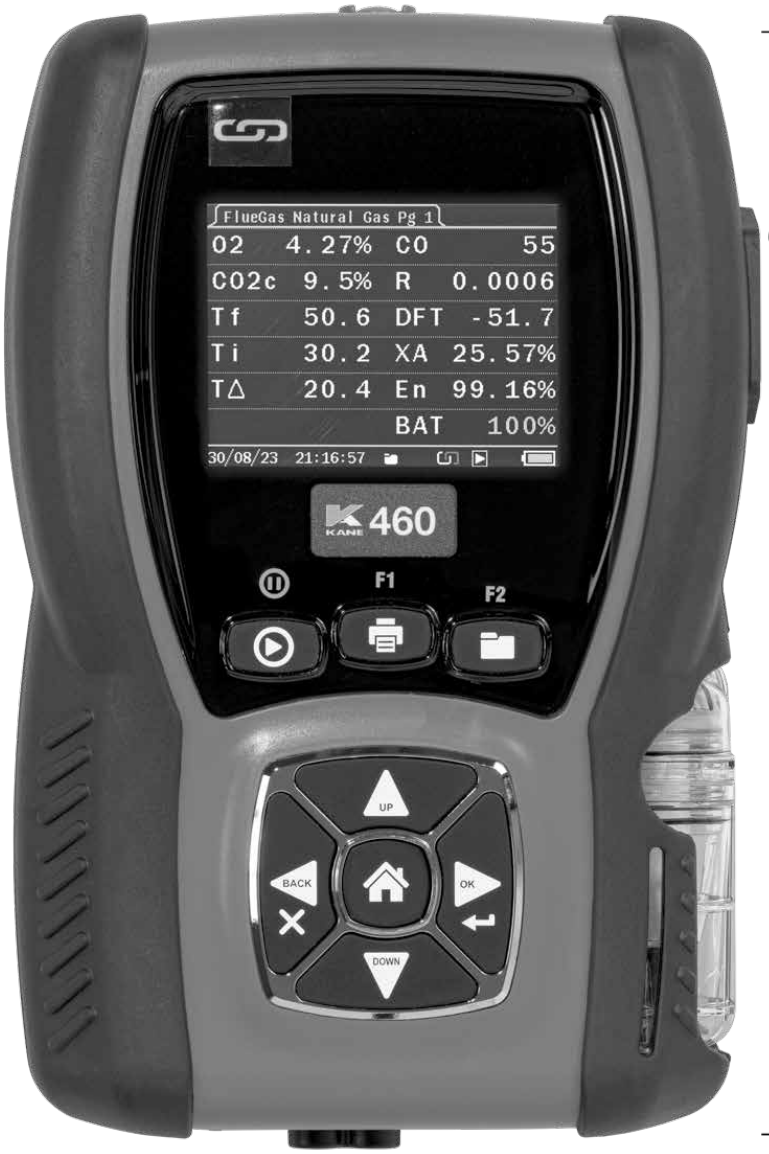
UEi TEST iNSTRUMENTS™

KANE460

THE HVAC/R ANALYZER

INSTRUCTION MANUAL

ENGLISH



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CONTENTS

1 WELCOME TO YOUR KANE460 - PLEASE READ

Thank you for using this KANE analyser.

Please read this manual so you know how to use your analyser - Do not assume you know how to use it.

Please read section 13 - Necessary Regular Maintenance - so you know how to care for your analyser after daily use.

Please read section 14 - General Safety - as you must be trained and competent to use this product.

Please read section 16 - Specification - to confirm measurements and calculations. This manual may reference measurements and features unavailable on this model.

Please also read section 19 - ***UEi SERVICE+*** Annual Recertification

1.1 KANE460 OVERVIEW

Your analyser uses up to 3 electrochemical sensors to measure up to 3 gases.

Your analyser has a colour graphical display and intuitive keypad for clear information and simple operation.

Your analyser is independently certified to EN50379 parts 1-3.

Your analyser measures (sensor dependent):

- Oxygen (O2)
- Carbon Monoxide (CO)
- Nitric Oxide (NO)
- Pressure
- Differential Pressure
- Temperature
- Differential Temperature

Your analyser calculates (sensor dependent):

- Carbon Dioxide (CO2)
- Oxides of Nitrogen (NOx)
- CO/CO2 Ratio
- Combustion Efficiency
- Losses
- Excess Air
- Poison Index (Pi)
- Airflow by Pitot Tube
- Air-Conditioning & Refrigeration Super Heat & Sub Cool

Your analyser has an integral protective rubber cover and easy fit accessory clip on rear next to the battery compartment.

Your analyser flow system automatedly detects any blockage in the sampling system.

Your analyser prints tests using an optional infrared printer or wirelessly sends tests to the KANE LIVE App.

1.2 MEMORY

Your analyser stores:

- Combustion logs = 178
- Pressure/Temp logs = 178
- Airspeed logs = 89
- DTHA2 logs = 89
- HVACR logs = 163
- Commission logs = 48
- Room test logs= 26
- Sweep test logs = 256
- Timed logs = 2*1440
- Average test logs = 99
- Tightness logs = 128

You can enter 2 lines of 24 characters to personalise your tests.

1.3 CO PROTECTION AND AUTO RANGE

Your analyser has an electrochemical CO sensor measuring up to 10,000ppm.

Above 10,000ppm the over range pump automatically protects the sensor.

1.4 KANE LINK

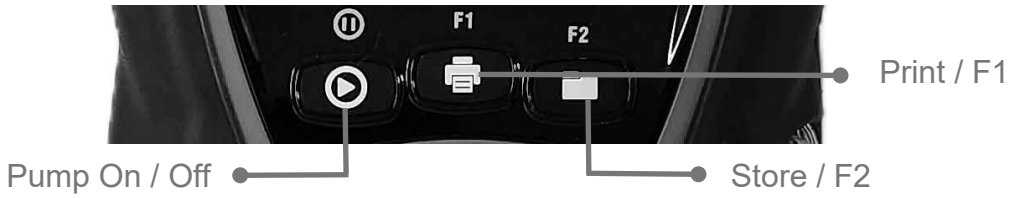
You can wirelessly connect optional KANE LINK devices to your analyser. When connected, they stay connected until you use KANE LINK to remove them.

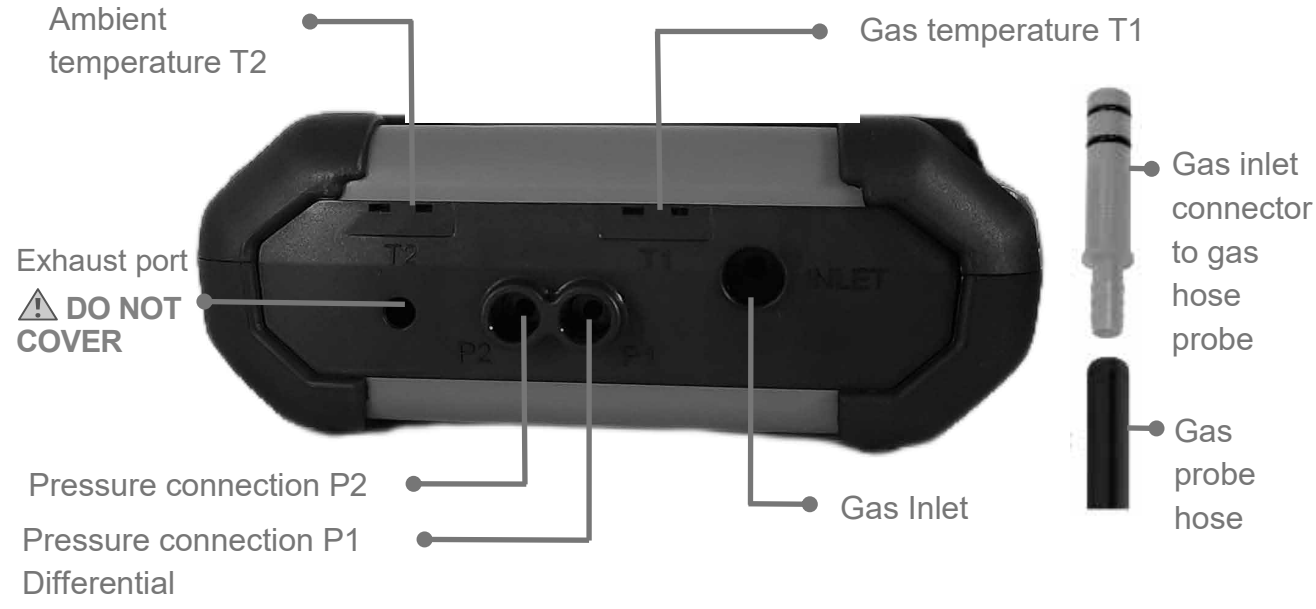
When powered on, KANE LINK devices replace or add measurements to your analyser.

 See section 11 to add, manage or remove KANE LINK devices.

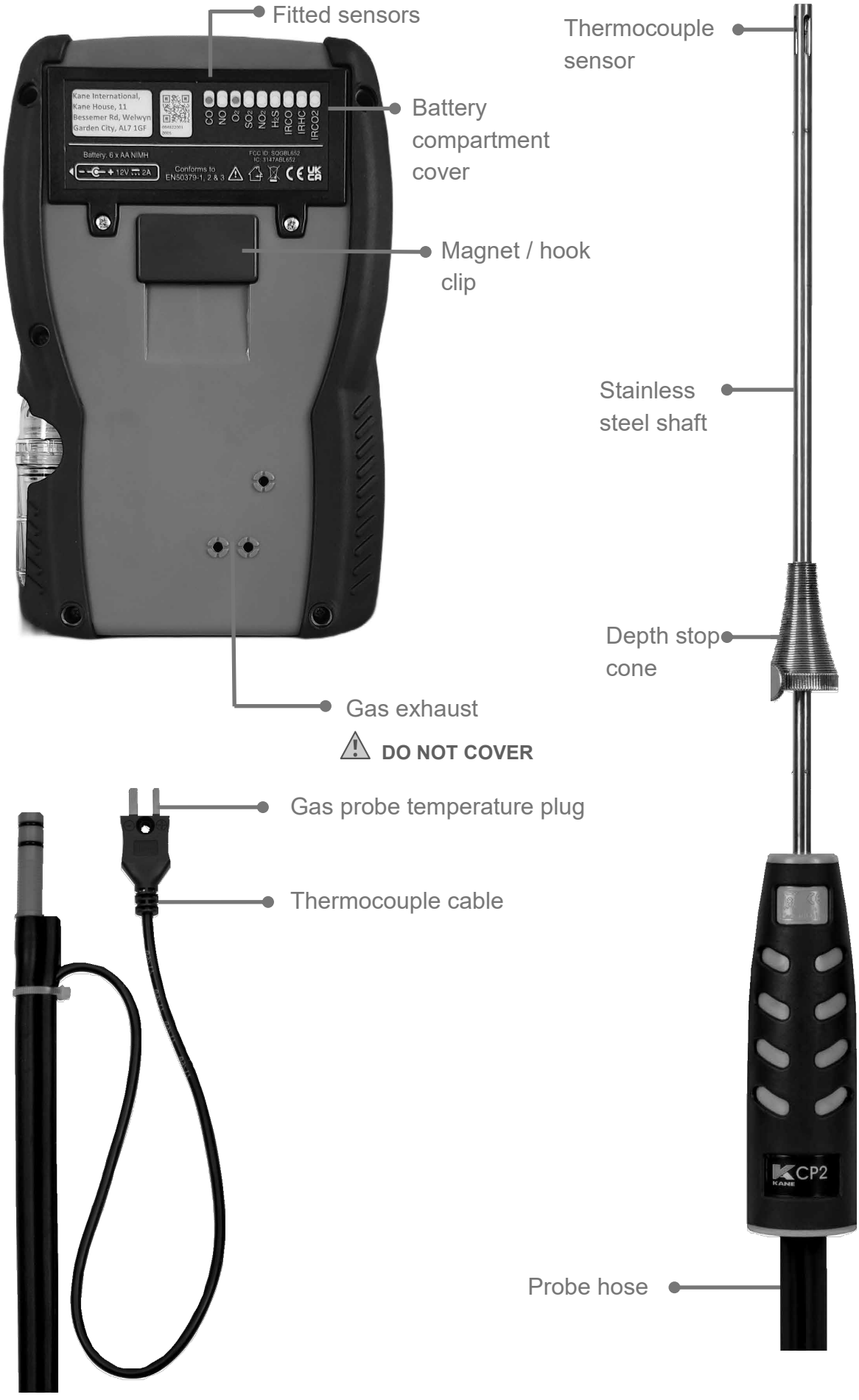
2 ANALYSER LAYOUT

2.1 ANALYSER FRONT & BOTTOM





2.2 ANALYSER BACK & PROBE



2.3 FUNCTION KEYS & KEYPAD

ICON	DESCRIPTION
 PLAY / PAUSE	Pump On / Off
 PRINT F1	Short press to print or send a report - Analyser offers destination choice
 STORE / F2	Short press to Store / F2
 HOME	Return to HOME screen
 UP	Short press to scroll up
 DOWN	Short press to scroll down
 BACK / CANCEL	BACK / CANCEL
 OK / ENTER	OK / ENTER

3 FIRST TIME USE - PLEASE READ TO SECTION 6

Fit and charge analyser batteries for 8 hours - See section 4.

