KANE 100-1

Gas Analyzer and Logger for Ambient Carbon Monoxide and Ambient Carbon Dioxide

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KANE100 Overview

The KANE 100-1 tests for ambient CO and ambient CO_2 concentrations.

The large display shows 2 readings at a time and all data can be printed via an optional infrared printer. The printed data can be 'live' data or 'stored data'.

The KANE 100-1 is controlled using 4 buttons and a rotary dial.

The four buttons (from left to right)

switch the instrument on and off,

print actual or saved data, switch the backlight on and off,

switch the pump on and off, change the top line data display,

save data or temporarily hold or ‘freeze’ the current reading.

△ = Scroll up	▽ = Scroll down	⇦ = Enter

The buttons with △, ▽ and ⇦ also change settings such as date, time, when in menu mode.

The rotary dial changes the display’s 2nd line and selects access to the menu to make changes to the date, time, fuel, etc.

The KANE 100-1 can store up to 255 sets of readings.

The KANE 100-1 is powered by internal re-chargeable NiMH batteries. The internal battery will power the analyser for about 6Hr, from full charge.

The KANE 100-1 has a protective rubber sleeve with a magnet for “hands–free” operation.

NOTE: Fresh air is referred to in this manual. Sometimes it may be convenient to use thin flexible tubing (min ID. 3mm.) to supply fresh outside air, if a tube is used ensure that the inlet is at least 1 meter away from any possible source of CO_2 such as an open window.

Fuel combustion of any sort may cause high and fluctuating levels of CO_2 over surprisingly large areas. Exhaled breath can easily reach 10,000 to 20,000ppm.

1. ANALYSER LAYOUT & FEATURES

INSTRUMENT FEATURES AND KEYPAD

On/Off **ON / OFF**
Turns analyser ON and OFF

△ Scroll key when using the Menu
Print / ✳ **PRINT / BACKLIGHT**
Print 'live' or stored data
Turns on Backlight

▽ Scroll key when using the Menu
Pump **PUMP**
Turns pump ON and OFF

⇦ Enter key when using the Menu
Hold **STORE**
Stores readings in the Memory

2. BATTERIES

Battery Disposal

Always dispose of depleted batteries using approved disposal methods that protect the environment.

3. BEFORE USING THE ANALYSER FOR THE FIRST TIME:

The analyser may be supplied with either or both of the following chargers.
To fully charge the battery, you may use a Kane trickle charger, plugged into the base of the unit for 12-24 hours. Alternatively the Kane fast charger which plugs into the side will take about 1-2 hours, after which it will switch to low trickle charge. Do not fast charge the unit unless the battery charge indicator reads less than 70% otherwise over heating could cause an internal thermal cutout to operate. The unit will then not operate on its internal battery until it has cooled.
Avoid leaving the unit on charge and switched off for more than 1 –2 days at a time or the internal battery life could be reduced.

Set the correct time, date etc, after it is switched on and calibrated – See **USING THE ROTARY DIAL** below. These are stored when the analyser is switched off.

4. BEFORE USING THE ANALYSER EVERY TIME:

Check the water trap is empty and the particle filter is not dirty:

- To empty the water trap, unplug its rubber stopper and re-plug once it is empty.

- To change the filter, remove protective rubber sleeve, pull out the water trap , remove the water trap's particle filter from the spigot and replace. Reconnect the water trap and rubber protective sleeve.

After switch on check that date and time are correct and battery power is sufficient.

Avoid exposing the instrument to sudden large temperature changes, and ensure that the unit reads zero for CO and approx. 400 ppm CO_2 in fresh air before use. If necessary re-zero (see: Menu Selection).

Avoid very close proximity to radio transmitting devices, otherwise readings may be affected.

SAFETY WARNING

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

Users of portable gas detectors are recommended to conduct a “bump” check before relying on the unit to verify an atmosphere is free from hazard.

A “bump” test is a means of verifying that an instrument is working within acceptable limits by briefly exposing to a known gas mixture formulated to change the output of all the sensors present. (This is different from a calibration where the instrument is also exposed to a known gas mixture but is allowed to settle to a steady figure and the reading adjusted to the stated gas concentration of the test gas).

