SCM1 Control Unit
System Installation & Operation Manual

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Important
Status Scientific Controls strive to continually improve their products in line with customer's requirements and technological advancement. Status Scientific reserve the right to modify the design of the system at any time.

Due to continual improvement not all of the features described within this manual may be available on earlier models, contact Status for further details.

Please Note:
Page numbers within this manual are of the form:
Section – Page
e.g. 'Page 2-3' refers to Section 2, Page 3

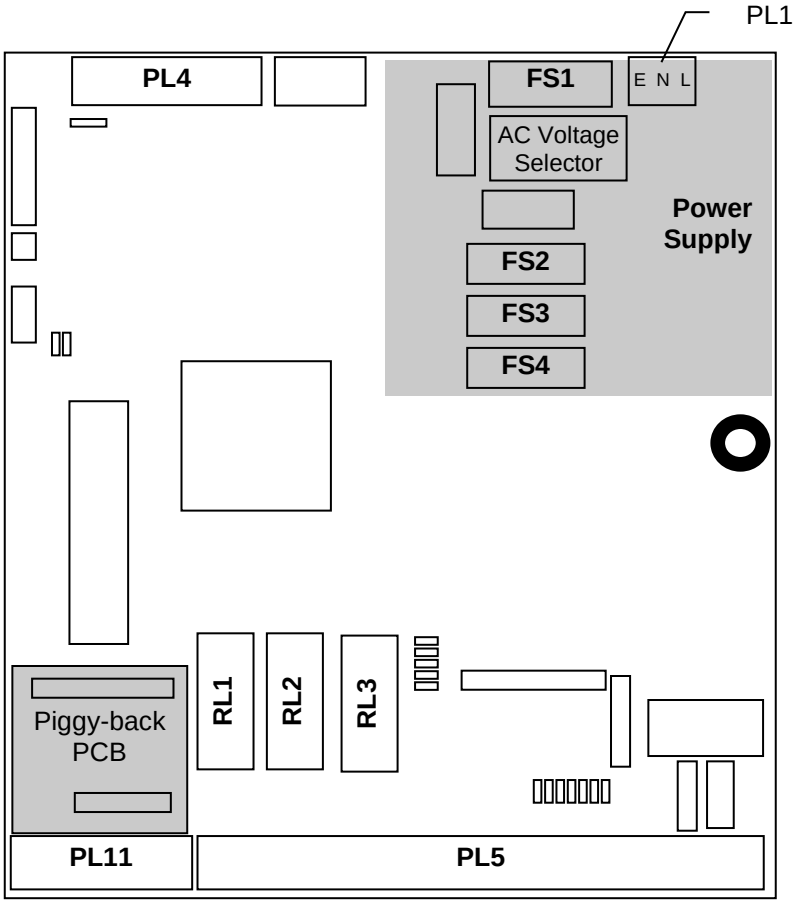
1 INTRODUCTION

The Environmental Monitoring System Type SCM1 is a micro controller based detection system, providing monitoring of a single channel and compatibility with a wide variety of sensor types.

The SCM1 has been designed primarily with Environmental Monitoring in mind. However, the versatility of the system lends itself to other aspects of industry where monitoring by local or remote sensors is required. The specification allows the use of any sensor that can produce a voltage or current output within a specified range.

The SCM1 system consists of a 'SCM1 Control Unit' and either a remotely connected gas detector head or a gas sensor mounted directly to the control unit. The control unit contains the power supply, standby batteries (optional), global alarm relays and outputs, the user interface and a visual alarm condition indicator.

Care has been taken with the design of the SCM Housing and internal chassis to facilitate ease of connection and wire termination. All on-site wiring to the system is via large removable screw terminal connectors. Seven cable gland positions are provided to allow for multiple cable entries.



The diagram above shows a pictorial view of the main PCB located within the SCM1 Control Unit. The locations of the key components on this board have also been shown.

Note: that the sensor type requested by the customer dictates which 'piggy-back' PCB is fitted. If a remote detector head is used then no piggyback PCB is required.

1.1 Micro controller

The SCM1 Control Unit is controlled via a H8 Micro controller mounted on the main PCB. The use of a micro controller allows many of the features of the unit to be software configurable by the user using the front panel mounted LCD Display and Keypad, very few of the available options require the user to open the front panel of the unit.

The user configurable features include:

- Sensor Configuration.
  - Allows adjustment of Sensor type and range (e.g. Flamm 100%LEL methane).
- Calibration of the system.
  - The sensor zero point and span are set via this function.
  - Calibration of the retransmitted output signal.

Relay Configuration.

- Relays can be configured as enabled or disabled, normally energised or de-energised, latching or non-latching.

- Visual Indicator Configuration.
  - Visual indicators can have their 'flash rate' altered between on, off, slow or fast.

1.2 Power Supply

BEFORE CONNECTING AN AC SUPPLY TO THE SYSTEM ENSURE THAT THE MAINS VOLTAGE SELECTOR SWITCH IS CORRECTLY POSITIONED.

The power supply is located on the main PCB with the transformer and back-up batteries (when fitted) located beneath the chassis out of view. The 110V/240V AC supply is connected to the system via PL1 located at the top right hand side of the main PCB (a wiring diagram is available within section 2.4). Alternatively the system can be powered from a 24V DC supply at PL4 located at the top left-hand side of the main PCB (a wiring diagrams is available within section 2.5).

The AC Mains voltage is selectable via a switch located beneath a yellow protective cover. Also located beneath the cover is the mains fuse (FS1). The cover is designed to protect the user from inadvertent contact with mains terminals, mains fuse and mains voltage selector switch during normal operation.

The four system fuses are:

FS1 (F250mAT rated, anti-surge)	Mains input fuse (beneath yellow cover)
FS2 (F1AT rated, anti-surge)	24V Supply to system
FS3 (F1AT rated, anti-surge)	Back-up battery
FS4 (F1A rated)	Outputs 1 and 2

REMOVING THE YELLOW PROTECTIVE COVER FROM THE MAIN PCB EXPOSES AC MAINS TERMINALS. UNDER NO CIRCUMSTANCES SHOULD THE UNIT BE OPERATED WITH THE COVER REMOVED.

1.3 User Interface

A user interface is provided in the form of a backlit 16 x 2 alphanumeric LCD display and a four-button multifunction keypad mounted on the front panel. The micro controller communicates with the user interface via a 26-way ribbon cable.

Three LED indications are provided at the user interface and are visible via the SCM1 front panel:-

Green LED indication of power on.
Red LED indication of alarm condition.
Yellow LED indication of fault condition.

1.4 Indicators

Located at the top of the front panel assembly is the Visual Indicator Unit. This provides a clear indication of the alarm status of the unit.

Green Indication	Status: Healthy
Yellow Indication	Status: Fault
Red Indication	Status: Alarm

The visual indication is provided using high brightness light emitting diodes providing benefits of low current consumption and extremely long life.

An audible indication is also provided on the lower face of the SCM1 Control Unit. This provides an audible intermittent tone under alarm conditions.

1.5 Relays

Three relays are provided (RL1-3) to control external equipment. Each relay has a pair of voltage free changeover contacts that are accessible via PL5 (pins 1–18). RL1 and RL2 operate when alarm levels 1 and 2 are encountered respectively, whilst RL3 operates under fault conditions.

RL3 is usually configured for normally energised operation. This permits indication of a fault in the event of a total power loss (i.e. mains and battery power failure).

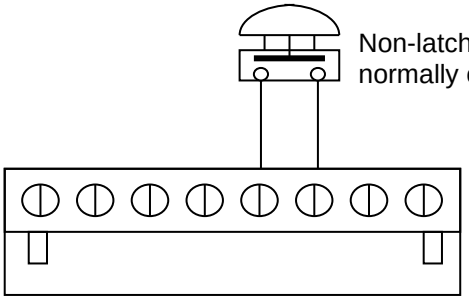
The relays are normally hidden from view beneath a grey protective cover. This cover holds the 'Intrinsically Safe' barrier components (when fitted) and is provided to prevent tampering with jumper switch configurable options. A legend is attached to the cover indicating relay contact designations on the associated screw terminals.

1.6 Common Outputs and External Reset

Two outputs are provided to control external alarms (if required). Connection to these outputs is via PL4 (wiring details are available within section 10.2). Output 1 is provided to operate an external audible alarm whilst output 2 operates an external visual alarm (refer to section 1.6.1 for configuration details).

The load current must not exceed 200mA per output. FS4 provides protection for the external outputs and has been fitted with a F1A fuse.

The system has an onboard watchdog that monitors the system status and provides a reset signal if required. An additional reset facility is provided at PL4. This feature allows the user to remotely 'reboot' the system or accept the alarm, see section 4.8 for further details. The connection diagram for an external reset pushbutton is shown below:



Non-latching push button switch with normally open contacts.

8-Way connector situated on top left-hand side of main PCB (PL4).

1.6.1 Common Output Configuration

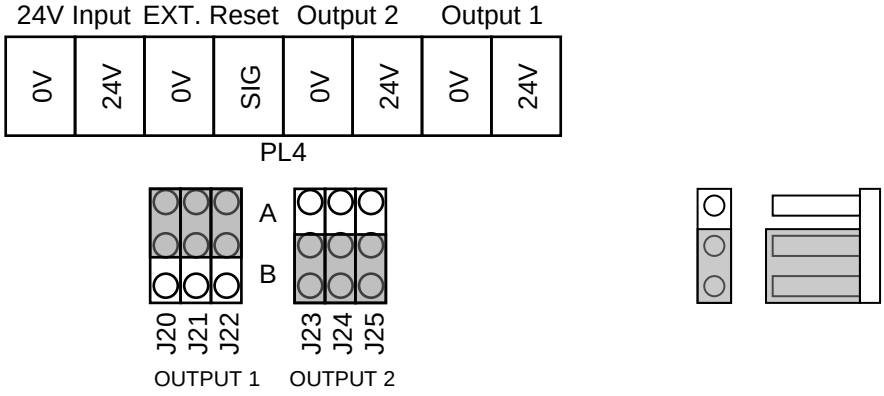
Note: Do not attempt to change the common output configuration unless the power source has been removed (i.e. switched OFF).

Three jumpers are provided on the main PCB to permit hardware configuration of each of the common outputs. The outputs may be configured to provide either:

- Permanent 24V supply, with the 0V line switched via a NPN transistor.

OR

- Permanent 0V supply, with the 24V line switched via a PNP transistor.



The diagram above demonstrates the two different jumper settings for each mode of output:

Output 1: shows the jumper positions if a permanent 24V supply is required with the 0V line being switched.

Output 2: shows the jumper positions if a permanent 0V supply is required with the 24V line being switched.

1.7 Sensor input circuit

The sensor-input circuit monitors the status of an externally attached sensor and interfaces the signals that it receives to the micro controller. The sensor-input circuitry is designed to accommodate virtually all sensor configurations currently available. It can be connected to any sensor (Environmental or otherwise) that supplies it status signal in any of the following formats:

- Current Loop 4 – 20mA from 24V source.
- Current Loop 4 – 20mA to ground.
- 3-Wire Pellistor Systems.
- Voltage Input.
- A 'piggy-back' board may be used to interface sensors that do not provide their signals in one of the above formats.

Under normal conditions the configuration of the sensor-input circuitry will be performed at the factory prior to despatch.

1.7.1 Local Gas Sensor

Local sensors (i.e. sensors mounted on the SCM1 control unit) are catered for in one of two ways:

- A 'piggy-back' board provides additional circuitry to the SCM1 to accommodate certain types of sensor.
  e.g. Oxygen, Toxic and sensors utilising infrared technology.
- Circuitry on the SCM1 main PCB accommodates sensor.
  e.g. Hydrocarbon pellistor based sensors.

1.7.2 Remote Gas Detector Heads

Remote detector heads interface to the SCM1 using circuitry on the SCM main PCB.

1.8 Analogue Output

The SCM1 can re-transmit the sensor signal for use by external equipment (e.g. chart recorders). The transmitted signal can be configured using jumper switches to provide one of three output options:

- 4 - 20mA Current source proportional to detected signal.
- 4 - 20mA Current sink proportional to detected signal.
- 0 - 5V Voltage output proportional to detected signal.

Configuration details can be found in section 3.2.

2 INSTALLATION

The SCM1 Control Units are fully tested prior to delivery. However, after installation we strongly recommend that system testing and commissioning be carried out. Status Scientific Controls Service personnel are best equipped to perform the relevant tests and commissioning.

WARNING
Installation should be made in accordance with either the Code of Practice BS5345: 'Selection, installation and maintenance of electrical apparatus for use in potentially explosive atmospheres', or in accordance with the relevant National or Local regulations.

CAUTION
The SCM Control Unit and associated equipment contain no user serviceable parts. Refer all servicing to qualified service personnel.

2.1 Siting the Control Unit

The SCM Control Unit is designed for wall mounting in any convenient non-hazardous location. The control unit can be powered by either 110 or 240V AC supply, alternatively a 24V DC supply can be used.

The site of installation should be chosen with regard to the following:

- This equipment should not be located near to known sources of heat.
- Operating personnel should be within convenient reach of the equipment and within audible distance of alarms.
- Avoid mounting this equipment near potential sources of electrical interference e.g. motors, switch gear, radio transmitters etc.
- The use of mobile phones or radios adjacent to sensor heads can cause interference.
- Ensure the unit is mounted such that routine calibration and maintenance is possible. *Sensors have a finite life; Pellistors have an expected life span in excess of two years, whilst electrochemical sensors have an expected life span of approximately two years.*
- Ensure the proposed site will not interfere with movement of existing equipment, e.g. cranes, doors etc
- Install all cables neatly and securely.
- Units for detecting gases that are lighter than air should be positioned at a high level.
- Units for heavier than air gases should be located at below head height.
- Ensure the unit is mounted with sufficient space to allow air movement around sensors, and the opening of the front hinged lid.

Mounting details for the SCM1 enclosure are located within section 10.3.

2.2 Assembling

If the SCM Control Unit has been fitted with 'Standby Batteries', it will be supplied with Standby Battery fuse (FS3) not fitted. This fuse should be fitted once the Control Unit is mounted in position and ready for use. It should be noted that once FS3 is fitted, power will be connected to the system. All wiring tests and commissioning should therefore be performed prior to fitting this fuse.