Power on & off analyser - See section 5.

Set up analyser to your requirements before use - See section 6.

4 FIT, REPLACE & CHARGE BATTERIES

4.1 BATTERY TYPE

Your analyser uses rechargeable Nickel Metal Hydride (NiMH) batteries - Using other battery types may void analyser warranty.

⚠ WARNING

You can use Alkaline batteries but do not charge analyser when fitted.

Do not mix NiMH cells with different capacities or from different manufacturers - All batteries must be identical.

4.2 FIT OR REPLACE BATTERIES

1. Turn over analyser, remove battery compartment cover
2. Fit 6 NiMH “AA” rechargeable batteries with correct battery polarity
3. Replace battery compartment cover

4.3 UPDATE TIME AND DATE

Reset analyser time & date after changing batteries.

NOTE: Your analyser STATUS bar displays current time, date and battery status - Time & date can only be changed when you have no stored logs in analyser memory to protect integrity of stored logs.

4.4 CHARGE NiMH BATTERIES

First Time - charge for 8 hours.

Thereafter - top up NiMH batteries any time.

See section 2 where to connect.

4.5 BATTERY DISPOSAL

Always use approved disposal methods protecting the environment.

5 POWER ON

Power on analyser by pressing ⏻ button for 2 seconds. Your analyser starts an automatic zero calibration countdown when powered on.

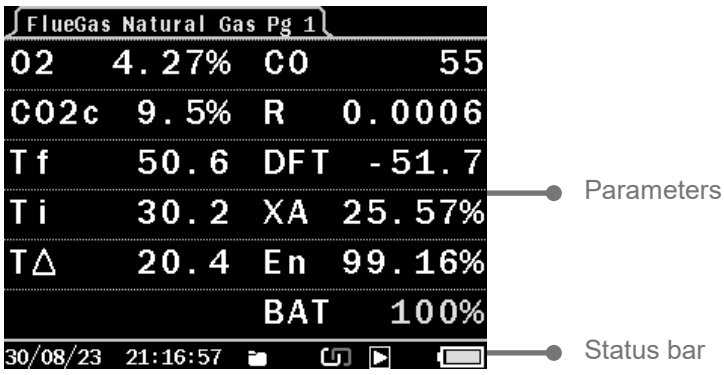
NOTE: Always power on analyser in fresh outdoor air when performing automatic zero calibration countdown.

NOTE: Connect gas probe hose to analyser gas inlet and gas probe temperature plug to analyser temperature socket T1.

Charge analyser batteries for 8 hours - an overnight charge is sufficient for an average 8-hour day.

5.1 ANALYSER DISPLAY & OPERATION SUMMARY

Your analyser displays multiple parameters & a status bar

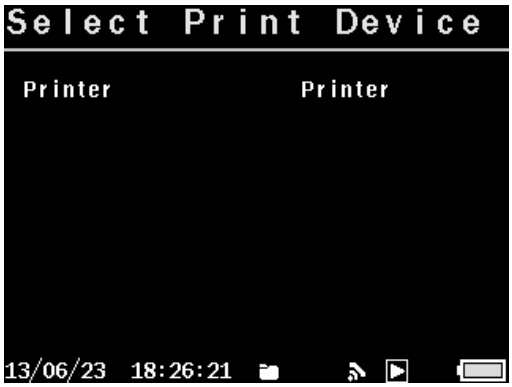


Navigate via 5-button control panel - press HOME to return to HOME MENU:

Use ▲ or ▼ & OK to navigate through options - Press HOME to exit without change.

5.2 PRINT OR SEND A TEST REPORT

Press PRINT key to print a test report to an optional KANE printer or send to KANE LIVE App.



Press ENTER key - display changes to show progress.

5.3 LOG AND PRINT OR SEND A TEST REPORT

Press STORE key until display shows LOG STORED.

To print logged data or send to KANE LIVE App:

1. Select LOG in REPORTS menu.
2. Press PRINT key or selected desired test from MEASURE MENU and use View Logs.
3. Select LOG and press PRINT key

6 SET UP YOUR ANALYSER

This section explains how to set up your analyser - Press HOME then change analyser default settings in SETTINGS & SET UP.

Power on analyser by pressing power ON / OFF in fresh outdoor air.

NOTE: Always power on analyser in fresh outdoor air when performing automatic zero calibration countdown.

After powering on your analyser, choose tasks to perform using MENU.

Your analyser status bar on bottom of display shows current time, date and battery status.

Check time and date are correct - they can only be changed with no stored logs in analyser memory to protect stored data integrity.

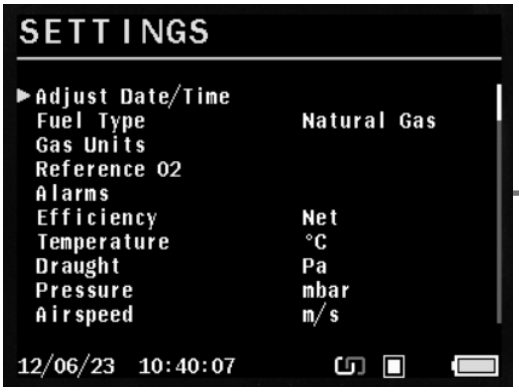
Press HOME menu to start setting up your analyser.

Use or & to select SETTINGS & / or SET UP - Press HOME to exit without change.

6.1 SETTINGS

Press HOME to display HOME MENU PAGE

Press ▼ to SETTINGS then press ENTER



Use ▲ ▼ & OK to select option to change.

Use ▲ & ▼ to change option then press ENTER to confirm.

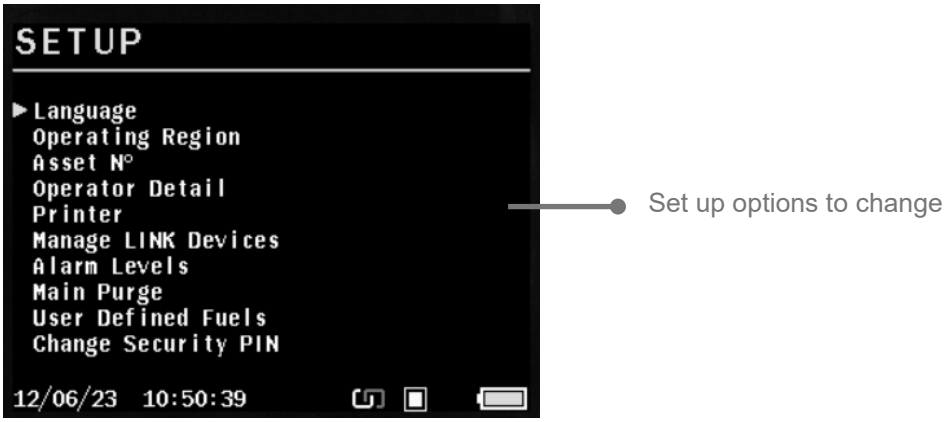
Press HOME to exit without change

MENU ITEM	OPTIONS / COMMENTS
DATE / TIME	Set date & time - NOTE: Can only change if all logs in memory are cleared
FUEL TYPE	Select option via UP / DOWN & OK to confirm
GAS UNIT	Select option for each gas
REFERENCE O2	Set % reference O2 for each measurement
ALARMS	Toxic Gas Alarm YES / NO Battery Low Alarm YES / NO Water trap Check Warning YES / NO High CO Warning YES / NO
EFFICIENCY	Select option via UP / DOWN & OK to confirm
TEMPERATURE	Select option via UP / DOWN & OK to confirm
DRAUGHT	Select option via UP / DOWN & OK to confirm
PRESSURE	Select option via UP / DOWN & OK to confirm
AIRSPEED	Select option via UP / DOWN & OK to confirm

6.2 SET UP

Press HOME to display HOME MENU

Press ▼ to select SETUP then press ENTER



Use ▲▼ & OK to select option to change.

Use ▲ & ▼ to change option then press ENTER to confirm.

Press HOME to exit without change

MENU ITEMS	OPTIONS / COMMENTS
LANGUAGE	Select analyser operating language
OPERATING REGION	Select fuel table country or region
ASSET N°	Enter equipment asset number
OPERATION DETAIL	Enter operator / owner information
PRINTER	Select IR printer type
MANAGE LINK DEVICES	Add or remove KANE LINK devices
ALARM LEVELS	Set alarm trigger levels for each gas sensor
MAIN PURGE	Set: MAIN PURGE DURATION Time in seconds MAIN PURGE INTERVAL Time in minutes AUTO ZERO YES / NO
USER DEFINED FUELS	Add custom fuel types
CHANGE SECURITY PIN	Set to stop changes without PIN code entry

7 USING YOUR ANALYSER

7.1 CHECK BEFORE POWER ON:

1. Particle and water stop filter are dry and clean
2. Water trap and probe line are empty of water
3. Water trap is correctly fitted and instrument upright
4. All hoses connections, etc, are properly made
5. Flue temperature plug is connected
6. Analyser & probe will sample fresh outdoor air during calibration
7. Analyser has sufficient battery power

7.2 AUTOMATIC ZERO CALIBRATION COUNTDOWN

Power ON instrument - Pressing ⏻ starts automatic zero calibration count down.

During automatic zero calibration analyser samples fresh air to zero toxic sensors and set oxygen sensor to 20.95%.

NOTE: Always power ON analyser in fresh outdoor air when performing automatic zero calibration countdown

After power on your analyser displays identity, software version and serial number.

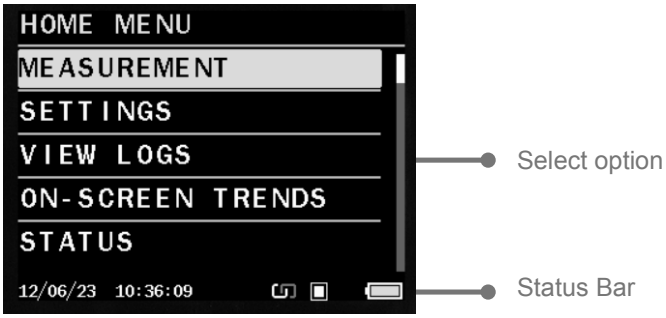
“ ANALYSER PURGING 90 secs” countdown appears on display.

Calibration time counts down in seconds to zero and can be changed to 90, 120, 180 or 300 seconds.

NOTE: 180 seconds is recommended to allow sensors to fully stabilise - anything less may result in toxic and oxygen sensor drift.

7.3 HOME MENU

Press HOME to display HOME MENU



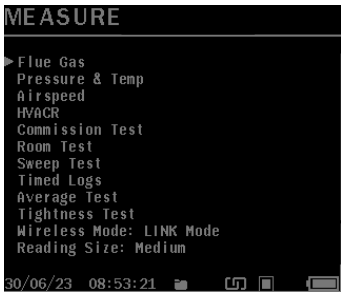
Press ▽ to select option then press ENTER.