5. USING THE ANALYSER AND ITS FOUR BUTTONS:

Switching ON the analyser	Press the On/Off button to switch the unit ON in fresh air. This allows the analyser's sensors to be calibrated. This will set CO to zero and CO_2 may be set to 400 ppm if required. At switch on, the analyser beeps four times and displays the model number. The bottom line counts down from typically 45 . The Analyser will then indicate AIR ZERO NO? Select NO? using the push button marked with an enter symbol, the CO_2 setting will not be altered, CO is always set to zero at this stage. Select YES only if you are in fresh air and wish to adjust the CO_2 zero offset. Use the △ / ▽ buttons to set the required value (this should be 400ppm in fresh air), allow a few seconds after each button press for readings to settle, and then press ⇦ to confirm. After ⇦ is pressed it will take about 4 seconds before the unit is ready to respond to the controls. The sensors are now ready to use. If the analyser will not calibrate, one or more of the sensors may need to be replaced or recalibrated by an authorized repair centre. When countdown and zero is finished the display's top line shows the last selected function and the bottom line displays whatever the rotary dial is turned to.
Switching OFF the analyser	Press the On/Off button to switch the analyser OFF. The display counts down from 30 with the pump on to allow time for the sensors to be cleaned or purged with fresh air. If the probe is connected, make sure both analyser and probe are in fresh air. Press HOLD / ⇦ if you want to stop the count-down to off and return to making measurements.

Using △ / ▽ / ⇦ Buttons	Once the "on" countdown has been completed: Press the ▽ button for more than 1 second after the short tone or "beep" to change the display's top line, if you hold this button down there is an "auto repeat" on this function . The Rotary Dial changes the display's bottom line. The top line display options are: Time Date CO_2 CO TL (-- or Logging interval in minutes if set) BAT % For example, the analyser will display CO_2 on the top line and CO on the bottom line if you turn the rotary dial to CO and hold down the ▽ button until CO_2 is displayed on the top line. Use the △ / ▽ / ⇦ keys to change settings (such as time and date) when the rotary dial is turned to MENU.
⇦ key to Hold or Store readings	In normal operation (not MENU) the ⇦ key is used to either HOLD the readings for printing (a short button press of about 1 second release the button on the first beep, the display flashes when held) or to save readings if memory locations are available (a long button press … wait until after the second beep). The display will flash LOG xxx (or FULL) to give the store location of the saved data or will continue to flash if held until reset by a short button press. Note: the HOLD function is inhibited whilst AUTOSTORE is operating.
Switching on and off the backlight.	Press Print / ✳ for about 2 sec. and release to switch backlight on or off. Note: use of the backlight increases the drain on the battery.

Printing Data	Press Print / ✳ quickly for about 1 sec. to start the analyser printing. The analyser displays "PRINTING" until this is completed. Make sure the printer is switched on, ready to accept data and its infrared receiver is in line with the emitter on top of the analyser.
Switching PUMP on / off	The analyser normally operates with the pump on. Press Pump quickly to switch the pump off and on. When the pump is switched off, the analyser displays "PUMP OFF" approx every 20 seconds.
“Freezing” the display	Press Hold /  to freeze all readings. The display flashes and can be printed by pressing the PRINT key. Press Hold /  again for “live” measurements. Note: the HOLD function is inhibited whilst AUTOSTORE is operating

6. USING THE ROTARY DIAL (starting from Menu):

Rotating the dial selects the display's 2nd line, unless MENU is selected.

Rotor positions are:

- Menu — the MENU options are listed below
- Count — displays time to next Autostore in minutes if set.
- Gas 1 — displays CO reading in ppm
- Gas 2 — displays CO_2 reading in ppm
- Date — the date format is user defined
- Time — military time format

6.1 MENU SELECTION (auto store must be off to access menu).

MENU	Rotate the dial to MENU and use the △, ▽ and ⇦ buttons as described fully below to select and change the following functions: 1. Time – Uses "Military" time as standard: 7am = 07:00, 7pm = 19:00 2. Date with date format selection 3. Pump speed control: full speed or 'quiet' mode which reduces power consumption. 4. The display's contrast 5. Language (this product is configured for English only) 6. ZERO – AIR - to set apply fresh air then use △ or ▽ to set for about 400ppm ZERO -TRUE – to set use a CO_2 zero calibration module (or 'stripper') Press ⇦ to start. Zero will run for about 45 seconds. 7. Alarm setting- user settable alarms to audibly warn of high readings. Pre-sets are 35 ppm for CO and 1000ppm for CO_2 8. Service – Password protected, for authorized service personnel only. 9. Memory functions

