DRAPER®

EN

Original Instructions
Version 1
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12V

LAMBDA TEST & SIMULATOR

24708

UK CA CE

User Manual for: Lambda Test & Simulator

Stock No: 24708

Part No: ETOT

Read this manual in full before using this product and retain it for future use. Always use the latest version of the manual.

Please visit **drapertools.com/manuals** for the latest version.

2. Product Introduction

2.1 Intended Use

This 12V oxygen sensor tester and simulator is designed for testing Zirconia & Titania lambda/oxygen sensors. Suitable for testing 1 to 4 wire lambda/oxygen sensors (heated and unheated) and to simulates rich/lean mixture to monitor ECU response. A wire piercing clamp is included for the positive lead for swift connection checking & confirming the wire identity.

Any other application beyond the conditions established for use will be considered misuse. Draper Tools accepts no responsibility for improper use of this product.

2.2 Specification

Stock No.	24708
Part No.	ETOT
Power Supply:	12V DC
Zirconia:	1V
Titania:	1V & 5V
Fuel Type:	Petrol & Diesel
Net Weight:	311g
Tester Dimensions (L X W X H):	140 X 90 X 35mm
Tester Battery:	9V (not supplied)
Positive Lead Length:	2m
Negative Lead Length:	2m

3. Health and Safety Information

Important: Read all the Health and Safety instructions before attempting to operate, maintain or repair this product. Failure to follow these instructions may result in injury or damage to the user, the product or the vehicle.

WARNING!

- **ALWAYS** follow the instructions and procedures listed in the vehicle's service manual before using this device.
- Keep the tester in good working order and condition.
- **DO NOT** operate the tester with damaged leads or it has been dropped, get it checked by a qualified service representative.
- **ALWAYS** use in a well-ventilated room and avoid breathing in the exhaust emission and vapour.
- **ALWAYS** wear eye protection and appropriate protective clothing.
- This tester should only be used by qualified personnel.
- Switch off the power before disconnecting any wires.
- To avoid electric shocks, **DO NOT** touch conductors with your bare hands.
- **DO NOT** touch any high temperature parts and do not touch any rotating or moving parts.

CAUTION! To avoid injury or damage to the device or wires, connect the tester to the vehicle before turning the engine on.

4. Symbols

Read the instruction manual

Warning!

Do not incinerate or throw onto fire

Wear face mask and safety glasses

Keep out of the reach of children

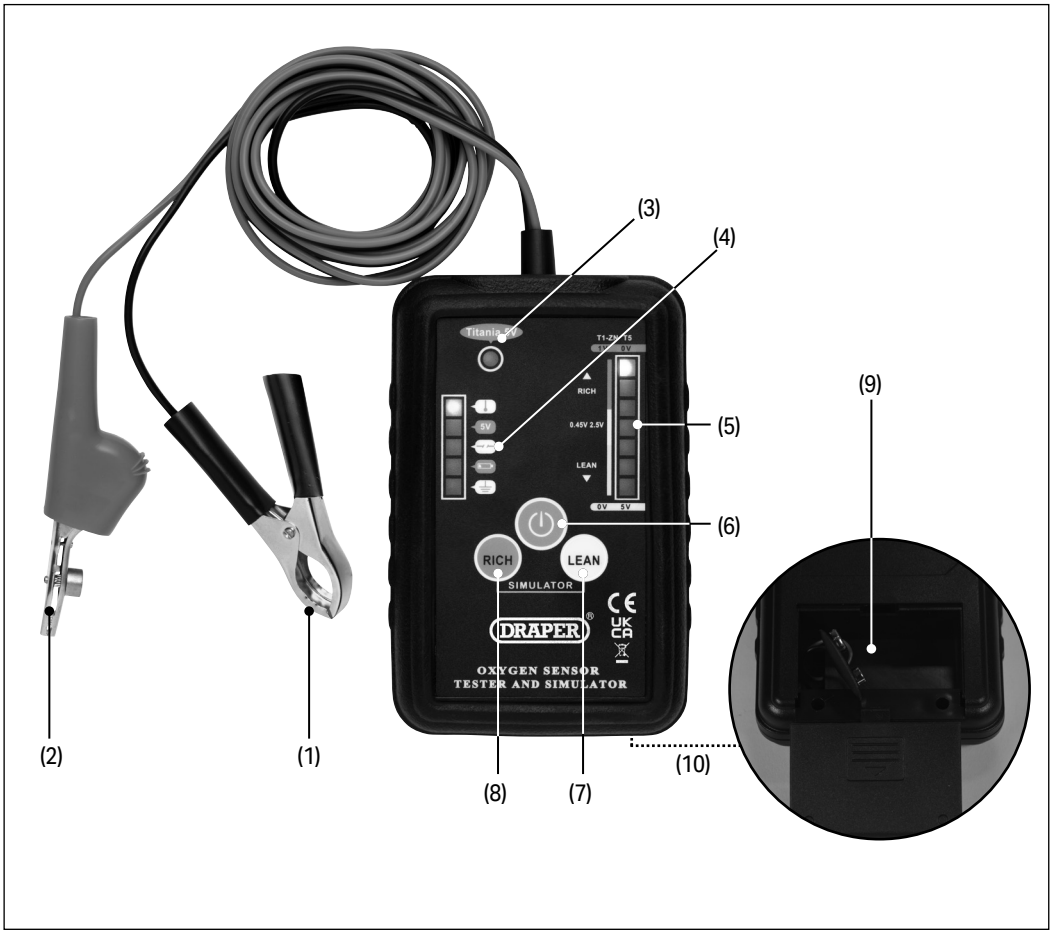
WEEE –
Waste Electrical & Electronic Equipment

