.
- Clean up any spilt fuel.
- Operate exhaust extraction fans in closed rooms.

**INJURIES**

There are mobile parts in stationary or running engines (belts and so forth) that can cause serious injury to hands and arms. Amongst the various engine components, pay the greatest attention to electric fans since they can start operating unexpectedly even when the engine is off.

SAFETY MEASURES

- Never place your hands near moving parts whilst the engine is running
- If you must work near electric fans, first allow the engine to cool and remove the fan plug from the motor.
- Keep the connection cables of test instruments well away from the moving parts of the engine.

**RISK OF BURNS**

Some of the engine components (eg. exhaust gas manifolds) can become very hot, as can some of the sensors. Take great care to avoid touching these components.

SAFETY MEASURES

- Wear protective gloves.
- Allow the engine and any self-contained accessory heaters to cool down.
- Do not route the connection cables of test instruments over or near hot parts.
- Do not keep the engine running after the tests.

**DANGER OF FIRE OR EXPLOSION**

There could be a risk of fire outbreak or explosion when work is carried out on the fuel system (fuel pump, injectors and carburettor, etc.) due to the fuels used and/or the vapours they create.

SAFETY MEASURES

- Disconnect the ignition system.
- Allow the engine to cool.
- Do not use naked flames or components that produce sparks.
- Do not smoke.
- Clean up any spilt fuel.
- Operate exhaust extraction fans in closed rooms.



NOISE LEVEL

The noise level can exceed 90dB when vehicles are tested, particularly at high engine rates. If a person is subjected to these noise sources for a lengthy period of time, his or her hearing could be damaged.

SAFETY MEASURES

- If necessary, the user is obliged to protect the work areas near to the places where tests are carried out.
- The operator must use personal protective equipment if necessary.



DANGEROUS VOLTAGE

There are dangerous voltages in residential, industrial and vehicle electric systems. When a person comes into contact with test instruments or engine parts to which voltage is applied, there is a danger of electric shock. This danger exists both in relation to the primary and secondary side of the ignition system and to the test instrument connections.

SAFETY MEASURES

- Connect test instruments to a socket that has a protection contact and that is correctly earthed.
- Only use the supplied cables to connect the test instrument and make sure that the insulation is not damaged.
- Make sure that the test instrument has been earthed before you turn it on.
- Always disconnect the power (e.g. battery) before you work on the electrical system.
- Make sure that you do not touch live parts of the vehicle when carrying out inspections and adjustments with the engine running.



DANGER OF INTOXICATION



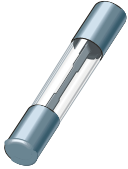

If subjected to high temperatures, the pipes used to sample exhaust gas release a highly toxic gas which can be harmful if inhaled.

SAFETY MEASURES

- Immediately consult a physician if you inhale this gas.
- Wear neoprene or PVC gloves to eliminate combustion residues.
- The remains of fire outbreaks can be neutralized with a solution of hydrated lime. This creates calcium fluoride which can be easily removed with water.

3.2 IMPORTANT INFORMATION ABOUT THE SAFETY OF THE INSTRUMENT

The work and operations described below are not permitted when the instrument is used in certain circumstances, they can endanger persons and lead to permanent damage to the instrument itself.

	<ul style="list-style-type: none"> - It is forbidden to remove the decals and/or danger signs affixed to the instrument.
	<ul style="list-style-type: none"> - It is forbidden to cut out the safety devices with which the instrument is equipped.
	<ul style="list-style-type: none"> - Only use original fuses with the indicated ampere capacity! The instrument must be immediately disconnected if the electricity supply is faulty. Defective fuses must not be repaired or by-passed. They must be replaced with fuses of the same type.
	<ul style="list-style-type: none"> - The electrical components of the instrument must be inspected/checked at regular intervals. Defects, such as loosened connections or burnt wires, must be immediately eliminated.

3.3 GENERAL NOTES

3.3.1 INSTALLATION

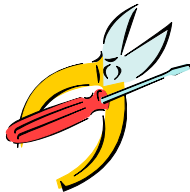


- Specialized personnel must install the instrument in strict compliance with the instructions in the installation manual.



- Protect the instrument from the rain and excessive damp to prevent it from being irreparably damaged.

3.3.2 IMPORTANT INFORMATION ABOUT THE BATTERY (BOTH INTERNAL AND EXTERNAL)



- Never attempt to dismantle the battery or to modify it in any way. Damage could result in heat or smoke escaping, leaking liquids, fire outbreaks and explosion of the battery itself.



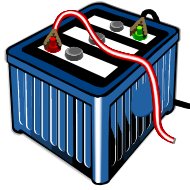
- Never allow the positive and negative terminals of the battery to be connected together. Never transport or store the battery near metal objects (necklaces, hair clips, etc.) which could cause a short circuit. Such action could cause the battery to explode, create heat and fumes, while the object that connects the two terminals could catch fire.



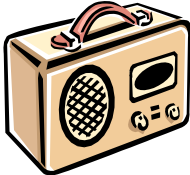
- Never use or leave the battery near flames, stoves or any other place where high temperatures could develop (80 °C or higher) as these could damage the seal of the battery itself. All this could lead to short circuits, explosion of the holder and fire outbreaks.



- Never wet the battery holder with either fresh water, salt water or any other liquid. Water can damage the battery causing heat and fumes to escape, explosion and fire outbreaks.



- Never use the battery if its outer part is very damaged or deformed. Use of a battery in these conditions could cause heat and fumes to escape, explosion and fire outbreaks.



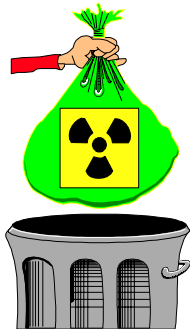
- Never use the battery for any purpose other than that for which it has been explicitly designed for. Such action could impair the performance of the battery, shorten its working life and lead to a power fault which could damage the battery itself.



- Only use a correct battery charger to carry out recharging. Ensure adequate space and where the temperature is between 10 °C and 45 °C. The wrong type of charger could overload the battery.





- If battery acid comes into contact with your eyes, do not rub them. Rinse the affected part with tap water and immediately consult a physician. Failure to rinse out all the battery acid could seriously damage the eyes.



- Batteries are considered a hazardous waste and must be disposed of in the correct way.

3.3.3 IMPORTANT INFORMATION ABOUT OPERATING SAFETY

	<p>When you work on engines, always protect your face, hands and feet by wearing adequate clothing. Do not touch hot components such as spark plugs, radiators, pipes of the cooling system and exhaust pipes. Catalytic converters become extremely hot and can cause burns or fire outbreaks.</p>
	<ul style="list-style-type: none"> - Do not smoke or use naked flames when working on engines.
	<ul style="list-style-type: none"> - If inhaled, exhaust gas (carbon monoxide) can be lethal or cause serious damage to health.
	<ul style="list-style-type: none"> - The cooling fan of vehicles can sometimes operate on its own, even when the engine is turned off. Take the utmost care when working near this component and disconnect it if necessary.
	<ul style="list-style-type: none"> - Never move the instrument by pulling the cables to which it is connected.

3.3.4 WHEN THE INSTRUMENT IS NOT USED



- Turn off all the power switches or unplug the power cable when the instrument is not in use for a long period of time.

3.3.5 CLEANING





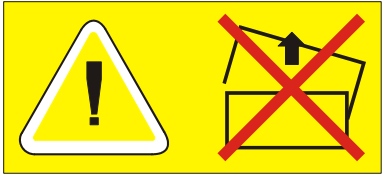


- When necessary, clean the outer surfaces of the equipment with neutral detergents and a soft, slightly damp cloth. Do not use detergents containing spirits, ammonia or petrol.

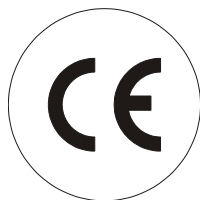
3.4 SYMBOLS

The safety symbols are described in this section.

3.4.1 SAFETY

	<p>ALTERNATE CURRENT</p>
	<p>EARTH</p>
	<p>CONSULT THE INSTRUCTION MANUAL</p>
	<p>DANGER! RISK OF ELECTRIC SHOCK</p>
	<p>WARNING! DO NOT REMOVE COVER (this may only be done by a qualified electrician)</p>

3.4.2 MARKING



CE CONFORMITY MARKING

CHAP. 4 - GENERAL DESCRIPTION

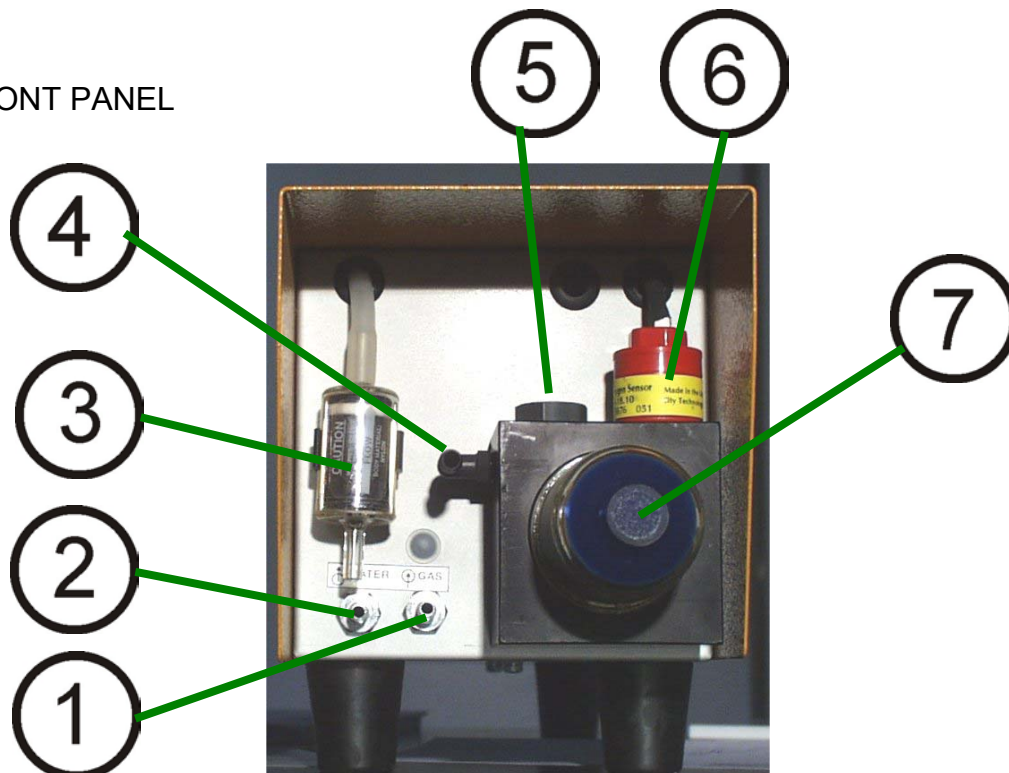
4.1 EXTERNAL ASPECT OF AGS-200

4.1.1 EXTERNAL ASPECT OF AGS-200

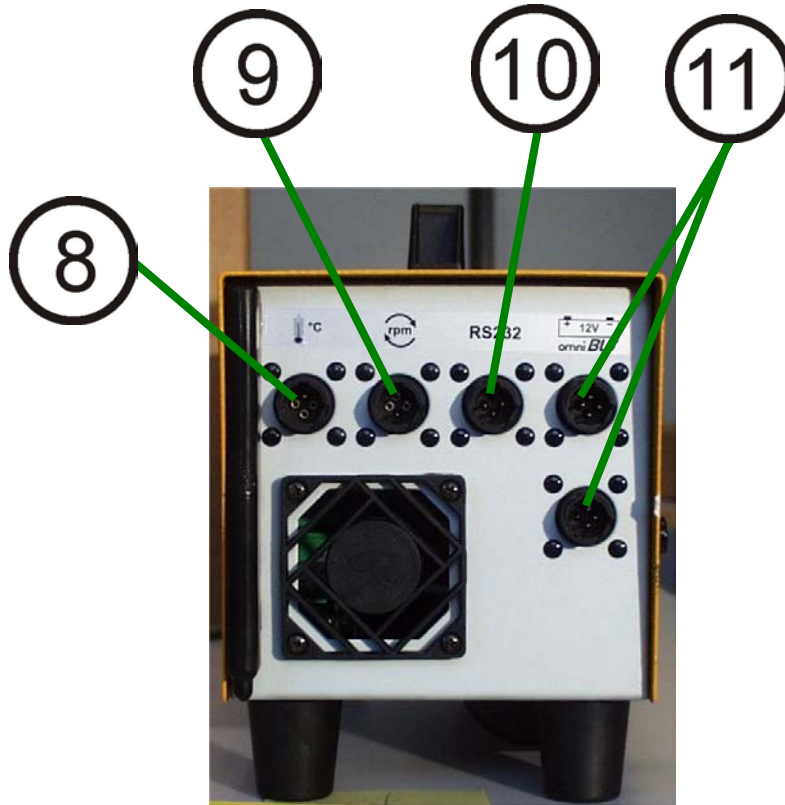
OVERALL VIEW



FRONT PANEL



REAR PANEL



- 1) GAS INLET
- 2) WATER OUTLET
- 3) ACTIVATED CARBON FILTER
- 4) GAS OUTLET
- 5) HOUSING FOR NOX SENSOR
- 6) O2 SENSOR
- 7) COALESCENT FILTER
- 8) ENGINE TEMPERATURE SENSOR INPUT
- 9) ENGINE RPM SENSOR INPUT
- 10) SOCKET FOR RS-232 SERIAL LINK
- 11) 12 Vdc POWER SUPPLY AND COMMUNICATION WITH OTHER INSTRUMENTS

