Solo

Single Loop Analogue Addressable Fire Control Panel

Hochiki ESP Protocol

Installation, Commissioning & Operating Manual

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1. INTRODUCTION

The **SOLO** is an analogue addressable fire detection and alarm control panel capable of covering a maximum of 16 zones with up to 127 individual Hochiki ESP communications protocol devices.

Solo supports loop powered sounders and if used as sensor bases, the sounders do not occupy an address in the range 1-127 thus leaving these addresses free for other devices.

Any number of devices can be allocated to any zone ensuring that any system configuration can be easily accommodated.

To ensure that the system is installed and commissioned with the minimum of trouble, it should be carefully planned before the installation is begun.

This involves allocating an address to each device (except base sounders) and allocating a message of up to 40 characters (including spaces) to each address to assist in the location of the devices.

Devices should then be grouped into zones in accordance with the appropriate fire detection systems design standard.

A fire alarm call point should be located near the panel.

The **SOLO** control panel offers an extensive list of features and options for the control and monitoring of plant, equipment and sounders which can be configured via the PC configuration programme.

The Hochiki range of compatible devices includes optical and ionization smoke sensors, heat sensors, switch monitors and relay or bell controllers. Interfaces to conventional detection systems can also be catered for using zone monitoring devices.

Hochiki ESP Protocol offers an addressing range from 1 to 127. However, devices such as the CHQ-S (switch monitor) and CHQ-B (bell controller) have "Sub-addresses" in addition to their main address.

Therefore a switch monitor for example, may have a main address of 123, input 1 sub-address 123.1 and input 2 123.2.

The sub-addresses can be treated as if they were individual addresses i.e. each can be allocated to any zone, given an individual address message and be operated on by different cause and effect tables.

Important: This control panel should be used only with Hochiki AS or ASX range of fire system components.

The control panel has the following options with requirements as defined in EN54-2

1) Fault signals from points
2) Coincidence detection
3) Delay of the actioning of outputs
4) Disablement of each address point
5) Test condition
6) Fire alarm devices (sounders)

2. SAFETY

Suppliers of articles for use at work are required under section 6 of the Health and Safety at Work act 1974 to ensure as reasonably as is practical that the article will be safe and without risk to health when properly used.

An article is not regarded as properly used if it is used 'without regard to any relevant information or advice' relating to its use made available by the supplier.

This product should be installed, commissioned and maintained by trained service personnel.

(i) IEE regulations for electrical equipment in buildings

(ii) Codes of practice

(iii) Statutory requirements

(iv) Any instructions specifically advised by the manufacturer

According to the provisions of the Act you are therefore requested to take such steps as are necessary to ensure that any appropriate information about this product is made available by you to anyone concerned with its use.

This equipment is designed to be operated from 230V 50Hz mains supplies and is of class 1 construction. As such it **must** be connected to a protective earthing conductor in the fixed wiring of the installation and a readily accessible double pole disconnect device shall be incorporated in the fixed wiring.

Failure to ensure that all conductive accessible parts of this equipment are adequately bonded to the protective earth will render the equipment unsafe.

Mains Transformer Technical Information

Type	-	6
Input	-	230V AC
Frequency	-	50/60 Hz
Power	-	100 VA
V Out	-	5, 14, 24 & 33V

3. INSTALLATION

Installation of the panel should be carried out by qualified personnel only.

The electronic components within the panel are vulnerable to physical damage and damage by electrostatic discharges. It is advisable to wear a wrist strap designed to prevent the buildup of static charges within the body, before handling any electronic circuit boards. Never insert or remove boards or components with the power on.

Mounting the Cabinet

The site chosen for the location of the panel should be clean and dry and not subject to shock or vibration. The temperature should be in the range 5° to 35° C, the humidity should not exceed 95%.

Open the cover using the key provided.

Using the chassis as a template, mark the position of the fixing holes, ensuring that the wall is flat at the chosen location.

Drill and plug the wall then fix the cabinet using all fixings.

The polarity of the battery connection should be carefully checked before proceeding.

4. CABLING

Cables should be brought into the cabinet using the knockouts provided and using couplers to maximise the space within the enclosure.

Inlet bushings or cable glands should be used to maintain insulation.
The screen or drain wires should be bonded to the earth terminals provided.
The maximum size of cable which can be terminated is 2.5 mm^2.

The ESP communications protocol is highly immune to noise but sensible segregation from known noise generating sources such as mains cables is recommended.

Detection circuit cable size and type is dependant on the number and type of devices used and should be calculated for each installation.

Cabling for sounder circuits should be sized according to sounder load and cable length but 1.5mm should suffice in the majority of cases.
The control panel requires a 230V AC supply which should be derived from a separate fused spur labelled "fire alarm - do not switch off".

The mains supply must include an earth conductor connected to the fixed installation earthing system.

This equipment relies on the building installation for protection and requires a 5 amp protection device. The mains supply should use cable with a minimum cross section of 1.5mm^2.

5. POWERING THE PANEL

Ensure that the panel is free from swarf, wire ends, knockout discs and any other debris.

NOTE:
The panel can not be powered by the battery until the mains is first connected.

5.1 Configuring the Panel

When supplied the panel will contain no configuration and when power is first applied the display will show:

SYSTEM INTEGRITY CHECK

For about 7 seconds, followed by:

CONFIGURATION MENU Configure automatically

Or if the "evacuate" button is pressed:

CONFIGURATION MENU Configure from PC

To select either of these, press the "silence alarms" button. It is usual to configure automatically at this stage as this tells you exactly what the panel has found connected to the loop and this can then be compared with what is expected.
At the "Configure Automatically" prompt press the "silence alarms" button to configure automatically, the panel will display:

AUTO CONFIGURATION Turn on memory write enable switch

Turn on the switch (located at the top of the display) and wait for the progress bar to fill the screen while the panel analyses the connected devices. After a couple of minutes the panel will display.

XXX devices found Turn off memory write enable switch

Turn off the memory write enable switch.
The panel is now running with all devices allocated to zone 1.

If the panel contains configuration data it will always run with that configuration when powered up or reset via the processor reset switch SW2 (see annex 3) with the write enable switch off after intialising.

If powered or reset via SW2 with the "write enable" switch on, the panel will first perform an "integrity check" as before then present the configuration menu but with 4 options which can be selected via the "evacuate" or "reset" switches and entered via the "silence alarms" switch as follows:

CONFIGURATION MENU Reconfigure automatically	As above (configure automatically)

"Reset"

CONFIGURATION MENU Reconfigure from PC	Transfer previously created configuration from PC to panel

"Reset"

CONFIGURATION MENU Transfer configuration to PC	Transfer current configuration to PC for storage or editing.

"Reset"

CONFIGURATION MENU Run with current configuration	Make no changes.

5.2 Zone Allocation

To allocate addresses to other zones without doing a download from a PC, it is necessary to enter the menu list. To do this, insert the enable key and hold the "Enter" button until the display shows:

ENABLE / DISABLE ZONES Zone 1 is enabled

Press the "More Events" button once to allow level 3 password entry. Use "Evacuate" (up), "Reset" (down) and "Silence" (next) to enter the number (1000), then "Enter" to enter access level 3.

The display will then show:

DEVICE CONFIGURATION Switch on write enable to view / change

Turn on the write enable switch. The display will then show:

CONFIGURE ZONE Addr xxx.x CHQ-CP zone 1

The actual address and device type will of course depend on what is connected at the lowest address on the system.

The available addresses and local programmable outputs can now be scrolled using the "Evacuate" (up) and "Reset" (down) buttons to select the first address to be allocated to zone 1. The zone number can be changed using the "Silence" (next) button.

Note: Base Sounders will automatically be allocated the same zone as the sensor to which they are attached.

The information entered is stored dynamically i.e. it is not necessary to press the "Enter" button to store the information, it is stored as soon as the next address or zone is selected.

It is now possible to attach a 40 character message to each address if required.

This is done by pressing the "Enter" button whilst in the "Configure Zone" menu and the display will show:

EDIT TEXT ADDR XXX.X CHQ-CP -

Letters, numbers and punctuation marks can now be selected using the "Evacuate" (up) and "Reset" (down) buttons. Once the desired character has been selected, the "Silence" (next) button can be used to move to the next character. This is repeated until the message is complete.

To enter the next message, press the "More Events" button, select the next address using the "Evacuate" (up) and "Reset" (down) buttons then press enter. The next message can now be entered as before. When all zones and messages have been entered, the write enable switch must be turned off. The system is now configured and will remember the programmed information even if the power is removed.

If things get confusing, don't worry. Switch off the "Write Enable" switch, remove the enable control key then re-insert it and start again.

