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# SIMPLICITY GAS SENSE

## TOXIC & COMBUSTIBLE GAS DETECTION CONTROL PANEL (SGS100)



# INSTALLATION MANUAL

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# 1 SAFETY INFORMATION

**WARNING:** *Read this section completely before commencing installation.*

## 1.1 INSTALLATION INFORMATION

**THIS GAS DETECTION CONTROL PANEL IS CLASS 1 EQUIPMENT AND MUST BE EARTHED**

This equipment must be installed and maintained by a qualified and technically experienced person. This C.I.E. must be wired to a fused spur rated at 3A. It must **NOT** be connected via a removable plug, or be connected through an RCD device. Prior to commencing installation of the control panel, ensure that adequate precautions are taken to prevent damage to the sensitive electronic components on the control board due to electrostatic discharge. You should discharge any static electricity you may have accumulated by touching a convenient earthed object such as an unpainted copper radiator pipe. You should repeat the process at regular intervals during the installation process, especially if you are required to walk over carpets.

***The panel must be located in a clean, dry position, which is not subject to excessive shock or vibration and at least 2 meters away from pager systems or any other radio transmitting equipment. The operating temperature range is 0°C to 40°C; maximum humidity is 95%.***

## 1.2 HANDLING THE PCB

**If the PCB is to be removed to ease fitting the enclosure and cables, care must be taken to avoid damage by static.** The best method is to wear an earth strap, but touching any earth point (e.g. building plumbing) will help to discharge any static. Always hold the PCB by its sides and avoid touching the legs of any components. Keep the PCB away from damp dirty areas, e.g. in a small cardboard box.

## 1.3 SAFETY PRECAUTIONS DURING NORMAL OPERATION OF PANEL

**NOTE:** When the SIMPLICITY GAS SENSE panel is operating normally, i.e. not being tended by service personnel, the front cover should be screwed closed with the hex screws provided.

## 1.4 BATTERY INFORMATION

This C.I.E. uses 2 x 12V Sealed Lead Acid (SLA) batteries up to 7.2 Ah.

CAUTION: RISK OF EXPLOSION IF BATTERY IS REPLACED WITH INCORRECT TYPE.  
DISPOSE OF USED BATTERIES ACCORDING TO BATTERY MANUFACTURERS INSTRUCTIONS

### IMPORTANT NOTES ON BATTERIES:

**WARNING:** Batteries are often heavy; take great care when lifting and transporting batteries. For weights above 24 kilos, lifting aids should be used.

**DANGER:** Do NOT attempt to remove the battery lid or tamper with the internal workings of the battery. Electrolyte is a highly corrosive substance, and presents a danger to yourself and to anything else it touches. In case of accidental skin or eye contact, flush the affected area with plenty of clean, fresh water and seek immediate medical attention. Valve Regulated Lead Acid (VRLA) batteries are "low maintenance", requiring no electrolyte top-up or measurement of specific gravity. Batteries are electrically live at all times. **NEVER short circuit the battery terminals.**

## 1.5 PRODUCT DISPOSAL AT THE END OF ITS WORKING LIFE

Like all electronic equipment, at the end of its working life this unit should not be disposed of in a refuse bin. It should be taken to a local reprocessing site as per the guidelines of the WEEE directive, for correct disposal.

## 2 DESCRIPTION OF THE SYSTEM

The Simplicity Gas Sense Controller (SGS100) has been designed to monitor and control 48 gas sense detectors.

In addition to this, it can run Zeta addressable I/O units, and the range of Zeta addressable sounders. It has a 4 x 20 character LCD display to clearly display all the required device information on the screen.

From the user menu, the status of each detector can be viewed, and its gas concentration level observed. This remote monitoring and checking facility is useful if there are many detectors spread across a wide area on the system.

The system can be divided into 8 zones, allowing detectors to be grouped either by gas type, or by building area.

The Panel has a powerful, but intuitive interface for programming the system cause and effect, allowing the detectors on the system to operate required outputs.

The panel topology for loop device connection is set to individual radial zones as default, this can be changed so the devices can be connected as a single loop using zone 1 as loop out and zone 2 as loop return circuits.

The system uses the individual gas sense detector threshold settings by default. There are thresholds for Pre-Alarm, Alarm 1 and Alarm2, these thresholds for each detector can be set at the control panel over-riding the detectors internal level settings.

Any detector or zone can be disabled through the menus if required.

## 3 INSTALLING THE SYSTEM

### 3.1 MOUNTING THE CONTROL PANEL

The control panel should be installed in accordance with the following recommendations:-

- The panel should be close to the main entrance of the building, so that it can be viewed by any relevant personnel entering the building.
- It should be fitted to a sturdy wall that will not flex unnecessarily.
- It should be mounted at eye level, in order for it to be viewed without need of a ladder.
- It should be installed in a dry, weatherproof place, away from direct sunlight.
- It should be easily accessible, so that the responsible person can perform their regular fire alarm checks.

### 3.2 RECOMMENDED CABLE TYPES AND THEIR LIMITATIONS

Screened cables should be used throughout the installation to help shield the Panel from outside interference and ensure EMC compatibility.

All cables should be at least 1mm<sup>2</sup> cross section

On the Simplicity GAS the general recommendation would be to use standard fire resistant cable, such as Firetuff™, FP200 or any equivalent. These cables are screened, and will provide good EMC shielding when properly grounded at the panel. Certain system specifications may demand the use of a particular type of cable and due regard should be paid to this fact.

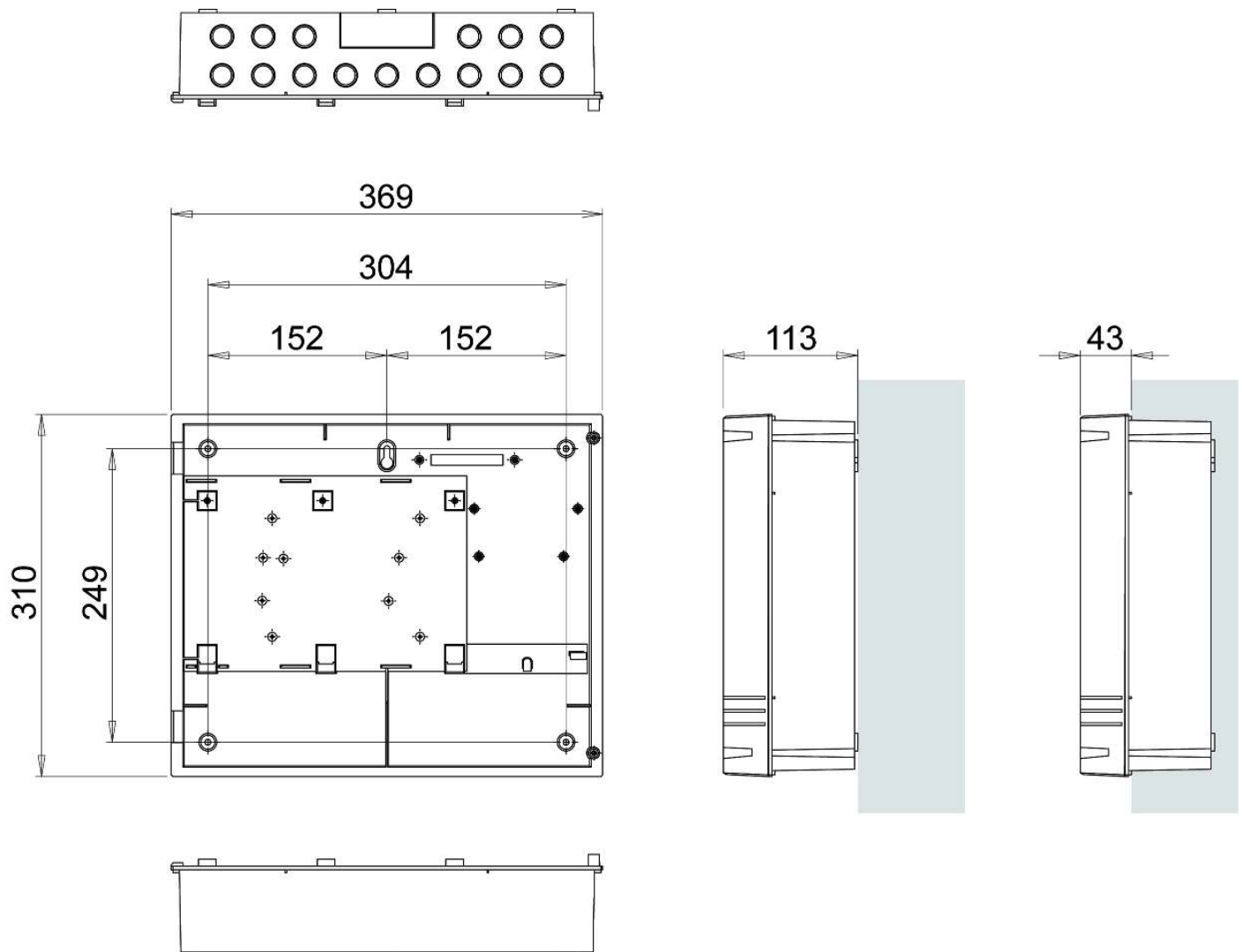
Depending on the environment, the cables may need mechanical protection (such as a conduit).