MENU ITEM	COMMENTS
MEASURE	Select test to perform - see section 7.4
SETTINGS	Change settings - see section 6.1
VIEW LOGS	Log & view stored tests - see section 7.5
ON-SCREEN TRENDS	Configure & display trends - see section 7.6
STATUS	Analyser status - see section 7.7
SET UP	Change more settings and add KANE LINK devices - see section 6.2 & section 11
TOOLS	Manual air & pressure zero, mid-stream finder tool - see section 7.8
SERVICE	Reserved - section 7.9

Press HOME to exit without change

7.4 MEASURE, TEST, WIRELESS & DISPLAY SIZE OPTIONS

Select MEASURE to display tests



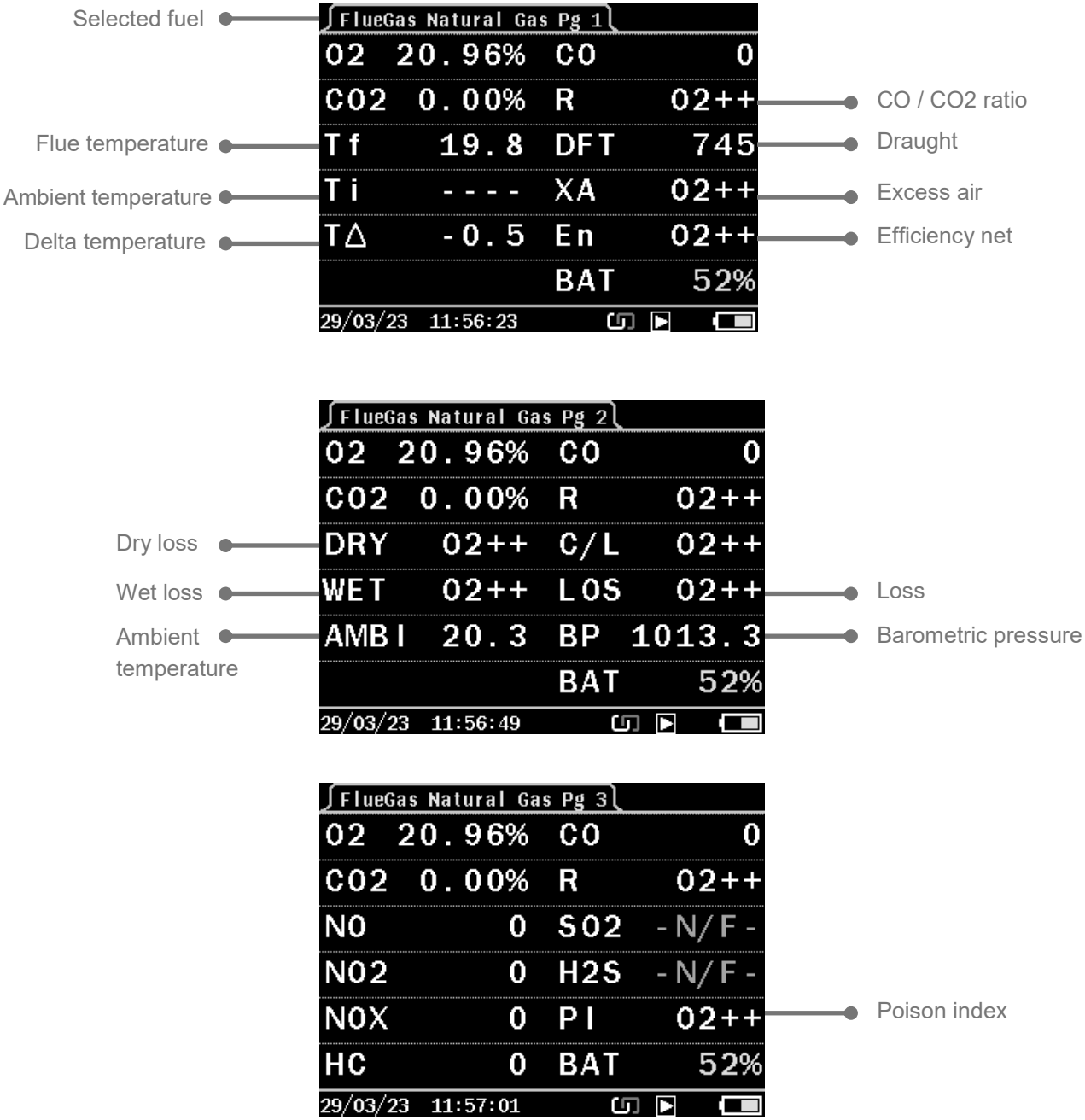
Use △ ▽ & OK to select test

Press HOME to exit without change

7.4.1 FLUE GAS

Select to start boiler or appliance combustion testing - Measurement & calculations are displayed over 3 pages.

Use ▲ ▼ buttons to view each page



7.4.2 PRESSURE & TEMPERATURE

Select to display pressure & temperature measurements & calculations.

7.4.2.1 PRESSURE MEASUREMENT

⚠ WARNING

Before using your analyser to measure an appliance gas / air ratio valve, read appliance manufacturer instructions thoroughly. If in doubt, contact appliance manufacturer.

After adjusting a gas / air ratio value O_2, CO_2 & CO/CO_2 ratio readings must be within appliance manufacturer specified limits.

7.4.2.2 MEASURING PRESSURE

NEVER TAKE A PRESSURE READING WITHOUT KNOWING MAXIMUM PRESSURE POTENTIALLY PRESENT.

⚠ **THIS PRESSURE TRANSDUCER IS RATED AT 2 PSI.**

Measurements can be made at any time.

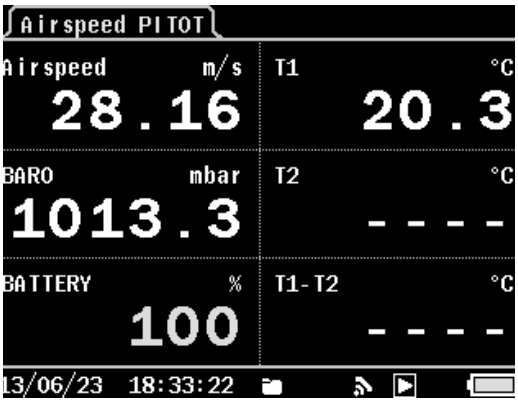
Connect a manometer hose with a black connector to analyser pressure port P1 for single pressure.

To measure differential pressure, connect another manometer hose to P2 for differential pressure - See section 2 where to connect.

7.4.2.3 MEASURING FLOW WITH A PITOT PROBE

Use Airspeed menu to set units to desired scale - See section 6.1 & 7.4.3.

NOTE: Range limit for Pitot calculation is 15Pa to 4600Pa and 0.15mbar to 446mbar.

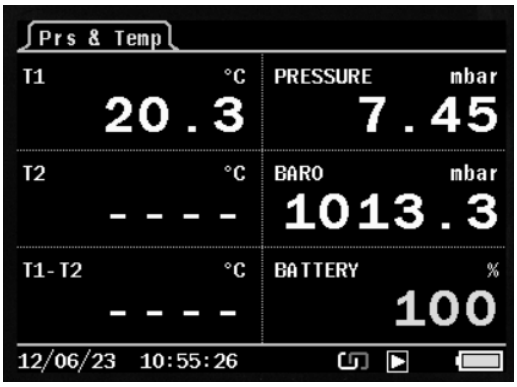


For accurate flow measurement always measure gas temperature - If a temperature probe is not used analyser defaults to internal ambient temperature.

NOTE: Temperature must be between -10°C to +650°C.

7.4.2.4 TEMPERATURE

Connect a temperature probe with a Type K thermocouple plug to analyser temperature socket T1 for single pressure measurements - See section 2 where to connect.



To measure differential temperature, connect another temperature probe with a Type K thermocouple plug to analyser ambient temperature socket T2.

To measure flow & return temperature, use T1 for flow & T2 for return.

If a probe is not connected to T2, analyser internal temperature calculates net temperature.

7.4.3 AIRSPEED - AIRFLOW, RH & TEMPERATURE

Select to display airflow, RH & temperature measurements - Analyser defaults to pitot unless a KANE-DTHA2 is connected - See section 11 to add, manage or remove.

7.4.4 HVACR - HEAT PUMP, AIR CONDITIONING & REFRIGERATION

Select to test HVACR systems with optional KANE LINK devices - See section 11 to add, manage or remove.

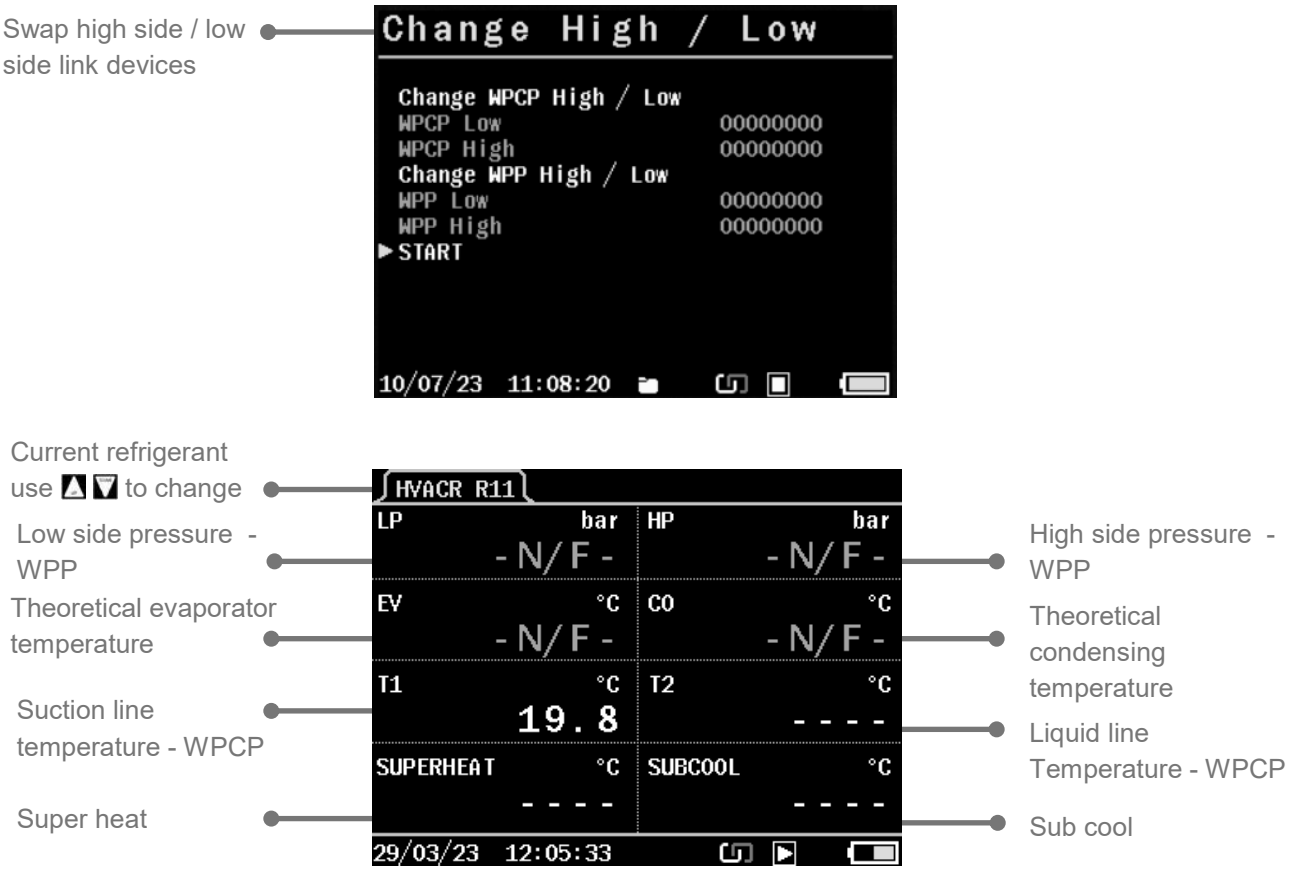
When using:

- 2 x WPCP temperature pipe clamp probes
- 2 x WPP pressure probes

Your analyser simultaneously displays high side / low side pressure, high side / low side temperature and theoretical super heat & sub cooling values on one screen.

To manage KANE LINK devices, use ▲ ▼ & OK to set each device to high or low side.

