AUTO TEST Products Pty Ltd®

User Manual
October 2026

AUTO*Test*® AutoGas 5 (Export)

Gas Analyser

AUSTRALIAN MADE AND OWNED
License ID number: 10242

DECLARATION OF CONFORMITY
We, AutoTest Products Pty Ltd. declare under our sole responsibility that the product AutoTest ® AutoGas 5 (Export) is in conformity with the provisions of the following Council Directive: 1999/5/EC.
For a copy of the Declaration of Conformity, please contact sales@autotest.net.au or refer to the document found in your product packaging.

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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 instrument on when wireless device use is prohibited or when it may cause interference or danger.

FOLLOW INSTRUCTIONS
To ensure accurate results and safety, please use this product in accordance with the user manual, otherwise warranty may not be provided if the product is damaged.

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

CLEAN AFTER USE
Clean the housing using a damp cloth or a mild soap solution. Avoid the use of abrasives, alcohol, or solvents when cleaning the instrument.

FLAMMABLE ENVIRONMENTS
Please do not use this product in flammable, explosive, humid or corrosive environments.

DAMAGE
To prevent inaccurate measurements, discontinue use if the product is damaged, or has been dropped.

CORRECT SETTINGS
Please use the correct emissivity to obtain accurate temperature readings.

QUALIFIED SERVICE
Only qualified personnel may install or repair this product.

ACCESSORIES AND BATTERIES
Use only approved accessories and batteries. Do not connect incompatible products.

WATER-RESISTANCE
Your instrument is not water-resistant. Keep it dry.

CONNECTING TO OTHER DEVICES
When connecting to any other instrument, read its user guide for detailed safety instructions. Do not connect incompatible products.

WARM UP BEFORE USE
To ensure the measurement accuracy, please warm up the instrument for 10 minutes before measuring if the product has not been used for a long time.

BE MINDFUL OF HOT SURFACES

Watch out for hot temperatures zones of vehicles particularly 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.

BE 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.

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1 SCOPE

This manual provides an instructional guide for use of the product and defines the operational parameters and compliance frameworks for the installation and use of the AutoTest ® AutoGas 5 (Export).

1.1 Instrument Purpose & Technology

This instrument measures vehicle exhaust gases to assess emissions and engine performance. The results can be used to support engine tuning, including performance tuning applications, and to assist occupational health and safety checks by identifying potentially harmful gases in the surrounding work area. The instrument also automatically calculates the Lambda and hydrocarbon based on the fuel type selected and its propane equivalence factor (PEF).

1.2 Applicable standards

Operation and deployment of this product strictly comply with all relevant directives and is in conformity with the applicable requirements of the following documents:

- AS/NZS 1425:2013
- AS/NZS 4251.1:1999
- ADR 114/00
- ADR 37
- ADR 26
- ADR 27
- ADR 79
- ADR 80
- UN R83/04-06
- IEC 61000-6-2 Generic immunity standard – Industrial environments
- IEC 61000-6-4 Generic emission standard – Industrial environments
- 2014/30/EU – EMC Directive
- 2006/51/EC – EMC Directive
- DVSA In Service Exhaust Emission Standards for Road Vehicles – Nineteenth Edition (2017)
- OIML R 99 Class 1
- VPB/07/24/20 - UK MOT

1.3 Regulatory Compliance

Please refer to your local government regulator to confirm applicable certification.

1.4 Personnel Training Frameworks

Refer to local regulations as accredited training may be required.

2 UNPACKING AND FIRST TIME USE

Congratulations on your choice of an AutoTest ® AutoGas 5 (Export). Please take the time to read this User's Manual before using AutoTest ® AutoGas 5 (Export) in the field. Incorrect or inappropriate use of this instrument may void the warranty. 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 online. Your warranty registration ensures that you are kept up to date on any software or hardware changes to your AutoTest ® AutoGas 5 (Export).

The packing box of your AutoGas 5 (Export) should contain the following:

- AutoGas 5 (Export)
- Sampling Probe with in-line filter
- Oil Temperature Sensor
- Inductive Pick-up Probe
- AC Power Cable
- USB Cable
- QR Code Card linking to manual and other materials

The current optional accessories are as follows:

- Battery Cable
- OBD-II Reader

- Magnetic Accelerometer
- PC Software
- RS232/Serial Cable

Please refer to Section 4.4 for accessories.

3 ACRONYM KEY

AC	Alternate Current – Mains supply
AFR	Air to Fuel Ratio
BET	Basic Emission Test
CC	Cubic Centimeter
CO	Carbon Monoxide
CO2	Carbon Dioxide
DC	Direct Current – Battery supply
DSM	Diesel Smoke Meter
ECU	Engine Control Unit
EGA	Exhaust Gas Analyser
HC	Hydrocarbon
HT cable	High Tension cable – Spark-plug cable
KM	Kilometer
Lambda (λ)	Engine efficiency
MOT	Ministry of Transport
NOx	Nitrogen-Oxides
O2	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

4 APPLICATION INFORMATION

4.1 Application

The AutoTest Gas 5 is a gas analyser designed to analyse the composition of vehicle exhaust gases. This analysis provides an indication of how efficiently a vehicle's engine is operating, particularly in terms of reducing harmful pollutant emissions released into the atmosphere. AutoGas measures five gases - CO, HC, CO_2, O_2, and NOx. Using the measured values of CO, HC, CO_2, and O_2, the unit can also calculate Lambda (λ) and Air-to-Fuel Ratio (AFR) which are key indicators of combustion efficiency.

The unit uses Non-Dispersive Infrared (NDIR) sensing technology is used to measure the contents of the input gas (CO, CO2, HC). While exhaust gas passes through the gas bench, a light source emits lights of different frequencies and then measures the amount of light that has been received at the opposite end by a detector. The signal received at the detector informs the gas bench about the concentration of each gas.
Oxygen (O_2) and nitrogen oxides (NOx) are measured separately using dedicated electro-chemical sensors.

In addition to gas analysis, AutoGas is capable of measuring engine oil temperature and engine speed (RPM) using supplied probes. Engine speed can be determined using multiple methods, listed below:

RPM Measurement Type	Description	Probe/Sensor
Battery-sense method	Measures engine RPM by monitoring the fluctuations in the vehicle battery voltage	Battery / DC cable
Inductive pick-up (HT cable)	Picks up ignition signal in a HT (high tension) cable using an inductive pick-up clamp	Inductive pick-up clamp
Accelerometer	Monitors the mechanical vibration of an engine	Accelerometer sensor

OBD-II (optional)	Obtains engine RPM and oil temperature from vehicle's ECU	Bluetooth OBD-II reader

For vehicles equipped with OBD-II, the unit can also wirelessly retrieve engine speed and oil temperature directly from the vehicle's ECU using a Bluetooth OBD-II reader (an optional accessory).

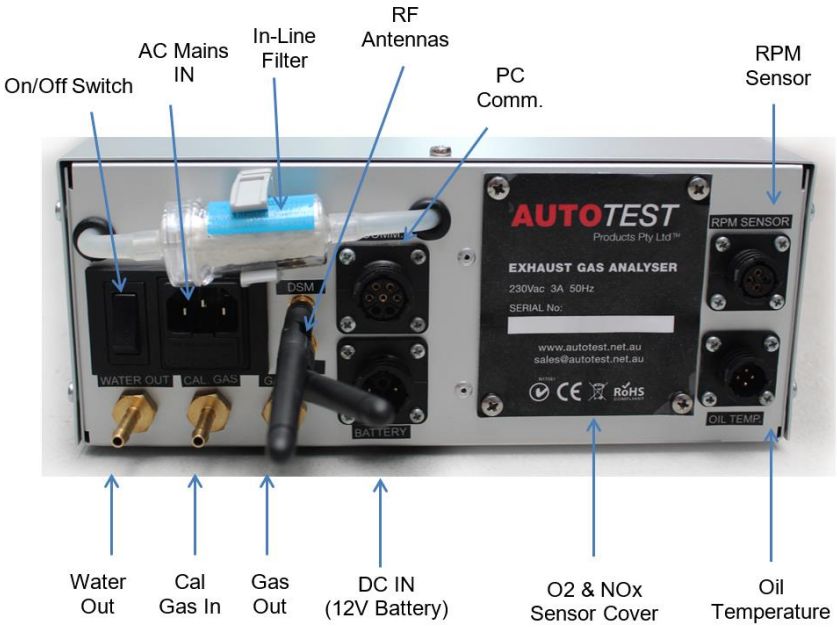
AutoGas is suitable for use vehicles that run on petrol, LPG, and CNG. Its lightweight and portable design make it well suited for both workshop use and roadside emissions testing. The instrument can perform standalone emissions tests based on standard procedures such as the MOT Exhaust Emissions test. It also includes a built-in database of over 60 vehicle models and their respective emission limits for quick reference, along with an integrated printer that allows users to generate test and calibration reports instantly.

To ensure accurate measurements, AutoGas includes an electronic leak detection function that verifies the integrity of the sampling system. The unit performs a leak check at least once every 24 hours or whenever it is powered on. During this process, a vacuum is created within the gas bench, and any fluctuations in pressure are monitored to detect leaks that could otherwise result in incorrect readings.

For diesel vehicles, AutoGas can be used in combination with the Auto*Smoke* ® Opacity Meter via a wireless connection. This allows the system to carry out Free Acceleration Smoke (FAS) tests in accordance with MOT Diesel Smoke Test procedures for compression ignition engines.