5.3 PC Configuration

Load the Solo configuration programme and the required data file.
Connect the special download lead to the serial port on the computer and to the connector J5 on the panel (see annex 2 & 3). Ensure that the PC is set to communicate with the correct port under the file - options menu. This is usually COM 2 but if it will not work try one of the others. Sometimes the PC will produce an "earth fault" on the panel. This can be ignored.

To programme the control panel with a previously created configuration, using the "SOLO" configuration utility, first turn on the "Write Enable" switch, reset via the internal "Processor Reset" switch (see annex 2 & 3). After the "System Integrity" check, the display will show:

CONFIGURATION MENU Reconfigure automatically

5. POWERING THE PANEL - *Continued*

Press the "Reset" button until the display shows:

CONFIGURATION MENU Reconfigure from PC

Press the "Silence" button to display:

PC CONFIGURATION Awaiting link, system not operational

Select "send to panel" on the PC. The PC will display progress bars indicating each part of the configuration being sent. After transfer, the panel will display:

CONFIGURATION COMPLETE Turn off memory write enable switch

After turning off the memory write enable switch, the panel will start "initialising". This process involves comparing the actual device configuration found by the panel on the detection circuit and the configuration sent from the PC.

If the two configurations match, the panel will display the time and date and the suppliers name (if entered on the PC). The system is now running normally and should be thoroughly tested to verify that it meets the requirements.

If the configurations do not match, one or more fault messages will be displayed. These messages can be used to reduce addressing errors on field devices as follows:

DISCONNECTED 002/002 Addr xxx.x zone xx (device type)

Indicates that this device was configured by the PC utility but was NOT found by the panel.

UNEXPECTED DEVICE 001/002 Addr xxx.x

Indicates that this device was not configured by the PC utility but WAS found by the panel. A reasonable assumption in this situation is that the unexpected device should have the address shown by the disconnected fault.

This message:

DOUBLE ADDRESS 002/002 Addr xxx.x zone xx (device type)

Indicates that more than one device has been set to the same address. There will probably be a disconnected fault present on the system at the same time as a double address fault and this device is likely to be the one incorrectly addressed.

5. POWERING THE PANEL - *Continued*

If the system has been planned and the devices addressed carefully, commissioning the system using the PC configuration utility should be simple and straight forward. The PC configuration utility has many benefits over manual configuration such as defining cause and effect logic, rapid message allocation, suppliers name entry, day / night mode setting and storage / retrieval of site data and is strongly recommended as the preferred method of data entry.

5.4 Auto Addressing Base Sounders

If the system contains base sounders, before a PC configuration is sent to the panel, the panel must be configured automatically as described in section 5.1.

This will ensure that all base sounders are addresssed automatically by the panel. Sounders are allocated an address which is 127 above the address of the sensor to which they are attached, so a sensor at address 3 for instance attached to a base sounder would address the sounder to 130.

Once the automatic configuration has been done, the panel can be configured from the PC as described in section 5.3.

6.0 TESTING THE SYSTEM

To ensure that the system operates as required it is first necessary to activate each device as shown on the installation plan and ensure that the correct panel response and message is displayed.

Once this has been established as being correct, the zone and address configurations should be recorded for future reference.

Next, the sounder outputs should be checked, making sure that they operate as required and that audibility levels are acceptable. If any special sounder sequencing or control of output devices has been programmed, all possible logical combinations should be checked to ensure that the required response is given.

Finally any use made of the volt free contacts or remote control inputs at the panel should be tested to ensure that they operate as intended.

The system should then be ready for handover to the client who should be given a copy of the operators manual and a set of keys for accessing the panel.

7.0 FACILITIES MENU - *(ACCESS LEVEL 2)*

A number of facilities are provided which can only be accessed at access level 2 or access level 3. Access level 3 can be reached by entering the correct password at access level 2 or switching on the write enable switch.

To access the facilities menus, insert the enable key and hold down the "Enter" button until the first menu item appears. Further presses on the "Enter" button cycle forward through the menu items and presses on the "More Events" button cycle backwards through the menu items.

7.0 FACILITIES MENU - *(ACCESS LEVEL 2) - Continued*

Note: Pressing "More Events" with "Enable/Disable Zones" on the display takes you directly to password entry.

If no buttons are pressed for more than 100 seconds the panel will revert to access level 2 or if the key is removed, to access level 1 (i.e. buttons not enabled).

The following describes each of the available facilities in the order that they will appear using the "Enter" button to cycle through them.

7.1 Enable / Disable Zones

To disable one or more zones, first select the zone to be disabled using the "Evacuate" (up) or "Reset" (down) buttons, then press "Silence" to disable.
The display will show:

ENABLE / DISABLE ZONES Zone XX is disabled

When a disablement is selected, the buzzer will sound a continuous tone for 3 seconds and the "Disabled" LED will light and remain lit for as long as there are any active disablements on the system. Disablements will be displayed at access level 1 as follows:

DISABLEMENT 001/001 Zone 1

Only fire inputs are suppressed during disablements. The "More Events" button can be used to view all active disablements at access level 1. Zones can be re-enabled using the same procedure as for disabling.

7.2 Enable / Disable Addresses

To disable one or more addresses or sub-addresses, first select the address to be disabled using the "Evacuate" (up) or "Reset" (down) buttons, then press "Silence" to disable.
The display will show:

ENABLE / DISABLE ADDRESSES Address xxx.x is disabled

When a disablement is selected, the buzzer will sound a continuous tone for 3 seconds and the "Disabled" LED will light and remain lit for as long as there are any active disablements on the system.
Disablements will be displayed at access level 1 as follows:

DISABLEMENT 001/001 Addr xxx.x zone xx

If a location message has been assigned to the disabled address the second line of the display will alternate between the address, zone and device type, and the message.

Only fire inputs are suppressed during disablements. The "More Events" button can be used to view all active disablements at access level 1.

Addresses can be re-enabled using the same procedure as for disabling.

7.3 Enable / Disable Fire Contact

To disable the fire contact, press the "Silence" button. The display will show:

ENABLE / DISABLE FIRE CONTACT Fire contact is disabled

The disablement will be displayed at access level 1 as follows:

DISABLEMENT 001/001 Fire contact is disabled

The "Rem. Sig" fire contact will not operate in response to any fire conditions whilst disabled.

To re-enable the fire contact, use the same procedure as for disabling.

7.4 Enable / Disable Fault Contact

To disable the fault contact, press the "Silence" button. The display will show:

ENABLE / DISABLE FAULT CONTACT Fault contact is disabled

The disablement will be displayed at access level 1 as follows:

DISABLEMENT 001/001 The fault contact is disabled

The fault contact will not operate in response to any fault condition other than total power failure or system fuse (F2) failure whilst disabled.

To re-enable the fault contact, use the same procedure as for disabling.

7.5 Enable / Disable Sounders

To disable the sounders, press the silence button.
The display will show:

ENABLE / DISABLE SOUNDERS Sounders are disabled

The sounders connected to the panel, loop powered sounders and bell controller outputs (which are programmed to respond as sounders) will not operate in response to any fire or evacuate condition.

To re-enable the sounders use the same procedure as for disabling.

7.0 FACILITIES MENU - *(ACCESS LEVEL 2) - Continued*

7.6 Test Zones

To put one or more zones into test mode, select the required zone using the "Evacuate" (up) and "Reset" (down) buttons to scroll to the desired zone number, then press "Silence" alarm. The display will show:

TEST ZONES Zone xx is in test mode

When in test mode, activation of a device in the zone under test will cause a normal response at the control panel and sound the sounders for 2 seconds. The control panel will then self reset, ready for the next device to be tested.

The Rem.Sig relay contact will not operate during test mode.

The disablement will be displayed at access level 1 as follows:

DISABLEMENT 001/001 The fault contact is disabled

The fault contact will not operate in response to any fault condition other than total power failure or system fuse (F2) failure whilst disabled.

To re-enable the fault contact, use the same procedure as for disabling.

7.7 Set the System Clock

The panel contains a 24 hour clock which is battery backed.

To set the clock, use the "Evacuate" (up) and "Reset" (down) buttons to scroll through the hours, minutes etc. and the "Silence" button to move to the next item on the clock menu. i.e. day, date, year etc.

When the panel is in normal condition at access level 1, the full time and date will be displayed on the top row of the display.

7.8 Contamination Status

Any sensors which are found to be near their calibration limits are listed here. When a sensor is found to be at or beyond 85% of the point at which a maintenance fault warning will be given, it is added to the list.

During the daily calibration routine, each sensors zero point (ZP) and fire point (FP) are checked and if either or both of these are at or beyond 85% of the centre of the tolerance band the status will be displayed as per the example below.

CONTAMINATION STATUS Addr.123 ALE-E ZP = 96% FP = 97%

7.0 FACILITIES MENU - *(ACCESS LEVEL 2) - Continued*

The lower line of the display will alternate between the information shown above and the location message for the device.

