

# OPERATING & MAINTENANCE MANUAL

SMOKE VENT  
CONTROL SYSTEM

# VCS-S2



Software version: SVCS2E

\* Enclosure design may vary



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## GENERAL OVERVIEW

The VCS series of smoke vent systems are easy to operate, need very little maintenance and are "intelligent", in that for most common failures (wiring, power supplies etc.) they will set some form of warning alarm.

## OPERATION

Once fully installed the system is totally automatic and provided that the Yellow FAULT LED indicator is not on and there are no warning sounds the system will upon receipt of an alarm input condition (BMS Fire Alarm etc.) open the smoke vents. The smoke vents will stay fully open until the input condition (BMS, Fire Alarm, etc.) has been normalized, when the vents will close. Should you require the vents to stay open after the alarm panel has been silenced (or de-activated) then a manual open command should be issued by use of the manual key switch on the front of the panel. Alternatively a jumper can be set to bridge S1 & S3, this will force the VCS to stay in a Fire condition until reset either via the Network or operating the front panel keyswitch briefly to Close position.

### TECHNICAL SPECIFICATION

Supply Voltage	230v AC +10% -7%
Output Voltage	24v DC 19 - 29.5
Output Current	5 Amp MAX
Batteries	2 x 5Ah 12v (Yuasa or Yucel)

## FUNCTION

### **PANEL KEYSWITCH – PRIORITY 1**

<b>OPEN</b>	<b>AUTO</b>	<b>CLOSE</b>
All vents will open even if smoke sensor or break glass call points are not activated.	Will obey any remote inputs.	Will close vents even if smoke sensor or break glass call points are activated.

### **NETWORK COMMANDS – PRIORITY 1 (Network enabled version only)**

<b>NET OPEN</b>	<b>NET AUTO</b>	<b>NET CLOSE</b>
Vent will open unless a Panel key override Close is operated.	Will obey any remote inputs.	Will Close vents even if smoke sensor, break glass, Panel Key Open or call points are activated.

### **FIREMANS OVERRIDE SWITCH – PRIORITY 1**

<b>OPEN</b>	<b>AUTO</b>	<b>CLOSE</b>
Vent will open even if smoke sensor or break glass call points are not activated.	Will obey any remote inputs.	Will Close vents even if smoke sensor or break glass call points are activated.

*Note: There is no priority between the override switches but a close signal will take priority over an open signal.*

### **SMOKE SENSOR – 2ND PRIORITY**

<b>ACTIVATED</b>	<b>NOT ACTIVATED</b>
All Vents will open unless overridden by FIREMANS OVERRIDE, CONTROL PANEL SWITCH or NETWORK CLOSE.	Vents stay closed.

### **BREAK GLASS – 2ND PRIORITY**

<b>ACTIVATED</b>	<b>NOT ACTIVATED</b>
All Vents will open unless overridden by FIREMANS OVERRIDE, CONTROL PANEL SWITCH or NETWORK COMMANDS.	Vents stay closed.

### **230V POWER FAILURE PROCEDURE**

<b>ON POWER FAILURE</b>	<b>ACTION</b>	<b>RESULT</b>
Within 10 minutes	Reports a fault.	HEALTHY LED goes out and FAULT LED flashes and panel sounder bleeps every 8 seconds. Net indicates Fault.
After 72 hours	Shuts down to minimum power.	The system will function for 180 seconds at full load. After 72 hours and 180 seconds of load the system will continue until batteries are exhausted.

# INSTALLATION

**1** Please read the contents of this manual in its entirety before proceeding with the installation notes below.

**2** Unlock cabinet door using key provided and remove PCB.

**3** Prepare holes for cable entry. Fit cable glands (by others).  
Fix cabinet in place.

**4** Feed cables into cabinet.

**5** Make cable connections as per attached wiring diagrams remove the appropriate connector from the circuit card to facilitate easy access to the connector.

**6** Connect ribbon connector (found on back of enclosure door) to control board.



Never connect or disconnect any connector whilst the VCS has power applied.

**7** Connect batteries (supplied with panel) as per the wiring **BEFORE** mains power is connected.

**8** Make mains connection, ensuring the cabinet and or the transformer is earthed (test using low value ohms meter).

## CABLING



Cabling/connection of this panel should only be carried out by a competent person and in accordance with all local and national standards and legislation.

### **MAINS VOLTAGE**

*Two core + earth on a fused 3 Amp spur or a separate circuit protected by a 6 Amp MCB.*

### **VENT ACTUATORS**

*Two core + earth FP200+ or equivalent for reverse polarity actuators.*

*Three core + earth FP200+ or equivalent for common with drive open- drive close.*

*Three core + earth FP200+ or equivalent for Belimo Actuators.*



**Some actuators have a signal wire to indicate open close status this MUST NOT be connected to the panel.**

*Cable sizes must be calculated to ensure against excessive voltage drop*

*Voltage Drop (Vd) should not exceed 2 Volts*

*The formula is as follows;  $Vd = mV \times A \times m$*

*Where;*

*A = total amperage of motors*

*m = length in metres*

*mV= millivolts per amp per metre figure taken from manufacturers cable data or use the tables in the BS7671 (wiring regs.) document.*