4.1.2 ACCESSORIES

AGS-200 is supplied with the following accessories



GAS SAMPLING PROBE



SAMPLING HOSE



SAMPLING PROBE FILTER

CHAP. 5 - GENERAL SPECIFICATIONS

5.1 GENERAL SPECIFICATIONS

* Measurement ranges :

- | | | | |
|--------------------|------------------|-----|------------|
| • CO..... | from 0 to 9.99 | % | Res. 0.01 |
| • CO2..... | from 0 to 19.9 | % | Res. 0.1 |
| • HC hexane..... | from 0 to 14000 | PPM | Res. 1 |
| • O2..... | from 0 to 25 | % | Res. 0.01 |
| • NOX..... | from 0 to 5000 | PPM | Res. 10 |
| • Lambda..... | from 0.5 to 2 | | Res. 0.001 |
| • Revolutions..... | from 300 to 9990 | rpm | Res. 10 |
| • Oil temp..... | from 20 to 150 | °C | Res. 1 |
-
- Measuring gas intake 4 l/min.
 - Automatic continuous condensation discharge
 - Semiautomatic leak test
 - Automatic flow monitoring
 - Automatic O2 sensor exhausted monitoring
 - Automatic compensation of environmental pressure from 850 to 1050 mbar
 - Automatic calibration (with sample gas bottle)
 - Automatic autozero
 - Time to warm up to 20°C - 10 minutes.
 - Response time < 10 sec.
 - Revolution counter pulse reception via cable or via wireless radio system
 - Oil temperature input for PT100, or via wireless radio system
 - RS 232 serial link
 - 485 serial link in network
 - 12 Volt DC power supply
 - Power draw 1.5A DC
 - Operating temperature from 5° to 40° C
 - Dimensions 220 x140 x 430 mm
 - Weight 5 Kg

CHAP. 6 - PRELIMINARY OPERATIONS

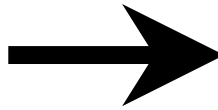
6.1 INSTALLATION

Carefully unpack and remove the AGS-200 from its shipping packaging

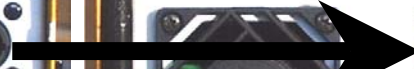
If you have a TRO-030 or TRO-010 trolley, place AGS-200 in its appropriate support as shown in the figures below.



PERSONAL COMPUTER



PSI-60



AGS-200

OPA-100

6.2 HOW TO INSTALL THE SOFTWARE

The PC software comes as a suite of programs that handle other **BOSTON** instruments and is supplied in two formats: Software for use in the Microsoft Windows environment and Software for use in the DOS environment. The programs operate in exactly the same way. Only the software for the Windows environment is supplied as standard.

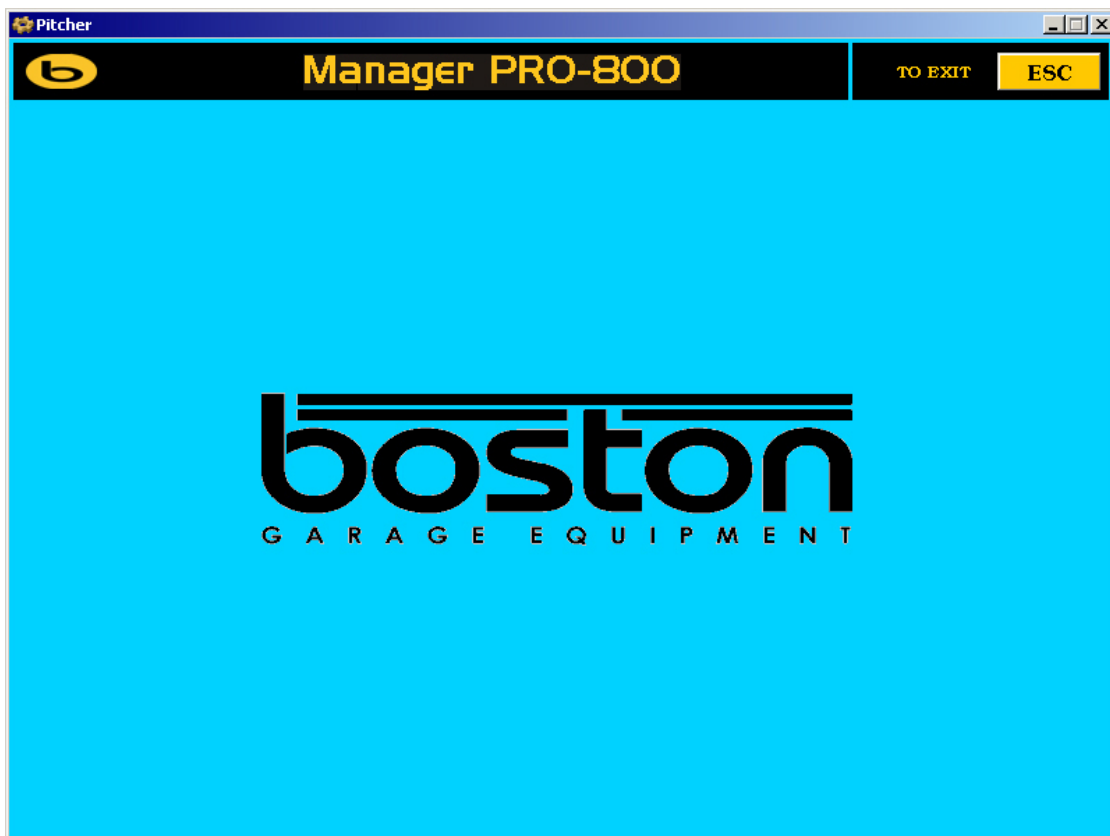
6.3 INSTALLATION IN THE Windows ENVIRONMENT

The software required to operate AGS-200 in the Windows environment is supplied on CD-ROM.

To install the software, insert the CD-ROM into the drive and open the **index.htm** file (this file will be automatically opened if the autorun function is activated). As soon as the prompt appears, select **MANAGER Pro-800 Win** and installation will automatically start.

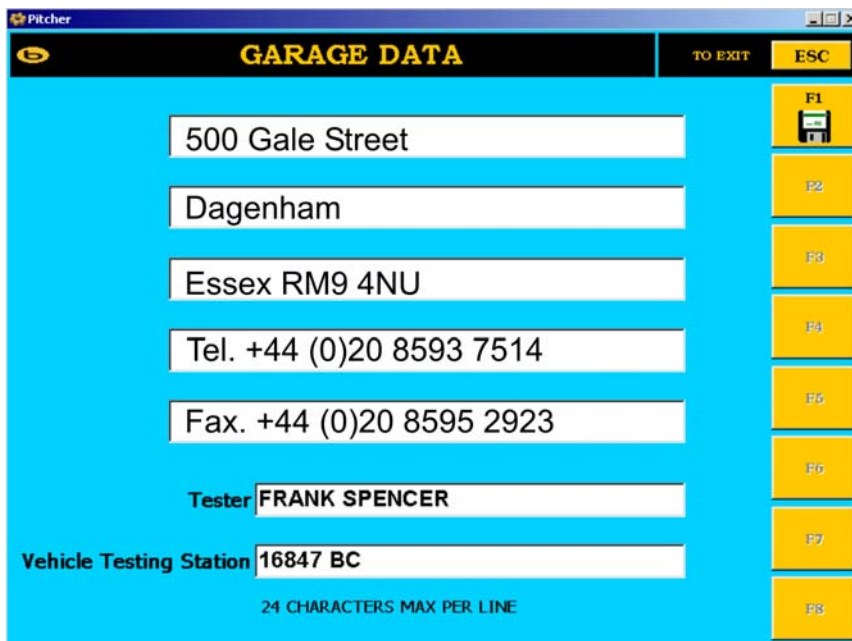
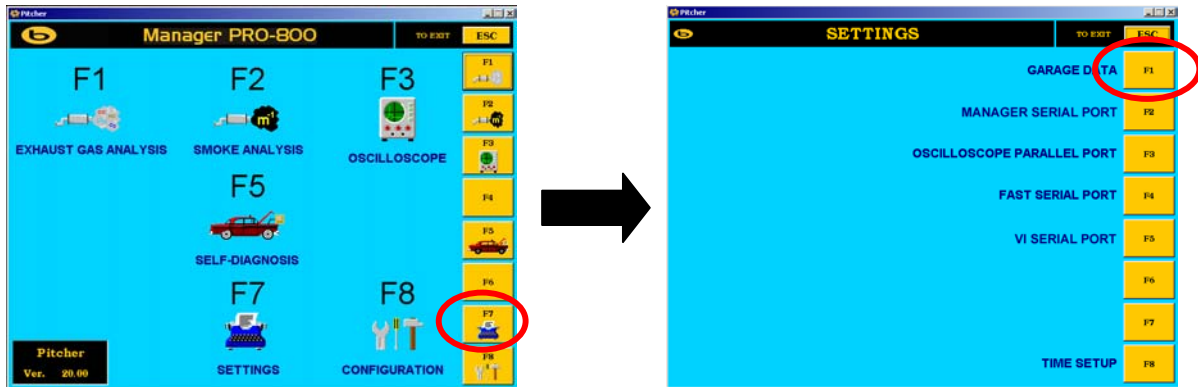
6.4 SETTINGS

Once the software has been installed, there are a few settings that need to be set. After the BOSTON presentation screen, which can be quit by pressing any key or by clicking with the mouse, the main menu is displayed. The main menu gives access to all the attached equipment and all the necessary settings that need to be made.



6.4.1 GARAGE DATA ENTRY

Press F7 "SETTINGS" in the main menu and then press F1 "GARAGE DATA"



This page allows the user to enter the company name and address. The information entered here is printed on all the test reports. Five lines of 24 characters each are available, plus an extra line where the testers name can be written. Use the mouse or press "ENTER" to move the cursor to the next field to be edited.

Press F1 to save the data.

6.4.2 DATE AND TIME SETTING

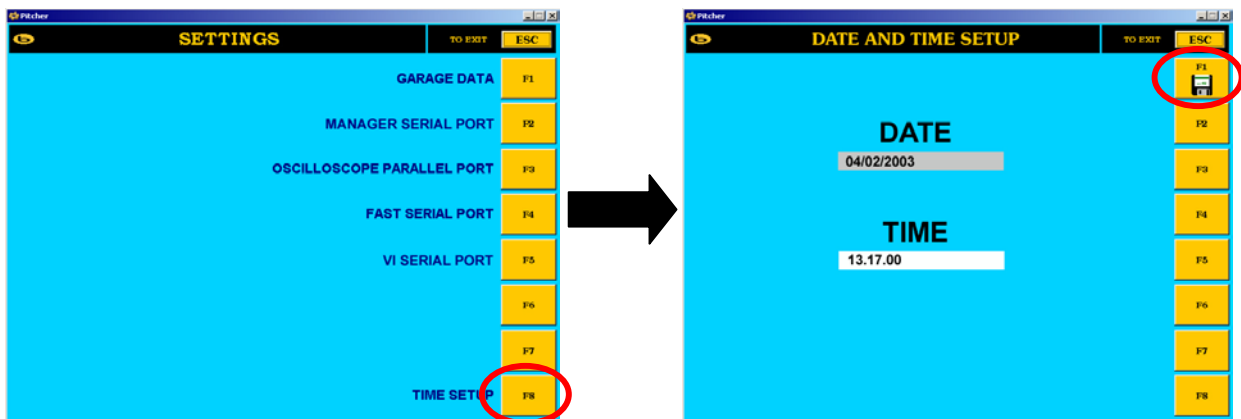


Attention ! It is not possible for the operator to change the date. This option is only available to an authorised engineer.

The time can be adjusted in the following way. Press F7 "SETTINGS" from the main menu.



