

***K850***  
***Portable Gas Analyser***  
***Instruction Manual***

**This Manual Contains Important Health & Safety Information.**

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## 1.0 SPECIFICATION

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### Display

Dot Matrix LCD showing 2 or 4 lines of alphanumeric characters

### Ranges available

Carbon dioxide, argon, neon, methane, Freon: 0/20%, 0/100% and 80/100%  
Hydrogen or helium: 0/1.00%, 0/5%, 0/20%, 0/100% and 80/100%, 95/100%,  
99/100%  
Consult Hitech for other gases and ranges.

### Sample

***The sample must comprise only those components shown in Screen 5 of View Mode - see page 4 .***

**Connections -** Inlet and Outlet 0.25" (suitable for 6mm) diameter tube. Both ports are fitted with captive seal compression fittings.

**Sample flow -** 100 to 300 ml/min for optimum performance.

**Sample pressure -** Maximum inlet pressure 3 bar. Minimum inlet pressure minus 100mb. Pressure within the measuring cell is set by vent pressure which must be nominally atmospheric.

**Sample temp. -** (-)10°C to 60°C

### Outputs - Signal

0 to 1volt analogue output is provided - programmable between 100% and 20% of range. For instruments scaled from zero the 1v point is programmable. For instruments with a 'live zero' e.g. 80% to 100%, the 0v point is programmable.

### Recharging power requirements

The instrument is equipped with an internal rechargeable battery and its associated charging circuitry. To charge the battery a supply of 12 to 24v dc or ac at 300mA must be connected to the socket in the rear panel. A separate mains-powered (80v to 250v) power supply that provides this power is included. The mains connection lead supplied has an IEC 60320 TC1 type connector at one end and a U.K. standard plug at the other. If required, the U.K. plug may be replaced with one suitable for the local standard. A charging adapter for a vehicle accessory socket is also provided.

### Ambient temperature

0°C to 40°C

### Dimensions

250mm wide x 255mm deep x 94mm high with handle parked in forward position

### Weight

1500 grammes approximately

### Accessories supplied and options

Flowmeter and connector pipe; Charging adapter for vehicle accessory socket; Mains powered charger supply. Options; Carrying case

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## 2.0 OPERATION

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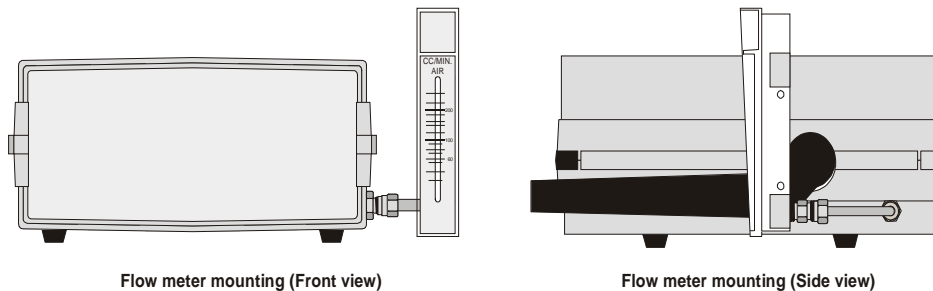
**Carbon dioxide (CO<sub>2</sub>) is shown as the measured gas in the manual. This is for illustrative purposes only.**

### SAMPLING and PIPING

Install the flowmeter as shown below. Connect the sample source to the instrument using appropriate tubing. The standard connections are captive seal compression fittings suitable for 0.25" (or 6mm) diameter tube on the sample inlet and sample outlet. The tubing must be sturdy enough to withstand the slight compression applied by the tightened coupling. Metal, nylon or other rigid plastics are suitable. Rubber, PVC etc. are only suitable if a supporting insert is used.

The instrument is supplied with a flowmeter to enable the sample flow to be monitored. It must be installed as shown in the illustration below.

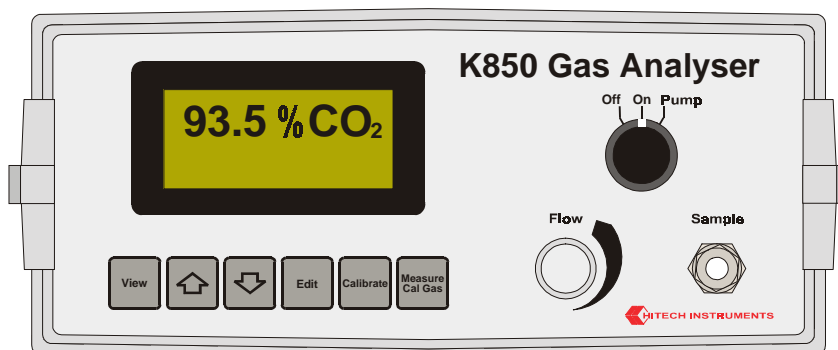
The sample must be non-corrosive and non-condensing



When connecting a sample line to the analyser first ensure that the sample flow control valve is turned fully off.