Further devices on the list can be viewed by scrolling with the "Evacuate" and "Reset" buttons.

7.9 Enter Level 3 Password

This is the last item on the menu at access level 2 and further presses of the "Enter" button without entering the level 3 password will continually scroll around these 9 items. Entering the correct password (set in the factory to 1000) will allow access to further menu items.

The password is entered using the "Evacuate" (up) and "Reset" (down) buttons to scroll through the numbers 0 to 9 and the "Silence" button to move to the next digit. When the last digit has been entered, pressing "Enter" will display the first item on the access level 3 menu.

It is possible (via the PC configuration programme) to change the password to any 4 digit number. If entering the default password (1000) does not allow access to level 3, then this has been done. To find the access level 3 password, if this occurs, it will be necessary to capture the configuration file from the panel using the **"SOLO"** configuration package and data transfer lead.

8.0 FACILITIES MENU - *(ACCESS LEVEL 3)*

To enter access level 3, enter the password (factory set at 1000) using the "Evacuate" and reset buttons, then press "Enter".

8.1 Zone Configuration

As described in section 5 (manual configuration) if the panel has not been configured using the PC configuration package, all devices are placed in zone 1 upon initialisation. This menu allows any device or sub device to be placed in any zone. Upon activation of the "Write Enable" switch the display will show:

CONFIGURE ZONE Addr 001.0 ATG-E zone 1

To change the zone number press the "Silence" button until the required zone appears, then press the "Evacuate" (up) or "Reset" (down) buttons to select the next address. Repeat the procedure until all addresses appear in the required zones. When all devices have been zoned, press enter to edit text.

8.2 Edit Text

It is possible using the panel push buttons to enter text messages of up to 40 characters. Although this is much better achieved using the PC configuration package, this facility does allow on site editing in situations where a PC may not be available and to correct minor mistakes.

From the configure zone menu, select the address for which the message is to be edited or allocated then press "Enter". The display will show:

```
EDIT TEXT ADDR 001.0 ATG-E
-
```

In the bottom left of the display a cursor marks the position where the first character of the message will appear. Upper and lower case letters, numbers from 0 to 9 and punctuation marks , . ( ) / can then be selected using "Evacuate" (up) and "Reset" (down) buttons.
To move to the next character, press the "Silence" button.

When the message is complete, the next address which requires message entry or editing can be selected by first pressing "More Events", then using the "Evacuate" (up) and "Reset" (down) buttons. A press on the "Enter" button then allows entry/editing of the message for that address.

8.3 Panel Sounder Delay Organising

The panel has two common conventional sounder circuits which can be delayed to allow confirmation of a fire condition if required. To enable the delay facility press the "Silence" button when this screen is displayed.

```
PANEL SOUNDER DELAY ORGANISING
Sounders not organised
```

To disable the delay facility, press the "Silence" button when this screen is displayed.

```
PANEL SOUNDER DELAY ORGANISING
Sounders organised
```

8.4 Device Alarm Delay Organising

The 24 local programmable outputs and the outputs of all field devices are listed as follows:

```
DEVICE ALARM DELAY ORGANISING
Address 003.1 is not organised
```

By using the "Evacuate (up) and "Reset (down) buttons all output addresses and local outputs can be viewed and those which are required to be delayed can be selected by pressing the "Silence" button. The display will then show:

```
DEVICE ALARM DELAY ORGANISING
Address 003.1 is organised
```

8.0 FACILITIES MENU - *(ACCESS LEVEL 3) - Continued*

8.5 Organising Delay Time

Once the outputs have been selected as organised or not as required, a further press on the "Enter" button allows the delay time to be selected as follows:

ORGANISING DELAY TIME 1 minute

Use the "Evacuate" (up) and "Reset" (down) buttons to select the required delay time (1 to 10 minutes), then press "Enter".

8.6 View Events

The system stores the last 100 events which have occurred. To view these press the "Evacuate" (up) or "Reset" (down) buttons to scroll through the event log.

A typical event log display will show:

VIEW EVENTS- 1 OF 25 26/01/98 11:21 System initialising

8.7 Clear Event Register

Once the panel has been commissioned the information can be cleared from the event log by pressing the Silence button. The display will show:

CLEAR EVENT REGISTER Event register cleared

8.8 Printer Disable

If the control panel is fitted with a printer, it is sometimes desirable to disable the printer during testing or commissioning. This is done by pressing the "Silence" button. The display will then show:

PRINTER The printer is disabled

To enable the printer press the "Silence" button again

If the printer is disabled, the following 2 menu items will not be available.

8.0 FACILITIES MENU - *(ACCESS LEVEL 3) - Continued*

8.9 Print Events

Events can be printed by type as follows:

i) Print fire events
ii) Print fault events
iii) Print disable events
iv) Print other events
v) Print all events

To print the required events, select the type using the "Evacuate" (up) and "Reset" (down) buttons, then press the "Silence" button to start printing.
The display will show (e.g. fire events):

PRINT EVENTS Printing fire events

Whilst the printer is printing, the next type can be selected or other menu items can be selected using the "Enter" and "More Events" buttons.

8.10 Print loop Configuration

The loop configuration can be printed in two ways:

i) By zone
ii) By address

These can be selected from the "Print Loop Configuration" menu by using the "Evacuate" (up) and "Reset" (down) buttons. To print the selected configuration press the "Silence" button. The display will show:

PRINT LOOP CONFIGURATION Printing configuration

The zone configuration printout will list the addresses contained in each zone (lowest numbers first) and the address configuration printout will list all addresses (lowest numbers first).

9.0 PANEL SOUNDER OUTPUTS

Two sounder outputs are provided in the panel which operate upon any fire alarm. These supply a minimum of 23VDC and a maximum of 25VDC. These outputs are not programmable but may be organised with a delay (see section 8.3).

Each output is individually fused and is capable of supplying an alarm load of 500mA or a total of 750mA over the two circuits, therefore a short circuit on one output will not inhibit correct operation of the other.

The sounder outputs are monitored for short and open circuit faults and reverse their normal (monitoring) polarity when activated. It is therefore necessary to use correctly polarised sounders on the system to prevent the sounders from consuming current when in the normal (quiet) condition.

To provide open circuit monitoring, it is necessary to fit a monitoring resistor at the end of the sounder circuit wiring. It is by passing a small monitoring current through this "End of Line" resistor that the control panel is able to detect breaks in the sounder circuit cables.

The panel is supplied with 20K end of line monitoring resistors and these should be used whenever possible. However, the circuits will tolerate any value of resistor between 7K and 42K. If a sounder open or short circuit fault occurs the panel will display:

SOUNDER 1 FAULT 001/001
Open or short circuit on sounder circuit 1

(Or sounder circuit 2 if on the other circuit)

During the fault condition the buzzer will sound a continuous tone and the "Sounder Fault" and "Common Fault" LED's will flash.

The buzzer may be silenced by pressing the "Silence" button whereupon the "Sounder Fault" and "Common Fault" LED's will light continuously, the buzzer will "Beep" every 7 seconds and the "Buzzer Silenced" LED will light. A subsequent sounder fault will resound the buzzer, extinguish the "Buzzer Silenced" LED, cause the "Sounder Fault" and "Common Fault" LEDs to start flashing. The second fault can be viewed by pressing the "More Events" button.

Sounder faults are not latched by the control panel and fault conditions will clear with 10 seconds of the fault being removed.

Sounder circuit fuses are of the self reset type and require no maintenance or replacement.

10.0 VOLT FREE CONTACTS

All volt free contacts are intended for switching low power and low voltage signals only. Under no circumstances should voltages or currents above the ratings listed below be exceeded.

Note: These functions may not be used to provide any "Options with Requirements" as specified in EN54-2

10.1 Rem.Sig Contact

The Rem.Sig contact is a volt free changeover which is rated at 1 amp at 30 volts DC.

This contact will operate upon any fire or evacuate condition and will remain operated until the panel is reset (i.e. it will not switch off when the alarms are silenced).
The contact will not operated however if the panel is in zone test mode and the activation is from the zone on test.

Typical uses for this contact are remote signalling of the fire condition to a house system or automatic dialler.

The contact can be disabled (for example if a fire test is being done) as described in section 7.3.

10.2 Fault Contact

The fault contact is a volt free changeover which is rated at 1 amp at 30 volts DC.

This contact will operate upon any fault condition including total power failure and will self reset when the fault has cleared.

Typical uses for this contact are remote signalling of the fault condition to a house system or automatic dialler.

The contact can be disabled as described in section 7.4.

10.3 Alarm Contact

The alarm contact is a volt free changeover which is rated at 1 amp at 30 volts DC.

This contact will follow the action of the panel sounder outputs i.e. it will de-activate when the "Silence" alarm button is pressed and if the panel sounders are delayed then operation of this contact will also be delayed

Typical uses for this contact are to activate sounders on a remote alarm system or trigger door release relays.