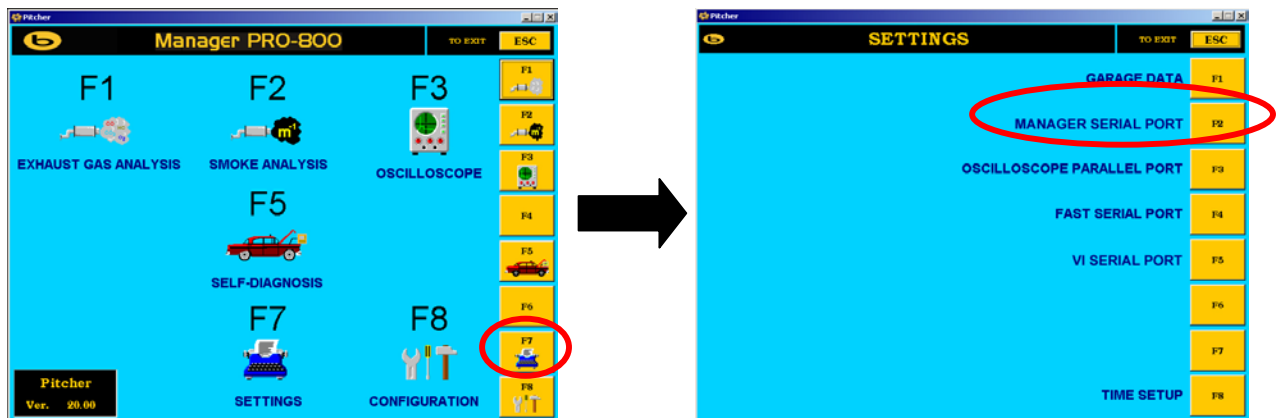
Press F8 to select the "TIME SETUP" menu.



This page only allows the operator to change the time. Adjust as necessary and press F1 to save changes.

6.4.3 SERIAL PORT SET-UP

The software must be told which serial port on the computer will be connected to the Analyser / Smokemeter. Because the computer uses a USB to SERIAL adapter cable, which is connected to one of the USB ports on the computer, you must check to see which port has been set for this connection within Windows. In most cases, COM3 or COM4 will be used for this selection, but for further information then please contact the BOSTON technical team or your agent. Select F7 "SETUP" in the main menu and then press F2 "MANAGER SERIAL PORT".



Use the arrows "↑" and "↓" to select the correct serial port. Press 'ENTER' to confirm and save the setting.

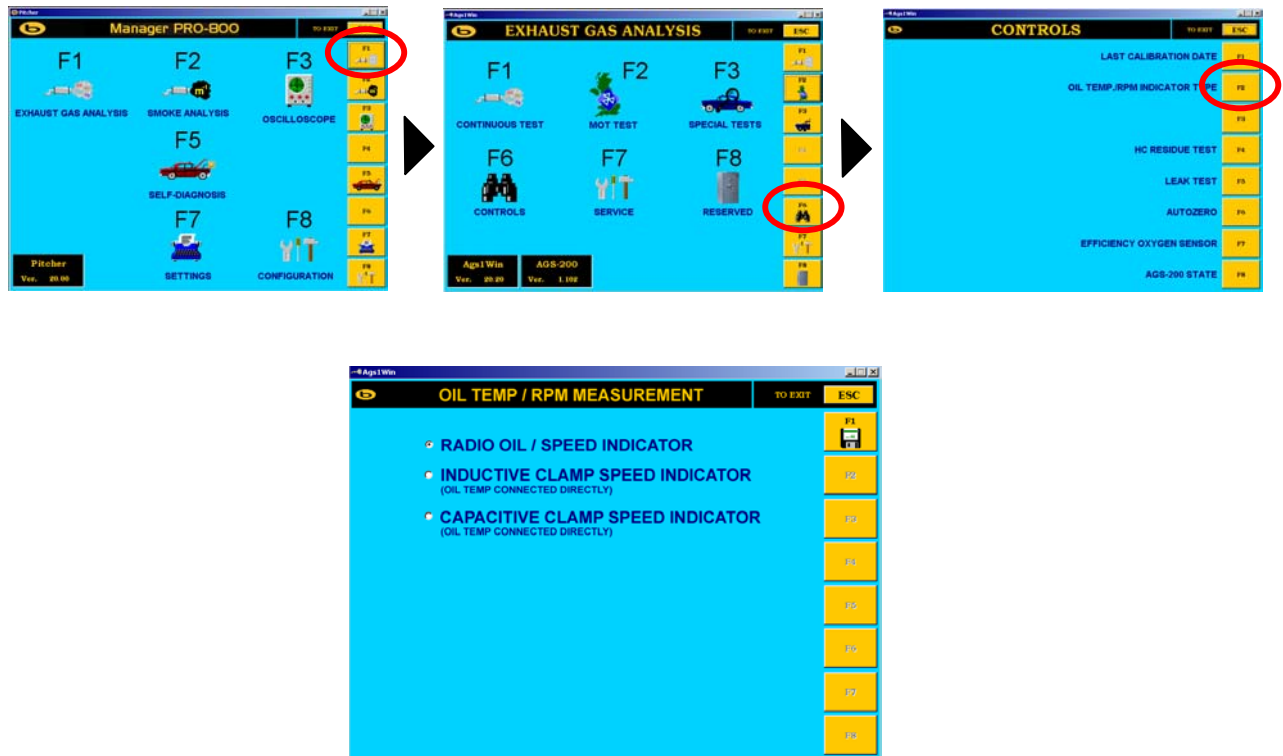


IMPORTANT !!!!

The correct serial port must be selected whenever the software is upgraded.

6.4.4 REVOLUTION COUNTER SET-UP

The AGS-200 must be told whether or not the wireless RF revolution counter MGT-300 will be used for RPM and Oil Temp measurement. From the main menu, press F1 "EXHAUST GAS ANALYSIS", then select F6 "CONTROLS" and lastly select F2 "OIL TEMP / RPM INDICATOR TYPE". Make the required selection.



If the operator selects to use either the inductive or capacitive clamps as shown above for RPM measurement, then the oil temperature probe and RPM cables must be connected directly to the AGS using the appropriate sockets on the rear panel.

If the operator selects to use the wireless MGT300/R "RADIO OIL / SPEED INDICATOR", then direct connections are not necessary. The MGT obtains power from either the lighter socket inside the vehicle or by connecting to the vehicle's battery directly. The MGT is able to obtain the RPM reading from either connection, but in the event that this is not possible then the operator may use the magnetic transducer supplied with the MGT. The oil temperature probe is connected to the socket on the bottom of the MGT. All measurements taken from the MGT are transferred by Radio Frequency to the AGS. This negates the need for any trailing cables and gives greater flexibility to the operator when testing vehicles. See MGT instruction manual for further information on RPM measurement.

Use the arrows "↑" and "↓" to select the type of revolution counter required and then press 'F1' to confirm and save the set-up.

All other setup pages relate to service and calibration and are not detailed in this manual. This information is only available to authorised engineers.

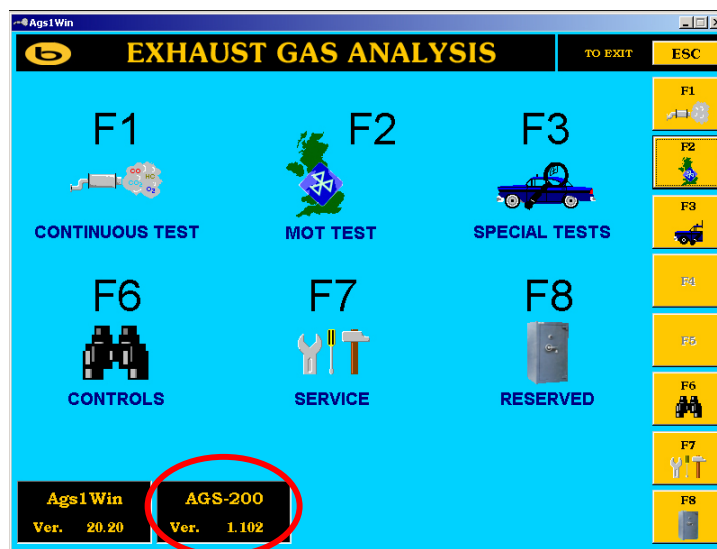
CHAP. 7 - USE OF THE INSTRUMENT

7.1 PROGRAM USE ON A PERSONAL COMPUTER

Access the main menu and press F1 "EXHAUST GAS ANALYSIS"



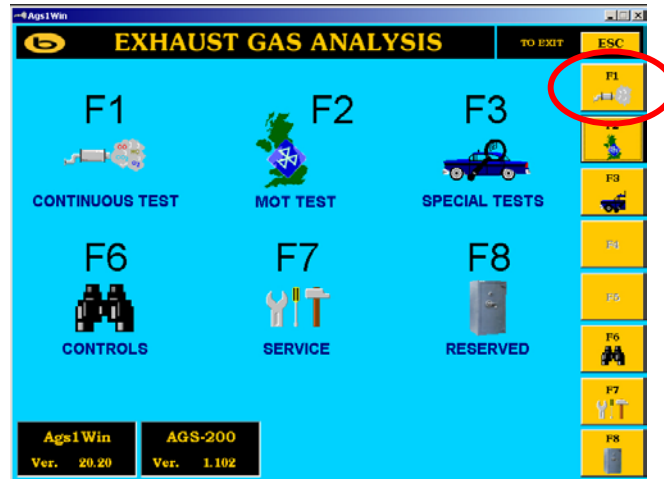
The GAS ANALYSER menu will appear.



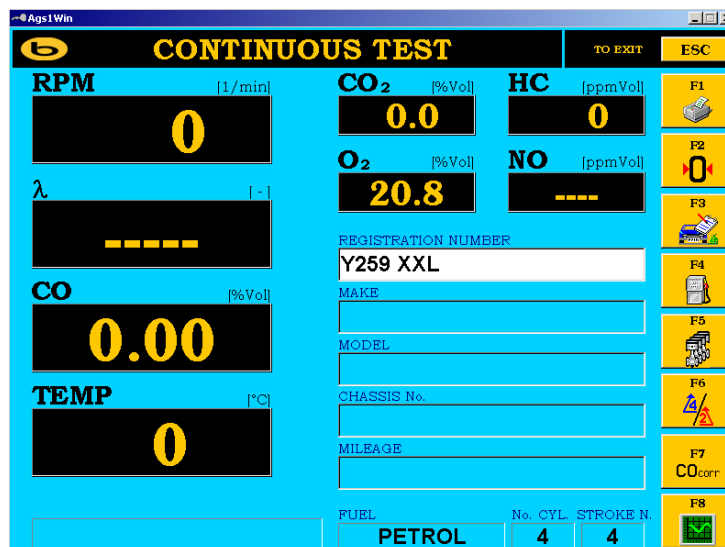
The latest software version that resides within AGS-200 is shown in the indicated box.

7.1.1 GAS MEASUREMENT IN CONTINUOUS MODE

From the GAS ANALYSIS menu select F1 "CONTINUOUS TEST"



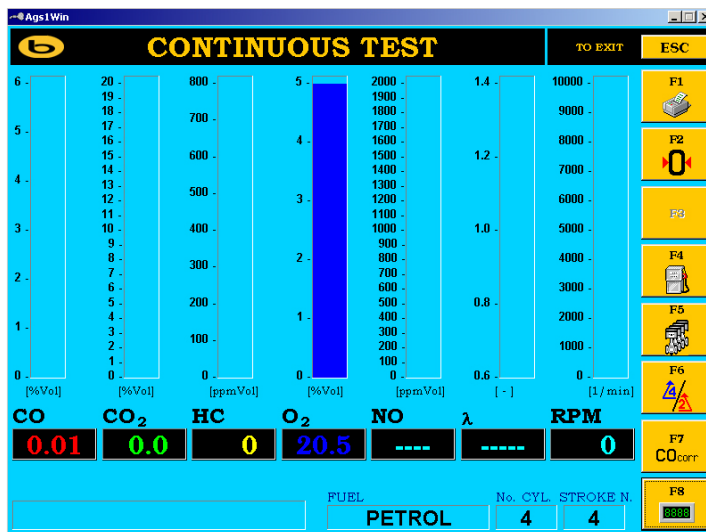
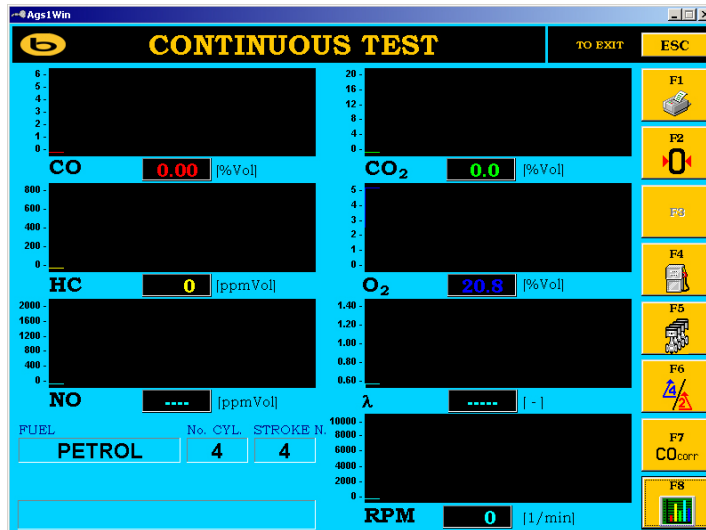
The CONTINUOUS TEST page is now shown.