**SAFETY NOTE - ENSURE THAT THE EXHAUST OF THE SAMPLE GAS IS FED TO A SAFE AREA.**

### CONTROLS & INDICATORS



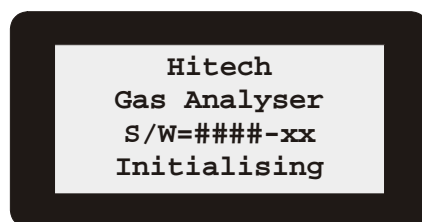
The controls on the front panel are largely self explanatory

### SWITCHING ON

The instrument is switched on by turning the front panel rotary switch to "On". The instrument will then go into its initialisation routine.

## INITIALISATION.

When the instrument is switched on the display will show :-



#### is the software number and x.x is the version number

This display will remain for a few moments after which the instrument will automatically enter **Measurement Mode** and display the measured values.

In the measurement mode the display and the analogue outputs are continually updated with the measured values.

## INTRODUCING the SAMPLE

Prepare the instrument as detailed at the front of this section.

If the sample source is at a pressure sufficient to obtain the necessary sample flow without the aid of the pump, slowly open the sample control valve until an adequate flow is obtained. If the sample is at too low a pressure to obtain an adequate flow then turn on the pump by turning the rotary switch to the position marked '**Pump**', and adjust the sample flow control valve until an adequate flow is obtained. The optimum performance from the analyser is obtained with the flow between 100 and 300 ml/min.

The display will now display the measured concentration.

## CONFIGURATION

### Keyboard

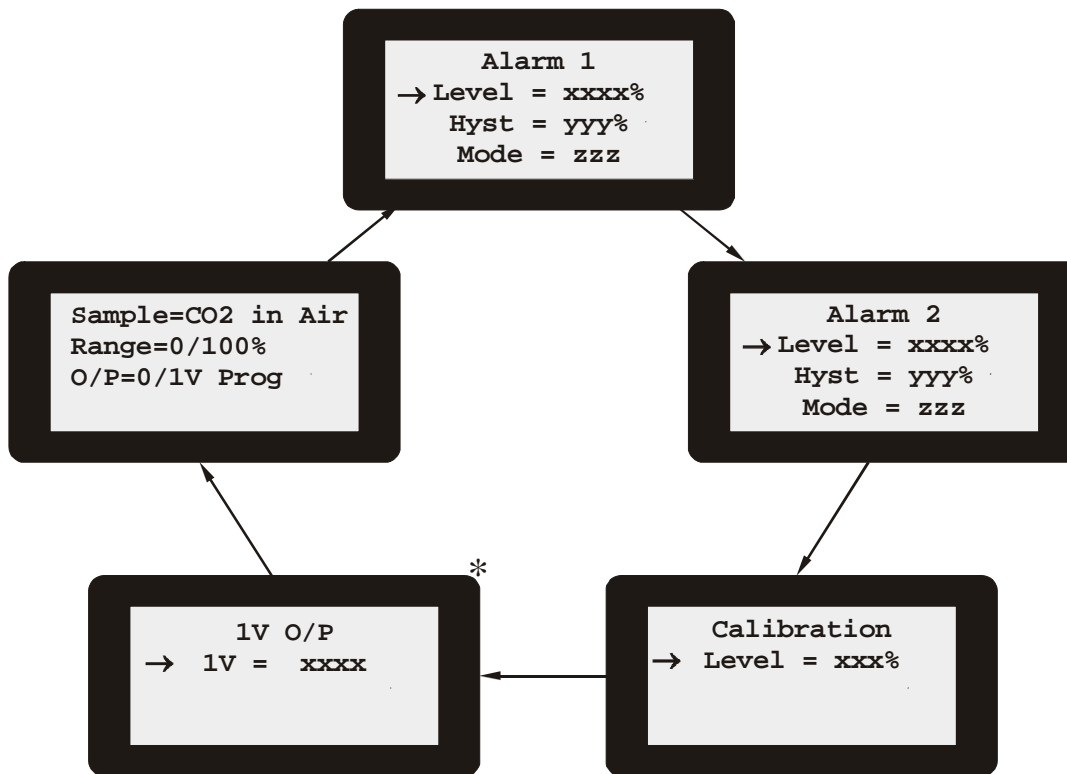
The following buttons are fitted :-

View -	VIEW Mode
↑ Up Arrow -	Used in calibration and editor
↓ Down Arrow -	Used in calibration and editor
<b>Edit</b> -	Edits a parameter
<b>Calibrate</b> -	Used to enter calibration mode
<b>Measure Cal. Gas</b> -	Used to trigger a measurement in calibration mode.