4.2 Instrument Layout and Overview

4.2.1 Rear view of AutoGas



4.2.2 Side View of AutoGas

4.2.3 Internal Layout

This section explains how an exhaust gas sample moves through the AutoGas and how the main internal components work together to prepare, filter, and measure the sample. The exhaust gas sample travels from the sampling probe to the gas bench. Inside the gas bench, the AutoGas measures the gases present in the sample. Figure 1 provides a visual overview of this flow path:

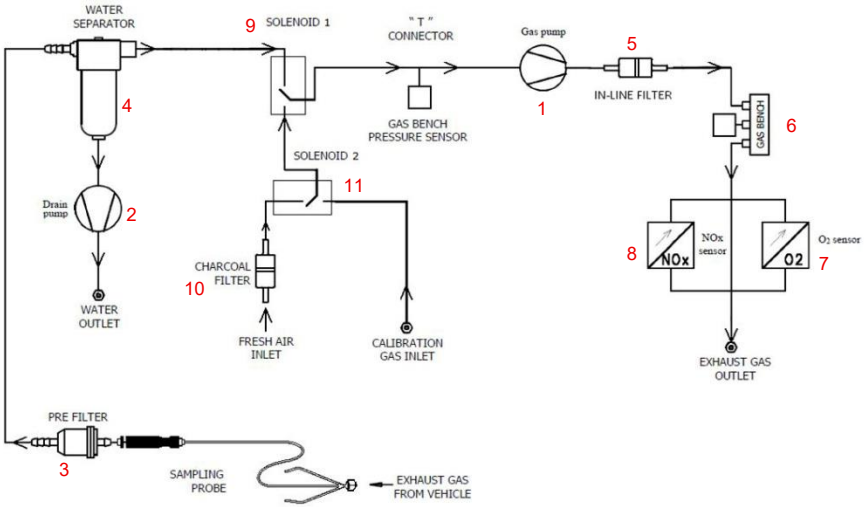


Fig. 1 AutoGas' internal layout

The AutoGas 5 (Export) has a dual head diaphragm pump; the first head of the pump [1] circulates the input exhaust gas through a set of filters into the gas bench, where the contents of the sampled gas are analysed.
The second head of the pump [2] circulate any water particles trapped in the water separator filter and drains via the water outlet.

The use of filters prevents any exhaust contaminants from reaching the gas bench. The exhaust gas flows through the pre-filter [3] to remove any contaminating particles.
After the pre-filter, exhaust gas flows through a water separator [4}, which filter out the moisture or water droplets.

After the water separators, the gas flows through another filter called the in-line filter [5]; this further removes any micron scale contaminating particles.
After the in-line filter, the gas flows through the gas bench [6] where the contents of the input gas are analysed. The gas bench analyses CO, CO2 and HC gases.

After the gas bench, the exhaust gas flows through two electrochemical sensors: O2 sensor and NOx sensor. The O2 sensor [7] measures the concentration of O2 gas in the exhaust gas, whereas the NOx sensor [8] measures the NOx level in the exhaust gas.

When zero calibration (resetting the instrument's readings back to fresh air) is performed, solenoid 1 [9] is activated to block the input gas. The pump then circulates the fresh air (ambient air) through a charcoal filter [10]. The fresh air then flows through the in-line filter and into the gas bench, where the zero calibration is performed.

During calibration, solenoid 1 is activated to block the input gas while the solenoid 2 [11] is also activated to block the zero gas. The calibration gas then flows through the in-line filter and then into the gas bench [6], where the calibration gas is analysed, and the gas bench is calibrated.

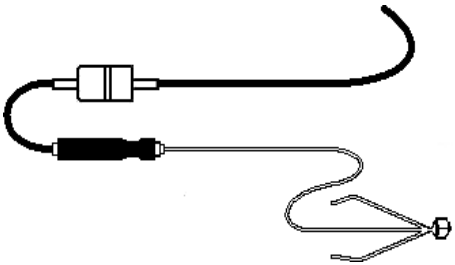
The temperature of the gas bench is maintained at 40 to 45°C to prevent condensation building up inside the gas bench tube. The gas bench includes two pressure transducers for measuring gas pressure and ambient pressure.

4.3 Maintenance

Do not drop or hit the instrument.
Do not disassemble the instrument as this may damage the delicate electronic circuits, causing instrument failure.
Ensure after use the water traps are emptied.
Do not subject the instrument to high temperatures or store the instrument in high temperature, high humidity, flammable, explosive and strong electromagnetic environments.
Clean the instrument with a soft cloth using a small amount of water or neutral detergent to wipe the case. Abrasives and solvents should not be used as they may create corrosion and damage the instrument.

4.4 Accessories

The following items are provided with the AutoGas as standard accessories.



Sampling Probe with Pre-filter (Code: 917829)

Inductive Pick-up Probe (HT cable probe) (Code: 917671)

Oil Temperature Probe (Code: 917830)

AC Power Cable (Code: 104324)

USB-to-Serial Adapter (Code: 916391)

4.4.1 Optional Accessories

The following list of accessories can be provided as optional extras (at an additional cost).

NO_x Sensor (Code: 917568)

Battery Cable (Code: 917831)

Accelerometer Sensor (Code: 917670)

RS232 Serial Cable (Code: 917832)

Bluetooth OBD-II Reader (Code: 917447)

4.4.2 Standard Consumables

The following listed consumables are available for purchase.

Prefilter (Pack of 10) (Code: 917686)

In-line Disposable Filter (Pack of 5) (Code: 917683)

Oxygen Sensor (Code: 917684)

5 TURNING ON THE AUTOGAS

The AutoGas can be powered using either an AC mains supply or a vehicle's 12 VDC battery.

Using AC Mains

When powering the AutoGas from an AC mains supply, ensure the power source meets the following requirements:

- Voltage: 230–265 VAC
- Phase: Single phase
- Frequency: 50–60 Hz

Using a Vehicle Battery (DC Power Supply)

The AutoGas can also be powered using a vehicle's battery.

- Ensure the battery has a minimum capacity of 60 Ah
- Ensure the battery voltage does not exceed the maximum rated voltage
- Confirm the battery is sufficiently charged before conducting a test

Connection Procedure

1. Connect one end of the supplied battery cable to the AutoGas unit.
2. Connect the clamps at the other end to the vehicle battery:
    - Red clamp → Positive (+) terminal
    - Black clamp → Negative (−) terminal
3. Once connected, the instrument will automatically power on.

6 PC SOFTWARE

To install the AutoTest® Emission Tester software:
System requirements: Microsoft Windows 2011 or later, a USB port or serial port, and 100 MB of available hard disk space.

1. Follow this link to download the AutoGas5 software: [Home - AutoTest Products Pty Ltd]
2. Once paid, a confirmation email with a code will be sent through. Run the install file with the license key supplied in the email.
3. Follow the on-screen prompts to complete the installation.

Once installation is complete, start the PC software.

Run Auto*Test*® Emission Tester:

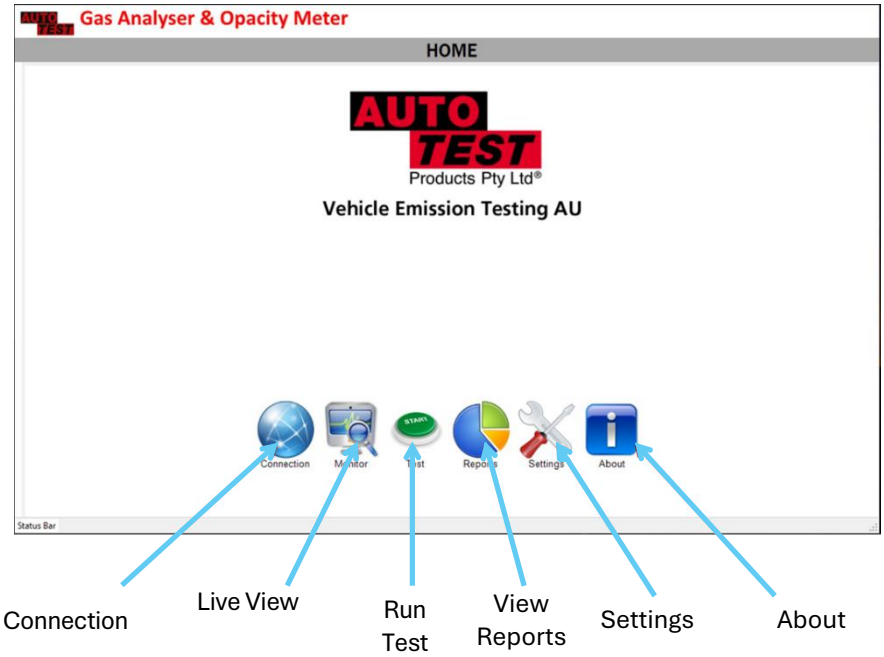


Fig. 2 Emission Tester Software - Homepage

6.1 Installation of MTS Certification Keys

Auto*Test*® Emission Tester software allows user to perform emission tests from PC as well as to upload these tests directly to the MOT Testing Service (MTS).

To install MTS Certification Keys:

1. Go to the Software Homepage and click "**Settings**". Then click the tab "**MTS Client Certificates**.

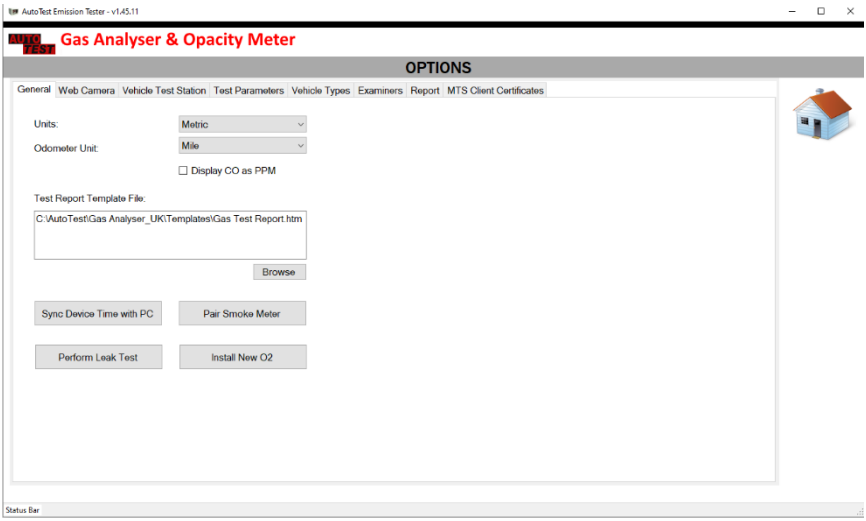
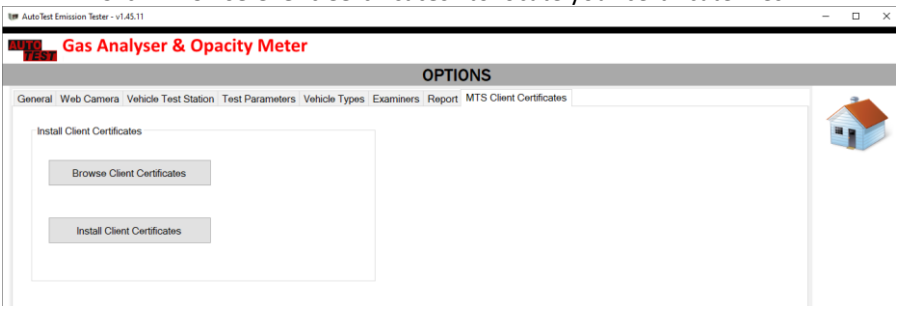


Fig. 3 Settings Menu

2. Click “**Browse Client Certificates**” to locate your certificate files.



3. 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**”.