The Gas Analyser will only operate after the WARM-UP period is complete. This will take approximately 5 minutes from cold. The following parameters are displayed on this page:

- Gas Values: CO, CO₂, O₂, HC, (NOX optional)
- Correct-CO,
- LAMBDA factor
- Engine oil temperature
- Engine rpm
- Vehicle data

There is no pre-set time limit on this type of test, hence testing can continue for as long as required. The gas measurements can also be displayed in graphic form in two different formats: continuous linear graph or histograms.

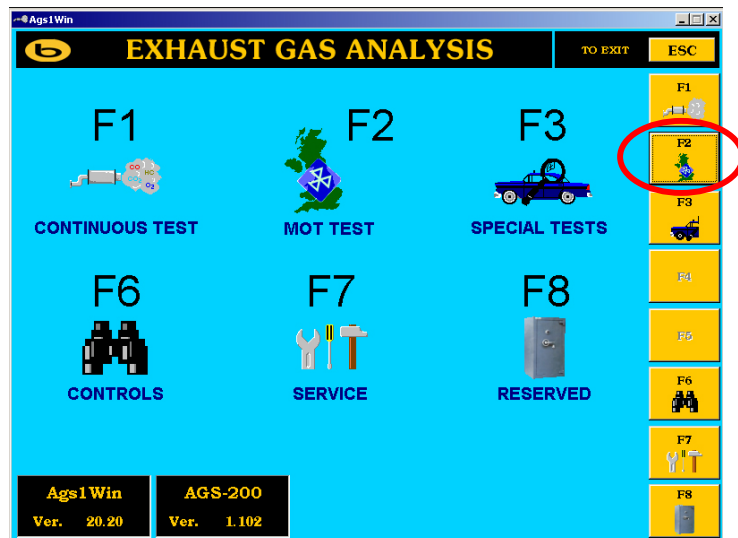


The keys on the right hand side of the display perform different functions. These are listed below:

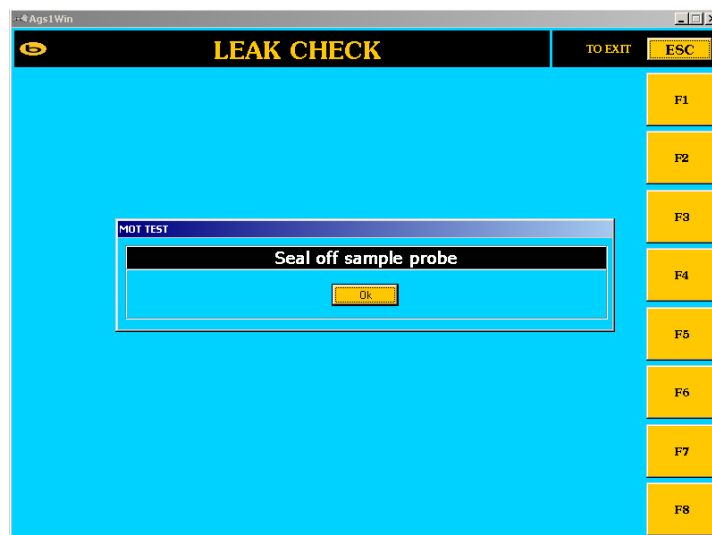
- F1 Immediately prints the displayed values
- F2 Performs and AUTOZERO
- F3 Vehicle data entry (only during numeric display phase)
- F4 Selects the type of fuel used by the test vehicle
- F5 Selects the number of cylinders on the test vehicle
- F6 Selects the number of strokes on the test vehicle
- F7 Selects display of the Carbon Monoxide CO or Correct CO parameter
- F8 Used to change the type of display: Numeric -> Graphic -> Histograms

7.1.2 OFFICIAL UK MOT TEST PROCEDURE

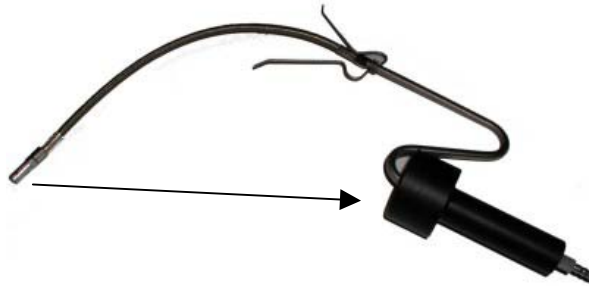
Enter the "EXHAUST GAS ANALYSIS" page and then press F2 to access the "MOT TEST" procedure. The software requires a leak check to be performed every 24 hours to ensure that there is no damage or 'splits' in the hose on the gas intake system. If the leak check has been done within the last 24 hours, then the software will continue on to the 'data entry' page. If not, then the operator will be prompted to perform a leak check.



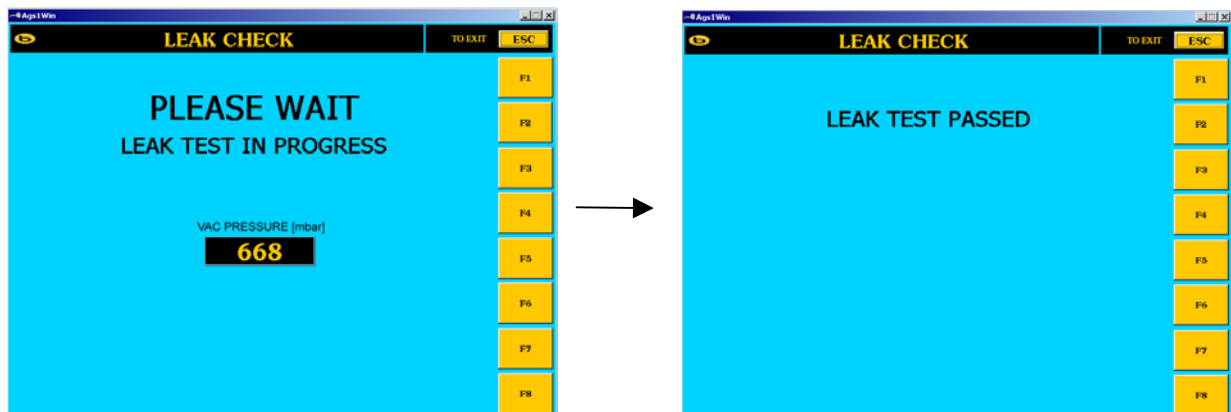
7.1.2.1 DAILY LEAK CHECK



The leak check is mandatory and the software will prompt the user to perform the check automatically every 24 hours. To Perform the leak check, bend the flexible sample probe hose back towards the handle and press it firmly into the round air-tight socket located on the plastic handle.



Press enter as instructed on the display to start the test. The pump inside the AGS will start and run for approximately 10 seconds, after which it will stop and measure the vacuum pressure for a further 10 seconds.

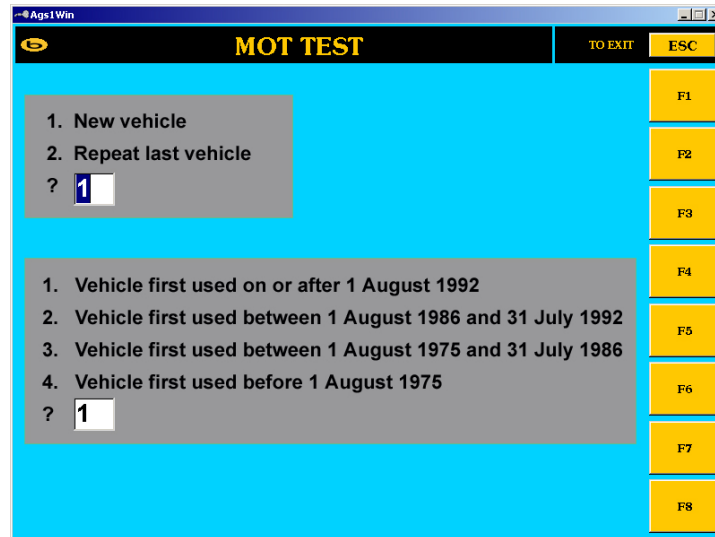


The operator can see the mbar vacuum pressure generated by the pump. The value should rise to above 550 when the probe and pipework are correctly sealed. If the system is airtight the value should remain for the duration of the check until the “LEAK CHECK PASSED” message is shown. In this case the software will continue automatically. If the value falls after the pump has stopped, then there is an air leak and the leak check will fail. Using the indicated vacuum pressure, the operator is easily able to locate any leaks in the external pipework.

If the problem persists then contact your local agent or the BOSTON technical department.

7.1.2.2 VEHICLE TO BE TESTED

After the leak check has been performed, the program will display the following page.



The operator must now select whether to repeat the previous test or perform a new test. If the operator selects “REPEAT LAST VEHICLE”, then the software will remember all the vehicle data from the previous test and use it for the repeat test. If the operator selects “NEW VEHICLE”, the previous vehicle data will be disregarded and the operator must enter new vehicle information when required.

Depending on the age and type of vehicle, the software will apply one of four different types of emission tests.

1. **BET Test using standard emission limits for all vehicles.**
2. **Non-CAT test for vehicles without a catalytic converter using preset limits.**
3. **Non-CAT test for vehicles without a catalytic converter using preset limits different to those used in test 2 above.**
4. **Visual emissions check where actual emission limits are not used.**

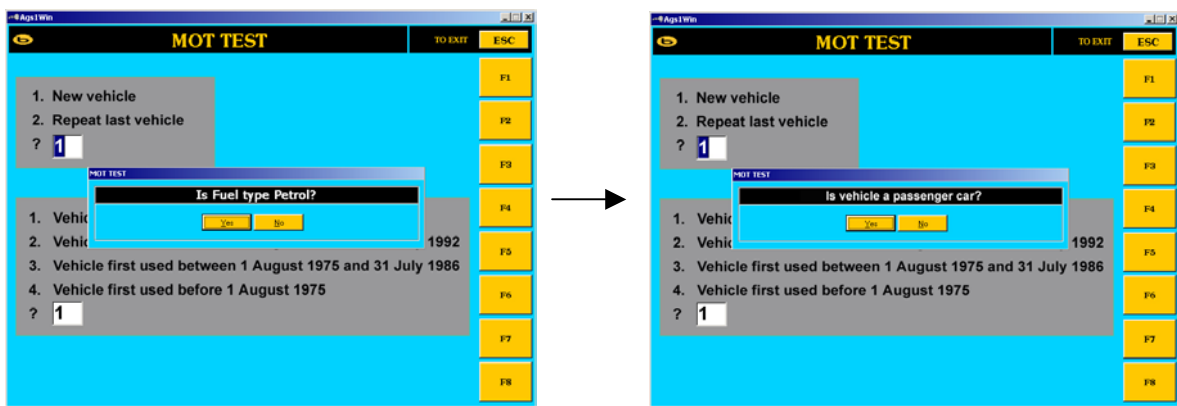
For the purpose of this manual we will assume that the software has been instructed to perform a BET test. For further information on the other test procedures, please contact the BOSTON technical department or your local agent.

7.1.2.3 BASIC EMISSIONS TEST

The Basic Emissions Test (BET) is a short test that applies default gas measurement limits to all vehicles manufactured after a specific date. The test limits are shown in section 7.1.2.5.

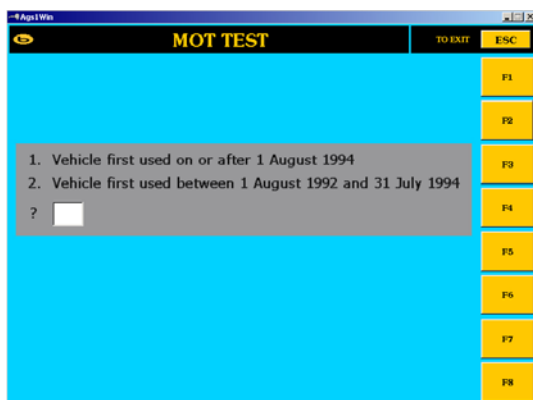
We will assume that the operator has selected to perform a new test and that the vehicle was manufactured after 1st August 1992. This would mean selecting option 1 from the top menu and option 1 from the bottom menu on the main MOT TEST page as shown above in section 7.1.2.2.