Note: FS3 is supplied in a plastic bag inside the SCM1 unit.

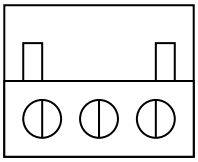
2.3 Wiring

All connections should be made according to the appropriate sensor or loop diagram for the configuration required. It is advised that 'Bootlace Ferrules' or 'flat blade crimps' be used for tidy and reliable connections of wires into the Control Unit and Detector Head connectors.

2.4 AC Mains Connection.

All mains voltage connectors etc. have been positioned beneath a yellow protective cover to prevent inadvertent user contact.

The three-pin screw terminal connector located at the top right hand side of the main PCB has been assigned for the connection of an AC supply. The AC supply can be either 240V or 110V. The 110V mains supply can be derived from either a 0V-110V AC power source or a 55V-0-55V AC power source. In all cases ensure the safety earth (E) is connected.



To connect AC power to the system it is necessary to unplug the three-terminal connector (PL1) from the main PCB. The screw terminals are connected as shown

Recommendation for mains input cable:

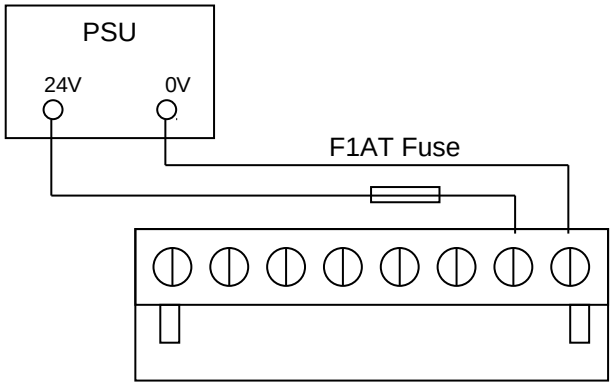
3-Core - Conductors having cross sectional area of 0.5mm^2 minimum (16/0.2).

2.4.1 Selecting Mains Input Voltage

1. Ensure AC mains supply is disconnected from the SCM1 Control Unit.
2. Rotate the two screws located on the yellow cover anti-clockwise until the cover is released. It is not necessary to completely remove the screws from the cover assembly.
3. Slide the voltage selector switch into the appropriate position dependent upon the AC Mains Voltage to be used.
   Note that the 110V setting is used for 110-120V supplies and the 240V setting is used for 220-240V supplies.
4. Refit yellow cover before connecting AC mains supply.

2.5 24V DC Connection.

The SCM system can be powered from an external power supply. The external PSU must provide a fused 24V (1A min) supply. The fuse should be F1AT rated.



The diagram above shows the 24V and 0V connections to the SCM Unit.

2.6 Remote Detector Installation

This section contains information only relevant when a remote sensor is used.

2.6.1 Cable Routing

Due to the low signal levels generated by gas detectors it is recommended that all wiring to the sensors be segregated away from AC mains or other high voltage/power lines to avoid interference.

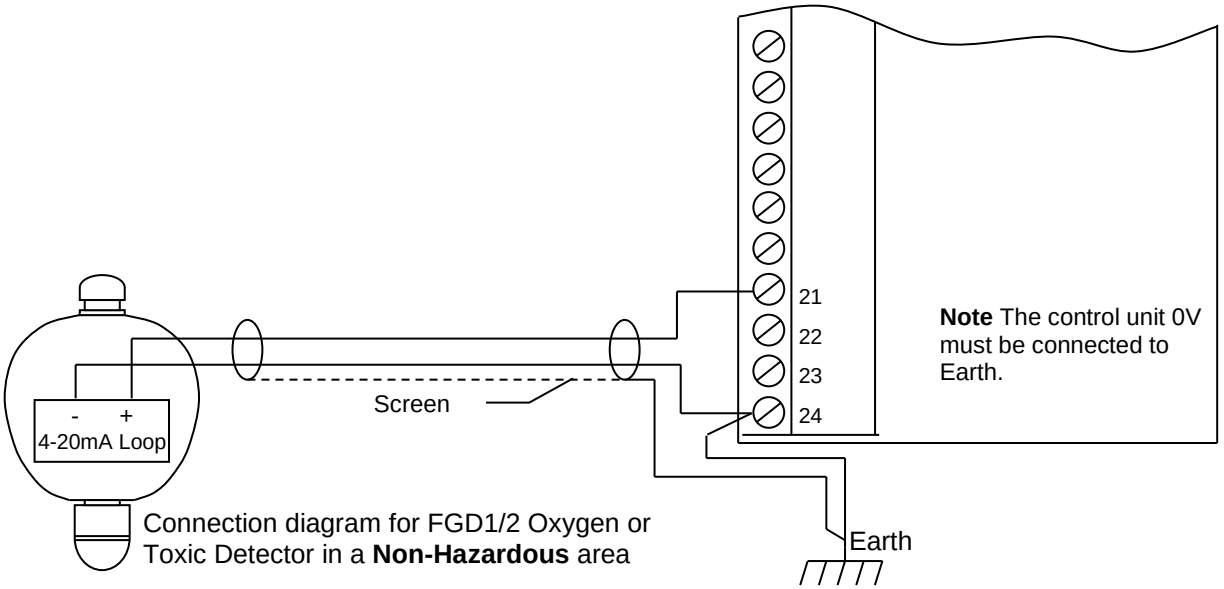
2.6.2 Cable Screening

Status Scientific recommends that a screened cable should be used for connecting the SCM1 control unit to a remote detector head. The screening is used to minimise the effects of electrical interference generated by external equipment e.g. motors, switchgear etc. The correct strategy for terminating the screen depends upon the area in which the detector head is to be installed (i.e. hazardous/ non-hazardous). In all cases the screen should be isolated at the detector head.

2.6.3 Installation in a Non-Hazardous Area.

When a detector head is installed in an area where there is no potential of an explosive gas hazard present, the cable lengths are limited solely by the resistance of the cable. The FGD1 and FGD2 gas detectors fitted with either oxygen or toxic sensors require a minimum of 6V between their loop '+' and '-' terminals to operate correctly. The maximum cable loop resistance is therefore (20-6)/25mA i.e. 560Ω.Cable resistance values depend upon the size of the cable.

Typical resistance values are:	1.0mm^2 solid core	40Ω/Km loop.
	1.5mm^2 solid core	25Ω/Km loop.



Connection diagram for FGD1/2 Oxygen or Toxic Detector in a **Non-Hazardous** area

The correct wiring method for SSCL Detector Heads is shown above. It is important to note that these drawings show the wiring connections but do not discuss sensor configuration of the SCM1 control unit. Prior to connecting the Detector Head ensure the SCM1 is correctly configured (refer to section 3.1.2).

Note: The screens from each cable are connected to the chassis earth of the control unit. The connection between the system 0V and the earth of the chassis is made by fitting Jumper J19 located at the top right hand corner of the SCM main PCB.

2.6.4 Installation in a Hazardous Area

When used in a hazardous area, the FGD1, FGD2 and FGD3 detectors require an intrinsically safe (I.S.) power supply. This can be provided in 2 ways:

1. By using proprietary safety barriers.
2. By using the Status SCM1 Control Unit incorporating the I.S. Output Module Type FGDIO.

The FGDIO module can be incorporated within the SCM control unit enclosure and will provide I.S. outputs for all versions of the FGD range of gas detectors.

When using barriers to create an I.S. supply, certain restrictions are imposed on the parameters of the interconnecting cables used. These parameters are defined by the manufacturer of the barrier and limit the maximum capacitance, inductance and inductance to resistance ratio of the cable. The installation is only intrinsically safe when the combination of the barrier and connecting cables comply with the manufacturer specification.

As with a non-I.S. installation, the cable length is restricted by the cable loop resistance. With the introduction of a barrier or the FGDIO module, the cable loop resistance is reduced because of the internal resistance of the barrier. The end to end resistance of the barrier must therefore be subtracted from the overall cable loop resistance when calculating cable lengths.

Barriers must be selected to restrict the parameters of the I.S. supply to the gas detectors within the following limits:

Gas Detector	Terminals	U_{max}	I_{max}	P_{in}
FGD1/2 Oxygen or Toxic	0V and SIG	30V	0.15A	0.81W
FGD1/2 Flammable	0V and SIG	30V	0.15A	0.81W
FGD1/2 Flammable, FGD3 IR	0V and PWR+	7.5V	0.75A	1.4W

When considering the capacitance and inductance allowable across the barrier output terminals, there is zero capacitance and zero inductance between terminals 0V and SIG on any model of FGD and an equivalent of 1.4μF and zero inductance between terminals 0V and PWR on the FGD1/2 flammable, FGD3 Infra-red gas detectors.

2.6.5 Intrinsically Safe Output Module Type FGDIO

The FGDIO barrier is designed to provide an intrinsically safe supply to power intrinsically safe equipment that is sited in hazardous locations.

The power supply input to the barrier is not intrinsically safe, the barrier must not therefore be located within a hazardous location unless housed in a suitably certified flameproof enclosure.

The barrier has two inputs and two outputs, its design being specifically aimed at gas detectors that require a 4-20mA loop supply. A higher power output is also provided for pellistor type and infra red sensors.

Specification

Channel 1 Output, Terminals 1 & 2:	28V DC 0.112 Amps 0.8 Watts Internal Resistance = 270Ω ±5%
Channel 2 Output, Terminals 3&4:	7.5V DC 0.66 Amps 1.24 Watts Internal Resistance = 12Ω ±5%

In order to maintain intrinsic safety, the capacitance and Inductance or Inductance to Resistance (L/R) ratio of the loads connected to the terminals of the FGDIO Barrier must not exceed specified values:

The capacitance and Inductance or Inductance to Resistance (L/R) ratio of the load connected to terminals 1 and 2 must not exceed the following values:

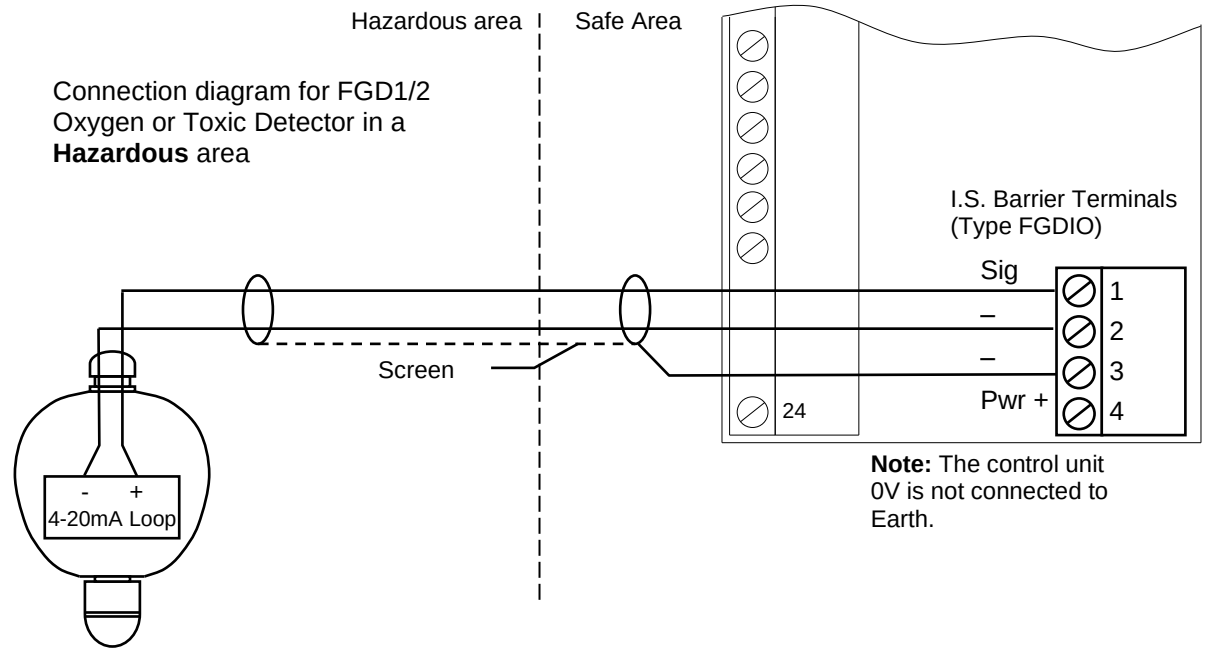
GROUP	CAPACITANCE in μF	INDUCTANCE in mH	OR	L/R RATIO in μH/ohm
IIC	0.083	3		44
IIB	0.65	12		177
IIA	2.15	25		355

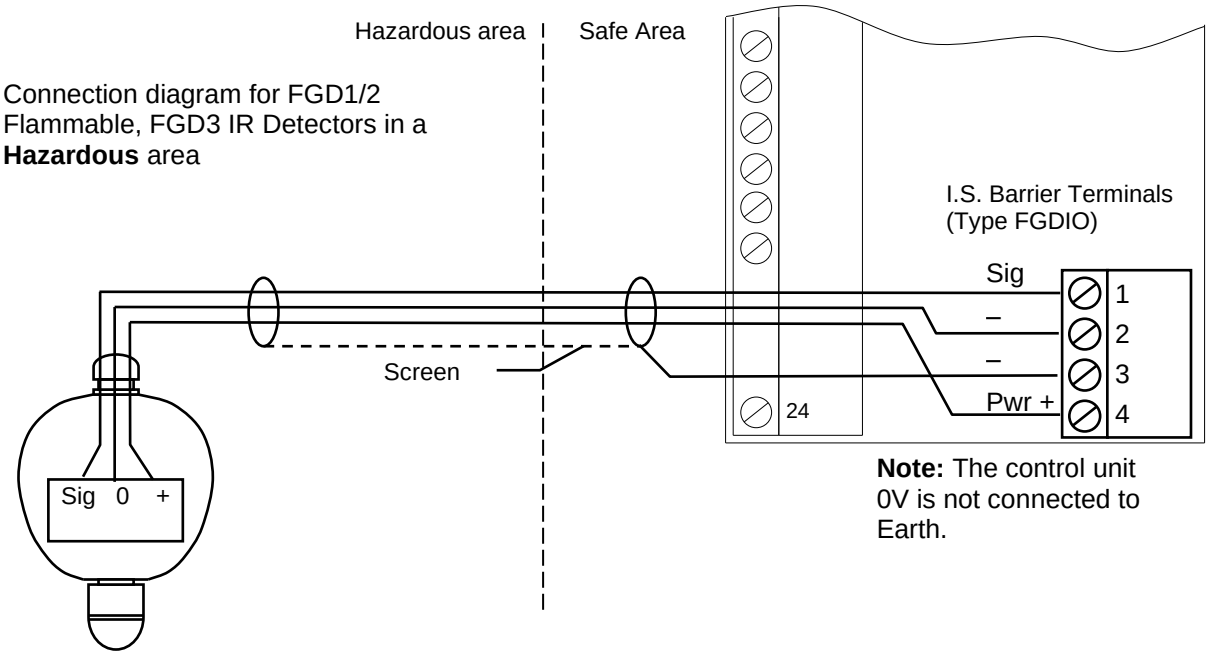
The capacitance and Inductance or Inductance to Resistance (L/R) ratio of the load connected to terminals 4 and 3 must not exceed the following values:

GROUP	CAPACITANCE in μF	INDUCTANCE in mH	OR	L/R RATIO in μH/ohm
IIC	11.1	0.07		28
IIB	174	0.28		114
IIA	1000	0.56		228

Warning:
When considering the suitability of an installation in terms of the load's capacitance and inductance, account must be taken of the interconnecting cable itself. The figures in the tables must not be exceeded by the combination of the load parameters and the cable parameters. This may restrict the permissible cable length in some applications. If in doubt, consult Status Scientific Controls for assistance.

