

AUTO TEST[®] AUTO SMOKE

Diesel Smoke Meter





DECLARATION OF CONFORMITY

We, Auto Test Products Pty Ltd. declare under our sole responsibility that the product AutoTest Diesel Smoke Meter is in conformity with the provisions of the following Council Directive: 1999/5/EC.

A copy of the Declaration of Conformity is available from <http://www.autotest.net.au>

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1. FOR YOUR SAFETY

Read these simple guidelines. Not following them may be dangerous. Read the complete user guide. Further detailed information is given in this manual.



SWITCH ON SAFELY

Do not switch the device on when wireless device use is prohibited or when it may cause interference or danger.



INTERFERENCE

All wireless devices may be susceptible to interference, which could affect performance.



SWITCH OFF WHEN REFUELING

Do not use the device at a refuelling point. Do not use near fuel or chemicals.



USE SENSIBLY

Use only in the positions as explained in the product documentation.



QUALIFIED SERVICE

Only qualified personnel may install or repair this product.



WATER-RESISTANCE

This device is not water-resistant. Keep it dry.



CONNECTING TO OTHER DEVICES

When connecting to any other device, read its user guide for detailed safety instructions. Do not connect incompatible products.



BE MINDFUL OF HOT SURFACES

Watch out for hot temperature zones of vehicles, particularly the engine head, exhaust pipe, and radiator hoses.



BE MINDFUL OF MOVING PARTS

Watch out for engine cooling fan. Watch out for any moving parts of a running engine. Watch out for the engine cooling fan and any other moving parts of a running engine.



RISK OF FUMES INHALATION

Inhalation of fuel and exhaust fumes is harmful to health. Never start vehicles in a closed area. Always work in a well-ventilated area.



RISK OF DAMAGE TO EYES

Wear safety goggles when operating near vehicle battery as Battery acid, fumes, oil and dust particles might cause damage to the eyes.

2. ACRONYMS

AC	Alternate Current – Mains supply
CC	Cubic Centimetre
CO	Carbon Monoxide
CO ₂	Carbon Dioxide
DC	Direct Current – Battery supply
DSM	Diesel Smoke Meter
ECU	Engine Control Unit
EGA	Exhaust Gas Analyser
HC	Hydro Carbon
KM	Kilometre
Lambda (λ)	Engine efficiency
MOT	Ministry of Transport
NO _x	Nitrogen-Oxides
O ₂	Oxygen
PC	Personal Computer – Desktop or a Laptop computer
PEF	Propane/hexane Equivalency Factor
PPM	Parts per million
RPM	Revolution Per Second – Engine speed
SPI	Serial Peripheral Interface Bus

3. UNPACKING AND FIRST TIME USE

Congratulations on your choice of AUTOTEST™ Diesel Smoke Meter (Auto Smoke). Please take the time to read this document before using Auto Smoke in the field. Incorrect or inappropriate use of this instrument may void the warranty. Please retain the packing materials for future shipping and transport of the unit for periodic calibration.

Please complete the warranty registration card and post it to AUTOTEST™ Products Pty Ltd, alternatively visit our website www.autotest.net.au and complete your warranty registration on line. Your warranty registration ensures that you are kept up-to-date on any software or hardware changes to your AUTOTEST™ Diesel Smoke Meter (Auto Smoke). It also helps us to provide you with faster services.

4. PRODUCT DESCRIPTION

4.1 Overview

AUTOTEST™ Diesel Smoke Meter (AUTO SMOKE) is intended for measurement of smoke opacity of diesel-run engines. Auto Smoke is intended for passenger cars and light commercial vehicles, and is approved for MOT testing of Category A vehicles (including MOT Class IV, VII and Single Vehicle Approval Scheme vehicles). Auto Smoke measures smoke opacity in terms of *light absorption coefficient* (K) or m^{-1} .

Auto Smoke has a built-in Wi-Fi module device to communicate with the PC. Smoke tests can be carried out using a PC connected to the AutoSmoke via the USB cable provided, or Wi-Fi connection.

Auto Smoke is durable and resistant against shocks and vibrations, dirty environment, light rain, EMI emission. The equipment complies with the EC requirements (CE certified). Auto Smoke is compliant with the following standards:

ISO:

- ISO3173
- ISO11614

CE Directive (Smoke measurement):

- 72/306/CEE
- 91/441/CEE

CE Directive (Emission test in Europe)

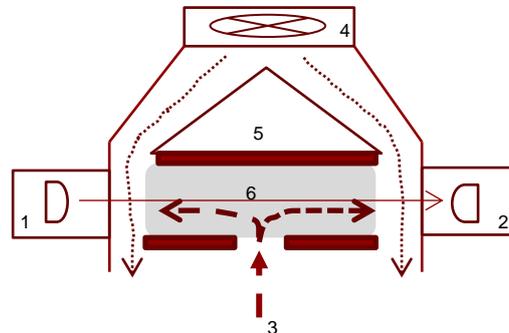
- 96/96/CE (20 Dec 1996)
- 2003/27/CE (03 Apr 2003)

4.2 Auto Smoke Mainframe

The mainframe of Auto Smoke contains all the necessary electronic and mechanical assemblies required for measuring the smoke opacity. The side panel of the mainframe unit contains power input plug and an On/Off switch, as well as all the necessary input/output connector ports. A smoke sampling probe provided with the unit allows the exhaust smoke to pass into the sampling chamber, where the intensity of the smoke is measured.

4.3 Measurement Technology

Auto Smoke uses light emitting diode (LED) to determine the opacity of the exhaust smoke. The following diagram outlines the smoke opacity measurement principle used in the Auto Smoke.



1	Light Source	4	Ventilation fan
2	Light Detector	5	Heating elements
3	Exhaust Gas Input	6	Measurement cell

The exhaust smoke flows through the smoke inlet port through the measurement cell or smoke chamber and out from the outlet ports. At one end of the measurement chamber, an LED light source emits visible light between 480 nm and 680 nm with a peak value of 565 nm. The light is emitted in pulses every 20 millisecond to reduce the effects of ambient static light. The light source is protected by a convex lens, which reduces reflections on the walls of the measurement cell.

On the opposite end of the smoke chamber, a detector receives the emitted light by the LED light source. The lens of the detector is protected and the temperature is maintained at 45°C to avoid variation in measurement due to the effects of variations in temperature. The detector detects the amount of light that is lost on its way from the emitter to the detector and correlates it to the opacity of the smoke/gas in the gas bench.

The temperature of the smoke bench tube is maintained at 80°C to eliminate condensation building up in the smoke chamber.

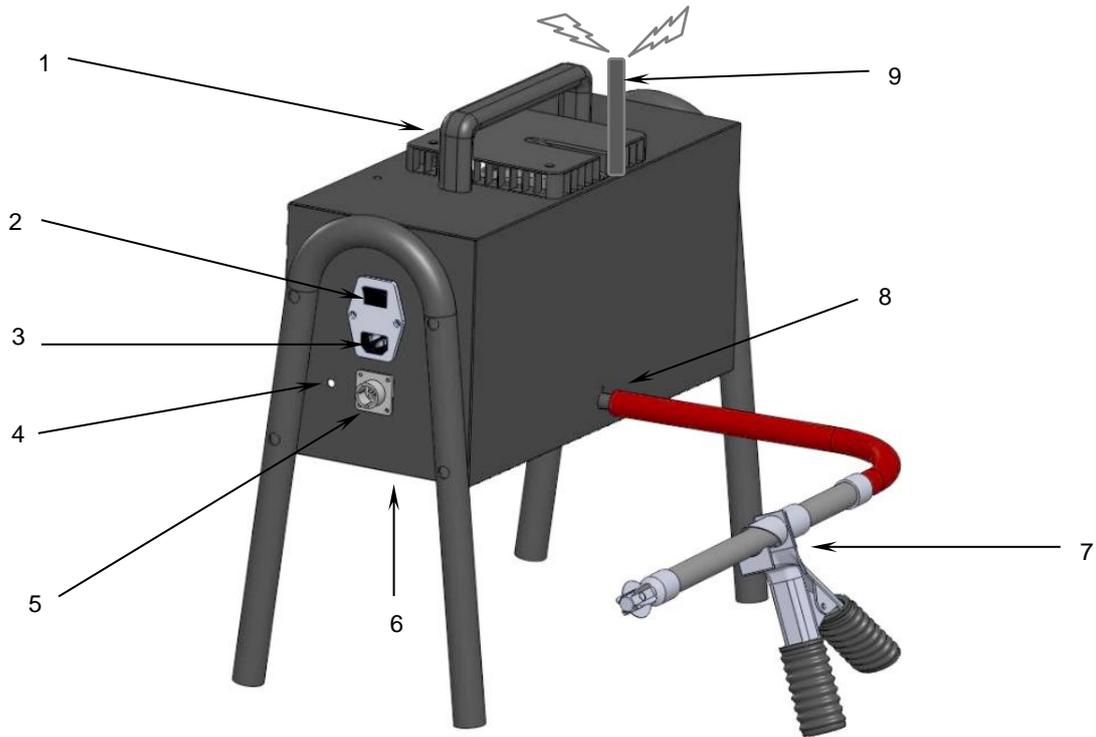


Fig. 1

- 1 Exhaust fan
- 2 ON/OFF switch
- 3 AC input
- 4 Status Indicator LED
- 5 PC connector

- 6 Gas outlet port
- 7 Sampling probe
- 8 Smoke gas inlet
- 9 Wireless RF antenna



When Auto Smoke is first started, it will go through its initial warmup process. The warmup time should not be longer than 10 minutes over a temperature range of 0-50°C. Once the warmup is complete, Auto Smoke will try to maintain the temperature of the measurement cell at 80°C.

A built-in fan aids in preventing the lenses from sooting, in maintaining the effective length and in favouring gas evacuation. The fan is equipped with an RPM sensor, which is used to monitor the constant speed of the ventilation fan. Smoke sooting may deposit over glass windows of the sensor and detector over time. Cleaning of the glass windows once a month is sufficient under most cases. The lenses must be cleaned with a dry cotton-duster.

The surface of the measurement cell is made of black-mat-anodic-aluminium, thus the reflection of the emitted light on the inner walls is eliminated. The chamber tube has a length of 215 mm (± 0.5 mm) and a diameter of 21 mm.

4.4 Standard Accessories

The following table lists the standard accessories supplied with Auto Smoke.

Smoke sampling probe

Adjustable up to 26 mm length
with diameter of 34 mm
(Code: 151016)



AC Power Cord
(Code: 104089)



Cleaning brush
(Code: 151025)



Optical filter
(weekly check filter)
(Code: 917836)



4.5 Turning On the Device

AUTOTEST™ Diesel Smoke Meter (Auto Smoke) can be powered up using AC power supply (AC mains, wall socket). Some selected smoke meters can also operate on vehicle’s 12V battery.

4.5.1 Using AC Mains

When running Auto Smoke using AC mains, please ensure that the AC supply meets the following conditions:

110 – 230 V_{AC} (+10% to -15%) at 50-60 Hz ($\pm 2\%$) frequency

Ensure the live phase is on the right side of wall socket. Phase to Neutral voltage should be 230V_{AC} and Phase to Earth should be 230 V_{AC}.

4.5.2 Using Vehicle Battery (DC power supply) (Selected models only)

When running Auto Smoke via the vehicle’s battery, please ensure the rating of the vehicle’s battery is over 60 AH. The battery voltage must not exceed the maximum rated voltage.

The tolerance of the DC power supply is given below:

- 13.5 V_{DC} $\pm 15\%$
- 65 W power rating

To power up Auto Smoke using a vehicle’s 12V_{DC} battery, connect one end of the supplied battery cable to DC input of the Auto Smoke and connect the other end, which contains two clamps, to the terminals of the vehicle’s battery. Ensure that the red clamp connects to the positive (+) terminal of the battery, and the black clamp connects to the negative (-) terminal.

Once the battery cable is connected, use the ON/OFF switch to turn ON or OFF the device.

5. INTERFACING AUTO SMOKE WITH PC

The AutoSmoke is a standalone unit that needs to be connected to the PC via either a USB/Serial RS232 Cable or over a Wi-Fi connection. If your PC does not have Wi-Fi built in, an external dongle can be used.

5.1 Software Installation

Installing the PC software:

(System Requirements: Microsoft Windows 2000 or greater, .NET Framework 2.0, 100 MB of hard disk space)

Optional Requirements

- Wi-Fi functionality
- Bluetooth functionality

Installation steps:

- Insert AutoTest Emission Tester software CD into your CD-ROM drive; if you are given a USB drive instead, plug it into your PC
- Select and run “*setup.exe*” (or “AutoTest_EmissionsTester_v2.00.exe”)
- Follow on-screen prompts to complete installation

Start the PC software once it has been installed successfully.

5.1.1 Installation of MTS Certification Keys – UK Only

AutoTest® Emission Tester software allows user to perform emission tests from PC as well as to upload these tests directly to the MTS. If your keys have already been installed when using a Gas Analyser and the Emission Tester software, this step can be skipped.

To install MTS Certification Keys to allow for directly uploading tests please follow these steps:

1. From the main dashboard click settings. Then click the tab MTS Client Certificates.

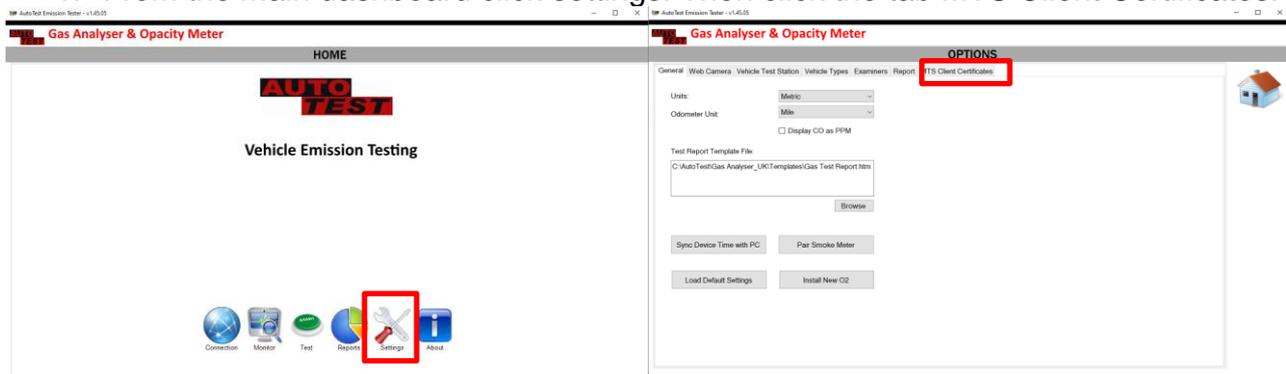


Figure 1 Dashboard Menu

Figure 2 Settings Menu

2. First click “Browse Client Certificates” to locate your certificate files.

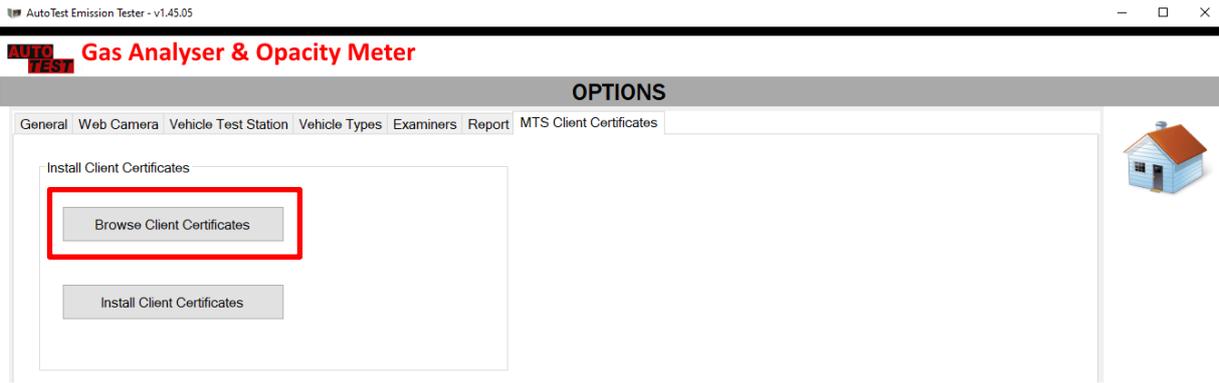


Figure 3 MTS Client Certificates

- Then Select all files by holding control and clicking each individual file. There must be 5 files matching your client number named as shown below, then click “Open”.

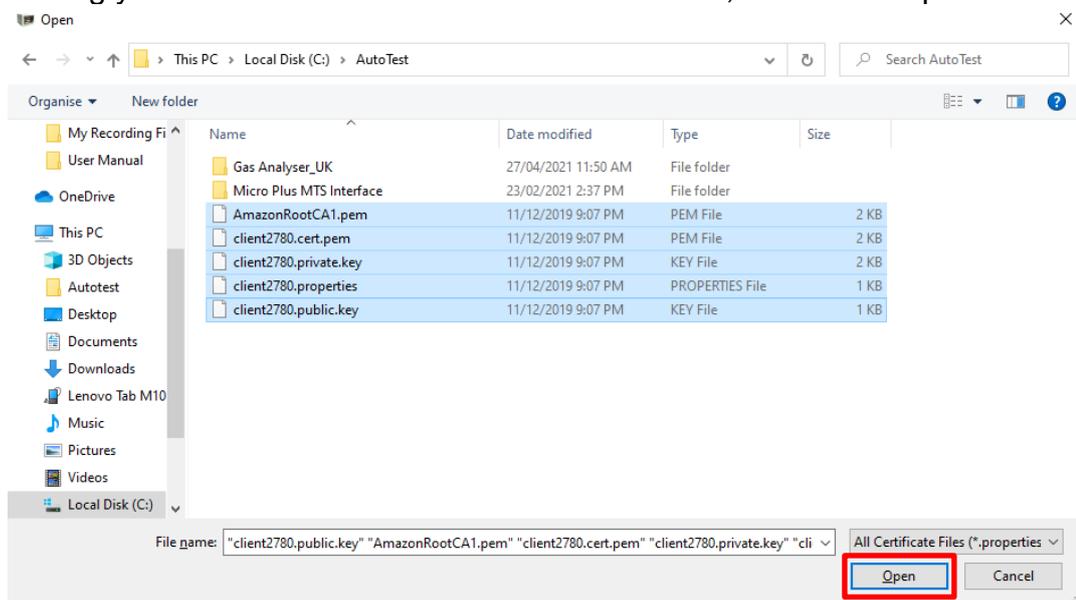


Figure 4 Browse Client Certification files

- Now click “Install Client Certificates”. Then click Yes when asked to allow the program to make changes to your PC. This may require administrator permission.

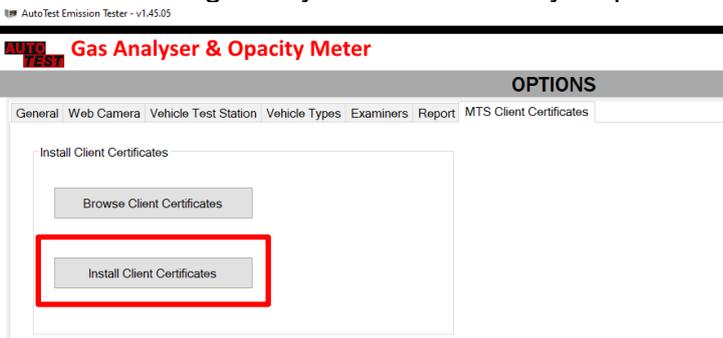


Figure 5 Install Client Certificates

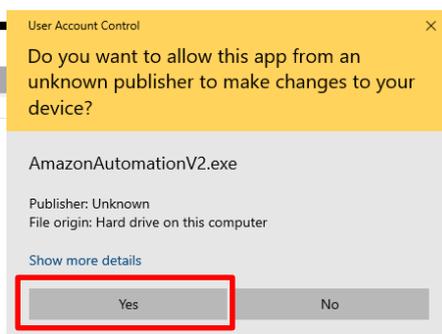


Figure 6 Permission Window

You can now upload Emission Tests to the MTS server.

5.2 Connecting the AutoSmoke to the PC

Connect one end of the supplied USB RS232 serial cable to AutoSmoke and connect the other end to the PC.

Turn on AutoSmoke meter. Make sure the cable is connected before turning on the unit. If you connect it after the unit is on, restart the unit or it will not be able to connect!

In AutoTest Emission Tester software, click on the  (Connection) icon to open the connection page.

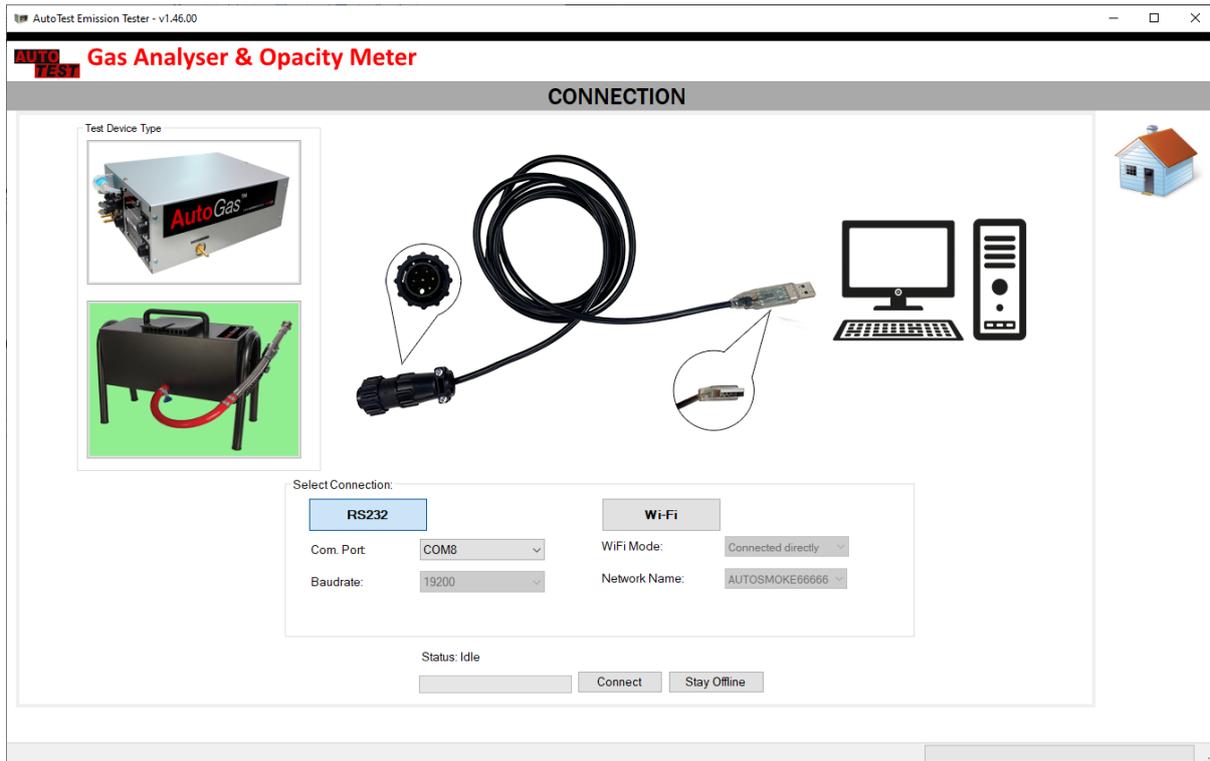


Figure 7 – Connection Page

If it is not already selected, select the Smoke Meter Test Device Type, and the RS232 connection type. Then, select the serial COM port to which AutoSmoke is connected. For desktop computers with RS232 support, the communication port is likely to be COM1. If a USB-to-serial adapter is used enter the communication port number that the computer displays on the lower-right corner of the screen (near clock) when the USB connector is attached to the computer (it can also be found from “Control Panel -> Device Manager -> Ports”). COM Ports in use are moved to the top of the list, so are usually one of the top few options depending on how many are in use on the PC.

The baudrate should be as 19200.

Now, click on the “Connect” button to establish connection.

Note: In case if the connection with AutoSmoke is suddenly lost, you need to reconnect to the AutoSmoke. If this is not working, restart AutoTest Emission Tester software.

5.3 Connecting via Wi-Fi

The AutoSmoke can also be connected to your PC via Wi-Fi wirelessly. This is particularly useful in crowded garage spaces where wiring, space and distance to the vehicle being tested is an issue.