After making this selection, the software will ask the operator if the vehicle is a Passenger Car and if the fuel type is Petrol.



If the operator selects 'NO' to "Is fuel type Petrol?" then the software will perform an emissions test for Non-Catalyst vehicles not covered in this manual.

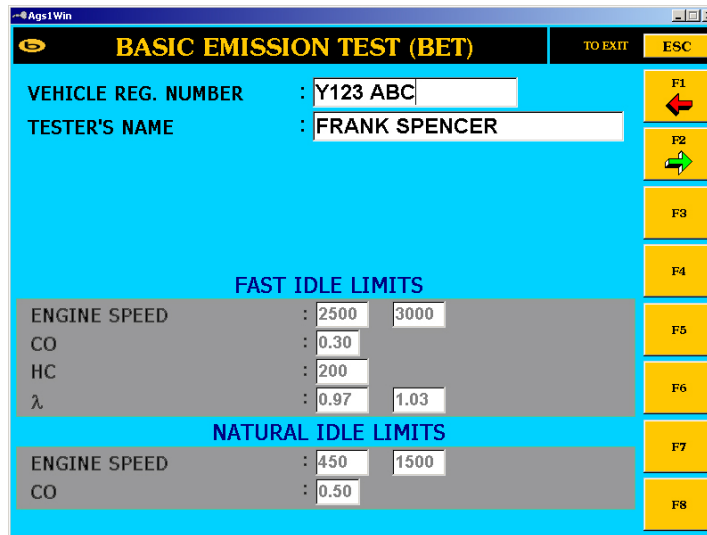
If the operator selects 'NO' to "Is vehicle a passenger car?" then a new menu will be shown.



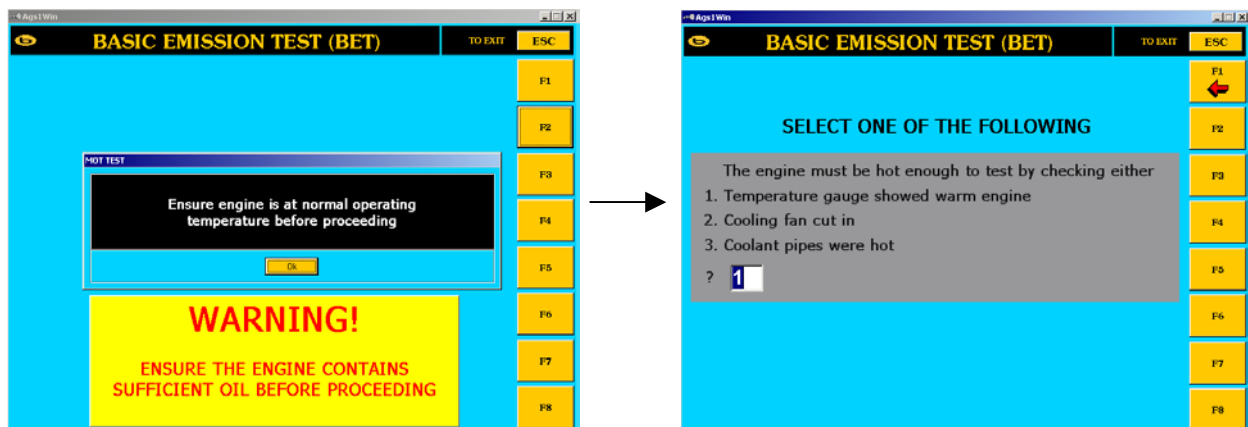
If the operator selects that the vehicle was used on or after 1st August 1994 then the software will continue using the BET test.

If the operator selects that the vehicle was used between 1st August 1992 and 31st July 1994 then the software will perform a test for Non-Catalyst vehicles.

We will assume that the operator selected 'YES' to "Is the vehicle a passenger car?" and "Is the fuel type Petrol?". This will instruct the software to continue using the BET test.

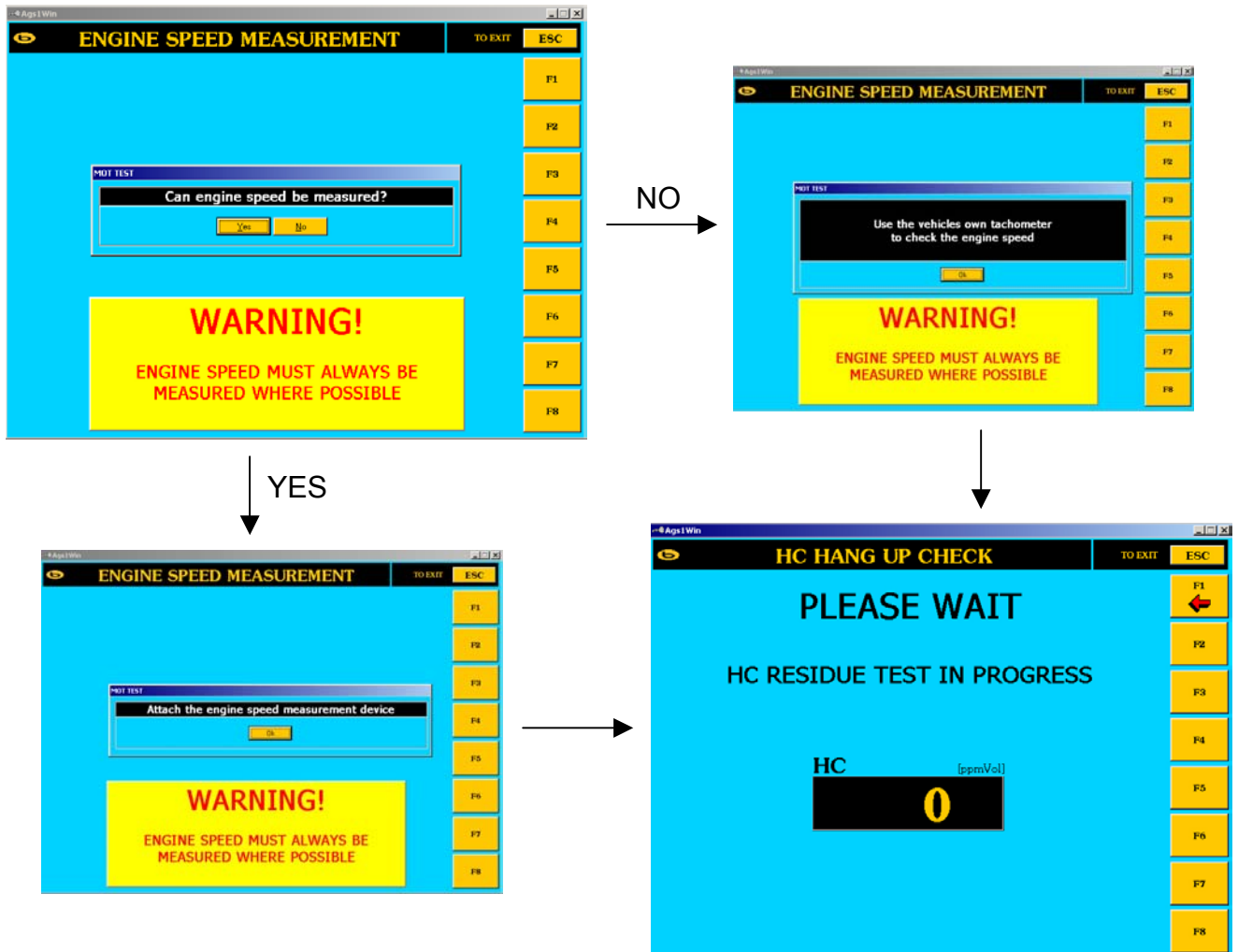


The operator must now enter the registration number of the vehicle and ensure that the 'TESTERS NAME' is correct. The testers name is always shown as the name of the tester who performed the last test. To change the name, simply enter new details into this field. The emission limits for the BET test are shown at the bottom of the display. Select F2 when the correct data has been entered.



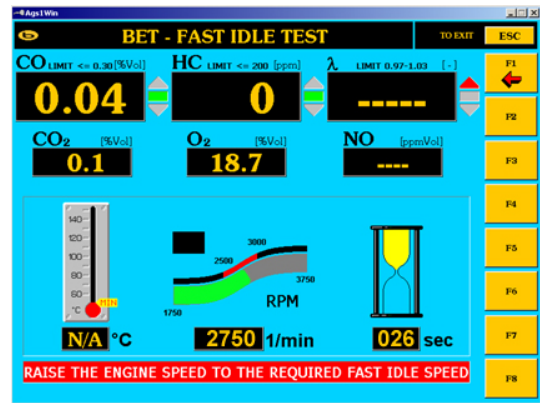
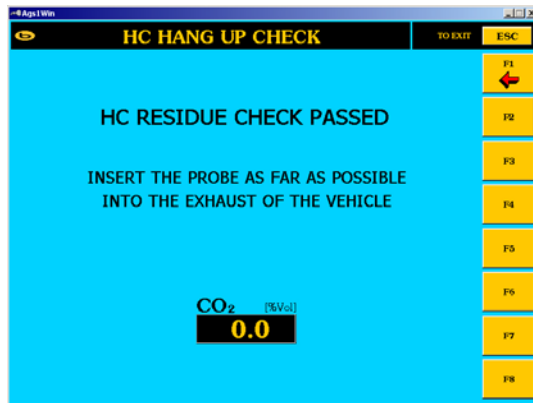
The software will now display a message telling the operator to ensure that the correct engine temperature has been reached. The operator must confirm this by pressing 'ENTER' and then selecting one of three options that would signify the engine was hot.

The operator must now select if the engine speed can be measured.



If the engine speed can be measured, the operator must attach the MGT300/R RPM measuring device to the vehicle as indicated on the display. If not, then the operator must use the tachometer fitted to the vehicle to ensure that the RPM is within the correct range during the test. For more information on connecting the RPM measuring device see section 6.4.4.

The software will now perform a “HC HANG UP CHECK”. This is a short automatic test to ensure that the analyser does not contain any Hydro Carbon (fuel) residue that could affect the end result of the emissions test. The maximum permissible amount of HC residue is 20ppm. If the HC test fails, this will be because the residue is too high. The operator will be given the option to repeat the test or abort the test. To purge the system of residual HC the pipework and filters should be cleaned and the unit be allowed to take in clean fresh air for a short period of time.



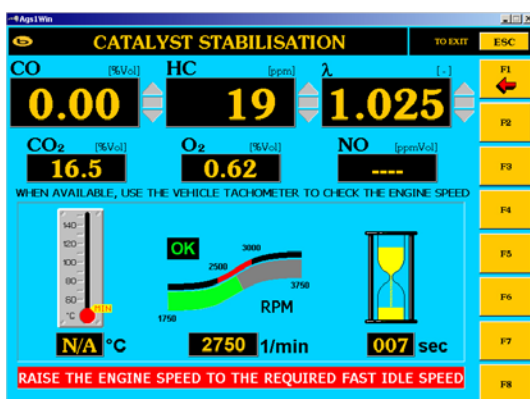
After the HC test has passed, the operator is instructed to insert the sample probe into the exhaust. The software will automatically detect the change in gas readings and move onto the next page.

The software will now enter into the “BET – FAST IDLE TEST” page where all the gas values are shown on the display. As the BET test is only measuring the CO, HC and Lambda values, it is only these readings that have the emission limits shown above them. They also have a red and green indicator to show the operator when the measured values are inside or outside of the allowed limits (see above).

If the operator selected that engine speed can be measured, the countdown timer on the right of the display will start to count down only when the engine speed is brought to within limits as indicated on the centre RPM graphic. The RPM limits for the BET fast idle test are between 2500 and 3000 rpm. When the RPM is brought to within limits, the operator must maintain the reading until the countdown timer reaches zero. If at any point the engine speed drifts outside the range, the countdown will reset back to 30 seconds.

NOTE: If the operator presses the ESC key at any time during the “BET - FAST IDLE TEST”, the software will give the operator the option to abort the test and to print partial results.

After the timer reaches zero, the software will continue into the “BET – CATALYST STABILISATION” (see below).



The operator must maintain the engine speed at between 2500 and 3000 rpm. If at any point the engine speed drifts outside the range then the countdown will reset back to 30 seconds.

After the timer reaches zero, the software will continue into the “NATURAL IDLE TEST”.