Press HOME to exit without change.



7.4.5 COM TEST - DOMESTIC GAS BOILER COMMISSION TEST

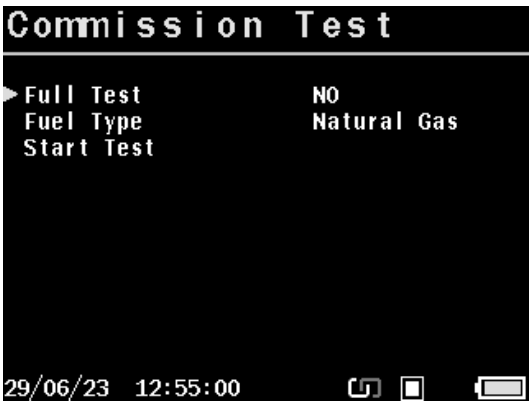
7.4.5.1 DOMESTIC GAS BOILER TEST

Select COM TEST to perform a domestic gas boiler commission test following UK Technical Bulletin 143 (TB143)

This is not a substitute for appliance manufacturer instructions.

From this screen you can manage logged tests or start test.

Select Set up Commission Test to start a new test



Select Test option

MENU ITEMS	OPTIONS / COMMENTS
FULL TEST	YES / NO - Select desired option UP / DOWN & OK to confirm YES to perform full test - See section 7.9.3 NO to perform simple test without minimum fire, flow & return - See section 7.9.2
FUEL TYPE	Select option via UP / DOWN & OK to confirm
START TEST	Begin Test

Press HOME to exit without changes

Check flue gas probe & temperature plug are correctly connected to your analyser before taking measurements - See section 2 where to connect.

Your analyser will prompt each test step.

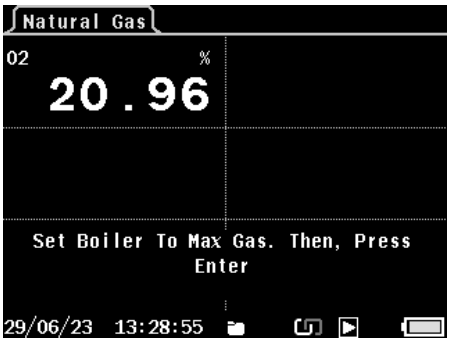
NOTE:

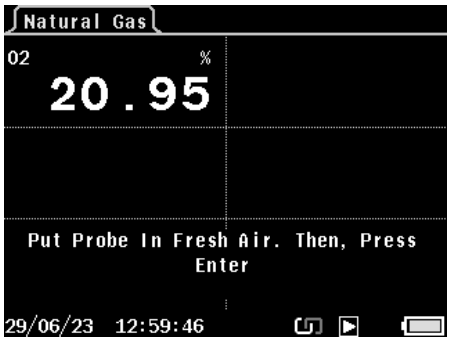
- Air Inlet Test
  Analysers measuring CO2 - Measurements must be steady & under or equal to 0.20% CO2
  Analysers measuring O2 - Measurements must be steady & over or equal to 20.6% O2

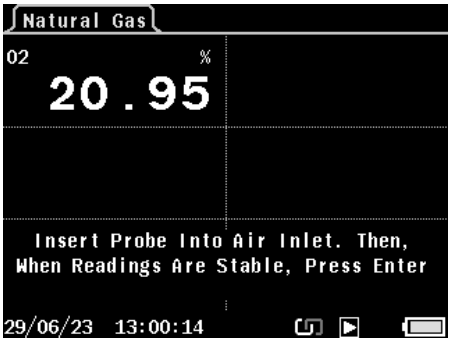
- Min and Max Gas Test
  If manufacturer instructions are not available, CO2 measurement must be steady and be above 5%, CO under 350ppm & RATIO under 0.0040.

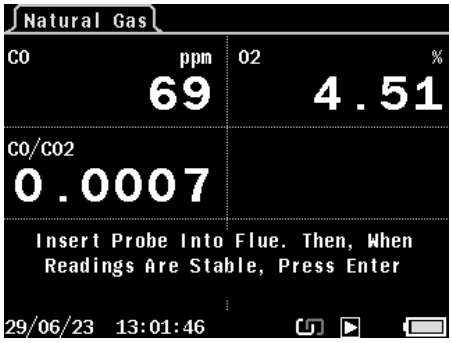
Set boiler to max rate, place analyser in fresh outdoor air and select Start Test.

7.4.5.2 DOMESTIC GAS BOILER SIMPLE TEST



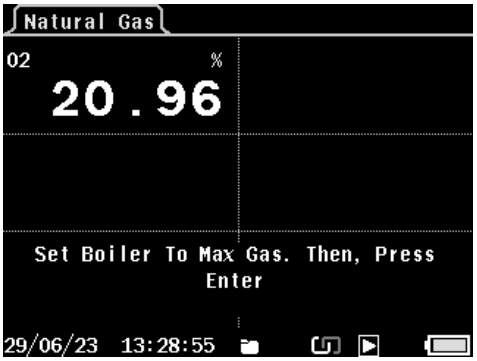


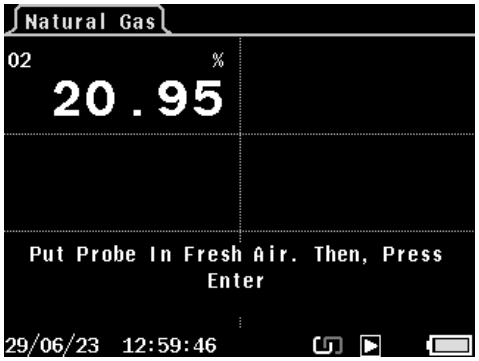


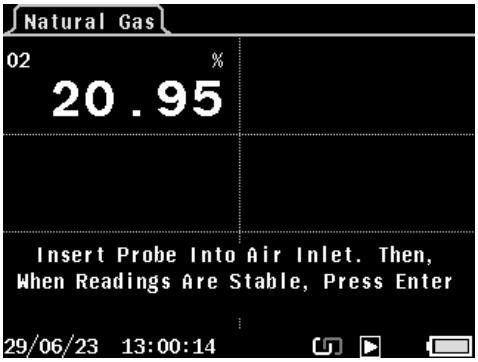


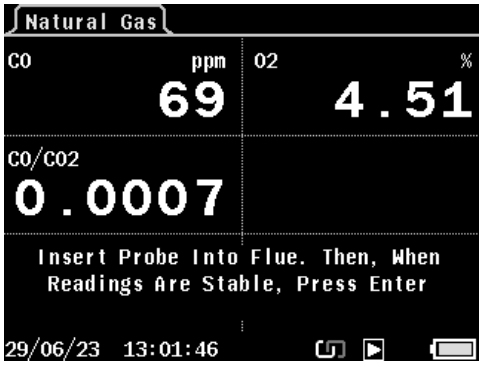
7.4.5.3 DOMESTIC GAS BOILER FULL TEST

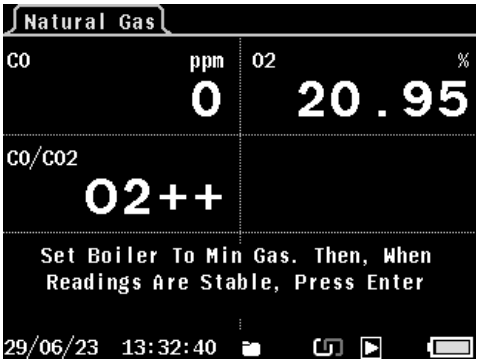
Set boiler to max rate, place analyser in fresh outdoor air & select Start Test.

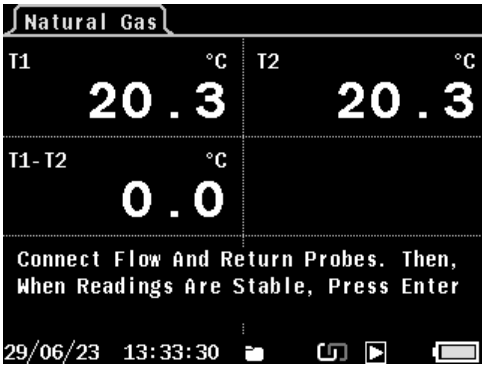












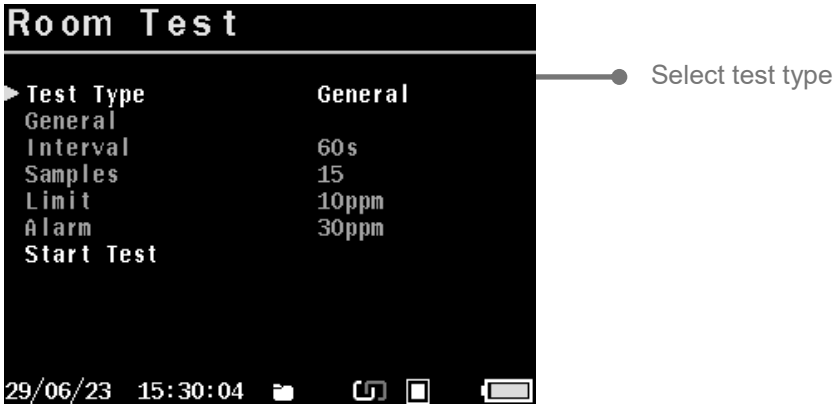
Tests are automatically logged in memory with a log number - Send test logs to your optional KANE-IRP3 printer or KANE LIVE App by pressing ENTER.

7.4.6 ROOM - CO MIGRATION TEST

Select ROOM Test to perform a CO migration test - See section 7.4.6.3 to test up to 4 rooms simultaneously.

From this screen you can manage logged tests or start a new test.

Select Test Type to start a new test



MENU ITEMS	OPTIONS / COMMENTS
TEST TYPE	Select option via UP / DOWN & OK to confirm
START TEST	Begin test

Press HOME to exit without changes

⚠ CO migration room tests are defined in UK standard BS7967 - You must be competent to perform these tests.

NOTE: Always perform an automatic zero calibration countdown in fresh outdoor air before starting a ROOM TEST.

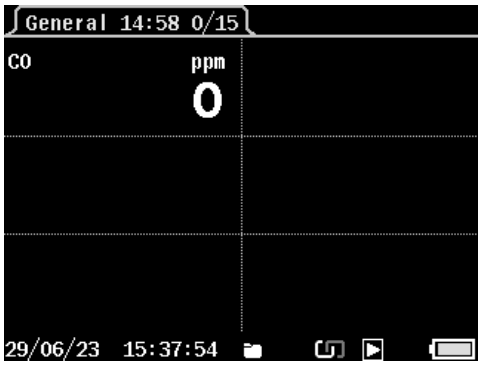
NOTE: Simultaneous tests require optional KANE79 monitors - See section 7.4.5.3 & 11

7.4.6.1 ROOM TEST TYPES

TEST TYPE	DURATION	LIMITS / ALARM LEVELS
GENERAL	15 minute test with results stored every minute	LIMIT = 10ppm ALARM - 30ppm
MIGRATION TEST	15 minute test with results stored every minute	LIMIT = 10ppm ALARM - 30ppm
TYPE C SEALED APPLICANCE	15 minute test with results stored every minute	LIMIT = 10ppm ALARM - 30ppm
TYPE B BOILER OPEN FLUE	15 minute test with results stored every minute	LIMIT = 10ppm ALARM - 30ppm
TYPE A COOKER	30 minute test with results stored every minute	LIMIT = 10ppm ALARM - 30ppm
TYPE A WATER HEATER	5 minute test with results stored every minute	LIMIT = 10ppm ALARM - 30ppm
TYPE A SPACE HEATER	30 minute test with results stored every minute	LIMIT = 10ppm ALARM - 30ppm

7.4.6.2 TESTING A ROOM FOR CO

When starting a room test your analyser automatically measures ambient CO:



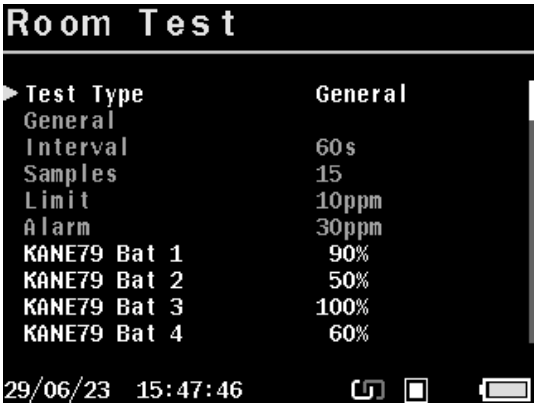
You can stop a **ROOM** test any time by pressing **ENTER** - otherwise it automatically stops after the preset time.

