

KANE 358

Flue Gas Analyser with direct O2 measurement
and CO sensor protection



Stock No: MAN00164 Rev: 1.00321

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KANE 358 OVERVIEW

The KANE358 combustion analyser measures:

- Carbon Monoxide (CO)
- Oxygen (O₂)
- Pressure
- Temperature

Depending on your options these parameters are calculated:

- Carbon Dioxide (CO₂)
- CO/CO₂ ratio
- Combustion Efficiency
- Losses
- Excess Air
- Differential Pressure
- Differential Temperature

Your KANE358 has a protective rubber cover with magnets for “hands-free” operation and is supplied with a flue probe with integral temperature sensor.

Your KANE358 has a low gas flow detector that switches off the analyser’s pump if it detects water entering the analyser from an overfilled water trap.

Your KANE358 has a large 6 line display showing data & test results based on your actions.

The display’s bottom line also highlights analyser status at all times.

Your KANE358 can print out test results using an optional infrared printer or to KANE’s wireless printer App.








Your KANE358 stores up to 30 logs of any combination of Combustion, AUX, Temperature & Pressure test results – including 10 Tightness Tests & 10 Commissioning tests

You can add 2 lines of 16 characters to your test results header.

ANALYSER FEATURES AND KEYPAD



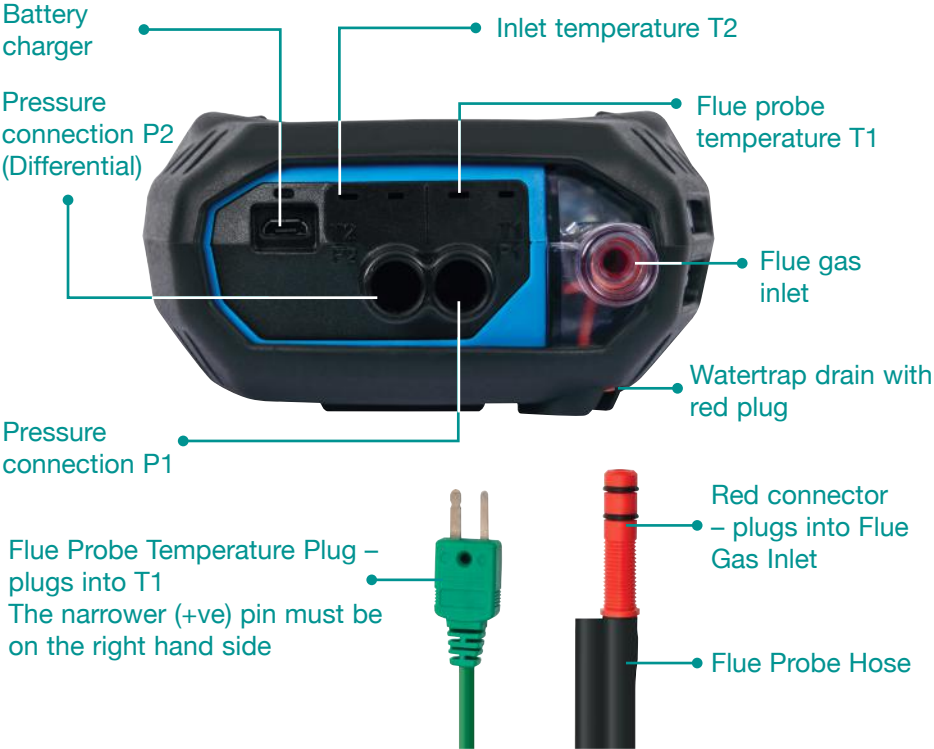
KEYPAD BUTTONS

ICON	DESCRIPTION
	Save log – Long press to store data
	Print report. Short press to print a report (Enters a print destination when both wireless and irda fitted)
	Navigate up – Short press to scroll up
	Enter button – Used to select the current option
	Navigate down – Short press to scroll down
	Data hold – Short press to hold current data on screen (see status bar section)
	Pump toggle – long press to toggle the pump on and off



Function buttons

INSTRUMENT LAYOUT





BATTERIES

BATTERY TYPE

This analyser uses rechargeable Nickel Metal Hydride (NiMH) batteries - Using other battery types may void your analyser's warranty.



Although you can use Alkaline batteries you must not charge your analyser with Alkaline batteries fitted.

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

REPLACING BATTERIES

Turn over your analyser & remove its protective rubber cover to find the battery compartment & fit 3 NiMH "AA" rechargeable batteries ensuring they are fitted with correct battery polarity. Replace battery cover & protective rubber cover.

TIME AND DATE

After changing batteries reset your analyser's time & date.

CHARGING NIMH BATTERIES

Your KANE358 uses a standard Micro USB connector - For best results turn it off then connect your charger. The charging indicator will illuminate and turn off when the need for charge is over.

Your first charge should be for 8 hours - Thereafter NiMH batteries can be "topped up" at any time, even for short periods.

If your batteries discharge so that the analyser enters a low power shutdown, 1 hour's charge provides approx 2 hours continuous use.

BATTERY DISPOSAL

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

GENERAL SAFETY

SAFETY WARNING

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

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

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

Note: This is different from a calibration where the instrument is also exposed to known gas mixtures but allowed to settle to a steady figure with readings adjusted to the stated gas concentration of the test gas.

Protection Against Electric Shock (In accordance with EN 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

FIRST TIME USE

Charge your analyser's batteries for 8 hours - an overnight charge should be sufficient for an average 8-hour day.

Take time to read this manual fully and be aware your analyser's configuration may not support all features explained in this manual. Before using your analyser set it up for your requirements.


NOTE: Your analyser's STATUS bar displays current time, date and battery status - Check time & date are correct as they can only be changed if you have not stored any logs in Memory to protect the integrity of your stored data.

GENERAL OPERATING PRINCIPLE

Using your KANE358 is simple with the rotary dial and user interface. Most tests can be made with little user activity.




Your analyser's status bar offers options based on tasks you are performing and displays useful information and messages.

QUICK START

Turn on your analyser pressing the  button for 2 seconds until it starts. Your analyser starts a 60 second zero calibration - once completed select the tests you want by turning the analyser's rotary dial.