The span of the outputs and the calibration gas concentrations may be viewed - **VIEW mode** - and changed - **EDIT mode**.

### VIEW MODE

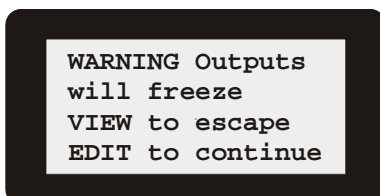
This mode is entered from **Measurement Mode** by pressing the **VIEW** button. In this mode a set of screens can be accessed as shown in the following diagram.



\* This screen varies depending on the scale of the instrument – see specification/ analogue output

To scroll through the screens the  $\uparrow$   $\downarrow$  keys are used. In some cases (instrument dependent) the value pointed at may be changed by pressing the **Edit** button and entering **EDIT MODE**..

## EDIT MODE



***This screen is displayed when EDIT MODE is activated.***  
***The operator should now ensure that continuing will not cause any plant malfunction or safety problems, due to locking of the outputs.***

When edit mode is entered a flashing cursor will appear on the first digit that may be altered. The  $\uparrow$   $\downarrow$  buttons increment or decrement the digit. Once a digit is correct the next digit is selected by pressing the **Edit** button and so on until the final digit. To skip a digit press the edit key twice. When the **Edit** button is pressed on the final digit the display will show “Storing Data” momentarily and then return to view mode, displaying the new parameter.

Alarm levels are programmable over the full range of the analyser. Analogue output and calibration gas levels are programmable over ranges shown on the following diagrams. Refer to the analyser's data plate (rear panel) for details of its range.



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## 3.0 CALIBRATION

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### General

Hitech katharometer based analysers are extremely stable instruments and require only very occasional calibration. The exact calibration period depends on the type of sample and environment the instrument is placed in. In practice it is unlikely that check periods of less than one month would be necessary and three to six months would normally be in order. We recommend that any quality assurance procedures written for the instrument are written to allow verification as opposed to calibration. Verification involves checking that the instrument provides the correct analysis of a standard gas within the limits of the instrument and only calibrating when a result outside of limits is produced. The frequency of the verification would need to be in line with the quality regime being operated by the user.

### SAFETY NOTE

*The analogue output and alarms are “frozen” or locked while the instrument is being calibrated. Ensure that any control loops that are connected to the instrument are disabled prior to verifying or calibrating the instrument. Also ensure that the process is in a safe state and the exhaust of the standard gas is vented to a safe area. Calibration mode is entered by pressing the **Cal** button for approximately 8 seconds.*

### Piping

Introduce the calibration gas in the same way as the normal sample. Because the calibration gas will typically be delivered from a cylinder at some positive pressure it is not necessary to use the in-built pump.

Note that pressure regulators and gauges that may be in the calibration gas lines all have a certain amount of dead space within them and so may require purging for several minutes before the delivered gas matches that of the cylinder contents. Only when the reading is steady has the dead space been purged.

### Calibration Gas Level

A full calibration requires two standard gases.

The requirements for the calibration gases depends on the configuration of the instrument. The scales available for the K850 fall into two types: 1) Those starting at zero concentration and going up to somewhere between 0 and 100%. 2) Those starting at a non-zero concentration and going up to 100%. Instruments are not supplied with a scales going from a non zero concentration up to a value less than 100%.

Refer to the diagram in the previous section for the calibration gas requirements for the various models. The instruments range can be found on its data label located on the rear panel.

For optimum accuracy, if it is possible within the constraints of the instrument and the calibration gas suppliers, it is advisable to calibrate at the typical sample concentration.

The calibration gas levels may be set prior to calibration as follows or from calibration mode (see screens diagram).

- a. Press the **View** button.
- b. Use the ↑↓ arrows to move to the entry for Calibration Gas.
- c. Press the **Edit** button. Then use the ↑↓ arrows to adjust the digit, and **Edit** button to move to each digit in turn.
- d. When the level is correct, press **View** to return to the measuring mode.