*Example;*

*1 Supermaster Actuator = 2 Amps max load*

*Cable length m = 20 metres*

*1.5mm square cable == 29mV per amp per metre == 0.029Volts*

*$(0.029 \times 2) \times 20 = 1.16V (Vd)$*

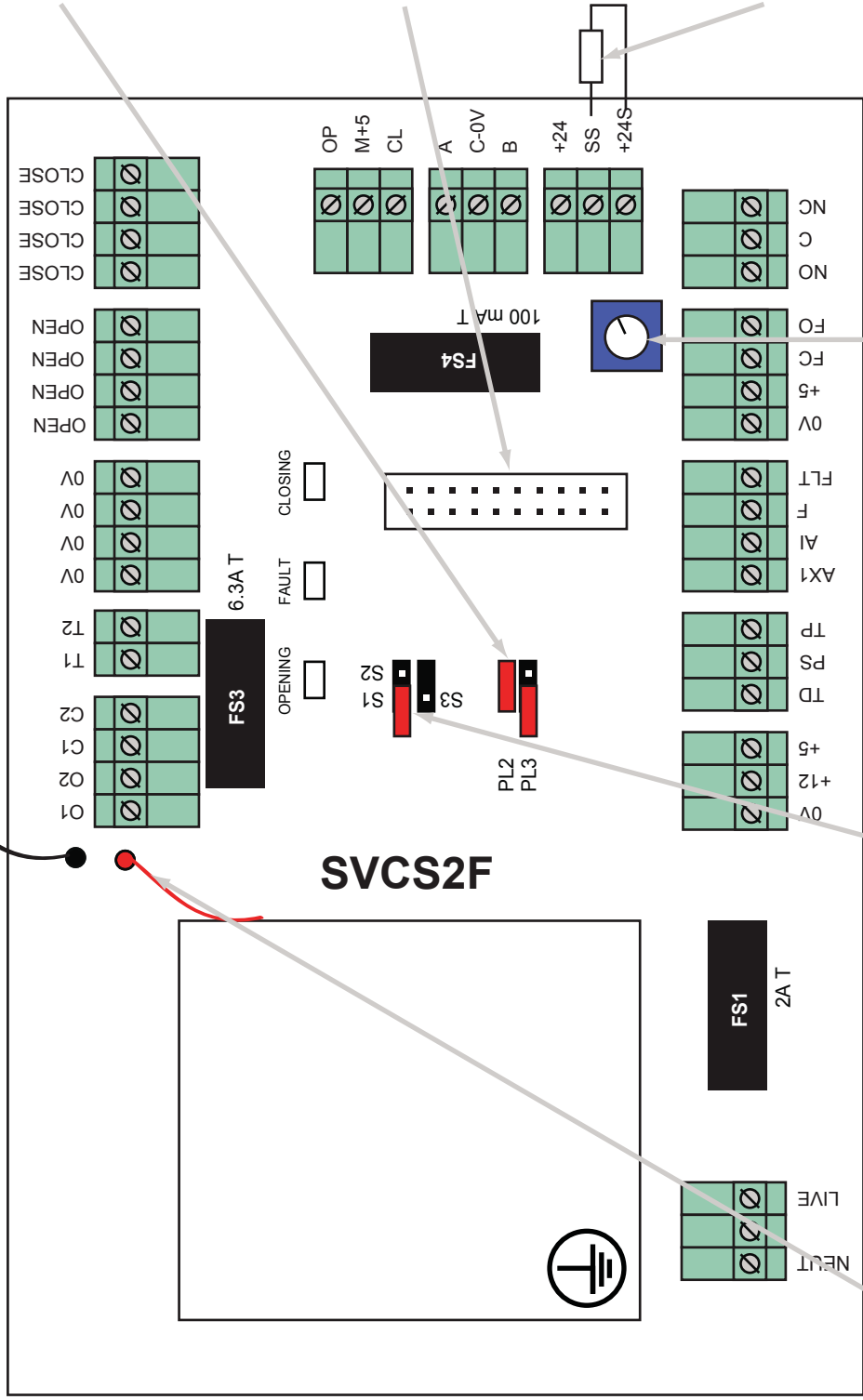
*The above result is well within the limit of a 2 Volt voltage drop.*

# OPERATING ELEMENTS

**Programming (Jumpers)**  
These can be adjusted to create a 'Slave' or 'Master' panel which will form part of a larger interlinked control system. Please refer to page 13 for more information.

**Front Keyswitch & LED display**  
Connect cable on the back of the cabinet door to allow for key switch and LED functions.

**End of Line Resistor (15k Ω)**  
This is connected here as standard, but will need to be removed if the system requires it. Please refer to pages 8 & 9 for more information.



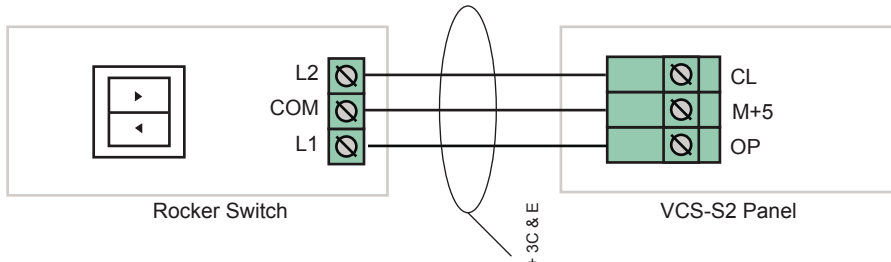
**Timer Adjustment**  
Use this to adjust the number of seconds that 24v power is applied to the actuator/s. Please refer to page 14 for more information.

**Manual Reset**  
As a default the SVCS-2 will automatically reset when smoke is cleared. To program the panel to allow for a 'Manual Reset' please connect jumper terminals 'S1' to 'S3' using jumper provided.

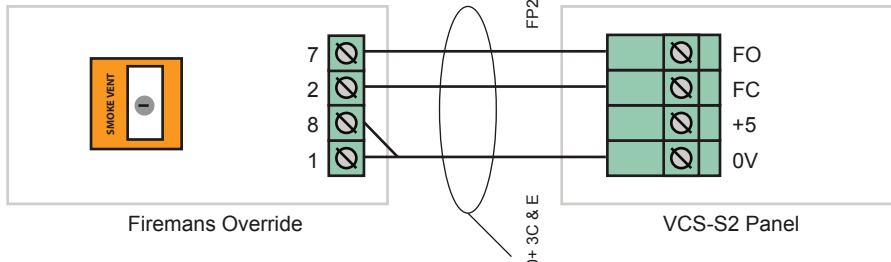
**Batteries**  
Use these pre-wired cables to connect pair of batteries supplied with panel. Please see page 12 for more information.