### 3.3 MAINS WIRING RECOMMENDATIONS

The Mains supply to the panel is fixed wiring, using 3-core cable (Between 1 mm<sup>2</sup> and 2.5mm<sup>2</sup>) or a suitable 3-conductor system, fed from an isolating double pole switched fused spur, fused at 3A. **IT SHOULD NOT BE CONNECTED THROUGH AN RCD.** This should be secure from unauthorised operation and be marked 'GAS CONTROL PANEL : DO NOT SWITCH OFF'. The supply must be exclusive to the control panel. **MAKE SURE ANY SPARE ENTRY HOLES ARE COVERED.** Also refer to rating information on the mains cover inside the control panel.

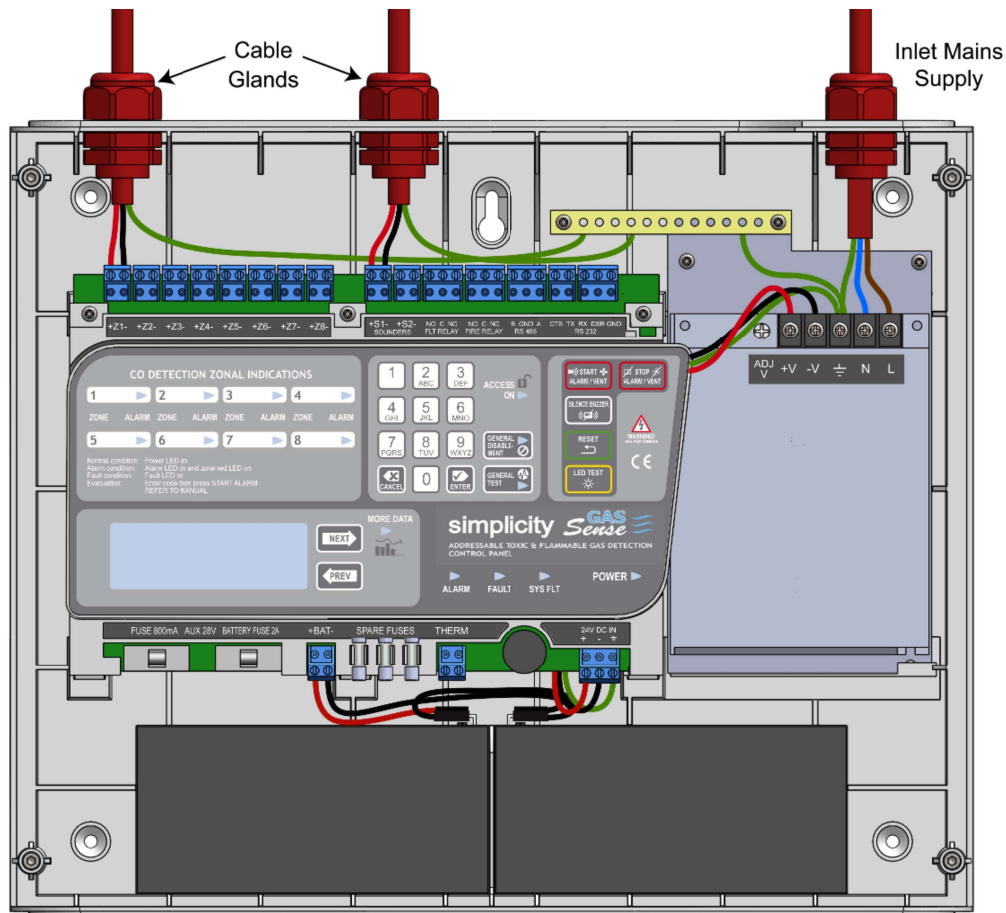
The SIMPLICITY GAS comes with many cable entry holes. If another entry hole is required, it is strongly recommended that the, the PCB should be removed and stored in a safe place. This would also help while fixing the back box to the wall.

#### 3.3.1 FIXING THE BACK BOX TO THE WALL



*Plan view inside the enclosure without PCBs. Side view for surface installation.*

Fix the enclosure to the wall using the three mounting holes provided. Check the build & condition of the wall to decide a suitable screw fixing. The mounting holes are designed for No 8 round-head or countersunk wood-screws (or similar). Remove any debris from the enclosure. Take care not to damage the control panel during installation.

**3.3.2 PLANNING CABLE ENTRY**

The 230Va.c. Mains cable must be fed into the enclosure via one of the cable entries at the top right corner of the back box. (Refer to "Connecting the Mains" on Following Page).

Appropriate cable glands should be used at all cable-entry points for mechanical stability and to maintain the panels ingress protection (IP) rating.

Unused cable entry holes should be closed off with an appropriate grommet.

**3.3.3 CONNECTING THE MAINS POWER**

The panel should be connected to 220-240V AC by a 3A rated spur to the fuse box with 1mm<sup>2</sup> to 2.5mm<sup>2</sup> 3-core cable. Nothing else should be connected to this supply.

Having entered the panel via the cable gland, the mains cable is then connected to the Live, Earth and Neutral connections marked on the power supply cage. The Mains is protected by an INTERNAL fuse on the PSU cage. (This fuse is not user serviceable)

The incoming mains cable should be labelled 100-230V and kept separate from the zone cables to help minimise mains interference.

It is advisable to apply power to the panel before connecting any devices, to check for correct operation, and to familiarise yourself with the use of controls on the panel.

## 4 ZONE WIRING

The SIMPLICITY GAS panel can be wired with up to 8 separate radial zone circuits each with 16 devices per circuit, or it may also be wired as a single loop by changing the topology settings. When Wired as a Loop, Zone 1 is used as Loop OUT (Side A), and Zone 2 is used as Loop IN (Side B). Each Zone is identified on the terminal labels. The Earthing of the cable screens should be connected to the earth bar provided.

It may be desirable to fit loop isolators between zones. This will protect the loop from total shut-down in the event of a short circuit appearing on the loop.

Each zone can have up to 16 devices allocated by their device address, in the ranges shown below:

Zone	Address	Zone	Address	Zone	Address	Zone	Address
1	001 – 016	2	017 - 032	3	033 - 048	4	049 - 064
5	065 - 080	6	081 - 096	7	097 - 112	8	113 - 126

### 4.1 CONNECTING THE DETECTORS

The Gas Sense detectors will require a separate power supply making the detectors a four-wire system. Refer to the Gas Sense detector instruction manual for further details. The devices have a unique address set via a dip switch the address is binary, using switches 1 to 7, or via a rotary switch Valid addresses are from 1 to 126.

#### 4.1.1 SETTING DEVICE ADDRESSES

Zeta device addresses are generally set with either an 8-way dip switch or 3 decimal rotary switches



The address leads from left-to-right as hundreds, tens and units. For example if the first switch is set to 0, the second to 3 and the last to 5 the address will be set to 035.



In general the **OFF** position represents binary 1, and the **ON** position represents binary 0, although certain devices may have this reversed (where OFF represents 0 and ON represents 1) so it is best to check the device documentation for further information.