The alarm contact will be disabled and enabled with the sounders as described in section 7.5.

11.0 REMOTE CONTROL INPUTS

The following inputs allow the basic controls of the panel to be duplicated by remote systems such as shopping precinct interfaces, house fire control panels or control desks.

All of the inputs are activated by switching the OV terminal to the input terminal via a normally open switch or contact. These inputs require a very low switching current therefore the contact or switch used should be suitable for switching currents as low as 0.1mA (see fig 4).

Note: These functions may not be used to provide any "options with requirements" as specified in EN54-2 and could leave the panel in a non-compliant state.

11.1 FLT (Fault)

The fault input can be used to indicate a fault at an associated system (e.g. extinguishant release control panel) and when operated will display "Remote Fault" on the LCD.

The input is non latching and when active will light the "Common Fault" LED and sound the fault tone on the buzzer. The fault contact will also be operated whilst the fault input is active and the event will be recorded in the event register.

11.2 RES (Reset)

The reset input can be used to reset the control panel from a remote location but will only operate following a "Silence Alarm" from either the front panel push-button or the remote "SIL" (silence) input.

This input is "Edge Triggered" i.e. there is no danger of the system not functioning if the reset input is permanently connected to 0V. It is only upon connection to 0V that the input activates. A remote reset will be recorded in the event register as "Remote Reset".

11.3 INT (Intermittent)

This input allows remote activation of all sounders in the intermittent mode (i.e pulsing on and off). When activated the LCD will display "Remote Alert". The input is not latching therefore all sounder outputs will be turned off when the input is removed.

This allows the fire bells to be used for class change signalling in schools, security alert or to be operated from the main system in a shopping precinct or other sectored site.

Operation of this input will not operate the Rem.Sig relay contact and will be recorded in the event register as "Remote Alert".

11.4 CNT (Continuous)

This input allows remote activation of all sounders in the continuous mode. When activated the LCD will display "RemoteEvacuate". The input is not latching and all sounder outputs will be turned off when the input is removed. This allows the fire bells to be activated by other systems without the need to silence the alarms then reset at the panel. Activation of this input will not operate the Rem.Sig relay contact and will be recorded in the event register as "Remote Evacuate".

11.0 REMOTE CONTROL INPUTS - *Continued*

11.5 SIL (Silence)

The silence input can be used to silence the alarm from a remote location.

This input is "Edge Triggered" i.e. there is no danger of the system not functioning correctly if the silence input is permanently connected to 0V. It is only upon connection to 0V that the input activates.

A remote silence will be recorded in the event register as "Remote Silence Alarm".

12.0 (AUX. 24V) AUXILIARY 24V DC

An independently fused auxiliary 24V DC supply is available for powering equipment related to the fire alarm system. The output is fused by a self reset fuse and therefore will not need replacing if it is tripped. The panel will display "AUX 24 V Supply Fuse Failed" when the fuse is tripped and this message will also be recorded in the event register. The aux supply is continuously rated for 250mA. The minimum voltage is 23VDC and the maximum voltage is 25VDC.

The AUX 24V output should be used with caution (particularly if used to permanently power other equipment) as its use can have a considerable effect on the stand-by time available from the stand-by battery.

Note: This output may not be used to provide any "options with requirements" as specified in EN54-2.

13.0 DETECTION CIRCUIT

This control panel must be used only with Hochiki AS or ASX range of devices using ESP protocol.

Four terminals (+ and - out, + and - in) are provided for connection to the detection circuit which should be wired as a loop with all devices connected across the cables such that + out connects to + in and - out connects to - in (see fig. 4). Short circuit isolators must be fitted in the detection circuit wiring in accordance with the appropriate fire detection systems standard. As a minimum these should be wired such that a short or interruption of the detection circuit will not prevent the indication of the fire alarm from more than 32 fire detectors and/or call points.

Fitting short circuit isolators ensures that only part of the detection circuit becomes disconnected from the control panel (i.e. the part between the isolators) in the event of a short circuit fault. In this respect the more isolators that are fitted, the greater the system integrity but practical considerations and cost dictate that this part of the system should be very carefully planned. The maximum number of isolators which should be fitted is 20.

The control panel normally supplies power and data to the detection circuit from the "Out" terminals and monitors the integrity of the cables at the "in" terminals. If a short or open circuit occurs on the detection circuit, the control panel immediately supplies power and data from both the "Out" and the "In" terminals effectively powering the circuit from both ends at once.

13.0 DETECTION CIRCUIT - *Continued*

Upon detection of a short or open circuit the display shows:

LOOP FAULT 001/001 Loop open or short cct

The common fault LED will flash and the buzzer will sound. Both of these events will be recorded in the event register. When the fault is cleared the panel must be reset.

14.0 BATTERY CHARGER AND PSU

The battery charger and PSU are integral to the panel.
The control panel requires one 12 volt, 7 ampere hour battery to maintain operation for 24 hours and thereafter supply the full alarm load for half an hour.

The panel power supply, converts the nominal 12 volts, to the 24 volts and 32 volts required by the detection and sounder circuits automatically upon failure of the mains.

The battery is an essential part of the system and correct charging will maximise its life. The output to the battery is set at the factory, to the optimum recommended by battery manufacturers for use in a temperate climate and varies with temperature as follows:

Temperature	Output
0° C	14.22
5° C	14.6
10° C	14.09
15° C	14.02
20° C	13.93
25° C	13.82
30° C	13.44

If adjustment is necessary, turn the adjustment control (see annex 3) very gently until the voltage is correct for the current ambient temperature.

The panel will display a fault message if the charging voltage is set too high, as this can be dangerous causing distortion of the battery case, but care must be taken to ensure that the charge voltage is not set too low or the battery will not reach its optimum capacity.

The battery charger output is protected by a conventional 20mm 315 mA glass fuse which protects against short circuit or battery reversal. (See annex 3).

14.0 BATTERY CHARGER AND PSU - *Continued*

The control panel monitors the battery connection and fuse constantly. Disconnection of the battery or failure of the fuse will display:

POWER FAULT 001/001 Battery disconnected

During a mains failure condition, the panel monitors the voltage of the battery and when the voltage reaches the battery manufacturers recommended minimum voltage of 10.5 volts, the display will show a low battery voltage warning.

If the voltage continues to fall (to about 9.5 volts) the battery will automatically be disconnected to prevent damage to the battery.

Power Ratings

230V AC mains	-	100VA max
5V DC supply	-	2.5W
14V DC supply	-	6W
24V DC supply	-	24W
32V DC supply	-	13.2W

15.0 SYSTEM FUSE

To protect against the high current capacity of the battery, a 5 amp 20mm fuse is fitted which disconnects all circuitry (except the current limited battery charger) in the event of a major fault. (see annex 3).

Failure of the system fuse is indicated by a blank display, a continuous tone from the internal buzzer and operation of the fault contact.

The system is completely inoperative when the system fuse has failed and this fault should be repaired as soon as possible.

16.0 EARTH FAULT MONITORING

The fire alarm system should have none of its supplies or signalling lines connected to earth. This ensures that two lines of different polarity or potential can not be joined by earth, which may prevent the system from functioning properly or produce false alarms.
The control panel therefore monitors the earth connection which should be at approximately 2.5 volts above the panels 0V or negative supply.

If the earth potential falls below 1.0 volts with respect to the panel 0V, the display will show:

POWER FAULT 001/001 Negative earth fault

16.0 EARTH FAULT MONITORING - *Continued*

If the earth potential rises above 4.0 volts with respect to the panel 0V, the display will show:

POWER FAULT 001/001 Positive earth fault

Any earth fault will light the "Common Fault" LED, sound the internal buzzer and operate the fault contact. Both will also be recorded in the event register.

Connection of the panel to a PC via the configuration lead sometimes produces an earth fault. This is quite normal and can be ignored.

17.0 WATCHDOG

The Panel contains a "Watchdog" circuit which monitors correct execution of the operating programme. If the programme stops as could happen in the event of a severe electrical storm or other interference, the watchdog circuit will reset the system and attempt to start the programme running again. Whether this is successful or not the "Watchdog" LED inside the panel will light and remain lit until the "Watchdog" reset switch on the main PCB is operated. (See annex 3).

18.0 OPERATION

Operation of the fire alarm system should be as simple and straightforward as possible. The **SOLO** maintains this philosophy by utilising the minimum number of controls and highlighting the most important indications. This ensures that a concise and unambiguous indication of the status of the system is presented to the user at all times.

18.1 Controls

There are 3 main controls required for the operation of the fire alarm system:

i) A means of sounding the alarms from the panel
ii) A means of silencing the alarms from the panel
iii) A means of resetting the alarms from the panel

All other functions associated with the essential requirements of the system are automatic and require no user intervention.