2.6.6 FGDIO Module Connection Diagrams





Note: Ensure Jumper J19 (located at the top right hand corner of the SCM main PCB) is NOT fitted.

The I.S. Earth connection on the SCM Main PCB must be connected to the installations I.S. earth point. The connection must be made via a conductor of minimum 4mm^2 cross sectional area. Refer to BS5345:Part4, section 16 for further details of earthing requirements.

2.7 FGDIO Intrinsically Safe output Module Installation into the SCM1

The SCM1 Control Units supplied by Status Scientific Controls are usually delivered correctly configured for the detector head or sensor supplied. An intrinsically safe output module Type FGDIO will be fitted if requested by the customer. However, on occasion it is necessary to fit an FGDIO module to an existing control unit. This section shows the procedure that should be followed during the installation of an FGDIO module.

The FGDIO Module *Kit of Parts* includes:

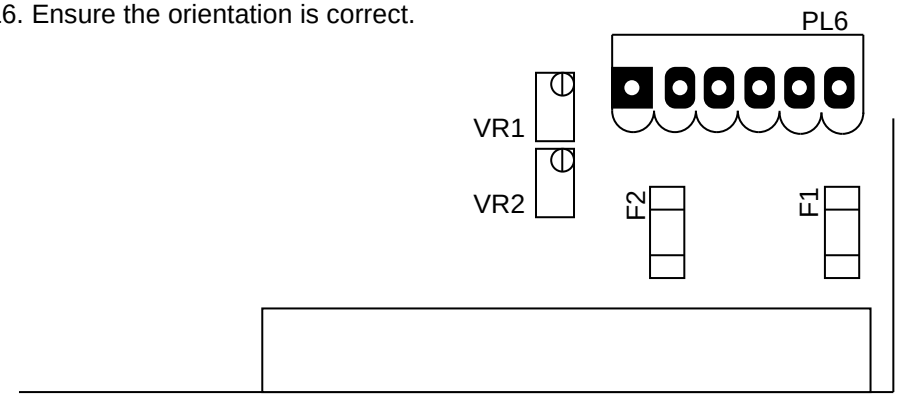
PL6 - 6 way Connector
F1 - 200mA Fuse (brown colour band)
F2 - 50mA Fuse (orange Colour band)
- Grey protective cover incorporating FGDIO module
- M3 x 18 CSK Screw
- M3 x 10 Hex Pillar

Tools required:

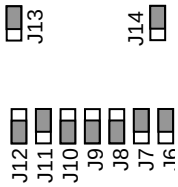
Flat blade screwdriver
5mm A/F Spanner
Multimeter
Soldering Iron & Solder
Wire cutters

Install the FGDIO module as follows:

1. **ISOLATE THE MAINS SUPPLY TO THE SCM1.**
2. Unplug the three connectors from the lower edge of the main PCB, also unplug the two connectors from the top edge of the PCB.
3. Disconnect the 26-way ribbon cable and the two white connectors from the left-hand edge of the PCB.
4. Remove the grey protective cover from the lower half of the main PCB.
5. Remove the pan head screws located at the bottom corners of the PCB, and the top left corner using a flat blade screwdriver.
6. Unscrew the two pan head screws from the yellow mains cover and remove the cover.
7. Unscrew the hexagon pillar in the top right hand corner of the PCB using a 5mm A/F spanner.
8. Carefully lift the PCB away from the chassis. There are three connectors plugged into the underside of the PCB (at the top edge), these must be disconnected before the board can be pulled clear of the control unit enclosure (note there positions).
   Note: Units that do not contain back-up batteries only have two connectors located on the underside of the main PCB.
9. Take the 6-way connector and insert it into the position identified on the PCB as PL6. Ensure the orientation is correct.



10. Solder the Connector in position.
11. Take the 200mA fuse, insert it into the position identified as F1.
12. Take the 50mA fuse, insert it into the position identified as F2.
13. Solder both fuses into position.
14. Snip off any excess lead from the underside of the board.
15. Remove the M3 fixings located in the hole next to PL6. Place an M3 x 6 pan head screw through the hole from the underside of the board. Place an M3 shake proof washer over the threads that protrude followed by a M3 x 10 Hex Pillar.
16. Hold the PCB just above the SCM1 chassis and connect the two connectors to its underside (one connector only if the battery back-up option is not installed).
17. Lower the PCB onto the four mounting pillars, ensure that all the cables are accessible with the PCB in position. Pay particular attention to the two white connectors to the left-hand side of the PCB.
18. Secure the PCB in position using the three M3 pan head screws and the small hex pillar removed previously.
19. Remove the jumper from position J19 (near the mains terminals).
20. Refit the yellow protective cover above the mains terminal.
21. Refit all connectors to the top, bottom and left hand edge of the PCB.
22. Ensure all mountings are tight and all connectors have been correctly reconnected.
23. Disconnect any wires that connect the main PCB to the detector head.
24. Configure the jumper switches located on the main PCB as follows:



25. Connect the multimeter (set to measure voltage) to pin 24 (0V) and pin 22 (+V).
26. Connect power to the control unit (the alarm may sound).
27. Determine the type of detector head to be used with the SCM1 Control Unit.

    O_2 / Toxic Detector Head:

    Rotate VR1 and VR2 (fine and coarse adjust respectively) until the voltage indicated by the multimeter reads 2.0V ±0.5V.

    Flammable Gas Detector Head:

    Adjust VR1 and VR2 (fine and coarse adjust respectively) until the voltage indicated by the multimeter reads 7.5V ± 0.1V.

    Infra-red Gas Detector Head:

    Adjust VR1 and VR2 (fine and coarse adjust respectively) until the voltage indicated by the multimeter reads 9.1V ± 0.1V.
28. Switch off the power supply to the control unit.
29. Take the grey protective cover incorporating the FGDIO output module and locate the connector on its underside into the newly fitted PL6.
30. Secure the Module into position using an M3 x 18 CSK screw.
31. Connect the detector head to the control unit at the FGDIO terminals (refer to section 2.6.4).
32. The I.S Earth stud on the main PCB must be connected to the installation's I.S. earth point. The connection must be made via a conductor of minimum 4mm^2 cross sectional area. Refer to EN60079-14 (previously BS5345:Part 4, section 16) for further details of earthing requirements.

    Note: Ensure that jumper J19 is not fitted (i.e. the mains earth and 0V are isolated).
33. Reconnect the power supply to the control unit ONLY after correct connection of the detector head.
34. Calibrate the control unit (refer to section 6).

3 HARDWARE CONFIGURATION

The hardware configuration for the SCM1 is performed using jumper switches located beneath the grey cover on the main PCB. J1–J5 configure the analogue output whilst J6-J14 configure the sensor input.

Cover removal – versions without I.S. barrier
Rotate thumbscrew anticlockwise until cover is released. It is not necessary to totally remove the thumbscrew from the cover assembly. Reverse this procedure to refit cover.

Cover removal – versions fitted with an I.S. barrier
Disconnect wires from the barrier terminal (located on top of cover). Remove the screw from the top of cover. Grip the cover at the 4-way terminal end and pull it away from the main PCB. Reverse this procedure to refit cover.

3.1 Sensor Configuration

Under normal circumstances the SCM1 unit is supplied correctly configured for use with the sensor type requested by the customer. If however the requirements of the user change the SCM1 can be re-configured for many of the various sensors currently available.

Note
Some sensor types may require the SCM1 having one or more of the following modifications (dependent upon current and proposed sensor type):

- Jumper switch configuration change
  Note:
  J6 to J14 only have functions related to sensor configuration.
- New software version installed
- Addition of a 'piggy-back' board
- Alternative 'piggy-back' board required

NOTE: Incorrect jumper switch configuration can cause damage to the system.

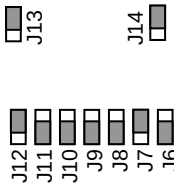
3.1.1 Local Sensor Options

3.1.1.1 Local Oxygen Sensors

The SCM1 Control Unit can accommodate a local oxygen sensor by the addition of a 'piggy-back' board. This board must be configured at the factory prior to despatch.

Connection Procedure

- Disconnect power from the system.
- Mount Sensor Housing to the bottom face of the SCM1.
- Remove the grey protective cover from the main PCB (refer to beginning of section 3 for removal instructions).
- Rotate VR1 and VR2 fully anticlockwise.
- Configure the jumper switches as shown below (i.e. J7, J12, J13 and J14 switched ON, all others OFF)



- Take the 'piggy-back' PCB and insert it into the sockets located on the main PCB (refer to page 1-2 for 'piggy-back' board mounting position).
- Connect the wires from the oxygen sensor (mounted within the sensor housing) to the terminals located immediately below the 'piggy-back' board as follows:

PL11 Pin Number	Description	Wire Colour
6	-	Blue
7	+	Green

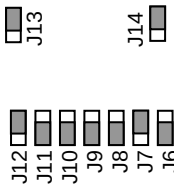
- Refit grey protective cover.
- Perform software configuration (refer to section 4).
- Perform system calibration.

3.1.1.2 Local Toxic Sensors

The SCM1 Control Unit can accommodate a local toxic sensor by the addition of a 'piggy-back' board. This board must be configured at the factory prior to despatch.

Connection Procedure

- Disconnect power from the system.
- Mount Sensor Housing to the bottom face of the SCM1.
- Remove the grey protective cover from the main PCB (refer to beginning of section 3 for removal instructions).
- Rotate VR1 and VR2 fully anticlockwise.
- Configure the jumper switches as shown below (i.e. J7, J12, J13 and J14 switched ON, all others OFF)



- Take the 'piggy-back' PCB and insert it into the sockets located on the main PCB (refer to page 1-2 for 'piggy-back' board mounting position).
- Connect the wires from the toxic sensor (mounted within the sensor housing) to the terminals located immediately below the 'piggy-back' board as follows:

PL11 Pin Number	Description	Wire Colour
1	Counter	Red
2	Reference	Yellow
3	Sense	Blue
8	Earth	Green

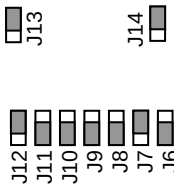
- Refit grey protective cover.
- Perform software configuration (refer to section 4).
- Perform system calibration.

3.1.1.3 Local Infra-red Sensors

The SCM1 Control Unit can accommodate infra-red sensors by the addition of a 'piggy-back' board. This board must be configured at the factory prior to despatch.

Connection Procedure

- Disconnect power from the system.
- Mount Sensor Housing to the bottom face of the SCM1.
- Remove the grey protective cover from the main PCB (refer to beginning of section 3 for removal instructions).
- Rotate VR1 and VR2 fully anticlockwise.
- Configure the jumper switches as shown below (i.e. J7, J12, J13 and J14 switched ON, all others OFF)



- Take the 'piggy-back' PCB and insert it into the sockets located on the main PCB (refer to page 1-2 for 'piggy-back' board mounting position).
- Connect the wires from the infra-red sensor (mounted within the sensor housing) to the terminals located immediately below the 'piggy-back' board as follows:

PL11 Pin Number	Description	Wire Colour
1	5V	Red
2	Active	Green
3	Reference	Yellow
4	Vref	White
5	Agnd	Black
6	Temp	
7	L+	Brown
8	L-	Blue

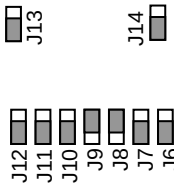
- Refit grey protective cover.
- Perform software configuration (refer to section 4).
- Perform system calibration.

3.1.1.4 Local Hydrocarbon Pellistor Based Sensors

Section 3.1.1.4 details the connection procedure for a pellistor based sensor mounted directly onto SCM1 casing. The SCM1 main PCB contains all of the circuitry required to interface to this type of sensor. A 'piggy-back' board is not required and must not be fitted.