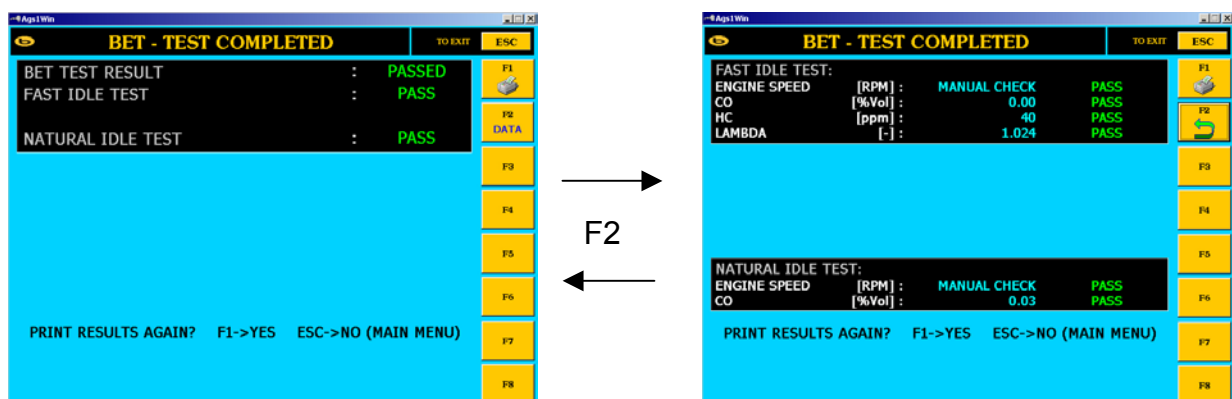


The software will prompt the operator to allow the engine to idle naturally and perform a 10 second countdown. After the timer reaches zero, another 30 second countdown is performed. During the 30 second countdown, the value of the CO is averaged over five second periods and is compared against the limit value. The test will automatically finish if the average value of CO in any 5 second period is within limits or the countdown finishes.

7.1.2.4 TEST RESULTS AND PRINTOUT

A message "TEST COMPLETED" will be shown and the operator is then prompted to disconnect the speed measurement device and remove the probe from the vehicle exhaust. The software then checks for an engine speed signal and the presence of oxygen or carbon dioxide to verify that the operator has removed both items from the vehicle. Once this is done, the software will check the result of the test. If the test result is a pass then the following page is shown. The software will automatically print two copies of the test results, one copy for the customer and the other for the MOT station. The operator can view the actual test data by pressing F2. Press F2 again to return back to the 'Test Results' page. Further copies can be printed by pressing the F1 key.

If the test failed, the software will automatically continue into another type of emission test whereby the operator must re-test the vehicle using specific vehicle data drawn from the on-board database. This test is not covered in this manual, but for further information please contact the BOSTON technical department or your local agent.



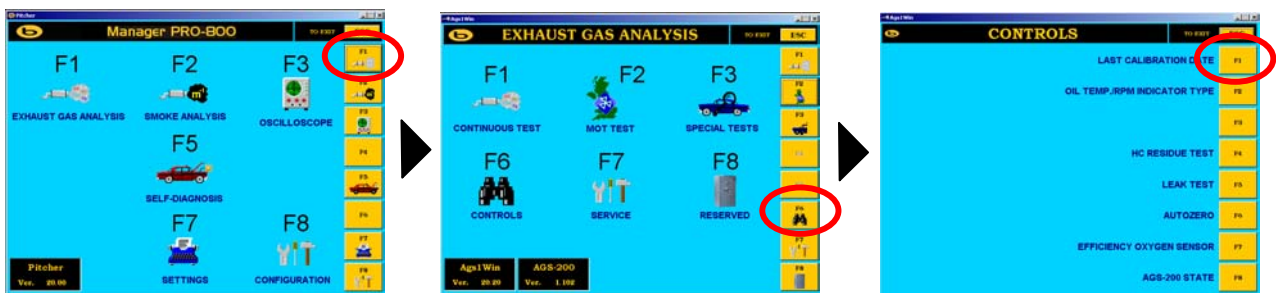
7.1.2.5 EXHAUST LIMITS - BET TEST

Fast idle Engine speed: 2500 – 3000 rpm
 CO limit: =< 0.30% vol
 HC limit: =< 200ppm
 Lambda: 0.97 – 1.03

Natural idle Engine speed: 450 – 1500 rpm
 CO limit: =< 0.50% vol

7.1.3 HOW TO CHECK THE CALIBRATION DUE DATE

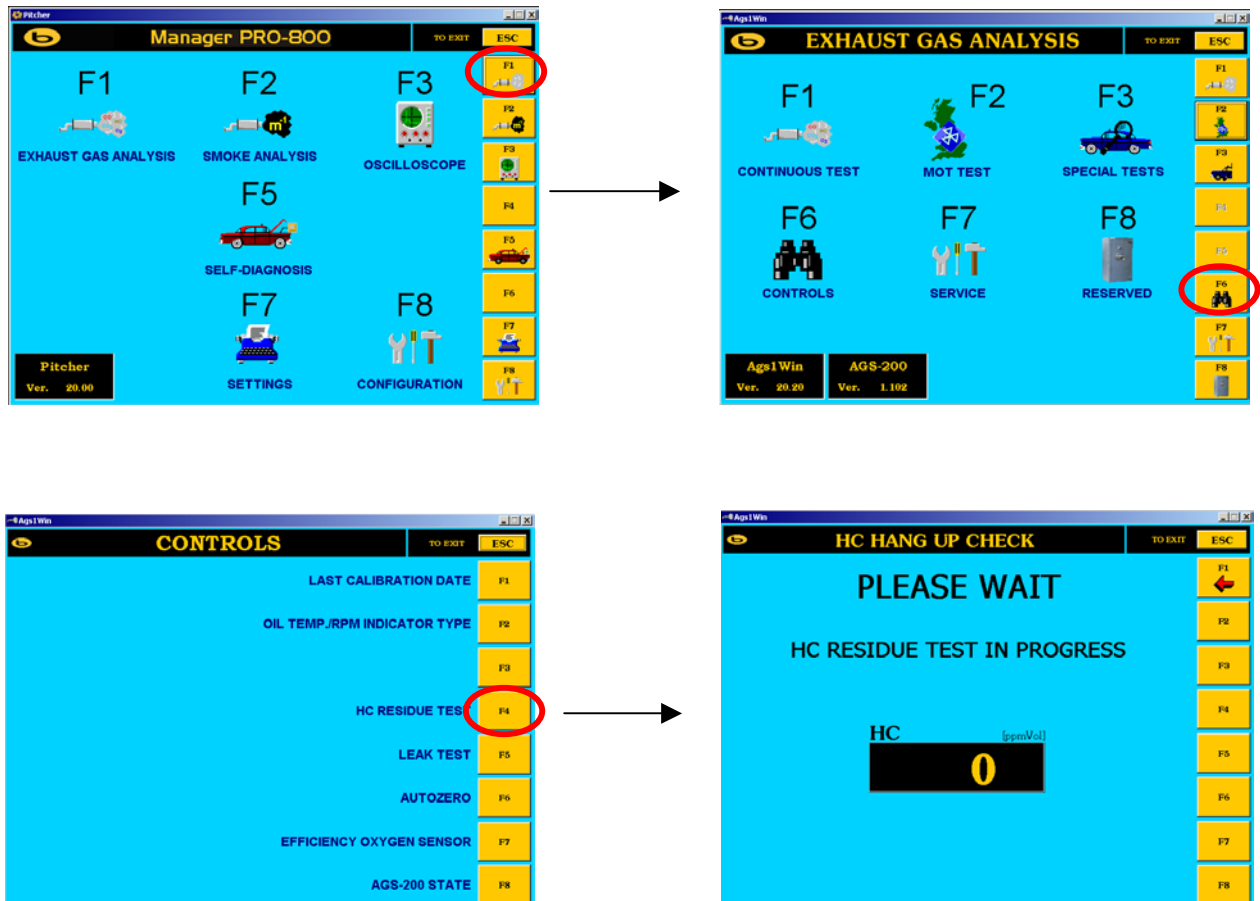
Enter the main menu of “EXHAUST GAS ANALYSER” and press F6 “CONTROLS”.
 Select F1 “LAST CALIBRATION DATE”.



Press 'ESC' to return to the previous menu.

7.1.4 MANUAL HC RESIDUE TEST

The HC Residue Test is performed automatically during the official test or can be performed manually by accessing the CONTROLS menu (F6) and then pressing F4.



The message PLEASE WAIT will appear during the test. This gives the analyser sufficient time to carry out the autozero operation. Once the autozero is complete, the measured HC value will be displayed in the window.

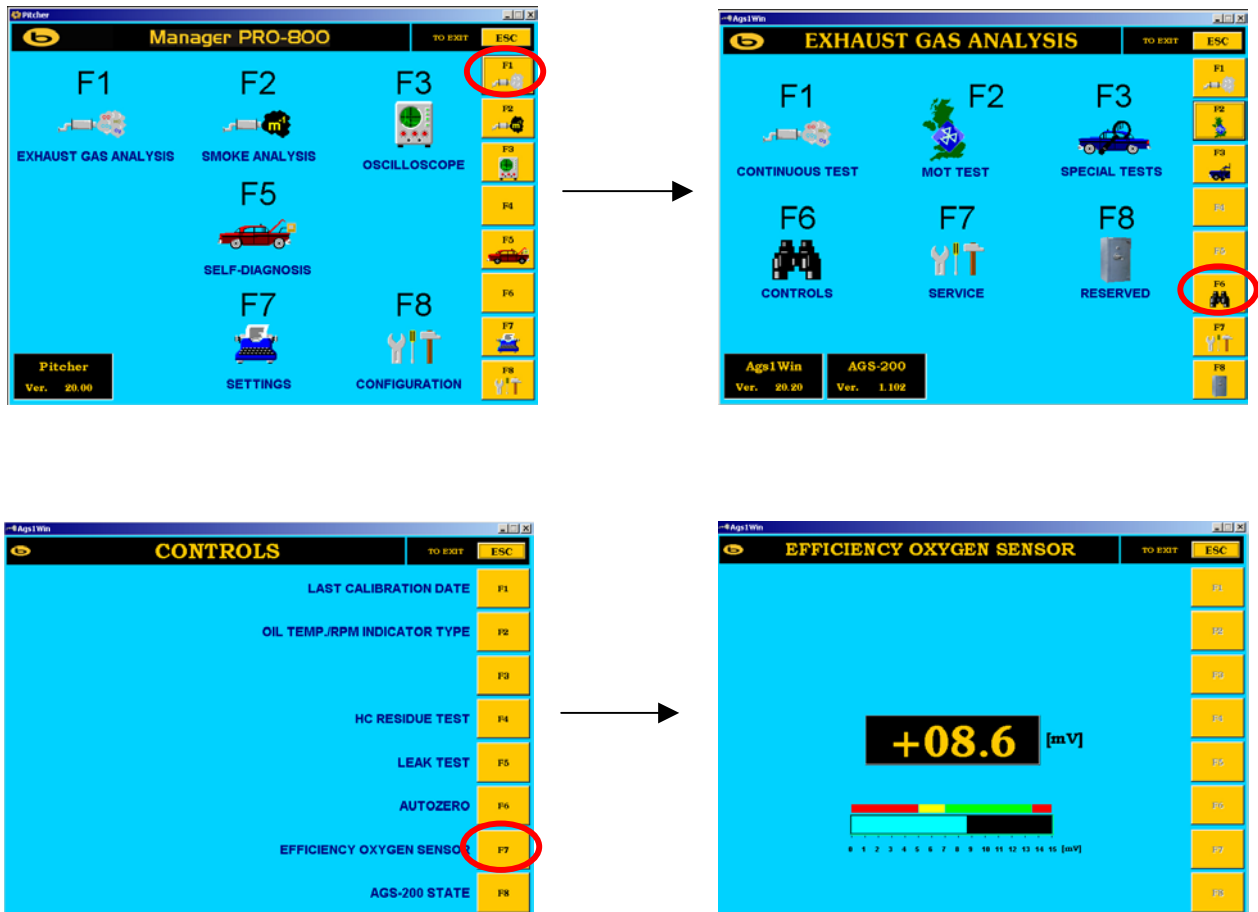
If the value exceeds 20 PPM the test will have failed, otherwise the test has passed.

If the test fails, it can be repeated to purge the probe filters and tubes. If the repeated test is also unsuccessful, the filters, pipework and sampling probe should be thoroughly cleaned. (DO NOT USE CLEANING FLUIDS OF ANY SORT)

7.1.5 O₂ SENSOR EFFICIENCY

Enter the main menu of “EXHAUST GAS ANALYSER”, press F6 “CONTROLS”. Then select F7 “OXYGEN SENSOR EFFICIENCY”

The pump will run for a short time whilst the software performs an autozero. The oxygen sensor output voltage is then measured and displayed on the following page.