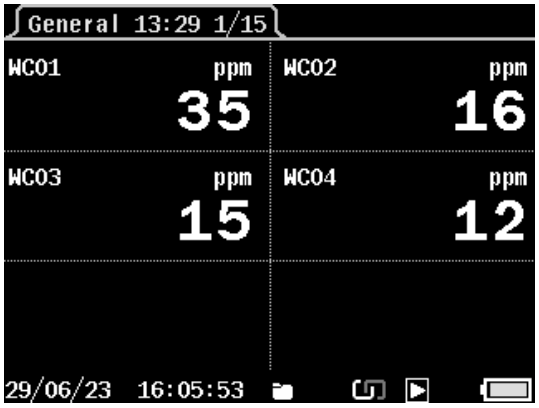
NOTE: Always power ON analyser in fresh outdoor air when performing automatic zero calibration countdown

7.4.6.3 KANE LINK SIMULTANEOUS MULTI ROOM CO TEST

Your analyser can test up to 4 room simultaneously with up to 4 optional KANE79 CO monitors

See section 11 to add, manage or remove optional KANE LINK devices.





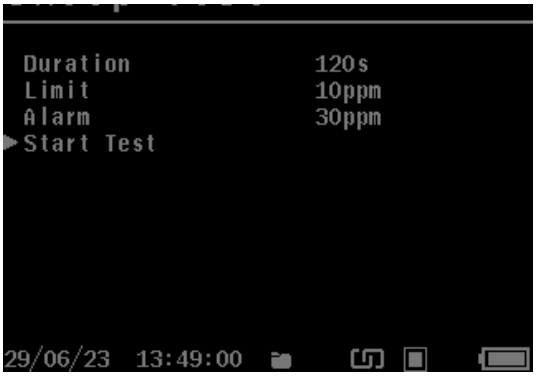
NOTE: Always perform an automatic zero calibration countdown in fresh outdoor air before starting a ROOM TEST.

7.4.7 APPLIANCE SWEEP TEST

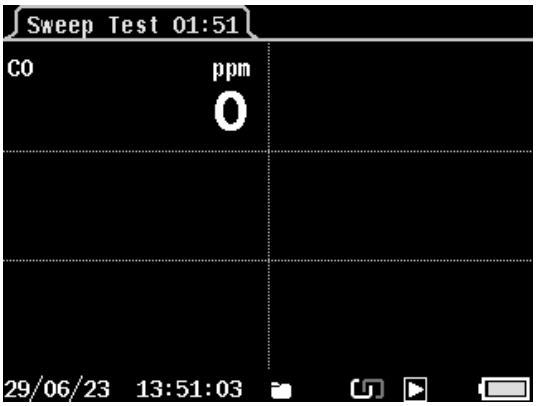
Select to automatically test for appliance emission leaks:

From this screen you can manage logged tests and start test.

Select Setup Sweep Test to start a new test



This screen displays preset limits - Select Start Test to proceed.



Sweep tests are automatically logged in memory with a log numbers - Send test logs to your optional KANE-IRP3 printer or KANE LIVE App by pressing **ENTER**.

Appliance sweep tests are defined in UK standard BS7967 - You must be competent to perform these tests.

NOTE: Always perform an automatic zero calibration countdown in fresh outdoor air before starting a SWEEP TEST.

7.4.8 TIMED LOGS

Select to automatically log tests in memory with a log number

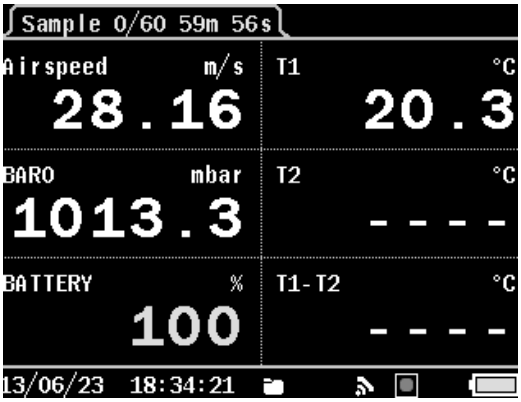
Select from menu below to customise your test

MENU ITEMS	OPTIONS / COMMENTS
MEASURE MODE	Choose required measurement parameters: FLUE GAS AIRFLOW PRESSURE & TEMP
DURATION	Choose test duration from 1 to 24 hours
INTERVAL	Choose sampling interval from 3 to 60 seconds
TOTAL SAMPLES	Indicates number of logs collected based on DURATION and INTERVAL settings
START TEST	Begin test

Press HOME to exit without changes.

7.4.8.1 TEST RUNNING

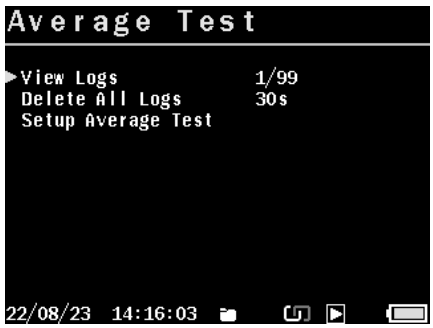
- This example confirms your analyser will automatically log a test every 60 minutes.



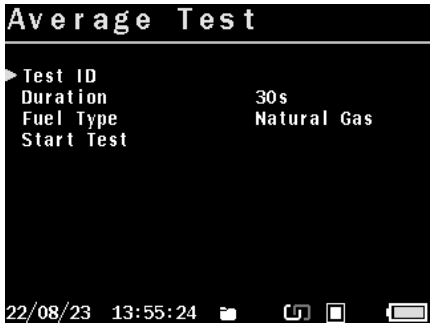
7.4.9 AVERAGE TEST

Select to perform a rolling average calculation based on user defined times.

From this screen you can manage logged tests and start a new test.



Select Average Test to customise your test



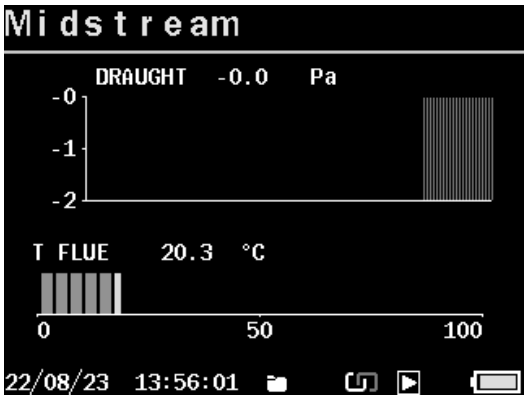
Select from menu below to customise your test

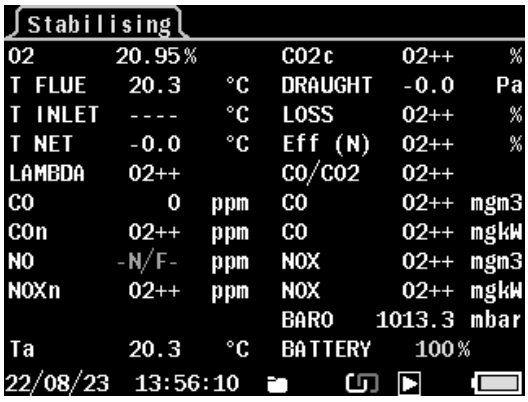
MENU ITEM	OPTIONS / COMMENTS
TEST ID	Set ID via UP/DOWN & OK to confirm each character
DURATION	Select desired option via UP/DOWN & OK to confirm
FUEL TYPE	Select desired option via UP/DOWN & OK to confirm
START TEST	Begin

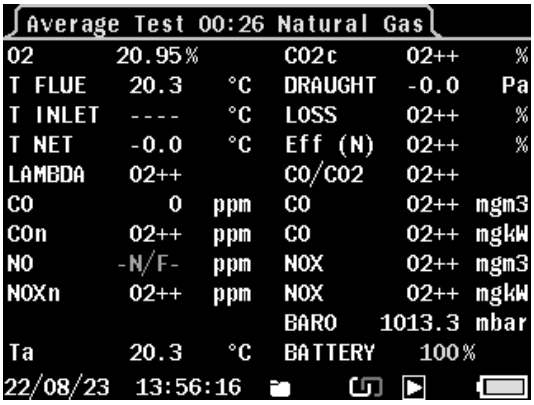
Press HOME to exit without changes

Check flue gas probe & temperature plug are correctly connected to your analyser before taking measurements - See section 2 where to connect.

Your analyser will prompt each test step.







Average tests are automatically stored in memory with a log number - Send test logs to your optional KANE-IP3 printer or KANE LIVE App by pressing ENTER.

7.4.10 TIGHTNESS TEST

Select to perform tightness & let by tests

From this screen you can manage logged tests and start a new test.

Select from menu below to customise your test

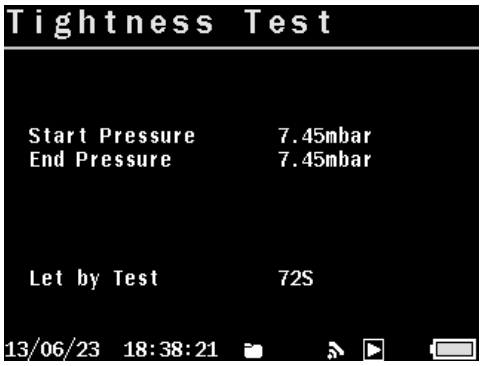
MENU ITEMS	OPTIONS / COMMENTS
STABILISATION TIME	Select desired option via UP / DOWN & OK to select duration of the test in minutes
TIGHTNESS TIME	Select desired option via UP / DOWN & OK to select duration of the test in minutes
LET BY TIME	Select desired option via UP / DOWN & OK to select duration of the test in minutes
LET BY TEST	Choose whether to perform let by test

Press HOME to exit without change

Using black connectors, connect your manometer hose from appliance test point to analyser P1 input - See section 2 where to connect.

SELECT LET-BY (optional)

LET-BY RUNNING

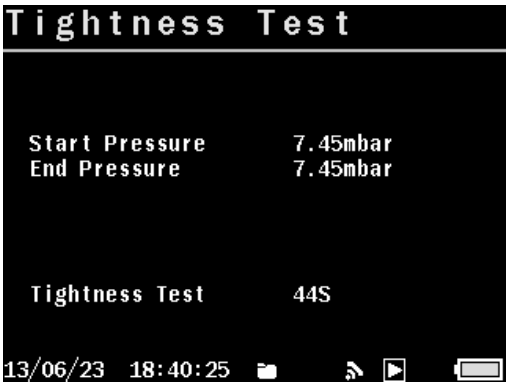


START STABLILISATION

STABILISATION RUNNING

START TIGHTNESS TEST

TIGHTNESS TEST RUNNING



7.4.11 WIRELESS MODE

Select to choose between KANE LINK or KANE App mode.

Select KANE LINK to connect to KANE LINK measurement devices - See section 11 to add, manage or remove.

Select KANE App to enable wireless transfer of test results to your KANE LIVE App.

Press HOME to exit without changes

7.4.12 READING SIZE

Select to choose display text size

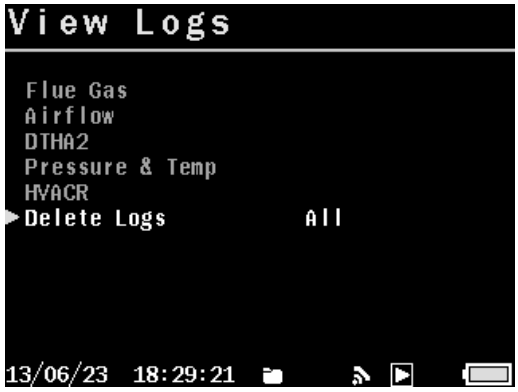
7.5 VIEW LOGS

Select to view or delete stored tests, known as logs.