USER INTERFACE

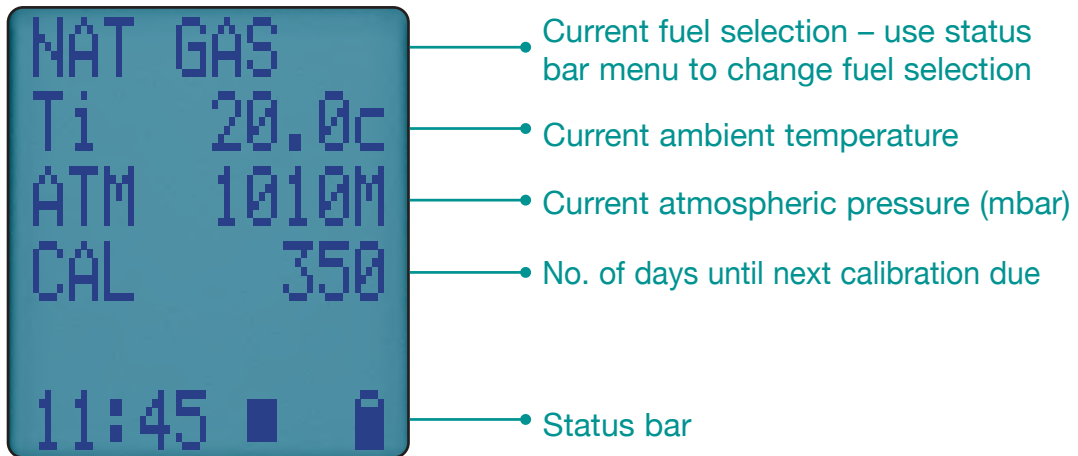
Your analyser's large display shows 5 lines of tests & a status bar. The backlight activates on each button press then turns off after 10 seconds.

Navigate through your options and menu choices via the 3 dedicated   &  buttons

Button presses are either short or long presses.

STATUS

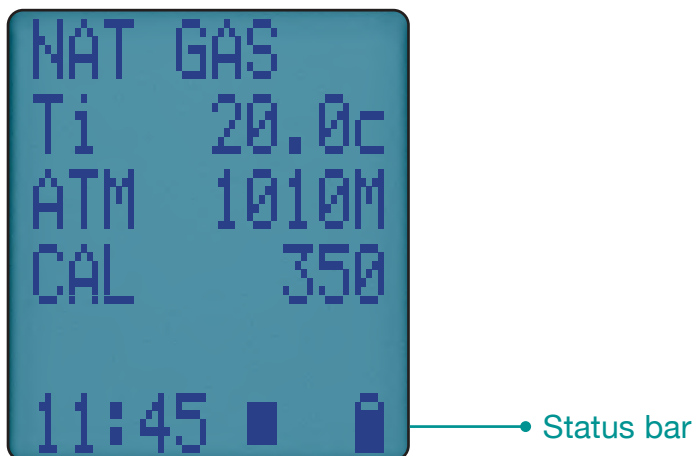
Select “Status” on the dial to view:



STATUS BAR

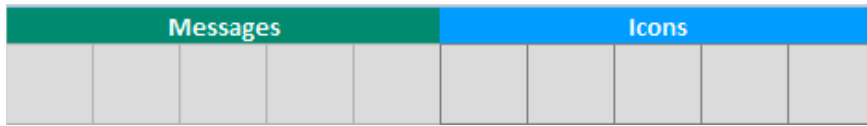
The Status bar shows instrument status and offers options based on your settings.

Navigate through the status bar options via the ▲ & ▼ buttons when the status bar is on the display.




STATUS BAR LAYOUT

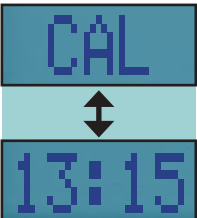
The status bar splits into 2 zones, the “Message” & “Icon” as shown below:

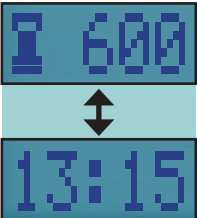


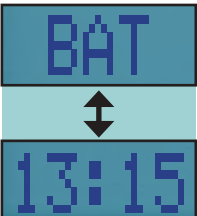
STATUS BAR MESSAGE AREA

CLOCK FUNCTION  Displays current time

DATA HOLD FUNCTION  Display alternates between Hold symbol & time stamp of held data

CALIBRATION DUE WARNING MESSAGE  Display alternates between calibration due symbol & current time

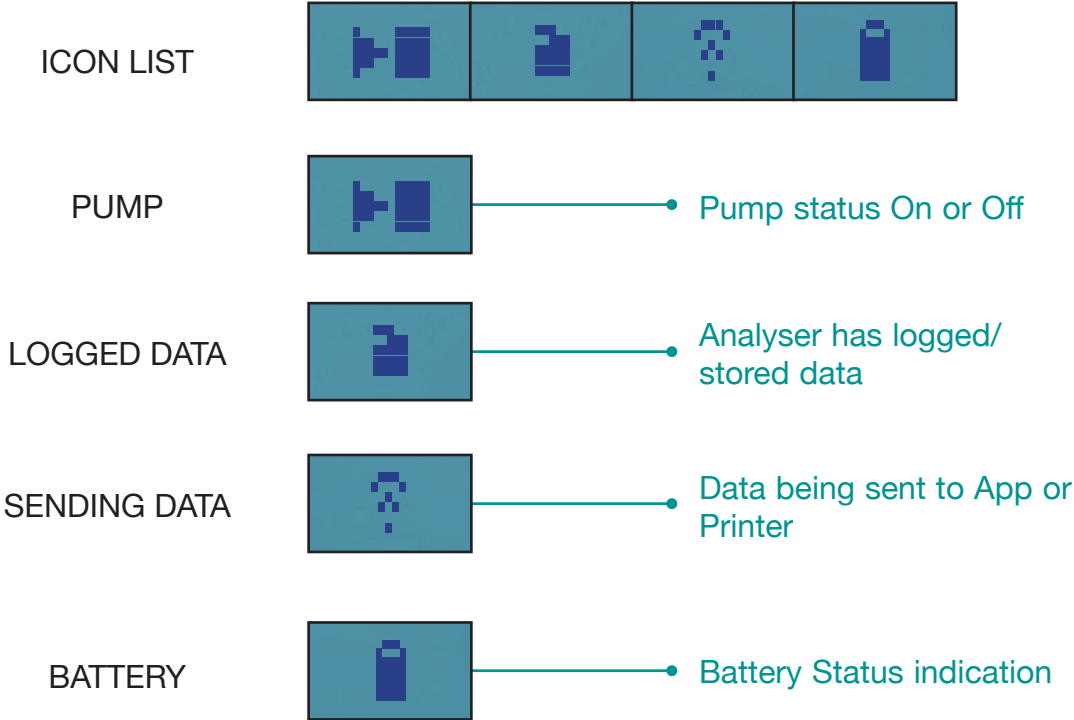
AIR PURGE “SNOOZE” TIMER  Display alternates between calibration due symbol & current time