Do not dispose of Waste Electrical & Electronic Equipment in with domestic rubbish

5. Identification

Carefully remove the product from the packaging and examine it for any signs of damage that may have occurred during shipment. If any part is damaged or missing, do not attempt to use the product.

Please contact the Draper Helpline; contact details can be found at the back of this manual.



(1) Ground clip (black)
(2) Wire piercing clip (red)
(3) 5V sensor indicator light
(4) Wire indicator lights
(5) Signal Rich/Lean indicator light
(6) Power button
(7) Lean button
(8) Rich button
(9) Battery compartment
(10) Tester protective cover

Please visit **drapertools.com** for our full range of accessories and consumables.

6. Battery Installation

1. To fit or replace the battery, remove the protective cover (10) from the tester and unclip the battery compartment cover (9).

Fig. 1

2. Fit 1 X 9V battery – ensuring that the battery is fitted in the correct +/- orientation.

Fig. 2

3. Clip the cover back on and replace the protective cover.

- Note: The low battery indicator will light up when the battery needs changing.

7. Before Operation

7.1 Before Connecting the sensor

Important: Before operating this product, read and understand all the safety instructions listed in this manual.

Important: **Before connecting the tester ensure the engine is off and the exhaust system has cooled down.**

- The oxygen sensor can test and simulate popular oxygen sensors. Select the correct sensor type to be tested.

1. When the '**POWER**' button (6) is pressed on the tester will default to 1V Zirconia an 1V Titanium oxygen sensor.

Sensor type	Version	Working Temperature	Output Voltage	If working correctly
Zirconia (Zirconium Dioxide)	Without heater (single wire)	315 - 425°C	0.45V	Signal indicator flows from low to high 8 times within 10 seconds.
	With heater (2 – 4 wires)	315 - 425°C	0.45V	
Titanium (Titanium Dioxide)	With heater (2 – 4 wires) 1V Power supply	426 - 500°C	0.1 – 1V Best 0.5V	Signal indicator flows from low to high 8 times within 10 seconds.
	With heater (2 – 4 wires) 5V Power supply	426 - 500°C	5V – 0V Best 2.5V	
Wide Band Single Cell	Disconnect signal wire from vehicle. Heater wire connected	As Titanium	As Titanium	As Titanium
Wide Band Dual Cell	Two Zirconia cells – one oxygen sensor and one oxygen pump.	N/A	0.45V	Steady signal near 0.45V

2. To switch to the 5V Titanium oxygen sensor press and hold the '**RICH**' button (8), then press the '**POWER**' button. The '5V Sensor indicator light' will come on.

7.2 Connecting the Oxygen Sensor

1. Connect the red clip (2) to the signal wire.
2. Then connect the black clip (1) to ground or the negative terminal of the vehicle's battery.
3. The '**Signal Indicators**' (5) and the '**Wire indicators**' will light up to indicate the type of fuel mixture and type of connected wire.

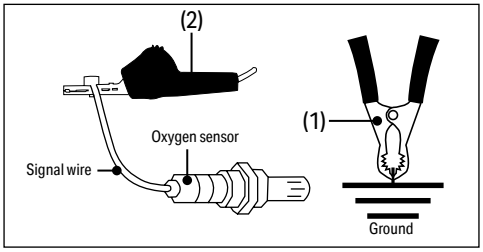


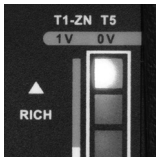
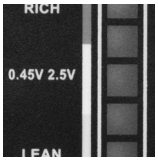
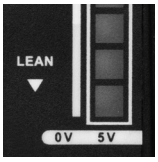
Fig. 3

CAUTION: there is no standard colour for oxygen sensor wires, refer to the manufacturer's service manual for guidance.