Operation of all of the controls (with the exception of "Lamp Test" and "More Events") is inhibited until the controls are enabled by operation of the "Enable Controls" keyswitch.

Without the "Enable Controls" keyswitch operated, pressing the reset button will perform a lamp test to allow the user to check that all of the lamps are working.

If there is more than one event of any type on the panel (indicated by 002/002 or similar on the right of the display and the "More Events" LED) then these can be viewed by pressing the "More Events" button to advance through them.

18.0 OPERATION - *Continued*

Operation of the enable control keyswitch puts the panel into access level 2. It is at this access level that the proper functions of the controls are available.

Operation of the "Evacuate" button will now sound all sounders continuously whether connected to the control panel loop or to field mounted bell controllers.

Operation of the silence button in the event of a fire will:

i) Change the tone of the fire buzzer from rapid pips, to one beep every 7 seconds.
ii) Change the flashing zonal fire indicator to continuous.
iii) Silence all sounders connected to the control panel and field mounted bell controllers.
iv) Illuminate the "Alarm Silenced" LED.

Operation of the silence button in the event of a fault will:

i) Change the tone of the buzzer from continuous, to one beep every 7 seconds.
ii) Illuminate the "Buzzer Silenced" LED.

Operation of the "Reset" Button has no effect without prior operation of the "Silence Button" following a fire or evacuate condition.

Following operation of the "Silence" button during a fire condition, operation of the "Reset" button will reset the fire condition at the control panel and reset the detector or detectors which initiated the fire condition.

If the fire condition was initiated by call points or switch input devices then these must be restored to normal before "Reset" is operated otherwise the fire condition will return.

For details on the use of the "Enter" button see section 7 of this manual.

19.0 INDICATIONS

19.1 Fire Indicators

The primary indications on the control panel are those associated with the fire condition. A common fire indicator will illuminate in the event of a fire detector, call point or input device being operated, accompanied by one or more "Fire in Zone" indicators to identify the zone in which the fire originated.

The common fire indicator will also illuminate if the "Evacuate" button is pressed and will remain lit until the condition is silenced then reset.

19.2 Fault Indicators

Common Fault

The "Common Fault" indicator will illuminate upon any fault condition. Further information about the nature of the fault can be obtained from the display or other fault indicators.

Sounder Fault
An open or short circuit on the cabling to the sounder circuits connected to the control panel will illuminate the "Sounder Fault" indicator.

Remote Fault
When the remote control fault input facility is used the fault condition signalled to this input will illuminate the "Remote Fault" LED.

System Fault
The "System Fault" indicator will illuminate in the event of failure of execution of routines associated with the main functions of the programme or corruption of the memory containing the programme or site configuration data.

CPU Fault
Operation of the system is monitored by a "Watchdog" circuit which will attempt to reset the central processor unit in the event of a failure to execute the programme properly.

Operation of the "Watchdog" circuit is indicated by the "Watchdog Operated" LED inside the panel (See fig. 1). This indicator will remain lit whether the reset was successful or not until IT is reset using the "Watchdog Reset" switch (See annex 3).

If the reset is unsuccessful and the processor still fails to execute the programme properly then the "CPU Fault" LED will be lit.

CPU Fault
Operation of the system is monitored by a "Watchdog" circuit which will attempt to reset the central processor unit in the event of a failure to execute the programme properly.

Operation of the "Watchdog" circuit is indicated by the "Watchdog Operated" LED inside the panel (See fig. 1). This indicator will remain lit whether the reset was successful or not until IT is reset using the "Watchdog Reset" switch (See annex 3).

If the reset is unsuccessful and the processor still fails to execute the programme properly then the "CPU Fault" LED will be lit.

19.3 Other Indicators

Supply Healthy
Indicates that equipment is being supplied with power.

Pre-alarm
For sensors which are configured to report a pre-alarm, the "Pre-alarm" indicator will illuminate when the control panel receives a signal from a sensor which is 85% of the set fire threshold level.
The panel buzzer will operate but no outputs will be operated during a pre-alarm condition.

Alarm Silenced
The "Alarm Silenced" indicator will be illuminated only when a fire condition has been silenced. Operation of a subsequent fire condition whilst the alarms are silenced will extinguish the "Alarm Silenced" indicator.

19.0 INDICATIONS - *Continued*

Remote Sig
Operation of the fire relay contact (Rem.Sig) is indicated by the "Remote Sig" indicator, this will be upon any fire condition unless the fire contact has been disabled via the menu functions (See section 7.3)

Buzzer Silenced
Silencing of the buzzer during a fault condition will be indicated by the "Buzzer Silenced" indicator.

Disabled
Any disablement selected via the menu functions (see section 7) or via cause/effect will be indicated by illumination of the "Disabled" indicator.

Test
The "Test" indicator will be illuminated whilst any zones are in test mode (see section 7.6).

20.0 DEVICE DEFAULT SETTINGS

When configuring automatically (i.e. without using a PC to download data) all device types will conform to the default settings. These determine the trigger level of analogue devices, the response of the panel (fire, fault etc) to inputs and the action taken by output devices. The trigger level of sensors and the default actions of all other input devices can be changed by using the PC configuration utility.

20.1 Input Devices

	INPUT ACTIONS					ATTRIBUTES		
DEVICE TYPE	FIRE	FAULT	PRE-ALARM	TRANS-PARENT	DISABLE-MENT	PRE-ALARM	DAY/NIGHT	LEVEL
CHQ-CP CALL POINT	D							
YCA-RL/3H2-ADDR. BSE	D							
YCA-RL/3H2-MASTER BASE	D							
CHQ-MZ-ZONE MODULE	D	S	S	S	S			
CHQ-Z-DUAL ZONE MODULE	D	S	S	S	S			
CHQ-S SWITCH MONITOR	1=D 2=S	1=S 2=D	S	S	S			
CHQ-B BELL CONTROLLER	S	D	S	S	S			
CHQ-R RELAY MODULE	S	D	S	S	S			
ALE/ALG PHOTO SENSOR	D					S	S	3%M
ATD/ATG HEAT SENSOR	D					S	S	60 DEG
AIC/AIE ION SENSOR	D					S	S	0.28

S = SELECTABLE D = DEFAULT

20.0 DEVICE DEFAULT SETTINGS - *Continued*

20.2 Output Devices

DEVICE TYPE	EVACUATE	DEFAULT RINGING	RESETABLE	SILENCEABLE	DELAYED	VOLUME
CHQ-B BELL CONTROLLER	D	D	S	D	S	
CHQ-R RELAY MODULE	S	D	D	S	S	
CHQ-BS LOOP POW. SOUNDER	D	D		D	S	S

S = SELECTABLE D = DEFAULT

21.0 PANEL DEFAULT SETTINGS

Supplier Name	-	Blank
Passcode	-	1000
Sounder Delay	-	No
Delay Time	-	0.5 Minute
Default Ring Mode	-	Common
Day/Night Start	-	0800 Hrs
Day/Night End	-	1800 Hrs

All of the above can be changed using the PC configuration programme.

Sounder delay and delay time can be changed at the panel via access level 3 (see section 8.3).

22.0 CALIBRATION

Every 24 hours at 7 am, all sensors connected to the system are automatically calibrated. This requires no intervention and is completely transparent unless any faults are found.

The calibration routine checks the zero point and the fire point of each sensor and compares this with the results of the previous day.

If a gradual change is detected (as will happen due to contamination over time) then the panels response will be adjusted to compensate, thus maintaining the sensitivity.

This process will continue until there is no adjustment left at which point the panel will display a maintenance fault condition indicating that the sensor should be replaced or cleaned.

This calibration routine incorporates a filtering process which eliminates false compensation due to spurious contamination at the time of calibration.
If after the filter process a sensors zero point or fire point differs significantly from the previous days readings then a calibration failed error will be reported indicating that the sensor should be replaced immediately.

23.0 REPEATERS

The Solo can support up to 16 repeater panels via a simple 2 core wire link.

To communicate with repeaters the main panel must first be fitted with a repeater driver card.

This plugs into the expansion port shown in annex 3.

The panel must be completely powered down before this card is fitted. Failure to do this will result in damage to both the panel and repeater driver card.

Whilst the panel is powered down, the repeater communication cable should be connected to the "COMMS" terminals at the left hand side of the terminal block on the main panel PCB (observe polarity).

The panel then needs to be configured using a PC and the SOLO configuration programme to communicate with the required number of repeaters.

Once the repeater(s) have been connected and powered, the main panel should be restarted (ensuring that the write enable switch is off).