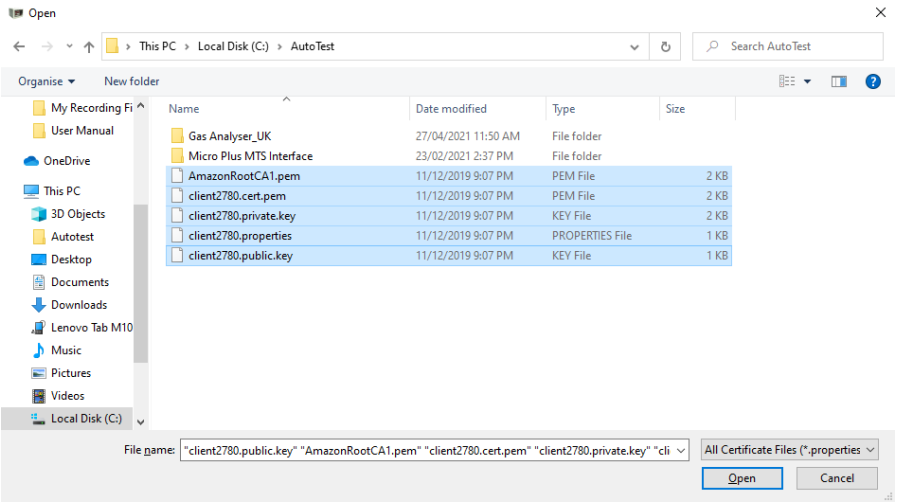


Fig. 5 Browse Client Certification files

4. Click “**Install Client Certificates**”. Then click “**Yes**” when asked to allow the program to make changes to your PC.

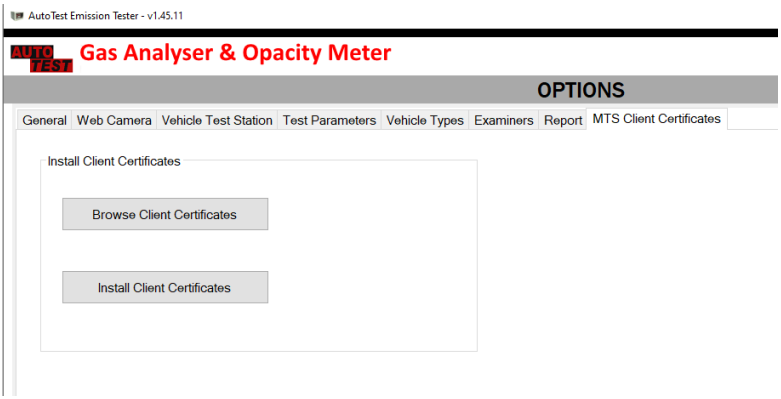


Fig. 6 Install Client Certificates

Emission Tests can now be uploaded to the MTS server.

6.2 Connection via USB-to-Serial Adapter

Connect the AutoGas and PC via the USB to serial cable (optional accessory). If the PC does not support USB connectivity, use the RS232 serial cable (optional accessory).

In the software, select the serial COM port connected to the AutoGas. When using the USB-to-serial adapter, use the COM port number shown by the computer when the USB connector is attached; This can also be found in Control Panel > Device Manager > Ports.
For desktop computers with RS232 support, the communication port is usually COM1.

Turn on the instrument and on the software, click the "**Connection**" icon.

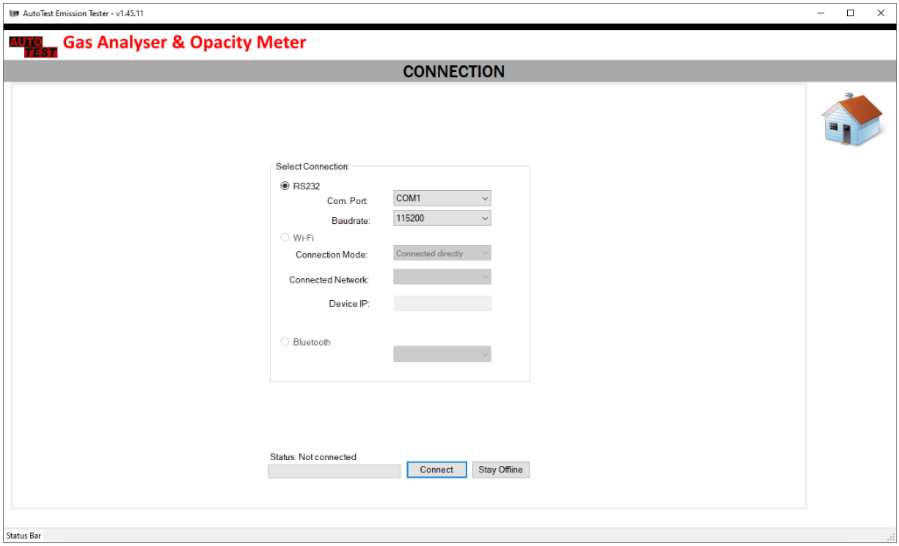


Fig. 7 Connection Page

The baudrate should be selected as 115200.
Click "**Connect**".
Note: In case the connection with AutoGas is suddenly lost, restart Auto*Test*® Emission Tester software.

6.3 Real Time View

Once Auto*Test*® Emission Tester software is connected to AutoGas, click on the "**Monitor**" icon to open the real-time view page.

Click on the "**Gas Pump On**" button to run the gas pump and start sampling gas readings.

Please note that the PRM reading comes from the RPM source selected in the last test conducted (see Fig. 21).

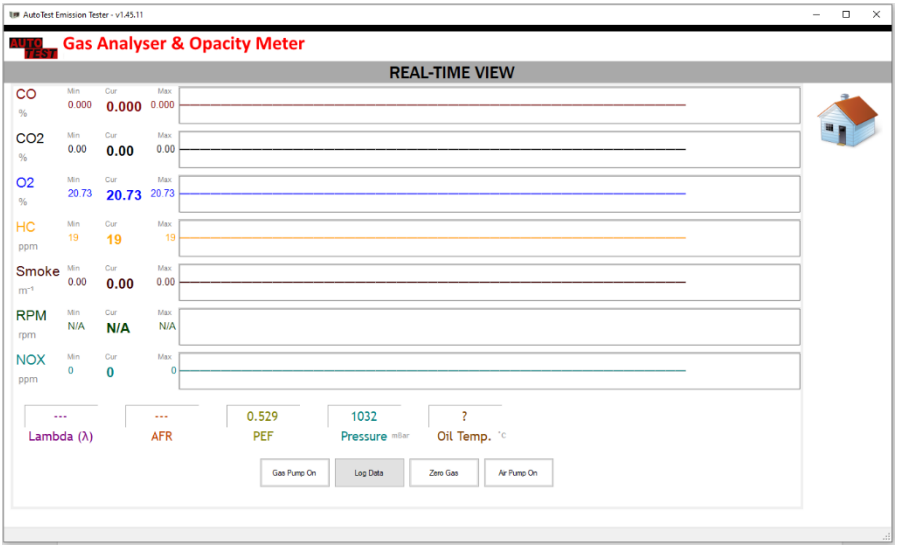


Fig. 8 Real Time View Page

6.4 Test Reports

The AutoGas stores all test data in its memory. Auto*Test*® Emission Tester software can be used to view test reports on the PC.

Once Auto*Test*® Emission Tester software is connected to AutoGas, click on the "**Reports**" icon to open the reports index page.

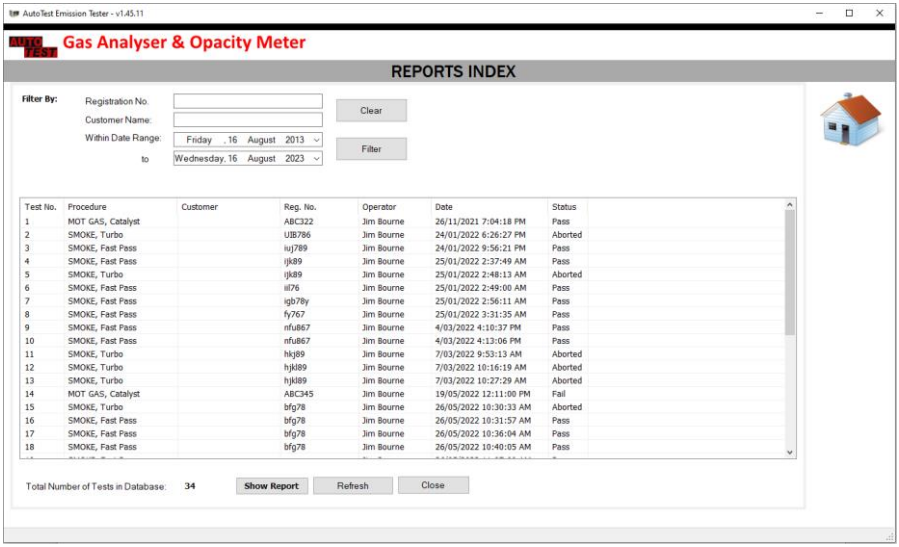


Fig. 9 Report Index Page

6.4.1 View Test Reports

From the “**REPORTS INDEX**” list, select a desired test record by double-clicking on it or clicking on the “**Show Report**” button on a highlighted entry. This will bring up a “**TEST REPORT**” page showing all the test information.