# CONNECTIONS (i)

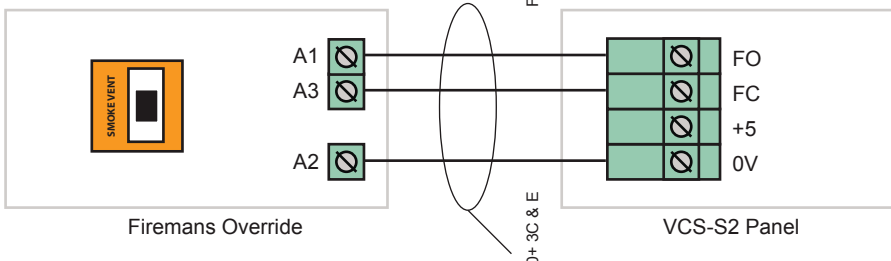
**ROCKER SWITCH**



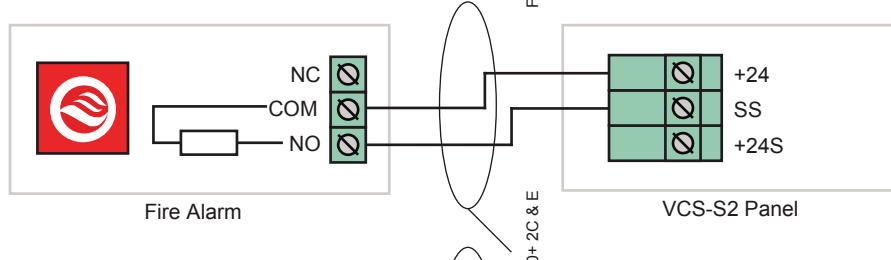
**FIREMANS OVERRIDE (KEY SWITCH)**



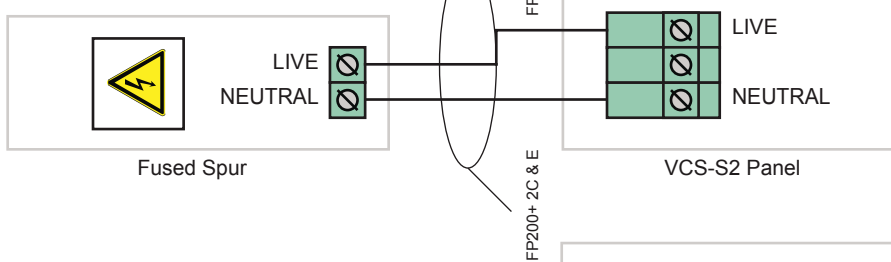
**FIREMANS OVERRIDE (ROCKER SWITCH)**



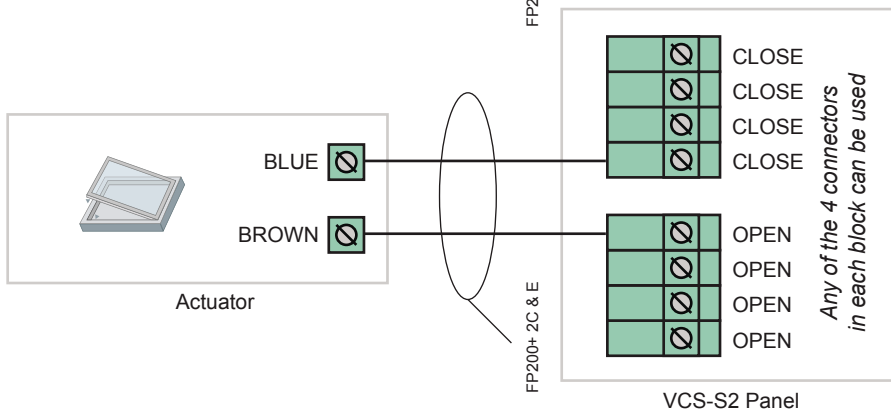
**FIRE ALARM**  
Normally Open contacts  
CLOSE on fire



**MAINS**  
230V AC from  
3A Fused Spur



**ACTUATOR**



**End of Line Resistor**

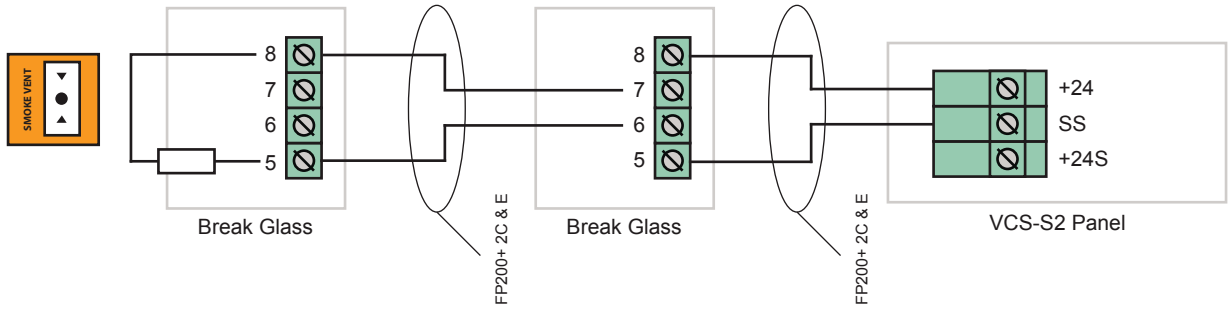
As standard this is connected to the '+24S' and 'SS' terminals. When connecting a Smoke Sensor, Break Glass and/or Fire Alarm this resistor must be removed and connected (as shown) to the end of line.