All Wi-Fi functionality of the AutoSmoke will require the PC to have Wi-Fi connectivity, either in-built or using an external Wi-Fi Dongle.

To connect to the AutoSmoke via Wi-Fi, select the Test Device Type as AutoSmoke and Connection Type as Wi-Fi.

Connected Directly

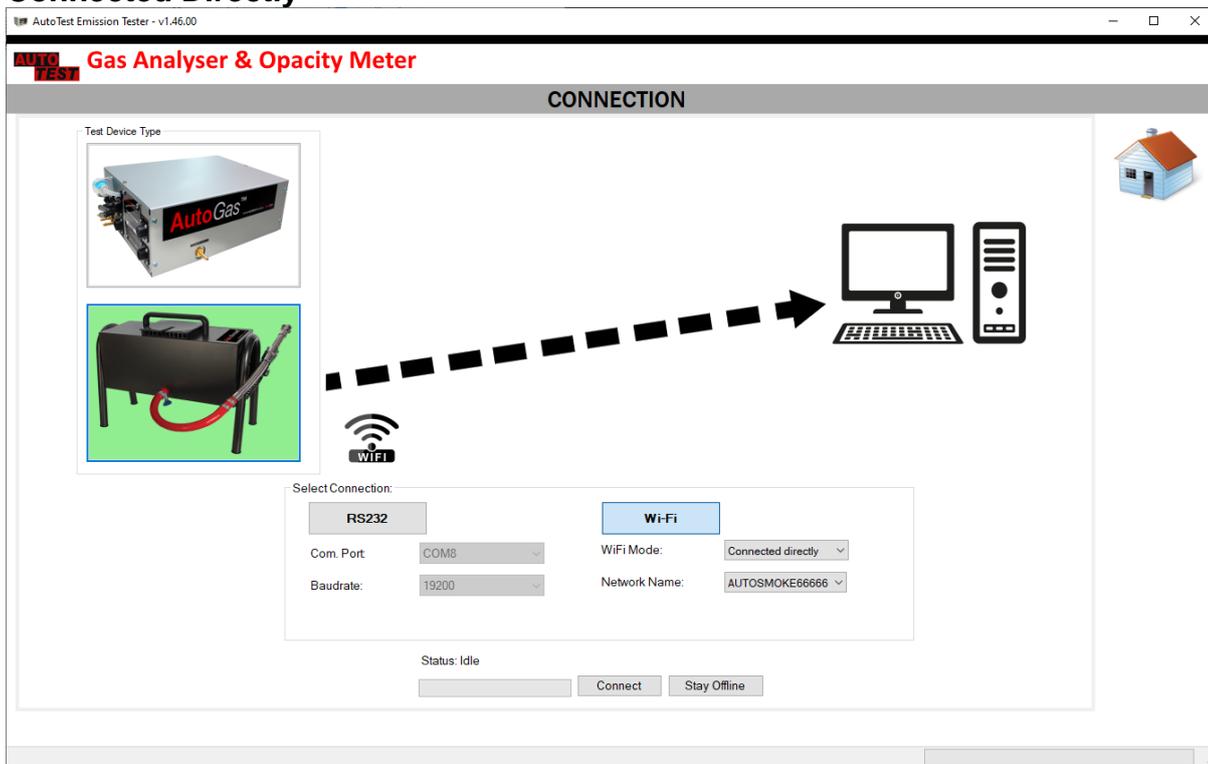


Figure 8 Connection Page

This is the Wi-Fi connection type available immediately out of the box, by default.

The LED on the front of the AutoSmoke Unit should be flashing a Green colour, this indicates it is set to connect directly.

Click the Network Name dropdown box and select the Wi-Fi network named ‘AutoSmoke12345’, where 12345 will be the serial number of the unit. If there are no networks appearing, make sure the PC has Wi-Fi capability, the AutoSmoke is turned on and click the windows internet connection button icon in the bottom-right corner of the screen to refresh the scan of networks.

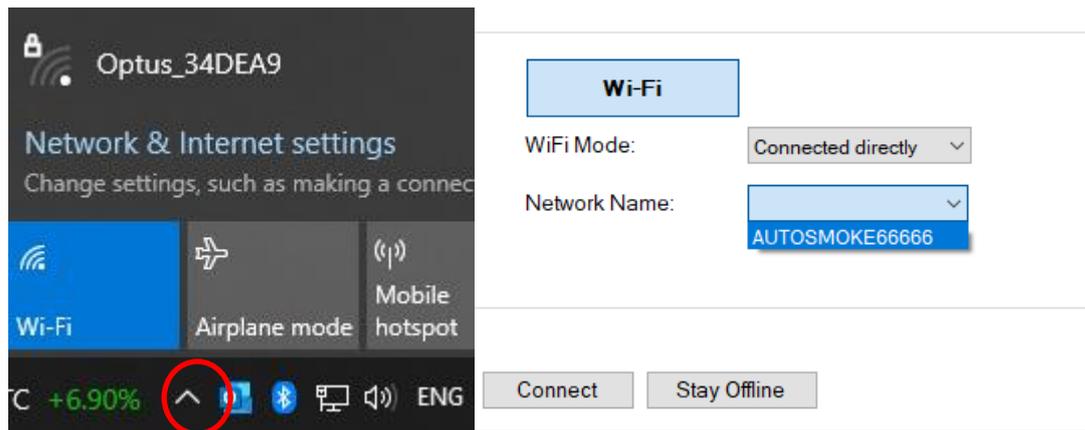


Figure 9 Network Icon and Selection

If correct, the AutoSmoke Wi-Fi network can be selected. Then, simply click connect.

The Green LED will flash at slowly (0.33Hz) when ready for connection, faster (1Hz) when the PC is connected to the network and quickly (5Hz) when connected to both the PC and the Emission Tester Software.

Connected via Router

To connect to the AutoSmoke via Router, make sure the settings have already been changed via RS232, as this is not the default setting.

To confirm the settings are on Connected via Router, the LED on the back of the unit will be flashing in Red.



Figure 10 Connection via Router

First select the router Wi-Fi network that will be connected and enter the IP Address of the AutoSmoke (as set up in the Wi-Fi Connection Settings page via RS232).

Then before clicking the Connect button, the PC must be connected to the same Wi-Fi network. If this connection is not already in place, connect to the network via your PC Wi-Fi settings. This can be accessed in the bottom right corner of the screen by clicking the Network Icon, then click the Network and enter the Password to connect.

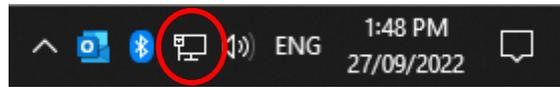


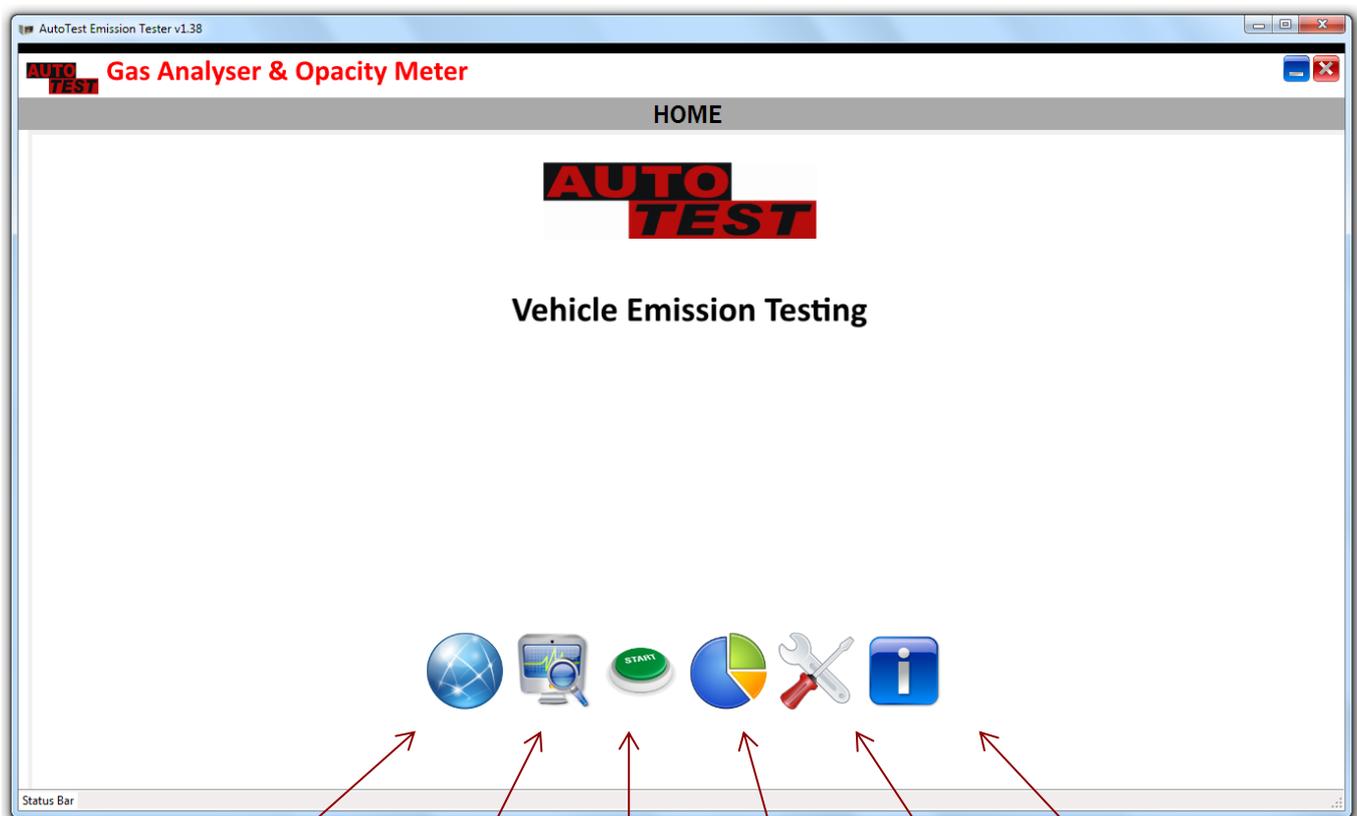
Figure 11 Network Icon

The Red light will flash slowly (0.33Hz) when ready to connect, quicker (1Hz) when connected to the router and quickly (5Hz) when connected to both the router and Emission Tester Software.

If the AutoSmoke is not connecting, check via Router settings that the AutoSmoke is connecting to the router. If not check the AutoSmoke Wi-Fi settings when connecting via RS232.

5.4 Main Menu

AutoTest Emission Tester software allows users to configure a smoke meter as well as to perform an MOT smoke test. The main menu is shown below.



Connection

Live View

Run Test

View Reports

Settings

About

5.6 Real Time View

Once AutoTest Emission Tester software is connected to AutoSmoke meter, click on the  (Monitor) icon to open the real-time view page.

Please be noted that the PRM reading comes from the RPM connection initiated in the last test conducted if the Meter or software has not been closed since (ref **Error! Reference source not found.**).

Alternatively, clicking Test OBD allows you to connect to the OBD-II via the PC Bluetooth if available. This will require Bluetooth Connectivity from the used PC. The user will need to search for nearby Bluetooth devices and then select “OBD-II” and connect.

The Zero Smoke button can be used to manual zero the smoke meter.

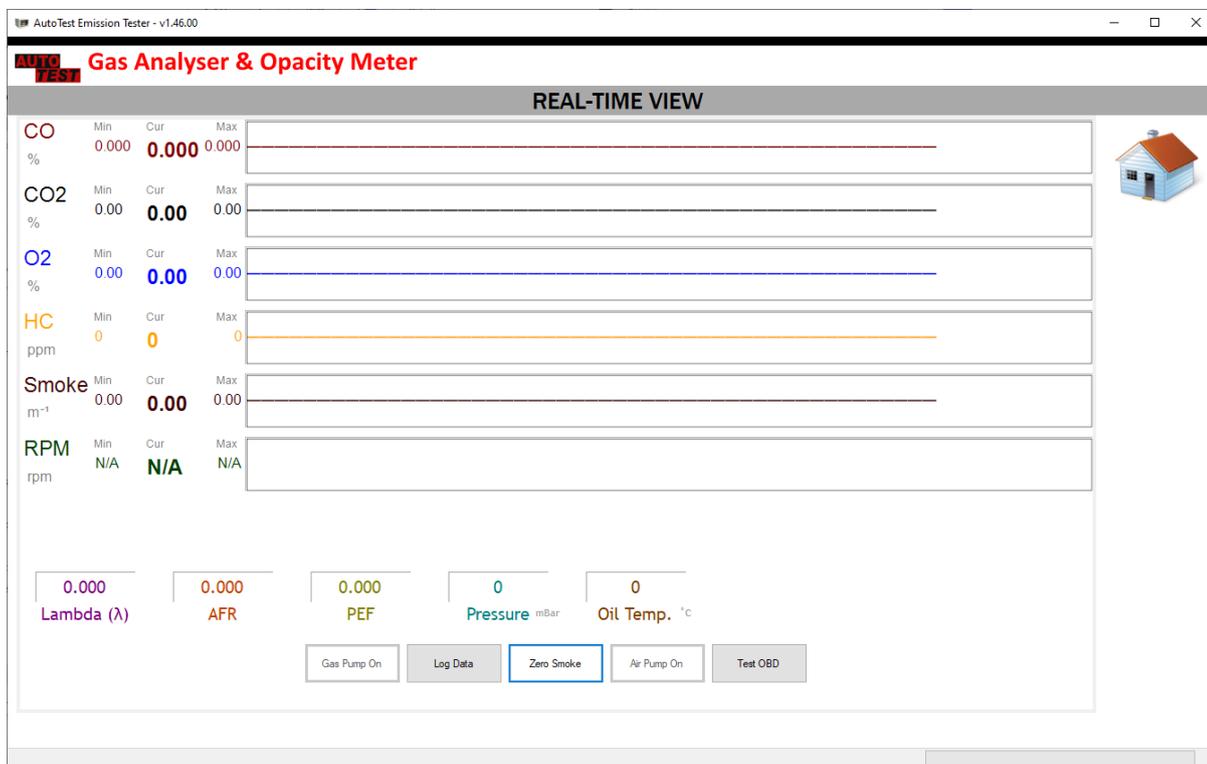


Figure 12 – Real Time View Page

The Log Data button will start logging the values recorded by the Smoke Meter in a .log file called GasLog - #####.log. Logging can be stopped by clicking the same button again that will show Stop Logging. The .log file will be located in the installation directory: C:\AutoTest\Gas Analyser_UK\.....

6. DIESEL SMOKE TEST VIA AUTO SMOKE

6.1 Preliminary checks

Make sure the vehicle is securely parked. The vehicle should be running at normal operating temperature. Do not carry out the test in an enclosed area. Always take caution when working near engine or moving parts. Make sure the vehicle contains sufficient engine oil.

6.2 Engine oil temperature and RPM measurement

OBD-II scanner connects to the vehicle’s OBD-II interfacing port and transmits the engine RPM and oil temperature readings of the vehicle to the PC via Bluetooth.

Locate the OBD-II port on the vehicle, which is usually located under the steering wheel or near the fuse box.

Once the OBD-II port is located, plug the OBD-II scanner. Make sure the engine is switched off and the key is positioned to the OFF position before plugging in the OBD scanner.

Once the OBD-II is plugged into the vehicle, start the smoke test and then select “OBD-II” as the RPM source during the test.

Ensure the PC in use has **Bluetooth capability** (a Bluetooth dongle can be used if not).

In the connection check step of the test, you will be asked to connect to OBD-II when plugged in. Click Search to search for nearby active Bluetooth connections and select the OBD-II when it appears and click connect. This will establish the Bluetooth connection to the OBD-II and provide RPM and Oil Temperature Measurements throughout the test.

6.3 Weekly Calibration Check

Auto Smoke will routinely require the user to carry out a calibration verification check once every seven and a half days. Once the weekly calibration check is overdue, the Auto Smoke will prompt the user to insert the weekly calibration check filter and carry out the check. If the weekly calibration check is failed or the user opts to skip the check, the Auto Smoke will return to the previous menu. Auto Smoke will not permit the user to carry out a smoke test until the weekly calibration check has been performed.

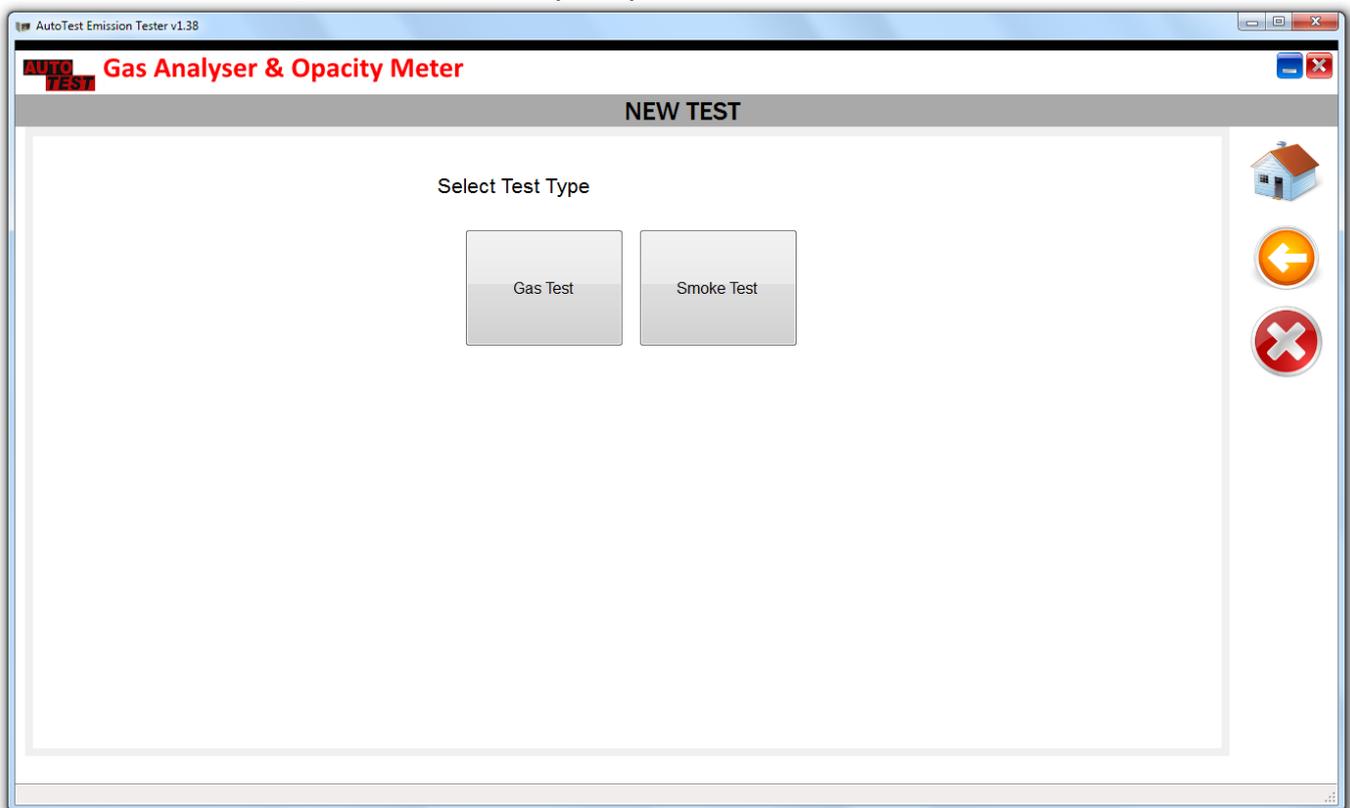
To perform the weekly calibration check, insert the supplied calibration filter into the slot of the smoke meter. Auto Smoke will then measure the opacity level when the filter is inserted into the filter slot. If the measured value differs with the pre-set reference value by more than 0.1 m^{-1} , the Auto Smoke will report an error and will not let the user carry out any smoke test. The weekly check has to be passed successfully before Auto Smoke permits the user to carry out any smoke test.

6.4 Starting a smoke test

Do not insert the smoke probe in the tail pipe at the start of the test.

To start a new gas test from a PC, first establish communication with the gas analyser using one of the methods described in section **Error! Reference source not found.**. Also, make sure the gas analyser is operating in main screen (showing live readings).

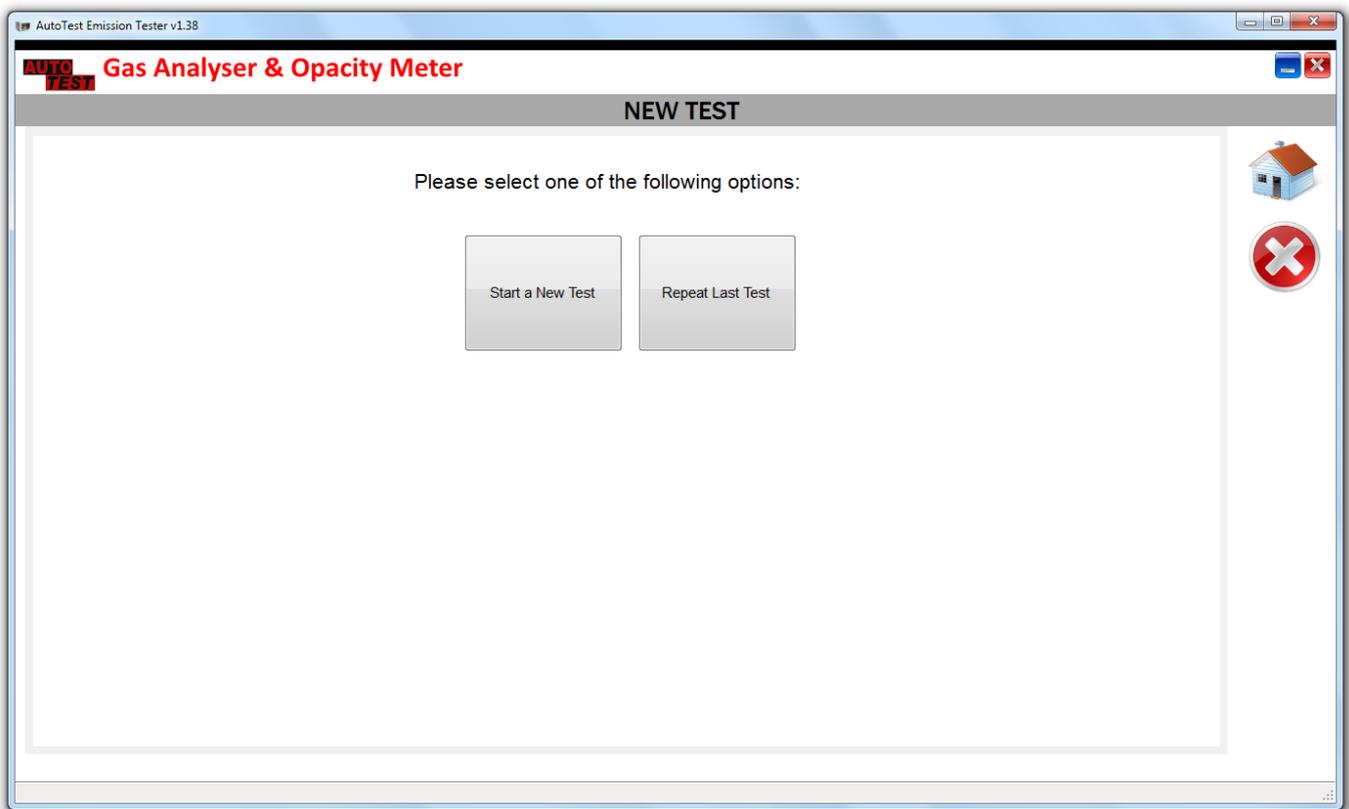
Press  (“Run New Test”) on the PC software to start a new test. If the connection to Auto Smoke is established, the software will prompt for the test information.