To print the report, click on the “**Print**” icon. A new window will appear to show the print preview - click “**Print**” and follow the prompts. Close the “**Print Preview**” window to return to the “**TEST REPORT**” page.

6.4.2 Filter Test Reports

Test reports can be searched for using a vehicle’s registration number, customer name and/or test date range.

In the “**REPORTS INDEX**” page, set the values accordingly, and then click “**Filter**” to launch a new search. Those values can be removed by clicking “**Clear**”.

6.4.3 Updating Vehicle Data

Entering the correct vehicle registration number is critical when connecting to MTS. An incorrect vehicle registration number that has been entered at the beginning of test can be corrected before connecting to MTS on “**TEST REPORT**” page.
In order to see updated test records, click on the “**Refresh**” button in the “**REPORTS INDEX**” page.

6.5 Settings

Once AutoTest® Emission Tester software is connected to AutoGas, click on the "**Settings**" icon to open the options page.

6.5.1 General Settings

General settings allow the user to select:

- units of measurements – either Metric or Imperial
- odometer unit - Kilometre, Mile or Hour
- choose to display CO value in the unit of PPM (default is %)

Users can customise test reports by editing the report template file in the Templates folder, located in the same directory as the AutoGas PC software. After editing the template, update the file path in the "**Test Report Template File**" field within the software; click "**Browse**" and then selected updated template.

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.

Click on the "**Load Default Settings**" button to restore factory default settings.

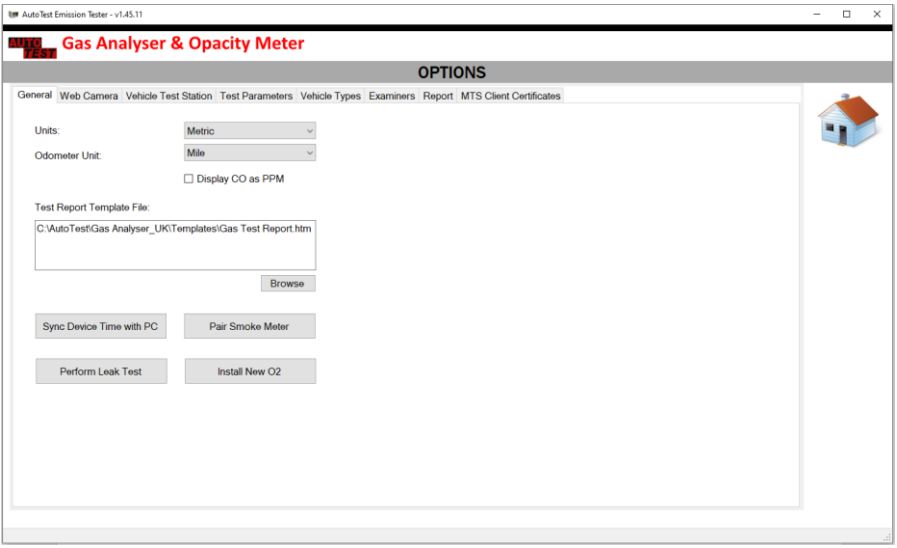


Fig. 10 General Settings

6.5.2 Web Camera

A web camera can be used to capture the vehicle's registration number plate. To enable the Web Camera, select the "**Enable Webcam**" tab and then select the relevant camera.
Once the camera is set up, an image of the vehicle registration number can be captured; it will save along with the test report in the installation directory: "C:\AutoTest\Gas Analyser_UK\Report\vehicle.jpg".

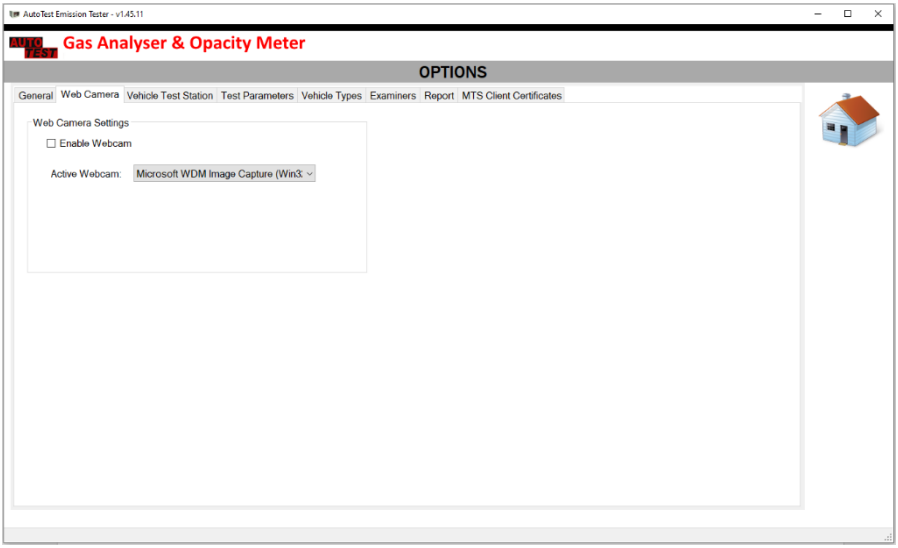


Fig. 11 Web Camera Settings

6.5.3 Vehicle Test Station Information

Vehicle test station (VTS) information can be stored on the "**Vehicle Test Station**" tab. If the AutoGas is currently connected to the PC, the PC software will load the VTS information from the instrument when the settings dialogue window is opened.

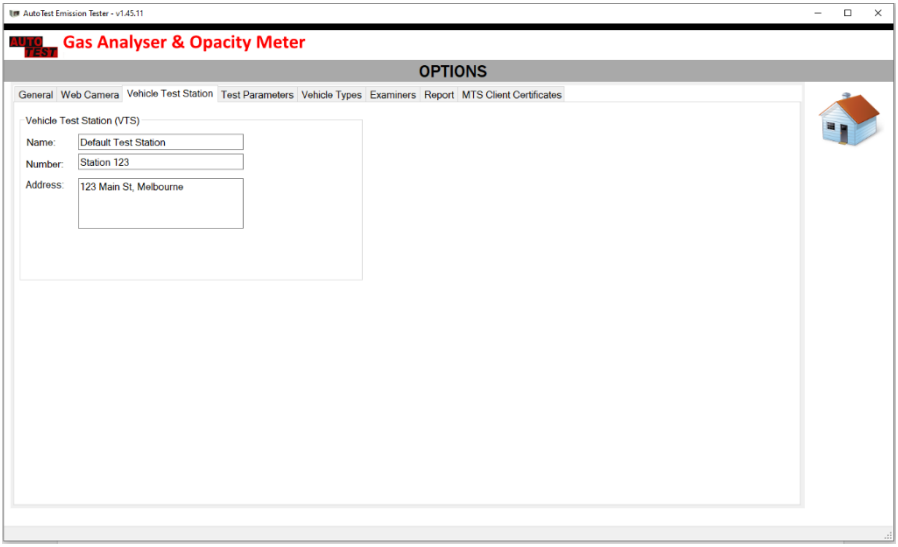


Fig. 12 Vehicle Test Station Settings

The user can enter the following information regarding the test station:

Name: the name of the vehicle test station or workshop.
Number: the registration number or reference number of the test station.
Address: the address of the vehicle test station.

6.5.4 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.

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

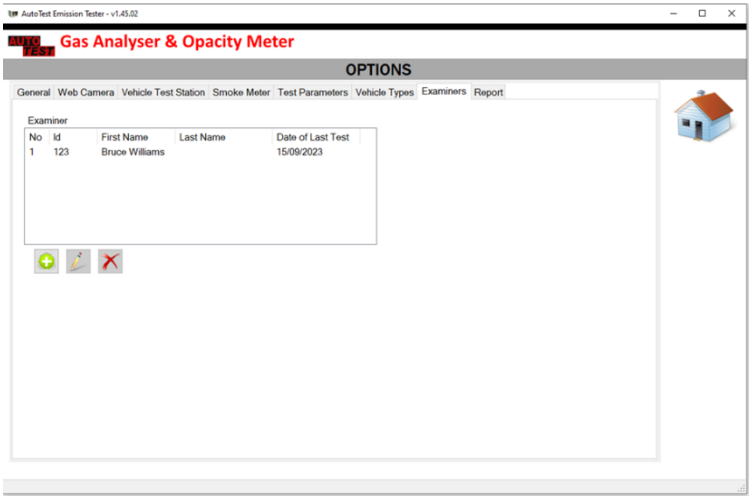


Fig. 13 Vehicle Types Settings

6.5.1 Examiners

The "**Examiners**" tab allows the user to change the examiner; The list of added examiners will be displayed at the start of a test for the user to choose the current examiner or tester.

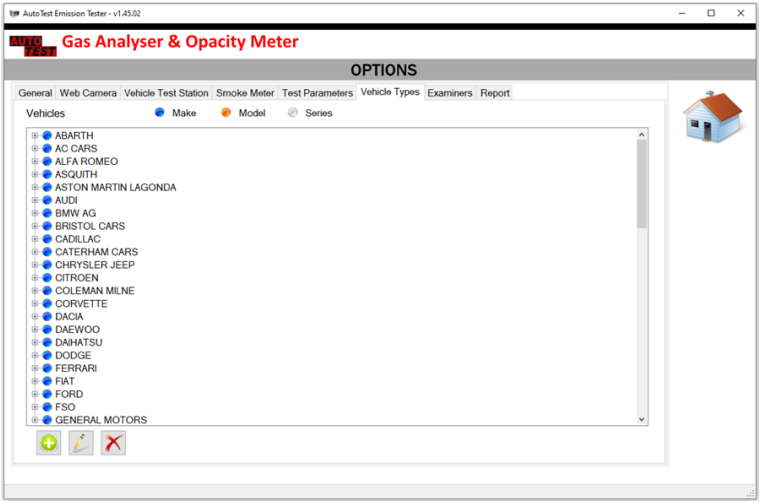


Fig. 14 Examiner Settings

6.5.2 Report Settings

The report configuration page allows users to customise the test report by select what to show on the test report and what not to include in the test report.

