STATUS SCIENTIFIC CONTROLS

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FGD4, FGD10B and PC192-NT Keypad

1. PACKAGE CONTENTS

Calibration / Configuration Keypad	SS748

* Refer to www.status-scientific.com for Stock No's for various gas types.

** The manual may be supplied on a CD

1 Scope of the manual

This manual relates to the keypad operation when used with the FGD4, FGD10B and PC192-NT gas detectors.

1.1. Calibration / Configuration Keypad

The FGD10B sensor can be calibrated via a purpose designed keypad. The keypad allows the user to carry out the following:

1) calibrate the sensor.
2) calibrate the 4 to 20 mA loop.
3) View the current gas level.
4) View the sensor raw data for diagnostic purposes.

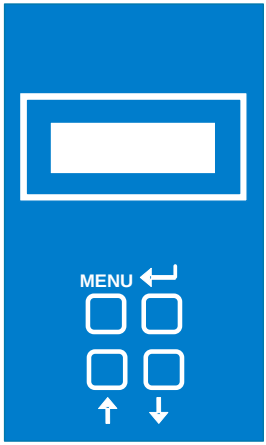
Connect the keypad into the FGD10B as shown below:

The display will give the following messages:

SSCL	Company
- - - -	
PELL	Sensor type (02tc, PELL, Ir)
88:88	Segment test
SSCL	Manufacturer
1.1.1r	Firmware version
- - - -	
0.0	Gas reading

Note: if the display is continually showing - - - - then the instrument is not communicating with the keypad.

The menu system featured within the keypad calibration unit allows all calibration and configuration activities to be performed.



The keypad has the following functionality:

Button	Function	Alternate Function
MENU	Open / Close Menu	Password
UP	Next / Increase	1
DOWN	Previous / Decrease	2
ENTER	Accept selection	3

This section of the manual discusses how the available menu options can be accessed, how the associated parameter may be changed via the selected menu option and what effect the change to the parameter has on the operation of the FGD4, FGD10B or similar gas detector that uses the keypad.

Note: It is important that the FGD4, FGD10B and PC192-NT are correctly configured for the sensor in use, prior to performing any feature available in the menu system.

1.2. Menu Mode Selection

The external Calibration / Configuration Keypad is used in its simplest form to calibrate the sensor for zero or gas drift.
It may also be used to configure the gas detector.

The following features are available via the Calibration / Configuration Keypad menu system: -

Menu Option
E : 01 – Sensor Zero
E : 02 – Sensor Span
E : 03 – Sensor FSD
E : 04 – Output Zero (4mA)
E : 05 – Output Span (20mA)
E : 09 – Diagnostics
E : 17 – Sensor Gain
E : 19 – Positive zero suppression
E : 20 – Negative zero suppression
E : 25 – Zero temperature compensation +ve
E : 34 – Span temperature compensation +ve
E : 35 – Span temperature compensation -ve
E : 36 – Zero temperature compensation -ve
E : 52 – Turn On/ OFF the manual calibration
E : 77 – Firmware version

The menu options are selected as follows:

- Press the MENU button, **E: 1** appears on the display.
- Press ↑ or ↓ until the required menu option is displayed, see following options.
- Press ↵ to select the menu option.
- To exit the menu press MENU.

While the instrument is in menu mode – any data displayed on the screen will alternate between the menu number and the reading.

Note: On selecting a menu option the display will show one of the following:

1)	E:xx	Action only
2)	Ed:xx	Value to be Edited
3)	LI:xx	Select value from a list, there may only be 1 item in the list. In some cases the value may be edited after selection, i.e. E:3

1.2.1. E : 01 – Sensor Zero

Refer to section 2.1.1. for sensor calibration details.

1.2.2. E : 02 – Sensor Span

Refer to section 2.1.2. for sensor calibration details.

1.2.3. E : 03 – Sensor Fsd

This Feature sets the FSD of the instrument. It must be matched to the sensor.

- Press MENU to open the menu system.
- Using the ↑ or ↓ buttons, select menu option: **E:3**
- Press ↵.
- Using the ↑ or ↓ buttons, change the display to the required setting.
- Press ↵ to store the new value.

  Note: Pressing the MENU button rather than the ↵ button exits without any change.

- Press MENU to close the menu system.

1.2.4. E : 04 – Output Zero (4mA)

Refer to section 2.2.1. for output calibration details.

1.2.5. E : 05 – Output Span (20mA)

Refer to section 2.2.2. for output calibration details.