LOW BATTERY WARNING MESSAGE  Display alternates between low battery symbol & current time

STATUS BAR ICONS

Icons give quick & simple status information:

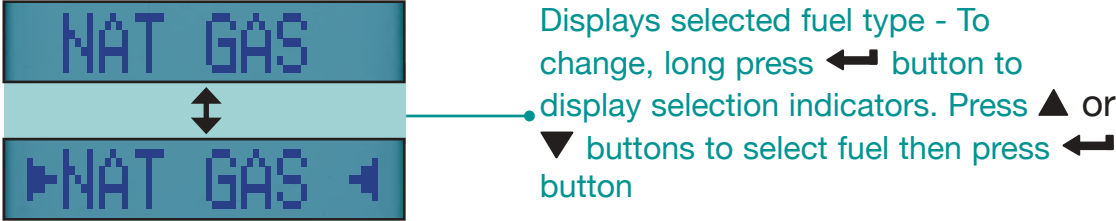
STATUS BAR ICON LEVEL



STATUS BAR MENU OPTIONS

The Status Bar will offer the user contextual menu items based on the items displayed on the screen.

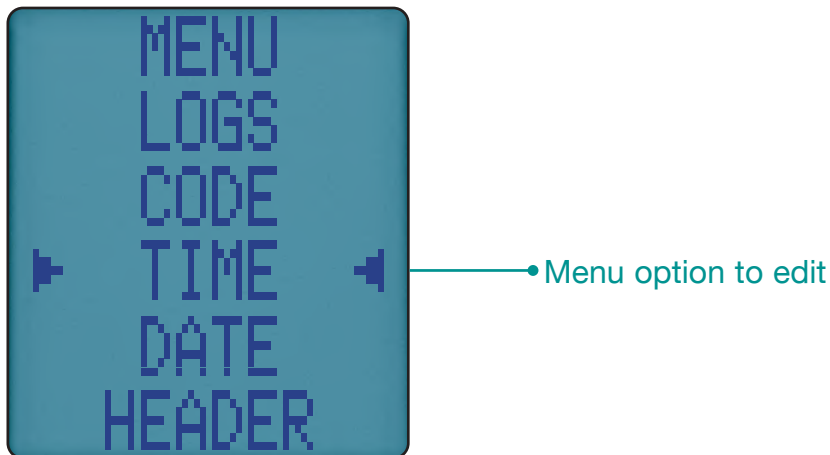
STANDARD OPTIONS



USING THE MENU

The Menu position on the rotary dial allows you to customise the analyser's default settings to your requirements.

Navigate through the Menu system using these buttons ▲ ▼ & ←.



As you navigate up or down through the menu items will move up or down the screen returning to the beginning.

NOTE: To exit Menu simply turn your analyser's rotary dial to any position but any changes not entered will not be stored.

MENU ITEMS

MENU ITEM	MENU TEXT	OPTIONS/COMMENTS
TIME	TIME	HH:MM:SS format E.g.. 7am = 07:00:00, 7pm = 19:00:00
DATE	DATE	DD/MM/YY format
HEADER	HEADER	Edit the 2 Line Header on your printouts.
REPORTS	REPORTS	View current memory usage & view stored reports.
EFFICIENCY	EFF	Efficiency calculation analyser is set to Gross or Net – Condensing automatically selected based on selected fuel type
GAS SCALE	ppm/mg	Select, ppm, ppm(n), mg/m ³ , mg/m ³ (n), mg/kWh, mg/kWh(n)
PRINTER TYPE	IR PRINT	Select, KMIRP, IRP-2
O ₂ REF	O ₂ REF	Use for “Normalised” readings - Default set to 3%, can adjust up or down
LANGUAGE	LANG	Selects your required language
CODE	CODE	Password protected for authorised service agents only - Default to 000000

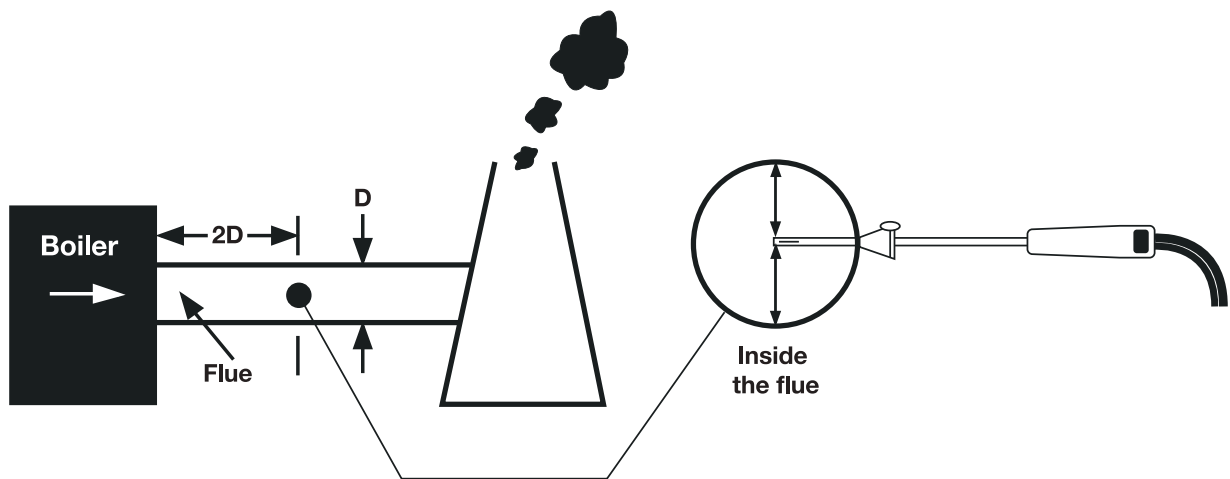
MEASURING FLUE GASSES

After the countdown is finished and the analyser is correctly set up, put its flue probe into the appliance’s sampling point. The tip of the probe should be at the centre of the flue. Use the flue probe’s depth stop cone to set the position.