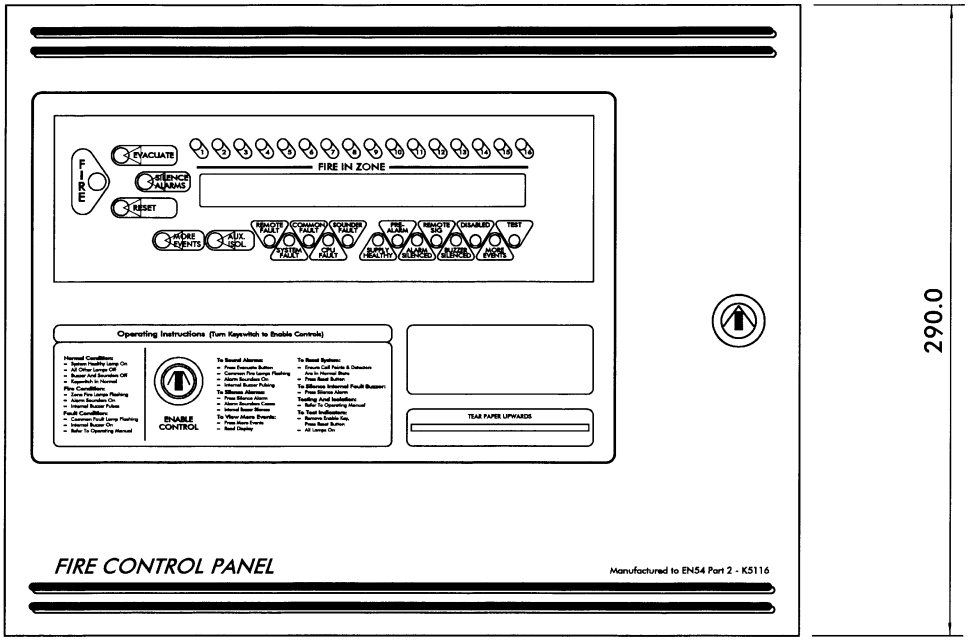
After the panel has finished initialising the system the repeaters should display the time and date and if programmed, the suppliers name as per the main panel.

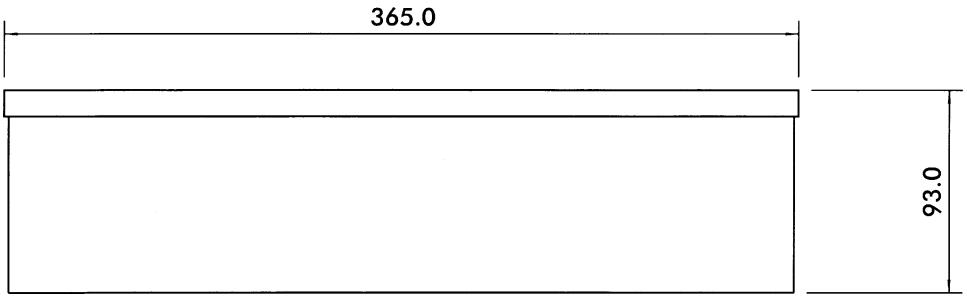
Any events on the main panel should now be displayed immediately on all repeaters. Repeaters can also silence, reset or evacuate the system in the same way as the main panel can, following operation of the enable switch.

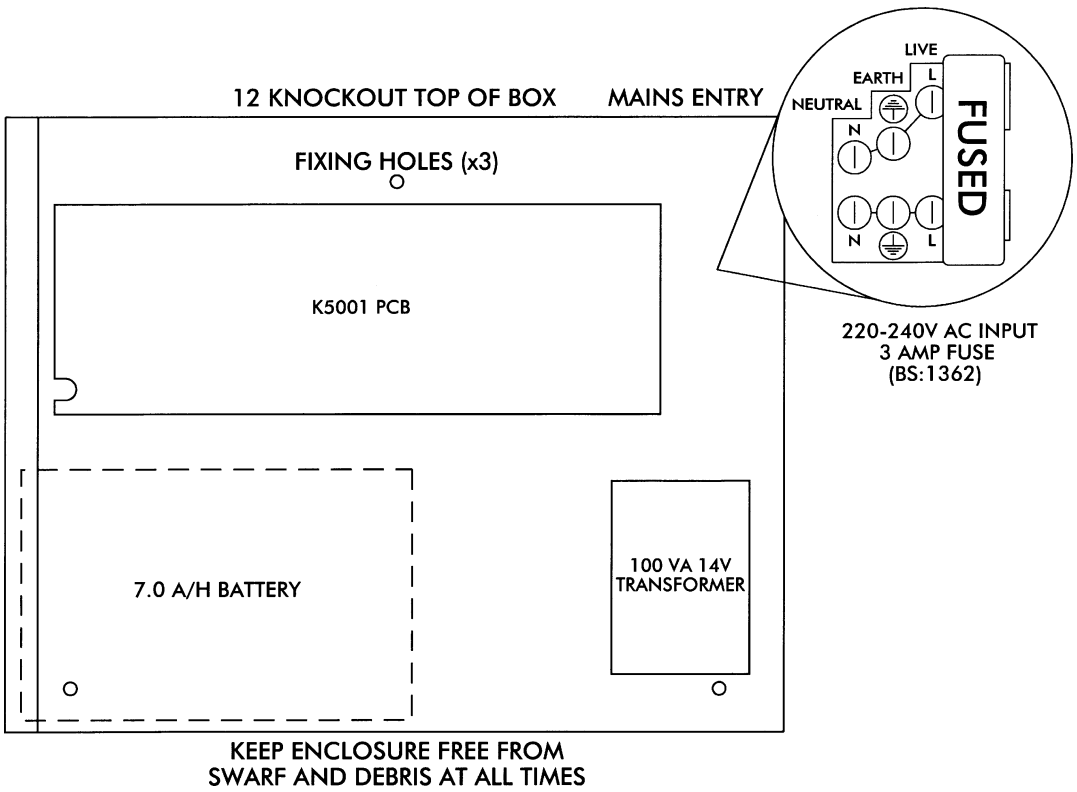
The repeater driver card and the repeaters themselves, have two LED's which flicker whilst communications are in progress. These can be used as a quick indication that all is well. If the LED's are on permanently or are not on at all then there is probably a fault on the communications cable.

If the communications cable becomes disconnected, the repeaters will automatically resume communication with the control panel upon re-connection.

