MODEL 320
HEATED
NON-METHANE HYDROCARBON
CUTTER
OPERATING MANUAL

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INTRODUCTION

The Signal Model 320 Cutter is specifically designed as a portable, stand-alone unit to allow users to achieve both Methane (CH_4) and Total Hydrocarbon (THC) measurement when used with a THC analyser.

The Model 320 Cutter utilises selective catalytic oxidation of Hydrocarbons to remove almost all of the Non-Methane Hydrocarbon content of a sample, leaving just Methane to be measured on the THC Analyser.

For ease of operation, the Model 320 Cutter is designed with a heated gas switch to select the desired gas path: CH_4 or THC. This enables users to take measurements of each with a minimum of sample gas path change-over time. This in turn enables the calculation of Non-Methane Hydrocarbons within the sample.

SPECIFICATION

- **Converter Chamber**
  Fully Heated
- **Wetted Materials**
  316 Stainless Steel
  Catalyst
  PEEK
- **Gas Connections**
  ¼" Stainless Steel
- **Gas Change Over Valve**
  Heated Ball Valve
- **Chamber Temperature**
  Fully Adjustable
- **Temperature Control**
  Accurate PID Controlled
- **Warm Up Time**
  60 minutes
- **Sample Settle Time**
  <30 minutes
- **Drift**
  <20ppm Methane Equivalent in 1hr
- **Filter**
  Stainless Steel Sintered Disk
- **Sample Flow**
  2 L/min maximum
- **Inlet THC Concentration**
  2000ppm C_3H_8 (Propane) equivalent maximum HC cutting ability
  Unlimited CH_4 (Methane) measurement (THC analyser permitting)
- **Power Requirements**
  320W
- **Weight**
  Approx. 10Kg

INSTALLATION

PLUMBING

Using ¼“ PTFE or PFA tubing and the supplied ¼” Stainless Steel fittings:

- Connect the INLET on the rear panel to the SAMPLE SOURCE.
- Connect the OUTLET to the ANALYSER.

NOTE: *For HOT SAMPLE, it is necessary to reduce the risk of Hydrocarbon condensation in the sample gas path:*

> *Signal Heated Sample Line should be used to supply the Signal Model 320 with sample gas.*
>
> *Also, insulated tubing should be placed between the Model 320 and the Analyser (for lengths up to 1 metre), or Signal Heated Sample Line (for lengths greater than 1 metre).*

ELECTRICAL

The Model 320 Cutter should only be supplied with its stated voltage from a stable and reliable electricity source (e.g. UK mains).

Using incorrect voltage may void warranty.

Set-Up

The Signal Model 320 Cutter must be set-up correctly before use. The set-up procedure **must be followed before usage** for optimum performance.

Once the Model 320 has been correctly installed, follow the instructions below to ensure that greater than 98% of the Propane is removed from the sample.

- Switch on the Model 320 and allow the temperature to stabilise. This should take no longer than 20 minutes.
- Set the gas path on the Model 320 to THC.
- Apply Propane of a known concentration to the inlet of the Model 320 and make a note of the reading obtained by the analyser (R_A).
- Switch the Model 320 gas path to CH_4.
- Allow the reading to stabilise.
- Make a note of the reading obtained by the analyser (R_C).
- Calculate the percentage cut using the following equation:

  $\% \text{ CUT} = (1 - R_C/R_A) \times 100$
- If the value is below 98%, increase the temperature of the cutter (see *Operation)* by increments of 1°C and repeat the above steps until the desired cut is achieved.

METHANE CONCENTRATION CALCULATION

- Set the gas path on the Model 320 to THC.
- Apply Methane of a known concentration to the inlet of the Model 320.
- Make a note of the reading by the analyser (R_{MA}).
- Switch the Model 320 gas path to CH_4.
- Allow the reading to stabilise.
- Make a note of the reading obtained by the analyser (R_{MC}).
- Calculate the concentration factor using the following equation:

  Concentration factor, $C = R_{MC}/R_{MA}$
- During normal operation, to find the actual Methane concentration of the sample, the value obtained by the analyser (R_N) whilst the Model 320 is in CH_4 mode, must be modified as follows:

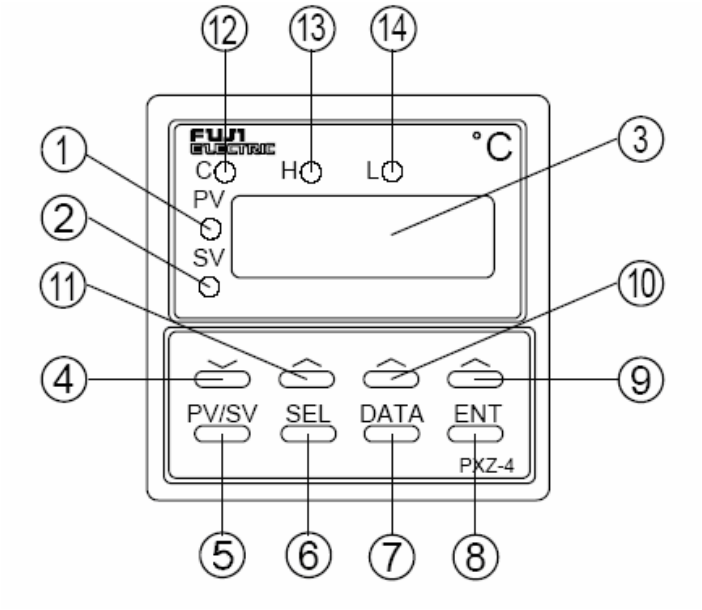
  Actual Methane concentration = R_N/C

NOTE: *See Analyser User Manual for instructions on analyser Span procedures.*

OPERATION

TEMPERATURE CONTROL

The temperature of the Cutter must be set and allowed to stabilise fully before use.



Temperature Controller Front Panel

	Name	Function
1	Process value (PV) indication lamp	Stays on while process value (PV) is on display.
2	Set value (SV) indication lamp	Stays on while a set value is on the display.
3	Process value (PV)/ set value (SV)/parameter display	Parameter symbols and codes are displayed for Process Value (PV) and Set Value (SV) and when setting various parameters.
4	DOWN key (common for each digit)	Decrements the numerical value in the place selected with the UP key. Where various parameters are displayed, each parameter is displayed one by one every time this key is pressed. The sequence of displays however is opposite to the sequence of displays with the SEL key.
5	PV/SV SELECT key	The display of Process Value (PV) and Set Value (SV) is toggled each time this key is pressed.
6	SELECT key	The key to be used when switching over to the 1st or 2nd block parameters, or when scrolling through the parameters within a block.
7	Data display key	Displays the data assigned to the parameter selected with the SELECT key
8	Data entry key	The key to be used for storing the data after previous data is changed. (None of changed data can be registered unless this key is pressed.)

9	UP key for 1's	By pressing once, the number in the units place blinks. The number is continuously incremented with the key held pressed.
10	UP key for 10's	By pressing once, the number in the tens place blinks. The number is continuously incremented with the key held pressed.
11	Up key for 100's	By pressing once, the number in the hundreds place blinks. The number is continuously incremented with the key held pressed. A numeric "9" is followed by "0" and, concurrently, a number of the thousands place is incremented by 1.
12	Control output indication lamp	Comes on when the control output is ON.
13	Upper limit alarm indication lamp	Comes on when the upper limit alarm is activated.
14	Lower limit alarm indication lamp	Comes on when the lower limit alarm is activated.

Viewing and Setting Parameters

The temperature controller programming menu consists of two blocks — PRIMARY (SETPOINT) MENU and SECONDARY (SYSTEM) MENU.

At power up, the controller will be in the operational mode — process variable (PV) will be displayed.

NOTE: PV is the temperature of the Cutter and it is not programmable.

How to Input Set-Point Value (SV)

	Operation		**Display**
1	Power on	—	Operational mode
2	Press UP (units, tens or hundreds) key to select digit	—	Digit blinks
3	Press the appropriate UP key or the DOWN key to increment or decrement digit value	—	SV value changes
4	Press ENT key	—	SV value registered

PRIMARY (SETPOINT) MENU

	Operation		**Display**
1	Operational mode	—	PV, SV
2	Press SEL key	—	"P" displayed
3	Press DATA key	—	"P" data displayed
4	Press the appropriate UP key once	—	Corresponding digit blinks
5	Press the same UP key or the DOWN key to increment or decrement the data	—	Data changes accordingly
6	Press ENT key	—	Data registered; "i" displayed

7	Press SEL key once to go to the next parameter, or press and hold UP (hundreds) key or DOWN key to scroll down or up the menu at a faster rate.	—	“d” ..... “Mod”
8	Press SV/PV key	—	Operational mode

SECONDARY (SYSTEM) MENU

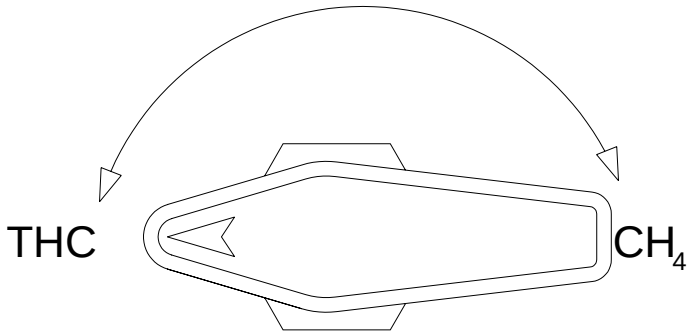
The access and alteration to the System Parameters is not necessary.

NOTE:

- After setting the data, press ENT key for registration.
- If the data setting is left as it is for 30 seconds, the display is automatically returned to the operational mode.

GAS PATH CONTROL

With the Model 320 Cutter correctly installed and set up, the gas output path from the Cutter can be switched directly between Methane-only (CH_4) output, and Total Hydrocarbon (THC) output.



Rotate the valve control knob on the front panel through 180°, as illustrated above, to select the desired gas path.