With balanced flues, make sure the probe is positioned far enough into the flue so no air can “back flush” into the probe.

WARNING

Ensure the flue probe handle does not get hot!





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

- Do not exceed flue probe max temperature - typically (600°C)
- Do not exceed analyser internal temperature operating range
- Do not put analyser on hot surfaces
- Do not exceed analyser water trap's levels
- Do not let analyser particle filter become dirty and blocked

View displayed data to ensure stable operating conditions are achieved and readings are within expected range.

PRINTING

To print, simply press and release the  button. Select your print destination to either KANE IRP1 optional printer or App. Printing can be stopped by pressing the  button again.

KANE INFRARED PRINTER

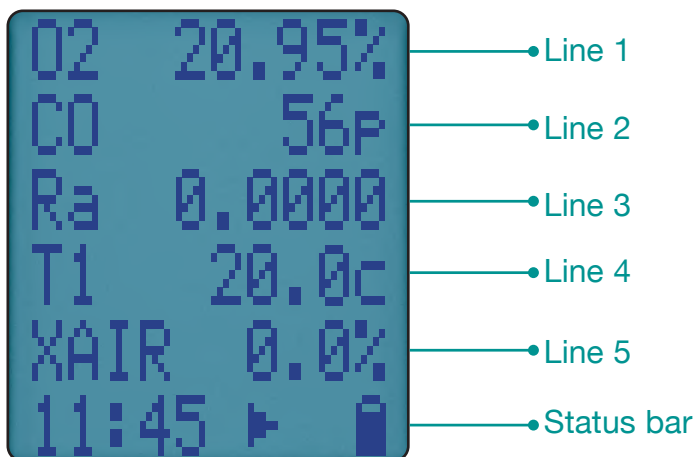
Switch on your printer and make ready to accept data with its infrared receiver in line with your analyser's emitter on top of the analyser – allow a 15cm gap between your analyser and printer.

CO SENSOR PROTECTION PUMP OPERATION

Your analyser's CO sensor is automatically protected from high levels of CO - When it measures CO above 2000ppm the main pump stops and the CO purge pump starts.

Your analyser display P-OFF until CO levels go below 2000ppm.

AUX SCREEN

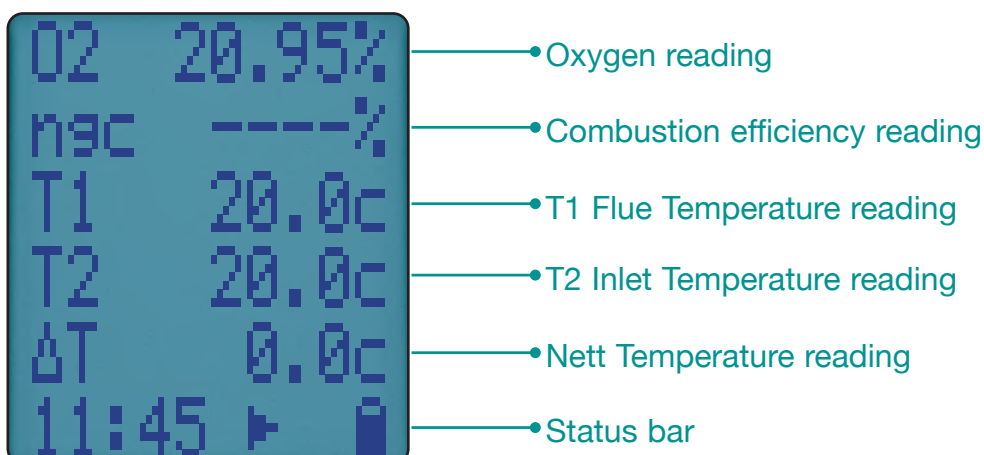


EDITING THE AUX SCREEN

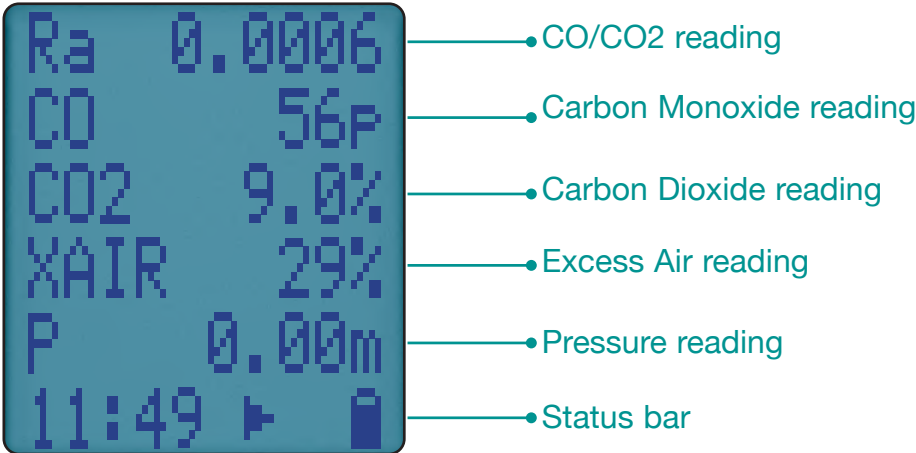
You can customise lines 1 to 5 of the AUX screen. To edit a line, press until EDIT appears on the status bar. Press and hold **←** to select EDIT.