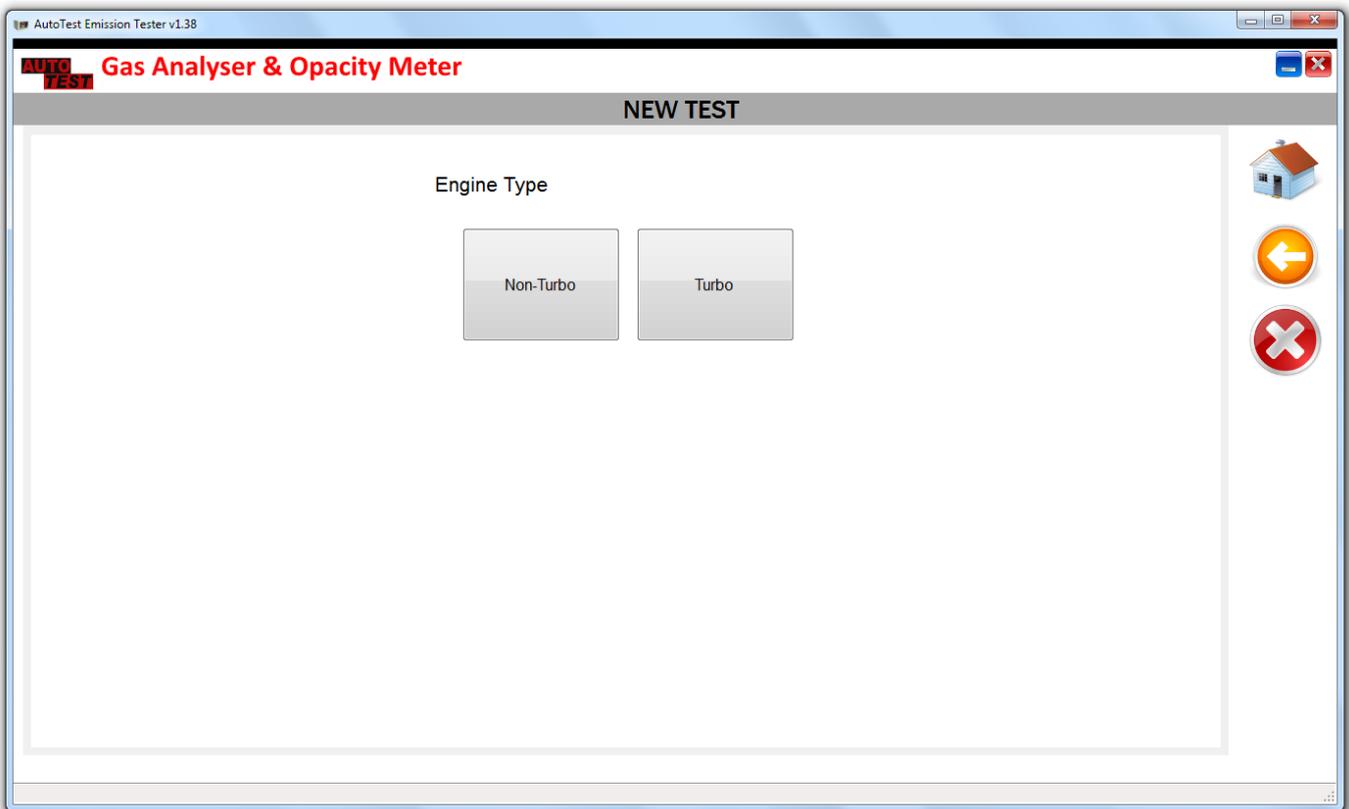
Select Smoke Test to run a Smoke Test.

Select “Start a New Test” to start a new test with new vehicle details. Alternatively, you can select “Repeat last test” to reload the last test’s information and use that to carry out a new gas test.

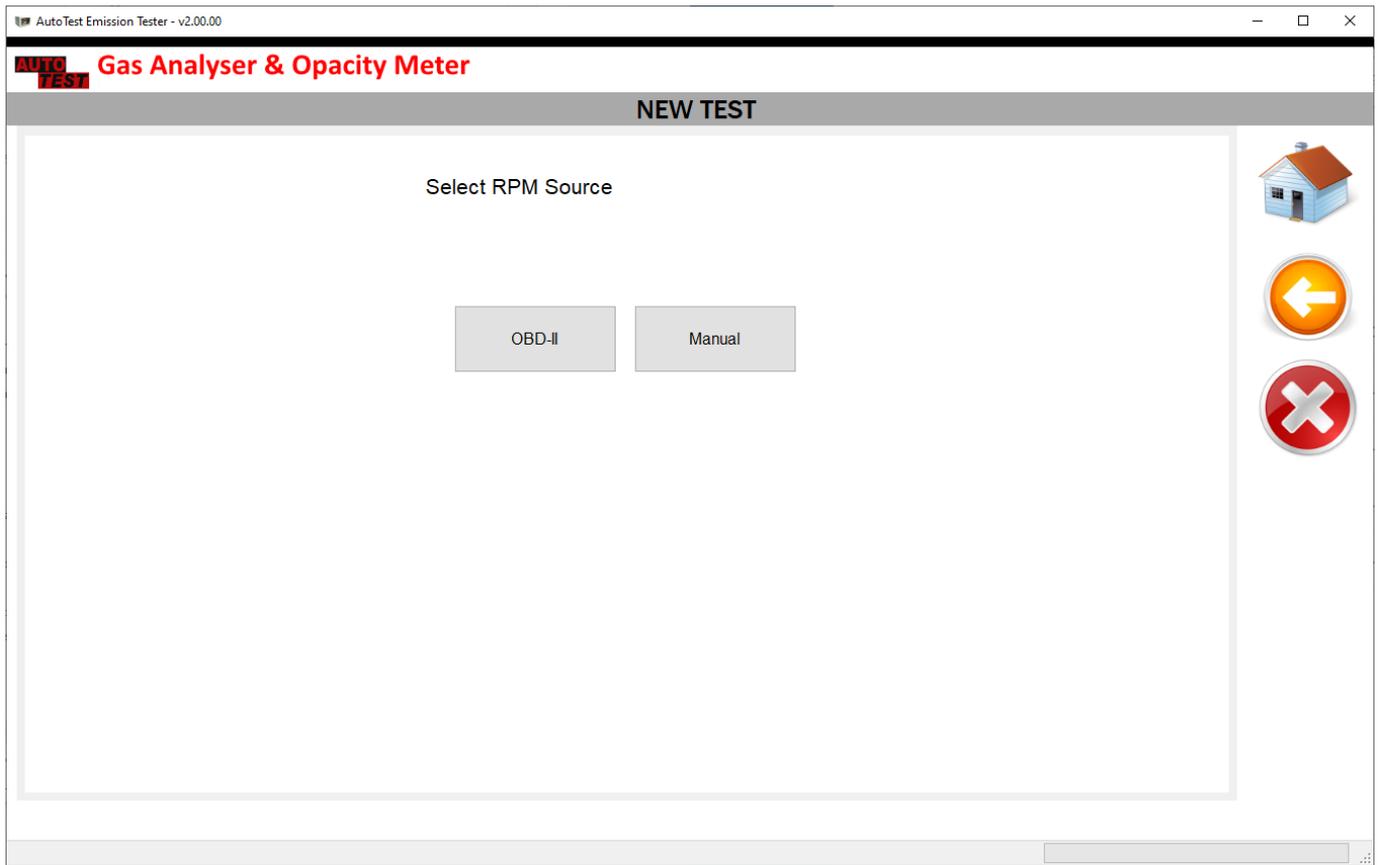
If a new test is selected, select the examiner information and the vehicle type. The examiner information can be edited in the settings.



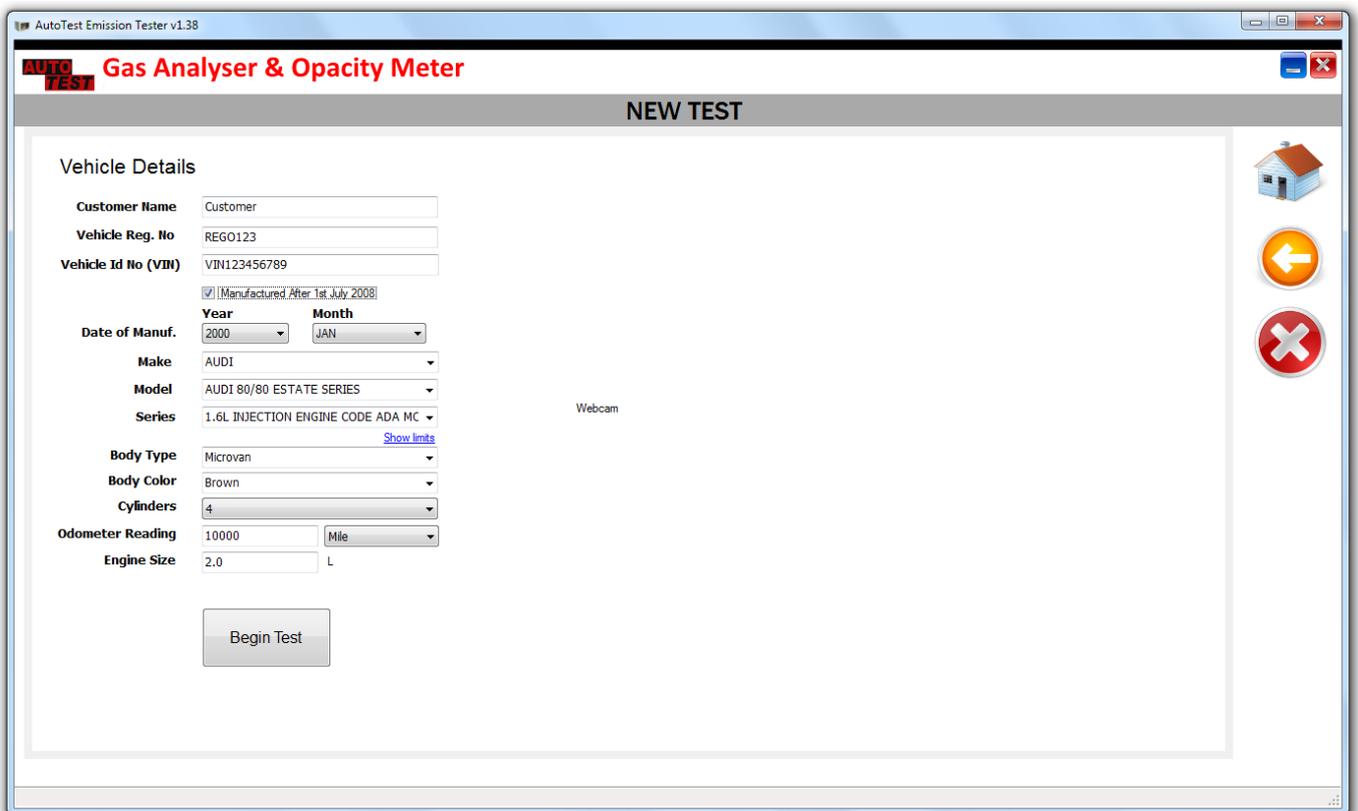
The next step will prompt for engine type.



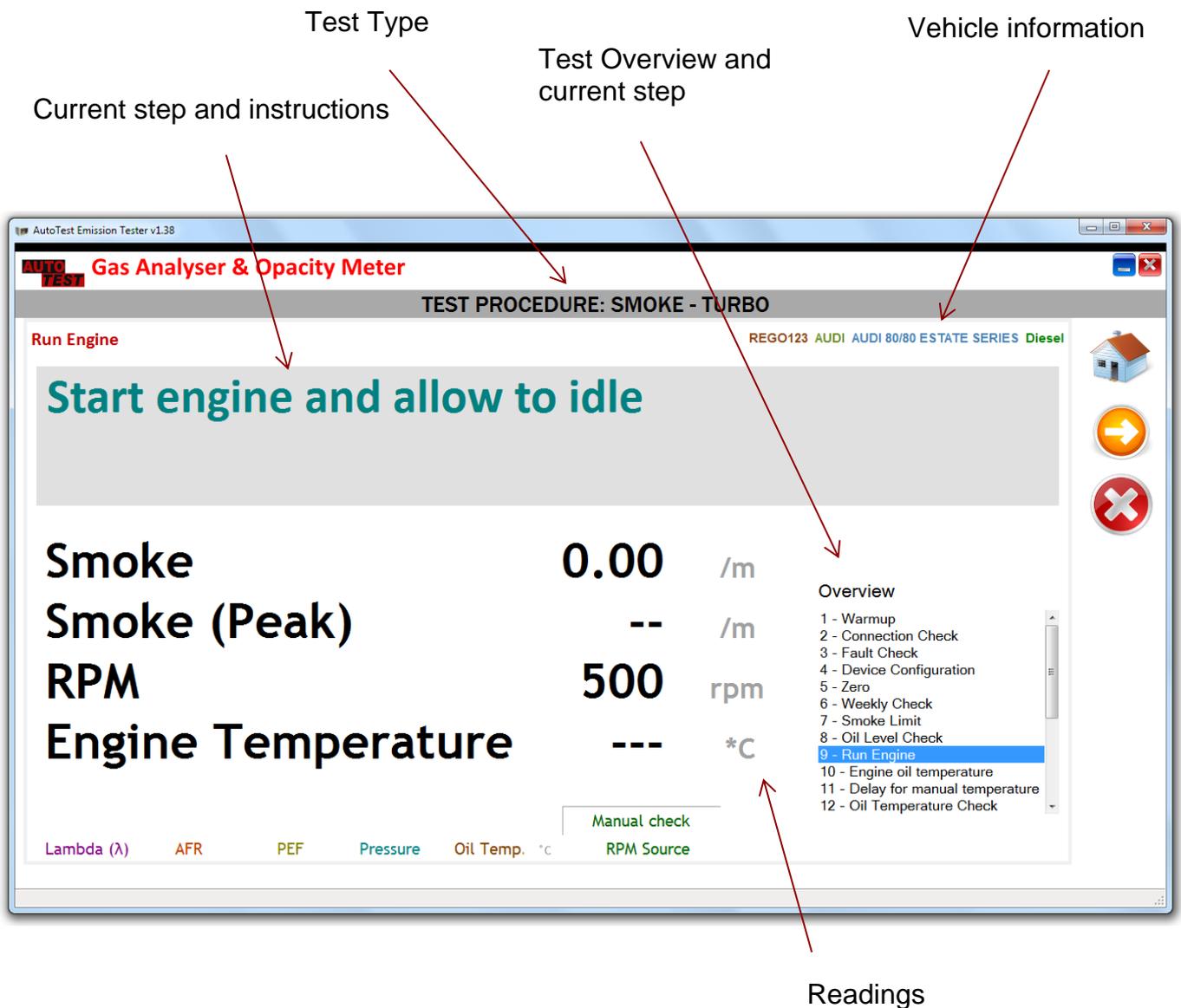
The next step will prompt for RPM type.



The next step will ask for details such as registration number, VIN, model, make, cylinders, engine size etc. Once the vehicle details are entered, press Begin Test to start the test.



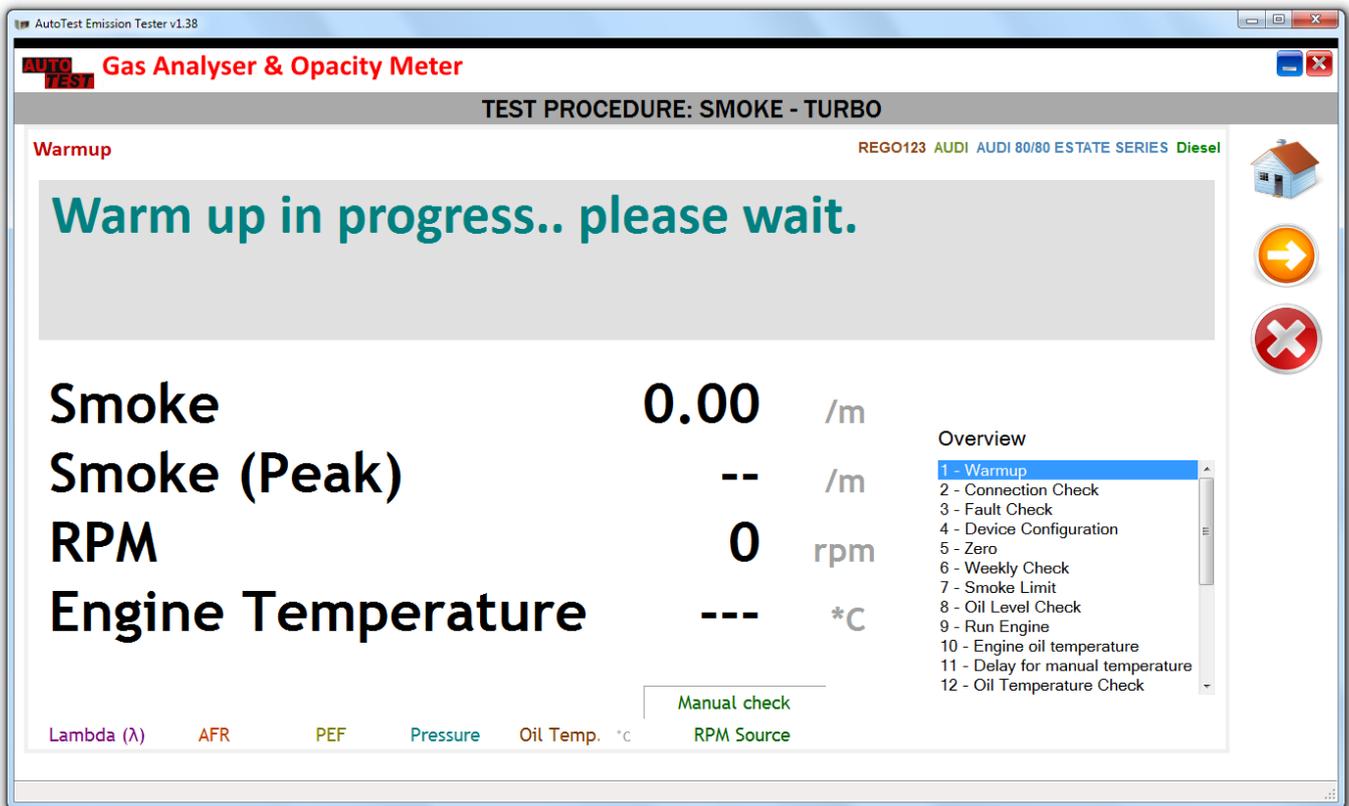
Once the smoke test is started, the PC software will display step-by-step instructions on the screen. It will also show a graph of currently sampled gas measurements and the test limit values.



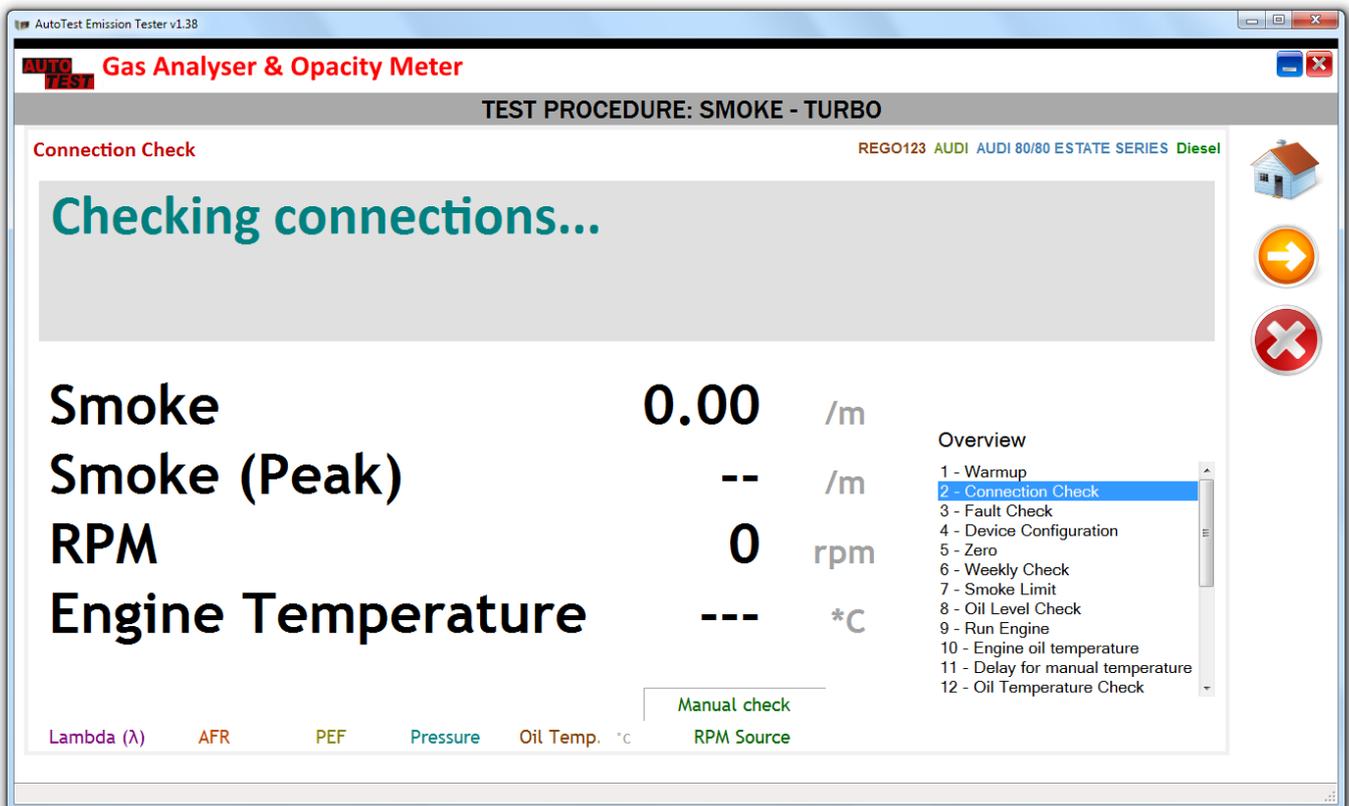
User can abort the test at any time by pressing  icon. At some stages during a test, user can opt to press  to skip that step (not all steps can be skipped).

The following table outlines the test steps involved in a smoke test.

