www.kane.co.uk

Kane International Limited
Kane House, Swallowfield, Welwyn Garden City, Hertfordshire, AL7 1JG, UK
T: +44 (0) 1707 375550 F: +44 (0) 1707 393277 E: sales@kane.co.uk

KANE504

Combustion Analyser

Stock No: 19101-2 April 2012

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OWNERS MANUAL & MAINTENANCE

The KANE504 Flue Gas Analyser tests heating appliances for carbon dioxide (CO_2), carbon monoxide (CO), Flue Temperature and Combustion Efficiency.

It is suitable for use with all common 'domestic' fuels including Natural Gas, Propane, Heavy Oil, LPG and Light Oil. (When used with oil burning appliances the flue gases should only be sampled after the smoke level has been measured and has been confirmed to be a very low smoke number.)

It uses a bespoke Non-Dispersive InfraRed (NDIR) sensor to directly measure CO_2 and a long life electrochemical sensor to measure CO.

The meter is controlled using a rotary dial.

The dial positions are:

OFF	
STANDBY	Pump off
CO	ppm carbon monoxide
CO_2	% carbon dioxide
O_2	% Oxygen
RATIO	CO/CO2
T FLUE	Flue temperature
EFF	Combustion Efficiency

Note: Ratio is shown to 4 decimal places, but without a decimal point. So 0001 on the display is equivalent to 0.0001

1. GETTING STARTED

1.1 SAFETY NOTES

Before using this meter, read all safety information carefully. In this manual the word “WARNING” is used to indicate conditions or actions that may pose physical hazards to the user. The word “CAUTION” is used to indicate conditions or actions that may damage this instrument.

 WARNING!

This analyser extracts combustion gases that may be toxic in relatively low concentrations. These gases are exhausted from the back of the instrument. This instrument must only be used in well-ventilated locations. It must only be used by trained and competent persons after due considerations of all the potential hazards.

1.2 PRE-TEST CHECKLIST

Clean particle filter
Water trap and probe line are empty of water
Power on and zero
All hose and thermocouple connections are properly secured
Flue gas probe is sampling ambient FRESH air
Water trap is fitted correctly to the instrument
Flue temperature plug is connected
Inlet temperature probe is connected if required

1.3 STORING INLET TEMPERATURE

To correctly calculate net temperature and combustion efficiency it is important to have the correct inlet temperature set. Two methods are available to properly establish the inlet temperature.

Non-ducted Systems. If the KANE504 is being used on a system that uses combustion air from the space near the appliance, simply turn the analyser on without the flue probe connected. The KANE504 will use an ambient sensor inside the handset as the inlet temperature to determine net temperature.

Ducted Systems. If the KANE504 is being used on a system that brings in outside air for combustion air it is important to set up the inlet temperature prior to taking flue gas readings. To properly set inlet perform the following steps during start-up of the KANE504:

Connect the flue temperature connector only to the KANE504.
Place the flue probe in the combustion air inlet system
Turn on and allow to complete the zero process.
Connect the flue gas connector and proceed to combustion measurements.
The temperature measured during the zero countdown has now been stored, and will be used to determine the net temperature.

1.4 SELECTING FUEL

When powering on, simply rotate the selector to the desired fuel. The display will show this, and then it will complete the zero process.

NOTE: If you wish to use the same fuel as previously selected rotate the selector to “Stand By” at power on. The fuel in use will be displayed and then blink. If the fuel is not correct rotate the selector to the proper choice before the zero countdown starts.

1.5 ANALYSER CONNECTIONS

NOTE: Take care when inserting the temperature probes as the pins are polarized. Insert with the smaller pin into input marked positive. (+)

⚠ CAUTION!

Turning the pump off while the probe is in the flue will leave toxic gases inside the analyser. Once data has been read, it is advisable to purge the unit with fresh air as soon as possible. To do this, with the probe removed from the flue, turn ON the pump. Always allow the readings to return to zero (0.0 for CO2) prior to shutting the unit off.

⚠ CAUTION!

The probe will be hot from flue gases. Remove the probe from the flue and allow it to cool naturally. Do not immerse the probe in water, as this will be drawn into the analyser and damage the pump and sensors. Once the probe is removed from the flue and the readings have returned to ambient levels rotate the selector to “OFF” and switch off the analyser. The instrument will count down from 10 to switch off.

1.6 POST TEST

Remove the probe from the flue and allow the analyser to purge with fresh air until the CO and the CO2 readings return to zero. (*Be careful as the probe tip will be HOT*)
Drain water trap.
Check particle filter.

2. MAINTENANCE

2.1 GENERAL MAINTENANCE

Check calibration of your instrument annually to ensure it meets original performance specifications.