The cursor flashes and the line number appears in the status bar. Use to select your option to appear on the line then press **←** to enter this option.

O2/EFF SCREEN



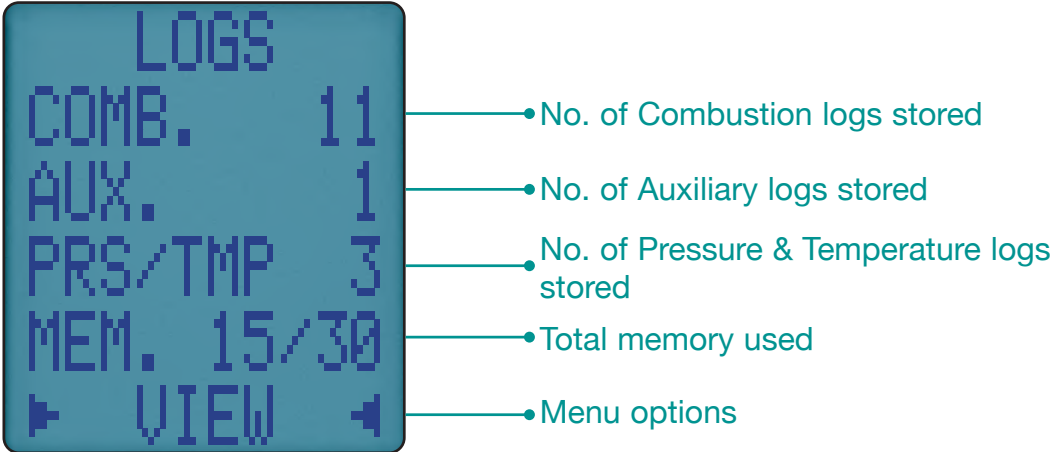
RATIO SCREEN



STORED MEMORY REPORTS

Your KANE358 utilises a shared memory system which means your stored logs are not limited by type.

An icon displays when your analyser has stored data. To view current memory turn rotary dial to MENU then select LOGS to display this:



MENU OPTIONS



View stored reports if available - enter secondary menu to select report type to view



Delete all stored reports if available - To delete long press  button






Return to main menu.

VIEWING STORED REPORTS

To view your reports, select VIEW option from REPORTS Menu:



List of available logs -
Navigate & select using   &  Buttons

REPORT VIEW MENU OPTIONS



View stored Combustion Reports – if any



View stored Auxiliary Reports – if any



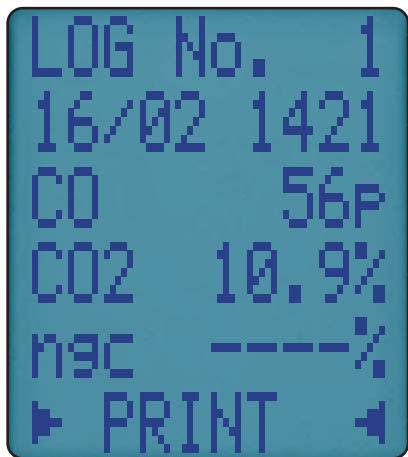
View stored Pressure & Temperature Reports – if any



Returns to previous menu

NAVIGATING STORED REPORTS

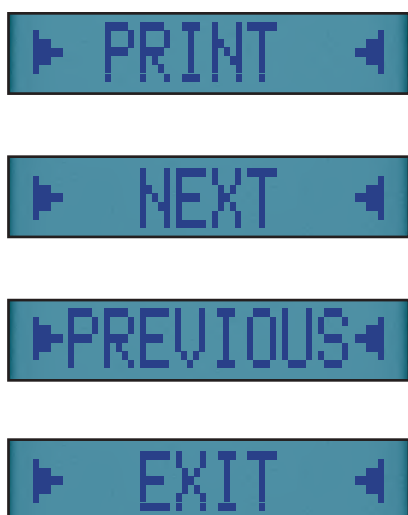
Once you select your report the first report is displayed



The screenshot shows a report display with the following text: LOG No. 1, 16/02 1421, CO 56P, CO2 10.9%, H9C ----%, and a navigation menu at the bottom with left and right arrows flanking the word PRINT. Four callout lines point to specific parts of the display: the first line points to 'LOG No. 1', the second line points to '16/02 1421', the third line points to 'CO2 10.9%', and the fourth line points to the 'PRINT' menu option.

- Report number of that type
- Report time and date – alternates between both
- Report readings specific to report type
- Navigation menu options

REPORT NAVIGATION MENU OPTIONS



The image shows four separate menu options, each in a rectangular box with left and right arrows flanking the text. Callout lines point from each option to its description: 'PRINT' points to 'Prints currently selected report', 'NEXT' points to 'Navigate to next available report if there's more than one report', 'PREVIOUS' points to 'Navigate to previously selected report - only once navigation begins', and 'EXIT' points to 'Return to main menu'.

- Prints currently selected report
- Navigate to next available report if there's more than one report
- Navigate to previously selected report - only once navigation begins
- Return to main menu

Note: commissioning and tightness are accessed via the TEST position.

PRESSURE & TEMPERATURE TESTING

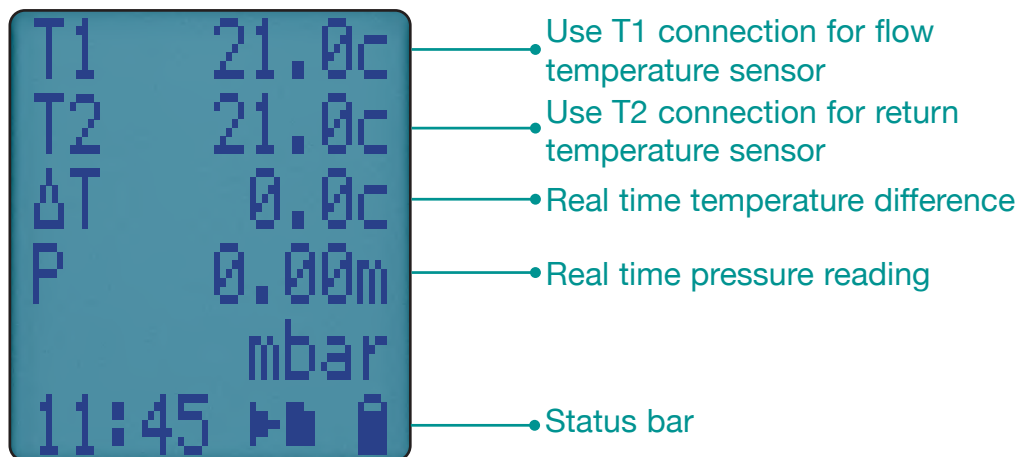
WARNING

Never attempt to take a pressure reading without knowing the maximum pressure present. This analyser's pressure transducer is rated at 80 mbar with a maximum over range of 400 mbar.