1.2.6. E : 08 – Sensor Type

There are two types of sensor that can be fitted, either an oxygen or electrochemical.

- Press MENU to open the menu system.
- Using the ↑ or ↓ buttons, select menu option: **E:8**
- Press ↵.
- Using the ↑ or ↓ buttons, set the required sensor type.
- Press ↵ to store the new value.

  Note: Pressing the MENU button rather than the ↵ button exits without any change.

- Press MENU to close the menu system.

Note: This option will restore the sensor to the factory default values. The user must set all

1.2.7. E : 09 – Engineer diagnostics

This feature is a view-only feature. No configuration changes are possible from within this menu.

The information is for use of Status Scientific Controls personnel.

- From the menu system select menu option: **E: 9** and press ↵.
- Using the ↑ or ↓ buttons, display the required setting. The displayed values are as follows:

  E : 90 Reading
  E : 92 Current sensor temperature °C
  E : 93 Active sensor A to D counts
  E : 94 Reference sensor A to D counts
  E : 95 Fractional Absorbance
  E : 96 Status flags

Note: gas detectors may not display all the above options.

1.2.8. E : 17 – Sensor gain, Toxic sensors

This feature is used to set up the gain of the electronics to match the range and sensor type. The gain setting can be between 0 and 31, where 0 is the lowest gain and 31 is the highest gain.

The gain setting should be kept as low as possible. The gain settings are based on the first stage having a gain of 61.6 (1 + 2000 / 33).

Typical settings:

Sensor Type	Max output (nA/ppm)	Make	Range	Resolution (display)	Units	Gain
H_2S	180	Ind. Sci.	0-50	0.05	ppm	10
H_2S	180	Ind. Sci.	0-100	0.1	ppm	6
H_2S	180	Ind. Sci.	0-200	0.5	ppm	2
H_2S	180	Ind. Sci.	0-500	1	ppm	0
H_2S(L)	450	Surecell	0-50	0.05	ppm	4
H_2S(L)	450	Surecell	0-100	0.1	ppm	2
H_2S(L)	450	Surecell	0-300	0.5	ppm	0
H_2S(4HS+)	850	City Tech	0-50	0.05	ppm	2
H_2S(4HS+)	850	City Tech	0-250	0.1	ppm	0
CO	90	Ind. Sci.	0-200	0.2	ppm	6
CO	90	Ind. Sci.	0-500	0.5	ppm	2
CO	90	Ind. Sci.	0-1000	1	ppm	0
CO(M)	85	Surecell	0-200	0.2	ppm	6
CO(M)	85	Surecell	0-500	0.5	ppm	2
CO(M)	85	Surecell	0-1000	1	ppm	0
CO(4CF+)	85	City Tech	0-200	0.2	ppm	6
CO(4CF+)	85	City Tech	0-500	0.5	ppm	2
CO(4CF+)	85	City Tech	0-1000	1	ppm	0
NH_3(100SE)	160	Sensoric	0-100	0.1	ppm	6
NH_3(1000SE)	12	Sensoric	0-1000	1	ppm	10
SO_2(4S)	600	City Tech	0-20	0.02	ppm	15

Note: NH_3 Sensors can have a T_{90} of several minutes when protected by a sinter and should not be used in time sensitive applications. Low levels may not be detected.

1.2.9. E : 19 – Positive Zero Suppression

This option is used to allow the user to suppress small amounts of positive sensor zero drift. The setting can be set between 0 and 10% of the sensor range as set by the FSD value.

- Press MENU to open the menu system.
- Using the ↑ or ↓ buttons, select menu option: **E:19**
- Press ↵.
- Using the ↑ or ↓ buttons, set the required zero suppression value.
- Press ENTER to store the new value.

  Note: Pressing the MENU button rather than the ↵R button exits without any change.

- Press MENU to close the menu system.

1.2.10. E : 20 – Negative Zero Suppression

This option is used to allow the user to suppress small amounts of negative sensor zero drift. The setting can be set between 0 and -10% of the sensor range as set by the FSD value.

- Press MENU to open the menu system.
- Using the ↑ or ↓ buttons, select menu option: **E:20**
- Press ↵.
- Using the ↑ or ↓ buttons, set the required zero suppression value.
- Press ↵ to store the new value.

  Note: Pressing the MENU button rather than the ↵ button exits without any change.

- Press MENU to close the menu system.