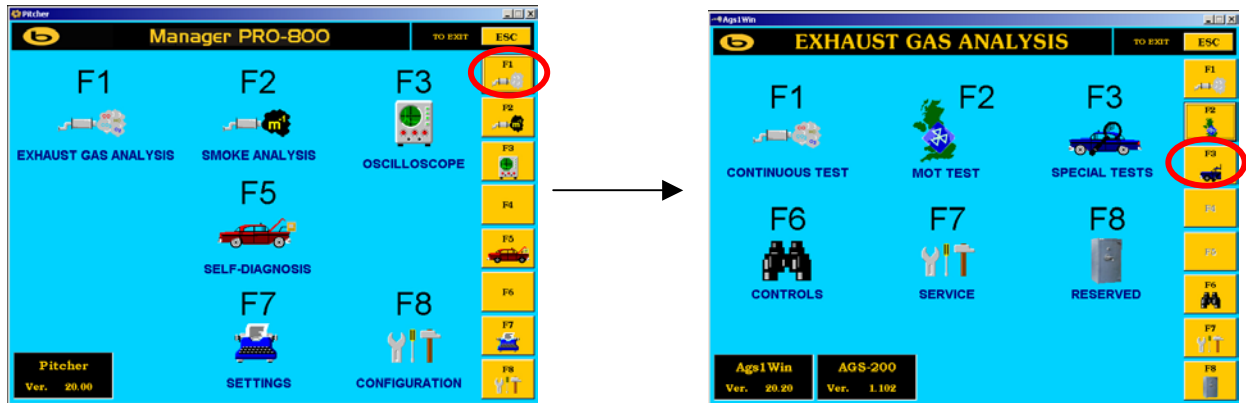


If the measurement range is within the green zone, the sensor can be considered efficient. If the measuring range is in the yellow zone, the sensor is becoming exhausted but can still be used for a short while. If the measuring range is in the red zone, the sensor is exhausted and must be replaced. In any case the software will notify the operator (also during official and special tests) if the sensor will shortly require replacement or if it must be replaced immediately.

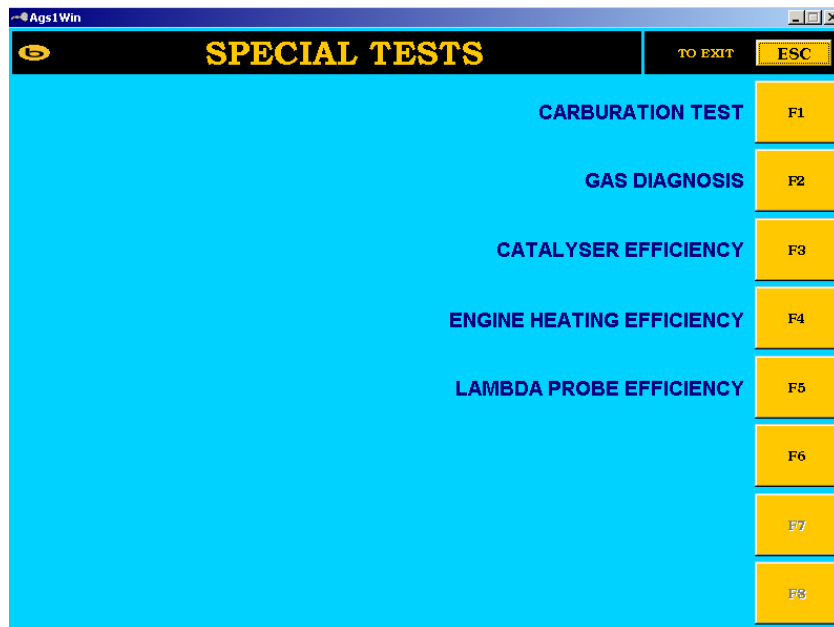
7.1.6 SPECIAL TESTS

This is an area of the software where the operator is able to perform several diagnostic 'special' tests.

Enter the main menu of "EXHAUST GAS ANALYSER" and press F3 "SPECIAL TESTS"

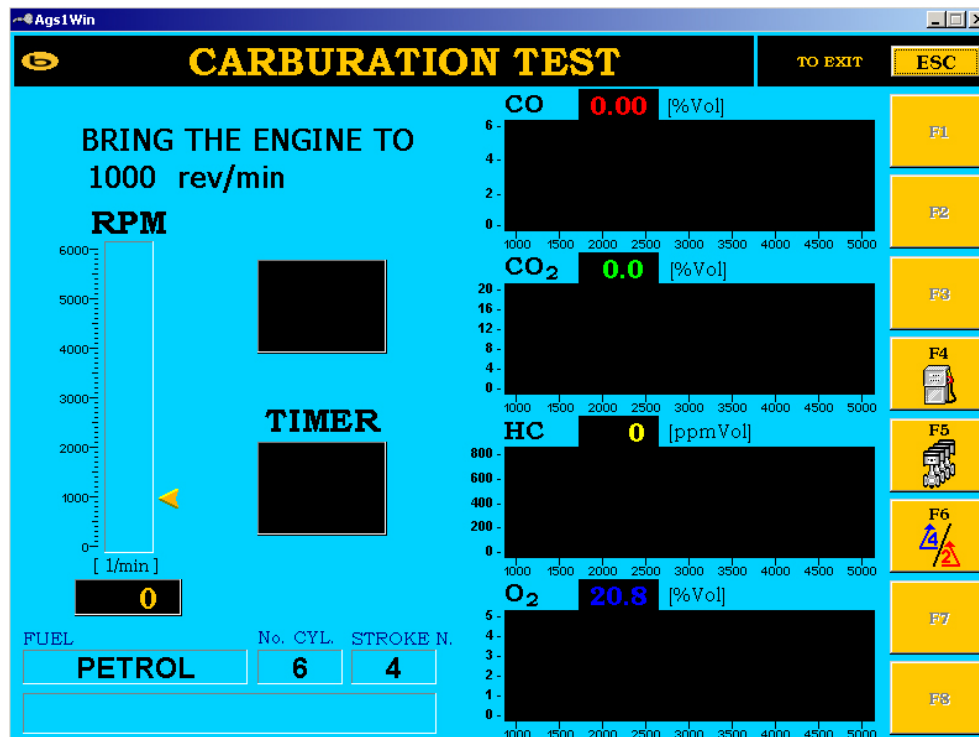
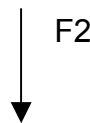
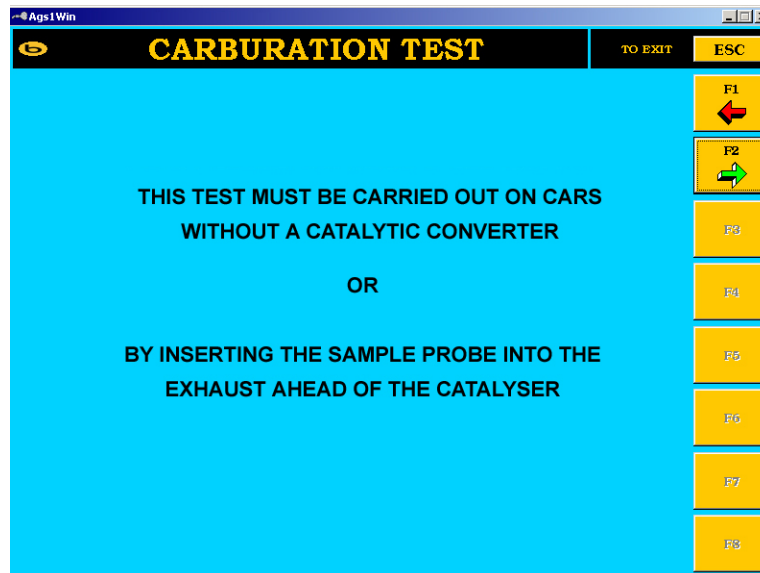


The list of available special tests will now be shown.



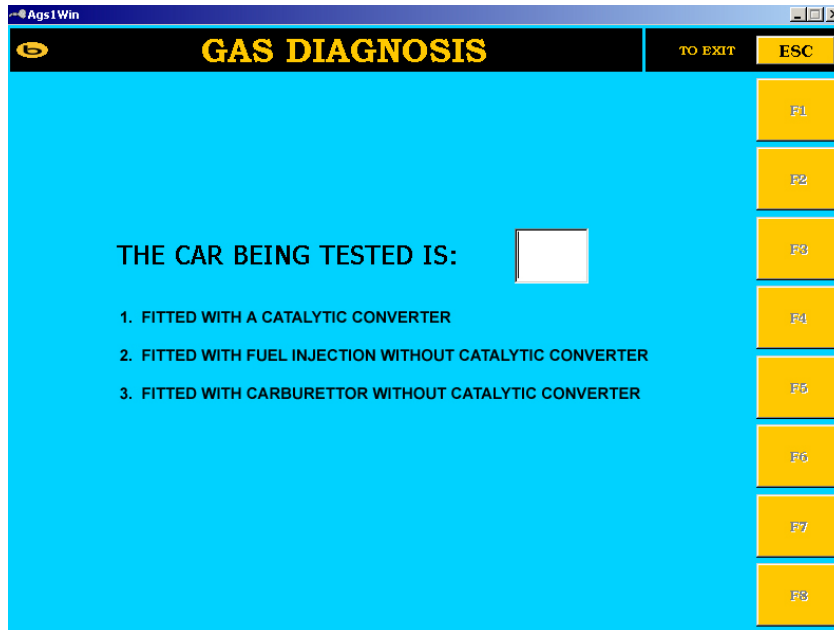
7.1.6.1 CARBURATION TEST

This test is designed for testing cars without catalytic converters and involves sampling the exhaust fumes at various engine speeds. The operator must follow the instructions shown on the display. This procedure is automated and the test result will appear in the bottom left of the display at the end of the test.

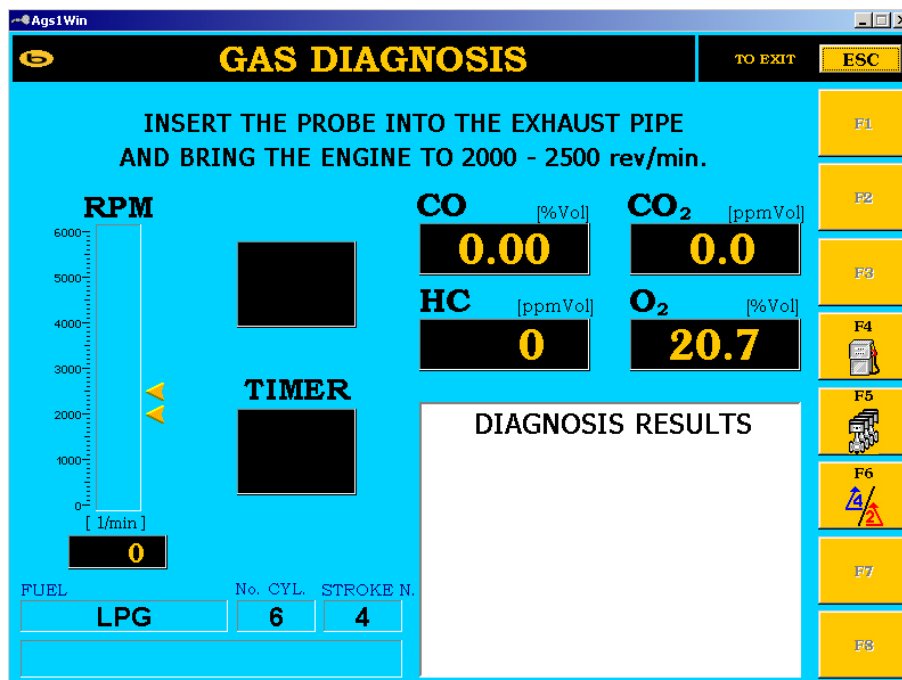


7.1.6.2 GAS DIAGNOSIS

This test is for vehicles without catalytic converters or where the sample probe can be inserted ahead of the catalytic converter.