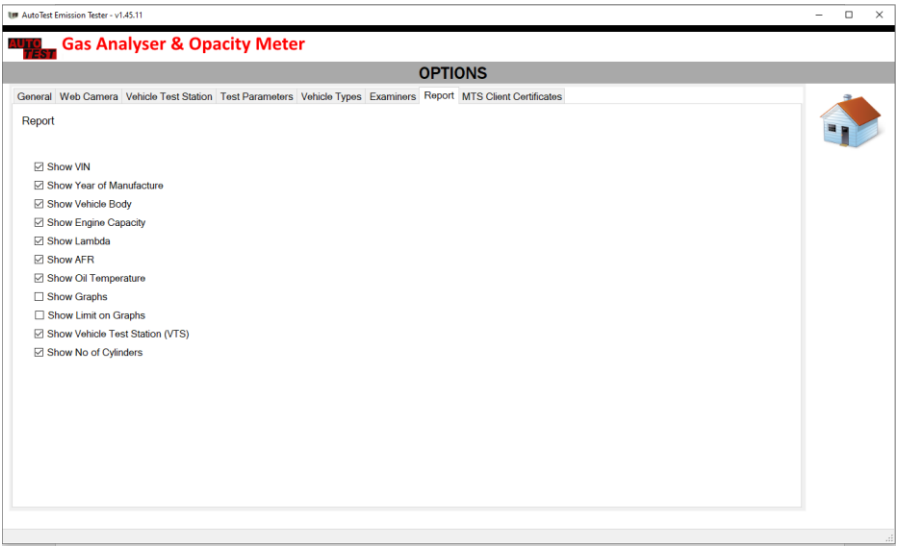


Fig. 15 Report Settings

7 EXHAUST GAS TEST

7.1 Preliminary Checks

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

7.2 Equipment Setup

Securely park the vehicle before connecting all necessary accessories to AutoGas. Make sure the vehicle engine is turned off.

Turn on the AutoGas and allow it to complete its initialisation phase and warm up to its operating temperature.

7.3 Engine Oil Temperature Measurement

Remove the oil dipstick from the vehicle, then extend the oil temperature probe by pressing its lock button until its length matches that of the dipstick.

Insert the temperature probe into the dipstick tube until the cable stopper prevents it from going further. Do not force the probe deeper, as this may damage the probe or engine components.

Start the vehicle, and the oil temperature reading will gradually increase as the engine warms up.

Note: Always ensure that both the oil dipstick and the temperature probe are clean before inserting them into the engine housing.

Note: If OBD-II device is used during the test for RPM measurement, it is not necessary to attach oil temperature probe, as the engine oil temperature reading will be taken from OBD-II.

Warning! If the temperature probe is longer than the dipstick, it may come into contact with moving engine components, potentially causing damage to the engine or the probe sensor.

7.4 Engine RPM measurement

If engine RPM is required during a test, ensure the RPM measurement device is set up before test begins.

The engine RPM can be automatically measured using one of the following methods:

- using vehicle battery
- using accelerometer sensor (optional accessory)
- using OBD-II reader (optional accessory)
- using inductive pickup

Please note each of the above accessories are available at Home - AutoTest Products Pty Ltd

7.4.1 Using Vehicle Battery

To measure engine RPM from the vehicle battery, operate the AutoGas from 12V vehicle battery.

First, disconnect AC mains cable from the AutoGas. Then, follow the steps in Section 5. 'Using Vehicle Battery (DC power supply)' to connect the AutoGas to the vehicle battery.

When starting a test procedure, make sure to select “**Battery**” as RPM source on the software.

Note: if the RPM reading shown by the AutoGas differs significantly from the vehicle’s actual RPM at different engine speeds, turn on the headlights, fan, heater, or other electrical loads to strengthen the battery voltage signal.

7.4.2 Using Accelerometer Sensor (Optional Accessory)

To measure engine RPM from the accelerometer sensor, connect the accelerometer cable to the back of AutoGas Analyser (“**RPM SENSOR**”). Make sure the magnetic base is attached to the accelerometer.

Place the accelerometer on the engine mount. Try several positions and choose the location with the strongest vertical vibration, as this is likely to provide the most reliable RPM signal.

Check the RPM reading and compare it with the value shown on the vehicle’s cluster panel. If the AutoGas Analyser reading differs significantly, move the accelerometer to another location and repeat the check until the readings match.

Warning! Components of a running engine can cause serious or fatal injuries. The engine head and radiator hoses can become extremely hot during operation. Ensure the accelerometer is securely mounted on the engine at all times. A loosely fitted sensor may become caught in moving parts, potentially causing injury and damaging both the sensor and engine components.

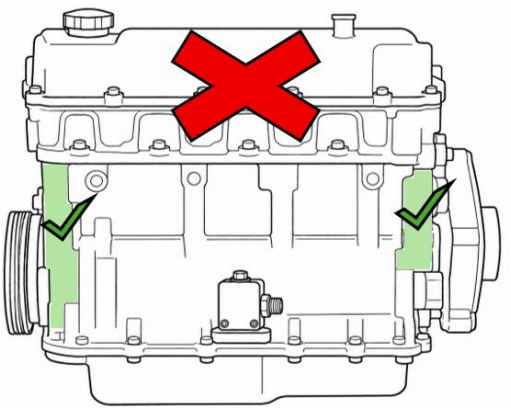


Fig. 16 Accelerometer placement

7.4.3 Using OBD-II Reader (Optional Accessory)

Note: If the vehicle does not support the OBD-II interface, the OBD-II scanner cannot be used to measure the RPM.

The OBD-II interface can retrieve engine RPM and oil temperature directly from the vehicle. The OBD-II scanner connects to the vehicle's OBD-II port and sends this data wirelessly to the AutoGas via Bluetooth.

Before connecting the scanner to your car, ensure the engine is switched off, and the key is in the off position. Locate the OBD-II port on the vehicle, typically found beneath the steering wheel or near the fuse box. With the engine off, plug in the OBD-II scanner to the port.

When starting a test procedure, make sure to select "OBD-II" as RPM source.

Note: it may take the AutoGas up to 20 seconds at the start of the test to establish communication with the OBD-II reader over Bluetooth.

7.4.4 Using Inductive Pickup

Engine RPM can be measured from the supplied inductive pickup probe (HT cable probe) with the following steps:

1. Locate the vehicle's spark plugs.
2. Identify the spark plug leads connected to the vehicle's power harness.
3. Check the arrow label on the clamp end of the inductive pickup cable; it shows the correct clamp orientation.
4. Ensure the arrow points toward the spark plugs.
5. Clamp the inductive pickup around one spark plug lead.
6. Connect the other end of the inductive pickup cable to the RPM Sensor port on the back of the AutoGas Analyser.

When starting a test procedure, make sure to select "**Inductive Pickup**" as RPM source on the software.

7.5 Running Gas Test

AutoTest® Emission Tester software allows a test to be executed from a PC using AutoGas PC software. One major advantage of running a test from a PC is that users monitor live gas readings and follow clearer on-screen instructions.

With the software connected to the AutoGas, click on the

"**Test**" icon to open the test page.

Press "**Run Gas Test**" to start a new test. If the connection to AutoGas is established, the software will prompt for the test information.

Select "**Start a New Test**" to start with new vehicle details.

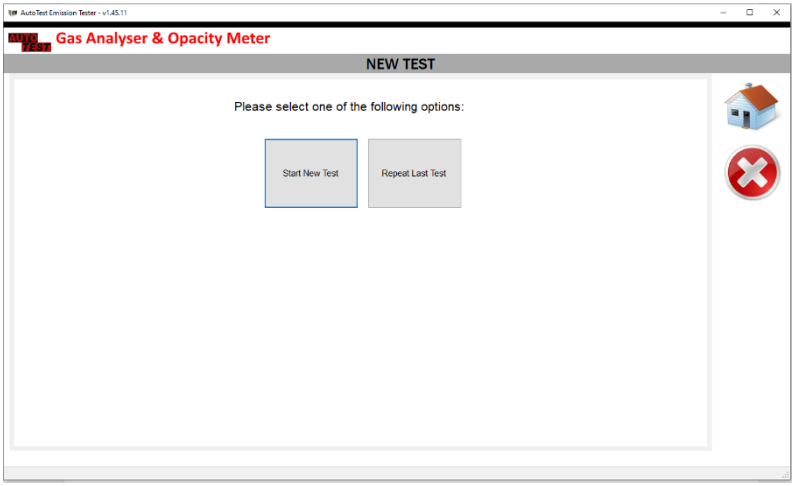
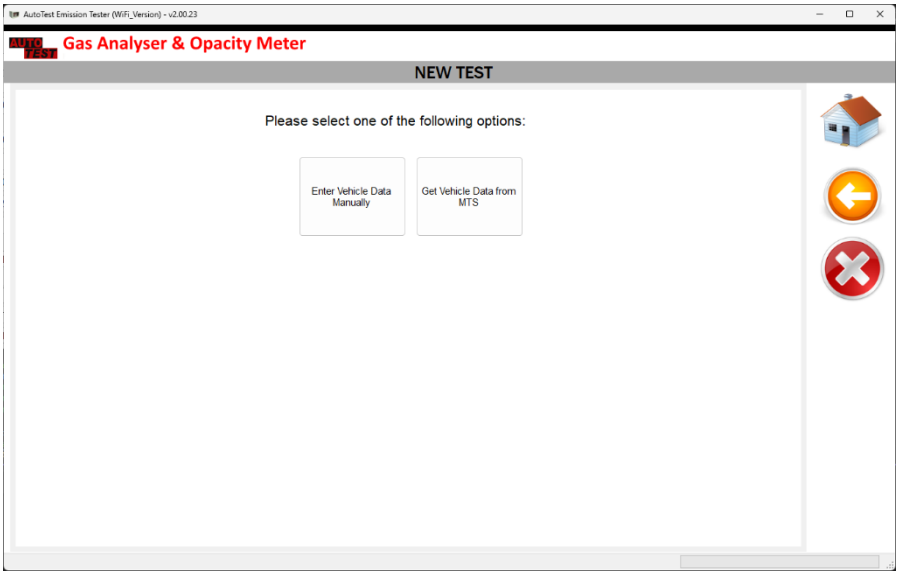


Fig. 17 New Test Page

Select "**Start a New Test**" to run a test from beginning with new vehicle details and testing options. Alternatively, user can select "**Repeat Last Test**" to reload the last test's information and use that to carry out a new one.