Press HOME to display HOME MENU page

Press ▼ to select VIEW LOGS then press ENTER

Select logs to view or delete



MENU ITEM	OPTIONS / COMMENTS
FLUE GAS / EXHAUST GAS	View logs
AIRFLOW	View logs
DTHA2	View logs
PRESSURE & TEMP	View logs
HVACR	View logs
DELETE LOGS	Select logs by type or all

Press HOME to exit without changes

7.6 ON SCREEN TRENDS

Select to customise & display trends.

Press HOME to display HOME MENU page

Press ▼ to select ON SCREEN TRENDS

Select TRENDS to display

MENU ITEM	OPTIONS / COMMENTS
SETUP	Set: SAMPLING INTERVAL TREND A Parameter TREND B Parameter TREND C Parameter
START TREND A	Start
STATY TREND B	Start
START TREND C	Start
START TREND D	Start
START DUAL TREND	Start
START QUAD TREND	Start

Press HOME to exit without changes

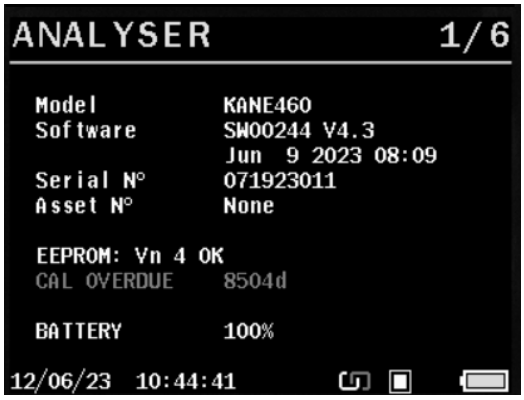
7.7 STATUS

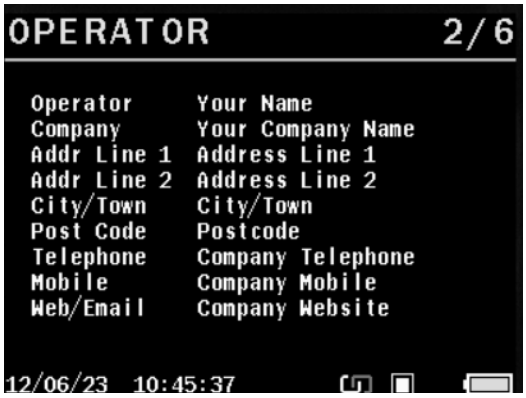
Select to see analyser current status

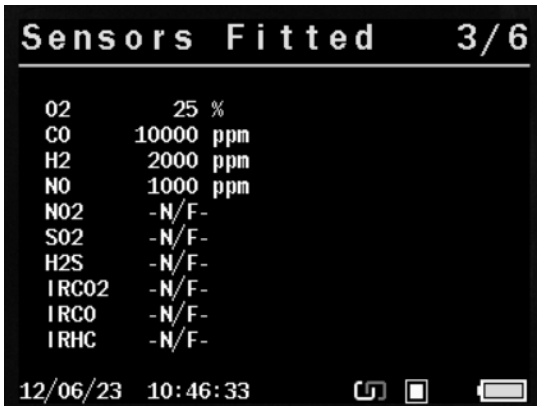
Press HOME to display HOME MENU page

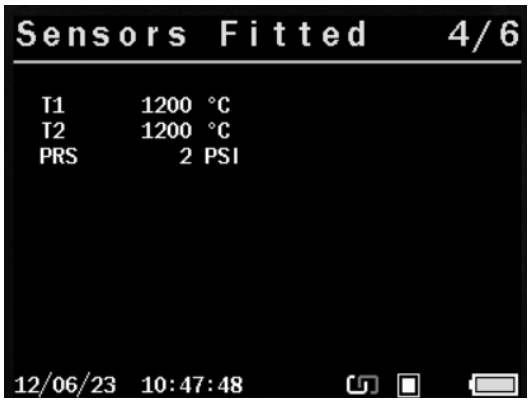
Press ▼ to select STATUS

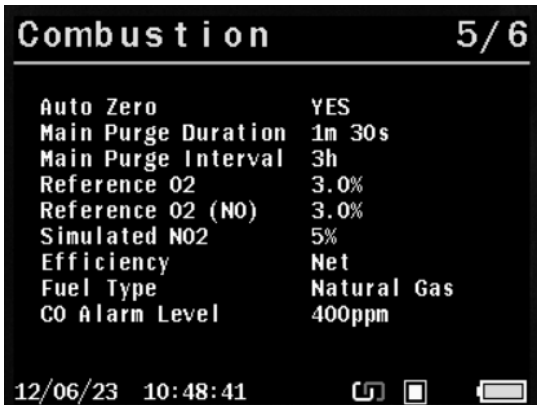
View current status - Use ▲ ▼ to see each page

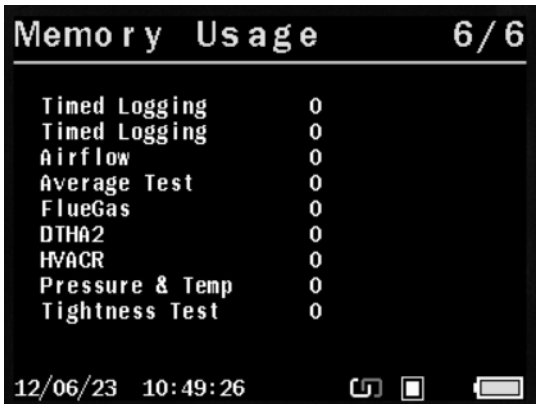












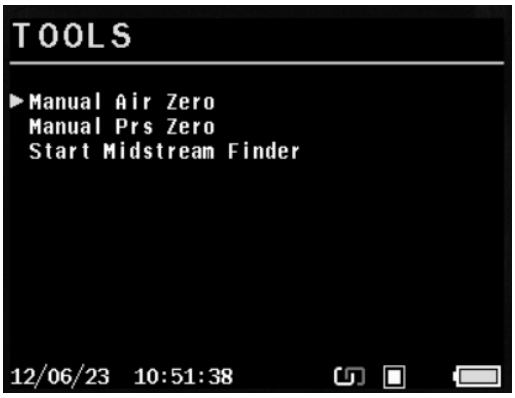
7.8 TOOLS

Select to start a zero calibration countdown gas sensor, a pressure sensor zero calibration countdown or flue gas midstream test point

Press HOME to display HOME MENU page

Press ▽ to select TOOLS

Select option to perform



MENU ITEMS	OPTIONS / COMMENTS
MANUAL AIR ZERO	Manually trigger Air Zero purge. ⚠ Always purge in fresh outdoor air
MANUAL PRS ZERO	Manually trigger zero calibration for pressure sensor - ⚠ Disconnect all pressure hoses first
START MIDSTREAM FINDER	Start MIDSTREAM Finder Tool

Press HOME to exit without changes

7.9 SERVICE

Restricted area for authorized personnel only.

8 REGULAR CHECKS DURING SAMPLING

Do not exceed analyser operating specifications:

- Do not exceed probe maximum temperature
- Do not exceed analyser internal temperature
- Do not place analyser on a hot surface
- Keep analyser water trap vertical - water vapour condenses and can quickly fill analyser water trap
- Keep analyser in-line particle filter clean and dry

9 NORMAL SHUTDOWN SEQUENCE

DO THIS EVERY TIME YOU USE THE ANALYSER

Remove probe from flue or exhaust - **TAKE CARE! PROBE HOT** - and allow to cool naturally.

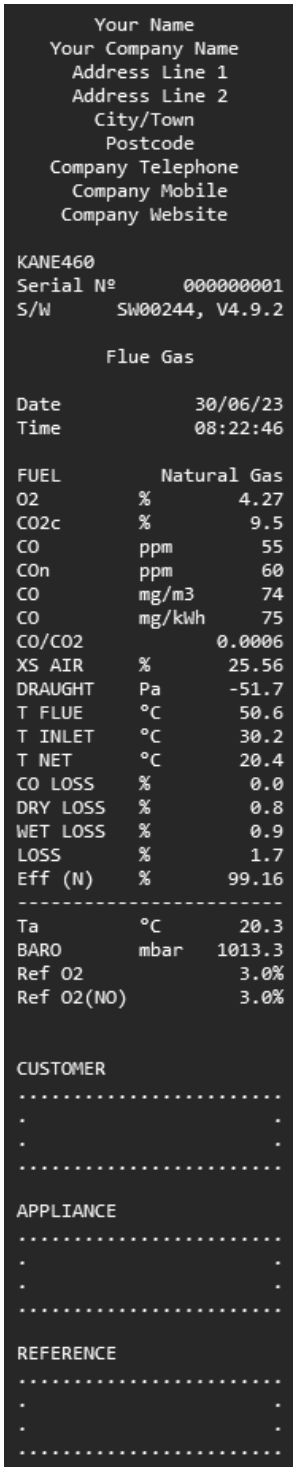
Allow analyser to purge in fresh air for at least three minutes or until all toxic sensor readings are below 10ppm.

NOTE: Do not immerse probe in water as this will damage pump & sensors.

Hang probe hose vertically after sampling so condensate drains away.

10 PRINTOUTS

10.1 Combustion



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      Your Name
   Your Company Name
     Address Line 1
     Address Line 2
       City/Town
        Postcode
   Company Telephone
     Company Mobile
    Company Website

KANE460
Serial Nº      000000001
S/W      SW00244, V4.9.2

        Flue Gas

Date             30/06/23
Time             08:22:46

FUEL          Natural Gas
O2          %        4.27
CO2c        %         9.5
CO          ppm        55
COn         ppm        60
CO          mg/m3      74
CO          mg/kWh     75
CO/CO2             0.0006
XS AIR      %       25.56
DRAUGHT     Pa      -51.7
T FLUE      °C       50.6
T INLET     °C       30.2
T NET       °C       20.4
CO LOSS     %         0.0
DRY LOSS    %         0.8
WET LOSS    %         0.9
LOSS        %         1.7
Eff (N)     %       99.16
------------------------
Ta          °C       20.3
BARO        mbar   1013.3
Ref O2               3.0%
Ref O2(NO)           3.0%


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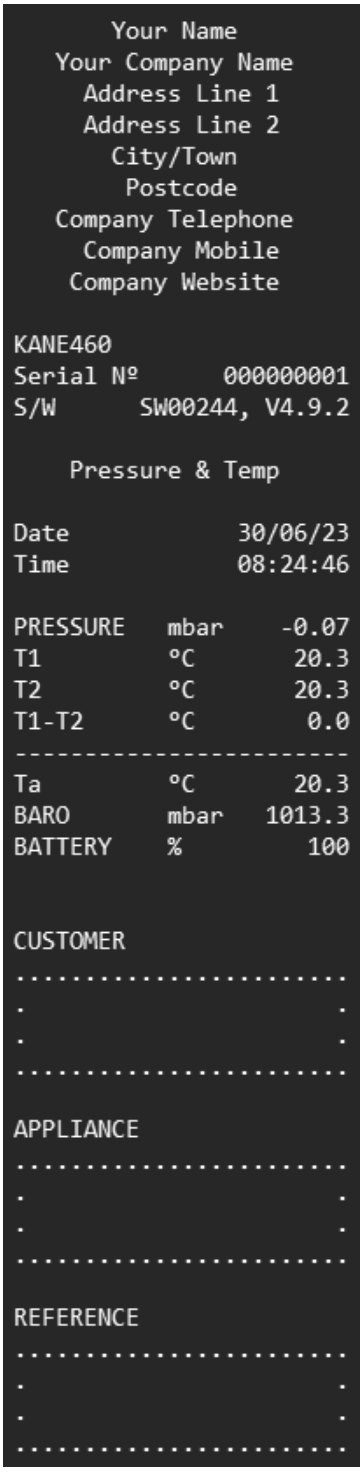
10.2 Pressure & Temp



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      Your Name
   Your Company Name
     Address Line 1
     Address Line 2
       City/Town
        Postcode
   Company Telephone
     Company Mobile
    Company Website