	Using △, ▽ and ⇦ keys. When you have selected the function to change, press ⇦ to select. Repeat this to scroll through the menu and select (using the ⇦ key) and change (using the △ / ▽ keys) the function. The final, logical ⇦ returns you to the main menu display. To exit the Menu function at any time, rotate the dial to another position - Unless the final logical ⇦ is pressed, no changes are made. Note: in AIR ZERO this mode will continue until terminated by the pressing of ⇦. You can choose from the menu, fresh air zeroing which allows CO_2 to be set to a user defined value (normally 400 ppm in fresh air) and CO to 0 ppm, Allow a few seconds after each button press for readings to settle, and then press ⇦ to confirm. Alternatively you can make a menu selection for, and use a TRUE zero calibration module (if available), which is used to set CO_2 to 0 ppm (and also CO to 0 ppm). This mode will take about 40 seconds to operate.

6.2 MEMORY Functions

With the rotor pointing to MENU use the △ /▽ keys to select MEMORY and press ⏎

The △ /▽ keys can then be use to select :

VIEW
AUTO STO (Auto store)
PRINT (Summary print of stored readings)
CLEAR

Press ⏎ to choose.

VIEW

The top line displays VIEW

The bottom line displays LOG 0000

Use △ /▽ to select next view number (within the range of data stored up to 255 maximum)

In view mode only stored readings "wrap round" so that using the up key you pass from maximum reading back to the first reading or using the ▽ key directly from the first reading to maximum.

Press ⏎ to select

The top line displays for example : V 01

The bottom line displays the stored information as selected on the rotary dial.

Use △ /▽ to scroll to later or earlier data.

Hold down the print button to print one set of stored data (example shown as Manually logged print).

Press ⏎ to exit back to start.

AUTOSTORE

Hold will be inhibited during auto store. If you push 

during auto store AUTO STO will be indicated on the top line. It is recommended that you select ZERO via the menu and perform a zero before starting a series of Auto stored readings.

Memory is always cleared before a new autostore sequence is initiated. Be sure to print out your previous results before starting a new sequence.

When store intervals greater than one minute are set and the pump is switched off it will power up automatically one minute before a reading is due to be stored. The pump will run whatever speed (high or low) was previously set. Where the store interval is set to 1 minute the pump momentarily switches off every minute.

You can maximize the number of stored readings by switching the pump to low speed (QUIET) and after initiating store switch the pump off. Typically if the batteries are fully charged you will be able to store 255 readings at up to 3 minutes interval.
To store for longer periods above 12 hours you should connect the Kane trickle charger.

The top line displays AUTO STO
Use the △ /▽ keys to select from OFF or ON
Press  to select

The display will show:

AUTO STO
TIME 01
Use the △ / ▽ keys to set any store interval
between 1 and 10 minutes.

The display top line will then revert to MENU
Select any required position on the rotary dial.

Every time readings are stored the top line will flash LOG and the STORE number until the memory is full or until the autostore is switched off. There will also be a beep for every store to a maximum of 255 sets of readings.

You can only exit AUTOSTORE by returning to MENU mode and setting AUTOSTO to OFF.

SUMMARY PRINT

The bottom line displays PRINT
Press ⇦ to select and EXIT
Maximum, minimum and average readings are shown.

CLEAR

The top line will display CLEAR
The bottom line will display NO
Use the △ / ▽ keys to toggle between NO and YES
Press ⇦ to select and exit .

6.3 CHANGING THE PUMP SPEED

The pump speed is toggled using the △ or ▽key.
The choices are Full Speed or Quiet.
Press ⇦ to select and exit

6.4 MANUAL ZEROING

From the MENU function you can choose to re-zero at any time except when auto storing.
The zeroing options are fresh air zero or true zero
Use the △ or ▽button to chose and ⇦ to select. Once zeroing has commenced it will continue until completed whatever you do with the rotary dial. Fresh air zero should be completed by pressing ⇦. The normal value of 400 for fresh air may be adjusted using the △ or ▽ keys. (The value first displayed when entering this mode is the analysers current measured value).

6.5 ALARMS

Select ALARMS from the menu and use the △ or ▽ buttons and  to alter the alarm points if different alarm positions are required to the preset alarms. The instrument will store new alarm settings. The last CO_2 alarm point set will be recalled at switch on. As a safety measure the CO alarm will be set to 35ppm at switch on unless a lower level is set.