Setting a switch to the binary 1 position adds a value to the address based on its position

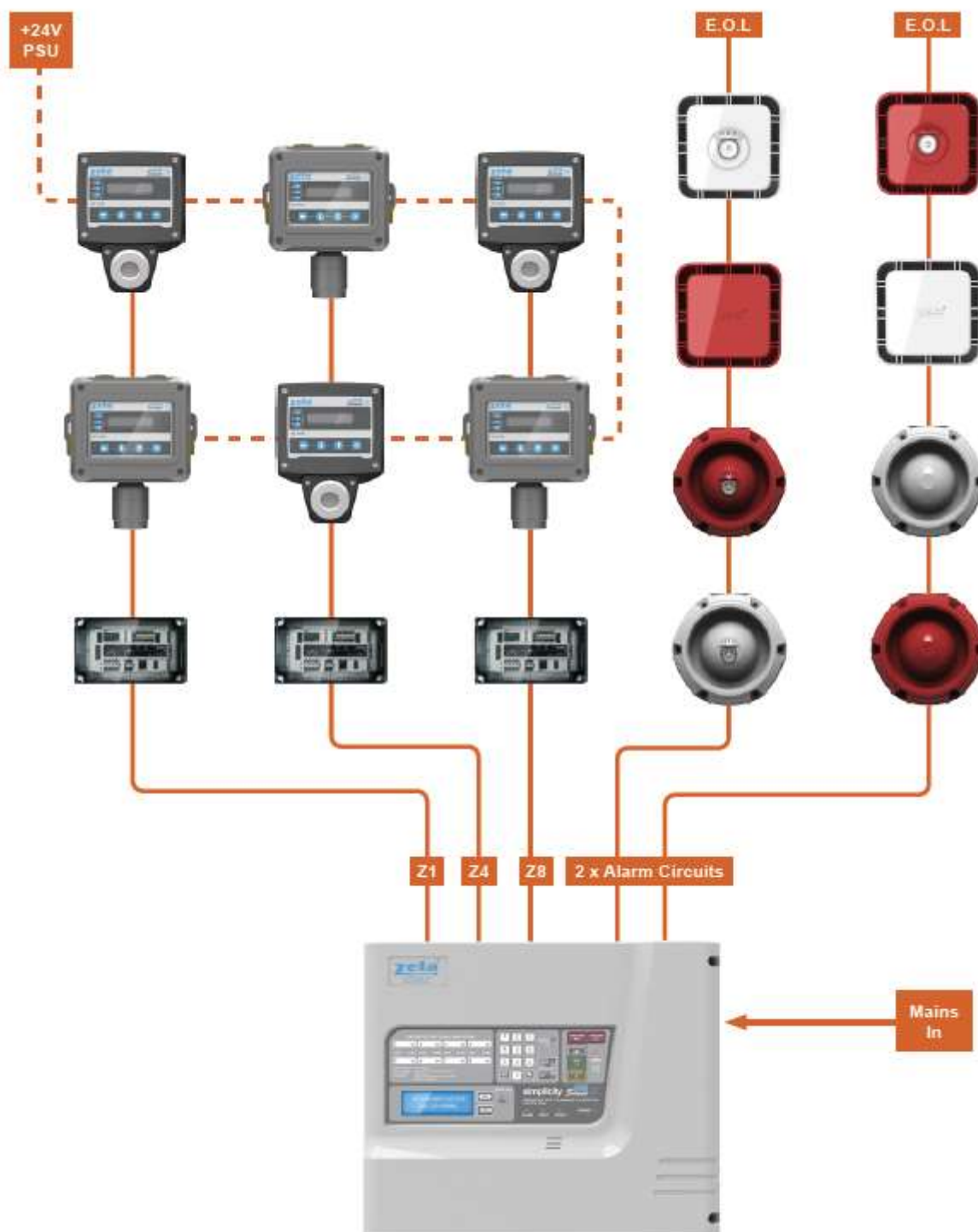
Switch Number	Value	Switch Number	Value
1	+1	5	+16
2	+2	6	+32
3	+4	7	+64
4	+8	8	special function (refer to device documentation)

For example, a detector with switches 1,3 and 6 set to OFF (binary 1) and the rest set to ON (binary 0) will have an address of  $1 + 4 + 32 = 37$ .

Once the device addresses have been set, the panel should be re-configured to the new device addresses.



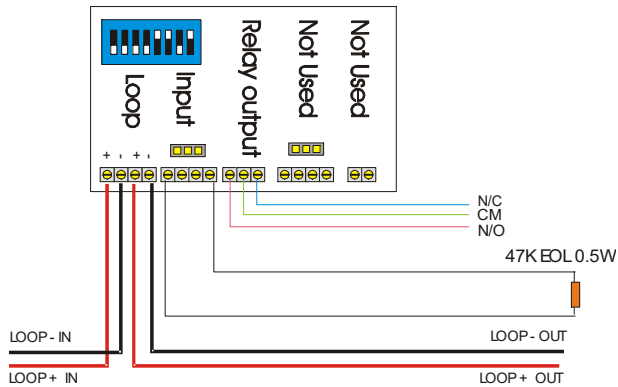
## 4.2 CONNECTION DIAGRAMS



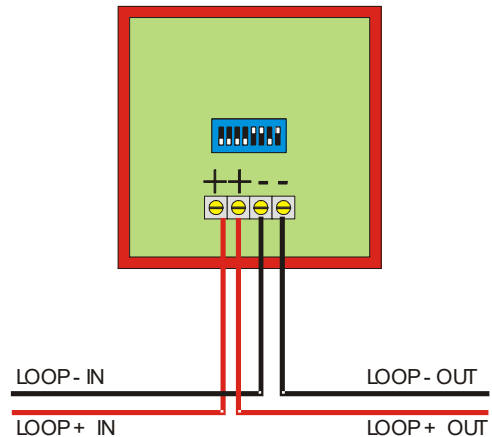
### Example of typical installation.

Zeta MKI Addressable Sounders and Interface units are compatible with the Simplicity Gas System.  
Zeta Gas Sense Detectors both Industrial and Flameproof versions can be used on the same system.

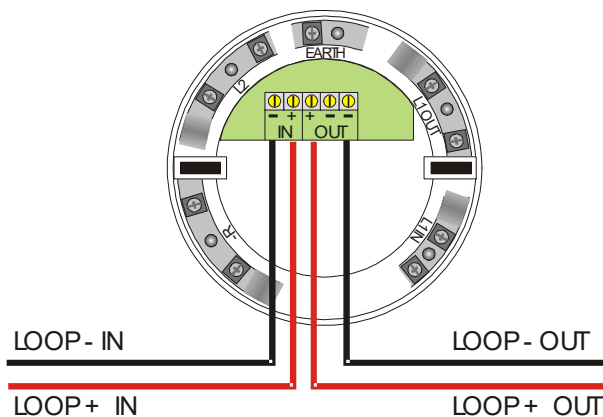
**Zeta Input Output Unit**  
**ZIOU/230**  
**48-105**



**Zeta Addressable Maxitone Sounder**  
**ZAMT/R**  
**42-007**



**Fyreye Loop Isolator**  
**FEA-ISO**  
**80-091**



## 5 AUXILIARY OUTPUTS

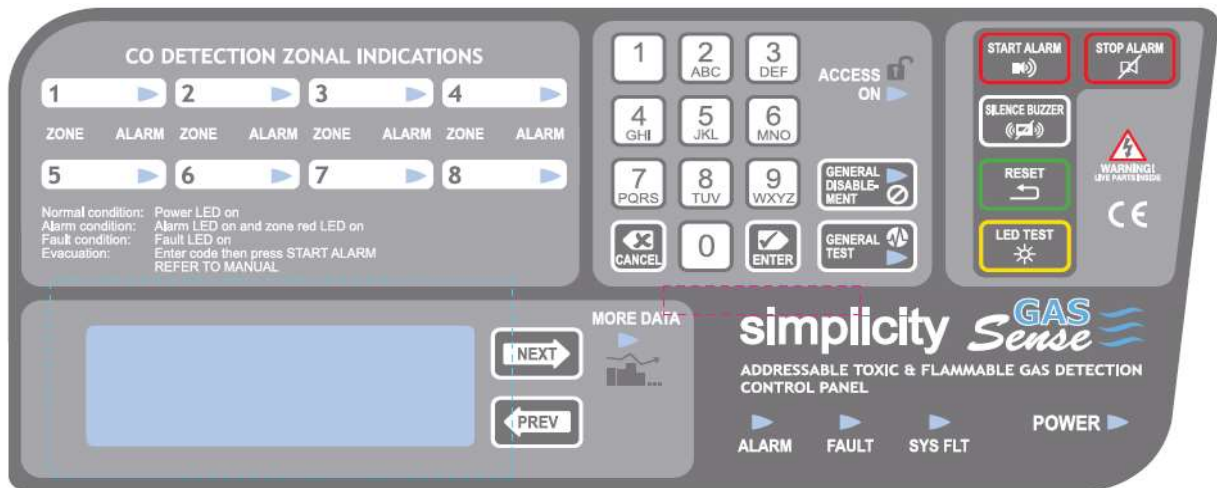
### 5.1 ALARM OUTPUT RELAY

This is a SELV volt free relay, to operate in Alarm. It can be connected to various devices which are activated upon detection of rising gas levels, such as ventilation, automatic door control or alarm systems.