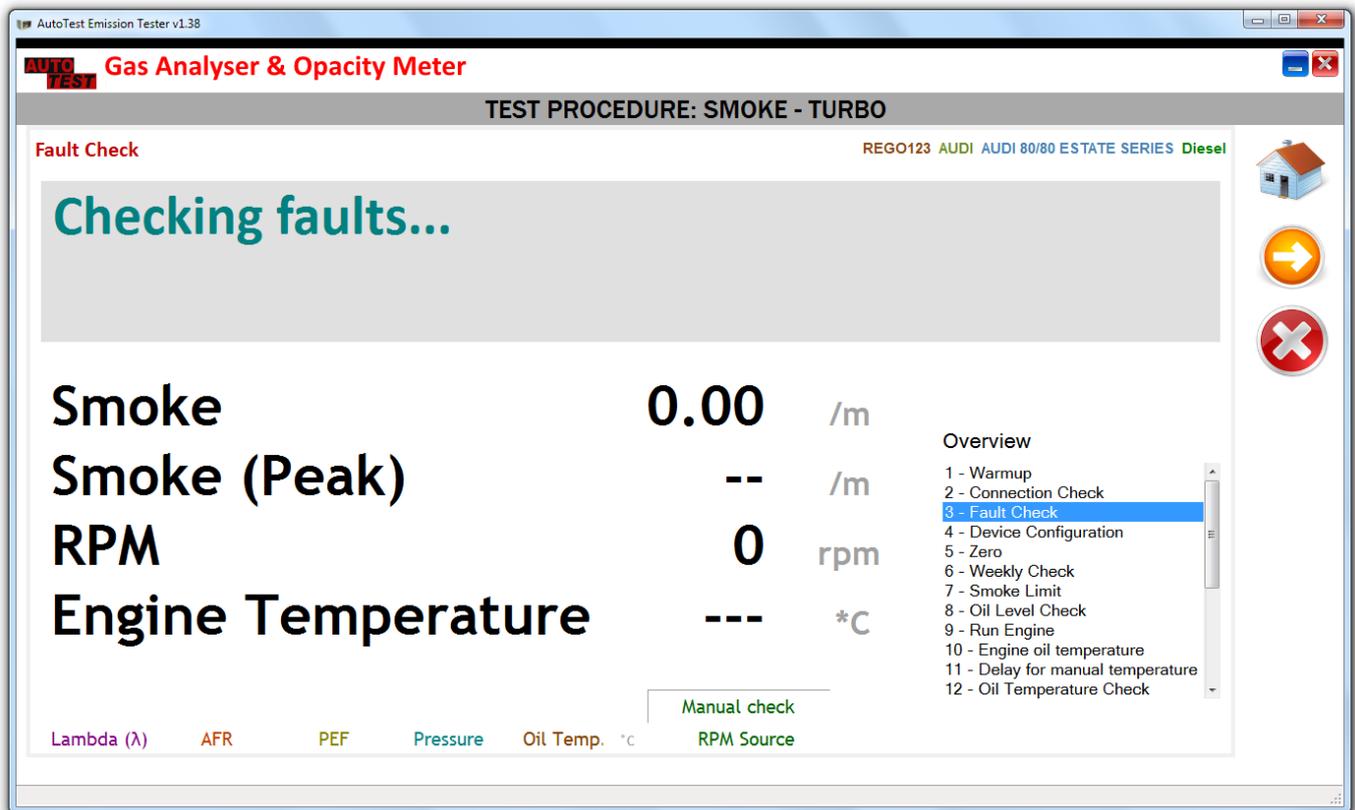
No	Step	Description
1	Warmup	Device is being warmed up. Please wait until the warmup is complete.
2	Connection Check	Checks RF connection
3	Fault Check	Checks for any faults in the device
4	Device Configuration	Checks device configurations
5	Zero	Sets the measurement values to zero
6	Weekly Check	Performs weekly check if required.
7	Smoke Limit	Displays the smoke limit value (Pass/Fail Limit)
8	Oil Level Check	Prompts the user to make sure the engine oil level is adequate
9	Run Engine	Prompts the user to start engine and let it run at idle
10	Engine oil temperature	Prompts the user whether to perform oil temperature check
11	Delay for manual temperature check	If oil temperature check is bypassed, a delay of 40 seconds will be added
12	Oil Temperature Check	Checks the oil temperature and waits until the temperature is above 60 °C
13	Remove Oil Probe	Prompts to remove the oil temperature probe from the engine
14	Zero	Performs zero
15	Insert Smoke Probe	Prompts user to insert smoke probe into the exhaust tail pipe
16	Acceleration	Asks the user to press accelerator
17	Release Accelerator	Prompts user to release accelerator
18	Sampling	Smoke peak monitor & measurement
19	Idle Engine	Asks the user to keep the vehicle running at idle
20	Zero Drift Check	Zero drift check at the end of the test sequences. Asks the user to remove smoke probe from the tail pipe.
21	Calculate	Calculates the test result
22	Save Test	Saves the test data to the database
23	Display Report	Displays the test report



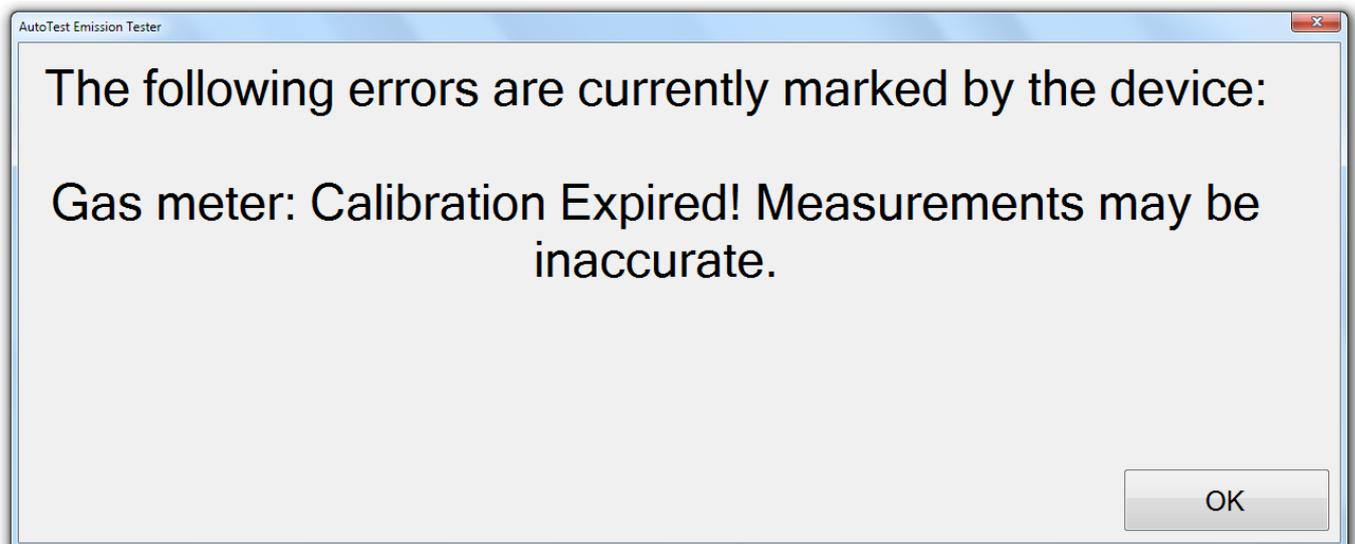
During the warmup stage of the smoke test, the software will wait until the smoke meter is warmed up to its normal temperature.



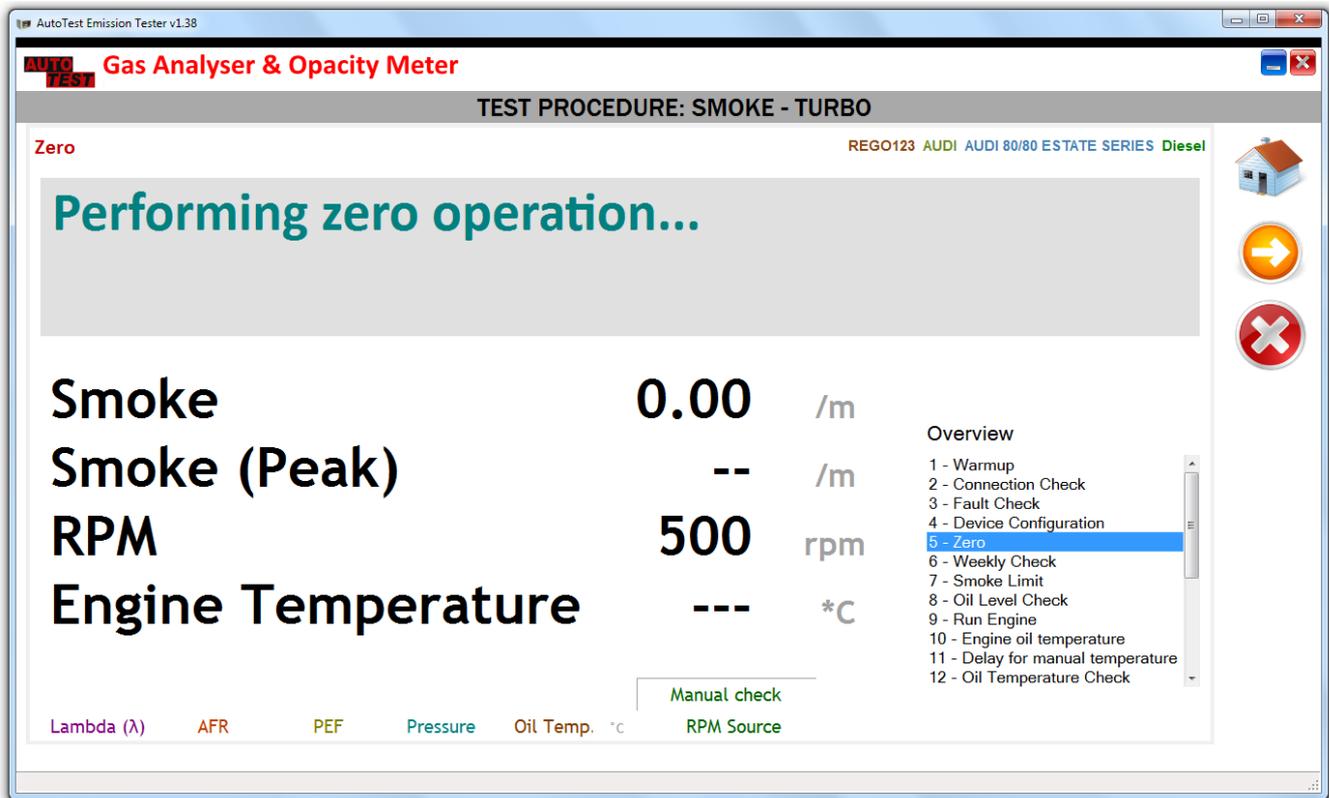
The emission tester software will then check for devices and connections.



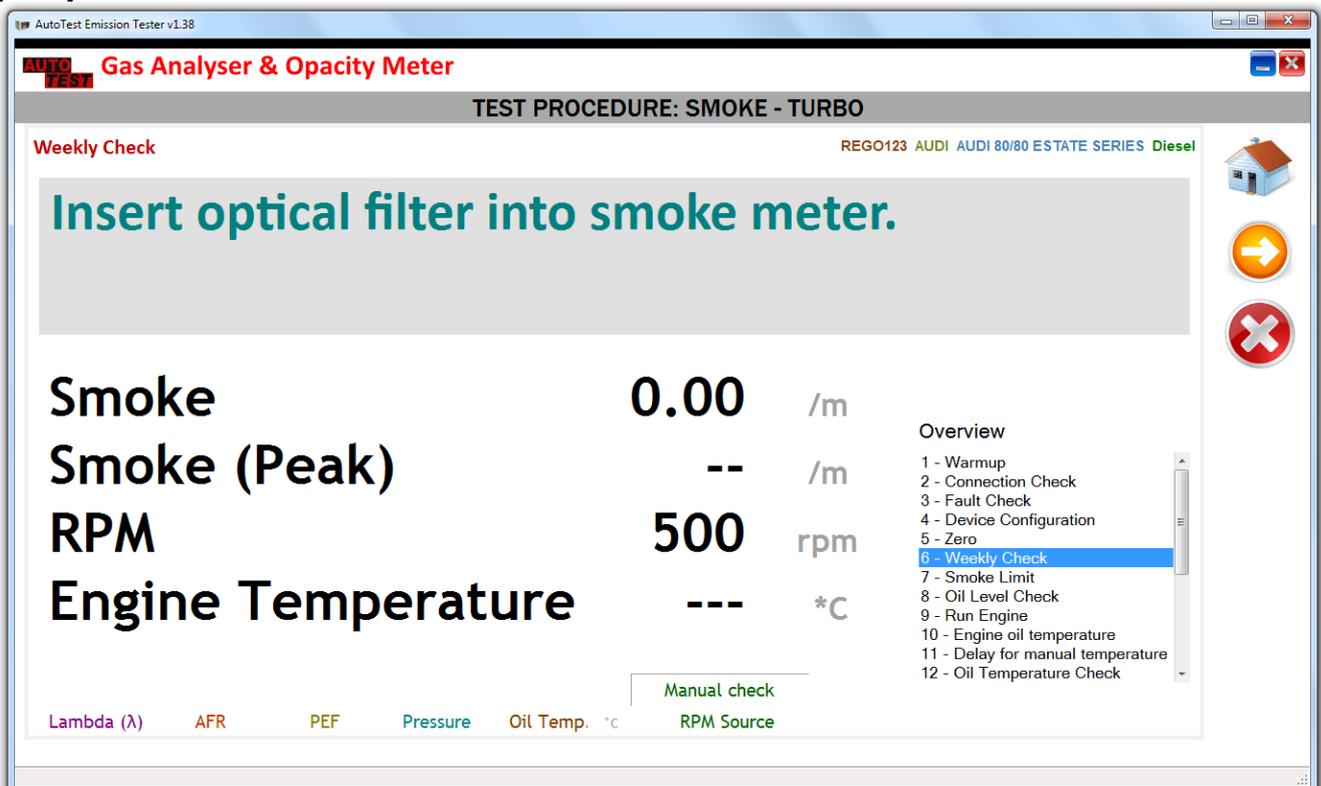
During the Fault Check stage, the emission tester software will determine any fault that has been marked by the device. The faults include such as calibration expiry, sensors failure, bench failure etc. The emission tester may display the following message when the calibration has expired.



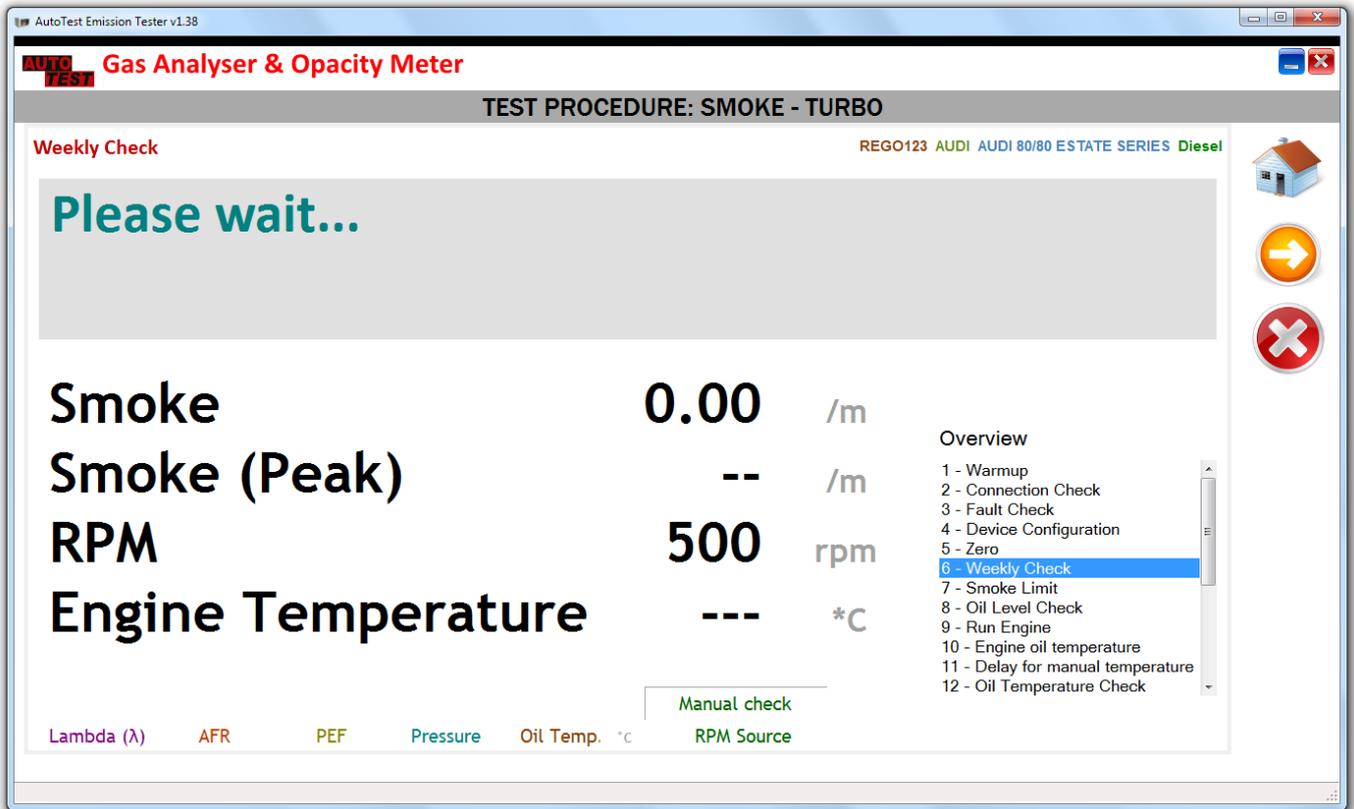
The emission tester software will perform zero. The smoke values are set to zero during the zero operation.



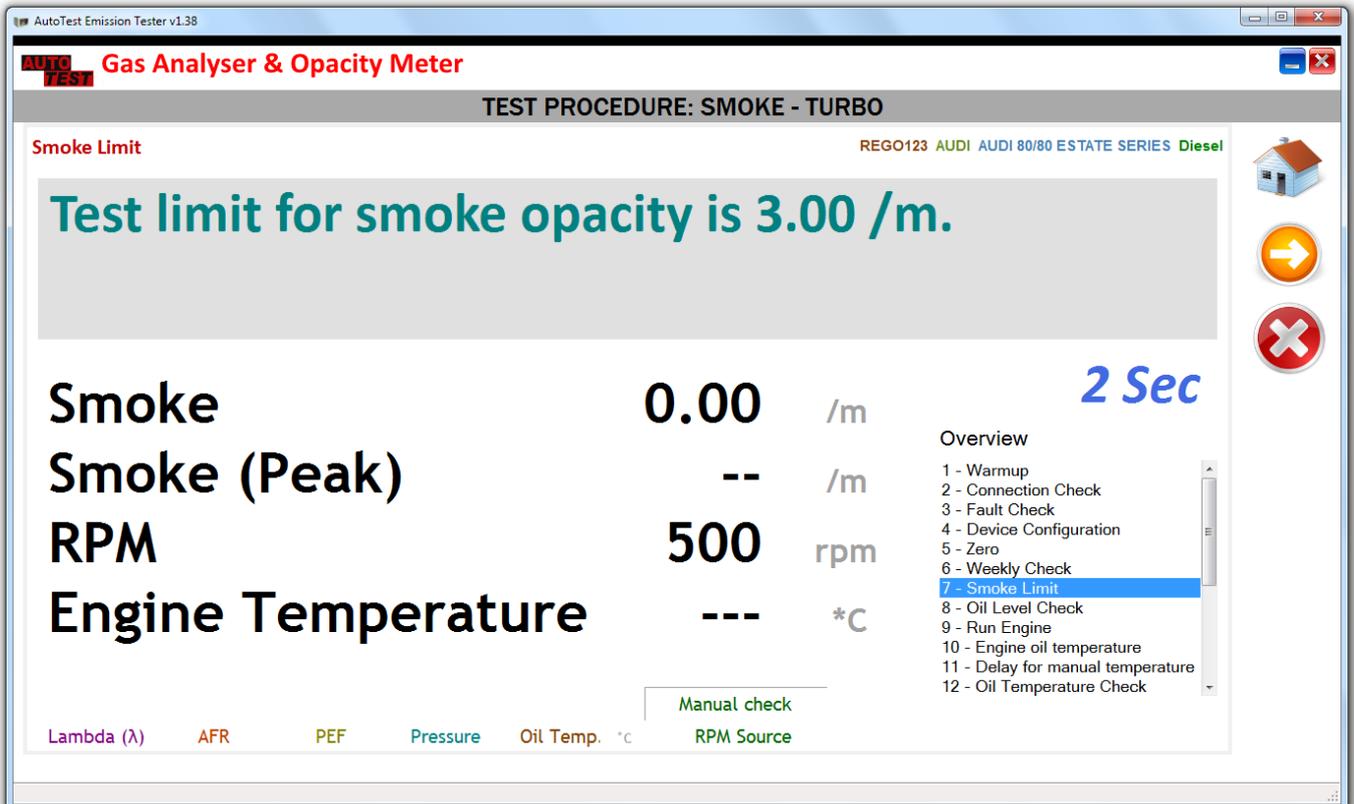
After zero is done, the emission tester will perform weekly check if it is required. When the software prompts “Insert optical filter into smoke meter”, insert the weekly check filter into the opacity meter and then wait for a few seconds.



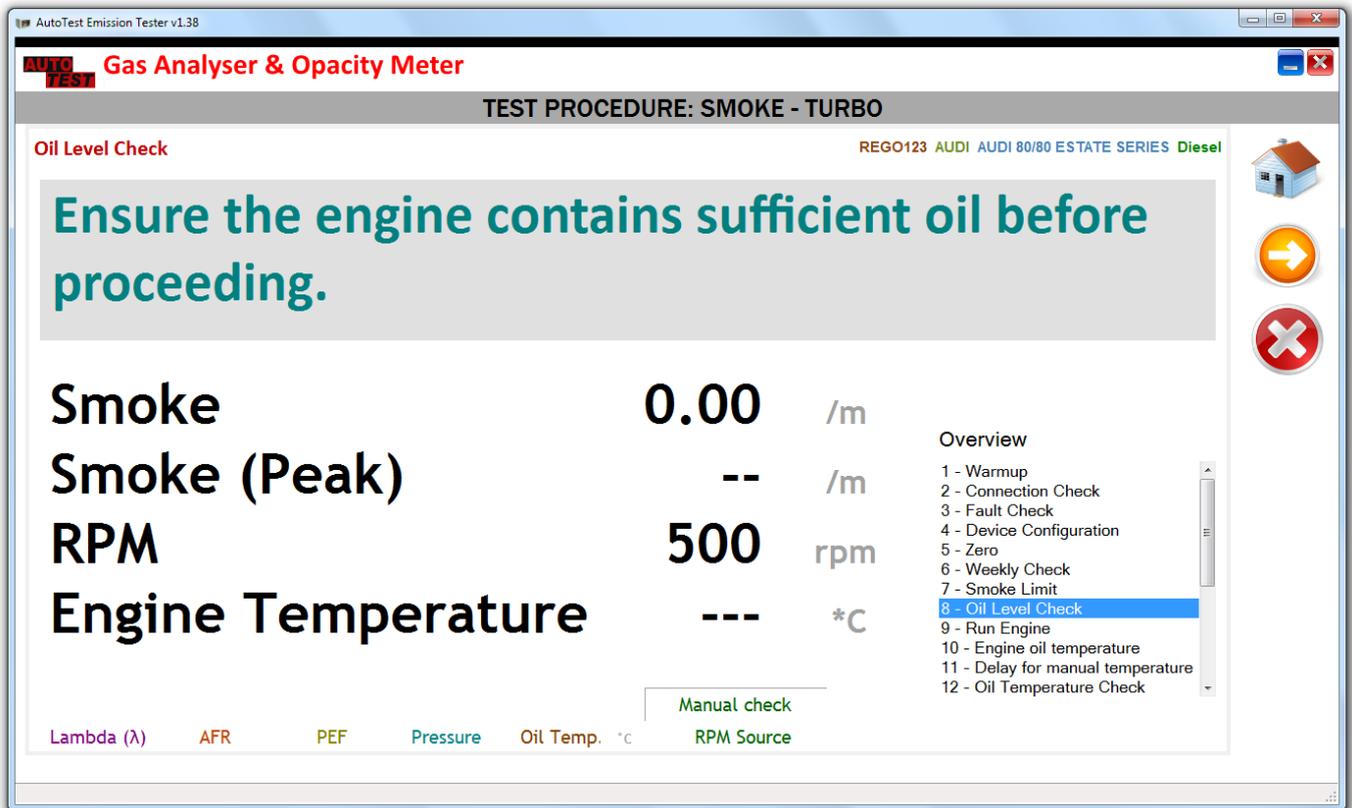
When the weekly check filter is inserted, the software will display “Please wait”. Keep the filter inserted for a few seconds until the weekly check is over.



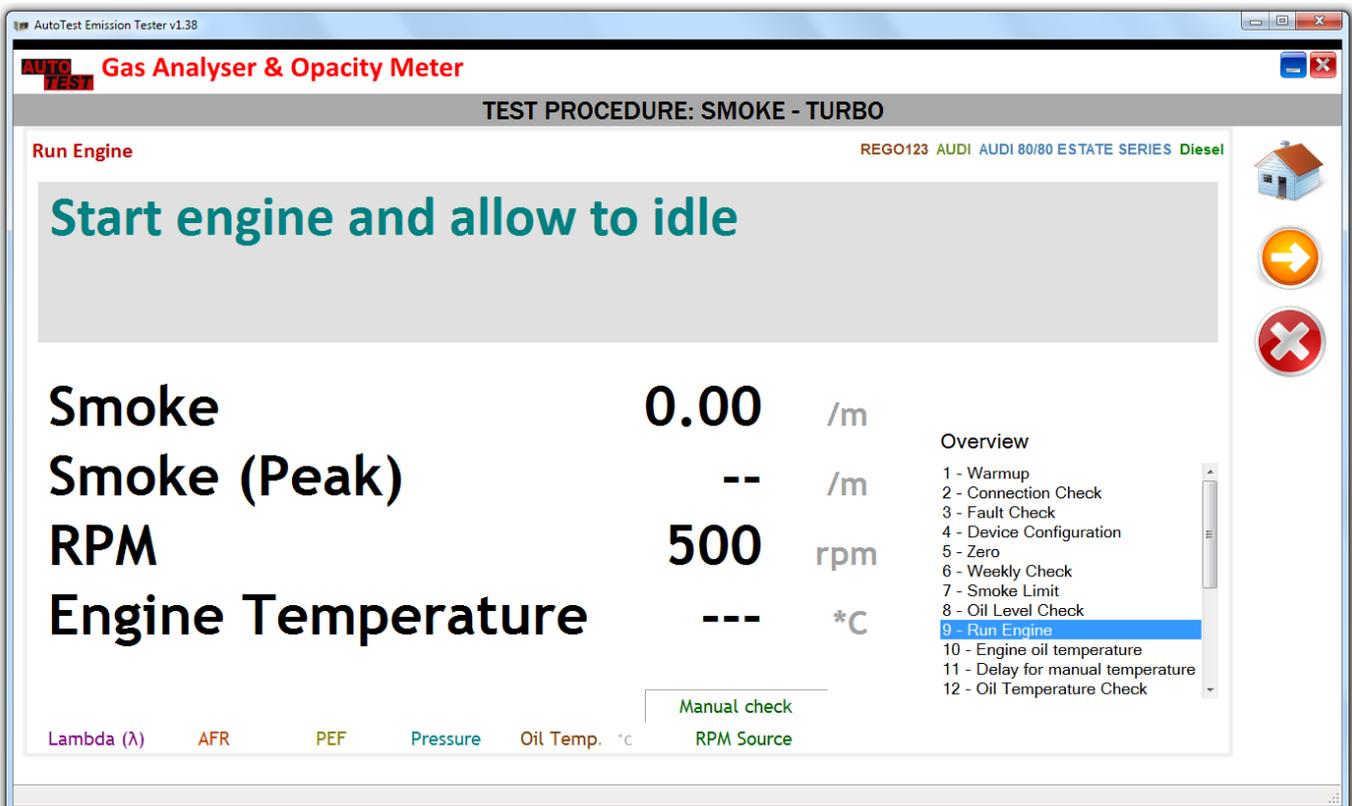
Once the weekly check is over, the software will display smoke limit value. The limit value is the pass/fail value for the smoke test.