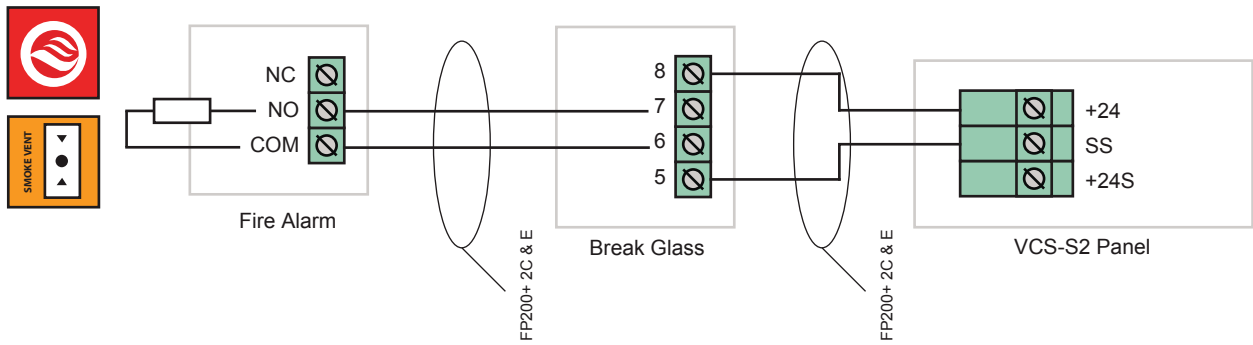


# CONNECTIONS (ii)

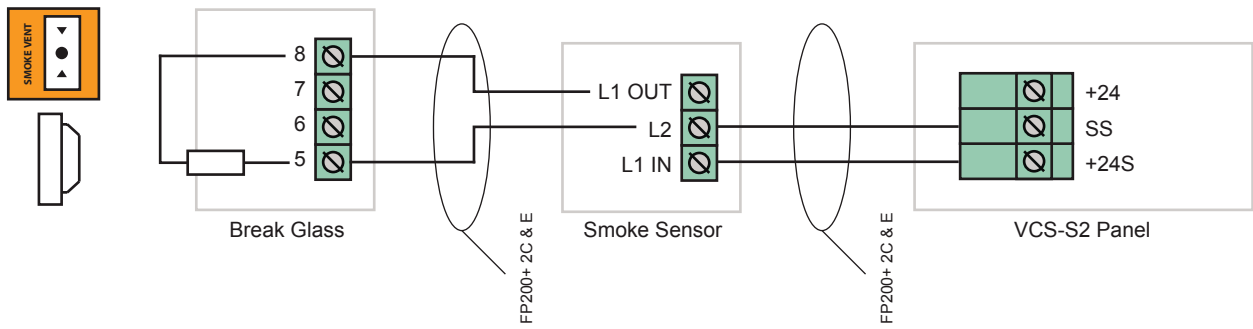
## 2 X BREAK GLASS



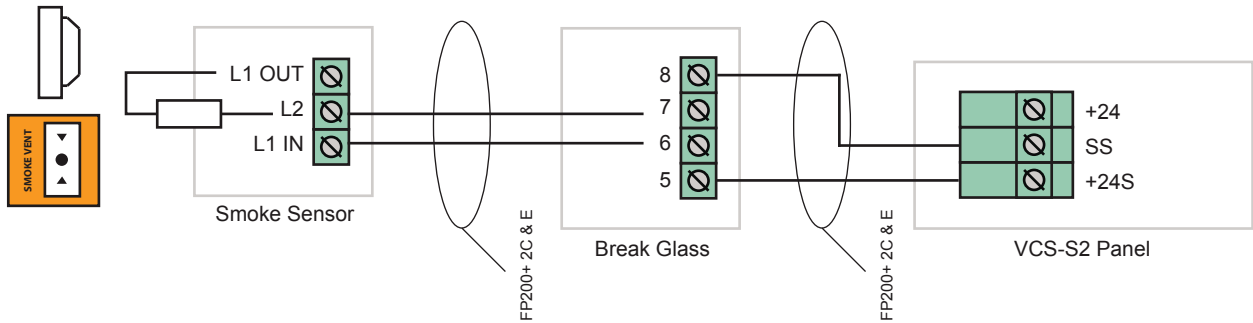
## BREAKGLASS & FIRE ALARM



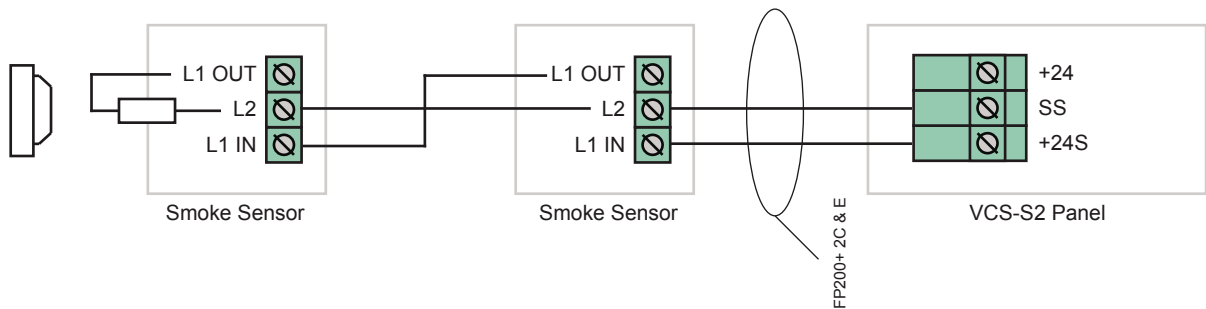
## SMOKE SENSOR & BREAK GLASS



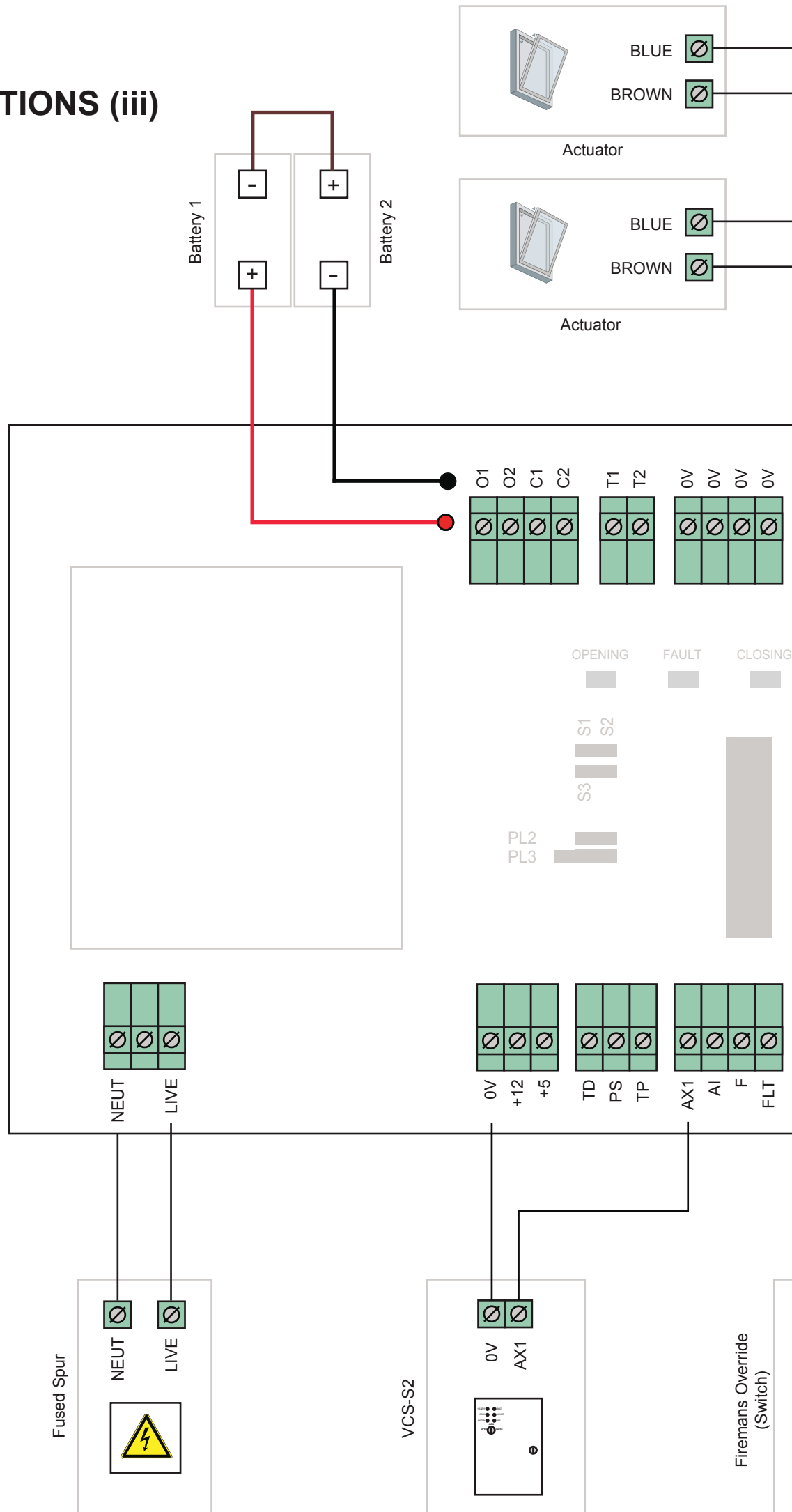