### 5.2 FAULT OUTPUT RELAY

This is a SELV volt free relay that operates in any Fault condition. It is Normally energised, which ensures it can give a fault signal, even in the event of total power loss.

## 6 PANEL CONTROLS & INDICATIONS



### 6.1 INDICATIONS

**POWER** The GREEN power indicator to show the system is powered from the mains or battery.

**1** The Simplicity Gas panel has a numbered alarm indicator for each of its eight zones. When a device reports an alarm condition the RED indicator for that zone will illuminate.

**ALARM** The RED General Alarm Indicator illuminates with an alarm condition, this can be accompanied by the zonal indication or when manual Start Sounders are activated. Refer to LCD screen information for details.

**FAULT** The AMBER General Fault Indicator illuminates with any FAULT condition, this will be accompanied by the internal buzzer. Refer to LCD screen information for details.

**SYS FLT** The AMBER System Fault Indicator illuminates when the panel has encountered a serious fault this will be accompanied by the General Fault indicator and the internal buzzer active. This can be reset by pressing the reset button, if the panel becomes unresponsive then remove mains and battery power for 10 seconds then reconnect power and check the system is operating correctly.

**ACCESS ON** The AMBER Access On Indicator illuminates when the keypad controls are active after entering the access code, this will time-out after five minutes or press cancel three times to exit.

**GENERAL DISABLEMENT** The AMBER General Disablement Indicator illuminates when there are any devices or outputs disabled on the panel. Refer to LCD screen information for details.

**GENERAL TEST** The AMBER General Test Indicator illuminates when there is a zone in Test Mode. Refer to LCD screen information for details.

**MORE DATA** More data is available on the LCD readout. Press [NEXT> and <PREV] to navigate through the panel events.

## 6.2 CONTROLS

The Simplicity Gas Control Panel requires the access code '123' to be entered before the control buttons are enabled.



Press START ALARM to manually start the external sounders.



Press STOP ALARM to silence external sounders. Any further alarms will re-sound external sounders and the internal buzzer.



The panel will give an internal audible signal for all alarm and fault events. This can be stopped by pressing the silence buzzer button. Any further events will re-sound tone until the silence buzzer button is pressed again.



After investigating the cause of an alarm and checking the gas concentration is at safe levels the panel can be reset by pressing the reset button.



Pressing the LED TEST button will activate all indicators and the internal tone for 3 seconds to check for correct operation. Additional panel information is displayed on the LCD screen allowing the membrane keypad to be checked and the total loop current usage will be displayed in mA.



Pressing the General Disablement button will prompt you for the code ('248') to access the disablement menu. This will allow you to disable zones, line sounders and external sounder circuits. Press the Cancel button to exit the menu.

Pressing the General Test button will prompt you for the code ('248') to access the zone test menu. This will allow you to select one zone at a time to test, this is a silent test the device will turn the LED on to acknowledge activation, line sounders and external sounder circuits can be tested separately.



The NEXT button will allow you to scroll forward or Navigate down through messages and events.

The PREV button will allow you to scroll backwards or Navigate up through messages and events.



Use the Alpha-Numeric keypad to select options and enter codes.

To enter text pressing a key will scroll through each character.

e.g. pressing button 2 will give 'A' then press again for 'B' and 'C' then '2'.

Pressing 1 will give '.' and '-' and '1' and pressing 0 will give ' ' (space) and '0'.

The ENTER button is used to confirm actions.

The CANCEL button is used to delete text or go back one level or to exit menu without saving changes.

## 7 DESCRIPTION OF THE MENU OPTIONS

To help locate the different features available, the menu structure of the Simplicity GAS panel is shown here.

Main Menu		Description
	1: Clock	Adjust Date/Time
	2: Zone	Display Zone Information
	3: Logs	Display event logs
	1: Alarms	Display Alarm events
	2: Faults	Display Fault events
	3: System	Display System events
	4: All	Display All events
	4: Devices	Shows Device information
	5: Levels	Display threshold levels
	6: Engineer Menu 1	Engineers menu
	1: Configure Zones	Configure zones
	2: Panel/Zone Text	Adjust panel or zone labels
	3: Set Device	Show information on device * Edit device label (Press ENTER) * Turn on alarm LED / Flasher (Press 4) * Ring sounder(Press GENERAL TEST) * Select alarm verification(Press 8) * Configure Sandwich Sounder Base (Press 7) * Disable this device.(Press General Disable) * Configure I/O OUTPUT(Press 8) * Configure I/O INPUT (Press 6)
	-> Engineer Menu 2	Press [NEXT> to access the 2nd engineers menu
	4: Alarm Config	Configure Alarm thresholds
	5: Response Time	Configure response times of detectors
	1: Prealarm	Configure pre-alarm response time
	2: Fault	Configure fault response time
	3: Alarm	Configure alarm response time
	6: Misc	Miscellaneous menu
	1: Language	Change language
	2: Version	Display version information
	3: Topology	Change loop topology
	6: Reset	Reset
	1: Event Logs	Reset (clear) event logs
	2: Factory Reset	Reset panel configuration

## 7.1 ACCESSING THE MENUS

If access is not already enabled, Pressing any key will request an access code the codes are

Enter Access Code	The User level menu can be accessed using the access code '123'
—	The Engineers level access can be obtained using the code '369'
	The Test/Disable access can be obtained using the code '248'

## 7.2 MAIN MENU OPTIONS

The options in the Main Menu are...

Main Menu	CLOCK	- Set the Date and Time.
1: Clock 4: Devices	DEVICES	- display individual device information.
2: Zone 5: Levels	ZONE	- Display devices in each zone.
3: Logs 6: Engineer	LEVELS	- view the gas levels for each detector type.
	LOGS	- View the panels event log.
	ENGINEER	- Menu Level 2 options to make changes to panel settings.

### 7.2.1 CLOCK - SETTING THE TIME AND DATE

Enter the Main menu by using the access code and select Clock by pressing button 1.

Set System Clock	The Clock Menu is now displayed.
15-12-2015 10:00	Enter the Day, Month, Year, Hour & Minutes as prompted, and press ENTER to save, or press CANCEL at any time to exit.

### 7.2.2 ZONE – ZONE INFORMATION

Enter the Main menu by using the access code and select Zone by pressing button 2.

Z01: 00 Z03: 00	The display shows the number of devices found in each zone.
Z03: 00 Z04: 00	Use this information to check all devices on the system have been configured and are
Z05: 00 Z06: 00	working correctly. Any missing devices can be easily noticed from this screen, refer to
Z07: 00 Z08: 00	section on fault-finding for further details.

Zone 1 Contents	Pressing the NEXT/PREV buttons will scroll to the Zone Contents Screen to Show
GAS 00	number of each device type configured and also shows number of errors found in that
I/O 00	zone.
SND 00 ERR 00	

### 7.2.3 LOGS – VIEW EVENT LOG

Enter the Main menu by using the access code and select Logs by pressing button 3.

View Event Log	The display shows a menu with types of events to display, there can be very many
1: Alarms 3: System	events in the log file to scroll through before you find the event you want to look at.
2: Faults 4: All	Pressing button 1 will show only ALARM events, button 2 will show only FAULT events,
	button 3 will show only SYSTEM events and button 4 will show ALL events in the log.
Event 1234	Each event log records the event number, the time and date the event occurred, a
15-12-2015 13:29	description of the event and the 20 character device label if applicable to the event.
Access Level 2	The event log memory can be cleared, but the event number is not reset, the number
	will restart at 0000 after event 9999.

### 7.2.4 DEVICES – VIEW DEVICE STATUS

Enter the Main menu by using the access code and select Devices by pressing button 4.

```

D0
Analog: 16 Normal
20 CHARACTER MESSAGE
Z1 Ad:001

```

The display shows information for loop devices. The top line shows device type and extra status information if available. The second line shows the Analogue Value and the Status of the device. The third line shows the device message and other information if available. The bottom line shows the zone number and device address. Use NEXT/PREV to scroll to next address, or pressing 1 will allow you to enter the address you wish to view.