Connection Procedure

- Disconnect power from the system.
- Mount Sensor Housing to the bottom face of the SCM1.
- Remove the grey protective cover from the main PCB (refer to beginning of section 3 for removal instructions).
- Configure the jumper switches as shown below (i.e. J8 and J9 switched ON, all others OFF)



- Connect a voltmeter (range 0-24V min) between pins 22 (+V) and 24 (0V) of PL5.
- Connect power to the system.
- Adjust VR1 and VR2 until voltmeter reads 2.0V ±0.05V (VR1 and VR2 provide fine and coarse voltage adjustment respectively).
  Note: Connecting a voltage of greater than 2.2V will cause irreparable damage to the pellistors.
- Disconnect power to the system and connect the wires from the sensor housing to PL5 on the main PCB observing the following:

PL5 Pin Number	Description	Wire Colour
24	Detector	Black
23	Signal	Blue
22	Compensator	Red

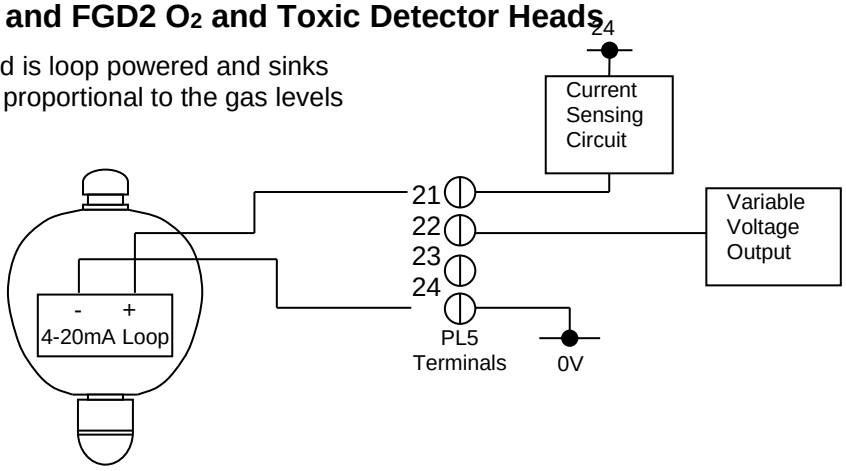
- Connect power to the system and check that the voltage across pins 22 (+V) and 24 (0V) of PL5 is 2.0V ±0.05V. Adjust if necessary using VR1 only.
- Refit grey protective cover.
- Perform software configuration (refer to section 4).
- Perform system calibration.

3.1.2 SSCL Remote Sensor Options

Status Scientific Controls Ltd (SSCL) design and manufacture detector heads for remote gas detection by fixed systems. The detector head used for monitoring oxygen or toxic gases (using conventional sensors) requires a 2-wire connection whilst detector heads incorporating infra-red sensors or pellistors require 3-wire connection.

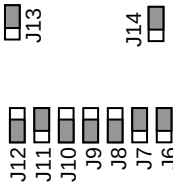
3.1.2.1 FGD1 and FGD2 O_2 and Toxic Detector Heads

The detector head is loop powered and sinks a current directly proportional to the gas levels that it detects.



Connection Procedure

- Disconnect power from the system.
- Remove the grey protective cover from the main PCB (refer to beginning of section 3 for removal instructions).
- Configure the jumper switches as shown below (i.e. J6, J7, J11, J13 and J14 switched ON, all others OFF)



- Connect the wires from the detector head to PL5 on the main PCB observing the following:

Detector Head Label 4-20mA Loop	PL5 (SCM1) Pin Number
-	24
+	21

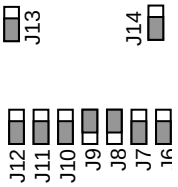
- Connect power to the system and ensure the detector head operates (text on LCD display, LED will flash once every six seconds approximately).
- Refit grey protective cover.
- Perform software configuration (refer to section 4).
- Perform system calibration (refer to section 6).

3.1.2.2 Remote Hydrocarbon 'Pellistor Only' Sensors

Section 3.1.2.2 details the connection procedure for a pellistor based sensor mounted at a remote location (i.e. not on the SCM1 casing). The SCM1 main PCB contains all of the circuitry required to interface to this type of sensor. A 'piggy-back' board is not required and must not be fitted.

Connection Procedure

- Disconnect power from the system.
- Mount Sensor Housing in its required location.
- Remove the grey protective cover from the main PCB (refer to beginning of section 3 for removal instructions).
- Configure the jumper switches as shown below (i.e. J8 and J9 switched ON, all others OFF)



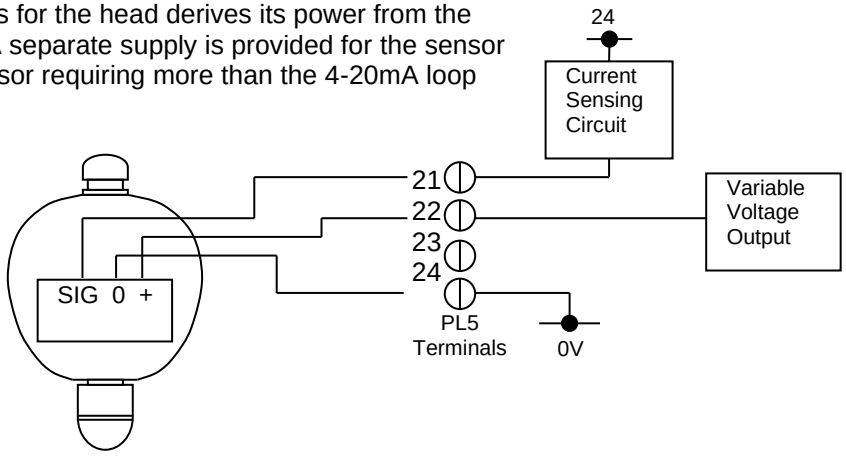
- Connect a voltmeter (range 0-24V min) between pins 22 (+V) and 24 (0V) of PL5.
- Connect power to the system.
- Adjust VR1 and VR2 until voltmeter reads 2.0V ±0.05V (VR1 and VR2 provide fine and coarse voltage adjustment respectively).
  Note: Connecting a voltage of greater than 2.2V will cause irreparable damage to the pellistors.
- Disconnect power to the system and connect the wires from the sensor housing to PL5 on the main PCB observing the following:

PL5 Pin Number	Description	Wire Colour
24	Detector	Black
23	Signal	Blue
22	Compensator	Red

- Connect power to the system. Confirm that 2.0V ±0.05V can be measured at the pellistors (Compensator = +V and Detector = 0V). Adjust if necessary using VR1 only.
- Refit grey protective cover.
- Perform software configuration (refer to section 4).
- Perform system calibration.

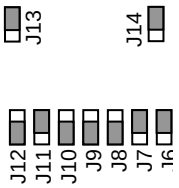
3.1.2.3 FGD1 and FGD2 Hydrocarbon Detector Heads

The electronics for the head derives its power from the current loop. A separate supply is provided for the sensor due to the sensor requiring more than the 4-20mA loop current range.



Connection Procedure

- Disconnect power from the system.
- Remove the grey protective cover from the main PCB (refer to beginning of section 3 for removal instructions).
- Configure the jumper switches as shown below (i.e. J6, J7, J11, J13 and J14 switched ON, all others OFF)



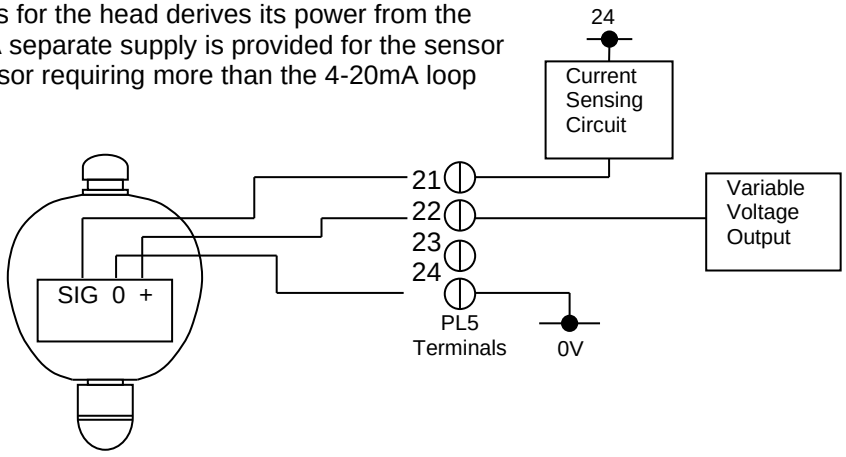
- Connect a voltmeter (range 0-24V min) between pins 22 (+V) and 24 (0V) of PL5.
- Connect power to the system.
- Adjust VR1 and VR2 until voltmeter reads 4.5V ±0.5V (VR1 and VR2 provide fine and coarse voltage adjustment respectively).
- Disconnect power to the system and connect the wires from the detector head to PL5 on the main PCB observing the following:

Detector Head Label 4-20mA Loop	PL5 (SCM1) Pin Number
0	24
+	22
Sig	21

- Connect power to the system and ensure the detector head operates (text on LCD display, LED will flash once every six seconds approximately)
- Measure the voltage between the + and 0 terminals at the detector head.
- If necessary adjust VR1 and VR2 at the SCM1 Control Unit to give 4.5V ±0.5V at the detector head (7.0V absolute maximum).
- Refit grey protective cover.
- Perform software configuration (refer to section 4).
- Perform system calibration.

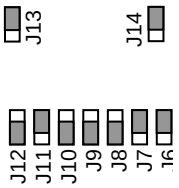
3.1.2.4 FGD3 Infra-red gas Detector Heads

The electronics for the head derives its power from the current loop. A separate supply is provided for the sensor due to the sensor requiring more than the 4-20mA loop current range.



Connection Procedure

- Disconnect power from the system.
- Remove the grey protective cover from the main PCB (refer to beginning of section 3 for removal instructions).
- Configure the jumper switches as shown below (i.e. J6, J7, J11, J13 and J14 switched ON, all others OFF)



- Connect a voltmeter (range 0-24V min) between pins 22 (+V) and 24 (0V) of PL5.
- Connect power to the system.
- Adjust VR1 and VR2 until voltmeter reads 6.5V ±0.1V (VR1 and VR2 provide fine and coarse voltage adjustment respectively).
- Disconnect power to the system and connect the wires from the detector head to PL5 on the main PCB observing the following:

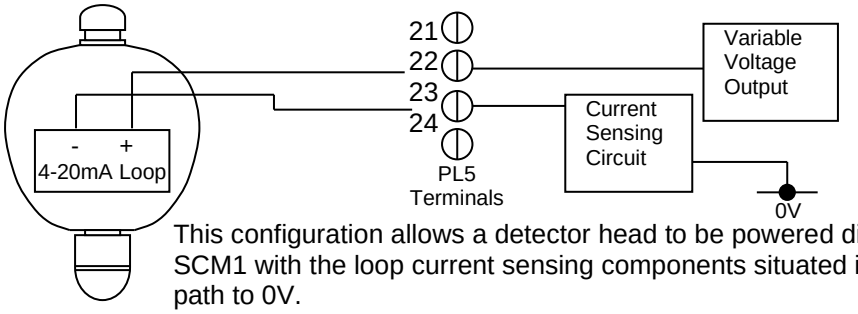
Detector Head Label 4-20mA Loop	PL5 (SCM1) Pin Number
0	24
+	22
Sig	21

- Connect power to the system and ensure the detector head operates (text on LCD display, LED will flash once every six seconds approximately)
- Measure the voltage between the + and 0 terminals at the detector head.
- If necessary adjust VR1 and VR2 at the SCM1 Control Unit to give 6.5V ±0.1V at the detector head (7.0V absolute maximum).
- Refit grey protective cover.
- Perform software configuration (refer to section 4).
- Perform system calibration.

3.1.3 Alternative Detector Heads

The SCM1 has been designed to accommodate detector heads built by alternative manufacturers, section 3.1.3 shows the relevant diagrams and procedures.

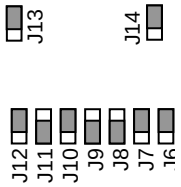
3.1.3.1 4-20mA Sink to Ground Using Internal PSU



This configuration allows a detector head to be powered directly from the SCM1 with the loop current sensing components situated in the return path to 0V.

Connection Procedure

- Disconnect power from the system.
- Remove the grey protective cover from the main PCB (refer to beginning of section 3 for removal instructions).
- Configure the jumper switches as shown below (i.e. J6, J7, J10, J12, J13 and J14 switched ON, all others OFF)

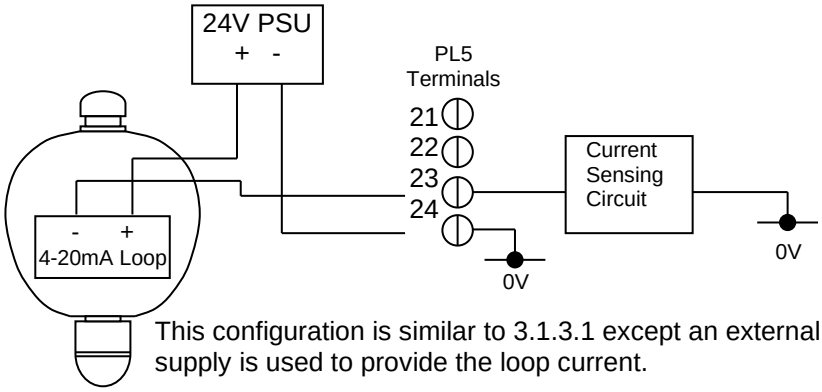


- Connect a voltmeter between pins 22 (+V) and pin 24 (0V) of PL5.
- Connect power to the system.
- Adjust VR1 and VR2 until the appropriate voltage is observed on the meter, typically 22V ±2V. Consult detector head instructions for recommended supply voltage.
- Disconnect power from the system.
- Connect the wires from the detector head to PL5 on the main PCB observing the following:

Detector Head	PL5 (SCM1) Pin Number
-	23
+	22

- Connect power to the system and ensure the detector head operates.
- Refit grey protective cover.
- Perform software configuration (refer to section 4).
- Perform system calibration. Refer to section 6 and detector head manufacturer's instructions.

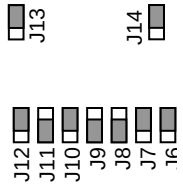
3.1.3.2 4-20mA Sink to Ground Using External PSU



This configuration is similar to 3.1.3.1 except an external power supply is used to provide the loop current.