KANE460
Serial Nº      000000001
S/W      SW00244, V4.9.2

    Pressure & Temp

Date             30/06/23
Time             08:24:46

PRESSURE    mbar     -0.07
T1          °C        20.3
T2          °C        20.3
T1-T2       °C         0.0
------------------------
Ta          °C        20.3
BARO        mbar    1013.3
BATTERY     %          100


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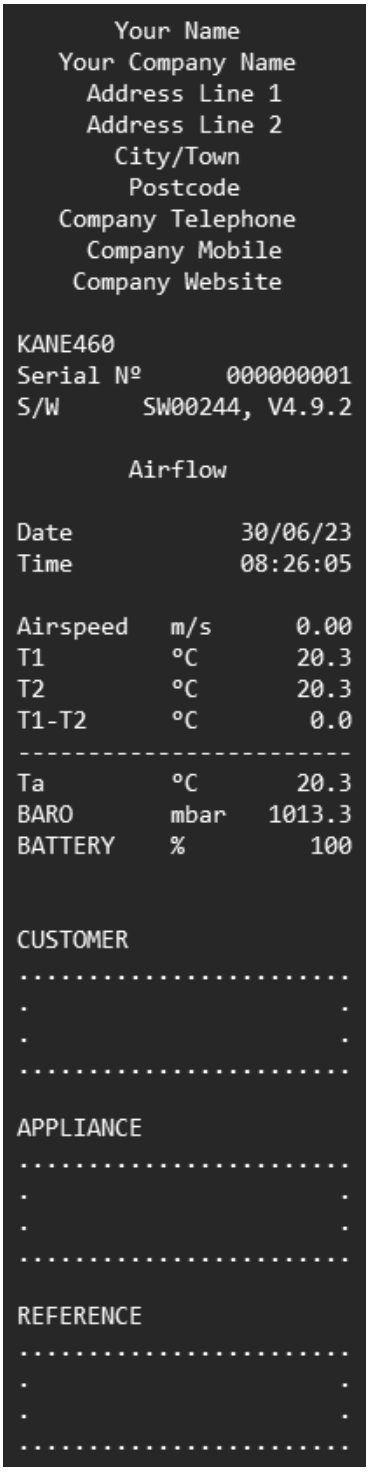
10.3 Air Speed



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      Your Name
   Your Company Name
     Address Line 1
     Address Line 2
       City/Town
        Postcode
   Company Telephone
     Company Mobile
    Company Website

KANE460
Serial Nº      000000001
S/W      SW00244, V4.9.2

        Airflow

Date             30/06/23
Time             08:26:05

Airspeed    m/s       0.00
T1          °C        20.3
T2          °C        20.3
T1-T2       °C         0.0
------------------------
Ta          °C        20.3
BARO        mbar    1013.3
BATTERY     %          100


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10.4 HVACR

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       Your Name
   Your Company Name
     Address Line 1
     Address Line 2
       City/Town
        Postcode
   Company Telephone
     Company Mobile
    Company Website

KANE460
Serial Nº      000000001
S/W      SW00244, V4.9.2

         HVACR

Date             30/06/23
Time             08:27:22

REFRIGERANT           R11
LP          bar       ----
HP          bar       ----
T1          ºC        20.3
T2          ºC        20.3
EV          ºC        ----
CO          ºC        ----
SUPERHEAT   ºC        ----
SUBCOOL     ºC        ----
------------------------
Ta          ºC        20.3
BARO        mbar    1013.3


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10.5 COM Test

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       Your Name
   Your Company Name
     Address Line 1
     Address Line 2
       City/Town
        Postcode
   Company Telephone
     Company Mobile
    Company Website

KANE460
Serial Nº      000000001
S/W      SW00244, V4.9.2

    Commission Test

LOG                    1
Test ID
Date            29/06/23
Time            13:02:07

FUEL          Natural Gas

     ANALYSER ZERO
------------------------
O2          %       20.95
CO          ppm         0

     FLUE INTEGRITY
------------------------
O2          %       20.95

      MAX GAS FLOW
------------------------
O2          %        4.52
CO2         %         9.3
CO          ppm        56
CO/CO2              0.0006

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10.6 ROOM Test

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       Your Name
   Your Company Name
     Address Line 1
     Address Line 2
       City/Town
        Postcode
   Company Telephone
     Company Mobile
    Company Website

KANE460
Serial Nº      000000001
S/W      SW00244, V4.9.2

       Room Test

LOG                    2
Date            29/06/23
Time            15:45:30

------------------------
General

CO Limit    ppm        10
CO Alarm    ppm        30
Tests                  15
------------------------
 1 CO       ppm         0
 2 CO       ppm         0
 3 CO       ppm         0
 4 CO       ppm         0
 5 CO       ppm         0
 6 CO       ppm         0
 7 CO       ppm         0
 8 CO       ppm         0
------------------------
CO Maximum  ppm         0
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10.6.1 KANE79 ROOM CO

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       Your Name
   Your Company Name
     Address Line 1
     Address Line 2
       City/Town
        Postcode
   Company Telephone
     Company Mobile
    Company Website

KANE460
Serial Nº      000000001
S/W      SW00244, V4.9.2

       Room Test

LOG                    4
KANE79 Serial Nº13358326
Kane79 Cal         Valid
Room                   4
Date            29/06/23
Time            16:03:19

------------------------
General

CO Limit   ppm        10
CO Alarm   ppm        30
Tests                 15
------------------------
 1 WCO-4   ppm         0
 2 WCO-4   ppm        45
 3 WCO-4   ppm        18
 4 WCO-4   ppm        36
 5 WCO-4   ppm        80
 6 WCO-4   ppm        52
 7 WCO-4   ppm        47
 8 WCO-4   ppm        18
 9 WCO-4   ppm         9
10 WCO-4   ppm        12
11 WCO-4   ppm         7
12 WCO-4   ppm         0
13 WCO-4   ppm         0
14 WCO-4   ppm         0
15 WCO-4   ppm         0
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CO Maximum ppm        80
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10.7 Sweep Test

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       Your Name
   Your Company Name
     Address Line 1
     Address Line 2
       City/Town
        Postcode
   Company Telephone
     Company Mobile
    Company Website