Keep your instrument dry. If it gets wet, wipe dry immediately. Liquids can degrade electronic circuits.
Whenever practical, keep the instrument away from dust and dirt that can cause premature wear.
Although your instrument is built to withstand the rigours of daily use, it can be damaged by severe impacts. Use reasonable caution when using and storing the meter.

2.2 PERIODIC SERVICE

CAUTION!

Repair and service of this instrument is to be performed by qualified personnel only. Improper repair or service could result in physical degradation of the instrument. This could alter the protection from personal injury this meter provides to the operator. Perform only those maintenance tasks that you are qualified to do.

2.3 ANNUAL RE-CALIBRATION

While the sensor has an expected life of more than five years in normal use it is recommended that the analyser is re-calibrated at least annually, this is so that long-term drift on the electronics can be eliminated. Local regulations may require more frequent re-calibration and users should check with appropriate authorities to ensure they comply with relevant guidelines.

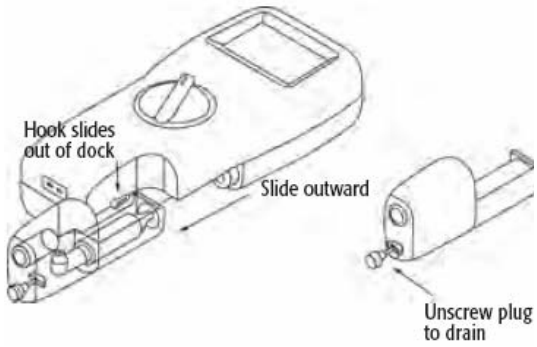
2.4 CLEANING

Periodically clean your instrument case using a damp cloth. DO NOT use abrasive, flammable liquids, cleaning solvents, or strong detergents as they may damage the finish, impair safety, or affect the reliability of the structural components.

2.5 EMPTYING AND CLEANING THE IN-LINE WATER TRAP

The integral water trap should be checked and emptied on a regular basis. Water vapour will condense in the probe line, which may cause the water trap to fill suddenly if the probe is moved. Care should be taken at all times.

Carefully unscrew the plug from the bottom of the water trap housing. Dispose of the condensate in a suitable drain, care must be taken as it could be acidic. If condensate spills onto the skin or clothing, clean off immediately using fresh water, seek medical advice of problems occur. Ensure plug is replaced before performing combustion tests.

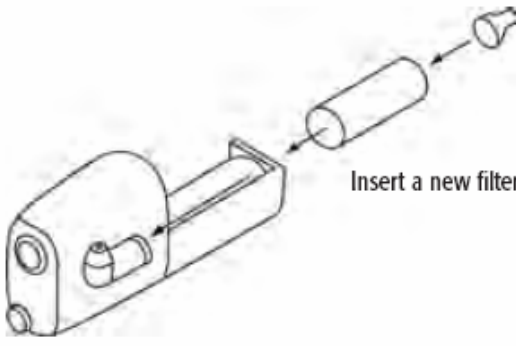


NOTE: CO2 reading will be low if the Water Trap Plug is not in place.

2.6 CHANGING THE PARTICLE FILTER

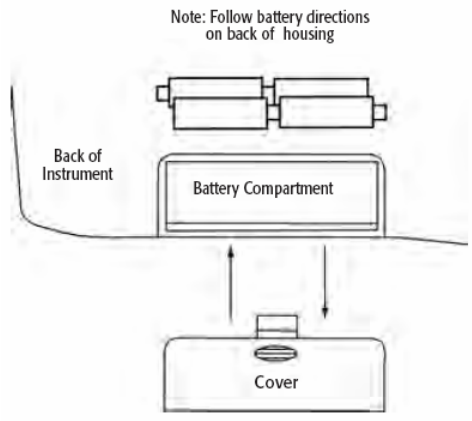
This is a very important part of the analyser and should be changed regularly. It prevents dust and dirt particles from entering pump and sensors that will cause damage. The filter MUST be changed when it appears discoloured.

Remove water-trap assembly from the analyser as shown above. Remove the filter and plastic holder from the housing. Discard the filter element but keep the holder to fit to the new filter. Clean the inside of the filter housing with a suitable soft cloth. Fit the holder onto the new filter element and then insert into the housing. Refit the housing onto the analyser.



2.7 BATTERIES REPLACEMENT

This meter has been designed for use with alkaline batteries. No other types are recommended. The analyser is supplied with 4 “AA” size alkaline batteries.



These should be installed into the instrument as shown in the diagram to the right and indicated on the back of the unit.

CAUTION!

Take great care when installing the batteries to observe the correct polarity. Always check the meter for operation immediately after installing new batteries.

3. METER PROBLEM SOLVING

If any problems are not solved with these solutions, contact us or an authorised repair centre.