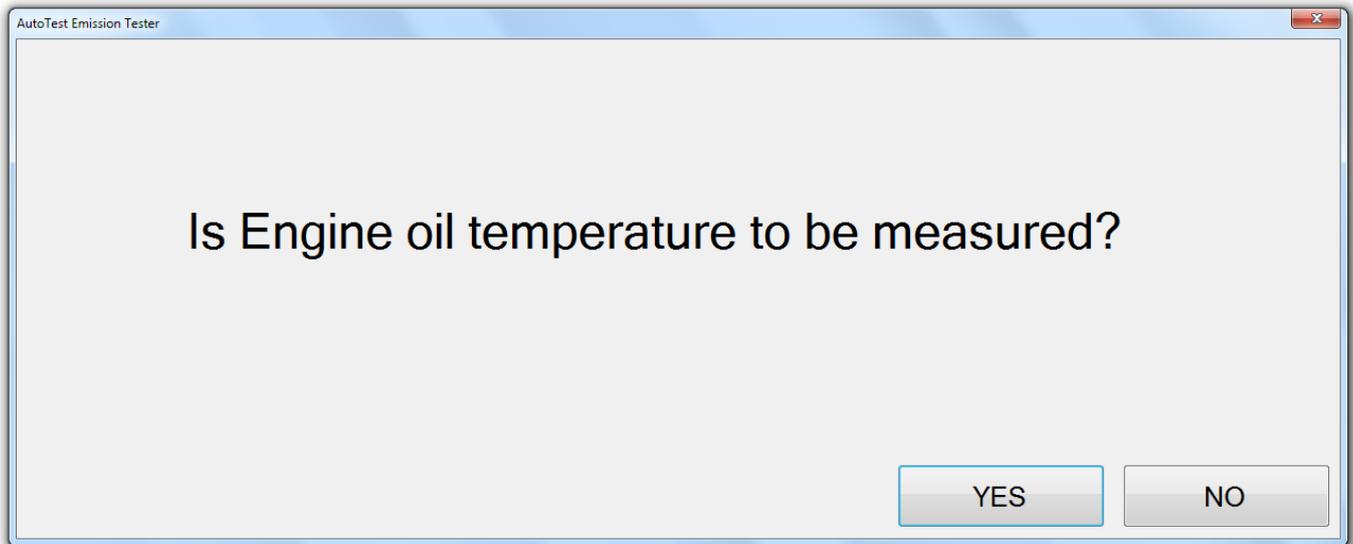
Before starting the engine, make sure the vehicle has sufficient amount of oil.



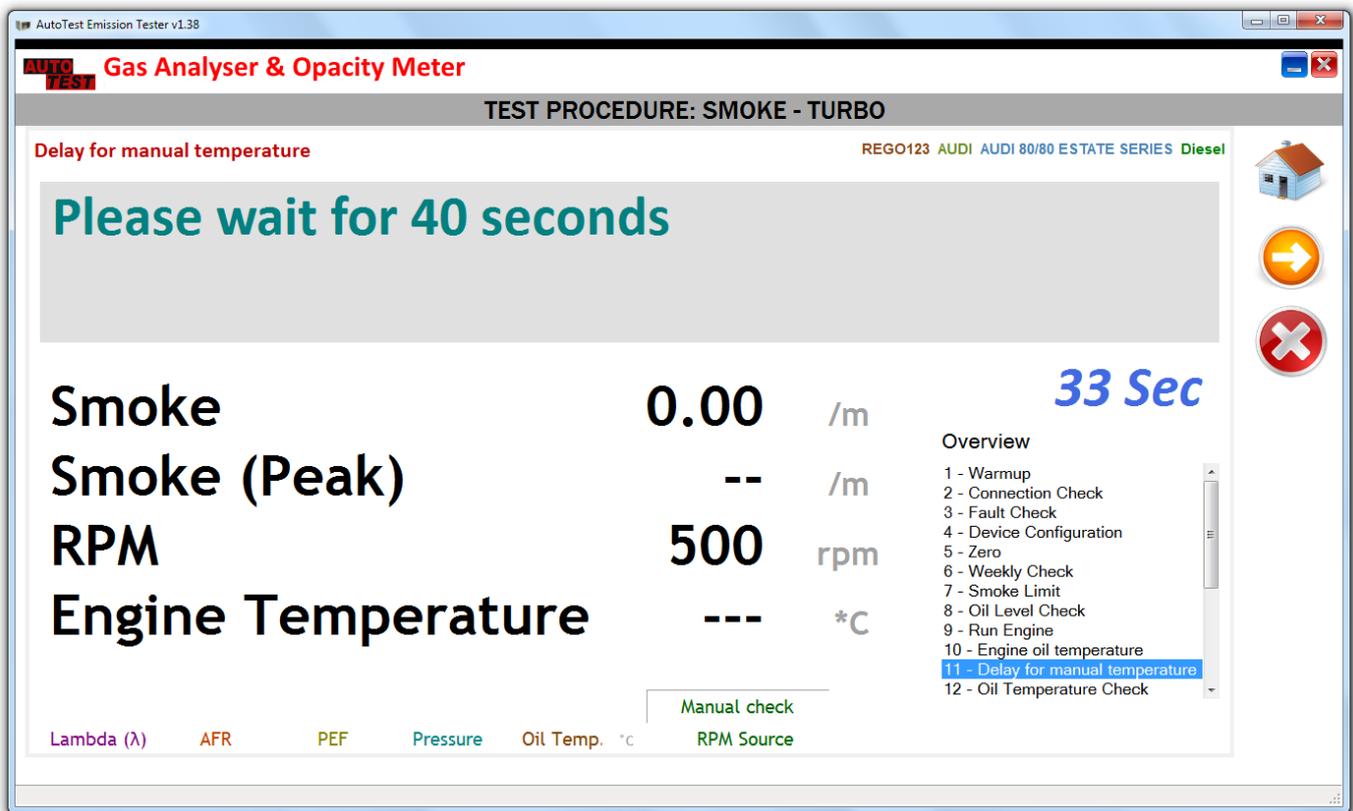
When the software displays “Run Engine”, run the vehicle’s engine. Make sure the smoke probe is not inserted into the tail pipe.



The software will then prompts whether to perform an oil temperature check. If the engine oil temperature check is to be performed, select “Yes”.

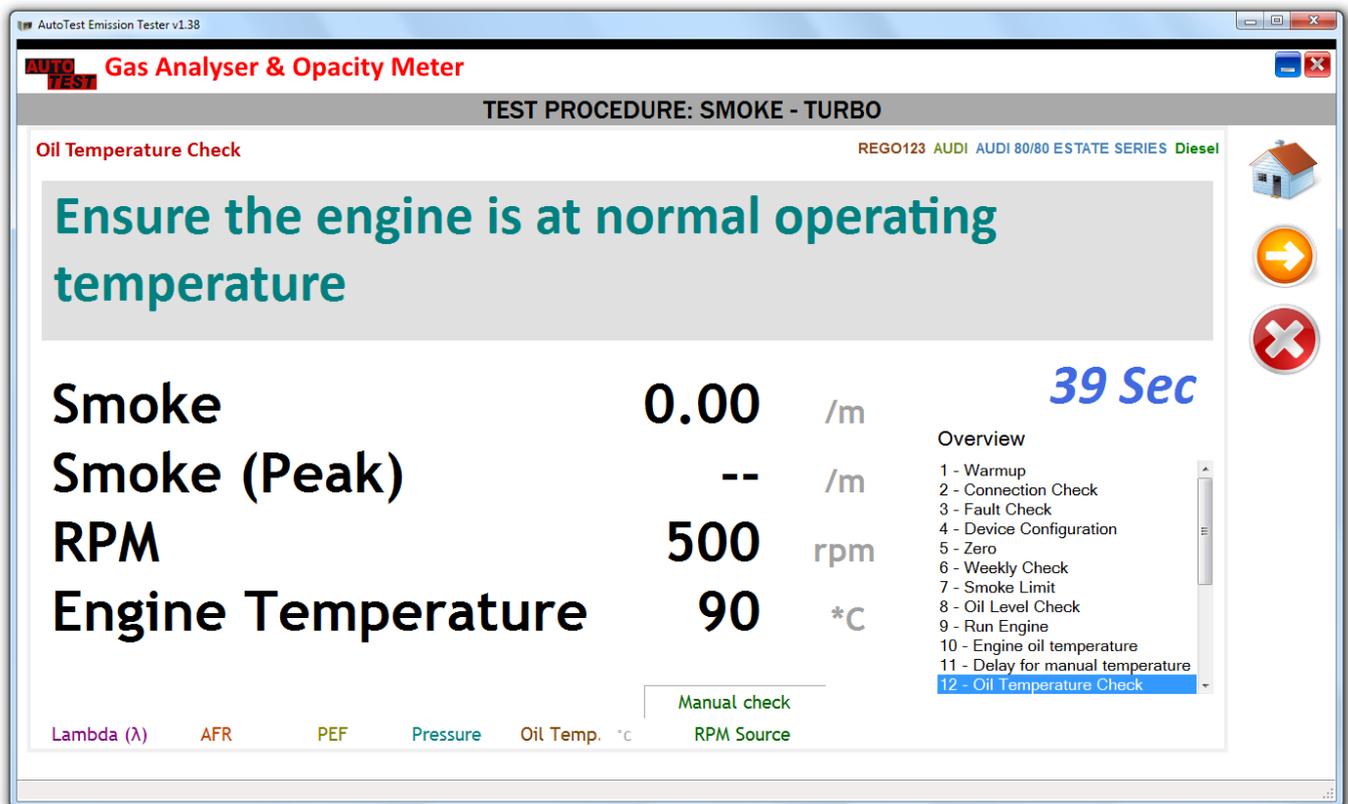


If the oil temperature check is bypassed, the software will add a delay of 40 seconds.

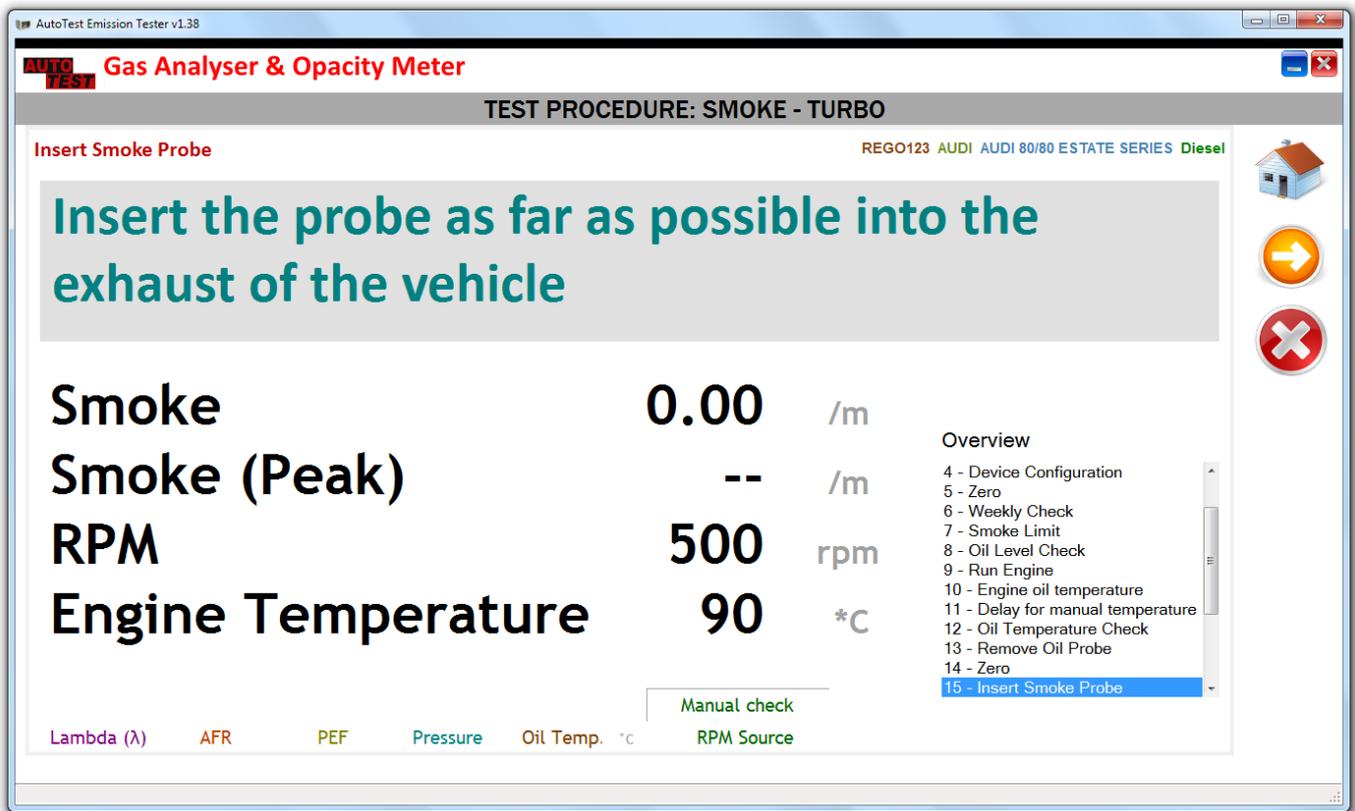


If the oil temperature probe is not inserted, the software will prompt the user to attach the oil temperature probe. Once the oil temperature probe is attached to the machine and the sensor is inserted into the vehicle engine, the software will wait until the vehicle’s temperature is at 60°C or above.

Caution: Always take care when inserting oil temperature probe into the engine’s dipstick housing. Be mindful of the hot surfaces and moving engine parts.

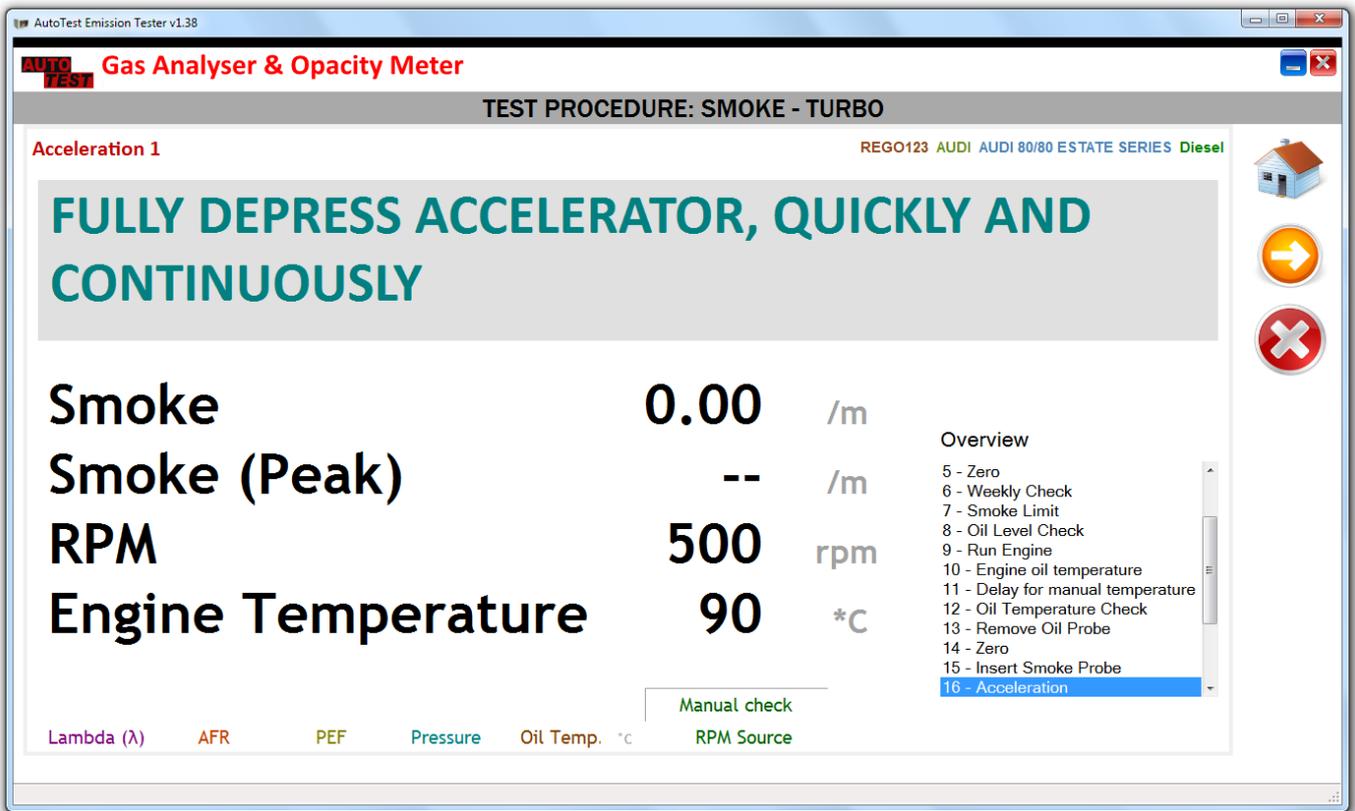


When prompted to insert smoke probe as far as possible into the exhaust tail pipe. Once the smoke probe is inserted, press “Yes” to acknowledge.

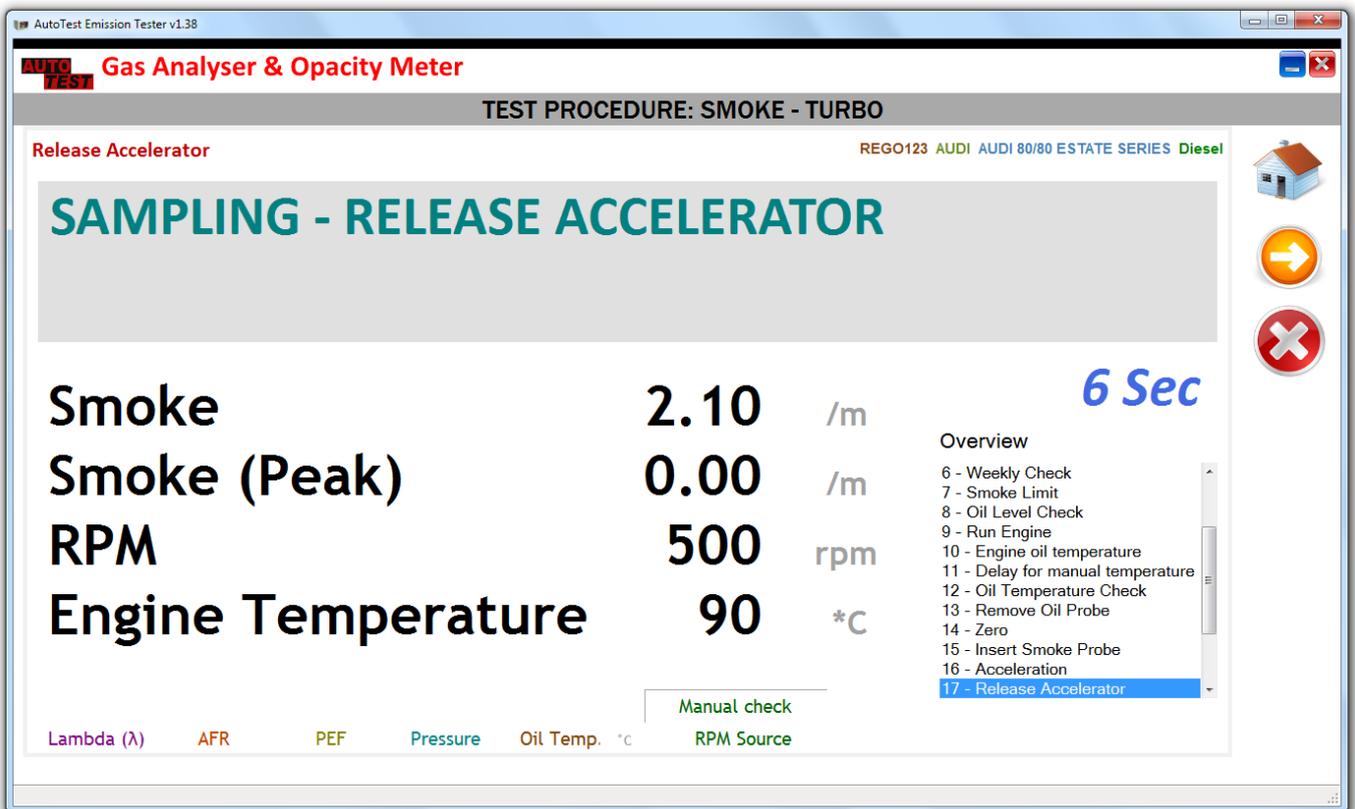


Caution: Make sure the vehicle’s hand brake is fully applied. Also, make sure the gear is disengaged.

When prompted to press the accelerator, fully depress the accelerator, quickly and continuously for about 2 seconds until the screen displays “Release accelerator”.



Release the accelerator when the software displays “Release Accelerator”.



The software will carry out up to six acceleration cycles. If the reading of the first acceleration test is less than the fast pass limit (1.5 /m), the software will conclude the test as Fast Pass.

The software will perform zero drift check at the end of the test. Remove the smoke sampling probe from the exhaust tail pipe and put it away from the exhaust. Once done, press “Yes” to acknowledge it.

AutoTest Emission Tester v1.38

Gas Analyser & Opacity Meter

TEST PROCEDURE: SMOKE - TURBO

Zero Drift Check REGO123 AUDI AUDI 80/80 ESTATE SERIES Diesel

PLEASE REMOVE SAMPLING PROBE FROM THE EXHAUST PIPE

Smoke **0.00** /m **0 Sec**

Smoke (Peak) **1.60** /m

RPM **500** rpm

Engine Temperature **90** °C

Overview

- 8 - Oil Level Check
- 9 - Run Engine
- 10 - Engine oil temperature
- 11 - Delay for manual temperature
- 12 - Oil Temperature Check
- 13 - Remove Oil Probe
- 14 - Zero
- 15 - Insert Smoke Probe
- 16 - Acceleration
- 17 - Release Accelerator
- 18 - Idle Engine
- 19 - Zero Drift Check**

Lambda (λ) AFR PEF Pressure Oil Temp. °C Manual check RPM Source

At the end of the test, the test data will be prepared and automatically saved in the software database. A saved test report can be recalled by the user and a printout can be generated.