1.2.11. E : 25 – Positive Zero Temperature Compensation

This option has no effect on the sensor version 1.0.3

1.2.12. E : 34 – Positive Span Temperature Compensation

This option has no effect on the sensor version 1.0.3

1.2.13. E : 35 – Negative Span Temperature Compensation

This option has no effect on the sensor version 1.0.3

1.2.14. E : 36 – Positive Zero Temperature Compensation

This option has no effect on the sensor version 1.0.3.

1.2.15. E : 52 – Enable / Disable calibration buttons

This option is only available for the infrared sensor

1.2.16. E : 77 – Firmware Version

The FGD4, FGD10b and ST196-NT Firmware version is displayed.

- Press MENU to close the menu system.

2. CALIBRATION

2.1. Sensor Calibration

This feature allows the sensor to be calibrated. Ensure that the correct sensor type is selected in the configuration prior to calibration. Refer to section 1.2. for details of the menu system operation.

Note: if the password is in operation then the user will be prompted with PASS when ever the menu key is pressed. Pressing the MENU key again will result in the restricted user access, i.e. only the zero and span options will be available. Entering the correct password will give access to the full menu facility.

2.1.1. Sensor Zero

- From the menu system select menu option: **E: 1** and press ↵.
- Ensure the sensor is in a zero-gas environment.
  Note: Where a purging gas has to be applied, use a flow rate of between 500 and 1000cc/min. Allow sufficient time for the sensor to respond.
- Press ↵ to zero the sensor, '**– – – –**' will be displayed to confirm the sensor zero has been performed.

  Note: Pressing MENU rather than ↵ exits the zero feature without performing the calibration.
- Press MENU to close the menu system.

2.1.2. Sensor Span

Always zero the sensor prior to performing a span operation.

- From the menu system select menu option: **E: 2** and press ↵.
- Apply a known concentration of gas (applicable to sensor type) at a flow rate of between 500 and 1000cc/min. Allow time for the sensor to respond.
- Using the ↑ and ↓ buttons, set the reading to that of the calibration gas level.
- Press ↵ to span the sensor, '**– – – –**' will be displayed to confirm the sensor span has been performed.
  Note: pressing MENU rather than ENTER exits the span feature without performing the calibration.

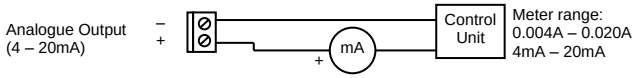
  Wait until the reading is stable, if necessary press ↵ again to span the sensor.
- Press MENU to close the menu system.
- Turn off and disconnect the calibration gas.

Note: NH_3 Sensors can take several minutes to respond. Low levels may not be detected.

2.2. Analogue Output Calibration

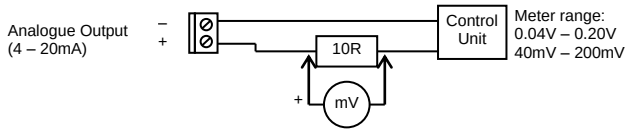
The analogue output is that of a current source. In order to calibrate the output it is necessary to monitor the output signal. This can be performed in one of two ways:

Current measurement:
Connect an ammeter (or multimeter set to measure current in the mA range) in series with the analogue output.



Advantage: Direct measurement of output.
Disadvantage: The analogue output has to be disconnected to allow the connection of the meter.

Voltage measurement:
Permanently connect a 10R resistor in series with the analogue output. When calibration is required, connect a voltmeter (or multimeter set to measure voltage in the mV range) across the 10R resistor.



Advantage: No need to disturb wiring between Gas detector and control unit.
Disadvantage: Measurement accuracy dependent upon resistor tolerance.

2.2.1. Analogue Output Zero

- Monitor the current sourced from the analogue output of the Gas detector using a suitable method.
- From the menu system select menu option: **E: 4** and press ↵.
- Using the ↑ and ↓ buttons; adjust the output to the required level (4mA or 40mV).
- Press ↵.

  Note: Pressing MENU rather than ↵ exits the zero feature without performing the calibration.
- Press MENU to close the menu system.

2.2.2. Analogue Output Span

Always zero the analogue output prior to performing a span operation.

- From the menu system select menu option: **E: 5** and press ↵ (button 4).
- Using the ↑ and ↓ buttons; adjust the output to the required level, usually 20 mA.
- Press ↵.

  Note: Pressing MENU rather than ↵ exits the span feature without performing the calibration.
- Press MENU to close the menu system.

3. LOW BATTERY

3.1. Low Battery Indication

There is no low battery warning to say that the battery level in the keypad is low. Look out for the following which are indications that the batteries level is low.

- The display on the keypad starting to fade
- Changes in the reading on the control panel connected to the detector. This can change as soon as the keypad is plugged into the detector.