7. MEASURING GASES

After the countdown is finished and the analyser is correctly set up sampling can take place either by using a sampling tube/probe to reach into ducts or flues or simply by taking a direct ambient air measurement without a probe or hose connected.

CAUTION: Just by breathing you are emitting a relatively high level of CO_2 in the local area and this can affect the measurements. We do recommend that a probe or flexible hose is used so that the point where the ambient air is being sampled is at least 1 metre away from where anyone is breathing.

Make sure you do not exceed the operating specifications. In particular:

- Do not exceed the probe's maximum temperature (any plastic parts must not contact hot flues).
- Do not exceed the temperature operating range
- Do not put the analyser on a hot surface
- Do not exceed the water trap's levels
- Do not let the particle filter become dirty and blocked
- Ensure that the magnetic boot is free from metallic particles and any surfaces used when attaching the analyser are appropriate.

View data and rotate the dial to see changes as you make adjustments.

Press 

first to hold or 'freeze' the readings before printing. Press 

to print the results.

Before starting a test sequence it is recommended to check that the value for CO reads zero and CO_2 reads about 400ppm in fresh air, if required you can "re-zero" the sensors by using the ZERO functions in MENU.

8. EXAMPLE PRINTOUT IN AMBIENT AIR

The standard printouts are:

Instant print press 

.

```
        KANE 100-1
    CO & CO2 MONITOR

DATE:              01-01-06
TIME:              14:27:08

.....................................

CO2          ppm          950
CO           ppm           12
```

Manually logged print via VIEW stored data.

```
        KANE 100-1
    CO & CO2 MONITOR

DATE:              01-01-06
TIME:              16:27:08

LOG NUMBER 123
.....................................

CO2          ppm          950
CO           ppm           12
```

Summary Print of autolog via MEMORY.

KANE 100-1
CO & CO2 MONITOR

AUTOLOG REPORT

DATE		01-01-06
TIME		18:27:08
Start Time		06-6-04 14:00:00
Stop Time		06-6-04 17:59:00
No of readings		255
.....		
Max CO2	ppm	950 06-06-04 14:10:00
Av CO2	ppm	650
Max CO	ppm	12 06-06-04 15:30:00
Av CO	ppm	06

9. WHEN YOU FINISH USING THE ANALYSER

Always try to switch the analyser off in fresh air .

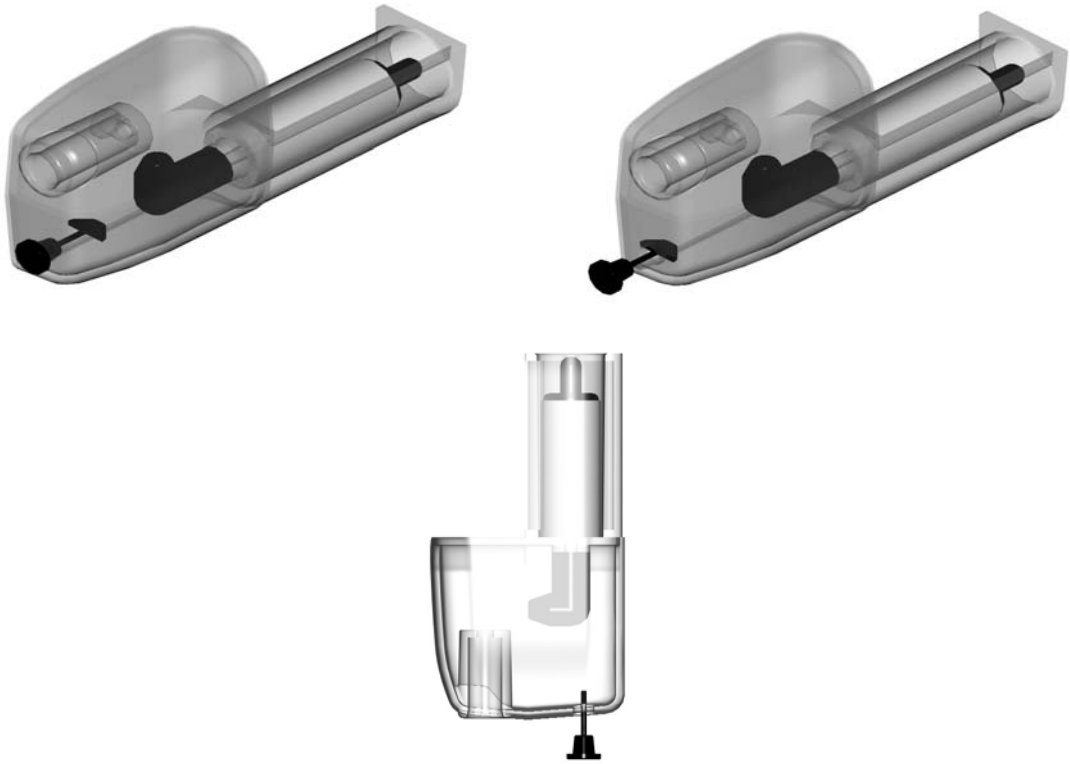
The analyser counts down from 30 before switch off with the pump running to self clean its sensors. If the measured CO level is more than 30 ppm do not switch off the analyser. It will need to sample fresh air until the CO level falls below 30 ppm. This extends the sensor's life and helps to eliminate any unwanted offset on next start-up.