Sample Report:

Exhaust Emissions Test Results

Operator ID: Bruce William

Test No. 222

Test Date: 30/01/2017 2:21:30 PM

Vehicle Details

Customer Name:	Customer Name	(No Image Available)
Vehicle Reg.:	REGO123	
VIN :	VIN123456789	
Vehicle Make:	FORD	
Vehicle Model:	FIESTA ENGINE TYPE HCS	
Vehicle Series:	1.3L ENGINE CODE J6	
Odometer Reading:	115,870 mile	

Test Results

Smoke Test <i>Non-Turbo</i>			
No engine temperature taken.			
Index	Absorption (k)	Limits	Result
1	8.15 /m	2.50 /m	
2	0.60 /m	2.50 /m	
3	0.65 /m	2.50 /m	
4	0.12 /m	2.50 /m	
5	0.55 /m	2.50 /m	
6	1.11 /m	2.50 /m	
Mean value	0.83 /m	2.50 /m	
Zero Drift	0.00 /m		
Overall Result			Pass

Operator: Bruce William

Signature:

RMI Training Academy

VTS12345

BUILDING 2-3, WELSH RD Southham CV47 1NA

6.5 Submit Test Results to MTS

Once the test is completed, the test report will be displayed on “TEST REPORT” page where user can submit test results to MTS.

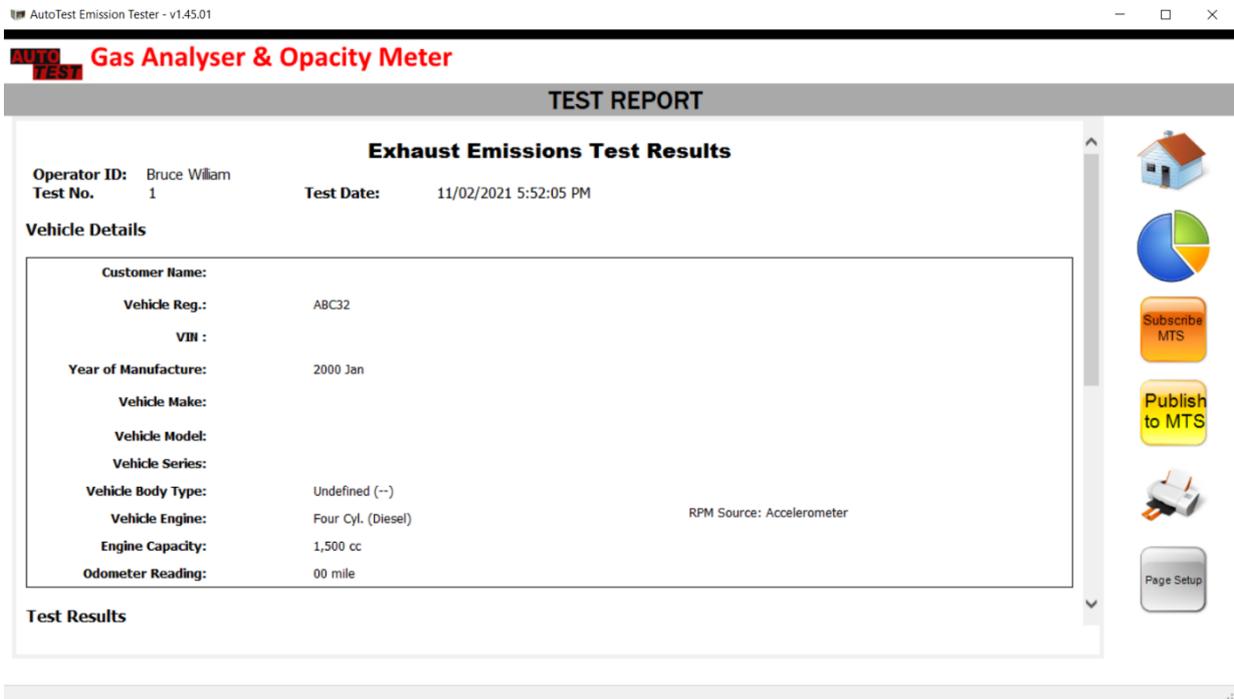


Figure 13 Test Report View with MTS Functions

Press “Subscribe MTS” to connect with MTS and obtain the corresponding work order.

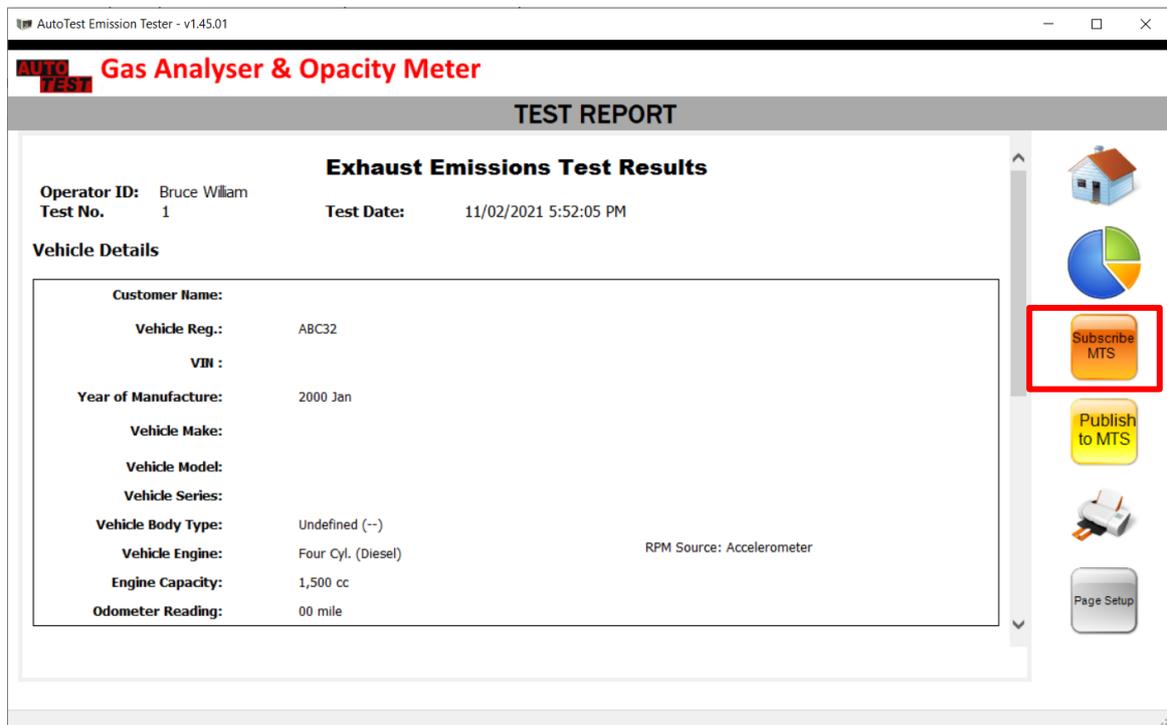


Figure 14 Subscribe MTS

If test has been published to MTS before, the following message will appear.

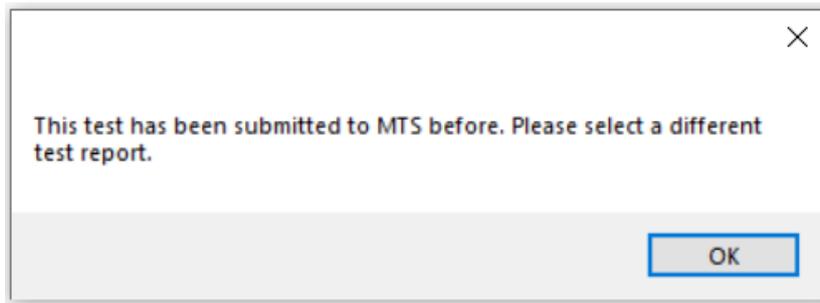


Figure 15 Previously Published

If not, the next step will prompt the user for vehicle registration number. “Test VRM” input box will display vehicle registration number mentioned in the test report as the default value. If vehicle registration is correct, please confirm it by pressing “OK”. Otherwise, user can edit the text field and enter correct vehicle registration before proceeding. Press “Cancel” if you do not wish to proceed with MTS connection.

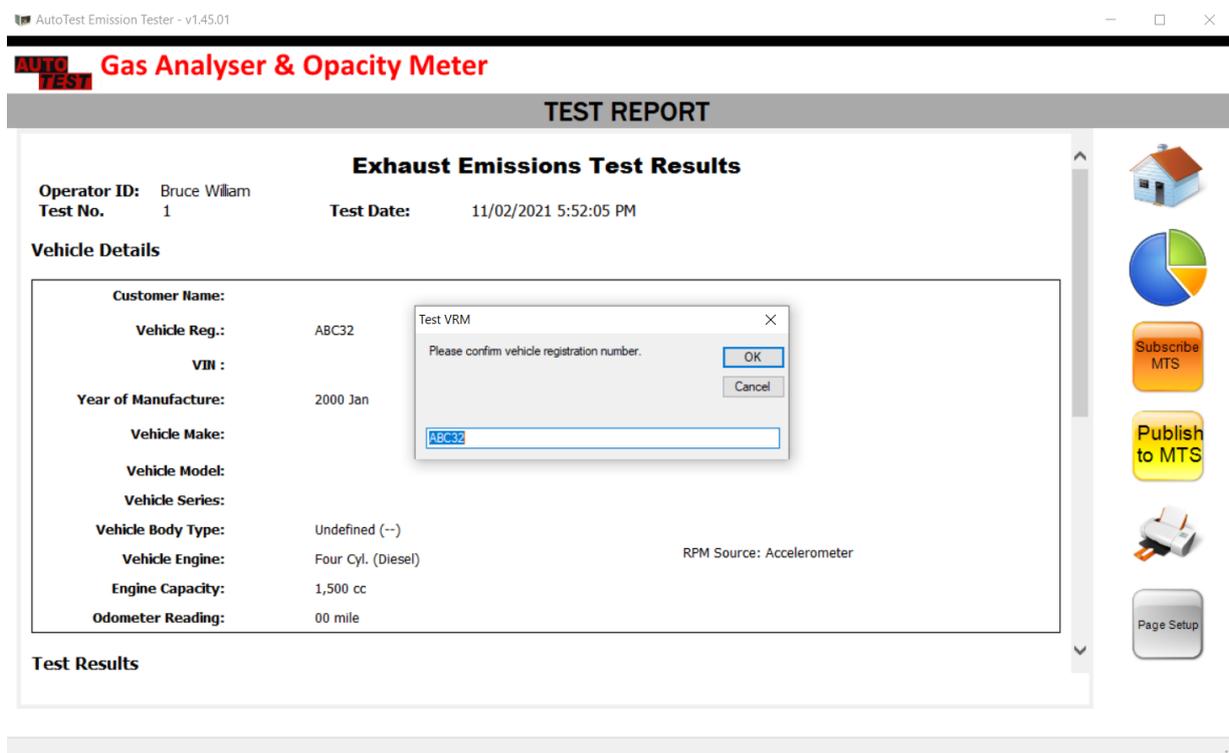


Figure 16 Confirm Vehicle Registration Number

Note: Remain in “TEST REPORT” page once the MTS connection is initiated.

“Searching for Work Order ...” message indicates that program is waiting for the work order.

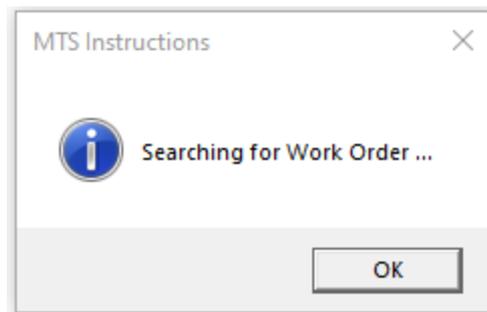


Figure 17 Searching for Work Order

“Work order Received. Submit Test Results.” message signals user to submit test results.

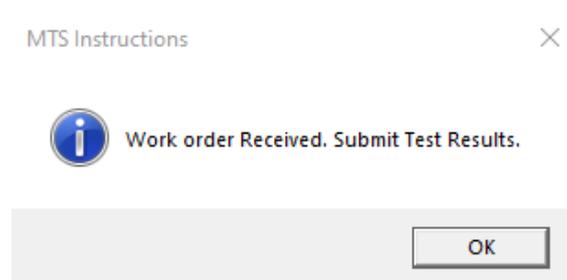


Figure 18 Work Order Received

If vehicle registration number entered in the software or into MTS by the tester is incorrect, a matching work order will not be available, and therefore user will see following message on the screen.

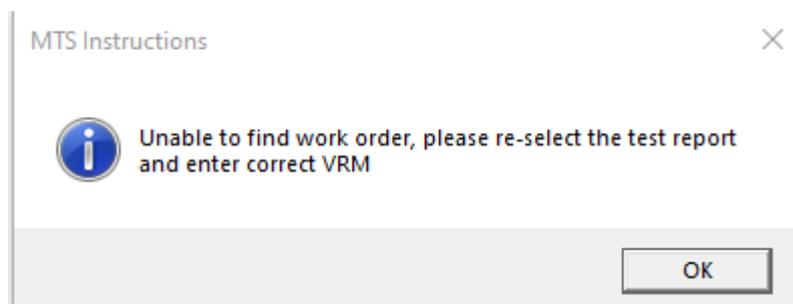


Figure 19 Unable to find Work Order

Note: To re-submit the test, go back to “REPORTS INDEX” page and select the test report and repeat the steps to connect with MTS.

Press “Publish to MTS” to submit test results to MTS.

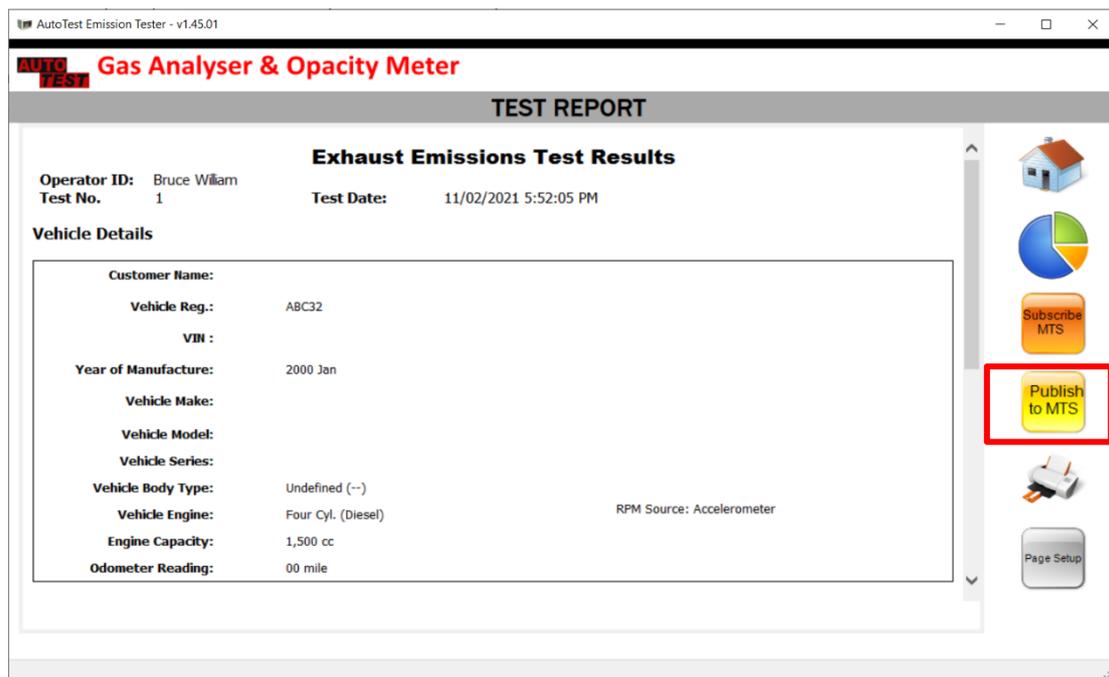


Figure 20 Publish Test Results to MTS

“Results Published to MTS” message will indicate that test results have been submitted to MTS by the software.

Note: This message is not an indication of successful submission of test results to MTS.

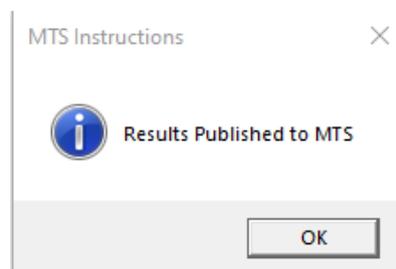


Figure 21 Test Results Published

Wait until “Results submitted to MTS successfully” message appear to conclude the test. This message indicates that submission of test results to MTS has succeeded.

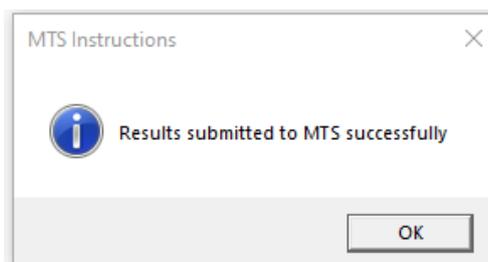


Figure 22 Confirmation Received

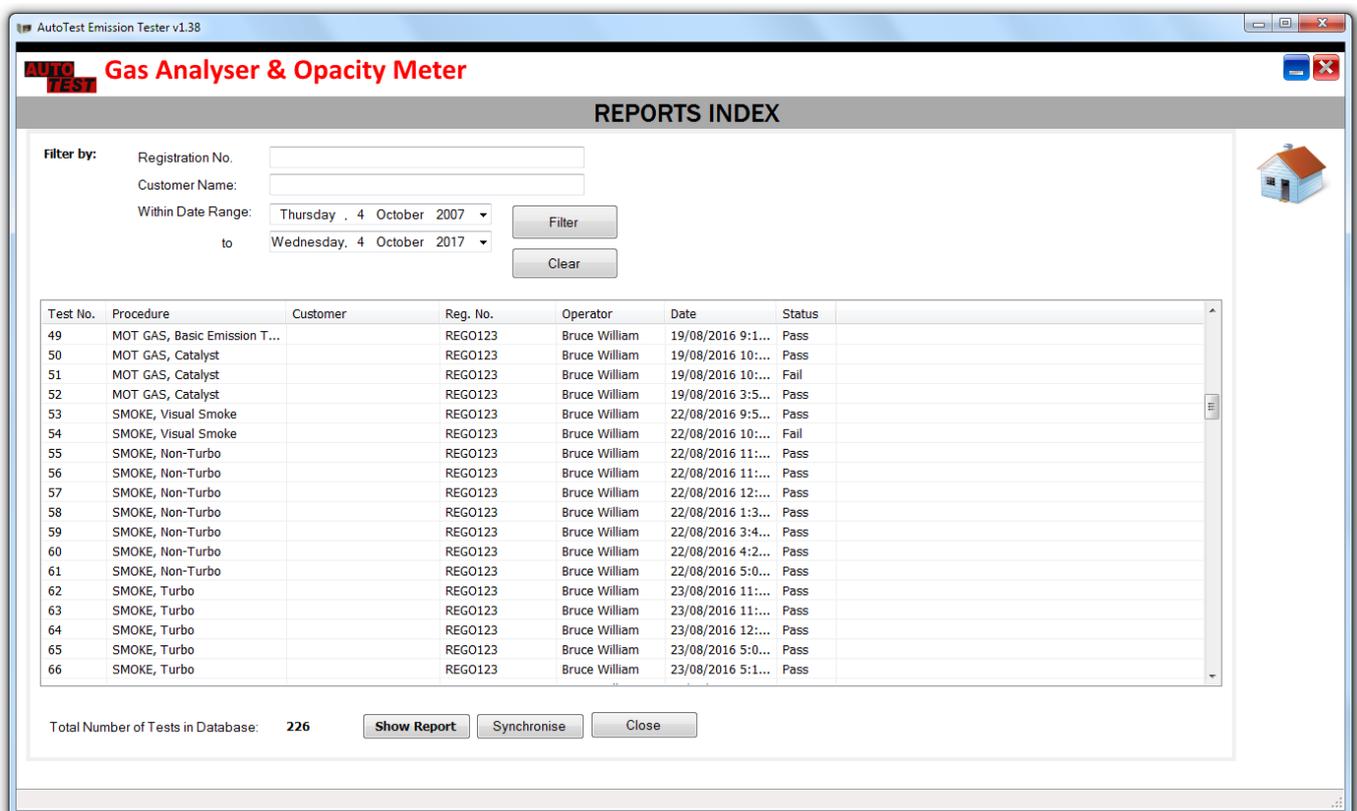
6.6 Viewing Test Results on PC

Run AutoTest Emission Tester software and then click on  “Show test reports”. In the test reports page, select the desired test record by clicking on it. Then click on “Show report” to view test information on a new page. To print report, click on the “Print Report” button. A new window will appear showing the printable test report. To print a report using a printer, click on the “Print” button. To close the report page, click on “Close”.

6.7 Using Search feature

Stored gas tests can be searched for fast retrieval using a vehicle registration number, customer name, or test date. To search a gas test, perform the following steps:

- Run Auto Gas PC software
- Establish communication using one of the methods described in section **Error! Reference source not found.**
- Once the connection is established, click on “Show test reports”.
- To search using a vehicle registration number, enter the Rego number in “Registration no.” text field.
- Or to search using a Customer Name, enter the customer's name in the “Customer name” text field.
- Or to search by date, enter a date range in the “within date range” field.
- To begin your search, press “Filter”.



Gas Analyser & Opacity Meter

REPORTS INDEX

Filter by:

Registration No.

Customer Name:

Within Date Range: Thursday, 4 October 2007 to Wednesday, 4 October 2017

Filter Clear

Test No.	Procedure	Customer	Reg. No.	Operator	Date	Status
49	MOT GAS, Basic Emission T...		REGO123	Bruce William	19/08/2016 9:1...	Pass
50	MOT GAS, Catalyst		REGO123	Bruce William	19/08/2016 10:...	Pass
51	MOT GAS, Catalyst		REGO123	Bruce William	19/08/2016 10:...	Fail
52	MOT GAS, Catalyst		REGO123	Bruce William	19/08/2016 3:5...	Pass
53	SMOKE, Visual Smoke		REGO123	Bruce William	22/08/2016 9:5...	Pass
54	SMOKE, Visual Smoke		REGO123	Bruce William	22/08/2016 10:...	Fail
55	SMOKE, Non-Turbo		REGO123	Bruce William	22/08/2016 11:...	Pass
56	SMOKE, Non-Turbo		REGO123	Bruce William	22/08/2016 11:...	Pass
57	SMOKE, Non-Turbo		REGO123	Bruce William	22/08/2016 12:...	Pass
58	SMOKE, Non-Turbo		REGO123	Bruce William	22/08/2016 1:3...	Pass
59	SMOKE, Non-Turbo		REGO123	Bruce William	22/08/2016 3:4...	Pass
60	SMOKE, Non-Turbo		REGO123	Bruce William	22/08/2016 4:2...	Pass
61	SMOKE, Non-Turbo		REGO123	Bruce William	22/08/2016 5:0...	Pass
62	SMOKE, Turbo		REGO123	Bruce William	23/08/2016 11:...	Pass
63	SMOKE, Turbo		REGO123	Bruce William	23/08/2016 11:...	Pass
64	SMOKE, Turbo		REGO123	Bruce William	23/08/2016 12:...	Pass
65	SMOKE, Turbo		REGO123	Bruce William	23/08/2016 5:0...	Pass
66	SMOKE, Turbo		REGO123	Bruce William	23/08/2016 5:1...	Pass

Total Number of Tests in Database: 226

Show Report Synchronise Close

Figure 23 – “Test report filter option”.

6.8 Settings

Once AutoTest Emission Tester software is connected to AutoSmoke, click on the  (Settings) icon to open the options page.

6.8.1 General Settings

General settings allow the user to

- select the units used by the software to Metric or Imperial
- select the odometer unit to Kilometer, Mile or Hour
- choose to display CO value in the unit of PPM (default is %)

Test reports are formatted according to a template file. The default location for that file is C:\Program Files (x86)\AutoTest\Gas Analyser\Templates\Gas Test Report.htm. However, user can modify that file to suit their needs or simply browse to another template file on the PC.

Click on the “Sync Device Time with PC” button to set the time on the connected device to be the same as PC. Please note this only changes the hour/minute/second on the device but not the date.

The Install New O2 button will register a newly installed O2 sensor in a connected Gas Analyser after it has been changed manually and zero the O2 sensor properly.

The Perform Leak Test button allows the user to manually make the Gas Analyser run a Leak Test outside of the regularly scheduled Leak Tests as required.