## BREAKGLASS & SMOKE SENSOR

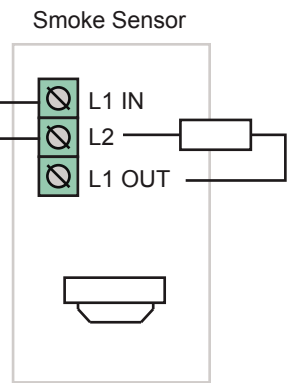
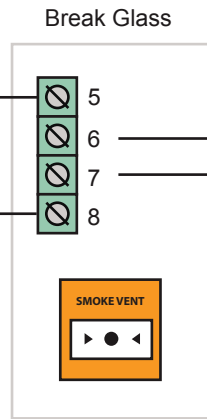
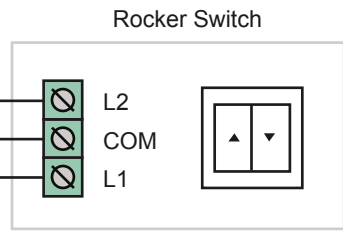
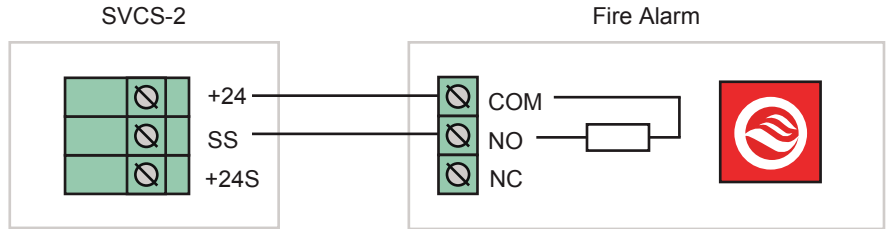
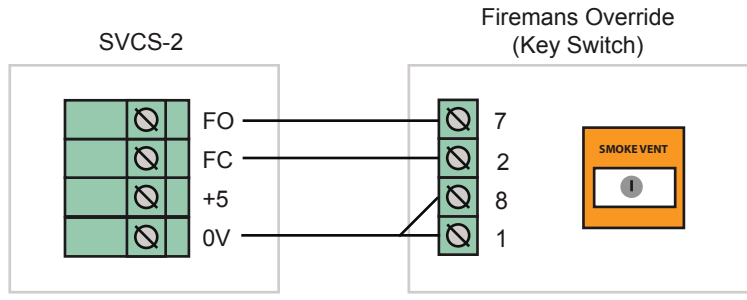
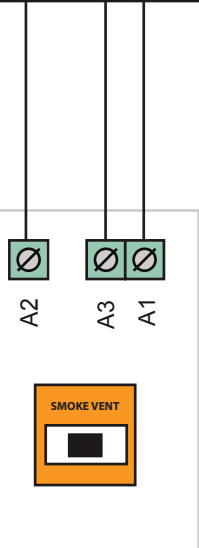
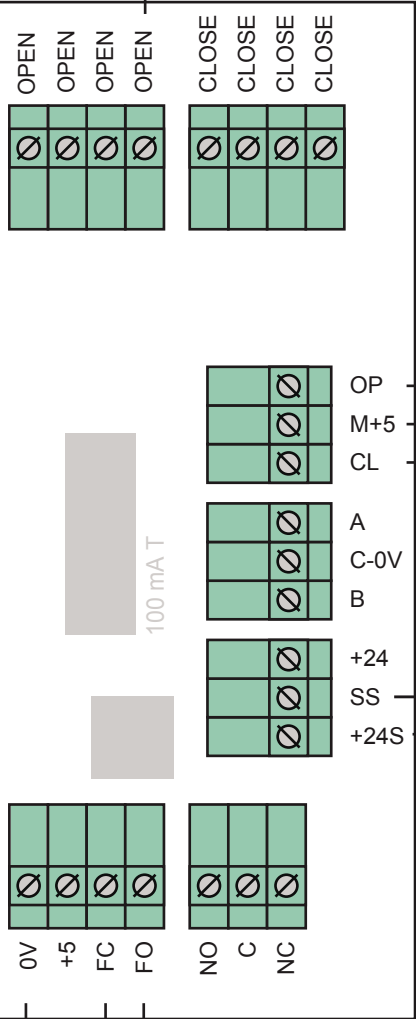
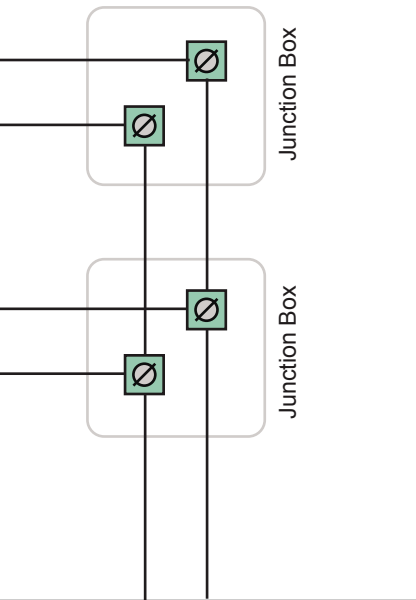