### 7.2.5 LEVELS – VIEW GAS DETECTOR THRESHOLD LEVELS

Enter the Main menu by using the access code and select Levels by pressing button 5.

```

← CL2-20 →
Set in Sensor
Press ENTER to Edit

```

The Zeta Gas Sense Detectors have three alarm level thresholds. Use NEXT/PREV to scroll to the gas type you wish to view. If the screen shows 'Set in Sensor' then you will need to view threshold levels from the detector, refer to the instruction manual for the detector for information.

```

← CL2-20 →
PREALARM 25 ppm
ALARM1 40 ppm
ALARM2 50 ppm

```

If the screen shows the three alarm thresholds then these values shown are used by the gas panel.

Refer to the ALARM CONFIG section for information on changing threshold levels.

## 7.3 THE ENGINEER MENU

Enter the Engineer Menu by using the access code and select Engineer by pressing button 6.

```

Enter Access Code
-

```

Enter code '369'.

```

Engineer Menu 1
1: Configure Zones
2: Panel/Zone Text
3: Set Device

```

The options in the Engineer Menu are...

- CONFIGURE ZONES - Configures devices into panel memory.
- PANEL/ZONE TEXT - Allows you to edit the panel and zone names.
- SET DEVICE - Allows you to setup gas detectors.

→ Note the arrow in bottom right-hand corner, use NEXT to display another page.

### 7.3.1 CONFIGURING DEVICES ON ZONES

The panel can scan for new devices and reports the devices found as unconfigured device faults, when the panel is used for the first time or when the memory is blank you are prompted to autoconfigure the zones.

```

Devices Found
Press ENTER to
Configure Panel

```

To configure zones, simply press [ENTER] to allow the panel to scan for devices. This will only function with no previous configuration in the memory (Blank Panel).

```

Engineer Menu 1
1: Configure Zones
2: Panel/Zone Text
3: Set Device

```

Press button 1 to configure connected devices, the zones will be scanned by the panel and stored in the panels memory.

```

Configuration in
Progress
80%
ENTER to Label Zone

```

The panel will show Configuration in progress, press enter to edit zone labels while you wait, or this can be done at a later time see section 7.5. After configuration is complete verify all devices have been found using zone information, refer to section 7.2.2



**7.3.2 LABELING PANEL NAME AND ZONE TEXT**

```

Panel/Zone Text
1: Panel
2: Zones

```

Press button 2 from Engineer 1 menu will display the Panel/Zone Text menu.

Press 1 to change Panel Name displayed on LCD screen.

```

Set Panel Name
For Service Call
01234 567890

```

Use alpha-numeric keypad to enter text, 2 lines of 20 characters are available, press enter after each line to confirm entry, press cancel to exit without making changes. To restore factory name just delete all entered text (blank lines) and press ENTER.

```

Set Zone Name
Zone 1
Ground floor

```

Press 2 to change Zone Text labels for each zone.

Use alpha-numeric keypad to enter text and NEXT/PREV buttons to scroll to next zone to edit and ENTER to confirm entry, press cancel to exit without making changes.

**7.3.3 SET DEVICE- GAS DETECTOR SETUP**

```

Set Device
1: Edit Device
2: Setup Gas Sensors

```

Press button 3 from Engineer 1 menu will display the Set Device menu.

The Edit Device screen shows the same information as the device status screen with the other features enabled.

```

00
Analog: 16 Normal
20 CHARACTER MESSAGE
Z1 Ad:001

```

To change the 20 character device labels press ENTER then a cursor will appear, use alpha-numeric keypad to change text then press ENTER to confirm entry, press cancel to exit without making changes.

The Gas Sense Detector has an on-board relay contact for each alarm level this can be energised from the panel for test purposes by using button 7 to toggle the Pre-Alarm relay, button 8 to toggle the Alarm1 Relay and button 9 to toggle the Alarm2 relay.

```

Use gas sensor
control panel to
setup sensors.
Press CANCEL to exit

```

This function will set the Gas Sense Detectors to operate as stand-alone devices to enable the alarm level thresholds to be adjusted. Refer to the Gas Sense Detector instruction manual for further information on changing the alarm levels for individual detectors. Press CANCEL to return to previous menu.

From Engineer Menu 1 press next button to display Engineer Menu 2.

```

Engineer Menu 2
4: Alarm Config
5: Response Time
6: Misc

```

The options in the Engineer Menu 2 are...

ALARM CONFIG	- Edit the alarm configuration.
RESPONSE TIME	- Edit the delay before each alarm is activated.
MISC	- displays the Miscellaneous menu.

Note the arrow in bottom right-hand corner use PREV to display previous page.

**7.3.4 ALARM CONFIG - GAS DETECTOR ALARM THRESHOLD SETUP**

Press button 4 from the Engineer Menu 2 to enter the Alarm Configuration menu.

```

Alarm Operation
1: Set Threshold
2: Alarm Relay
3: Sounders

```

SET THRESHOLD – Edit the alarm level thresholds.

ALARM RELAY – Set the level the Alarm relay operates.

SOUNDERS – Set the Sounder configuration.



## SIMPLICITY GAS SENSE (SGS100) – INSTALLATION MANUAL

Press button 1 to display the set threshold screen, it shows the same information as the view alarm levels screen, but will allow you to change the settings.

```
←  CL2-20  →
Set in Sensor
Press ENTER to Edit
```

The Zeta Gas Sense Detectors have three alarm level thresholds. Use NEXT/PREV to scroll to the gas type you wish to view. If the screen shows 'Set in Sensor' then you will need to view threshold levels from the detector, refer to the instruction manual for the detector for information. Press ENTER to over-ride the detectors internal alarm levels with the panel settings for that gas type.

```
←  CL2-20  →
PREALARM  25 ppm
ALARM1    = 40 ppm
ALARM2    50 ppm
```

The screen shows the three alarm thresholds these values shown are used by the gas panel. An '=' (equals) sign indicates the alarm level to change, use PREV/NEXT to change the value. Press ENTER again will move the '=' down to the next alarm level, press cancel to exit editing mode and the '=' will disappear. If you want to enable the Gas Detectors internal alarm levels press the General Disablement button.\*\*\*\*\*

### 7.3.5 ALARM RELAY - ALARM RELAY SETUP

Press button 2 to display the alarm relay operation screen, it shows the current alarm level setting.

```
Aux Relay Operation
Alarm 1
ENTER to Confirm
```

Use NEXT/PREV to select alarm level to operate alarm relay in panel, then press ENTER to confirm selection.

### 7.3.6 SOUNDERS - SOUNDERS SETUP

Press button 3 to display the sounders operation screen.

```
Sounder Operation
1: Ext Sounders
2: Loop Sounders
```

Press 1 to change settings for external sounders.

Press 2 to change settings for loop sounders.

```
Sounder Operation
Ext Sounders
Alarm 1
ENTER to Confirm
```

```
Sounder Operation
Loop Sounders
Common / Alarm 1
ENTER to Confirm
```

Use NEXT/PREV to select alarm level for sounders, then press ENTER to confirm selection.

Loop sounders can be set to Common or Zonal mode.

### 7.3.7 RESPONSE TIME - SETUP DELAYS FOR ALARM RESPONSE TIME

```
Response Time
1: Prealarm
2: Fault
3: Alarm
```

Press 1 to change delay settings for Pre-alarm response time.

Press 2 to change delay settings for Fault response time.

Press 3 to change delay settings for Alarm response time.

```
Prealarm Time
0:10
ENTER to Confirm
```

Use NEXT/PREV to select delay time from 10 seconds to 2 minutes in 5 second intervals, then press ENTER to confirm selection. (Default = 10 seconds)

```
Fault Time
1:00
ENTER to Confirm
```

Use NEXT/PREV to select delay time from 10 seconds to 4 minutes in 10 second intervals, then press ENTER to confirm selection. (Default = 1 minute)

```
Alarm Time
  0:10
ENTER to Confirm
```

Use NEXT/PREV to select delay time from 10 seconds to 2 minutes in 5 second intervals, then press ENTER to confirm selection. (Default = 10 seconds)

### 7.3.8 MISC - MISCELLANEOUS MENU

From Engineer Menu 1 press next button to display Engineer Menu 2.  
Press button 6 from the Engineer Menu 2 to enter the Miscellaneous menu.

```
Misc Settings
1: Language
2: Version
3: Topology 6: Reset
```

Press 1 to change the panel language setting. (Default = ENGLISH)  
Press 2 to display system information and the firmware versions.  
Press 3 to change the loop topology. (Default = Radial Zones)  
Press 6 to display Reset settings menu.