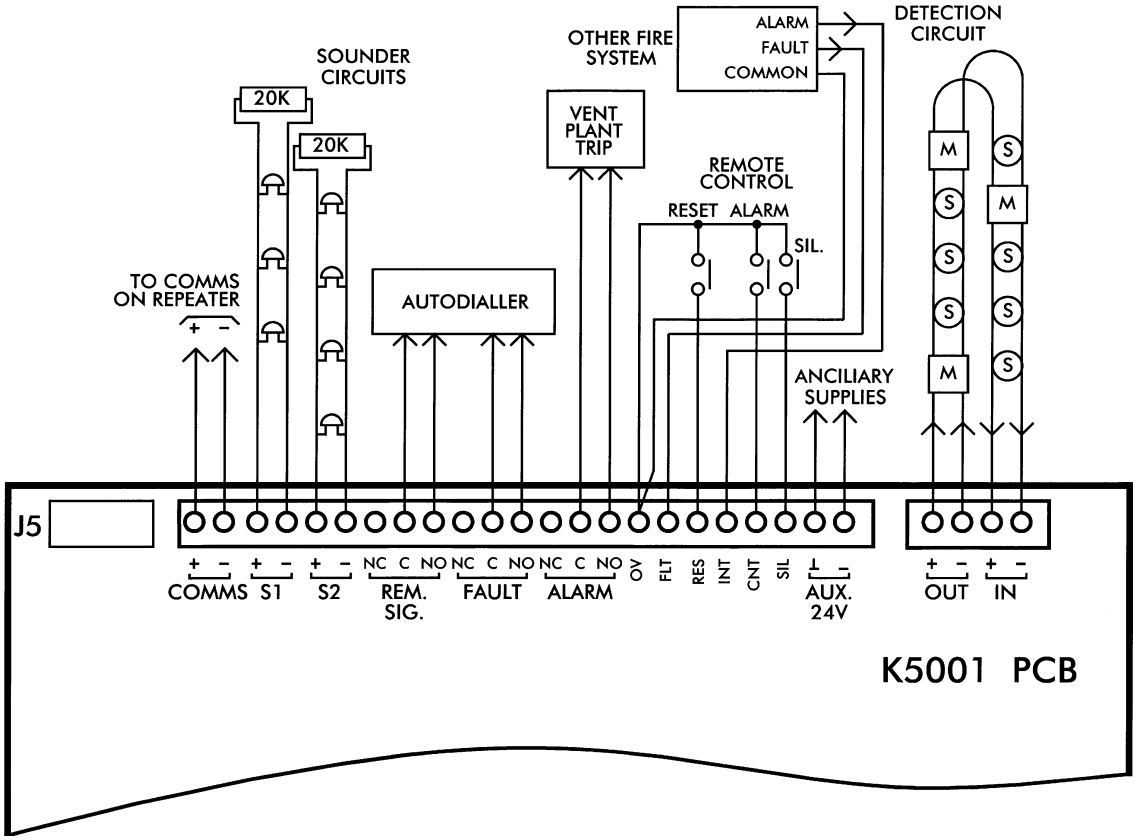
ANNEX 1

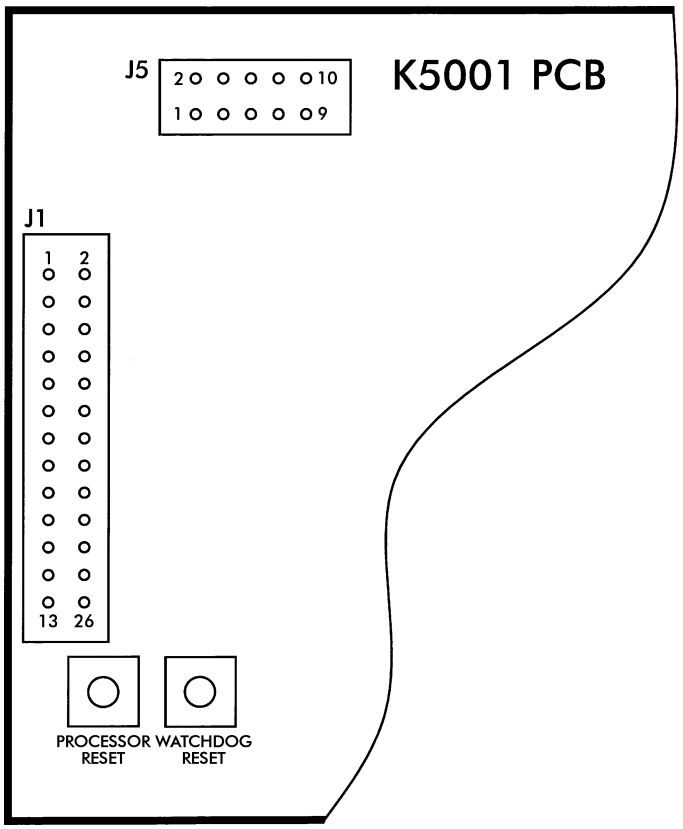

FIRE
EVACUATE
SILENCE ALARMS
RESET
FIRE IN ZONE
Operating Instructions (Turn Keyswitch to Enable Controls)
ENABLE CONTROL
TEAR PAPER UPWARDS
290.0
FIRE CONTROL PANEL
Manufactured to EN54 Part 2 - K5116


365.0
93.0


12 KNOCKOUT TOP OF BOX
MAINS ENTRY
LIVE
EARTH
L
NEUTRAL
N
FUSED
FIXING HOLES (x3)
K5001 PCB
220-240V AC INPUT
3 AMP FUSE
(BS:1362)
7.0 A/H BATTERY
100 VA 14V
TRANSFORMER
KEEP ENCLOSURE FREE FROM
SWARF AND DEBRIS AT ALL TIMES

ANNEX 2

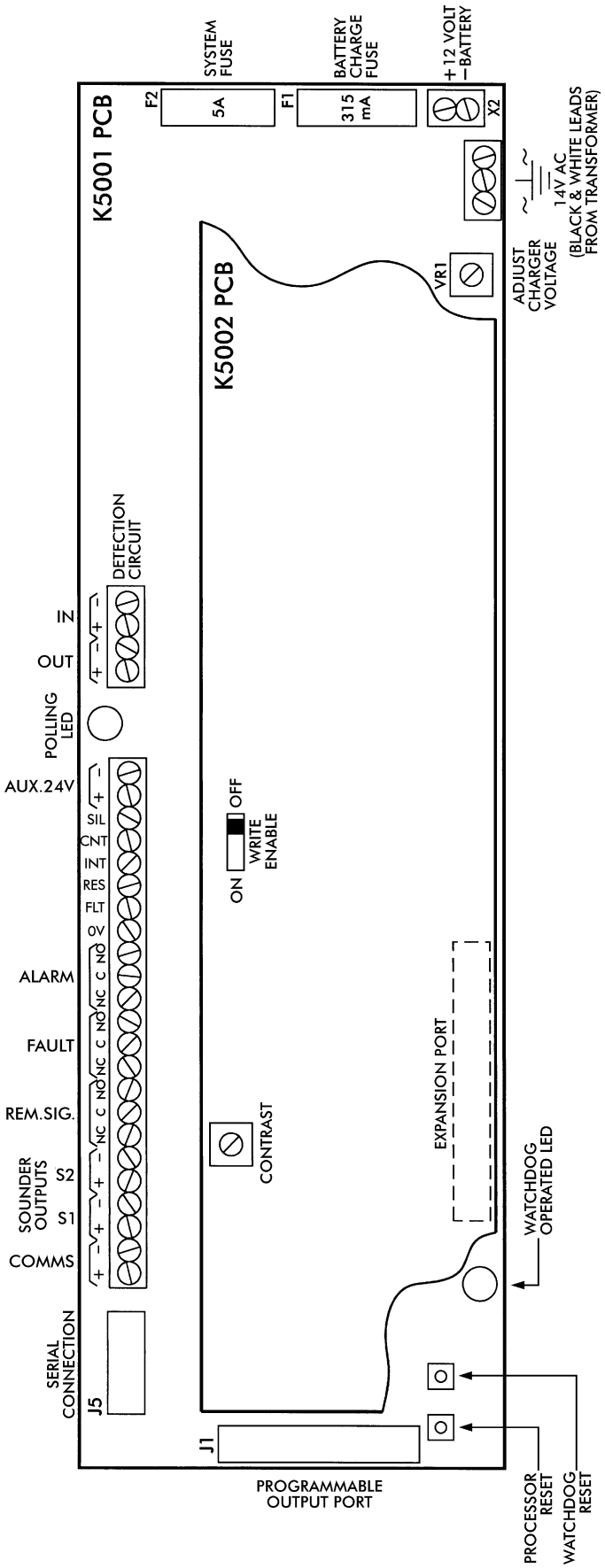




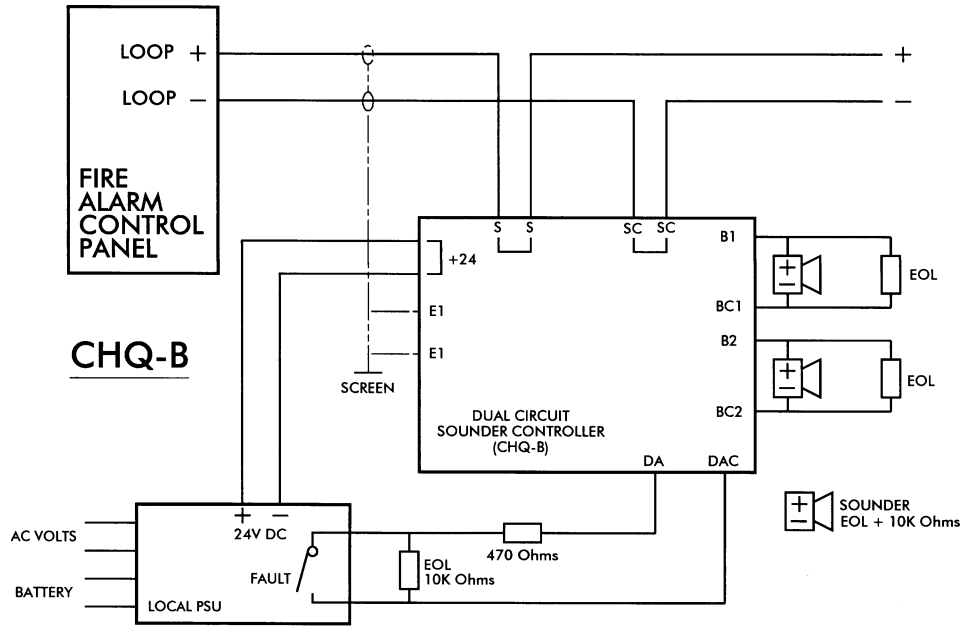
CONNECTOR J5	
1	0V
2	0V
3	0V
4	DO NOT USE
5	RX (RS232)
6	+24V
7	TX (RS232)
8	+24V
9	DO NOT USE
10	+24V