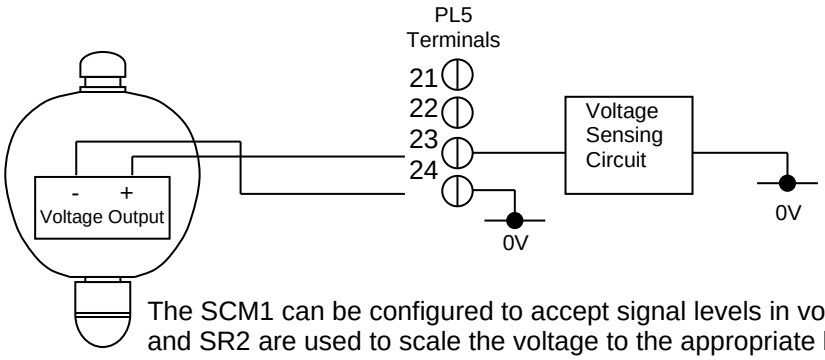
Connection Procedure

- Disconnect power from the system.
- Remove the grey protective cover from the main PCB (refer to beginning of section 3 for removal instructions).
- Configure the jumper switches as shown below (i.e. J6, J7, J10, J12, J13 and J14 switched ON, all others OFF)



- Connect the detector head to the SCM1 (PL5) observing the above diagram.
- Connect power to the system and ensure the detector head operates.
- Refit grey protective cover.
- Perform software configuration (refer to section 4).
- Perform system calibration. Refer to section 6 and detector head manufacturer's instructions.

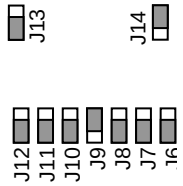
3.1.3.3 DC Voltage Input



The SCM1 can be configured to accept signal levels in voltage form. SR1 and SR2 are used to scale the voltage to the appropriate level.

Connection Procedure

- Disconnect power from the system.
- Remove the grey protective cover from the main PCB (refer to beginning of section 3 for removal instructions).
- Configure the jumper switches as shown below (i.e. J9 and J14 switched ON, all others OFF)



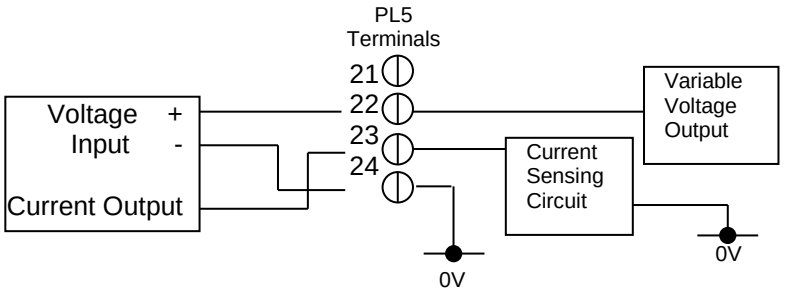
- Remove R18 and R19 (located above J13) from the SCM1 main PCB.
- Fit conventional ¼watt resistors to positions SR1 and SR2 using values from the following table.

Voltage Input (max)	SR1	SR2
2.5V	18R	470R
5V	390R	330R
10V	1K5	470R
12V	1K8	390R
24V	12K	1K2

For alternative voltage inputs contact Status Scientific for appropriate resistor values.

- Connect the detector head to the SCM1 (PL5) observing the above diagram.
- Connect power to the system.
- Refit grey protective cover.
- Perform software configuration (refer to section 4).
- Perform system calibration. Refer to section 6 and detector head manufacturer's instructions.

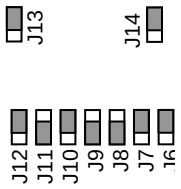
3.1.3.4 3-Wire Connection – (4-20mA Current Input and Separate Supply)



This configuration allows the connection of a detector head that provides a 4-20mA current output, and requires a separate power source, between 0-24V.

Connection Procedure

- Disconnect power from the system.
- Remove the grey protective cover from the main PCB (refer to beginning of section 3 for removal instructions).
- Configure the jumper switches as shown below (i.e. J6, J7, J10, J12, J13 and J14 switched ON, all others OFF)



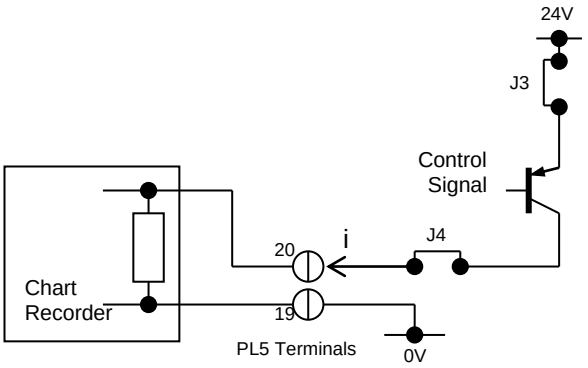
- Connect a voltmeter between pins 22 (+V) and 24 (0V).
- Connect power to the system.
- Adjust VR1 and VR2 until the correct voltage can be measured for the detector head being used.
- Disconnect power to the system.
- Connect the detector head to the SCM1 observing the above diagram.
- Refit grey protective cover.
- Connect power to the system and confirm that the detector head operates.
- Perform software configuration (refer to section 4).
- Perform system calibration. Refer to section 6 and detector head manufacturer's instructions.

3.2 Analogue Output Configuration

The SCM1 Control Unit can provide an analogue output directly proportional to the gas levels detected. This signal can then be used by external equipment (e.g. chart recorders, data loggers) for a variety of purposes.

The analogue output options available are:

3.2.1 4-20mA Current Source

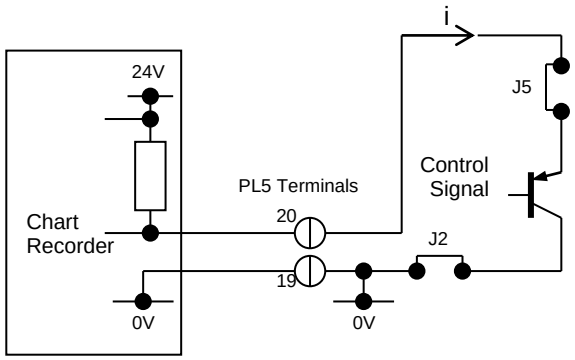


The SCM1 sources current proportional to the detected gas level.
i.e. zero gas = 4mA
full-scale = 20mA

The supply is taken from the internal PSU.

Notes
Switch ON J3 and J4

3.2.2 4-20mA Current Sink

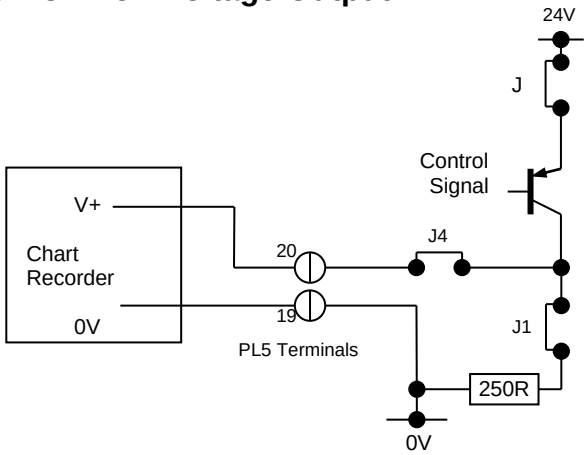


The SCM1 can also sink current proportional to the detected gas level.
i.e. zero gas = 4mA
full-scale = 20mA

The supply is derived from the external equipment.

Notes
Switch ON J2 and J5

3.2.3 1-5V Voltage Output



The SCM1 can provide a voltage output.
i.e. zero gas = 1V
full-scale = 5V

This output is not ideal when transmitting a signal over a large distance. The resistance of a cable attached will cause a voltage drop to occur.

Notes
Switch ON J1, J3 and J4.

NOTE: Incorrect jumper switch configuration can cause damage to the system.

4 SOFTWARE CONFIGURATION

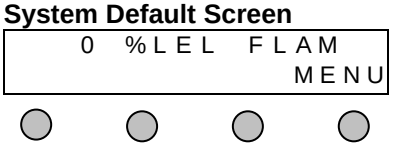
The compatibility of this system with many of the sensor types available, and the wide variety of applications for which this system is suitable have required the software configuration to be as flexible as possible. Many options are included within the software to allow the system to be fine tuned to a particular application, and these options may require changing as the system develops (e.g. change in alarm triggering levels).

Before attempting to configure the system ensure:

1. The SCM1 main PCB is correctly configured for the sensor or detector head being used (refer to section 3).
2. The sensor or detector head is correctly connected to the SCM1 control unit (refer to section 3).

Switch on the supply to the system. The firmware version and firmware creation date will be displayed for several seconds on the LCD display. The display will then change to its default screen. This displays the sensor type (flam, Oxygen etc.) for the system and the current reading (if the unit is not configured the top line of the display will be blank).

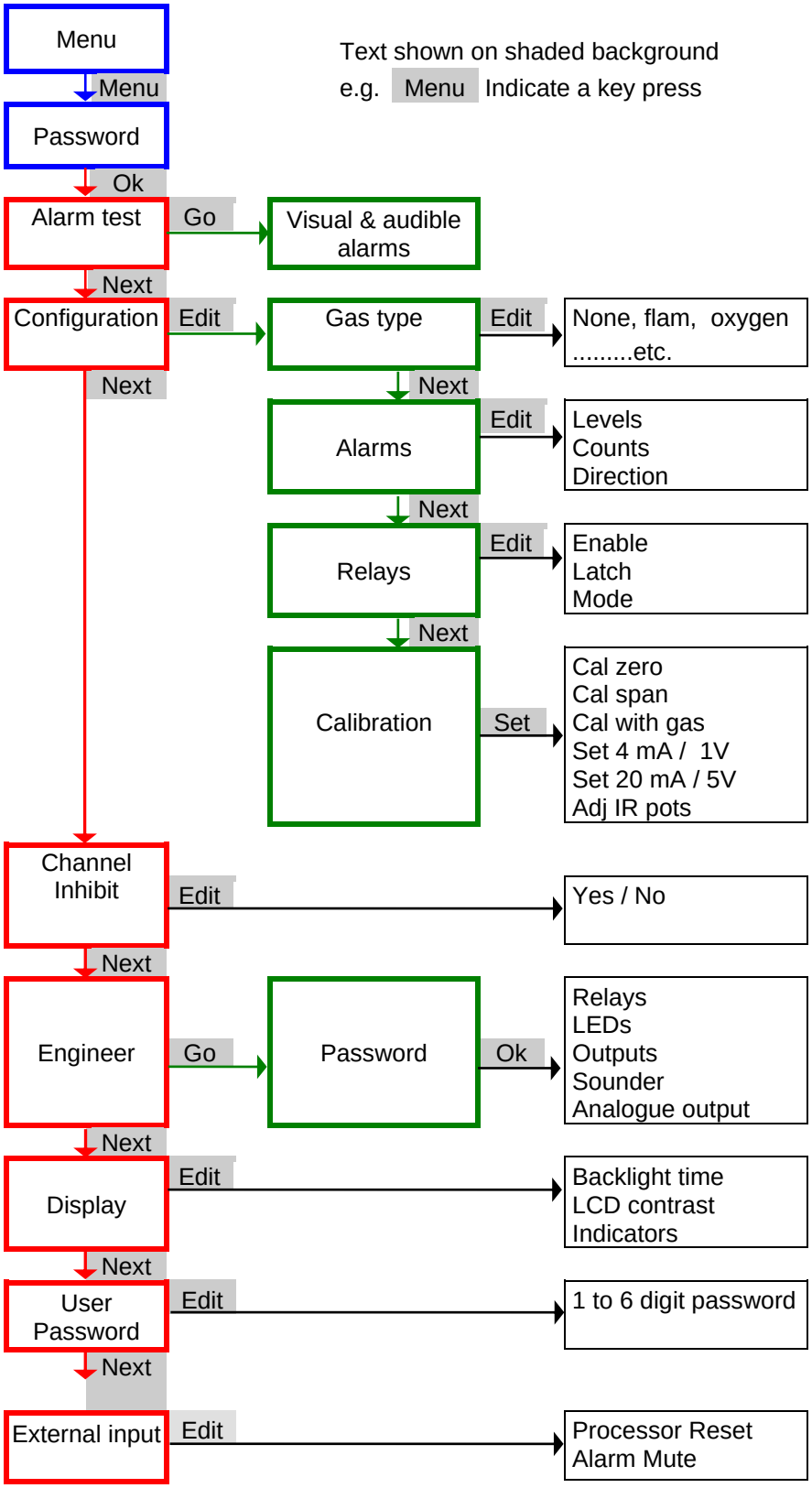
System Default Screen



Most of the features available within the SCM system are configurable in software via the SCM1 front panel display and keypad. Pressing the ‘MENU’ button (as indicated by the display) provides access to these features following correct password entry.

The SCM1 Control Unit will ordinarily be supplied with the correct hardware and software configuration for the detector or sensor requested by the customer at the time of ordering. However there are many parameters which may require alteration to suit the users requirements or personal preference. This section will discuss all of the options available and demonstrate the correct procedure for making alterations.

The flowchart below shows the menu structure of the software contained within the SCM1 Control Unit.


Menu
Text shown on shaded background
e.g. Menu Indicate a key press
Menu
Password
Ok
Alarm test
Go
Visual & audible alarms
Next
Configuration
Edit
Gas type
Edit
None, flam, oxygen .....etc.
Next
Next
Alarms
Edit
Levels
Counts
Direction
Next
Relays
Edit
Enable
Latch
Mode
Next
Calibration
Set
Cal zero
Cal span
Cal with gas
Set 4 mA / 1V
Set 20 mA / 5V
Adj IR pots
Channel Inhibit
Edit
Yes / No
Next
Engineer
Go
Password
Ok
Relays
LEDs
Outputs
Sounder
Analogue output
Next
Display
Edit
Backlight time
LCD contrast
Indicators
Next
User Password
Edit
1 to 6 digit password
Next
External input
Edit
Processor Reset
Alarm Mute

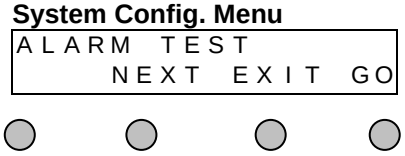
4.1 System Configuration Menu

From the System default Screen press MENU.