### 7.3.9 LANGUAGE - SETTING THE PANEL LANGUAGE

```
Set Language
English
Press ENTER to Save
```

Use NEXT/PREV to select language for panel, then press ENTER to confirm selection.

The panel will have one of 2 language banks:-

- |            |    |            |
|------------|----|------------|
| 1.         | or | 2.         |
| English    |    | English    |
| Spanish    |    | Hungarian  |
| Portuguese |    | Serbian    |
| French     |    | Lithuanian |
| Italian    |    |            |

Other languages are available on request.

### 7.3.10 VERSION - DISPLAY THE SYSTEM INFORMATION

```
Zeta Alarm Systems
Gas Panel/8 Zone
Panel : 0.D.9705
Loop : 0.M.9683
```

< Panel Manufacturer  
< Panel Model Type  
< Firmware version of panel  
< Firmware version of loop

### 7.3.11 TOPOLOGY - SETTING THE PANEL LOOP TOPOLOGY

```
Topology
Radial Zones
ENTER to Confirm
```

Use NEXT/PREV to select topology for the panel, then press ENTER to confirm selection. (Default = Radial Zones)

The Simplicity Gas Panel has up to 8 radial zones to connect up to 16 devices per zone.

With the topology set to LOOP the device wiring can be connected as a single loop using the ZONE1 terminals as LOOP OUT and the ZONE2 terminals as LOOP IN, any unused zone terminals will be disabled, the maximum number of devices you can connect to an 8 zone panel is 126, for a 4 zone panel is 64 and for a 2 zone panel is 32 devices.

### 7.3.12 RESET - THE RESET SETTINGS MENU

```
Reset Settings
1: Event Logs
2: Factory Reset
```

Press 1 to clear event log entries.  
Press 2 to restore factory defaults.

**7.3.13 EVENT LOG - RESETTING THE EVENT LOG**

During installation and commissioning, it is possible to create a large number of events, especially if a configured Zone is disconnected. This is normal, and is not a case for concern, up to 1000 events can be stored in memory.

Clear Event Log

ENTER to Confirm

Press ENTER to clear event log. A warning message informs you this process cannot be undone, press ENTER again to confirm action, ALL event log entries are now removed. If an Access Code is required then use the Engineer Access Code '159'.

WARNING

This action  
cannot be undone  
ENTER to Confirm

Note that when the event log is cleared, the EVENT NUMBER remains the same. This is so that a visiting engineer will have an idea of the activity on a panel, even if the event log has been cleared. The counter has a maximum value of 9999, and will return to 0 after this.

**7.3.14 FACTORY RESET – RESTORE THE PANEL TO FACTORY DEFAULTS.**

Reset Everything to  
Factory Defaults

ENTER to Confirm

Press ENTER to reset to factory defaults. A warning message informs you this process cannot be undone, press ENTER again to confirm action, ALL settings and messages are now removed. If an Access Code is required then use the Engineer Access Code '159'.

WARNING

This action  
cannot be undone  
ENTER to Confirm

NOTE: The factory reset option does not delete any panel name that has been programmed into the panel. To clear any programmed name, follow the steps in section 7.3.2, and use the cancel button to delete all text.

**7.4 I/O UNIT OPERATION****7.4.1 SETTING INDIVIDUAL I/O UNIT OPERATION – RELAY**

The I/O module can be common mode or zonal mode operation to switch voltage-free contacts rated at 230Vac 5A

I/O Zh-D

Analog: 16 Normal

20 CHARACTER MESSAGE

Z1 Ad:001

◀ To change the operation of an individual I/O unit, go to Edit Device (Engineers menu and 3), Scroll to the required Address and Press button 8 (V) to cycle through the different Variations of I/O configuration.

## 8 DISABLEMENT OF DEVICES

The Simplicity GAS panel has many features including output relays and sounder circuits to zones of devices all can be disabled. Note that when there is any type of disablement present, the [General Disablement] indicator will also be lit.

### 8.1 ZONE DISABLEMENT

To aid commissioning and assist routine maintenance, the zones and sounders can be disabled. When a zone is disabled, the panel will not respond to any fault or alarm signals it receives from devices in that zone.

```
Zone Disablement
Zone 1
Zone Enabled
Devs: 0
```

Press [General Disablement] button to display the Zone Disablement screen. If an Access Code is required then use the Engineer Access Code '248'.

Use NEXT/PREV to select zone to disable, then press ENTER to confirm selection.

```
Zone Disablement
Zone 1
Zone Disabled
Devs: 0
```

Note: The number of devices disabled in this zone is shown on the bottom line.

Note: More than one Zone can be disabled at a time and line sounder and external sounder circuits can be disabled from this screen. When the sounders are the panel will not start any sounders in an alarm condition.

#### 8.1.1 DISABLING INDIVIDUAL DEVICES

Individual devices on the system can be disabled from the Edit Device screen located in the engineer menu.

```
CO
Analog: 16 Normal
20 CHARACTER MESSAGE
Z1 Ad:001
```

Use NEXT/PREV to select device to disable, then press [General Disablement] to disable device selected, the 'Device Disabled' message will be displayed alternately with the 20 character message. Pressing [General Disablement] again will enable the device.

#### 8.1.2 DISABLING THE SOUNDERS

```
Zone Disablement
External Sounder 1
Zone Enabled
```

There are two 24V external sounder circuits each can be disabled individually use NEXT/PREV to select circuit to disable and press ENTER, screen will show Zone Disabled, then press ENTER again to enable sounder circuit.

```
Zone Disablement
Line Sounders
Zone Enabled
Devs: 0
```

To disable Line or Loop Sounders use NEXT/PREV to select Line Sounders and press ENTER, screen will show Zone Disabled, then press ENTER again to enable sounder circuit. Line Sounders can be individually disabled using the procedure above for devices. The number of Line Sounders disabled is shown on the bottom line.

## 9 TEST MODE

To aid commissioning and assist routine maintenance check, a silent, non-latching 'one man test' facility is available.

When a detector or I/O unit is triggered on any zone in Test, the Device will light it's LED without triggering a general alarm, When the unit comes out of alarm it will reset automatically. Should an Alarm occur in a zone that is not in test mode the Panel will go into full alarm. The Zone test LED will continue to be lit. When the alarm has been reset, test mode will resume.

```
Select Zone to Test
Zone 1
Normal Operation
```

Press [General Test] button to display the Test screen.

If an Access Code is required then use the Engineer Access Code '248'.

Use NEXT/PREV to select Zone to Test, then press ENTER to confirm selection.

```
Select Zone to Test
Zone 2
Test Active
Zone 1
```

Screen shows Test mode is active in Zone 1 shown on bottom line, you can scroll to another zone shown as Zone 2 on second line and press ENTER to select Zone 2 and the bottom line will change to zone selected.

NOTE: Only one zone can be in test mode at any one time.

Refer to the instruction manual for the gas detectors to test each type of detector.

## 10 DESCRIPTION OF DISPLAY MESSAGES

The SIMPLICITY GAS panel has zonal alarm indicators and general alarm, general fault, system fault indicators and an LCD screen to display messages and also records other non critical items such as User access, clock change, configuration changed, event log erased etc. These can be used to help determine the chain of actions before or after an event.

The types of events recorded are: -

Power On/Startup	Panel Reset	Evacuate	Access Level 2
Access Level 1	Sounders Silenced	Configure Loops	Time & Date Set
Zone Disabled	Zone Enabled	Device Disabled	

If the panel has a device in fault condition displayed, press ENTER to show the status screen. It will show device information with one of the following messages:-

FAULT	MEANING
Changed	The device had been changed with one of a different type since last configuration. The message will flash between Changed, and the new type of device seen (eg. Ion).
Missing	The device is not communicating (ie removed , damaged or Address setting changed)
DetRmvd	A Detector has been removed
Side A Only	There is a break in the cable, and the device is only seen from Side A – Loop Mode Only
Side B Only	There is a break in the cable, and the device is only seen from Side B – Loop Mode Only
2-ADDR	Double Address - Two devices have the same switch setting
No message	This device is signalling an internal fault by returning a value of less than 8.

## 10.1 LOCATING A DEVICE

From the Edit Device screen in engineer menu, it is possible to send commands to individual devices to start their sounder, or to turn on their alarm LED / Flasher.

Select the Zone and Address for the device to be checked.

If the device has an LED, its LED can be turned on by pressing Button 4. A star will appear in the top right hand corner to show that the LED has been lit on this device. Press again to turn off.