10. MAINTENANCE

10.1 EMPTYING AND CLEANING THE IN-LINE WATER TRAP

The in-line 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.

Emptying of the water trap is detailed below: -

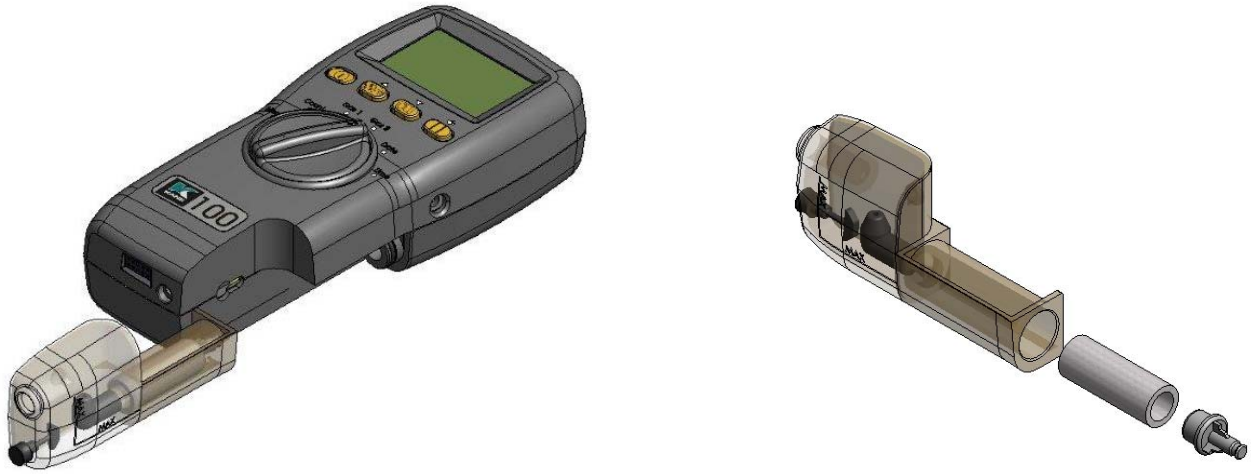


Carefully remove the rubber plug from the bottom of the water-trap housing. Dispose of the condensate in a suitable drain, care must be taken as it could be acidic.

If condensate spills onto the skin or clothing, clean off immediately using fresh water, seek medical advice if problems occur. Ensure plug is replaced before performing further combustion tests.

10.2 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 the 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.

TIP It is the inner surface of the filter that becomes discoloured.

11. PROBLEM SOLVING

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

Fault symptom	Causes / Solutions
• Batteries not holding charge.	• Batteries exhausted. • AC charger not giving correct output. • Fuse blown in charger plug.
• Analyser does not respond to gas	• Particle filter blocked. • Probe or tubing blocked. • Pump not working or damaged with contaminants. • Water Trap Bung not fitting tightly. • Sensor fault

TROUBLE SHOOTING

I have set the analyser to AUTOLOG but it has stopped logging:

- Memory might be full
  - Menu
  - Memory
  - View ….. displayed number is last log number. 255 is full
- PUMP is OFF
- Analyser is PRINTING

Display is totally clear or totally dark

- Set the rotary dial to MENU switch on and leave unit for five minutes.
  - Press △ **three** times (listen for three beeps) then press ⇦
  - Press and hold down △ until the display becomes visible again (this can take up to 20 seconds). Use △ and ▽ to adjust the display's contrast.
  - Press ENTER to exit.

The analyser continually beeps and the display has frozen.