Select either "**Enter Vehicle Data Manually**" to enter all vehicle data by hand, or '**Get Vehicle Data from MTS**' to select a vehicle from a currently open work order – this will automatically fill in relevant details (MTS certification keys must be installed, see Section 6.1 for details).



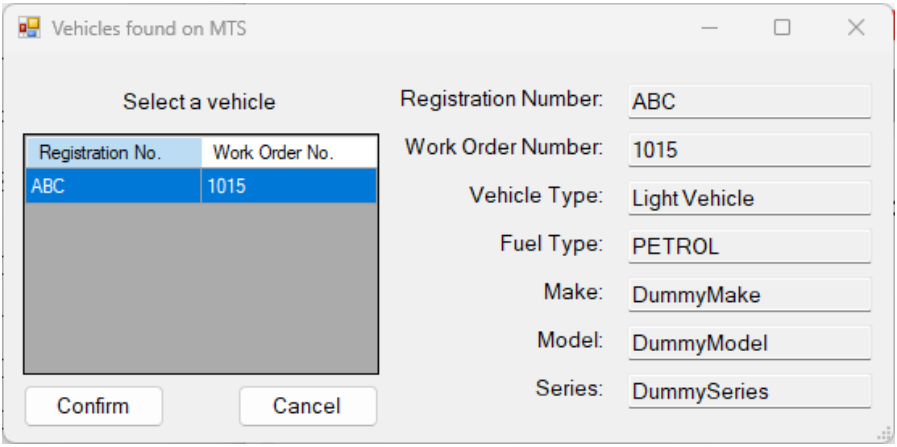


Fig. 18 Entering in Vehicle Data

If “**Start a New Test**” is selected, user then needs to select the examiner and the vehicle type. The examiner information can be edited in the settings (see Section 6.2.1 ‘Examiners’). Note that if vehicle data was loaded from MTS, only the vehicle type listed on the MTS will be available.

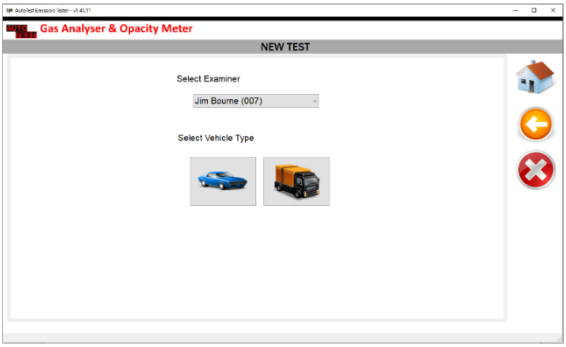


Fig. 19 Select Examiner and Vehicle Type

The next step will prompt user for test type.

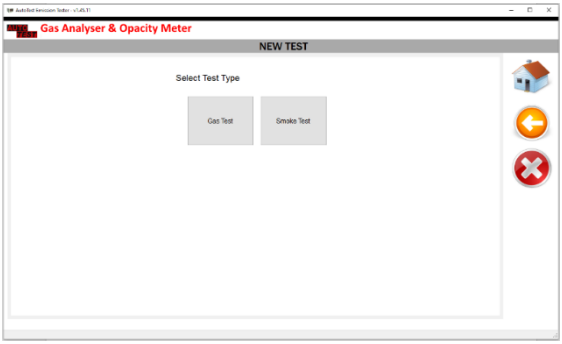


Fig. 20 Select Test Type

If “**Gas Test**” is selected, the next step will prompt user for fuel type; Petrol, LPG or CNG. Note that if vehicle data was loaded from MTS, only the fuel type listed on the MTS will be available.

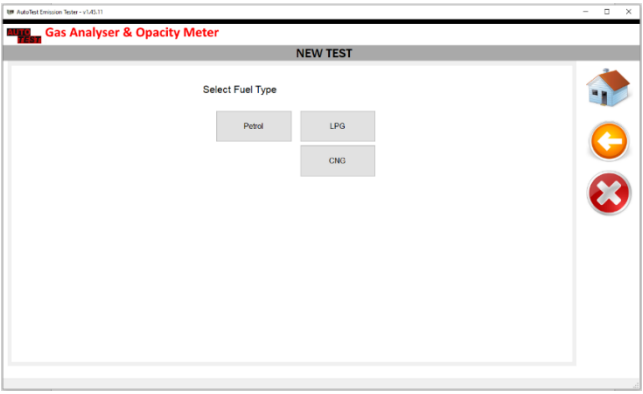


Fig. 21 Select Petrol Type

The next step will prompt user for RPM source.

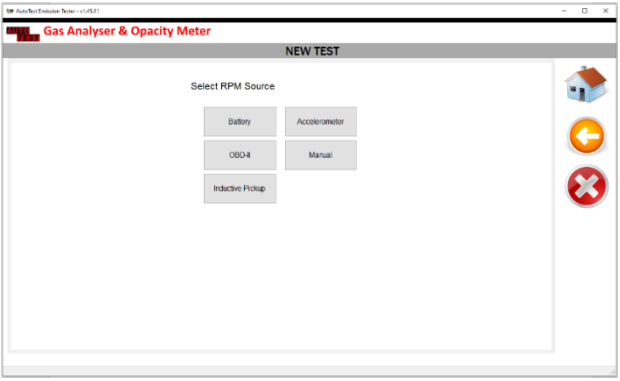


Fig. 22 Select RPM Source

The next step will prompt user to fill in the vehicle details such as registration number, VIN, make, model, series, cylinders, engine size etc.

Once the vehicle details are entered, press the “**Begin Test**” button to start the test.

Note: the highlighted section only appears when a "**Smoke Test**” has been selected. User needs to input the smoke test limits printed on the vehicle manufacturer’s plate (if fitted) according to “MOT special notice 07-17”.

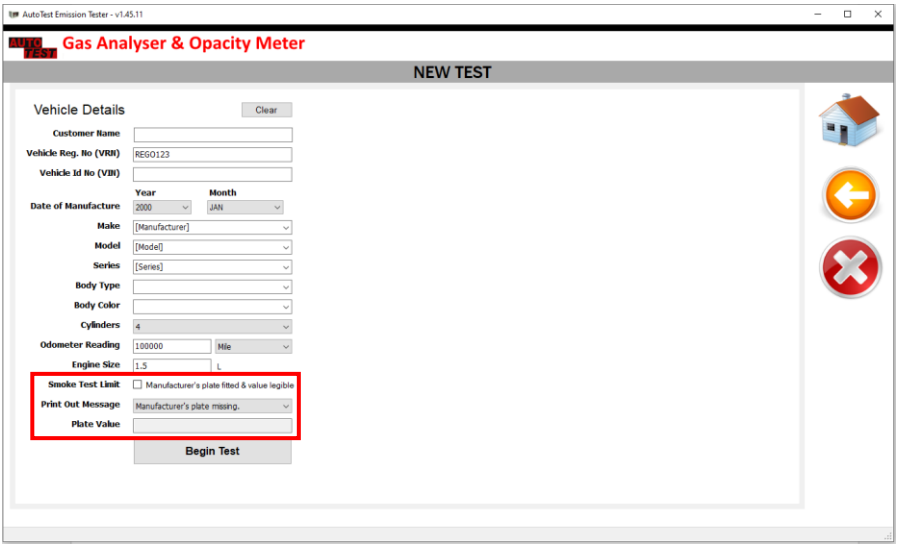


Fig. 23 Vehicle Details

As the gas emission test starts, the software will display detailed user instructions on the screen following each step. 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 the **"Stop"** icon. At certain stages during a test, user can/needs to press the **"Next"** icon to skip that step or move to the next step.