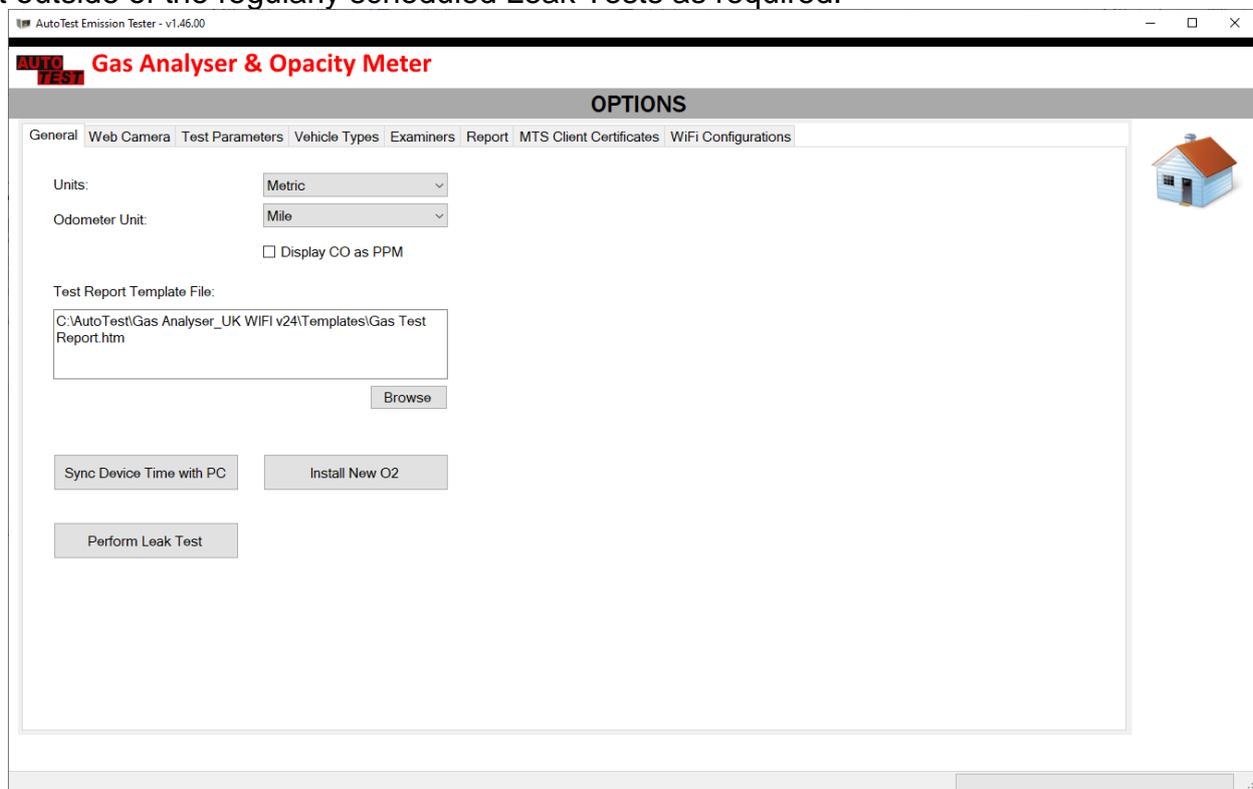


Figure 24 – General Settings

6.8.2 Web Camera

To enable the Web Camera for the purpose of capturing the vehicle registration plate during a gas test, check the “Enable Webcam” box and then make the selection from a list of available webcams connected to the PC.

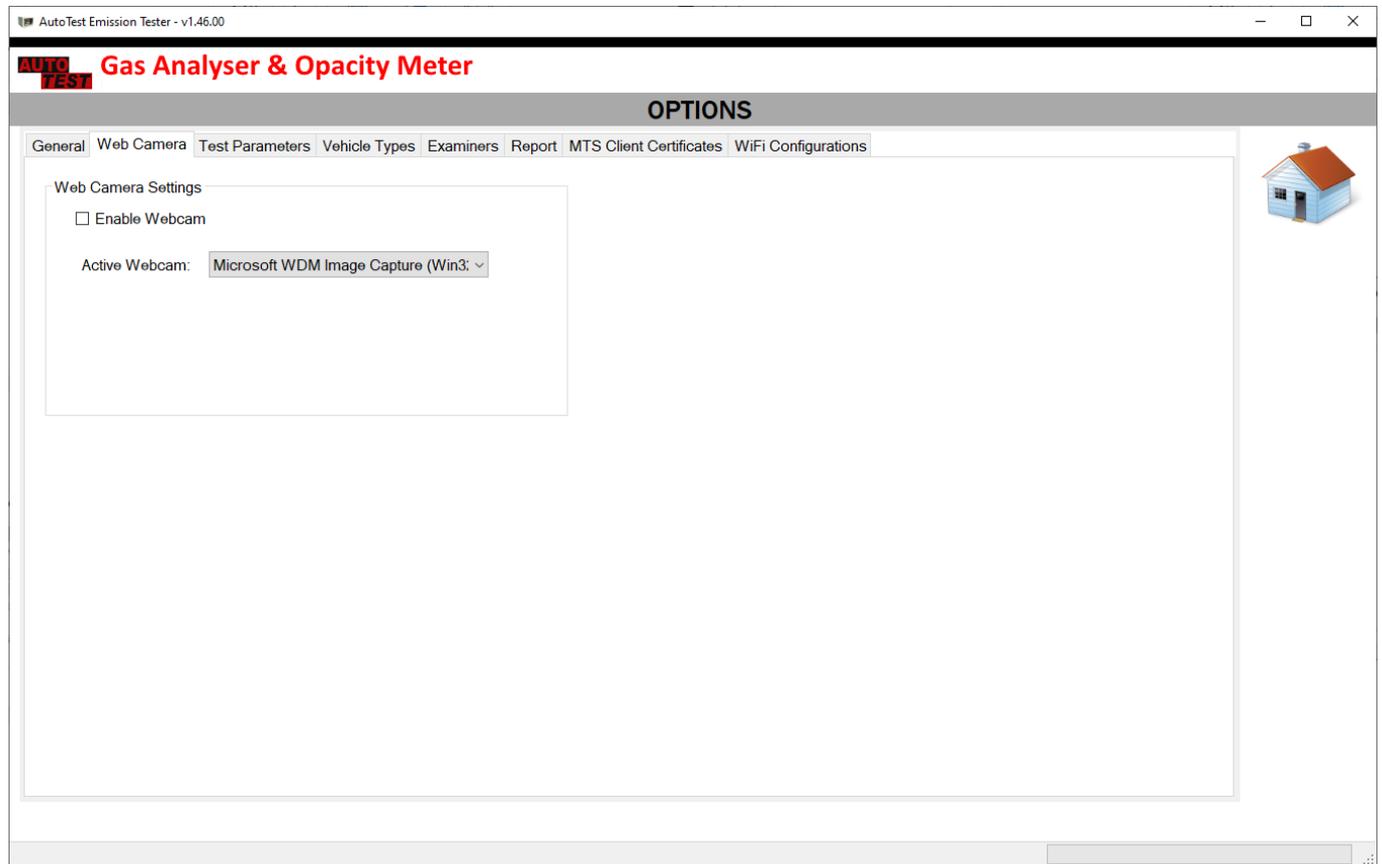
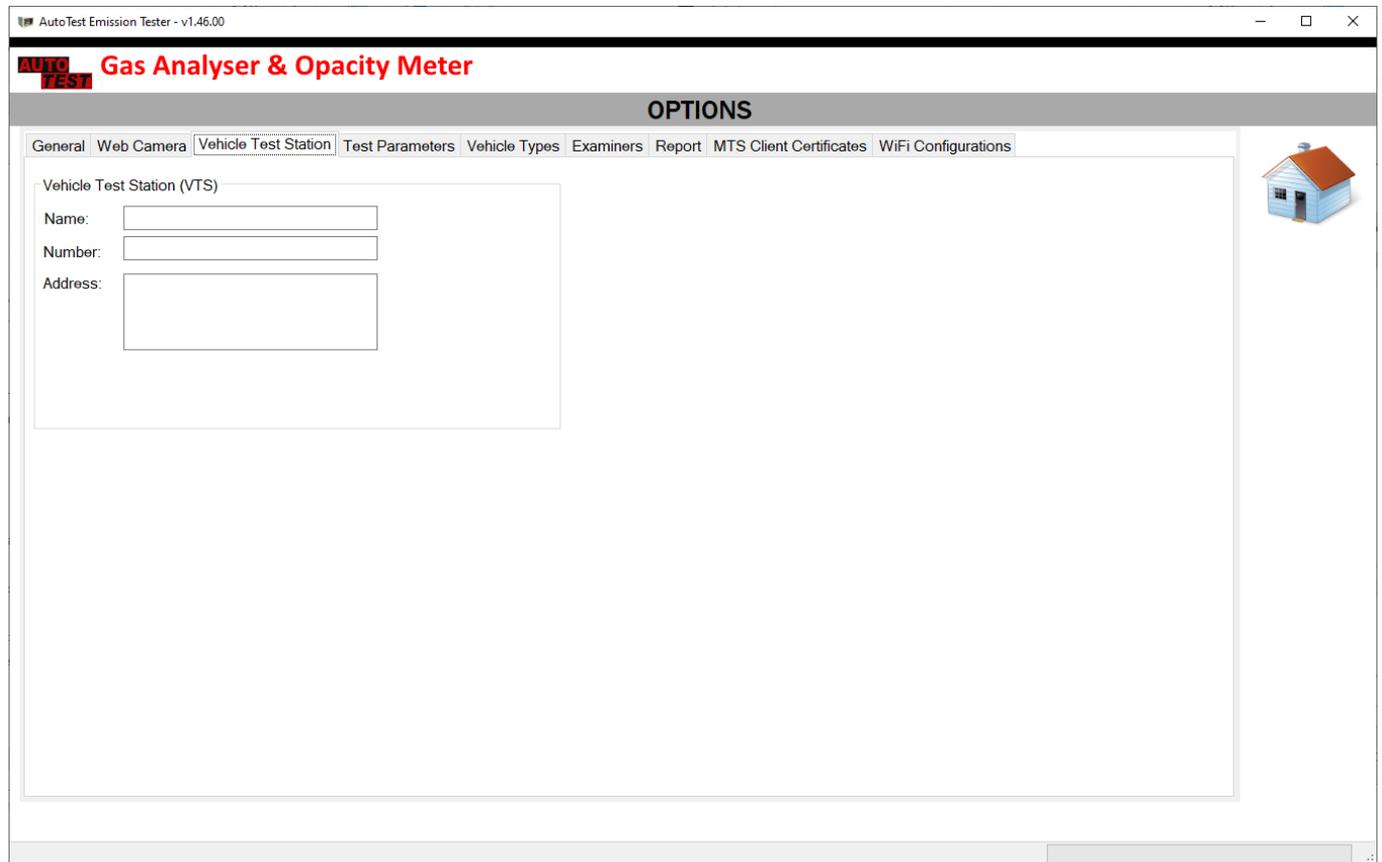


Figure 25 – Web Camera Settings

6.8.3 Vehicle Test Station

User can view and change the Vehicle Test Station (VTS) information under this tab. If AutoGas Analyser is connected to the PC, these information will be synchronised by the AutoTest Emission Tester software.



The screenshot shows the 'AutoTest Emission Tester - v1.46.00' window. The title bar includes standard window controls. The main window has a header with the 'AUTO TEST' logo and the text 'Gas Analyser & Opacity Meter'. Below this is a tabbed interface with the 'OPTIONS' section selected. The 'Vehicle Test Station' tab is active, showing a form with three input fields: 'Name', 'Number', and 'Address'. A small house icon is visible on the right side of the form area.

Figure 26 – Vehicle Test Station (VTS) Settings

User can enter the following information regarding the vehicle test station (or workshop):

Field	Description
Name	The name of the vehicle test station
Number	The registration number or reference number of the vehicle test station
Address	The address of the vehicle test station

6.8.4 Vehicle Types

The vehicle types tab shows the content of the Vehicle Emission Database and lists down all the vehicle test limit values. These limit values will be used for Catalyst gas test or smoke test.

User can use the  (add) or  (delete) button to make changes to the list.

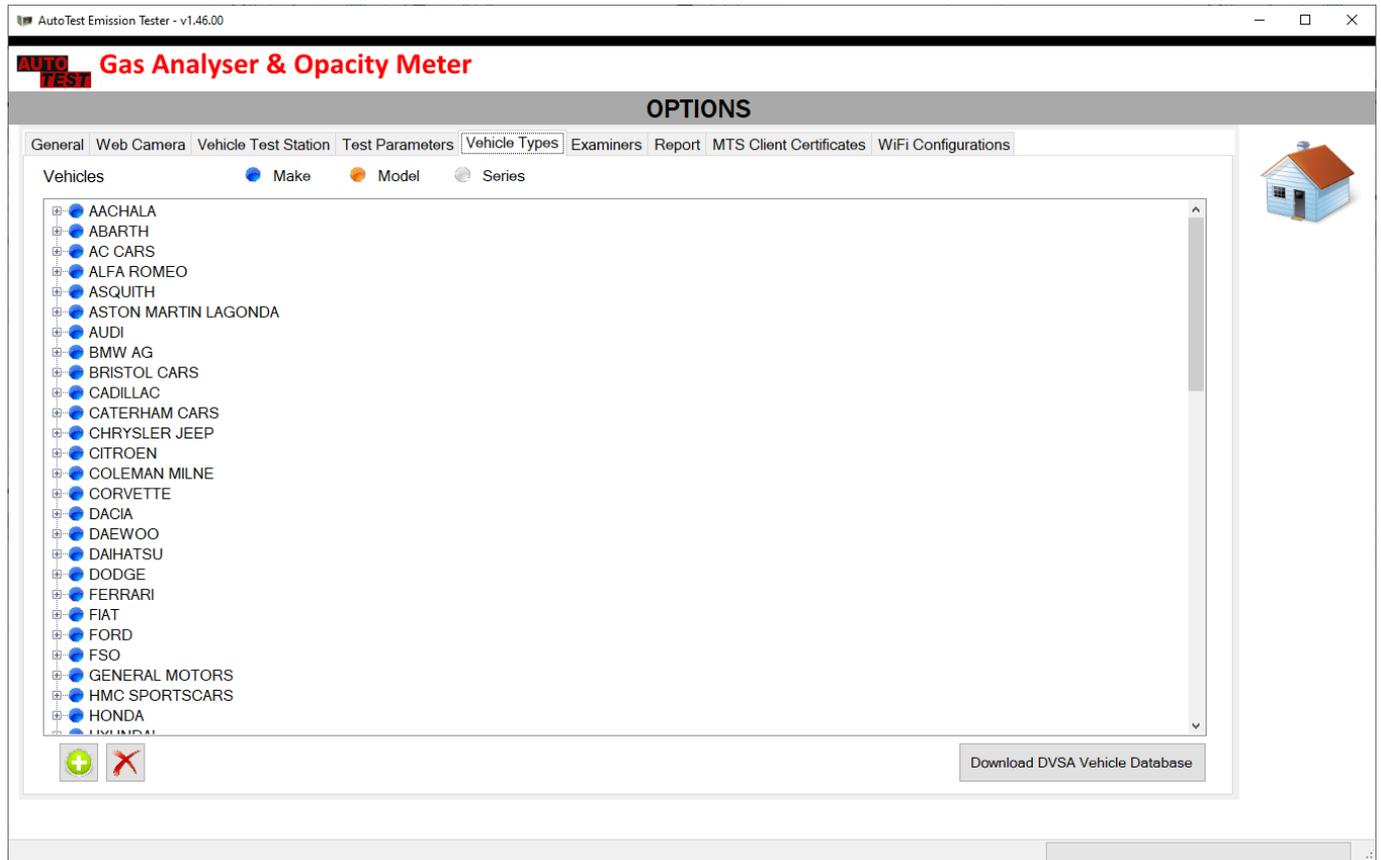


Figure 27 – Vehicle Types Settings

Custom User Added vehicles will be at the bottom of the list of vehicle types.

The Download DVSA Vehicle Database will allow the user to import a newly released DVSA Vehicle Database when released. This will replace the previous Database of vehicles loaded into the software while all custom added vehicles will remain. The Database file must be downloaded and located on your PC to import to the AutoTest Emission Tester Software.

Vehicles cannot be edited at all. Custom vehicles can be replaced by creating a new one (and if necessary deleting the old entry first).

6.8.5 Examiners

The examiners tab allows user to view and change the test examiner details. At the start of a smoke test, the user will be prompted to select the examiner from this list.

User can use the  (add),  (edit) or  (delete) button to make changes to the list.

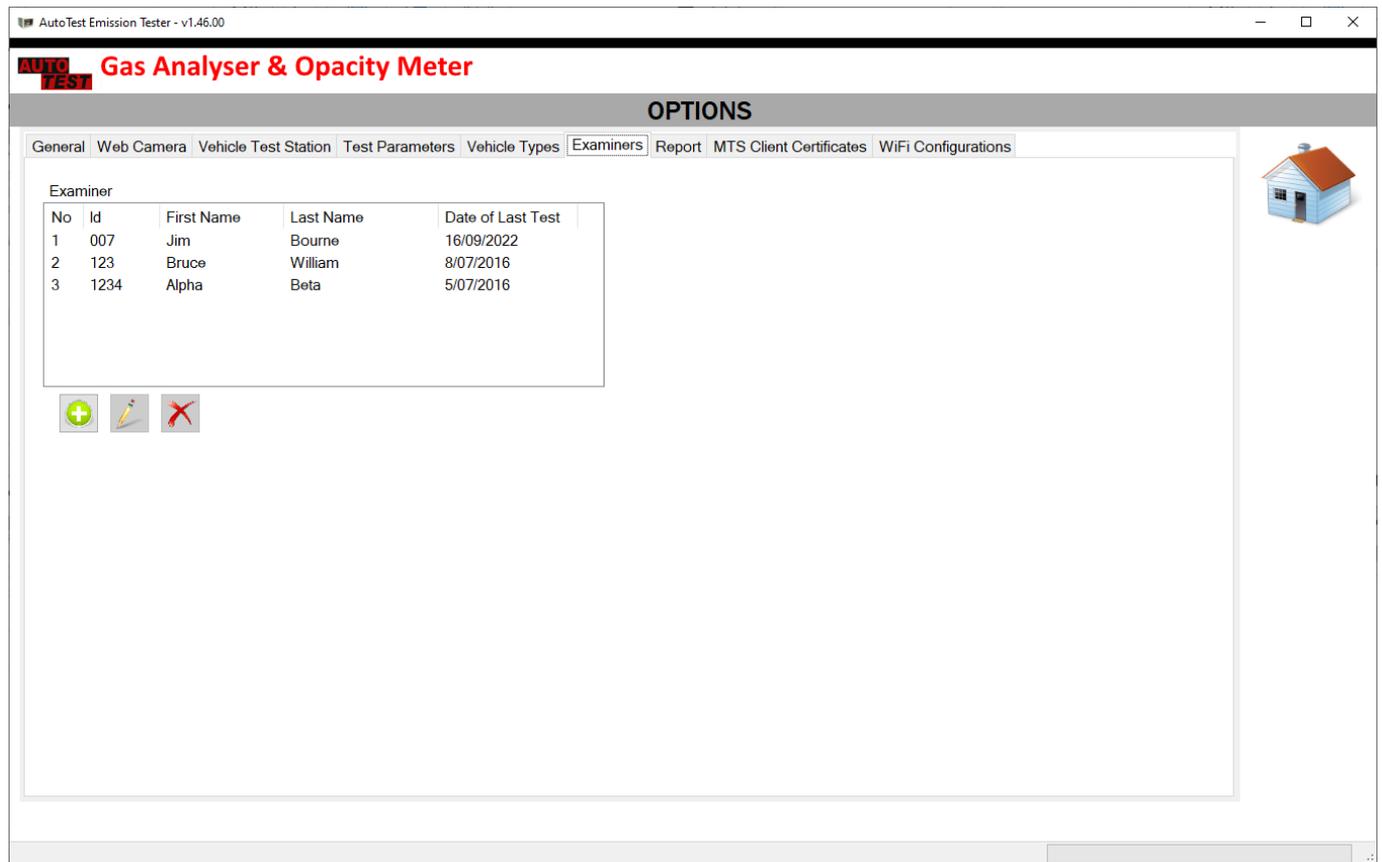


Figure 28 – Examiners Settings

6.8.6 Report

The report tab allows user to select what to show on the test report.

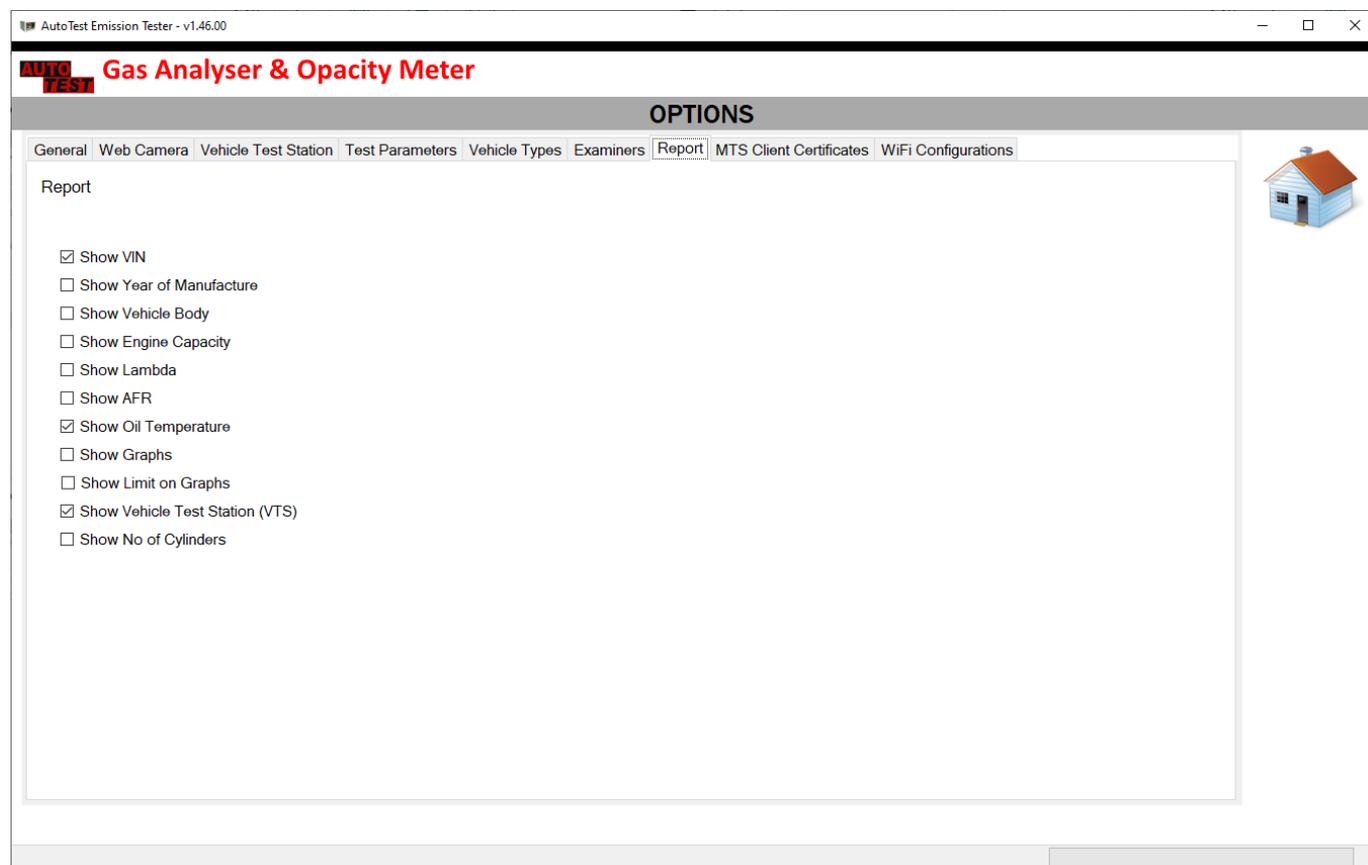


Figure 29 – Report Settings

6.8.7 MTS Client Certificates

The MTS Client Certificates settings tab is used initially to link the AutoGas Emission Tester software to the users MTS Client. This is explained in detail in [5.1.1 Installation of MTS Certification Keys](#).