KANE460
Serial Nº      000000001
S/W      SW00244, V4.9.2

       Sweep Test

LOG                    1
Date            29/06/23
Time            13:52:55

------------------------
CO Limit   ppm        10
CO Alarm   ppm        30
------------------------
CO Maximum ppm         0
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10.8 Average Test

```
Joe Bloggs
KANE International Ltd
KANE House
11 Bessemer Road
Welwyn Garden City
AL7 1GF
0800 059 0800
07755 555 555
feedback@kane.co.uk

KANE460
Serial N°      080123113
S/W     SW00244,    V5.1

Average Test

LOG                     2
Test ID 20230921T124813L
Date             21/09/23
Time             12:55:30

FUEL          Natural Gas
O2          %        4.80
CO2c        %         9.2
CO          ppm        12
COn         ppm        13
CO          mg/m3      17
CO          mg/kWh     17
CO/CO2              0.0001
XS AIR      %       29.71
DRAUGHT     Pa      -39.9
T FLUE      °C       39.8
T INLET     °C       ----
T NET       °C       15.3
CO LOSS     %         0.0
DRY LOSS    %         0.6
WET LOSS    %        10.0
LOSS        %        10.6
Eff (G)     %       89.41
NO          ppm        11
NOn         ppm        12
NOXn        ppm        13
NOX         mg/m3      27
NOX         mg/kWh     27
------------------------
Ta          °C       24.5
BARO        mbar    986.2
Ref O2               3.0%
Ref O2(NO)           3.0%


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10.9 Tightness Test

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       Your Name
   Your Company Name
     Address Line 1
     Address Line 2
       City/Town
        Postcode
   Company Telephone
     Company Mobile
    Company Website

KANE460
Serial Nº      000000001
S/W      SW00244, V4.9.2
LOG                     1
Date             30/06/23
Time             08:34:44


      Let by Test
------------------------
PRS1        mbar    -0.00
PRS2        mbar    -0.00
Test time   Min      1:00

     Tightness Test
------------------------
PRS1        mbar     0.00
PRS2        mbar     0.00
Delta       mbar     0.00

Stab time   Min      1:00
Test time   Min      2:00
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11 KANE LINK - ADD, MANAGE OR REMOVE WIRELESS DEVICES

You can wirelessly connect optional KANE LINK devices to your analyser.

Press HOME to display HOME page menu, then press ▼ to select set up & then press ENTER

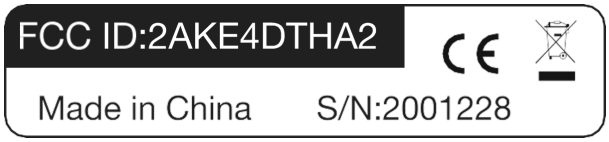
Use ▼ to select manage link device to add or remove a KANE LINK device

11.1 DTHA2 ANEMOMETER

To add select **DTHA2** using ▲ & ↵

Enter serial number using ▲ & ↵ - Each serial number must be 10 digits long.

If shorter enter 0's to make up to 10 - e.g: in this example enter 2001228 as 0002001228.



11.2 WPCP PIPE CLAMP TEMPERATURE PROBE

To add select **WPCP2** using ▲ & ↵

Enter serial number using ▲ & ↵ - Each serial number must be 10 digits long.

If longer use last 10 digits - e.g: in this example enter last 10 digits: 2105094301

Other KANE LINK devices can be paired - Contact KANE for more details

11.3 WPP PRESSURE PROBE

To add a pressure probe select WPP1 using ▲ ▼ & OK buttons.

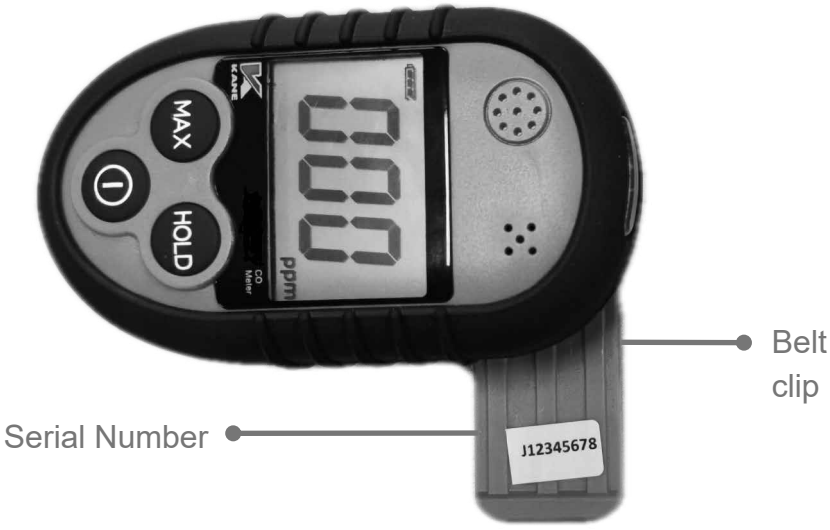
Enter serial number using ▲ ▼ & OK buttons - Each serial number must be 10 digits long.

If longer use last 10 digits, e.g, enter serial number below using last 10 digits: 2208000602

11.4 KANE79 CO MONITOR

To add a KANE79 select KANE79 using ▲ ▼ & OK buttons.

Enter serial number using ▲ ▼ & OK buttons - Each serial number must be 10 digits long



Use numeric part of serial number to pair your KANE LINK analyser. KANE LINK requires a 10-digit serial number - If shorter, use 0's to make up to 10 infant of serial number.

For example: Enter serial number J12345678 above as 0012345678.

12 KANE LINK - CONNECT TO KANE LIVE APP

You can transfer test results to KANE LIVE APP or change analyser header

To transfer, open KANE LIVE on your smartphone or tablet

Use ☑ to select KANE App mode from MEASURE menu - See section 7.15

Tap CONNECT on KANE LIVE to find your analyser - Select from device list then, if asked, tap PAIR to connect.

13 NECESSARY REGULAR MAINTENANCE

You must perform regular, simple and necessary maintenance to ensure your analyser works correctly.

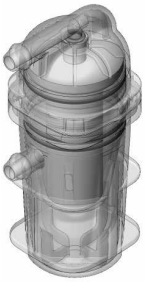
13.1 WATER TRAP, PARTICLE & WATER STOP FILTER

Your analyser has a water trap & particle filter with a hydrophobic filter located in the top section of the water trap.

Some boilers produce high water vapour volume which can affect your analyser.

You must drain the analyser water trap when you see water collecting in it.

Always empty water trap after use - To empty:



1) Carefully pull water trap, particle & water stop filter carrier sideways from analyser

2) Carefully pull water trap away from particle & water stop filter carrier - DO NOT ROTATE

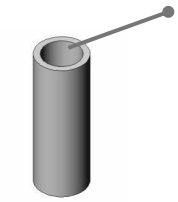
KANE Particle Filter & Hydrophobic Water Stop Filter

Always replace particle filter & water stop filter when dirty, wet or your analyser displays LOW FLOW:

To replace, remove water from your analyser as shown above:

3) Rotate water trap top part housing 30° anti-clockwise

4) Separate to access particle filter & water stop filter



Particle filter

5) Replace particle filter

Water stop filter

6) Replace water stop filter - ensure small o-ring sits correctly in top hole of carrier and Whatman label on filter faces o-ring

Replacement part numbers:
Water stop filter:
WSF2
Particle filter: PF2
Water trap: SM50675

Only use KANE replacement parts, available from authorized KANE partners or www.kane.co.uk

13.2 GAS SAMPLE & TEMPERATURE PROBE

Aways hang your probe to fully drain & dry.

You must check:

1. Your gas & temperature probe and tubing for cracks or leaks.
2. Your gas temperature probe is not bent or out of shape.
3. Your analyser connectors are not bent or cracked.

⚠ WARNING

Never cool your gas sample probe in water or use probe shaft as a lever.

13.3 BATTERY CHARGER & BATTERIES

You must ensure your analyser uses correctly charged & specified batteries.

See section 4 - FIT, REPLACE & CHANGE BATTERIES

15 GENERAL SAFETY

⚠ SAFETY WARNING

15.1 GASES

Your analyser extracts combustion gases that are toxic in relativity low concentrations.

These gases are exhausted from bottom and reserve side of analyser.

It must only be used in well-ventilated locations by trained and competent persons after considering all potential hazards.

Portable gas detectors should conduct “bump” tests before relying on units to verify atmospheres are free from hazards.

A “bump” test is a way to check an instrument works within acceptable limits by briefly exposing it to known gas mixtures to change output of all sensors present.

NOTE: This is different from calibration where your analyser is exposed to known gas mixtures but allowed to settle to a steady figure with readings adjusted to the gas concentration of the test gas.

15.2 PROTECTION AGAINST ELECTRIC SHOCK (IN ACCORDANCE WITHN 61010-1:2010):

This analyser is designed as Class III equipment and should only be connected to SELV circuits. The battery charger is designated as:

- Class II equipment
- Installation category II
- Pollution degree 2
- Indoor use only
- Altitude to 2000m
- Ambient temperature 0°C-40°C
- Maximum relative humidity 80% for temperatures up to 31°C decreasing linearly to 50%RH at 40°C
- Mains supply fluctuations not to exceed 10% of the nominal voltage

16 TESTS

16.1 BOILER

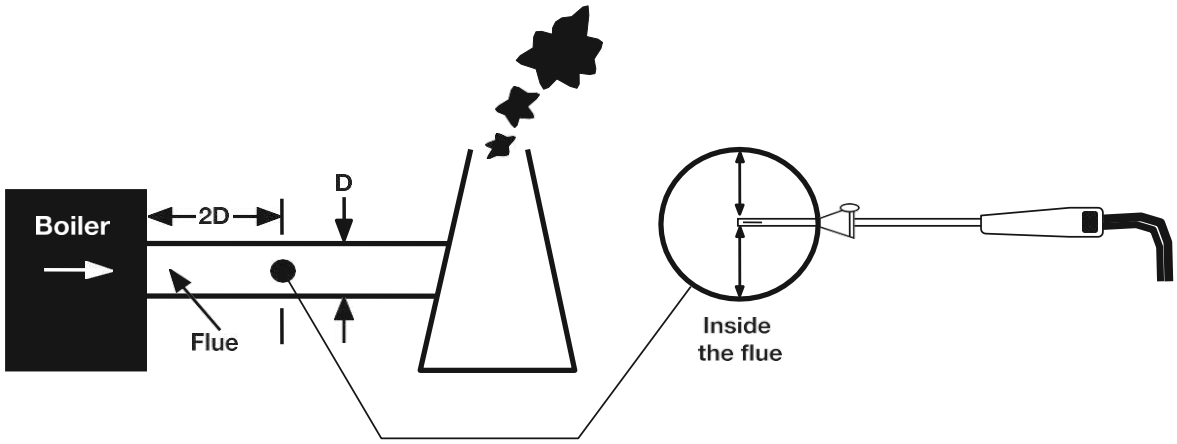
After analyser zero countdown ends, insert probe into sampling point & flue gas centre - Use probe depth stop cone to position.

For balanced flues, push probe into flue so air cannot “Back Flush”

Check readings are stable and within expected range

⚠ SAFETY WARNING

Probe handle may be hot - Take care removing probe!



Do not exceed analyser operating specifications - In particular:

- Do not exceed probe maximum temperatures - 600°C or 1100°C depending on probe type
- Do not exceed analyser internal temperature operating range
- Do not put analyser on a hot surface
- Do not exceed water trap levels
- Do not let analyser particle filter become dirty and blocked

Check readings are stable and within expected range

17 SPECIFICATIONS

PARAMETER	RESOLUTION	ACCURACY	RANGE
Temperature & Pressure Measurement			
Flue Temperature	0.1°C	±0.1°C ±0.3% reading	-50 - 1200°C With suitable probe
Inlet Temperature	0.1°C	±0.1°C ±0.3% reading	0 - 50°C
Pressure (Differential)	0.1mbar	±0.5% FSD full scale	±150mbar
Flue Gas Measurement *1			
Oxygen	0.1%	±0.3% Volume	0 - 25%
Carbon Monoxide (H2 Compensated)	1ppm	±5ppm<100ppm ±5%>400ppm - 2000ppm ±10%>2000ppm	0 - 10000ppm 10000 - 20000ppm
Nitric Oxide (optional)	1ppm	±5ppm<100ppm ±5%>100ppm	0 - 5000ppm
Calculations *2			
Losses	0.1%	±1.0% reading	0 - 99.9%
Carbon Dioxide	0.1%	±0.3% Volume	0 - 20%
CO/CO2 Ratio	0.0001	±5% of reading	0 - 0.9999
Efficiency (Net or Gross)	0.1%	±1% of reding	0 - 99.9%
Efficiency High (C)	0.1%	±1% of reading	0 -119.9%
Excess Air	0.1%	±0.2% of reading	0 -119.9%
Pre-programmed Fuels - FGA			
UK	Natural Gas, Kinsale Gas, Natural Gas L, Town Gas, Gas Cor, Propane, LPG, Butane, Light Oil, Digester Gas, Heavy Oil, Coal, Anthracite, Wood Pellets, Coke, 5x User defined fuels		
Pre-programmed Refringents			
R11, R12, R22, R123, R134a, R290, R401a, R401b, R402a, R402b, R404a, R406a, R407a, R407c, R408a, R409a, R410a, R414b, R416a, R417a, R420a, R421a, R421b, R422a, R422b, R422d, R424a, R427a, R434a, R437a, R500, R502, R503, R507a, R508b, R600, R718, R744, R1234YF, R1234ZE, R32, R434a, R437a			
Battery Life	>6 hours from full charge		
Certification	KANE460 is independently tested and certified to EN50379 parts 1-3		

SPECIFICATIONS CONTINUED

Operating Conditions	
Temperatures	0 - 45°C
Humidity	15 to 90% RH, (non-condensing)
Ambient Operating Range	-5°C to +50°C/10% to 90% RH non condensing
Power Supply (battery charger)	Input: 110Vac/220 Vac nominal Output: 12 VDC off load
Physical Characteristics	
Weight	Approx. 1.2kg
Dimensions	240mm x 165mm x 65mm

*1 Using dry gases at STP *2 Calculated

18 EU DECLARATON OF CONFORMITY

UK Directives	
The Electromagnetic Compatibility Regulations 2016 (EMC)	
The Restriction of the Use of Certain Hazardous Substances in Electrical and Electronic Equipment Regulations 2012 (RoHS)	
Electrical Equipment (Safety) Regulations 2016	
EU Directives	
201430EU	Electromagnetic Compatibility (EMC)
201165EU	Restriction of the use of certain hazardous substances in electrical and electronic equipment (EMC)
2014/35	Low Voltage Directive (LVD)
Harmonised standards and technical specifications applied	
Certification	Independently tested and certified to EN 50379, Parts 1 & 3
EMC	EN50270:2015
SAFETY	EN61010-1:2010
ROSH (UK & EU)	IEC62321-2:2013, IEC62321-1:2013, IEC62321-3-1:2013, IEC62321-5:2013, IEC62321-4:2013, IEC62321-7-2:2017, IEC62321-7-1:2015, IEC62321-6:2015

19 ANNUAL RECERTIFICATION

UEi SERVICE+

An Award-Winning Promise To Never Let You Down

BACKED BY UEi SERVICE+

10 YEAR WARRANTY

48 HR SERVICE

UPS FREE SHIPPING

When you:

Request Annual Recertification or Service Online Within 1 Year of Purchase or Last Service Date

UEi will:

10-Year Warranty: All UEi combustion analyzers have a standard 1-year warranty. Each recertification extends the warranty for 1 more year for up to ***10 years*** from the date of purchase.

*Contractors who book recertification of a **KANE460** analyzer at **www.ueitest.com/service** within 12 months from either the date of purchase or the date of the last recertification will receive reduced service pricing that lowers the cost of ownership and 2 additional benefits:*

48-Hour Service: All qualifying ***KANE460*** analyzers received for recertification through UEi Service+ are returned on the second business day.

Free Shipping: UEi Service+ offers free shipping both to and from our service center. When customers book their recertification, they receive a prepaid UPS Ground shipp ing label.

Register Online

Registering you analyzer online is quick and easy. Just log in or setup an account, it only takes a couple of minutes. Once logged in you can register you analyzer by providing some product information and uploading a proof-of-purchase. When it's time to request recertifcation, just log into your account, select the analyzer, select the service and place your order.

Canadian Customers

All Canadian customers needing annual recertification should visit **https://www.kanetest.ca.**

20 DISPOSAL

Caution: This symbol indicates that equipment and its accessories shall be subject to separate collection and correct disposal.

21 CLEANING

Periodically clean your meters' 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.

22 STORAGE

Remove the batteries when instrument is not in use for a prolonged period of time. Do not expose to high temperatures or humidity. After a period of storage in extreme conditions exceeding the limits mentioned in the General Specifications section, allow the instrument to return to normal operating conditions before using it.

23 COLD WEATHER PRECAUTIONS

Do not leave your analyser in a cold place overnight.

Cold electronic devices suffer when taken into a warm place - Condensation may form and degrade performance, causing permanent damage.

If analyser is affected by condensation or water ingress, leave running in a warm place with pump "ON" sampling fresh air for a several hours. Connect charger to protect battery life.

24 WARRANTY

The KANE460 is warranted to be free from defects in materials and workmanship for a period of 1 year from the date of purchase. If within the warranty period your instrument should become inoperative from such defects, the unit will be repaired or replaced at UEi's option. This warranty covers normal use and does not cover damage which occurs in shipment or failure which results from alteration, tampering, accident, misuse, abuse, neglect or improper maintenance. Batteries and consequential damage resulting from failed batteries are not covered by warranty.

Any implied warranties, including but not limited to implied warranties of merchantability and fitness for a particular purpose, are limited to the express warranty. UEi shall not be liable for loss of use of the instrument or other incidental or consequential damages, expenses, or economic loss, or for any claim or claims for such damage, expenses or economic loss.
A purchase receipt or other proof of original purchase date will be required before warranty repairs will be rendered. Instruments out of warranty will be repaired (when repairable) for a service charge

For more information on warranty and service, contact:

www.ueitest.com Email: info@ueitest.com
1-800-547-5740

This warranty gives you specific legal rights. You may also have other rights, which vary from state to state.