## 2 X SMOKE SENSORS



# CONNECTIONS (iii)





# GENERAL BATTERY SET



When batteries are changed, the battery charger should be checked for voltage which should read approx. 27.3V, at 20 degrees C. if significantly different please contact technical helpline on number below.

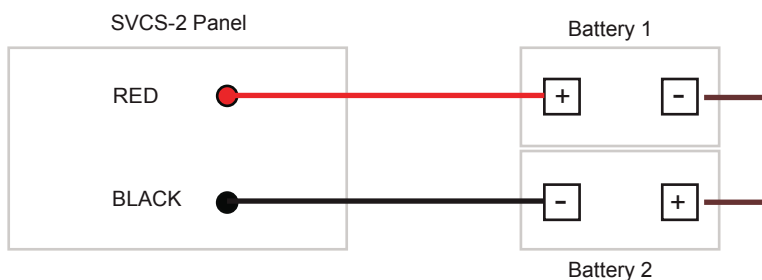
The SVCS-2 has a temperature probe which is to be taped to one of the batteries and located between the batteries, this probe varies the applied charge voltage in accordance with the temperature of the batteries.

There are a number of conditions that can occur in the chemistry of batteries that can give erroneous indications by using simple voltage measurement techniques. The only sure way of testing capacity is with a known load over time and tracking the battery voltage over this time. If the batteries have been abused by discharging them to totally flat and kept in that condition for an extended period it is better to replace them as they are likely to be damaged and therefore may have a much reduced capacity.

This is a guide to the state of charge of the batteries measured Open Circuit, U3 temperature is a guide to whether the batteries are accepting a charge when connected.

VOLTAGE		STATE
27.3	Float Charge Voltage U3 Cool	Batteries trickle Charging + fully charged
25-27.3	U3 Warm to hot	Batteries Charging + 50 – 95% charged
22.1-24.9	U3 Warm to hot	Batteries Charging + 10 - 49% charged
21-22	U3 Warm to hot	Batteries Charging + <10% charged
14-21.9	May need replacing	Batteries Charging + <5% charged
<14	WILL NEED REPLACING	Batteries Charging + <5% charged

## BATTERY CONNECTIONS



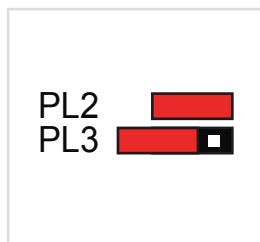
# PROGRAMMING / INTERLINKING PANELS

To link VCS-S2 panels together a dedicated 2 core and earth cable should be used to connect the AX1 on one panel to the AX1 on the next panel. The 0V on one panel should be connected to the 0V on the next panel.

This procedure ensures that only one panel may operate at a time in accordance with the 'Fire Compartmentation' requirements.

If linking requires a panel to operate as a slave to the others, e.g. a stairwell roof vent, then one adds the spare jumper strap to the OPEN position on the board (PL3), should a panel wish to be removed from the interlinking then the BUS strap may be removed or simply disconnect the AX1 Connector. The above cabling/strapping procedure is only required when an RS485 Network is **not** installed.

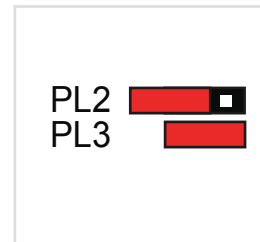
## MASTER



Suitable for:

- Corridor vent
- Smoke shaft vent
- Lobby vent

## SLAVE



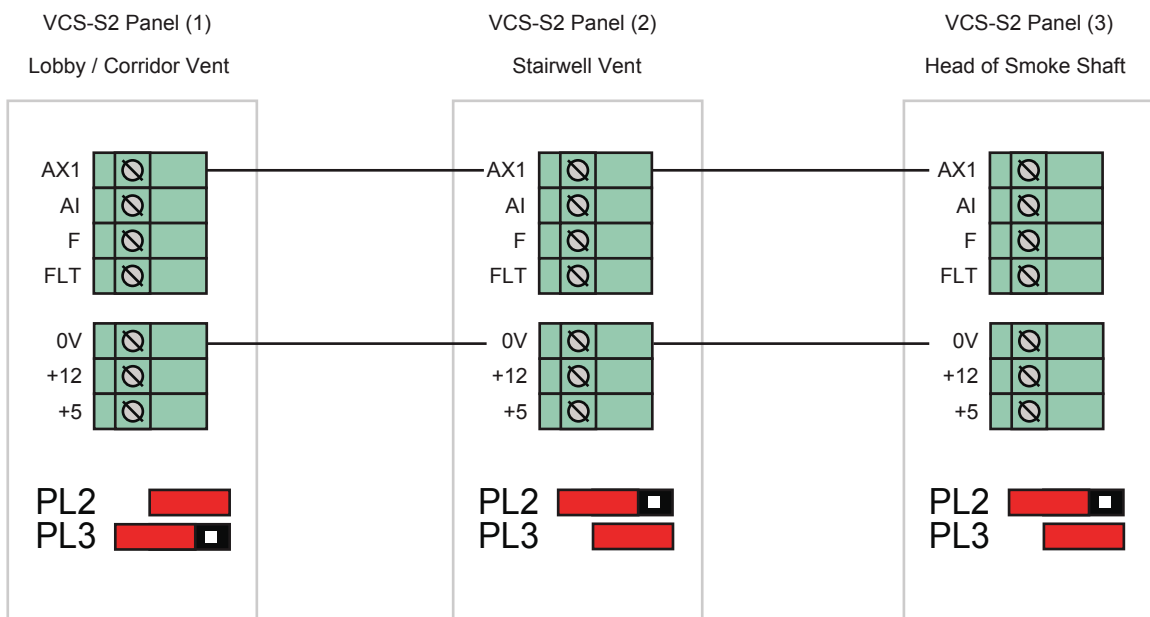
Suitable for:

- Stairwell vent
- Head of smoke shaft



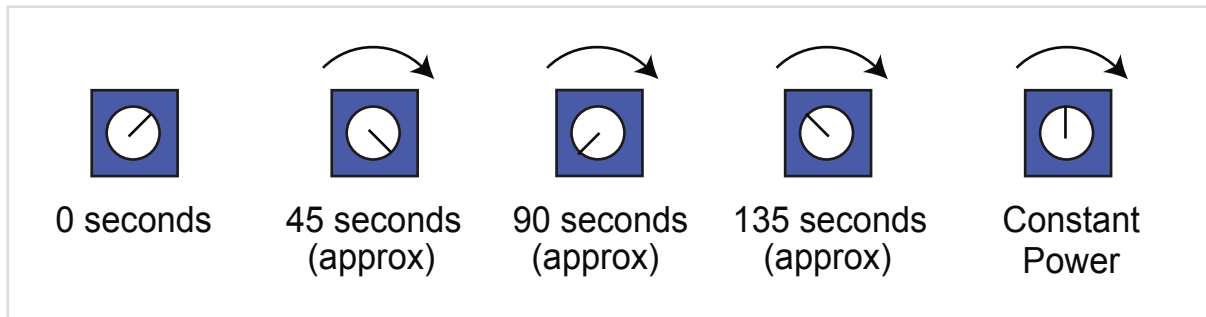
*Note; The programming jumpers are only to be used when linking panels together. For single zone systems please use the 'MASTER' setup as above.*

## EXAMPLE SETUP FOR LINKING PANELS



## TIMER ADJUSTMENT

Cycle time can be adjusted between 5-180 seconds or no timeout by adjusting the blue potentiometer in the centre of the PCB above the 'FC' and 'FO' terminals thus:



If the timer is turned fully clockwise it will send constant power to the actuator/s. We only recommend this program for actuators that require constant power such as Belimo type actuators.



For standard actuators we recommend adjusting this to suit the time it takes the actuator to reach its full opening position (refer to actuator manual for details). Providing constant power to standard actuators can cause the actuator to malfunction and become faulty.



The 'Opening' LED on the VCS-S2 will stay lit for as long as there is power to the actuator/s. If the actuator reaches its full opening position and the 'Opening' LED stays lit for a long period of time we recommend adjusting the timer to a period that is much closer to the time it takes the actuator to reach its full opening position.

*Note; The 0 Second position may be used for testing the network without operating roof hatch actuators in inclement weather etc.*

## TESTING

By far the most important thing about the use of this type of equipment is REGULAR TESTING! Please read page 16 carefully.

Testing has two major functions.

- A The smoke sensors, alarm panel and vents are fully tested.
- B Like all mechanical equipment the Vent Actuator motors need to be used periodically so as to help prevent the build-up of internal corrosion and the likelihood of an associated seizure of the mechanical parts.

### ***Weekly visual (5 minutes)***

Go to the panel and check for any warning/fault indications. If there is a fault then call your local electrical engineer or supplier who will be pleased to help you.

### ***Monthly test (15 minutes)***

The Full Alarm testing should be carried out with the use of a "Smoke Aerosol". A 5-10 second spray at one of the smoke sensors will set off the alarm system. Each month choose a different smoke sensor. Whilst the alarm is active check that all Vents are open (*Note; in accordance with your cause and effect chart*), reset the alarm condition (you may have to do this a couple of times if the sensor under test has not cleared the "smoke"). Next check that the manual key-switch will OPEN the Vents (if fitted). After this switch back to AUTO, check again that there no fault conditions and that concludes the test.

### ***Annual***

Once a year a full battery discharge test is advisable to check the condition of the secondary power supply so that in the event of a fire the firemen have sufficient open and close cycles available for their use. This should be done by a specialist. Call your supplier for further information about annual service contracts.

# TESTING

The following are guidance notes around the mandatory maintenance and testing requirements for both powered and natural smoke ventilation systems.