If the device is a sounder or I/O with a relay, the sounder or relay can be started by pressing the GENERAL TEST button. The Outline sounder Symbol turns solid to show that the Sounder is active. Press again to turn off.

Similarly their Flasher can be started by pressing button 4. Press 4 again to turn off.

The sounder and flasher can both be activated if required. (Press General test, then 4)

Scrolling to another device or exiting the menu will automatically turn the LED or sounder/flasher off.

## 10.2 VIEWING ALARM EVENTS

When a detector reports an increase in gas levels above the threshold levels, the panel will report the Zone and Address of the detector in Alarm. Multiple events may be displayed and these can be cycled through with the <PREV] and [NEXT> buttons.

## 10.3 VIEWING FAULTS DURING AN ALARM CONDITION

In the event of multiple alarms, and multiple faults on the system at the same time, the LCD screen will give priority to alarm events. The screen will show the first alarm, and the Prev/Next scroll buttons will cycle through alarm events only.

The LEDs will show general fault information. To show fault event details on the LCD screen, press the CANCEL button. <PREV] and [NEXT> will now scroll through the faults. Press cancel to return to viewing the alarm information. (If the panel is left viewing a fault, after a short period of inactivity, the panel will revert to the alarm display)

A sounder fault is classed as an Indication that should not be suppressed, to the panel reserved part of the bottom line of the LCD to indicate sounder faults.

## 10.4 VIEWING ZONE DISABLEMENTS DURING AN ALARM CONDITION

If zones are disabled, then by pressing the GENERAL DISABLEMENT button, information about disabled zones can be displayed on the LCD.

## 10.5 VIEWING ZONES IN TEST MODE DURING AN ALARM CONDITION

To view details of a zone in test during a general alarm (caused by an alarm from a zone not in test), Press the general test button. The panel will display details of the zone in test. The panel will time out to display the general alarm screen within 20 seconds of the last button press.

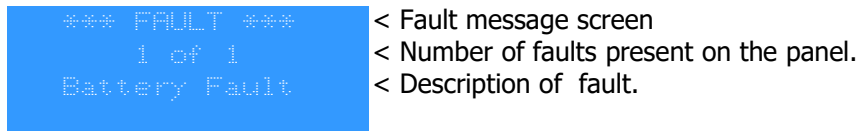
1. The screen will now invite you to select the zone to be tested, use the <PREV] and [NEXT> buttons to cycle through the zones.
2. Once the desired zone is selected, press the [ENTER] button to put the zone into test mode.
3. Detectors in this zone can now be tested with a test gas. The Detector will light it's LED until the gas clears, then it will reset. The sounders & the fire relay are not operated during test mode.
4. Once testing of that zone is completed, press [ENTER ] to bring the zone out of test mode.

## 11 FAULT INDICATORS AND MESSAGES DISPLAYED

On the Simplicity GAS panel, Faults are divided into 2 types, "Faults" and "Device Faults". Device Faults are any fault associated with a particular Device on the system. Faults are everything else, EG, power supply etc. In the event of multiple faults, the Faults are grouped together first, followed by the device faults. Next button will scroll to next fault.

### 11.1 GENERAL FAULTS

There can be many causes for the panel to display faults the reasons for each fault are listed below.



#### 11.1.1 BATTERY FAULT

The system is running on mains power only.

Check- If batteries are fitted to the panel, The battery is connected correctly or the battery fuse has blown.  
The battery voltage is below 21 Volts. For safety the panel will not try to charge deep discharged battery.

#### 11.1.2 BATTERY HIGH IMPEDANCE FAULT

The performance of the batteries decrease with age, the panel can detect this and indicate there may be insufficient battery life to reliably provide back-up power in the event of a mains failure.

#### 11.1.3 POWER SUPPLY FAULT

The mains power has failed and the system is running on battery power.

Check the mains fuse or circuit breaker.

#### 11.1.4 EARTH FAULT

The panel monitors the EARTH voltage and can indicate when a short-circuit has occurred between part of the system wiring and earth. This usually means there is a short between the cables in the detection loop and the cable screen. The Screen will indicate if it is a Positive or Negative voltage shorting to earth. (Earth Fault Pos or Earth Fault Neg).

(Note: connecting other equipment, eg an oscilloscope or a PC, to the panel can give an earth fault)

DO NOT DISCONNECT THE MAINS EARTH CONNECTION, THE SAFE OPERATION OF THE PANEL WILL BE AFFECTED

As an EARTH fault can occur anywhere on the system the only way to locate the fault is to remove all circuits connected to the system, just leave the mains supply connected and with no earth fault present start to connect each circuit until the fault is detected by the panel, the fault will be on the last circuit connected.

#### 11.1.5 SYSTEM FAULT (SYS FLT)

A system fault is active when abnormal microprocessor condition is detected due to various unexpected phenomena.

This will result in the panel attempting to correct itself, and should this fault occur, the System Fault LED, General Fault LED, General Fault relay and fault internal buzzer will be constantly active until the control panel is RESET. The panel should clear the system fault and return to normal condition. If the panel is non-responsive or the system fault condition returns the panel PCB has internal damage and will require repair or replacement, consult your supplier.

**11.1.6 COMMON FAULT (FAULT)**

This is a general indicator which lights whenever a fault is present. It is normally accompanied by the internal buzzer which can be silenced and does not refer to a specific fault, see LCD screen for more information.

**11.2 ZONE FAULTS**

If the Zone contents are different to what was expected, then the probable causes are:-

The Gas Detectors are powered from a separate supply check the detectors power is normal.

Two or more devices may have the same address setting. This is referred to as a double address fault. If this occurs all devices with the same address will answer at the same time. The panel will not be able to understand the answer.

NOTE: If a panel detects a double address, it will light the LEDs of the devices with that address. (NOTE: only detectors will light their LED. Sounders & interface modules will not be shown).

Check cable connections to devices are correct (they are polarity sensitive). The devices should be connected using Loop in and Loop out terminals provided. Other devices will have their polarity marked by their connections.

If the wiring polarity is correct, check that there is no cable break on the loop. (If there is a break, the panel will report the break after 60 seconds or so). The loop will be powered for 20 sec, and then will power side A for 5 sec, then power both for 20 sec, then power side B for 5 seconds. (the loop will cycle while the cable break is present).

Some devices take a few seconds to power up, so may show as missing during the repeated Power Down / Power Up cycle that occurs during a line break.

**11.2.1 RADIAL SHORT-CIRCUIT / CABLE FAULT / LOOP FAULT**

The radial zones each have over-load protection and will automatically reset when the fault is removed.

If the panel Topology is set to LOOP then the panel will monitor the cable for open and short circuits. If loop isolators are active ( some devices have internal isolators ) this can show as a cable break – open circuit.

**11.3 DEVICE FAULTS****11.3.1 DOUBLE ADDRESS**

The panel has detected a zone or loop with two or more devices at the same address. This usually happens during installation where 2 detectors are given the same address, or a detector is replaced during maintenance and has been wrongly set. In the second scenario, the panel will report 2 fault addresses, one will be the double address, and the other will be a missing device. As a further aid to finding the fault, the panel will light the LEDs of any detectors with a double address (Sounders & I/O units will not be indicated as they have no panel controlled LED to light up).

Make a list of the double addresses reported (there may be more than one).

Go to view device screen in Configuration menu 1. Scroll through the devices, and make a list of any that are missing (Note: the panel skips over empty addresses when scrolling)

Go to the location of the missing device, and check if it has its LED on (Detector), or check the dip switch setting. If this does not find the double addresses, go to the known location, and temporarily remove the device. The panel will now show the type of device that was configured at this address from the view device screen. This will help narrow down the search for the device. (eg if extra device is call point, check the address settings of all the call points)

**11.3.2 MISSING DEVICE**

This means that the panel cannot see the reported device. This detector could have been removed, or a device has malfunctioned and is no longer responding.



## 12 GENERAL RECOMMENDATIONS

Do not connect the detectors to their bases until the whole building work has been carried out and remember that once installed, power should be provided as soon as possible.

To carry out the installation, use an individual duct and avoid installing the detector close to sources that generate electromagnetic disturbances (fluorescent lights, engines, counters, etc.) If you cannot avoid installing them close to these disturbances, we recommend you use shielded cable (hose)

Do not use the detector base as a junction box to make connections to more than one detector, use the terminals supplied for the cabling of the detector base.

If extra holes must be drilled in the control unit cabinet, take care to clean the cabinet of all swarf, as the conductive coating could irreversibly damage the electronics.