Rotate the dial to Prs/Temp and use the black connectors & manometer hose to connect to P1 for single pressure or P1 & P2 for differential pressure.



TEMPERATURE & PRESSURE DISPLAY



VIEWING, SENDING & PRINTING

Press  button to send a full Pressure & Temperature report either to the optional KANE IRP-2 printer or the App.

Press and hold  button for 2 seconds to log a pressure and temperature report - See PRINTING to print stored reports.

PRESSURE MEASUREMENT GOOD PRACTICE

WARNING

Before using the KANE358 to measure an appliance's gas/air ratio valve, read the appliance manufacturer's instructions thoroughly. If in doubt contact the appliance manufacturer.

After adjusting a gas/air ratio valve it is essential CO, CO₂ & CO/CO₂ ratio readings are within the appliance manufacturer's specified limits.

LARGE BORE TUBING ISSUES

If using large bore tubing when performing pressure tests:



Push orange tube over rim of spigot to ensure a gas tight seal.



This may not produce a gas tight seal.

COMMISSIONING TEST

Your analyser's commissioning test uses the test outlined in the UK's TB143 but is not a substitute for an appliance manufacturer's instructions.

Rotate dial to TESTS position. Press the ▼ followed by the ← & follow your analyser's instructions.

TEST 1 – CHECK THE APPLIANCE AT MAX GAS RATE

Switch on appliance to max rate & zero your analyser in outside fresh air.

Once stable at its maximum gas flow rate; insert your flue probe into the flue's air inlet to measure O₂ levels - Readings must be stable & greater or equal to 20.6%.

TEST 2

Insert your flue probe into the appliance's exhaust outlet to measure CO, CO₂ & RATIO levels – these must be within the manufacturer's instructions. If manufacturer's instructions are not available CO must be under 350ppm & RATIO under 0.0040.

TEST 3 – CHECK THE APPLIANCE AT MINIMUM GAS FLOW RATE WHERE THIS IS POSSIBLE

Once the appliance is stable at its minimum gas rate, measure CO, CO₂ & RATIO levels – these must be within the manufacturer's instructions.

If manufacturer's instructions are not available, CO must be under 350ppm & RATIO under 0.0040.

To finish press the enter symbol. To continue next press down triangle followed by enter symbol

TEST 4 – MEASURE FLOW & RETURN TEMPERATURES FROM THE APPLIANCE

All measured readings are logged & can be printed to our optional KANE IRP-2 printer or KANE's App via wireless module.

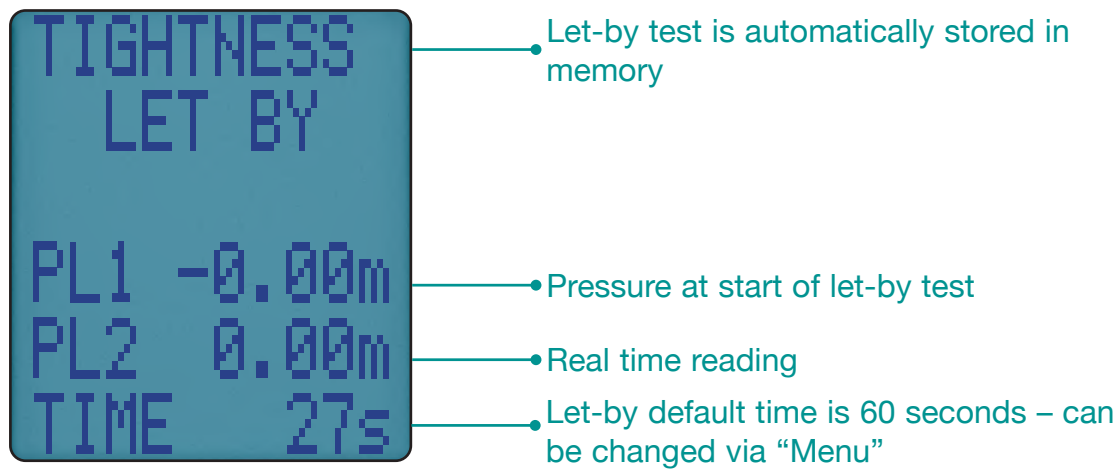
LET-BY & TIGHTNESS TESTING

Rotate dial to “Tightness” & press **←** to auto zero pressure sensor.

Using the black connectors, connect your manometer hose from the appliance’s test point to your analyser’s P1 input.

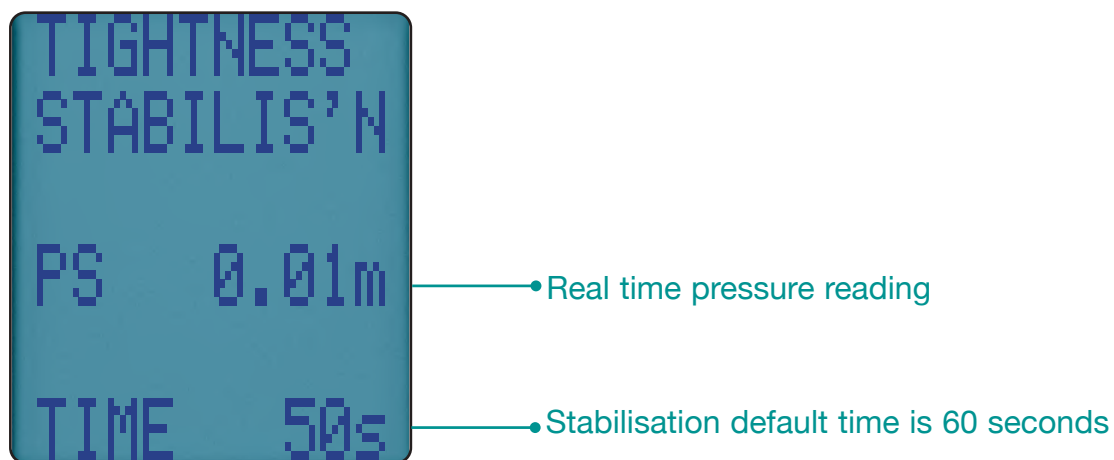
Display shows “LET BY?” – use **▲ ▼ & ←** to select YES or NO.