- You have exited a menu function without completing the required sequence.
  - Rotate the dial back to MENU
  - Press  until MENU appears on the top line
    - (NB You may be changing settings when you do this)
  - Rotate the dial to the required display position.

The unit will not turn off.

- Do not hold down the 

button.
  - Try connecting the charger.

12. ANNUAL RECALIBRATION AND SERVICE

Although sensor life is typically more than two years the analyser 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.

SERVICE MODE

This mode can be selected from MENU and gives password protected access to certain functions **WARNING: entering inappropriate codes may corrupt the calibration of this instrument**.

The User level pass code to view software issue is 1111

13. SPECIFICATION

Parameter	Resolution	Accuracy*1	Specified Range	Over Range
Gas Measurement				
Carbon Monoxide	1 ppm	+/-5 ppm <100ppm +/-5% > 100ppm +/-10% >1000ppm	1000 ppm	2000ppm
Carbon Dioxide	1 ppm	+/-20ppm <400ppm +/-5% < 4000ppm +/-10% >4000ppm	200 to 4000 ppm	9999ppm
Dimensions Weight Handset		1kg / 2.2lb 200mm / 7.9" x 45mm / 1.8" x 90mm / 3.5"		
Ambient Operating Range		+0°C to +45°C / 32-104°F 10% to 90% RH non- condensing		
Battery Life		6 hours from full charge and with pump on		
Battery Charger (standard type trickle charger)		Input: 100 - 240 V ac 50 - 60 Hz Output: 12V dc. @ 800 mA. Max.		

*1 Using dry gases at STP with the instrument not subjected to sudden changes of temperature, position or severe vibration

14. 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 analyser are stated below.

As there are electrical products in use pre-dating this Directive, and radio transmitting devices which may not be covered by this Directive, they may emit excess electromagnetic radiation levels and, occasionally, it may be appropriate to check the analyser before use by:

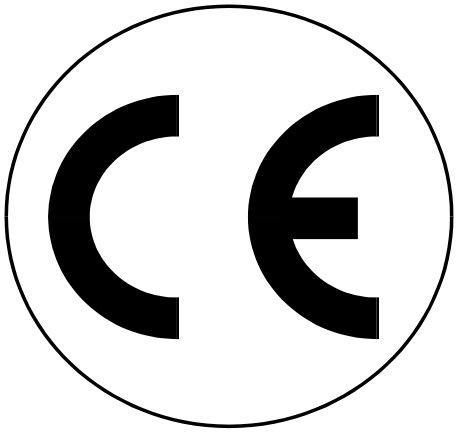
Use the normal start up sequence in the location where the analyser will be used.

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 position to minimize interference or switch off, if possible, the offending equipment during your test.

At the time of writing this manual (January 2010) 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/KANE 100 details the specific test configuration, performance and conditions of use.

Please Note:

Batteries used in this instrument should be disposed of in accordance with current legislation and local guidelines.

At the end of the product's life it should be recycled in accordance with current legislation and local guidelines.

APPENDIX

Carbon Monoxide:

Current World Health Organisation recommended maximum exposure levels to Carbon Monoxide:

15 minutes	89ppm	=	100mg/m^3
30 minutes	53ppm	=	60mg/m^3
60 minutes	27ppm	=	30mg/m^3
8 hours	9ppm	=	10mg/m^3

Carbon Dioxide:

British Standards BS6896, BS6230 and BS5990 confirm CO_2 concentration should not exceed 2800ppm where people are working.

HSE Regulation EH40 sets the maximum occupational exposure limit at 5000ppm.

BSRIA recommend a maximum of 800ppm over an eight hour time weighted average.

ASHRAE (62/99) recommends a maximum level of 1000ppm.

Data on ambient CO_2:

NOAA observatory
(US. National Oceanic and Atmospheric Administration)
http://www.cmdl.noaa.gov/ccgg/insitu.html
http://www.cmdl.noaa.gov/ccgg/iadv/

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
☐ Other Recommendation
☐ Value for Money
☐ Our Fixed Price Servicing Programme
☐ Kane
☐ Previous Owner
☐ Not your Decision
☐ Other:

What brand was your previous analyser?

How did you hear about Kane?

☐ Magazine Advert
☐ Trade Counter Literature
☐ Personal Recommendation
☐ Internet
☐ Exhibition
☐ 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 instrument.

Before use,
please register on our website
www.kane.co.uk

or complete, detach and return the Product Registration page