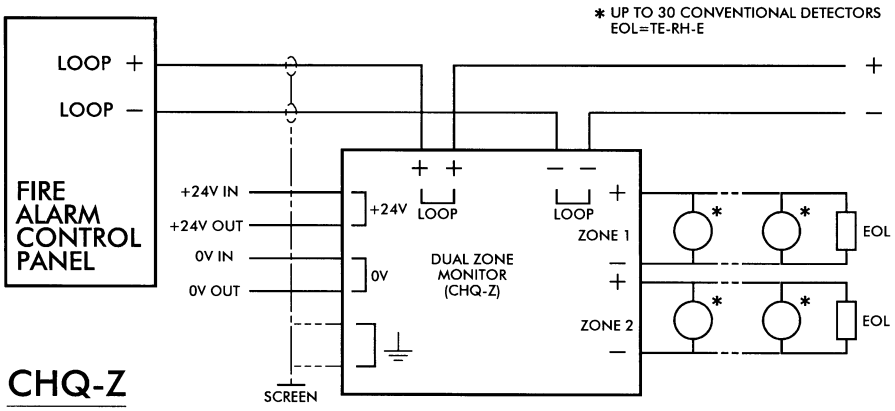
CONNECTOR J1		
1	9	OPEN COLLECTOR OUTPUTS
2	10	
3	11	
4	12	
5	13	
6	14	
7	15	
8	16	
9	1	
10	2	
11	3	
12	4	
13	5	
14	6	
15	7	
16	8	
17	17	
18	18	
19	19	
20	20	
21	21	
22	22	
23	23	
24	24	
25	FAULT INPUT	
26	+VE 24 VOLTS	

ANNEX 3

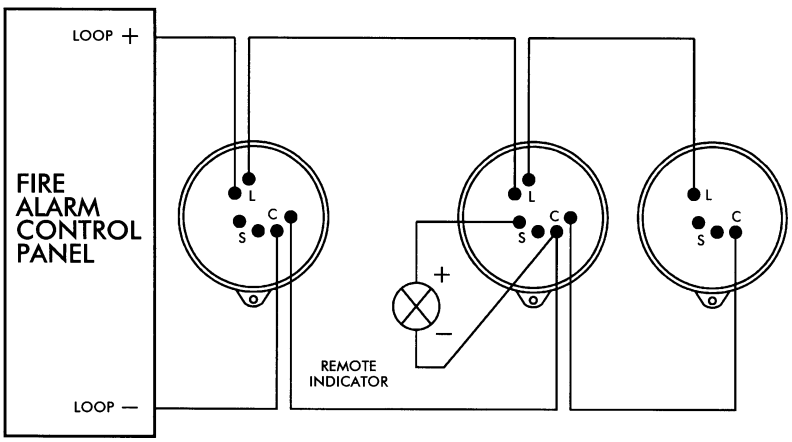

K5001 PCB
K5002 PCB
SYSTEM FUSE
F2
5A
BATTERY CHARGE FUSE
F1
315 mA
+12 VOLT
–BATTERY
X2
14V AC
(BLACK & WHITE LEADS FROM TRANSFORMER)
VR1
ADJUST CHARGER VOLTAGE
DETECTION CIRCUIT
IN
OUT
POLLING LED
AUX.24V
SIL
CNT
INT
RES
FLT
0V
ALARM
FAULT
REM.SIG.
SOUNDER OUTPUTS
S2
S1
COMMS
SERIAL CONNECTION
J5
ON
OFF
WRITE ENABLE
CONTRAST
EXPANSION PORT
WATCHDOG OPERATED LED
J1
PROGRAMMABLE OUTPUT PORT
PROCESSOR RESET
WATCHDOG RESET

ANNEX 4

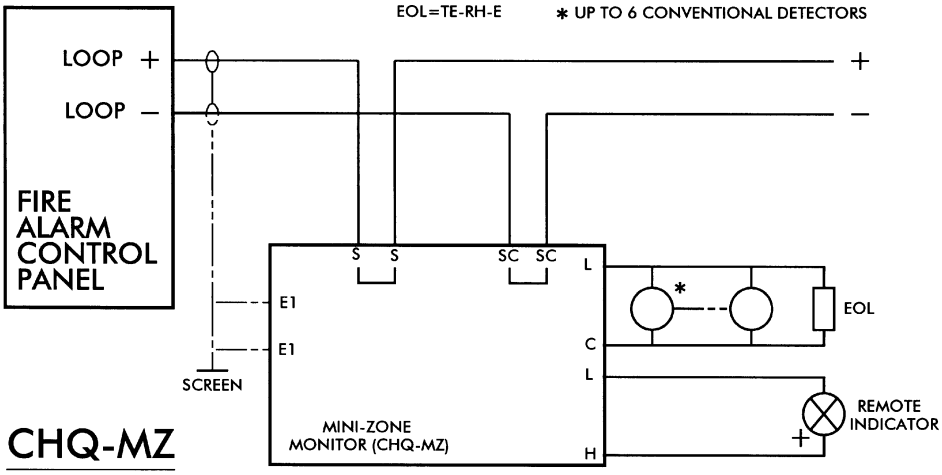


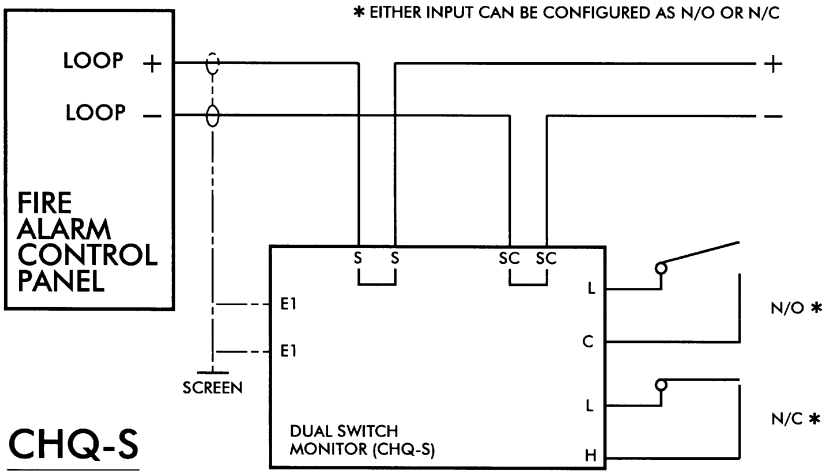


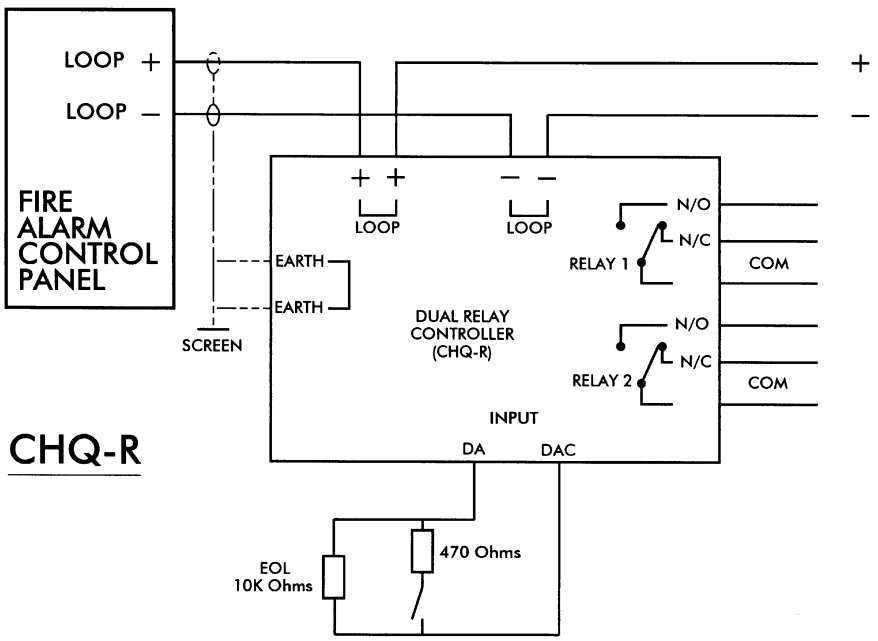
DETECTOR BASES



ANNEX 5


EOL=TE-RH-E
* UP TO 6 CONVENTIONAL DETECTORS
LOOP +
LOOP –
FIRE ALARM CONTROL PANEL
S S
SC SC
L
E1
E1
SCREEN
C
L
EOL
REMOTE INDICATOR
MINI-ZONE MONITOR (CHQ-MZ)
H
CHQ-MZ


* EITHER INPUT CAN BE CONFIGURED AS N/O OR N/C
LOOP +
LOOP –
FIRE ALARM CONTROL PANEL
S S
SC SC
L
E1
E1
SCREEN
C
N/O *
L
N/C *
DUAL SWITCH MONITOR (CHQ-S)
H
CHQ-S


LOOP +
LOOP –
FIRE ALARM CONTROL PANEL
+ +
– –
LOOP
LOOP
N/O
N/C
RELAY 1
COM
EARTH
EARTH
SCREEN
DUAL RELAY CONTROLLER (CHQ-R)
N/O
N/C
RELAY 2
COM
INPUT
DA
DAC
470 Ohms
EOL 10K Ohms
CHQ-R