Fault Symptom	Causes / Solutions
CO_2 too low	Air leaking into probe, tubing, water trap or connectors.
Meter does not respond to flue gas	Particle filter blocked. Probe or tubing blocked. Pump not working or damaged with contaminants.
Net temperature or Efficiency calculation incorrect	Ambient temperature set wrong during Automatic Calibration.
Flue temperature readings erratic	Temperature plug reversed in socket. Faulty connection or break in cable or plug.
T flue or T net displays (----)	Probe not connected or faulty.
EFF display (----)	CO_2 reading is too low. No temperature measurement available
CO reading too low	Air leaking into probe, tubing, water trap or connectors. Sensor may be depleted: check against a known concentration

4. METER SPECIFICATION
(NOTE MAY BE SUBJECT TO CHANGE)

Parameter	Resolution	Accuracy	Range
Flue Temperature	0.1 °C	± 2°C ± 0.3% Reading	0-600°C
Carbon Dioxide[*1]	0.1%	±0.2%	0 - 21%
Oxygen[*2]	0.1%	±0.2%	0 - 21%
Carbon Monoxide[*1]	1 ppm	+/- 5ppm <100 ppm +/-5% of reading >100 ppm	0 to 1999 ppm
Efficiency [*3]	0.1%	n/a	0-110%
Dimensions (approximate) Weight Handset Probe	0.5 Kg 180mm x 85mm x 50mm 250mm x 6mm stainless steel shaft nominal 0.9m neoprene hose.		
Ambient Operating Range	+0°C to 45°C 10% to 90% RH non- condensing 850 to 1100 mbar atmospheric pressure		
Battery Life	4 AA cells >8 hours using Alkaline AA cells		

[*1] Using dry gases at STP
[*2] Calculated assuming Fuel Lean Combustion for.
[*3] Calculated

5. ELECTROMAGNETIC COMPATIBILITY

European Council Directive 89/336/EEC requires electronic equipment not to generate electromagnetic disturbances exceeding defined levels and have adequate immunity levels for normal operation. Specific standards applicable to this meter are stated below.

As there are electrical products in use pre-dating this Directive, they may emit excess electromagnetic radiation levels and, occasionally, it may be appropriate to check the meter before use by:

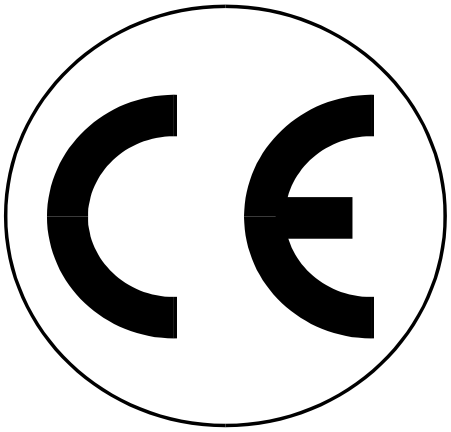
Use the normal start up sequence in the location where the meter will be used.

Switch on all localized electrical equipment capable of causing interference.

Check all readings are as expected. A level of disturbance is acceptable.

If not acceptable, adjust the meter's position to minimize interference or switch off, if possible, the offending equipment during your test.

At the time of writing this manual (Dec 2008) we are not aware of any field based situation where such interference has occurred and this advice is only given to satisfy the requirements of the Directive.



This product has been tested for compliance with the following generic standards:

EN 61000-6-3 : 2001
EN 61000-6-1 : 2001

and is certified to be compliant

Specification EC/EMC/KI/K500S details the specific test configuration, performance and conditions of use.

Please Note: Batteries used in this meter should be disposed of in accordance with current legislation and local guidelines.

6. GLOSSARY

6.1 SELECTOR AND DISPLAY PARAMETERS ON KANE504:

“2Er0”	Analyser is performing the initial zero setting.
CO2 (Carbon Dioxide)	Direct reading of the Carbon Dioxide Sensor displayed in percentage (%).
CO	Carbon monoxide reading in parts per million.
Eff (Efficiency)	Calculated combustion (not appliance) efficiency based on measurements of CO2, Flue Temperature and fuel selected. The KANE504 calculates nett combustion efficiency and automatically determines if the combustion is in the condensing mode to make appropriate corrections.
Ratio	The ratio of CO to CO_2
O2 (Oxygen)	O2 is calculated for each fuel type from the CO2 measurement. It assumes that the combustion process is running fuel lean. It is important to make other measurements to confirm that this assumption is always correct.
TFlue (Flue Temperature)	TFlue is a direct measurement of the temperature at the tip of the flue probe. This measurement is used to determine the net temperature for use in calculation of the combustion efficiency.
BAT symbol	Displays the Battery Power available.