The display will change and a password will be requested. The default password for the system is 123. Key in the number and press the 'OK' button (If the incorrect password is entered the system will revert to the system default screen).

If the password is found to be correct, the display will show the first option within the System Configuration Menu.

System Config. Menu



Pressing NEXT will scroll through the menu allowing each of the options shown in the software menu structure flowchart to be selected.

Pressing EXIT will return the user to the 'System Default Screen' whilst pressing GO will select the option currently displayed (for options that allow system configuration GO will be replaced by EDIT).

4.2 Alarm Test

'ALARM TEST' allows the user to see how the unit will react in the event of an alarm condition.

From the 'System Configuration Menu' select ALARM TEST and press GO.

How the unit reacts will depend upon the system settings, for example an audible alarm may be heard, and the top visual indicator may flash red.

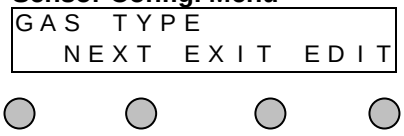
Pressing EXIT will return to the 'System Configuration Menu'.

4.3 Configuration

'CONFIGURATION' allows the user to configure the sensor connected to the system.

From the 'System Configuration Menu' select CONFIGURATION and press EDIT.

Sensor Config. Menu



The display will show the first option within the Sensor Configuration Menu.
Pressing NEXT will scroll through the menu allowing each of the options shown in the software menu structure flowchart to be selected.

Pressing EXIT will return the user to the 'System Configuration Menu' whilst pressing EDIT will select the option currently displayed (EDIT will be replaced by SET when the CALIBRATION option is displayed).

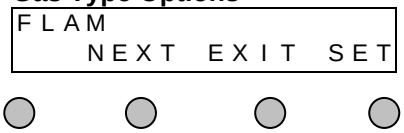
4.3.1 Gas Type

'GAS TYPE' allows the user to select the gas type that the system is monitoring. Note that the user must ensure that the sensor fitted is capable of detecting the gas type selected.

From the 'Sensor Configuration Menu' select GAS TYPE and press EDIT.

The display will show the current gas type selected (NONE will be displayed if the system has not been configured at the factory prior to dispatch).

Gas Type Options



Pressing NEXT will scroll through the available gas type options.

Pressing EXIT will return the user to the 'System Configuration Menu' whilst pressing SET will select the gas type currently displayed.

Following SET a screen will appear requiring the user to provide the full-scale deflection value for the gas type selected. The default FSD will be displayed and in most cases will not require alteration. Pressing the ↑ and ↓ keys will increase or decrease the FSD value allowing alternative FSD values to be selected. Press OK once the appropriate FSD value has been selected.

If the gas type selected is FLAM then an additional screen will now be displayed giving the user the option to choose which flammable gas the system is detecting. Pressing NEXT will scroll through the available options, pressing OK will select the gas currently displayed.

The screen will now provide the option UPDATE SYSTEM with two buttons YES or NO. Pressing YES will save the new settings, NO will discard any alterations made.

Note: when using the Infra-red hydrocarbon FGD3 select FLAM as the gas type. Do not use the cross sensitivity option as this is catered for within the FGD3.

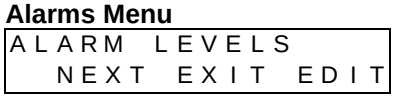
4.3.2 Alarms

'ALARMS' allows the user to determine the conditions that must be encountered for the system to enter its alarm status.

From the 'Sensor Configuration Menu' select ALARMS and press EDIT.

The display will show the first option within the Alarms Menu.

Alarms Menu



Pressing NEXT will scroll through the menu allowing each of the available alarm options to be selected.

Pressing EXIT will return the user to the 'System Configuration Menu' whilst pressing EDIT will select the option currently displayed.

4.3.2.1 Alarm Levels

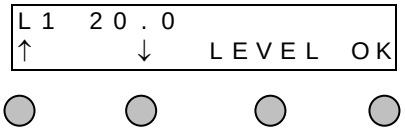
The system has two user configurable alarm levels. When an alarm level set under 'Level 1' is reached, relay 1 (located on the main PCB) will operate. Similarly if the alarm level set under 'Level 2' is reached, relay 2 will operate. Should either of the levels be reached the system will always enter its alarm status (assuming the system has not been inhibited).

From the 'Alarms Menu' select ALARM LEVELS and press EDIT.

The display will show the LEVEL option. Use the ↑ and ↓ keys to select the alarm level to be set and press OK.

A screen will now appear allowing the required alarm level to be set.

Alarm Levels



Use the ↑ and ↓ buttons to change the alarm level.

Press LEVEL to allow selection of the other level if required. Once all levels have been set press OK.

The screen will now provide the option UPDATE SYSTEM with two buttons YES or NO. Pressing YES will save the new settings, NO will discard any alterations made.

Note: level 3 is associated with the fault relay. The factory default setting is –10% of the sensor FSD, falling alarm, non-latching contacts.

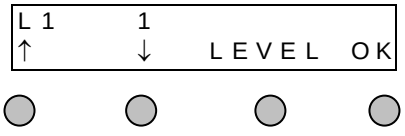
4.3.2.2 Alarm Counts

The 'ALARM COUNTS' option allows the user to configure how long the system must detect a gas in excess of the alarm levels before entering its alarm status (count being a multiple of seconds approximately). This feature can be used to minimise spurious alarms.

From the 'Alarms Menu' select ALARM COUNTS and press EDIT.

The display will show the LEVEL option. Use the ↑ and ↓ keys to select the alarm level to have counts set and press OK.
A screen will now appear allowing the number of alarm counts to be set.

Alarm Counts



Use the ↑ and ↓ buttons to change the number of counts required to cause an alarm. It is advisable to initially set the count value to 1. If spurious alarms do not occur then this value does not require alteration.
Press LEVEL to allow selection of the other level if required. Once all levels have been set press OK.

The screen will now provide the option UPDATE SYSTEM with two buttons YES or NO. Pressing YES will save the new settings, NO will discard any alterations made.

4.3.2.3 Alarm Direction

Each of the alarm levels can be set to alarm on a rising or falling gas level.

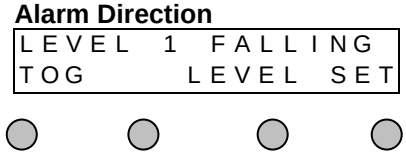
Example
An SCM1 connected to an oxygen sensor may require alarm levels at 19% and 23%.
Under normal conditions the instrument would display a reading of 20.9% oxygen (in air).
Level 1 alarm would be set at 19% **falling**.
Level 2 alarm would be set at 23% **rising**.

From the 'Alarms Menu' select ALARM DIRECTION and press EDIT.

The display will show the LEVEL option. Use the ↑ and ↓ keys to select the alarm level to have its direction set and press OK.

A screen will now appear allowing the alarm direction to be set.

Alarm Direction



Use the TOG button to change between rising and falling alarm levels.

Press LEVEL to allow selection of the other level if required. Once all levels have been set press OK.

The screen will now provide the option UPDATE SYSTEM with two buttons YES or NO. Pressing YES will save the new settings, NO will discard any alterations made.

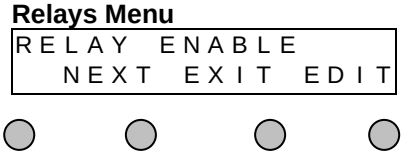
4.3.3 Relays

There are three relays fitted to the SCM1 main PCB. Each relay has 3 options:

- Relay Enable
- Relay Latch
- Relay Mode

From the 'Sensor Configuration Menu' select RELAYS and press EDIT.

Relays Menu



The display will show the first option within the Relays Menu.
Pressing NEXT will scroll through the menu allowing each of the available relay options to be selected.

Pressing EXIT will return the user to the 'System Configuration Menu' whilst pressing EDIT will select the option currently displayed.

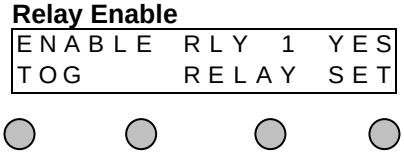
4.3.3.1 Relay Enable

'RELAY ENABLE' allows the user to control whether or not the relay will operate when the appropriate alarm levels have been reached.

From the 'Relays Menu' select RELAY ENABLE and press EDIT.

The display will show the RELAY option. Use the ↑ and ↓ keys to select the appropriate relay.

Relay Enable



A screen will now appear allowing the relay to be enabled (YES or NO).
Use the TOG button to change the enabled YES/NO status of the relay.

Press RELAY to allow selection of an alternative relay if required. Once all relays have been set press SET.

The screen will now provide the option UPDATE SYSTEM with two buttons YES or NO. Pressing YES will save the new settings, NO will discard any alterations made.

4.3.3.2 Relay Latch

'RELAY LATCH' allows the user to control whether or not the relay will latch following an alarm condition.

> **Relay 1 enabled, and set as latching**
> If a level 1 alarm condition is encountered relay 1 will operate. If the environment then clears, relay 1 will not reset until CLEAR is pressed on the SCM1 keypad. The SCM1 would reset the relay if it was set as non-latching and no user intervention would be required (Refer to section **5.1** for further details).

From the 'Relays Menu' select RELAY LATCH and press EDIT.

The display will show the RELAY option. Use the ↑ and ↓ keys to select the appropriate relay and press OK.

A screen will now appear allowing the relay to be latched (YES or NO).

Relay Latch

LATCH	RLY 1	YES
TOG	RELAY	SET

Use the TOG button to change the latch YES/NO status of the relay.

Press RELAY to allow selection of an alternative relay if required. Once all relays have been set press SET.

The screen will now provide the option UPDATE SYSTEM with two buttons YES or NO. Pressing YES will save the new settings, NO will discard any alterations made.

Note: Relays 1 and 2 must be set to the same mode, either latching or non-latching.

4.3.3.3 Relay Mode

'RELAY MODE' allows the user to control whether each of the relays function in a normally energised or de-energised state.

From the 'Relays Menu' select RELAY MODE and press EDIT.

The display will show the RELAY option. Use the ↑ and ↓ keys to select the appropriate relay and press OK.

A screen will now appear allowing the relays normal state to be set (N/E or N/D).

Relay Mode

RLY 1	N/E	
TOG	RELAY	SET

Use the TOG button to change the relays normal status.

Press RELAY to allow selection of an alternative relay if required. Once all relays have been set press SET.

The screen will now provide the option UPDATE SYSTEM with two buttons YES or NO. Pressing YES will save the new settings, NO will discard any alterations made.

Fault Relay

It is often preferable to operate relay 3 (fault relay) in a normally energised state. This will cause the relay to indicate a fault should the system suffer a total power loss (mains and battery back-up failure).

4.3.4 Calibration

'CALIBRATION' contains all of the functions required to calibrate the SCM1 system. This function is discussed in section **6**.

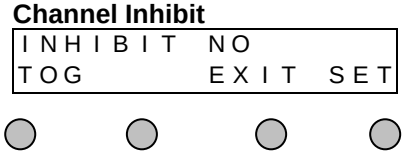
4.4 Channel Inhibit

'CHANNEL INHIBIT' allows the signal from a sensor to be ignored. This may be useful when changing a sensor or waiting for a new sensor to stabilise.

It is important to note that whilst the channel is inhibited the SCM1 will not indicate an alarm condition to the user and no relays will operate as a result of an alarm level being reached.

From the 'System Configuration Menu' select CHANNEL INHIBIT and press EDIT.

Channel Inhibit



Press TOG to alternate between the inhibit status.

Pressing EXIT will return to the 'System Configuration Menu'.

Once the sensor has been inhibited (YES / NO) press SET.

The screen will now provide the option UPDATE SYSTEM with two buttons YES or NO. Pressing YES will save the new settings, NO will discard any alterations made.

4.5 Engineer

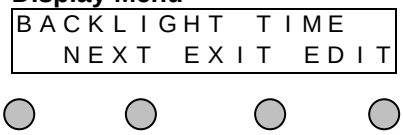
The 'ENGINEER' option is provided for use by Status Scientific personnel only.

4.6 Display

The 'DISPLAY' option allows various features of the LCD display, visual indicators and sounder to be configured.

From the 'System Configuration Menu' select DISPLAY and press EDIT.

Display Menu



Pressing NEXT will scroll through the menu allowing each of the available display options to be selected.

Pressing EXIT will return the user to the 'System Configuration Menu' whilst pressing EDIT will select the option currently displayed.

4.6.1 Backlight Time

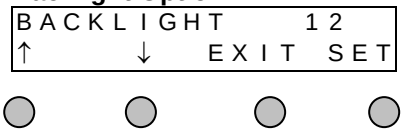
After a key press the LCD display backlight will turn on. How long the backlight stays on is user configurable. There are essentially three options:

- Permanently ON
- Permanently OFF
- ON for a predetermined time (measured in seconds).

From the 'Display Menu' select 'BACKLIGHT TIME' and press EDIT.

The display will show the current backlight time.

Backlight Option



Use the ↑ and ↓ buttons to adjust the back light time. Pressing ↓ from 1 results in the backlight being permanently OFF, pressing ↓ again results in the backlight being permanently ON.

Pressing EXIT will return the user to the 'System Configuration Menu' whilst pressing SET will save the current backlight time.

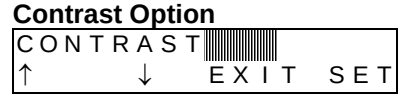
The screen will now provide the option UPDATE SYSTEM with two buttons YES or NO. Pressing YES will save the new settings, NO will discard any alterations made.

4.6.2 LCD Contrast

From the 'Display Menu' select 'LCD CONTRAST' and press EDIT.

The display will show a bar graph indicating the current contrast setting.

Contrast Option



Use the ↑ and ↓ buttons to adjust the contrast of the display.

Pressing EXIT will return the user to the 'System Configuration Menu' whilst pressing SET will save the current contrast setting.

The screen will now provide the option UPDATE SYSTEM with two buttons YES or NO. Pressing YES will save the new settings, NO will discard any alterations made.

4.6.3 Indicators

This feature allows configuration changes to be made to the way the SCM1 indicates various conditions.