6.8.8 Wi-Fi Configurations

The Wi-Fi settings page allows the user to change the Wi-Fi connection settings of the device between connecting directly to the unit and connecting via the router. After changing any settings, you must click the Save Settings button to save the settings to the AutoSmoke Unit.

By default, the AutoTest Smoke Meter is set up and ready to use via Wi-Fi *Direct Connection*.

Clicking the Reset to Default button will reset the Wi-Fi settings to the Direct Connection setting.

An LED at the back of the unit will flash in **Green** when the Smoke Meter is set up to run via Direct Connection or **Red** when set up connect via router.

For help with connecting via Wi-Fi see: [5.3 Connecting via Wi-Fi](#)

Note: Wi-Fi Settings of the unit can only be edited when the unit is connected via the RS232 cable.

Connected Directly

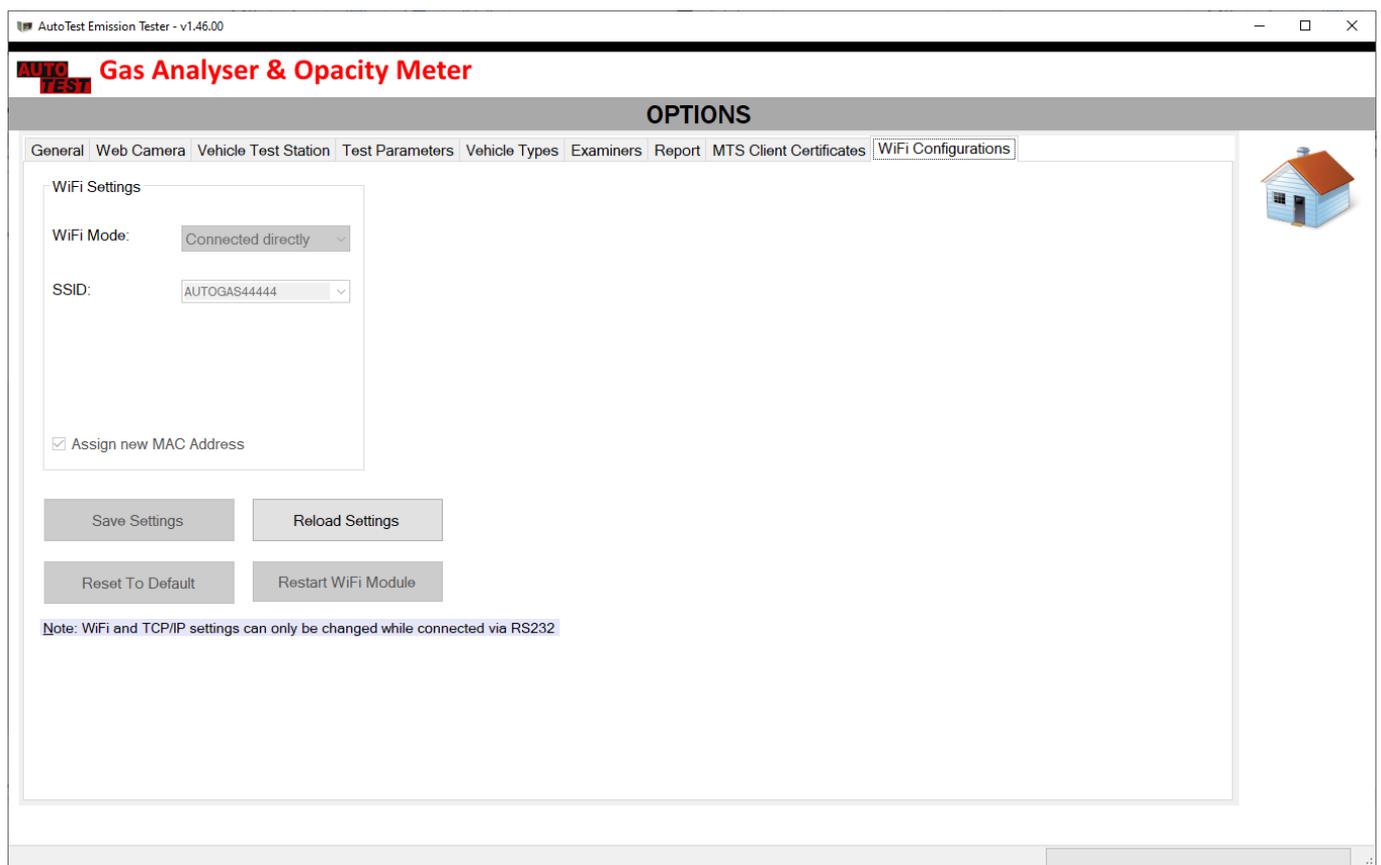


Figure 30 Wi-Fi Settings Page

In this mode, the AutoSmoke will broadcast it’s own Wi-Fi network for the PC to connect to. The Wi-Fi name will be ‘AutoSmoke12345’ where 12345 will be replaced by the serial number of the unit.

This is the simplest set-up of the Wi-Fi functionality where connecting only requires the user to select the correct Wi-Fi network.

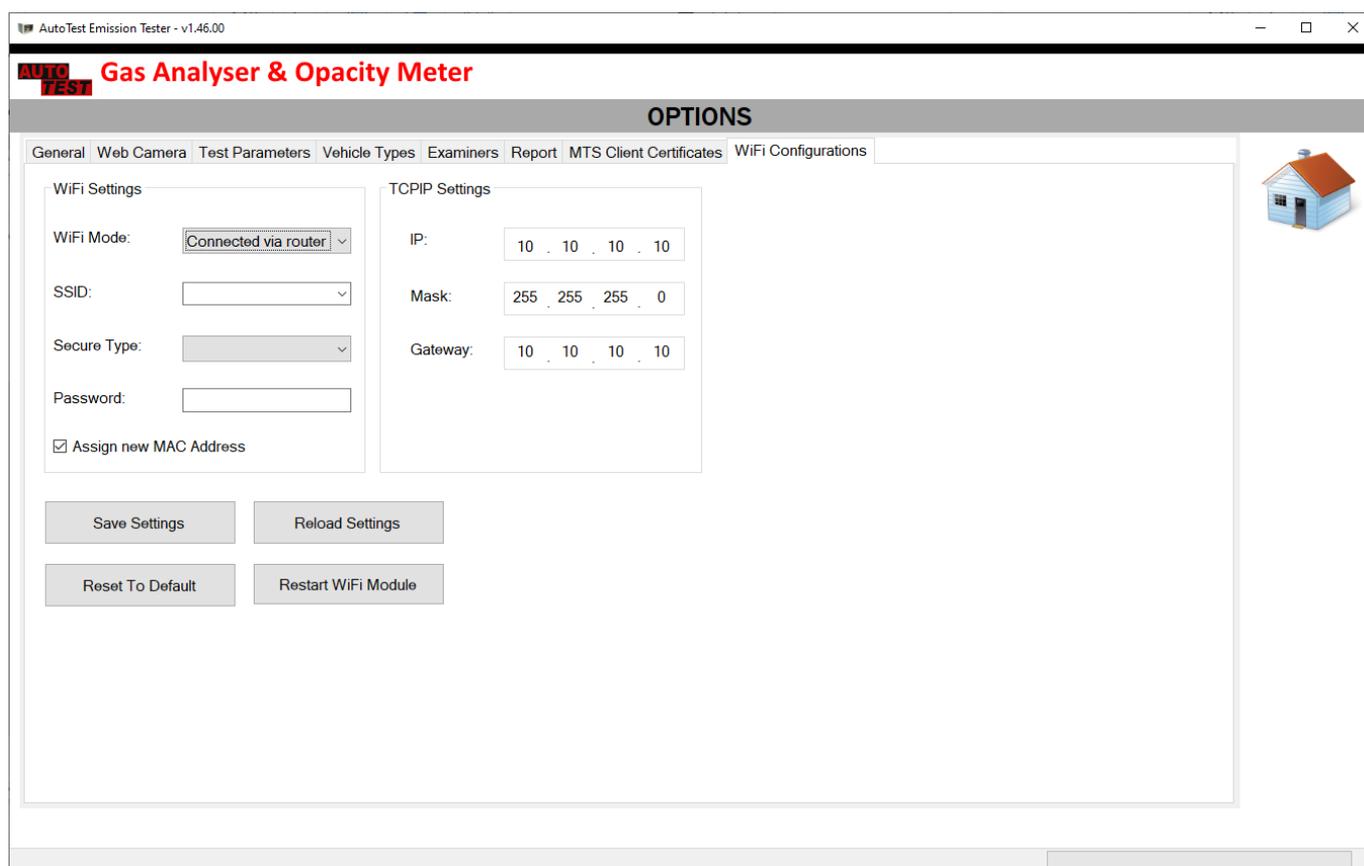
When connected via Wi-Fi as above, the Save Settings, Reset to default and Restart WiFi Module buttons are unavailable to be used as this would interrupt the current connection. To make changes to the Wi-Fi settings connect via the RS232 cable.

The LED will flash green at :0.33Hz when waiting for a connection.

:1Hz when connected to the PC Wi-Fi

:5Hz when connected to the PC Wi-Fi and Emission Tester software.

Connected via Router



The screenshot shows the 'AutoTest Emission Tester - v1.46.00' window. The title bar includes the text 'AutoTest Emission Tester - v1.46.00' and standard window controls. The main window has a header 'Gas Analyser & Opacity Meter' and a sub-header 'OPTIONS'. Below the header is a navigation menu with tabs: 'General', 'Web Camera', 'Test Parameters', 'Vehicle Types', 'Examiners', 'Report', 'MTS Client Certificates', and 'WiFi Configurations'. The 'WiFi Configurations' tab is active. The interface is divided into two main sections: 'WiFi Settings' and 'TCP/IP Settings'. In the 'WiFi Settings' section, 'WiFi Mode' is set to 'Connected via router' (indicated by a dropdown arrow), 'SSID' is empty, 'Secure Type' is empty, and 'Password' is empty. There is a checkbox labeled 'Assign new MAC Address' which is checked. In the 'TCP/IP Settings' section, 'IP' is '10 . 10 . 10 . 10', 'Mask' is '255 . 255 . 255 . 0', and 'Gateway' is '10 . 10 . 10 . 10'. At the bottom of the settings area, there are four buttons: 'Save Settings', 'Reload Settings', 'Reset To Default', and 'Restart WiFi Module'. A small house icon is visible on the right side of the window.

Figure 31 Connected via Router Settings

As connecting directly requires the Wi-Fi connection of the PC, thus losing any internet provided by this connection, the second Wi-Fi connection setting will allow the PC to keep it's normal Wi-Fi Connection while also connecting to the AutoSmoke Meter.

This option is more technical and therefore if the PC in use is connected to the internet via ethernet cable then we recommend sticking to Direct Connection. Alternatively, the Wi-Fi can be switched back and forth as needed, but the user will need to reconnect to the Smoke Meter when this is done.

The set-up of the Connection via Router mode involves giving details to the Smoke Meter so that it can automatically connect to the router.

Wi-Fi Settings:

- The SSID: can be either entered or selected from the available Wi-Fi list populated by windows.
- Secure type: select the security of the router in use.
- Password: enter the Wi-Fi password used to connect to the router.

TCP/IP Settings:

- IP: The IP address assigned to the Smoke Meter
- Mask: The Subnet mask used.
- Gateway: The IP address of the router that the Smoke Meter will connect to.

The LED will flash Red at :0.33Hz when waiting for a connection.

:1Hz when connected to the Router Wi-Fi network

:5Hz when connected to the Router Wi-Fi and Emission Tester software.

7. MAINTENANCE AND CALIBRATION

7.1 Maintenance

AUTOTEST™ Diesel Smoke Meter(Auto Smoke) is designed to function without regular maintenance. The only components requiring periodic maintenance are the glass windows of the light emitter and detector.

Occasional heavy exhaust particles might stick to the glass windows of both the optical emitter and the detector during smoke tests. Cleaning operation on these windows should be performed regularly. Use a dry cotton rag to wipe off any carbon deposit from the surface of the glass windows. **DO NOT USE ANY CLEANING FLUID.**

A carbon deposit may also be deposited in the measurement chamber. Use the supplied cleaning brush to sweep out carbon deposits from the tube to eliminate the soot.

It is not necessary to open Auto Smoke’s side cover to carry out these maintenance operations.

7.2 Calibration

Auto Smoke requires regular calibration. The interval of the calibration will depend on the local regulations but it is advised to recalibrate the unit once a year. Each time test results are printed, the printout will include the day and month of the last calibration. Once the calibration is due, Auto Smoke will display “Calibration Expired” message on the screen and will prevent any further tests to be carried out.

There are two ways of calibrating Auto Smoke - either via your local authorised service centre or by returning the unit to AUTOTEST™ Products (See Section 7.2.1).

7.2.1 Returning Auto Smoke for Calibration

7.2.1.1 Packaging

Please remember that you are shipping an electronic instrument. Bubble pack or foam should surround the Auto Smoke, which should be inserted into a sturdy cardboard box.

7.2.1.2 Shipping

Labelling - A label noting “Electronic Device - Fragile” should be placed on the box.

Freight Carrier – Container should be sent **freight prepaid**. Auto Test Products has no preference on freight carriers. However, we prefer companies such as TNT, IPEC, UPS, or Federal Express to forward units, if a prompt delivery is required.

Ship to the following address:

The Service Department,
AutoTest Products Pty Ltd,
61-63 Parsons St,
Kensington, VIC 3031,
Australia.
Phone: (+61 3) 8840 3000.

Alternatively, contact your nearest service agent (see Section 11).

Users residing in the UK may ship the unit to the local authorised service centre:

Tecalemit Garage Equip. Co. Ltd
Unit 2, Eagle Road, Langage Bus Pk., Plympton, Plymoth, Devon, PL7 5JY
PH: (+017) 5221 9150

8. CONVERSION CHART

8.1 Absorption (K) to Opacity (%) based on 430mm EOPL

<i>Absorption (k) m⁻¹</i>	<i>Opacity (%)</i>	<i>Absorption (k) m⁻¹</i>	<i>Opacity (%)</i>	<i>Absorption (k) m⁻¹</i>	<i>Opacity (%)</i>
0	0	3.9	81.31	7.8	96.51
0.1	4.21	4	82.09	7.9	96.65
0.2	8.24	4.1	82.85	8	96.79
0.3	12.1	4.2	83.57	8.1	96.93
0.4	15.8	4.3	84.26	8.2	97.06
0.5	19.35	4.4	84.92	8.3	97.18
0.6	22.74	4.5	85.56	8.4	97.3
0.7	25.99	4.6	86.17	8.5	97.41
0.8	29.11	4.7	86.75	8.6	97.52
0.9	32.09	4.8	87.31	8.7	97.63
1.0	34.95	4.9	87.84	8.8	97.73
1.1	37.69	5	88.35	8.9	97.82
1.2	40.31	5.1	88.84	9	97.91
1.3	42.82	5.2	89.31	9.1	98.00
1.4	45.23	5.3	89.76	9.2	98.09
1.5	47.53	5.4	90.19	9.3	98.17
1.6	49.74	5.5	90.61	9.4	98.24
1.7	51.86	5.6	91	9.5	98.32
1.8	53.88	5.7	91.38	9.6	98.39
1.9	55.82	5.8	91.74	9.7	98.46
2.0	57.68	5.9	92.09	9.8	98.52
2.1	59.46	6	92.42	9.9	98.58
2.2	61.17	6.1	92.74	9.91	98.59
2.3	62.81	6.2	93.05	9.92	98.59
2.4	64.37	6.3	93.34	9.93	98.60
2.5	65.87	6.4	93.62	9.94	98.61
2.6	67.31	6.5	93.89	9.95	98.61
2.7	68.68	6.6	94.15	9.96	98.62
2.8	70	6.7	94.39	9.97	98.62
2.9	71.26	6.8	94.63	9.98	98.63
3.0	72.47	6.9	94.85	9.99	98.64
3.1	73.63	7	95.07		
3.2	74.74	7.1	95.28		
3.3	75.8	7.2	95.48		
3.4	76.82	7.3	95.67		
3.5	77.8	7.4	95.85		
3.6	78.73	7.5	96.02		
3.7	78.83	7.6	96.19		
3.8	80.49	7.7	96.35		

8.2 Opacity (%) to Absorption (K) based on 430mm EOPL

<i>Opacity % (N)</i>	<i>Absorption K (m⁻¹) Co-efficient</i>	<i>Opacity % (N)</i>	<i>Absorption K (m⁻¹) Co-efficient</i>	<i>Opacity % (N)</i>	<i>Absorption K (m⁻¹) Co-efficient</i>
1	0.02	40	1.19	79	3.63
2	0.05	41	1.23	80	3.74
3	0.07	42	1.27	81	3.86
4	0.09	43	1.31	82	3.99
5	0.12	44	1.35	83	4.12
6	0.14	45	1.39	84	4.26
7	0.17	46	1.43	85	4.41
8	0.19	47	1.48	86	4.57
9	0.22	48	1.52	87	4.74
10	0.25	49	1.57	88	4.93
11	0.27	50	1.61	89	5.13
12	0.30	51	1.66	90	5.35
13	0.32	52	1.71	91	5.60
14	0.35	53	1.76	92	5.87
15	0.38	54	1.81	93	6.18
16	0.41	55	1.86	94	6.54
17	0.43	56	1.91	95	6.97
18	0.46	57	1.96	96	7.49
19	0.49	58	2.02	97	8.15
20	0.52	59	2.07	98	9.10
21	0.55	60	2.13	99	10.71
22	0.58	61	2.19	99.1	10.95
23	0.61	62	2.25	99.2	11.23
24	0.64	63	2.31	99.3	11.54
25	0.67	64	2.38	99.4	11.90
26	0.70	65	2.44	99.5	12.32
27	0.73	66	2.51	99.6	12.84
28	0.76	67	2.58	99.7	13.51
29	0.80	68	2.65	99.8	14.45
30	0.83	69	2.72	99.9	16.06
31	0.86	70	2.80		
32	0.90	71	2.88		
33	0.93	72	2.96		
34	0.97	73	3.04		
35	1.00	74	3.13		
36	1.04	75	3.22		
37	1.07	76	3.32		
38	1.11	77	3.42		
39	1.15	78	3.52		

9. TROUBLESHOOTING

9.1 Fault Diagnostics

Fault Description	Possible Reasons	Possible Solution
Device not turning ON	<ul style="list-style-type: none"> AC Fuse blown 	Check the AC fuse located in the compartment where AC-in cable is connected. Notice the fuse value printed on a sticker next to the AC input socket.
Fan not running	<ul style="list-style-type: none"> Smoke meter just started 	Normal. The fan does not turn on during the initial warmed up phase.
	<ul style="list-style-type: none"> Faulty Fan 	If the FAN does not turn on after the warmup is done while the communication between Auto Smoke and Auto Gas is ok, replace the fan as it might be faulty.
Auto Gas unable to connect to Auto Smoke	<ul style="list-style-type: none"> Signal reception problem 	Change the angle and direction of the RF antenna located on the smoke meter
		Reduce the distance between Auto Gas and Auto Smoke
"Smoke Bench Failed" message appears on Auto Gas when starting a smoke test	<ul style="list-style-type: none"> Smoke bench is faulty or dead 	Contact Auto Test Service

9.2 Error Messages

Fault Description	Possible Reasons	Possible Solution
"Calibration Expired! Measurements may be inaccurate."	<ul style="list-style-type: none"> Calibration has expired 	Recalibrate the meter
"RTC clock on the device has failed."	<ul style="list-style-type: none"> Internal clock chip fault or the 3V clock battery is flat 	The meter needs to be repaired. Contact AutoTest Service Centre.
"Dirty window - needs cleaning"	<ul style="list-style-type: none"> Smoke meter's glass / lens are dirty and need to be cleaned 	Switch off the smoke meter. Clean the lens using a dry cotton rag
"Temperature sensor is faulty"	<ul style="list-style-type: none"> Smoke meter's temperature sensor is faulty 	The meter needs to be repaired. Contact AutoTest Service Centre.
"Gas bench board failed."	<ul style="list-style-type: none"> Gas Bench board of the gas analyser is faulty 	The meter needs to be repaired. Contact AutoTest Service Centre.

For other problems, contact Auto Test Products or any Authorised Service Centre in Australia on (61 3) 9647 9797 or fax details of the problem to (61 3) 9464 3427. Repairs should only be carried out by an authorised AutoTest service centre, in order to ensure that the gas analyser retains its calibration. Refer to Section 12 regarding warranty. For instructions on returning products for calibration or servicing, see Section 10.1.

10. SPECIFICATIONS

10.1 Technical Specifications

	Measurement parameters	Value	Resolution	Notes
1	Smoke Opacity (%)	0 – 99.9 %	0.10 %	< 1.0 % (full range)
2	Smoke Absorption (m ⁻¹)	0 – 9.99 m ⁻¹	0.01 m ⁻¹	
3	Source LED (λ)	480 - 680 nm		
4	Source LED (λ_{peak})	565 nm		
5	Response time	0.2 sec		
6	Warm-up time	< 10 minute		Over 0 – 50 °C.
7	Zero Calibration	Automatic		
8	Detector temperature	40 °C		
9	Chamber temperature	80 °C		
10	Chamber tube length	215 mm		0.5 mm
11	Chamber diameter	21 mm		
12	Effective Optical Path Length (measured)	215 mm		
13	Effective Optical Path Length (compensated)	430 mm		
14	Ventilation Fan Speed	2600 RPM		Constant speed fan
Using AUTOTEST™ Exhaust Gas Analyser (Auto Gas)				
15	Engine Speed	400 – 7000 RPM	10 RPM	
16	Engine Speed (via OBD-II)	0 – 16383 RPM	1 RPM	
17	Oil Temperature Sensing	0 – 110 °C	1 °C	
18	Oil Temperature Sensing (via OBD-II)	-40 – 210 °C	1 °C	

10.2 Electrical Specification

1	AC Power supply	110 – 230 V _{AC} (+10% to -15%) 50-60 Hz
2	DC Power supply	13.5 V _{DC} ±15% (65 W)

10.3 General Specifications

1	Operating temperature	+2°C to +45°C
	Gas Analyser & Smoke Meter	+2°C to +45°C
	Accelerometer Sensor	+2°C to +130°C
2	Storage temperature	-20°C to +70°C
3	Dimensions	200 mm x 400 mm x 170 mm
4	Weight	6.5 Kg
5	ISO-3173, ISO-11614	
6	CE Directive: 72/306/CEE, 91/441/CEE	
7	CE Directive 96/96/CE (20 Dec 1996), 2003/27/CE (03 Apr 2003)	

11. AUTHORISED SERVICE AGENTS

AUSTRALIA

AutoTest Products
61-63 Parsons Street, Kensington, VIC-3301
PH:+61 3 8840 3016

UNITED KINGDOM

Tecalemit Garage Equip. Co. Ltd
Unit 2, Eagle Road, Langage Bus Pk., Plympton, Plymoth, Devon, PL7 5JY
PH: (+017) 5221 9150

12. WARRANTY

AUTOTEST Products Pty Ltd or any Authorised AUTOTEST Service Centre warrants this product against defects in material and workmanship for a period of 12 months from the original date of purchase. This warranty applies only to products and components supplied by AUTOTEST Products which can be identified by the trade name or logo affixed to them or by other documents. AUTOTEST Products does not warrant any products not supplied by AUTOTEST Products.

During the warranty period, AUTOTEST Products or any Authorised Service Centre will repair (or at its option replace) any defective component(s) without charge for parts or labour, provided the product is returned freight prepaid to an authorised AUTOTEST Service Centre. Transit insurance and return freight will be at the owner’s expense.

In order to obtain calibration, warranty or non-warranty service, ship the product, freight and insurance prepaid to your nearest AUTOTEST Service Centre. Attach to the product your name, address, contact phone numbers, description of the problem and if a warranty claim, proof of purchase (dated sales receipt or invoice).

AUTOTEST Products or any Authorised AUTOTEST Service Centre reserves the right to refuse warranty repair if accident, abuse, misuse or misapplication has damaged the product, or if the product has been damaged in transit or as a result of service or modification by other than an Authorised Service Centre, nor are any other warranties expressed or implied, including any regarding merchantability or fitness for any other particular purpose.

AUTOTEST Products or any Authorised Service Centre is not responsible for incidental or consequential damages resulting from the breach of any express or implied warranty, including damage to property and, to the extent permitted by law, damages for personal injury

NOTES:

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