### **Calibration method**

**Calibration Mode** is entered by pressing the **Cal** button for approximately 8 seconds when in **Measurement Mode**.

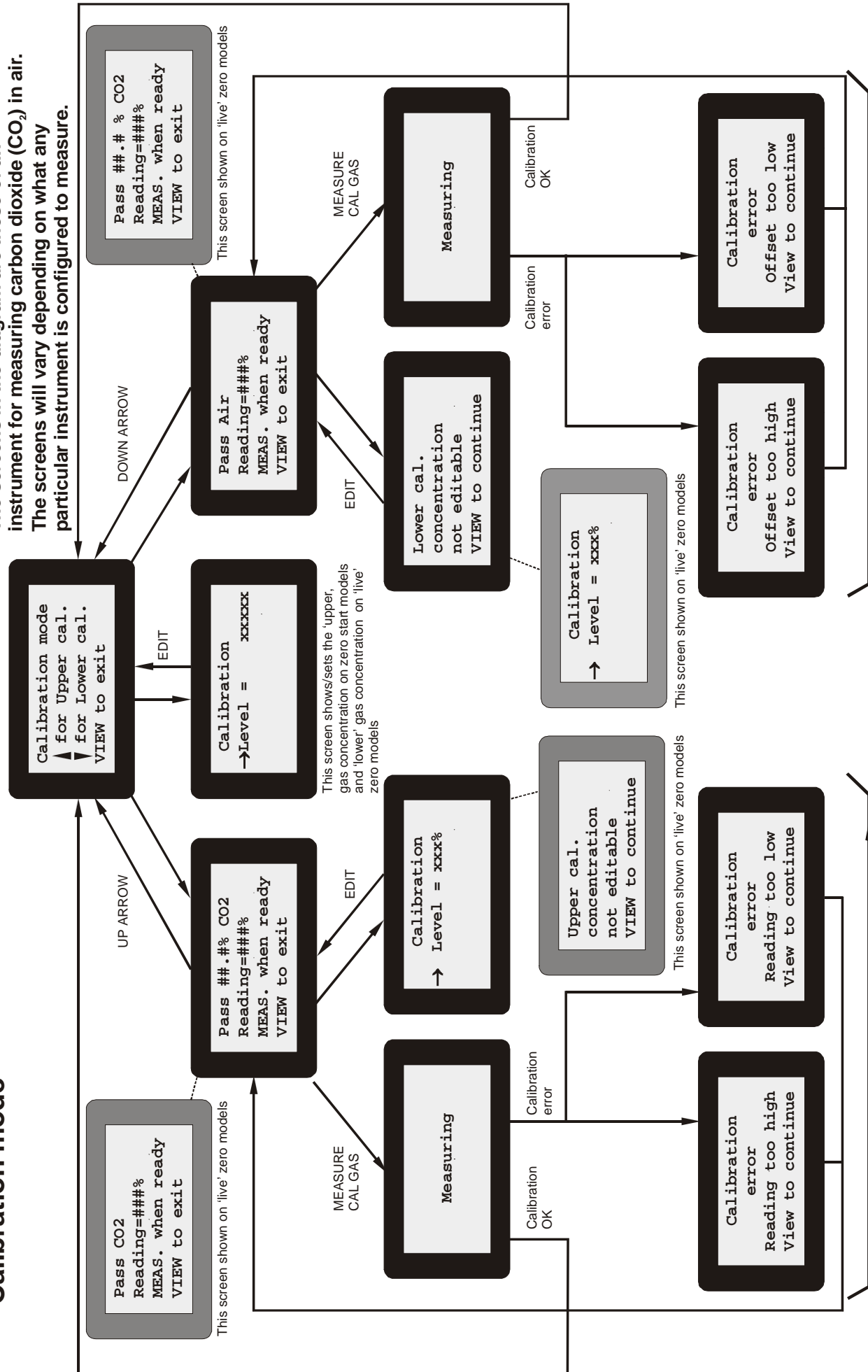
Instruments with a zero start scale require that the “lower” calibration point is calibrated first; and those with a ‘live’ zero that the “upper” point is calibrated first. Screen prompts are given to confirm the gas required at the appropriate point in the calibration procedure.

The analyser should be isolated from the process gas and the calibration gas introduced into the analyser at the correct flow rate.

The following diagram illustrates the 'route map' of the calibration mode screens.

# Calibration mode

The screens in the diagram are those of an instrument for measuring carbon dioxide (CO<sub>2</sub>) in air. The screens will vary depending on what any particular instrument is configured to measure.



These screens messages interchange on 'live' zero models

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## **4.0 TECHNICAL INFORMATION**

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**The katharometer** sensor used in the K850 is a device that produces an output that is a function of the thermal conductivity of the gas surrounding its sensor. Gases differ in their thermal conductivity and the thermal conductivity of a mixture is approximately the mathematical average of the thermal conductivity and concentration of each component. Because thermal conductivity is a bulk physical property of the gas its measurement is not specific for any component. The software of any particular instrument is programmed in such a way that it assumes the components are always the same species, e.g. oxygen, nitrogen and carbon dioxide. If a gas mixture containing other components is introduced into the analyser it will not produce the correct readings.

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## **5.0 SERVICING**

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The katharometer sensor is non-depleting and will last indefinitely if not subjected to misuse. The sensor can only be replaced by the use of specialist equipment and would have to be returned to Hitech or their agent should a replacement be required.

When raising queries on the analyser, it is important that the serial number or job number are quoted. These numbers may be found on the data label on the rear panel.

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