From the 'Display Menu' select 'INDICATORS' and press EDIT.

Indicator Options

Press NXT to select the indicator option.

Press TOG to change the method of indication.

SLOW	The *ON* time is equal to the *OFF* time (equal mark-space ratio).
FAST	The *ON* time is less than the *OFF* time.
OFF	The indicator will never come on.
ON	When required indicator is *ON*, not flashing.

Pressing EXIT will return the user to the 'System Configuration Menu' whilst pressing SET will save the current settings.

The screen will now provide the option UPDATE SYSTEM with two buttons YES or NO. Pressing YES will save the new settings, NO will discard any alterations made.
For further details regarding indicators refer to section 1.4.

Note: The sounder option must not be changed. This has been configured at the factory prior to despatch.

4.7 User Password

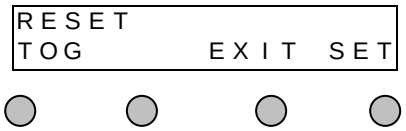
This feature allows selection of a new user password.
From the 'System Configuration Menu' select USER PASSWORD and press EDIT.
Key in the new password and press OK.
The screen will now provide the option UPDATE SYSTEM with two buttons YES or NO. Pressing YES will save the new settings, NO will discard any alterations made.

4.8 External Input

This feature allows the user to configure the ‘Reset Input’ as either a processor reset or an alarm mute/ clear.

From the ‘System Configuration Menu’ select EXTERNAL RESET and press EDIT.

External Reset



Press TOG to alternate between the RESET and MUTE options.

Pressing EXIT will return to the ‘System Configuration Menu’.

Once the external input mode has been selected press SET.

The screen will now provide the option UPDATE SYSTEM with two buttons YES or NO. Pressing YES will save the new settings, NO will discard any alterations made.

5 OPERATION

Under conditions of no alarm the SCM1 does not require any user intervention to operate normally.

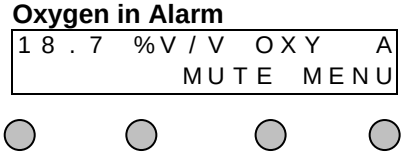
5.1 Accepting an Alarm

If the sensor connected to the SCM1 indicates a gas level in excess of the alarm levels set during software configuration, the unit will enter its alarm status.

Alarm status is indicated by (dependent on software configuration):

- Red Indicators at top of front panel will flash.
- Red LED on front panel will light.
- Pulsing audible alarm can be heard.
- 'A' appears after the gas level reading on the LCD display.

Oxygen in Alarm



Pressing the MUTE button will silence the audible alarm. *Note that pressing the MUTE button has no effect on any other feature within the system i.e. relays, outputs, visual indicators etc.*

The MUTE button now changes its function to that of CLEAR.

Once the alarm condition has passed pressing the CLEAR button will reset latched relays and outputs to their healthy status.
CLEAR has no effect on the system until the alarm condition no longer exists.

Note: The CLEAR function operates automatically if all relays are configured as non-latching (i.e. user intervention is not required to reset relays, visual indicators etc).

The external input can be software configured to mimic the MUTE button, see section 4.8 for further details.

5.2 Fault Indication

If the signal from the sensor is not detected by the system, the system will indicate a fault. This will be seen as flashing (dependent on software configuration) yellow indicators at the top of the front panel.

If the green 'power' light (located on the front panel) is flashing, the fault is due to the system power supply failing and the system is running on its standby batteries (if fitted).

6 CALIBRATION

The SCM1 Control Unit is normally supplied as a calibrated instrument. After installation the unit should be connected to a power source and allowed to stand for 1 hour minimum before readings are taken or any further calibrations are performed.

6.1 SCM1 fitted with a Local Sensor

Local sensors are calibrated by having a zero point recorded (CAL ZERO) and either their full-scale point or an alternative high level reading recorded. A local oxygen sensor is a special case and is discussed in section 6.1.2.

Important Before Calibration
Ensure the hardware configuration (J6 – J14) is correct at the SCM1.
Ensure the software configuration is correct at the SCM1 (gas type, range etc).

6.1.1 SCM1 with a Local Sensor

CAL ZERO
Ensure the sensor is in fresh air.

- Press MENU from the keypad.
- Enter the password (default password from factory is 123) and press OK.
- Press NEXT until CONFIGURATION appears on the display, press EDIT.
- Press NEXT until CALIBRATION appears on the display, press SET.
- Press NEXT until CAL ZERO appears on the display, press SET.
- Press ZERO followed by SET.
- Press YES to update the system.
- Press EXIT, confirm instrument reads 0.

Following CAL ZERO perform either CAL GAS SPAN or CAL FSD SPAN

CAL GAS SPAN

- Apply a known concentration of gas (applicable to sensor type) using sampling adaptor code 231201 at a flow rate of between 500 and 1000cc/min. Allow time for the sensor to respond.
  The concentration should ideally be greater than 75% of the full-scale reading.
  e.g. if FSD is 1000ppm then use a minimum of 750ppm as a calibration gas.
- Press MENU from the keypad.
- Enter the password (default password from factory is 123) and press OK.
- Press NEXT until CONFIGURATION appears on the display, press EDIT.
- Press NEXT until CALIBRATION appears on the display, press SET.
- Press NEXT until CAL WITH GAS appears on the display, press SET.
- Using the ↑ and ↓ buttons change the value on the display to give the current level of gas to which the sensor is being exposed.
- Press SPAN to calibrate the sensor. SPAN can be repeatedly pressed until the readings match the calibration gas level.
- Press SET followed by YES to update the system.

CAL FSD SPAN

- Apply a concentration of gas to the sensor, equal to the full-scale reading selected on the SCM1 using sampling adaptor code 231201 at a flow rate of between 500 and 1000cc/min. Allow time for the sensor to respond.
- Press MENU from the keypad.
- Enter the password (default password from factory is 123) and press OK.
- Press NEXT until CONFIGURATION appears on the display, press EDIT.
- Press NEXT until CALIBRATION appears on the display, press SET.
- Press NEXT until CAL FSD SPAN appears on the display, press SET.
- Using the ↑ and ↓ buttons change the value on the display to give the FSD reading.
- Press SET followed by YES to update the system.

6.1.2 Local Oxygen Sensor

CAL ZERO
This function should only be performed following installation or replacement of a piggy-back board.

- Press MENU from the keypad.
- Enter the password (default password from factory is 123) and press OK.
- Press NEXT until CONFIGURATION appears on the display, press EDIT.
- Press NEXT until CALIBRATION appears on the display, press SET.
- Press NEXT until CAL ZERO appears on the display, press SET.
- Unplug the 8-way screw terminal connector from PL11.
- Wait approximately 2 seconds.
- Press ZERO followed by SET.
- Press YES to update the system.
- Plug the 8-way screw terminal connector back into PL11.
- Wait for 1 hour before attempting to perform CAL GAS SPAN calibration.

CAL GAS SPAN
Ensure the instrument is under normal environmental conditions (i.e. 20.9% Oxygen).

- Press MENU from the keypad.
- Enter the password (default password from factory is 123) and press OK.
- Press NEXT until CONFIGURATION appears on the display, press EDIT.
- Press NEXT until CALIBRATION appears on the display, press SET.
- Press NEXT until CAL GAS SPAN appears on the display, press SET.
- Using the ↑ and ↓ buttons set the reading on the display to 20.9%.
- Press SET followed by YES to update the system.

6.2 SCM1 with Remote Sensors

Calibration of an SCM1 connected to a remote FGD1 or FGD2 detector head (manufactured by Status Scientific) is a very simple process. The calibration of a detector head from an alternative manufacturer may or may not be as simple. Section 6.2.2 will show how to calibrate the SCM1 but the user must consult the data for their detector head to ensure the calibration is performed to a satisfactory level.

Important Before Calibration
Ensure the hardware configuration (J6 – J14) is correct at the SCM1.
Ensure the software configuration is correct at the SCM1 (gas type, range etc).
Ensure the Detector Head is calibrated.

6.2.1 FGD Detector Heads

This calibration procedure is suitable for calibrating the SCM1 Control Unit when connected to any calibrated FGD1, FGD2 or FGD3 detector head.

Important Before Calibration
Ensure the FGD Detector Head is in a zero gas environment.

CAL ZERO

- Place the detector head in CAL 1 mode, see FGD head manual.
  The head will now sink a current of 4mA simulating a zero gas environment.

At the SCM1:

- Press MENU from the keypad.
- Enter the password (default password from factory is 123) and press OK.
- Press NEXT until CONFIGURATION appears on the display, press EDIT.
- Press NEXT until CALIBRATION appears on the display, press SET.
- Press NEXT until CAL ZERO appears on the display, press SET.
- Press ZERO followed by SET.
- Press YES to update the system.
- Exit CAL 1 mode at the detector head by pressing the SPAN and ZERO buttons simultaneously.

CAL GAS SPAN

- Place the detector head in CAL 4 mode, see FGD head manual.
  The head will now sink a current of 20mA simulating a full-scale gas environment.

At the SCM1:

- Press MENU from the keypad.
- Enter the password (default password from factory is 123) and press OK.
- Press NEXT until CONFIGURATION appears on the display, press EDIT.
- Press NEXT until CALIBRATION appears on the display, press SET.
- Press NEXT until CAL FSD SPAN appears on the display, press SET.
- Press SPAN followed by SET.
- Press YES to update the system.
- Exit CAL 4 mode at the detector head by pressing the SPAN and ZERO buttons simultaneously.

6.2.2 Alternative Detector Heads

CAL ZERO
Ensure the detector head is in a zero gas environment.

- Press MENU from the keypad.
- Enter the password (default password from factory is 123) and press OK.
- Press NEXT until CONFIGURATION appears on the display, press EDIT.
- Press NEXT until CALIBRATION appears on the display, press SET.
- Press NEXT until CAL ZERO appears on the display, press SET.
- Press ZERO followed by SET.
- Press YES to update the system.

Following CAL ZERO perform either CAL GAS SPAN or CAL FSD SPAN

CAL GAS SPAN
Apply a known concentration of gas to the remote sensor (applicable to sensor type). Allow time for the sensor to respond.
The concentration should ideally be greater than 75% of the full-scale reading.
e.g. if FSD is 1000ppm then use a minimum of 750ppm as a calibration gas.

- Press MENU from the keypad.
- Enter the password (default password from factory is 123) and press OK.
- Press NEXT until CONFIGURATION appears on the display, press EDIT.
- Press NEXT until CALIBRATION appears on the display, press SET.
- Press NEXT until CAL GAS SPAN appears on the display, press SET.
- Using the ↑ and ↓ buttons change the value on the display to give the current level of gas to which the sensor is being exposed.
- Press SET followed by YES to update the system.

CAL FSD SPAN
Apply a concentration of gas to the remote sensor equal to the full-scale reading selected on the SCM1. Allow time for the sensor to respond.

- Press MENU from the keypad.
- Enter the password (default password from factory is 123) and press OK.
- Press NEXT until CONFIGURATION appears on the display, press EDIT.
- Press NEXT until CALIBRATION appears on the display, press SET.
- Press NEXT until CAL FSD SPAN appears on the display, press SET.
- Using the ↑ and ↓ buttons change the value on the display to give the FSD reading.
- Press SET followed by YES to update the system.

6.3 Analogue Output Calibration.

Ensure the correct hardware configuration is selected on the SCM1 (refer to section 3.2).

There are two methods of calibration for the analogue output, the method used depend upon the type of output being provided.

Method 1 (4-20mA Output)
Connect an ammeter between pins 19 (-) and 20 (+) on PL5 on the SCM1 Control Unit (jumper switches J3 & J4 are switched ON).

- Press MENU from the keypad
- Enter the password (default password from factory is 123) and press OK.
- Press NEXT until CONFIGURATION appears on the display, press EDIT.
- Press NEXT until CALIBRATION appears on the display, press SET.
- Press NEXT until SET 4mA LEVEL appears on the display, press SET.
- Press ↑and ↓ until the reading on the ammeter reads 4mA ±0.1mA, press SET.
- Press YES to update the system or press NO to abandon the changes.
- Press EDIT.
- Press NEXT until CALIBRATION appears on the display, press SET.
- Press NEXT until SET 20mA LEVEL appears on the display, press SET.
- Press ↑ and ↓ until the reading on the ammeter reads 20mA ±0.1mA, press SET.
- Press YES to update the system or press NO to abandon the changes.
- Press EXIT to return to the normal monitoring status of the system.

Method 2 (1-5V Output)
Connect a voltmeter between pins 19 (-) and 20 (+) on PL5 on the SCM1 Control Unit (jumper switches J3, J4 and J1 are switched ON).

- Press MENU from the keypad.
- Enter the password (default password from factory is 123) and press OK.
- Press NEXT until CONFIGURATION appears on the display, press EDIT.
- Press NEXT until CALIBRATION appears on the display, press SET.
- Press NEXT until SET 4mA LEVEL appears on the display, press SET.
- Press ↑ and ↓ until the reading on the voltmeter reads 1.0 ±0.03V, press SET.
- Press YES to update the system or press NO to abandon the changes.
- Press EDIT .
- Press NEXT until CALIBRATION appears on the display, press SET.
- Press NEXT until SET 20mA LEVEL appears on the display, press SET.
- Press ↑ and ↓ until the reading on the voltmeter reads 5V ±0.03V, press SET.
- Press YES to update the system or press NO to abandon the changes.
- Press EXIT to return to the normal monitoring status of the system.

Note: In both cases a multimeter may be used giving its reading in the correct format and over the correct range. i.e. 4 – 20 milliamps or 1 – 5 volts.

7 GAS DETECTOR CONTAMINANTS

The information provided in this section and its associated sub-sections is taken from the sensor manufacturers 'Product Data Handbook'.

7.1 Flammable Gas Sensors

This section relates only to flammable sensors containing pellistors.

Certain substances are known to have a detrimental effect on sensors containing pellistors.

Poisons

Some compounds will decompose on the pellistor and form a solid barrier over its surface. This action is cumulative and prolonged exposure will result in an irreversible decrease in sensitivity. The most common of these substances are:

lead or sulphur containing compounds,
silicones, phosphates.