If YES is selected, set the let-by pressure then press **←** to start the let-by test – display shows:

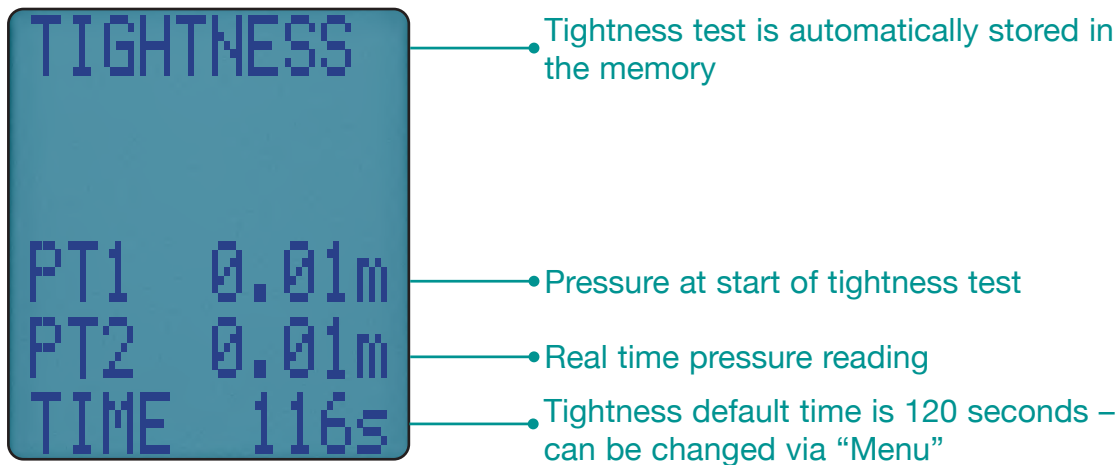


If let-by test fails rotate dial to another position to stop the test.

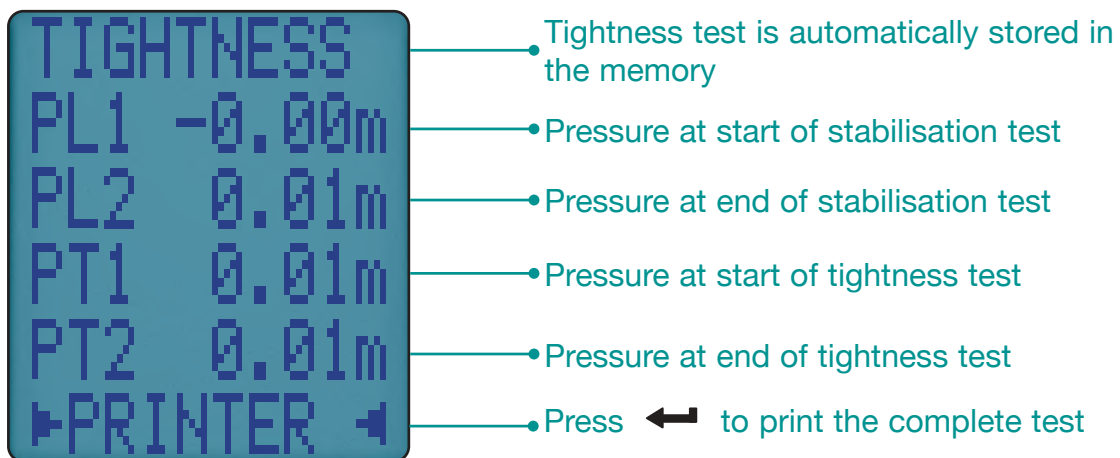
If Let-by test passes, adjust gas pressure for the tightness test & press **←** to start the stabilisation test – display shows:



When complete press **←** to start the tightness test:



When complete display shows:



VIEWING/PRINTING

Press  button to print a full Let-By & Tightness report to our optional KANE IRP-2 printer or KANE’s App via wireless module.

Let-by & Tightness reports are automatically stored. Page 20 explains how to view & print stored reports.

PRINTOUTS

Auxiliary

```

KANE
KANE358
SW00139 1.11

NAME
NUMBER

SERIAL NO. 120821229

DATE 03/03/21
TIME 08:34:43

-----
CAL DUE 02/03/22

-----
AUXILIARY
-----
FUEL NAT GAS
CO2 % 0.00
CO ppm 0
CO/CO2 0.0000
O2 % 21.0
XAIR % 0.0

-----
CUSTOMER
-----
APPLIANCE
-----
REFERENCE
-----

```

Combustion

```

KANE
KANE358
SW00139 1.11

NAME
NUMBER

SERIAL NO. 120821229

DATE 03/03/21
TIME 08:34:59

-----
CAL DUE 02/03/22

-----
COMBUSTION
-----
FUEL NAT GAS
CO2 % 0.00
O2 % 21.0
CO ppm 0
CO/CO2 0.0000
T1 °C ----
T2 °C ----
T3 °C 23.1
NETT °C ----
EFFnc % ----
LOSS % ----
XAIR % 0.0
PRS mbar 0.03

-----
CUSTOMER
-----
APPLIANCE
-----
REFERENCE
-----

```

Pressure/Temp

```

KANE
KANE358
SW00139 1.11

NAME
NUMBER

SERIAL NO. 120821229

DATE 03/03/21
TIME 08:35:39

-----
CAL DUE 02/03/22

-----
PRS/TMP
-----
T1 °C 24.8
T2 °C 25.0
NETT °C -0.2
PRS mbar 0.03

-----
CUSTOMER
-----
APPLIANCE
-----
REFERENCE
-----