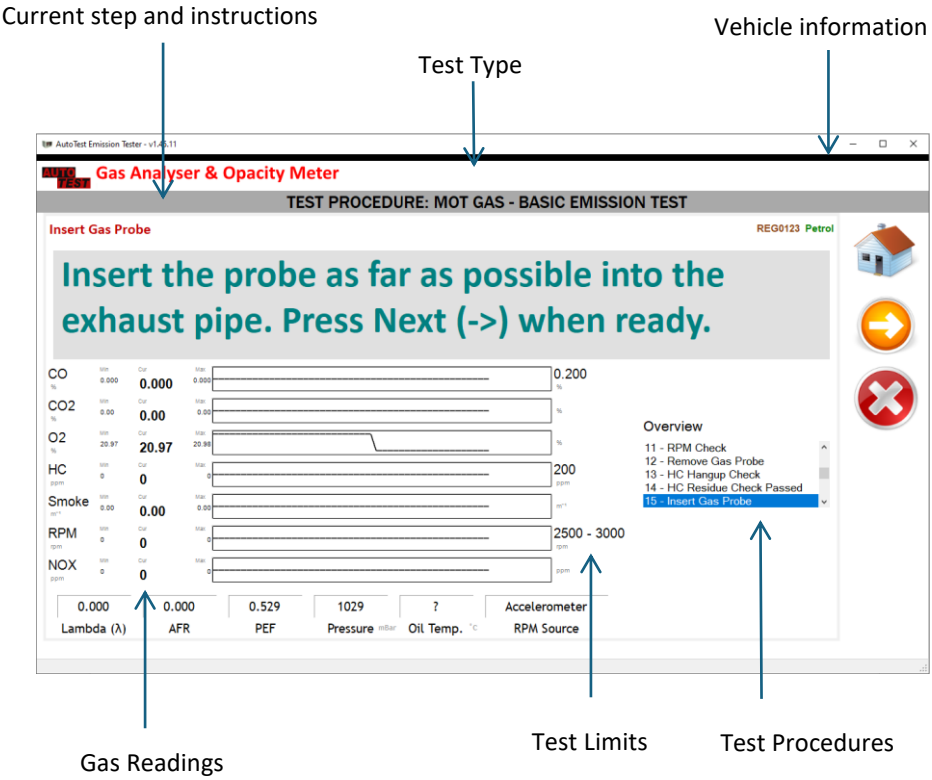


Fig. 24 Test Procedure

Exhaust Emissions Test Results

Operator ID: 123456

Test No. 1 **Test Date:** 26/03/2013 2:35:59 PM

Vehicle Details

Customer Name:	Chris Smith
Vehicle Reg.:	ABC123
VIN :	123456789
Year of Manufacture:	2007
Vehicle Make:	Holden
Vehicle Model:	Astra
Vehicle Body Type:	Hatchback (Blue)
Vehicle Engine:	Four Cyl. (Petrol)
Engine Capacity:	1,500 cc
Odometer Reading:	35,000 km

Test Results

	Description	Limits	Obtained Value	Result
Fast Idle Test				
	RPM	2,150 - 2,850 rpm	2,556 rpm	Pass
	CO	0.300 %	0.090 %	Pass
	HC	200 ppm	32 ppm	Pass
	CO2		14.800 %	
	O2		0.210 %	
	NOX		89 ppm	
	Lambda	0.970 - 1.030	1.006	
	Air Fuel Ratio (AFR)		14.788	
Idle Test				
	RPM	450 - 1,500 rpm	867 rpm	Pass
	CO	0.500 %	0.100 %	Pass
	HC		96 ppm	
	CO2		14.700 %	
	O2		0.190 %	
	NOX		32 ppm	
	Lambda		1.002	
	Air Fuel Ratio (AFR)		14.729	
Overall Result				Pass

Operator: 123456

Signature:

Fig. 25 Test Report Sample

7.6 Submit Test Results to MTS

Once the test is completed, the test report will be displayed on the "**TEST REPORT**" page where users can submit test results to MTS. Press "**Subscribe MTS**" on the right-hand side to connect with MTS and obtain the corresponding work order.

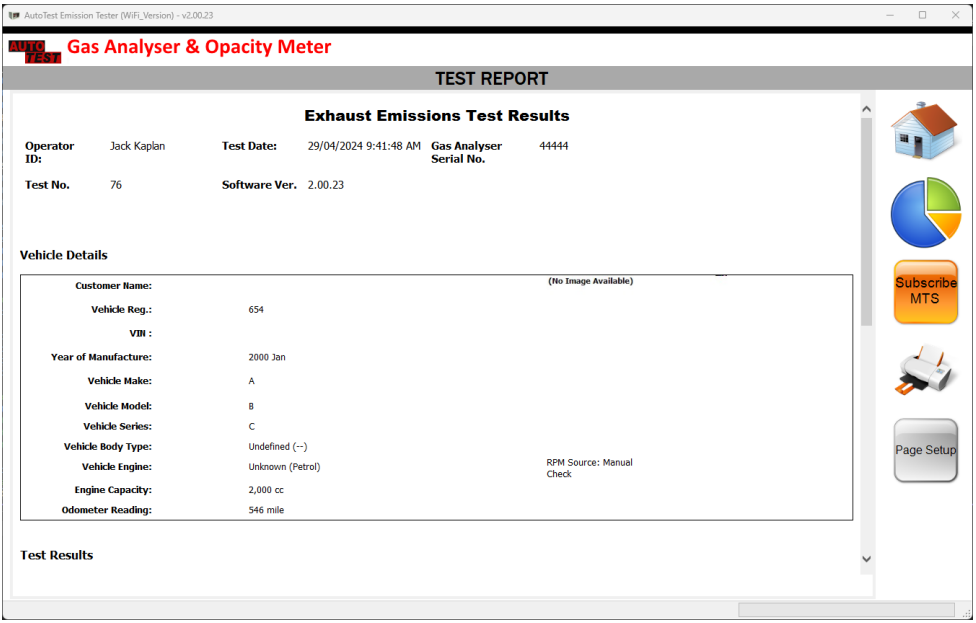


Fig. 26 Test Report View with MTS Functions

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

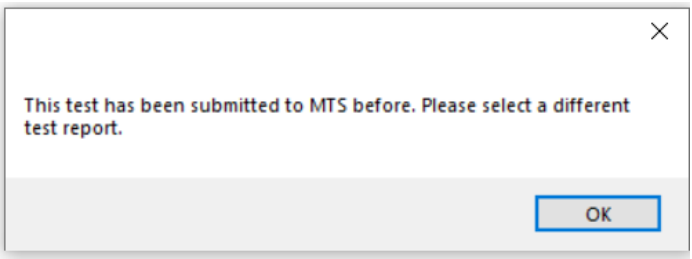


Fig. 27 Previously Published

If the test hasn't been published to MTS yet, a new window will open. This will show the registration number and the test details, as well as a drop-down list of open work orders for that registration number on MTS.

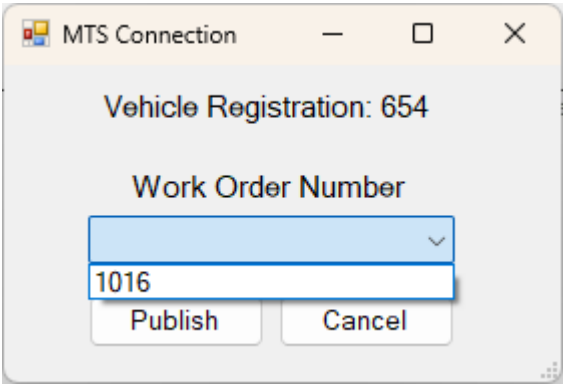


Fig. 28 Selecting Word Orders from MTS

Once the correct Work Order Number is selected, the following message will appear:

Fig. 29 Successfully Uploaded to MTS

7.7 PEF, AFR and Lambda (λ) calculation

Propane Equivalency Factor (PEF) is calculated by the Gas Analyser automatically and is the factor used to convert the Hydrocarbon (HC) reading from the fuel type selected to the Propane Equivalent. For example, if the fuel selected is Petrol (Hexane) then an example PEF of 0.523 and a HC of 1046 ppm. Hexane could be converted to the Propane equivalent by diving the HC value by the PEF to give a HC value of 2000 ppm Propane which corresponds to the standard calibration gas.

Lambda (λ) is the combustion efficiency and can be calculated using the following Brettschneider formula:

$$\lambda = \frac{[CO_2] + \left[\frac{CO}{2}\right] + [O_2] + \left[\frac{NO}{2}\right] + \left(\left(\frac{H_{CV}}{4} \times \frac{3.5}{3.5 + \frac{[CO]}{[CO_2]}}\right) - \frac{O_{CV}}{2}\right) \times ([CO_2] + [CO])}{\left(1 + \frac{H_{CV}}{4} - \frac{O_{CV}}{2}\right) \times ([CO_2] + [CO] + (n \times [HC]))}$$

Where:

[XX] = Gas Concentration in % Volume.

(You have to convert PPM HC to % HC by dividing it by 10,000)

H_{cv} = Atomic ratio of Hydrogen to Carbon in the fuel.

O_{cv} = Atomic ratio of Oxygen to Carbon in the fuel.

n = Number of carbon atoms in a molecule of the selected HC.

n = 6 for Hexane (Gasoline), 3 for Propane (LPG), 1 for Methane (CNG)

Lambda (λ) indicates how efficiently the engine is burning fuel (the combustion or air-to-fuel ratio):

Λ < 1.0 (Rich mixture): Too much fuel, not enough air
λ = 1.0: Ideal balance of air and fuel (optimal combustion)
λ > 1.0 (Lean mixture): Too much air, not enough fuel

The Air Fuel Ratio (AFR) is the ratio between the mass of air and the mass of fuel used by the engine when running. The ideal (theoretical) air-fuel ratio for a complete combustion is called the stoichiometric air-fuel ratio. When the AFR is higher than the stoichiometric ratio, the AFR mixture is called 'lean' as there is more air than necessary for perfect combustion. When the AFR is lower than the stoichiometric ratio the AFR mixture is called rich, as there is more fuel. The stoichiometric AFR is different depending on the fuel used, some common stoichiometric AFR's are shown below:

Fuel	Chemical Formula	Stoichiometric AFR
Petrol (Hexane)	C6H14	14.7
LPG (Propane)	C3H8	15.67
CNG (Methane)	CH4	17.19
Diesel	C12H24	15.5

Lambda (λ) is a standardised mathematical representation of AFR designed to be more easily comparable between fuel sources and simpler to understand. A Lambda value of 1 indicates perfect stoichiometric fuel ratio. Lambda > 1 represents a Lean mixture, while Lambda < 1 represents a Rich fuel mixture. Lambda is calculated by dividing the observed AFR with the fuels stoichiometric AFR.