7. Before Operation

7.3 Signal Indicator Lights (5)

CAUTION: If only the top two indicator lights are flashing with 1V Zirconia and 1V Titanium mode the connected sensor is 5V Titanium. Switch off and change to 5V Titanium mode (Refer to 7.1).

Rich Fuel/Air Mix	Best Fuel/Air Mix	Lean Fuel/Air Mix
		
Exhaust gases too low. Engine has more power but combustion not completed. Fuel wasted.	Correct mix.	Exhaust gases too high. Combustion not stable, Temperature increases and speed decreases.

7.4 Identifying The Oxygen Senor Wires

When the tester is connected to the sensor wires the lights (4) will indicate the type of connected wire (for most vehicles the engine will need to be started to obtain the correct reading).

Wire Indicator	Wire Type
	Power wire for heater
	ECU 5V power wire for 5V Titanium Oxygen Sensor
	Open circuit Wire is damaged or not properly connected
	Low battery power
	Ground wire Wire is connected to ground or short with ground.

8. Testing Oxygen Sensor EN

Important: Before testing refer to **Section 7**. Before Operation.

8.1 Tester connected to the Oxygen Sensor

1. Run the engine between 1500 – 2000rpm for three minutes to ensure the engine and oxygen sensor are working at the normal operating temperature.
2. If the tester is connected to a good oxygen sensor the '**Signal Indicators**' (5) will flow up and down. Ignore the 'Wire Indicators' when the 'Signal Indicators are moving.

8.2 Testing the Oxygen Sensor for Pre-Catalytic Converter vehicles (Flowing fast)

1. The '**Signal Indicators**' (5) will flow from lean to rich repeatedly when connected to a normal oxygen sensor. The indicator flow will repeat continuously for at least 8 times within 10 seconds.
2. If there is an error with the oxygen sensor the indicator lights will not move.

8.3 Testing the Oxygen Sensor for Pre-Catalytic Converter vehicles (flowing slow)

NOTE: Ensure the oxygen sensor is working correctly before testing on post-catalytic converters.

- The signal will be stable if testing a good oxygen sensor.
- For 1V Zirconia and 1V Titanium the indicator should be close to 0.45V during testing.
- For 5V Titanium the indicator should be about 2.5V.
- If the indicator lights are flowing the circuit may be damaged.

8. Testing Oxygen Sensor

8.4 Testing the Oxygen Sensor Off Vehicle (Zirconia Type Only)

CAUTION! The temperature will be high when carrying out this test. To avoid a hazard or personal injury use insulated tools and wear appropriate protective clothing including a face mask and gloves.

1. Remove the oxygen sensor from the vehicle.
2. Connect the tester to the sensor.
3. Apply the flame from a propane torch to the sensor. The first or second indicator light should light up to 0.8V or greater as the sensor is heated. If not, the sensor may be damaged.
4. Turn off the propane torch and the sensor will detect the oxygen in the air and the indicator light should drop to 0.2V or lower.

9. Oxygen Sensor Simulation

- The simulation introduces different mixture signals to the system and by observing the response of the vehicle it is possible to determine potential problems.
- **NOTE**: To prevent damage to the engine and converter, the simulating signal will only last for 4 seconds. The signal can be switched between '**RICH**' and '**LEAN**' at any time by pressing the simulator buttons.

Mode		1V Zirconia & 1V Titanium Preset Mode	5V Titanium Press & Hold 'Rich' when switching on
'**LEAN**' button	Engine rotation increases	Simulates the 'lean' fuel/air mixture signal	Simulates the 'lean' fuel/air mixture signal
'**RICH**' button	Engine rotation decreases	Simulates the 'rich' fuel/air mixture signal.	Simulates the 'rich' fuel/air mixture signal.
Refer to 7.3 Signal Indicator Lights for more information.			

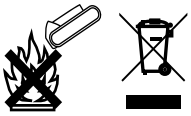
10. Maintenance, Storage and Disposal

WARNING! Do not attempt to repair or service this product. Any servicing or repairs must be carried out by a qualified person.

- Wipe the case with a damp cloth and a mild detergent. **DO NOT** use solvents or abrasives to clean the tester.
- Remove the battery if stored for a long period of time.
- **DO NOT** store in a place of high temperature or humidity.

At the end of its working life, dispose of the product responsibly and in line with local regulations. Recycle where possible.

- **DO NOT** dispose of this product with domestic waste; most local authorities provide appropriate recycling facilities.
- **DO NOT** burn or mutilate batteries; this may release toxic or corrosive substances.



9. Warranty

24 months

Visit **drapertools.com/warranty** for full details.

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