6.2 FUELS AVAILABLE

Selector Position	Display	Type
L Oil	LOIL	Light Oil
Propane	PrOP	Propane
Nat Gas	nGAS	Natural Gas
H Oil	HOIL	Heavy Oil
Wood	wOOd	Wood
Coal	COAL	Coal

7. CLEANING

This product can be cleaned using a damp lint free cloth and a small amount of non-abrasive detergent. Take care to avoid moisture entering the sensor's grill and after cleaning leave the product in a warm dry place to allow any surface dampness to evaporate. Under no circumstance should any solvent cleaner be used as this may cause damage to the plastic case, display and sensor.

8. ANNUAL RECALIBRATION AND SERVICE

Although sensor life is typically more than five years, the monitor should be re-calibrated and serviced annually to stop any long-term sensor or electronics drift or accidental damage.

Local regulations may require more frequent re-calibration.

In the UK Kane International has service facilities at Atherton near Manchester (Tel: 01942-873434), the primary service centre for UK customers and at Welwyn Garden City in Hertfordshire (Tel: 01707-375550), the primary service centre for non-UK customers.

By sending your monitor back to Kane for an annual fixed price service (check *www.kane.co.uk* for details) you have the opportunity to extend the warranty on your analyser to 5 years.

8.1 RETURNING YOUR ANALYSER TO KANE

When returning your KANE504, please always ensure that you enclose:

- ✓ Your full contact details
- ✓ A daytime telephone number
- ✓ Details of faults you might have experienced
- ✓ Any relevant accessories (eg. probe, printer, adaptor and leak detectors). Any accessories that are returned will be checked. If an accessory has failed then we will quote you for a repair or a replacement.

Packing your analyser

When returning your analyser, please pack it appropriately to prevent any damage during transit.

Before sealing your package, please ensure that you have enclosed the items listed above and that it is clearly marked for the attention of:

Northern Service Centre
Kane International Ltd
Gibfield Park Avenue
Atherton
Manchester
M46 0SY

Sending your analyser

Once the analyser has been securely packed then your package is ready for shipment back to Kane. If you do not have an account with a courier company you can take your package to your local Post Office. It is advisable to send the package by Special Delivery so that it is insured and traceable while in transit.

When we receive your analyser

On receipt of your package, our Service Engineers will inspect the analyser and any accessories and confirm to you the total service cost. Once you have accepted this the work will be carried out, and upon completion the analyser returned to you by Fed Ex “Next Day Service”.

If you have any questions that we haven’t answered, please feel free to contact our Northern Service Centre:

Tel: 01942 873434
Fax: 01942 873558
Email: nservice@kane.co.uk

Service Returns (Simply cut out and attach to your package)

Northern Service Department
Kane International Ltd
Gibfield Park Avenue
Atherton
Manchester
M46 0SY

Northern Service Department
Kane International Ltd
Gibfield Park Avenue
Atherton
Manchester
M46 0SY

Northern Service Department
Kane International Ltd
Gibfield Park Avenue
Atherton
Manchester
M46 0SY

Product Registration

Please complete, detach and return to: Kane International Ltd, Kane House, Swallowfield, Welwyn Garden City, Hertfordshire, AL7 1JG

Your Details	
Name:	
Job Title:	
Company Name:	
Company Address 1:	
Address 2:	
Town/City:	
County:	
Postcode:	
Country:	
Phone Number:	
Fax Number:	
Mobile Number:	
Email Address:	

Product Details *Note: Proof of Purchase may be required for warranty claims.*	
Date Purchased as numbers (05.01.10):	
Purchased From:	
Model Number:	
Product Serial Number:	

Why did you buy a Kane Product?

☐ Dealer Recommendation
☐ Value for Money
☐ Kane
☐ Not your Decision
☐ Made in the UK
☐ Our Fixed Price Servicing Programme
☐ Previous Owner
☐ Other reason:

What brand was your previous analyser?

☐ 1st time purchase
☐ Testo
☐ Anton
☐ Other manufacturer:
☐ Kane
☐ Telegan
☐ TPI

How did you hear about Kane?

☐ Magazine Advert
☐ Personal Recommendation
☐ Exhibition
☐ Trade Counter Literature
☐ Internet
☐ Other:

Which do you read most often?

	Often	Sometimes	Hardly Ever
Registered Gas Engineer	☐	☐	☐
Gas Installer	☐	☐	☐
P.H.P.I.	☐	☐	☐
P.H.A.M. News	☐	☐	☐
Heating Ventilating & Plumbing	☐	☐	☐
Heating & Plumbing Monthly	☐	☐	☐

Thank you for completing this survey.
All the information we have collected is confidential.
We do not sell or share data with any other company or organisation.

Thank you for buying this Analyser.

Before use, please register on our website

www.kane.co.uk

or complete, detach and return the Product Registration page.