8 SPECIFICATIONS

8.1 Technical Specifications

Measurement parameters	Range	Resolution	Accuracy
CO (Carbon Monoxide)	0 – 15.5%	0.001%	±0.03% Abs. (or) ±3% Rel.
CO2 (Carbon Dioxide)	0 – 21%	0.1%	±0.4% Abs. (or) ±4% Rel.
HC (Hydrocarbon)	0 – 20000 PPM	1 PPM	±10 PPM Abs. (or) ±5% Rel.
O2 (Oxygen)	0 - 25%	0.01%	±0.1% Abs. (or) ±3% Rel.
NOx (Optional)	0 – 5000 PPM	1 PPM	±25 PPM Abs. (or) ±4% Rel.
Oil Temperature	0 – 120 °C	1°C	
Oil Temperature (via OBD-II)	-40 – 210 °C 0 – 120 °C	1°C	
AFR	0 - 30%	0.01%	
Lambda	0 – 9.999	0.001	
Engine Speed	400 – 10000 RPM	10 RPM	
Engine Speed (Using OBD-II)	0 – 16383 RPM	1 RPM	
Automatic compensation for variations in temperature and pressure			
Measuring Gas Intake	3 litres / minute		

Leak test	Electronic
Condensate discharge	Automatic
Response time (For Sample probe length of 5m length)	<10 sec.
Warm-up time (for ambient temperature of above 25°C)	< 3 minutes
Zero & RPM calibration	Automatic

8.2 Electrical Specification

AC Power supply	230-265V AC Single phase, 50/60 Hz
DC Power supply	12-16 V DC Battery
Power consumption	25 watts

8.3 General Specifications

Operating temperature	+2°C to +45°C
Storage temperature	-20°C to +70°C
Overall machine dimensions-Unpacked (W x D x H)	270 mm x 400 mm x 110 mm
Machine weight (Unpacked)	4.5 kg

8.4 Communication Interfaces

RS232 Serial interface (PC)	With or without USB-to-Serial adapter
Wi-Fi	Communication interface between AutoGas and Auto Smoke meter

9 TROUBLESHOOTING

Fault Description	Possible Reasons	Possible Solution
Device not turning ON	• 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.
"**Calibration Expired! Measurements may be inaccurate**."	• Calibration has expired	Recalibrate the meter.
"**RTC clock on the device has failed.**"	• Internal clock chip fault or the 3V clock battery is flat	The meter needs to be repaired. Contact distributor.
"**Gas bench board failed**"	• Faulty gas bench board	The gas bench needs to be checked. Contact distributor.
"**EEPROM memory on gas bench board has failed**"		
"**Gas bench channel has failed**"		

"**Leak test failed**"	• Leak in the sampling probe / tube	Check the leak or loose fittings and then perform leak-check again.
"**NOx sensor has failed**"	• NOx sensor has failed/expired.	Install a new NOx sensor.
"**O2 sensor has failed**"	• O2 sensor has failed/expired	Install a new O2 sensor.
"**RPM board has failed**"	• RPM board is faulty	The RPM board needs to be checked. Contact distributor.
"**Data flash memory is faulty**"	• Internal flash memory is faulty	The flash memory needs to be checked/replaced. Contact distributor.

For other problems, please contact Home - AutoTest Products Pty Ltd or your local distributor. Repairs should only be carried out by an authorised AutoTest service centre, in order to ensure that the AutoGas retains its calibration. Refer to Section 11 regarding warranty. For instructions on returning products for calibration or servicing, see Section 10.

10 SERVICE AND REPAIR

The AutoGas 5 (Export) must be re-calibrated every 1 year. The reason for this is to maintain creditability in tests and acceptance of data according to international standards.

There are two ways of calibrating AutoGas - either via your local authorised service centre or by returning the unit to AutoTest Products (See Section 10.3).

10.1 Replacing O2 Sensor

The user can replace the O2 sensor themselves.

The O2 sensor is located inside the AutoGas, and the top cover needs to be removed to replace the old O2 sensor. It is recommended that this sensor is replaced annually.

Fig. 30 NOx and O2 sensors inside the unit

The following steps guide on how to replace an O2 sensor.

1. Turn off the AutoGas, disconnect the power cord, and open the top cover.
2. Locate the O_2 sensor (red sensor) and disconnect the connector.

3. After disconnecting the connector, remove the sensor by turning it counterclockwise.
4. Install the new O_2 sensor in place of the old one, ensuring it is securely tightened.
5. Reconnect the sensor connector and make sure it is firmly attached.
6. Close the AutoGas lid and reinstall the screws.
7. Install the new O_2 sensor via the PC software (Settings → General Settings → Install New O_2).
8. Turn on the AutoGas and allow it to complete its startup tests.

10.2 Packaging

When sending for repair or service, the unit should be packaged in the original shipping container. However, where the container is not available, it is important to remember that you are shipping an electronic instrument. Bubble pack or foam should surround the unit and should be inserted into a sturdy cardboard box. Please ensure that the container is locked or otherwise obviously secured.

10.3 Shipping

Labelling
A label should be placed on the outside of the container noting “Device Fragile”.

Freight Carrier
Container should be sent ‘Freight Prepaid’. Auto*Test*® has no preference on freight carriers.
Return freight details must be included.

Addressing
Please address to

Auto*Test*® Products Pty Ltd
Att: Service Department
69 Parsons St
Kensington, VIC 3031 AUSTRALIA
Phone: +61 3 8840 3000
Email: service@autotest.com.au

For international servicing, please contact AutoTest to find your closest distributor.

11 WARRANTY

11.1 Application of these Conditions

These conditions, including any written variations agreed by us, apply to all supplies made by Auto*Test*® Products Pty Ltd (the Supplier) to the purchaser identified in the relevant invoice or contract. Together with these conditions, as amended from time to time under their terms, the applicable payment terms, invoices, and purchase orders exchanged between the parties form the contract.

11.2 Inconsistencies

Where the supply purports to be made on or subject to terms and conditions other than these conditions, the Purchaser agrees that such other terms and conditions are disregarded and form no part of the Contract unless the Supplier agrees otherwise in writing.

11.3 Warranty Terms and Conditions

When you purchase an Auto*Test*® Product you are required to complete the warranty registration form and return to Auto*Test*® Products Pty Ltd within 10 days of purchase of the product.

Auto*Test*® Products or any Authorised Auto*Test*® 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 Auto*Test*® Products which can be identified by the trade name or logo affixed to them or by other documents.
Auto*Test*® Products does not warrant any products not supplied by Auto*Test*® Products.

Our goods come with guarantees that cannot be excluded under the Australian Consumer Law.

Subject to section 8.1 within the Standard Terms and Conditions of Contract as well as the terms below; as your Standard Warranty Auto*Test*® agrees to repair or replace at Auto*Test* 's cost the Auto*Test*® product, and any Auto*Test*® accessory supplied with the product, purchased by you in Australia from a Auto*Test*® Authorised Dealer when the product does not perform in accordance with the manufacturer's specifications during the Warranty Term, commencing from the date of purchase. Transit insurance and return freight will be at the owner's expense.
Auto*Test*® Products or any Authorised Auto*Test*® Service Centre reserves the right to refuse warranty repair if accident, abuse, misuse or misapplication has damaged the product. 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.
Products presented for repair may be replaced by refurbished products of the same type rather than being repaired. Refurbished parts may be used to repair the products. Replacement of the product or a part does not extend or restart the Warranty Term.
The product will be at the owner's risk whilst in transit to and from the Auto*Test*® Authorised Service Centre.
Auto*Test*® will bear the expense of transport where transported by Auto*Test*® or its Authorised representatives. Any other expense of claiming the warranty will be borne by you.
Auto*Test*® and its Authorised Service Centres may seek reimbursement of any costs incurred by them when the product is found to be in good working order.

Auto*Test*® Products or an Authorised Service Centre is not responsible for incidental or consequential damage 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.
To the full extent permitted by law, but subject always to 8.1, the Standard Warranty does not cover:

- If the product has not been installed, operated, maintained or used in accordance with the manufacturer's instructions or specifications provided with the product.
- If the factory-applied serial number has been altered or removed from the product.
- To damage, malfunction or failure resulting from alterations, accident, misuse, abuse, fire, liquid spillage, mis-adjustment of customer controls,

use on an incorrect voltage, power surges and dips, thunderstorm activity, voltage supply problems, tampering or unauthorised repairs by any persons, use of defective or incompatible accessories, the operation of a computer virus of any kind, exposure to abnormally corrosive conditions or entry by any insect, vermin or foreign object in the product.

- The use of proper paper and stationery is very important to the operation of products with printers. Use of non-standard paper will jam the printer and/or wear the print head. Use of non-standard paper will void the warranty.
- Repairs attempted or made by other than our regional repair centre or authorised warranty service centre.
- To damage arising during transportation, installation or while moving the product, or to any transportation costs of the product or any parts thereof to and from the owner, unless otherwise specified in these Warranty Terms.
- Conditions or malfunctions caused by the reasonable effects of fair wear and tear or the malfunction of normally wearing parts, which include but are not limited to batteries, plugs and leads.
- To any third-party software or hardware not contained in the product as originally configured by the manufacturer.
- To any failure, to the extent that the failure is not a failure of the product to perform in accordance with its specifications.
- To replacement or repair of any
  1) consumables (including cables), paper, ink ribbons or
  2) batteries (beyond 3 months from date of purchase), or
  3) lost parts or accessories.
- To service of any product whilst it is outside Australia.
- To any wear and tear.
- Auto*Test*® will not be liable for any loss, damage or alterations to
  1) third party hardware or software.

  or

  2) programs, data or information stored on any media or any part of the product, no matter how occurring.

  or

  3) for any loss or damage arising from loss of use, loss of profits or revenue, or for any resulting indirect or consequential loss or damage.

- Modified, abused, neglected, accidentally damaged or excessively worn products, or products that have become damaged or defective as a result of improper use.
- Auto*Test*® products that are not distributed through Auto*Test*'s authorised distributors and resellers.

(Warranty non-transferable) This warranty is not transferrable beyond the original purchaser.
Warranty is subject to Auto*Test*® Products Standard Terms & Conditions published widely. For more detailed warranty clauses, please visit our website www.autotest.net.au/terms-and-conditions/.

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