It may be possible to recalibrate a sensor that is known to have been exposed to a poison. However Status Scientific Controls strongly advise sensor replacement in these circumstances.

Inhibitors

Certain compounds (especially H_2S and halogenated hydrocarbons) are absorbed or form compounds that are absorbed by the pellistor. This absorption is so strong that reaction sites within the pellistor become blocked and normal reactions are inhibited. The resultant loss of sensitivity is temporary and in most cases a sensor will recover after a period of operation in clean air.

Pellistors will detect numerous flammable gases. The level at which they respond varies depending upon the flammable gas. Contact Status Scientific Controls for details regarding the cross sensitivity of flammable gases.

7.2 Oxygen Sensors

At very high levels (i.e. % levels), highly oxidising gases (e.g. ozone and chlorine) will interfere to the extent of their oxygen equivalent *, but most other commonly occurring gases will have no effect. For example:

Methane100%	0
Hydrocarbons 100%	0
Hydrogen 100%	< -2%
Carbon Monoxide 20%	< -0.5%

Acid gases such as CO_2 and SO_2 will be slightly absorbed by the electrolyte (within the oxygen sensor) and tend to increase the flux of oxygen to the electrode.. This gives an enhanced oxygen signal of about 0.3% of signal per 1% CO_2. The oxygen sensors are not suitable for continuous operation in concentrations of CO_2 above 25%.

* Sensors should not be subjected to prolonged exposure to highly corrosive atmospheres, as this will cause premature failure.

7.3 Toxic Gas Sensors

Toxic gas sensors are known to be cross sensitive to gases other than those for which they have been designed to detect. The amount of response observed by a sensor will vary depending upon the sensor type and the interfering gas.

For example:
This table shows the cross-sensitivity of the H_2S sensor fitted to our FGD1,2 and 3 Detector Heads. The table shows the typical response to be expected from a sensor when exposed to a given test gas concentration.

Gas	Concentration	Sensor Response
Carbon Monoxide	300ppm	≤ 6ppm
Sulphur Dioxide	5ppm	< 1ppm
Nitric Oxide	35ppm	0ppm
Nitrogen Dioxide	5ppm	≈ -1ppm
Chlorine	1ppm	≈ -0.1ppm
Hydrogen	10,000ppm	< 15ppm
Hydrogen Cyanide	10ppm	0ppm
Hydrogen Chloride	5ppm	0ppm
Ethylene	100ppm	0ppm

Contact Status Scientific Controls for further details regarding the cross-sensitivity of a particular sensor.

8 SENSOR DISPOSAL

All gas sensors should be disposed of according to local waste management requirements and environmental legislation. They should not be burnt since they may evolve toxic fumes. Status Scientific will accept sensors for disposal (by prior arrangement) contact Status Scientific Controls for further details.

8.1 Oxygen Sensors

Oxygen Sensors contain a 4-molar potassium acetate solution which is corrosive. They also contain small amounts of lead, lead oxide, platinum, silver, carbon and antimony, some of which are toxic and/or mutagenic. As these sensors contain some highly toxic compounds, irrespective of physical condition, they should be disposed of according to local waste management requirements and environmental legislation. They should not be burned as they may evolve toxic fumes.

8.2 Toxic Gas Sensors

The majority of toxic gas sensors contain a sulphuric acid electrolyte. They also contain platinum, ruthenium, gold, silver and carbon, some of which are toxic.

Several sensors contain a phosphoric acid electrolyte. And a select few also contain lithium chloride, sodium chloride and iodine which are toxic.

8.3 Flammable Gas Sensors

Pellistor based flammable gas sensors contain two pellistor beads known as the detector and the compensator. The pellistor bead of the detector element contains very small traces of toxic chemicals. The amounts involved are so small they do not represent any safety hazard. However they should still be disposed of in accordance with guidelines laid down by any relevant safety bodies as well as in accordance with local regulations.

9 SERVICE

9.1 Warranty

The quality of design and manufacture included in all Status Scientific Controls Instruments ensure a long and trouble free life.

In the unlikely event of a piece of our equipment failing within the first twelve months following delivery, Status Scientific will repair or replace any faulty parts, free of charge, providing that the equipment has not been misused.

9.2 Commissioning and Service

The SCM Control Unit is fully tested prior to delivery. However, after installation we strongly recommend that full system testing and commissioning be carried out. Status Scientific Controls Service personnel are best equipped to perform the relevant tests and commissioning.

9.3 Sensor Replacement

Sensors have a finite life; Pellistors have an expected life span in excess of two years, whilst electrochemical sensors have an expected life span of approximately two years.

SCM1 Control Units and FGD Detector heads have push-fit sensors to aid on-site replacement. The different sensor designs dictate mounting orientations to minimise possibilities of incorrect installation. The front cover of the SCM1 or the FGD detector head does not require opening in order to replace the sensor (assuming new sensor is of same type).

Sensor Removal and Refitting

a) Use ‘Channel Inhibit’ to disable the SCM1 Control Unit (refer to section 4.4).
b) Release the grub screw situated on the stainless steel sensor housing.
c) Unscrew the sensor housing cover.
d) Unplug the sensor assembly noting the position of any gaskets or ‘O’ rings.
e) Ensure the new sensor assembly is identical to the old.
f) Push in the new sensor assembly.
g) Refit the sensor housing cover, gaskets etc. and tighten the grub screw.
h) Allow the sensor to stabilise (1-24 hours for toxic, 1-2 minutes for flammable, 30 minutes for Infra-red).
i) Use ‘Channel Inhibit’ to enable the SCM1 Control Unit (refer to section 4.4).
j) Calibrate the unit.

9.4 Routine Servicing

The SCM Control Unit will provide a reliable and fault free service but it relies upon sensible housekeeping and regular calibrations.

It is recommended that the system be calibrated **at least** once every six months. This can be arranged with Status Scientific Controls as part of a maintenance contract.

9.4.1 Routine Inspection

It is advisable to periodically inspect the SCM Control Unit Installation:

- Check cables to ensure no damage has occurred.
- Clean control unit casing using a clean cloth.
- Where remote detectors are used:
  - ◊ Clean detector heads using a clean DAMP cloth.
    Note: Use of a dry cloth would constitute a static hazard.
- Inspect the sensor housing and ensure the aperture is not obstructed.

The time interval between routine inspections will depend upon the area in which the equipment is installed. A clean laboratory installation may only require inspection at calibration time, where as a installation in a particularly dirty environment may require weekly inspections. It is the responsibility of the system engineer to assess the installation environment and determine the frequency of routine inspections.

10 APPENDIX

10.1 FGD Detector Head Calibration 'Look-up Table'

Each time a calibration is performed on a detector head, the user will be displayed a zero and a span factor (refer to the FGD head manual for calibration instructions). The values given for these factors should be compared to the table below to determine the serviceability of the sensor.

Status Scientific Controls strongly advise that sensors providing zero and span factors that do not correspond to those listed as acceptable must not be used. A new sensor MUST be fitted in the detector to allow continued accurate and reliable readings to be made (refer to section 9.3 for sensor replacement instructions).

Sensor	Zero			Span		
	Min	Typical	Max	Min	Typical	Max
LEL CH_4	50	300	600	200	320	960
O_2	0	5	20	350	450	1300
H_2S	350	500	600	100	n/d	1500
CO	350	500	600	100	n/d	1500
CL_2	350	500	600	100	n/d	1500
NO_2	350	500	600	100	n/d	1500

n/d : no data.
This data is unavailable at time of printing. Please contact Status Scientific Controls for updated table.

Note: Contact Status Scientific Controls for details regarding any sensor not listed.

10.2 Installation Instructions for Sounder/Beacon Accessories

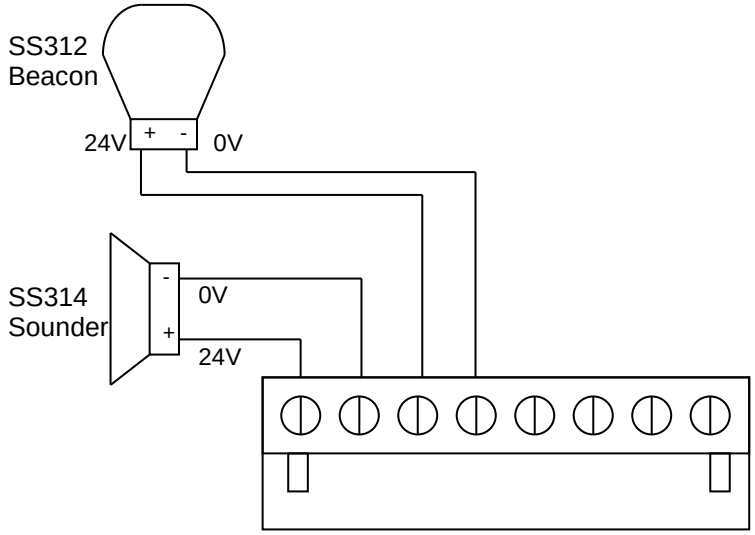
The SCM1 system has two outputs that are intended for switching alarm sounders and/or beacons. These alarms take their power from the SCM system, whereas alarms triggered by the various relays are more suited to supply from external power sources.

Cable Specification:
1mm^2 minimum conductors should be used between the SCM and sounder/beacon.

Sounder/Beacon Specification:
All Status Scientific sounders and beacons are suitable for internal/external use.
Rated to IP65
Supply Voltage 24V

Terminations:

The wiring diagram below shows the interconnection details between PL4 on the top left-hand side of the SCM1 main PCB and external sounders and/or beacons.



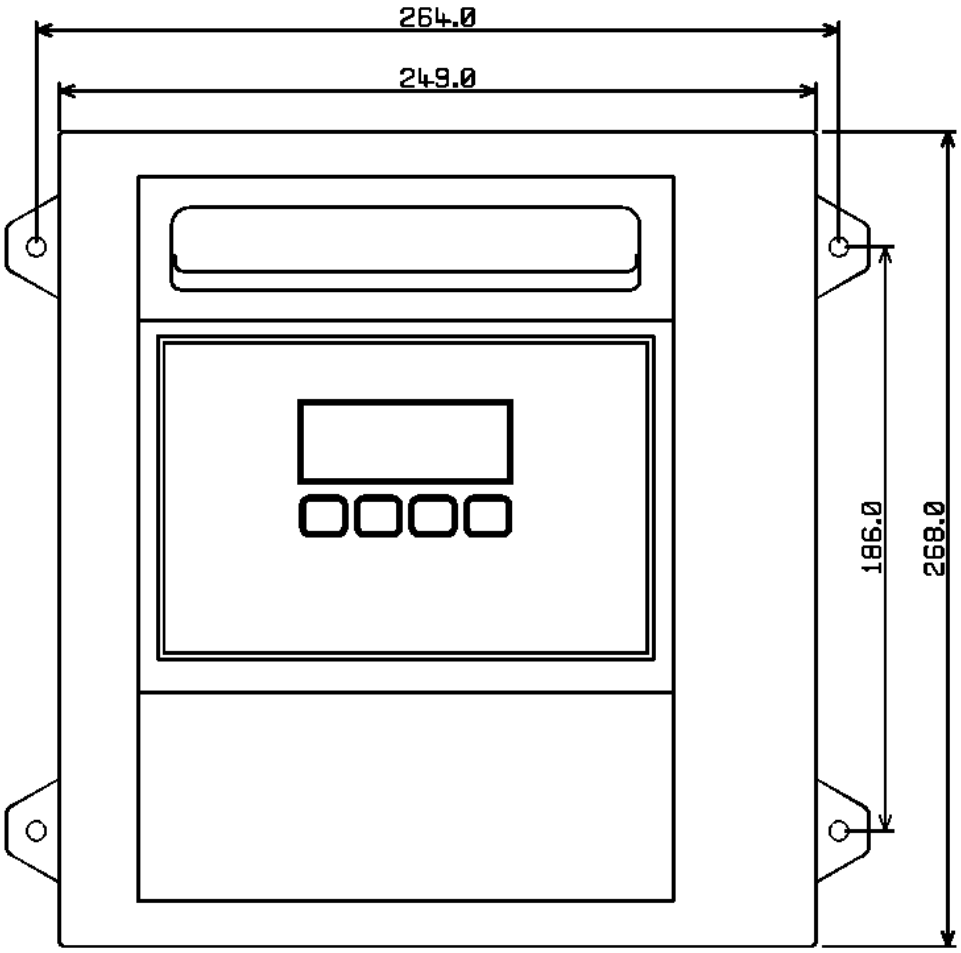
Notes
(a) The alarms should only be connected with the SCM1 isolated from its supply.
(b) The load placed upon outputs 1 & 2 must not exceed 200mA each.

Part Numbers:

SS-312	24V DC Beacon
SS-314	24V DC Sounder
SS-315	24V DC Sounder/Beacon Combined

10.3 Mounting Details for SCM1 Control Unit

The diagram below shows the mounting centres for the SCM1 Control Unit.



The external dimensions of the enclosures have also been shown to aid in planning of a suitable site for mounting.

Note

a) The front panel of the SCM1 opens to allow access to the screw terminals situated inside. Sufficient space should be allowed around the mounting position so that this action is not restricted.

b) If a local sensor is fitted 100mm minimum clearance should be provided beneath control unit.

Four mounting holes are provided, each having a diameter of 6.5mm.

Fixings Required:

4 off M6 Fasteners
(Rawl Bolts or similar dependent on mounting wall construction)

11 GLOSSARY OF TERMS

Detector Head	A device containing the necessary electronic circuitry to supply a 4-20mA or voltage output to a control unit. This allows the control unit to monitor gas levels at a remote location. Connects to the control unit by cable.
Local Sensor	A sensor using circuitry located within the SCM1 and mounted directly onto the SCM1 casing.
Piggy Back Board	A PCB which plugs into the main PCB within the SCM1 Control Unit providing the SCM1 with additional options or features.
Remote Sensor	A sensor mounted on a detector head and connected to the SCM1 by cable.
SSCL	Status Scientific Controls Ltd.
Infra-red Sensor	Sensor utilising infra-red technology to detect gas.