```

Commission

```

KANE
KANE358
SW00139 1.11

NAME
NUMBER

SERIAL NO. 120821229

LOG 03
DATE 02/03/21
TIME 15:34:09

-----
CAL DUE 02/03/22

-----
COMMISSION TEST
-----
FUEL NAT GAS

-----
ANALYSER ZERO
-----
CO2 % 0.00
CO ppm 0

-----
FLUE INTEGRITY
-----
O2 % 21.1

-----
MAX GAS FLOW
-----
CO2 % 0.00
CO ppm 0
CO/CO2 0.0000

-----
MIN GAS FLOW
-----
CO2 % 0.00
CO ppm 0
CO/CO2 0.0000

-----
FLOW & RETURN
-----
T1 °C ----
T2 °C ----
NETT °C ----

-----
CUSTOMER
-----
APPLIANCE
-----

```

Tightness

```

KANE
KANE358
SW00139 1.11

NAME
NUMBER

SERIAL NO. 120821229

LOG 01
DATE 02/03/21
TIME 16:26:40

-----
CAL DUE 02/03/22

-----
LET BY TEST
-----
PRS1 mbar -0.00
PRS2 mbar -0.01
LET BY MINS 1:00

-----
TIGHTNESS TEST
-----
PRS1 mbar 0.00
PRS2 mbar 0.00
DELTA mbar 0.00

-----
STABILIS'N MINS 1:00
TIGHTNESS MINS 2:00

-----
CUSTOMER
-----
APPLIANCE
-----
REFERENCE
-----

```

SPECIFICATIONS

PARAMETER	RANGE	RESOLUTION	ACCURACY
Temperature Measurement			
Flue Temperature	0 - 600°C	0.1°C	±0.5°C
Inlet temp Internal Sensor	0 - 50°C	0.1°C	±1°C
Inlet temp External Sensor	0 - 600°C	0.1°C	±0.5°C
Flue Gas Measurement			
Carbon Monoxide	0 - 2000ppm	1ppm	±3ppm or ±5% of reading whichever is greater
Carbon Dioxide	0 - 20%	0.1%	±0.3% Volume
Oxygen	0 - 21%	0.1%	±0.3% Volume
Calculations			
Carbon Dioxide	0 - 20%	0.1%	±0.3% Volume
Oxygen	0 - 21%	0.1%	±0.3% Volume
CO/CO2 Ratio	0 - 0.9999	0.0001	±5% of reading
Efficiency (Net or Gross)	0 - 99.9%	0.1%	±1% of reading
Efficiency High (C)	0 - 119.9%	0.1%	±1% of reading
Excess Air	0 - 119.9%	0.1%	±0.2% of reading
Pressure (Differential)	±80mbar	0.1mbar	±0.5% FSD
Pre-programmed Fuels			
UK, USA & France	Natural Gas, Propane, Butane, LPG, Light Oil, Digester Gas, Wood Pellets		
European	Natural Gas, Light Oil, Bio Oil, Coke, LPG, Wood, Town Gas, Butane & Propane		
Battery Life	>8 hours (continuous with pump on)		
Certification	The KANE358 is independently tested and certified to EN 50379, Parts 1-3 in accordance to 1st German Federal Emission Control Ordinance (BimschV)		

Operating Conditions	
Temperatures	0 - 45°C
Humidity	15 to 90% RH, (non-condensing)
Power Supply	Rechargeable batteries, USB Charging
Physical Characteristics	
Weight	Approx. 0.625g
Dimensions	L: 216mm x H: 105mm x W:45mm

EU DECLARATION OF CONFORMITY

This declaration of conformity is issued under the sole responsibility of the manufacturer:-

Kane International Ltd.

Kane House, 11 Bessemer Road, Welwyn Garden City, Hertfordshire. AL7 1GF, UK.

Tel: +44 1707 375550 Web: www.kane.co.uk

The KANE358 is in conformity with the relevant Union harmonization legislation below:

DIRECTIVE	TITLE
201430EU	Electromagnetic Compatibility (EMC)
201165EU	Restriction of the use of certain hazardous substances in electrical and electronic equipment (RoHS)

The following harmonised standards and technical specifications have been applied:

CERTIFICATION

The KANE358 is independently tested and certified to EN 50379, Parts 1-3 in accordance to 1st German Federal Emission Control Ordinance (BImSchV)

EMC

EN50270:2015

SAFETY

EN61010-1:2010

ROHS

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

Signed for on behalf of:- Kane International Ltd.

01 July 2020



A handwritten signature in black ink, appearing to read 'P. Morrison'.

Paul Morrison
Engineering Manager

COLD WEATHER PRECAUTIONS

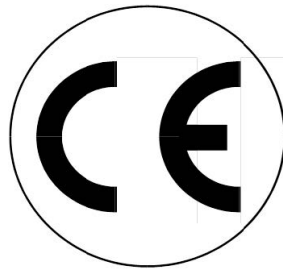
Please keep your flue gas analyser in a warm place overnight.

Electronic devices become really cold when left in a vehicle overnight then suffer when taken into a warm room. Condensation may form affecting analyser performance & causing permanent damage.

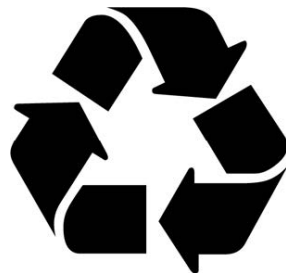
Flue gas analysers are affected by condensation or water being sucked into the analyser as their sensors can become blocked with water, stopping them see flue gases. When this happens, Oxygen or Carbon Dioxide reading will display as “—” & sensors may be permanently damaged.

If you think your analyser is affected by condensation or water ingress, you may be able to rectify the problem yourself. Leave your analyser running in a warm place, with the pump ‘ON’ sampling fresh air for a few hours whilst connected to mains power. If, after this, you still experience problems please contact a KANE Service Centre or authorised Service Partner.

THIS PRODUCT CONFORMS WITH THE FOLLOWING



RoHS



PLEASE RECYCLE

MADE IN THE UK