5.- In compliance with the STANDARD EN 6.1010-1, 1.5mm<sup>2</sup> monopole cable should be used for the 220 AC connection to the control unit, protecting the input with a 5A contactor or circuit breaker and installing it as close as possible to the control unit.

6.- The minimum voltage needed for a detector to be able to function is 17V. If long cable runs are used, check the voltage of the first, middle and last detector on the loop.

7.- When the installation is 5 years old the detectors should be replaced and system recommissioned.

8.- REMEMBER that the detectors should not be left in the installation when:

- The control unit is disconnected
- There is no voltage or when there is only temporary power supply for the building work
- The building work has not been completely finished
- When maintenance work is being carried out, such as painting, changes to structure, when floors are being degreased, etc.

When any of the above circumstances cannot be avoided, remove the detectors, store them in their boxes and keep them in a clean and dry place.

## 13 STANDBY BATTERY REQUIREMENTS

### 13.1 STANDBY BATTERY CALCULATION

In order to calculate the standby battery size required, the following formula can be used:-

$$\text{Battery Size (Standby time in Amp Hours)} = 1.25 \times [(Df \times TALM \times IALM) + (TSBY \times IQ)]$$

(DF is a de-rating factor (typically = 2) used when a battery has to supply a high current load)

Where:

TALM	=	Maximum time in hours required for the alarm [½ hour is most common time]
IALM	=	Total Alarm Current in amps for all alarm devices connected to the alarm circuits
TSBY	=	Standby time in hours for the system after mains failure [normally 24, 48 or 72 hr]
IQP	=	Quiescent current in amps of control panel in fault condition [because of mains failure]
IQZ	=	Quiescent current in amps of all detection zones.

**13.2 TYPICAL DEVICE VALUES FOR PANEL BATTERY CALCULATION**

Device	Quiescent	Alarm	Comment
Simplicity GAS Panel	50mA	102mA	This is the current used during mains failure
Gas Detector	0.5mA	20mA	
ZIOU	1.3mA	2.9mA	

**13.3 EXAMPLE BATTERY CALCULATION**

A system comprises of a 4 zone Simplicity GAS panel, with 10 detectors and 2 ZIOU.

**Calculate the battery size required.**

TALM = 0.5 Hr

TSBY = 24 Hr

IQP = 0.050A (Quiescent current for panel)

IQD =  $(10 \times 0.0005) + 2 \times (0.0013) = 0.0076 \text{ A}$

IAP = 0.102A

IAD =  $(10 \times 0.0012) + (2 \times 0.0029) = 0.0178 \text{ A}$

**Therefore using the equation:**

Battery Size (Standby time in Amp Hours) =  $1.25 \times [(Df \times TALM \times (IAP + IAD)) + (TSBY \times (IQP + IQD))]$

Battery Size (Standby time in Amp Hours) =  $1.25 \times [(2 \times 0.5 \times (0.102 + 0.0178)) + (24 \times (0.050 + 0.0076))]$

Battery Size (Standby time in Amp Hours) =  $1.25 \times [0.1198 + 1.3824]$

Battery Size (Standby time in Amp Hours) =  $1.25 \times 1.5022$

Battery Size (Standby time in Amp Hours) = 1.87775 Amp Hours

This system would require a minimum of 1.87775 Ah batteries, so we would recommend using 2Ah Batteries or higher.

## 14 PCB TERMINATION CONNECTIONS.

Connection No	Description	Use
1- 8	Zone 1- 8	Connection for zone wiring
9	Sounder circuit 1	Connection of conventional sounders
10	Sounder circuit 2	Connection of conventional sounders
11	Fault Relay	Volt free relay. normally energised. Operates on any fault
12	Fire Relay	Volt free relay – Operates on a fire condition
13	RS485	Connection for Repeater panel
14 &15	RS232	NOT ACTIVE
16	Aux Power Supply	Power External Equipment, such as a repeater panel.
17	Battery Connection	Connects batteries to the PCB
18	Thermistor	Monitors battery temperature
19	24VDC Input	Connection from power supply

## 15 SPECIFICATIONS

### 15.1 ENCLOSURE SPECIFICATIONS

DESCRIPTION	VALUE
ENCLOSURE SIZE	364 x 302 x 90 mm
TOP CABLE ENTRIES	15 x 19mm DIA ENTRIES

### 15.2 ELECTRICAL SPECIFICATIONS

ELECTRICAL DESCRIPTION	VALUE
MAINS VOLTAGE	230V AC +10% /- 15% @ 50/60 Hz
BATTERY VOLTAGE	24V DC (2 X 12V SLA BATTERY)
SYSTEM VOLTAGE	29V DC NOMINAL (19 – 30 V)
CHARGER SIZE	300mA
ZONE VOLTAGE	28V DC NOMINAL (+9V data) (19.5 – 29.5V DC)
TOTAL ZONE RATING	500mA Max (in Radial or loop mode)
SOUNDER ALARM OUTPUTS	2 x Conventional sounder circuits 28V nominal,150mA (20-30V DC), and Loop Powered Addressable sounders.
AUXILIARY FAULT OUTPUT	1 x FAULT RELAY SELV@1A (NORM. ENERG)
AUXILIARY VENT/ALARM OUTPUT	1 x FIRE RELAY SELV@1A
MAXIMUM NUMBER OF ZONES	8 ZONES
MAXIMUM ZONE CAPACITY	15 DEVICES PER ZONE
MAX NUMBER OF DETECTION CIRCUITS	8 Radial Circuits or 1 Loop Circuit
MAXIMUM LOOP SOUNDER QUANTITY	64 SOUNDERS
AUX POWER OUTPUT	28V Nominal (20 – 30V DC)
AUX POWER RATING	100mA
CHARGER VOLTAGE	27.6V @ 22-24°C (NO BATTERY CONNECTED)
BATTERY DEEP DISCHARGE PROTECTION	Batteries less than 21V DC
TOTAL PSU OUTPUT	2.5 Amp

### 15.3 Maximum loop cable lengths

Maximum Loop Current (in Alarm)	500 mA	400 mA	300 mA	200 mA
1mm CSA cable	500 m	625 m	830 m	1250 m
1.5mm CSA cable	750 m	930 m	1250 m	1870 m
2.5mm CSA cable	1000 m	1250 m	1660 m	2500 m

## 16 SYSTEM DESCRIPTION CHART

This must be completed by an authorised Engineer before system handover.

INSTALLATION LOCATION:

ADDR	ZONE	TYPE	LABEL	ADDR	ZONE	TYPE	LABEL	ADDR	ZONE	TYPE	LABEL
1	1			43	3			85	6		
2	1			44	3			86	6		
3	1			45	3			87	6		
4	1			46	3			88	6		
5	1			47	3			89	6		
6	1			48	3			90	6		
7	1			49	4			91	6		
8	1			50	4			92	6		
9	1			51	4			93	6		
10	1			52	4			94	6		
11	1			53	4			95	6		
12	1			54	4			96	6		
13	1			55	4			97	7		
14	1			56	4			98	7		
15	1			57	4			99	7		
16	1			58	4			100	7		
17	2			59	4			101	7		
18	2			60	4			102	7		
19	2			61	4			103	7		
20	2			62	4			104	7		
21	2			63	4			105	7		
22	2			64	4			106	7		
23	2			65	5			107	7		
24	2			66	5			108	7		
25	2			67	5			109	7		
26	2			68	5			110	7		
27	2			69	5			111	7		
28	2			70	5			112	7		
29	2			71	5			113	8		
30	2			72	5			114	8		
31	2			73	5			115	8		
32	2			74	5			116	8		
33	3			75	5			117	8		
34	3			76	5			118	8		
35	3			77	5			119	8		
36	3			78	5			120	8		
37	3			79	5			121	8		
38	3			80	5			122	8		
39	3			81	6			123	8		
40	3			82	6			124	8		
41	3			83	6			125	8		
42	3			84	6			126	8		

Pre-Commissioning Cable Checks:

+ve in to +ve out less than 24 Ohms \_\_\_\_\_  
 +ve to -ve greater than 500K Ohms \_\_\_\_\_  
 -ve to Earth greater than 1M Ohms. \_\_\_\_\_  
 +ve to -ve less than 50 mV pickup AC \_\_\_\_\_ & DC \_\_\_\_\_

-ve in to -ve out less than 24 Ohms \_\_\_\_\_  
 +ve to Earth greater than 1M Ohms. \_\_\_\_\_