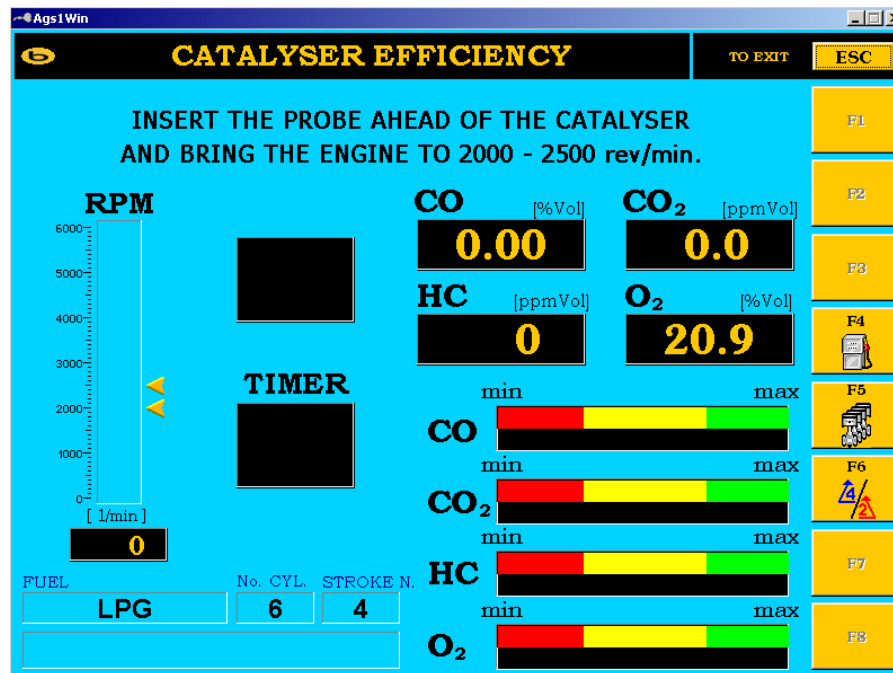


The test involves measuring the exhaust fumes at a raised engine speed of 2000-2500 rpm and at idle speed. The operator must follow the instructions that are shown on the display and the test result will appear at the bottom right of the display as indicated.



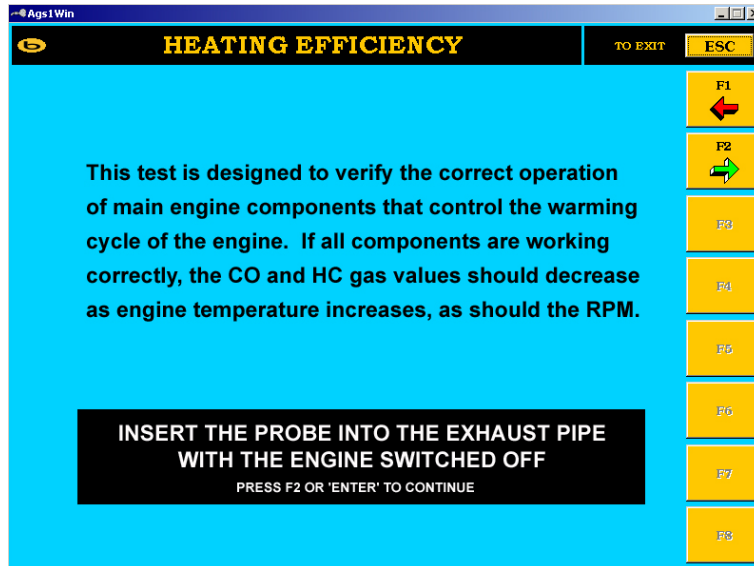
7.1.6.3 CATALYSER EFFICIENCY

This test is designed to test the efficiency of the catalytic converter by testing exhaust emissions before and after. The exhaust gases are measured at a raised engine speed of 2000-2500 rpm and at engine idle. The operator must follow the instructions on the screen. The efficiency of the converter will be shown in graphical format at the end of the procedure in relation to the four gases: CO, CO₂, HC and O₂.

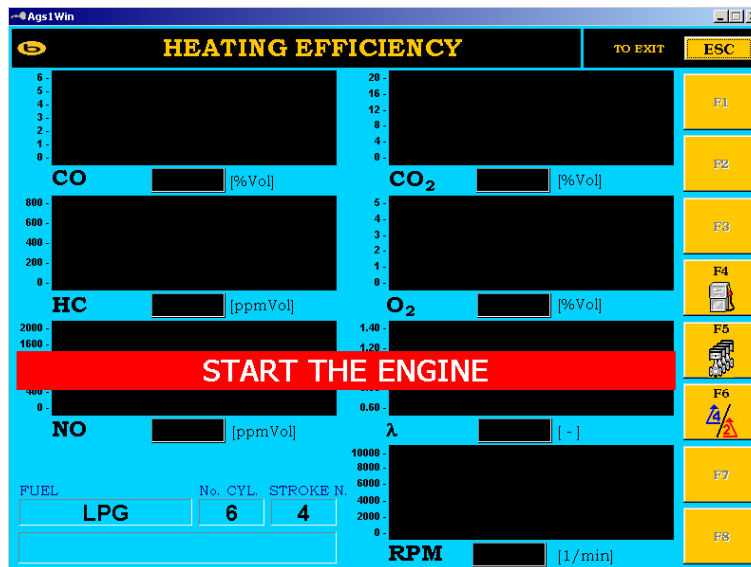


7.1.6.4 *ENGINE WARM-UP EFFICIENCY*

This test is designed to check the warming-up efficiency of the engine and the catalytic converter.



The probe should be inserted into the exhaust before the engine is started. The engine is then started and the exhaust gasses are sampled for 15 minutes at regular intervals whilst the engine is idling. At the end of the test, the operator must visually check that emissions of the four gases have reduced between the start time of the engine and the time when the correct engine operating temperature has been reached.



CHAP. 8 - MAINTENANCE

8.1 CLEANING THE FILTRATION SYSTEM

The filters installed in the AGS are very important since they protect delicate internal parts from dirt and impurities. It is essential to keep them clean.

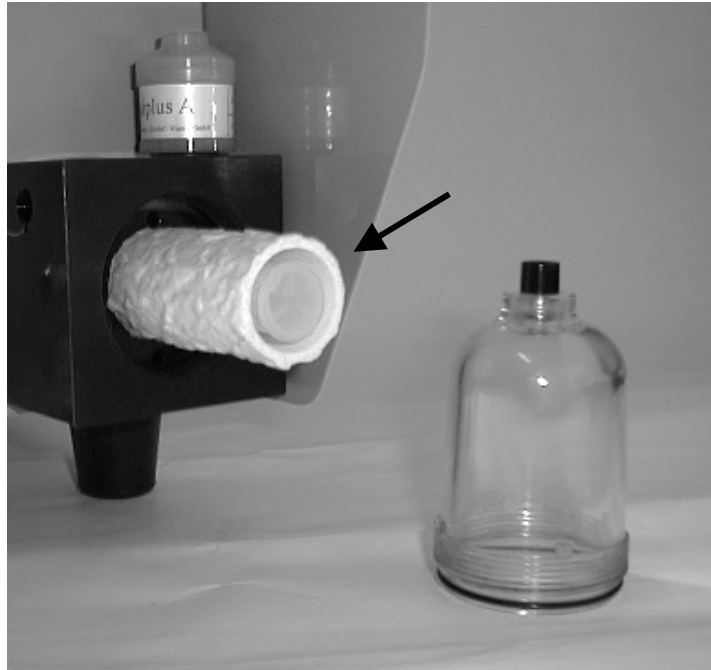


The arrow points to the clear plastic filter cup which must be unscrewed to allow access to the filters.

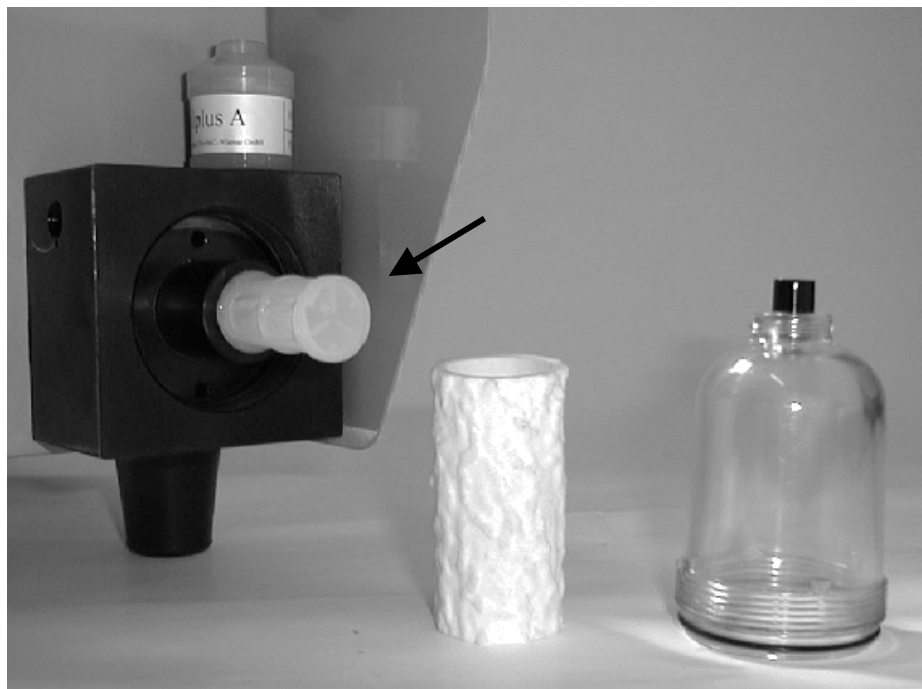
Two types of filters are housed in the cup:

- Coalescent filter, which must be replaced when its white surface becomes black, or at least once a month.
- Gauze filter, which must be washed at least once a month and replaced at least once every six months.

Unscrew the cup to replace the coalescent filter, indicated by the arrow.



Once the coalescent filter has been removed, the gauze filter indicated by the arrow can be replaced, or washed with soap and water.

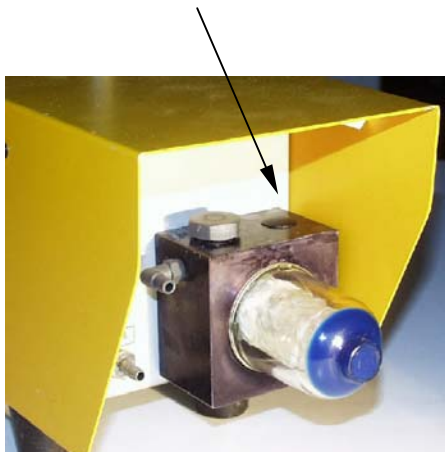


8.2 REPLACING THE OXYGEN SENSOR

The oxygen sensor is on electro-chemical cell that produces an electrical voltage in the presence of oxygen.

Over time it's efficiency decreases and eventually the cell becomes worn out. To replace the cell on the AGS-200, follow the procedure below.

- 1) Turn off the power to the AGS and unplug the small connector on the rear of the sensor.
- 2) Grip the sensor firmly and unscrew/remove from the black filter housing. This may be slightly tight if the sensor hasn't been replaced for some time.
- 3) Remove the new sensor from it's airtight packing and allow to stand in ambient air for approximately 10 minutes.
- 4) Attach the new sensor to the AGS and re-connect the plug.
- 5) Switch the equipment back on and use as normal.



8.3 REPLACING THE CARBON FILTER

This filter removes dust and unburnt hydrocarbons from the air before it is used to autozero the instrument. If the instrument is used in optimum conditions, this filter should be replaced once a year. To replace the filter, disconnect the tube that holds it in place and replace it with a new filter.

8.4 CALIBRATION AND INSPECTION

It is mandatory to have the instrument calibrated every 6 month.

This procedure is official and may only be carried out by authorised engineers.

The software will notify the user when the instrument is due for inspection by means of a page at the beginning of the MOT TEST.





At the end of the 6 month calibration period, the instrument can still be used, but the official MOT test procedure will be disabled.



CHAP. 9 - ERRORS

This chapter lists the errors that may appear during operation of the instrument. Full comments on the errors are displayed on the screen. For further information please contact your agent or the BOSTON technical department.

ERROR	Cause	Remedy	Ref.
	No connection between interface board and PC	<ul style="list-style-type: none"> ▪ Check serial connection cables 	
	Periodic inspection due	<ul style="list-style-type: none"> • Call technical service 	

CHAP. 10 - ACCESSORIES

	<p>NOX-010</p> <p>NO sensor for gas analyser AGS-200 and MANAGER-600</p>
	<p>RPM-010</p> <p>Cable to test Otto cycle and moped engine rpm for AGS-200 and MANAGER-600</p>
	<p>CPI-020</p> <p>Induction clamp to test Otto cycle engine rpm for AGS-200 and MANAGER-600</p>
	<p>CA-020</p> <p>12V battery power cable, with clamps, for OPA-100, AGS-200 and MANAGER-600.</p>
	<p>ST-030</p> <p>Temperature probe for MGT-300 , (Length 2m.)</p>
	<p>ST-040</p> <p>Temperature probe for AGS-200, OPA-100 (Length 6m.)</p>

For up to date information, contact your agent or visit our website www.boston-ge.com