## THE REGULATORY REFORM (FIRE SAFETY) ORDER 2005 states

*Maintenance 17:- (1) Where necessary in order to safeguard the safety of relevant persons the responsible person must ensure that the premises and any facilities, equipment and devices provided in respect of the premises under this Order or, subject to paragraph (6), under any other enactment, including any enactment repealed or revoked by this Order, are subject to a suitable system of maintenance and are maintained in an efficient state, in efficient working order and in good repair.*

## BRITISH STANDARD BS 9999:2008 states:

### **Annex V (normative) Routine inspection and maintenance of fire safety installations**

#### **V.1 General**

*NOTE Fire safety installations comprise the items and elements of which examples are listed in Annex J.*

*It is essential for the safety of the occupants of a building that fire safety equipment (including passive fire protection provisions) is inspected frequently. Although much of the inspection can be undertaken by suitably trained personnel, a formal agreement should be made with the installer or the installer's representative to provide the regular inspection and testing described in the relevant British Standards for individual fire safety installations. Unless temporary alternative fire safety systems can be put in place, it might be appropriate for certain of the inspections carried out at three-monthly or longer intervals to be done outside normal working hours.*

#### **V.2 Daily inspections**

##### **V.2.1 General**

*The checks described in V.2.2 to V.2.6 should be undertaken daily. For premises with defined opening times such as shops, theatres and cinemas, these checks should be undertaken prior to members of the public entering the building.*

#### **V.3 Weekly**

##### **V.3.1 General**

*In addition to the checks recommended in V.2, the checks described in V.3.3 to V.3.7 should be undertaken once a week.*

##### **V.3.5 Smoke control systems for means of escape**

*Actuation of the system should be simulated once a week. It should be ensured that any fans and powered exhaust ventilators operate correctly, smoke dampers close (or open in some systems), natural exhaust ventilators open, automatic smoke curtains move into position, etc.*

#### **V.4 Monthly**

##### **V.4.1 General**

*In addition to the checks recommended in V.2 and V.3, the checks described in V.4.2 to V.4.9 should be undertaken once a month.*

#### **V.5 Three-monthly**

*In addition to the checks recommended in V.2, V.3 and V.4, the actuation of all smoke control systems should be simulated once every three months. All zones should be separately tested and it should be ensured that any fans and powered exhaust ventilators operate correctly, smoke dampers close (or open in some systems), etc.*

#### **V.6 Six-monthly**

##### **V.6.1 General**

*In addition to the checks recommended in V.2, V.3, V.4 and V.5, the checks described in V.6.2 and V.6.3 should be undertaken once every six months. Arrangements should be made for six-monthly inspections and tests to be carried out by competent persons on the fire detection and alarm systems, the sprinkler systems, any extinguishing systems, the emergency and escape lighting systems and the fire-fighting lift, for any defects found to be logged and the necessary action taken, and for certificates of testing to be obtained.*

#### **V.7 Yearly**

*NOTE Attention is drawn to the testing and inspection requirements of BS 7671.*

*In addition to the checks recommended in V.2, V.3, V.4, V.5 and V.6, arrangements should be made for annual inspections and tests of the following to be carried out by competent persons, for any defects to be logged and the necessary action taken, and for certificates of testing to be obtained:*

- a) *smoke ventilators and smoke control systems;*

Whilst this is a comprehensive assessment (and is for general guidance only), it should be noted that manufacturers have their own maintenance and testing requirements and if different these should be followed. For full guidance you should read the Regulatory Reform Order 2005 along with BS9999 to satisfy that you are meeting your statutory obligations.








# LED INDICATORS

KEY - LED indicators on front of cabinet door.

HEALTHY 	 FAULT
COMM 	 INHIBIT
BATTERY 	 FIRE



## **NORMAL FUNCTIONS**

(System OK LED is illuminated)

	<b>FAULT INDICATOR</b>	<b>FAULT</b>
	No Sound HEALTHY LED illuminated.	Power On, System OK.
	FIRE LED illuminated and continuous buzzer sounds.	The SS pin has been activated or the Network has issued a fire override OPEN command.
	FIRE LED illuminated and Rapid 2 tone sound.	Firemans override switch operated to OPEN.
	FIRE LED not illuminated and Rapid 2 tone sound.	Firemans override switch operated to CLOSE.
	COMM LED very short flash.	A communication event occurred.






## **WARNINGS & STATUS INFORMATION**

(System OK LED is illuminated)

	<b>WARNINGS</b>	<b>STATUS</b>
	Intermittent buzzer & INHIBIT LED.	Panel is disabled either locally or via RS Network.
	BATTERY LED flashing.	The batteries are low in charge but are charging.

## **FAULT INDICATORS**

(System OK LED not illuminated and FAULT relay activated)

	<b>FAULT INDICATOR</b>	<b>FAULT</b>
	One bleep at 8 second intervals.	Mains Power failure or FS1 blown (2A T) or batteries drawing excess charging current.
	2 Bleeps + 2 Flashes of FAULT LED.	Terminating resistor not connected or FS4 blown (125mA T).
	3 bleeps + 3 Flashes of FAULT LED. BATTERY LED at 8 second intervals.	Actuator terminating resistor not connected or term module missing.
	4 bleeps + FAULT LED. BATTERY LED at 8 second intervals.	Battery set very low charge or un-serviceable or FS3/4 blown (6.3A T)
	10 bleeps + FAULT LED.	Internal program checksum error.

# MAINTENANCE

## **CONTROL PANEL**

Control Panel should be maintenance free with the exception of the Batteries.

## **BATTERIES**

Between 3 to 5 years the backup batteries will need to be changed.

## **SENSORS, SWITCHES & ACTUATORS**

Refer to individual instructions for any attached components of this system. If you are in any doubt about any of the above procedures etc. then do give us a call and we will help you.



The above maintenance & testing should be entered into a log with the sensor number (or floor level), date of testing and signed. The log should be kept in a safe place near the main control panel so any maintenance may be recorded. These are purely our recommendations and we would advise you to contact your local fire officer who will only be too pleased to analyse the building and give his/her own recommendations as to testing the safety etc. Maintenance log table is on the following page.

# MAINTENANCE SCHEDULE

DATE	WORK DONE	COMPANY	INITIALS	SIGNATURE



0086

I.M. Design & Repair Ltd, Tredington,  
Warwickshire

16

Certificate number 0086-CPR-607257

EN12101-10

Product Name: SVCS2F

Electrical power supply equipment, intended to  
be used in smoke and heat control systems

Operational Class: A

Max Battery Capacity: 4AH

Output Current: (max b) 5 Amps

Input: 230V single phase 50 Hz

Output: 19 to 29.5 Volts DC

Additional: (self-certification method)

EMC EN55014

LVD EN50130

Relevant Parts of: BS5839 & EN54-2