

Zeta Alarm Systems by GLT Exports Ltd

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ZSC100 Analogue Gas Detection and Alarm System Controller



Installation and Maintenance Guide

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1. Introduction

This manual contains instructions for installation, commissioning and maintenance of ZSC100 analogue gas panels, and its technical data.

This C.I.E is to serve small and medium-sized installations that require a gas leak detection system, such as businesses, schools, small and medium enterprises, etc.

The control panel is designed for fixed (addressable) flammable and combustible gas detection instruments manufactured by GLT Exports, namely the Zeta GasSense. It is compatible with Zeta range of input/output devices and sounders.

2. Safety Information

WARNING: Read this section completely before commencing installation.

1.1 Installation Information

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

Equipment must be installed and maintained by a qualified and technically experienced person.

Before installation, ensure that adequate precautions are taken to prevent damage to the sensitive electronic components on the display board and 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 metres away from pager systems or any other radio transmitting equipment. The operating temperature range is 0°C to 40°C; maximum humidity is 95%.

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 handle PCBs by their sides and avoid touching the legs of any components. Keep the PCB away from damp dirty areas, e.g. in a small cardboard box.

1.2 Safety Precautions during Normal Operation of Panel

NOTE: When the ZSC100 panel is operating normally, i.e. not being tended by service personnel, the access door must be closed and locked. After locking, the key **MUST** be removed and **ONLY** held by the responsible person and/or the service personnel. It must under **NO CIRCUMSTANCES** be held by the user.

1.3 Battery Information

This C.I.E. uses 2 x 12V Sealed Lead Acid (SLA) batteries up to 7 Ah.

1.3.1 CAUTION

RISK OF EXPLOSION IF BATTERY IS REPLACED BY AN INCORRECT TYPE

DISPOSE OFF USED BATTERIES ACCORDING TO BATTERY MANUFACTURERS INSTRUCTIONS

1.3.2 IMPORTANT NOTES ON BATTERIES:

DANGER: Batteries are electrically live at all times. **NEVER short circuit the battery terminals.**

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 significant danger to you 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.

1.4 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.

1.5 Product Design Information

1.5.1 Gas Alarm Control Section

The ZSC100 Gas Alarm Control and Indicating Equipment (CIE), has been designed in compliance with codes of practice for use in zone2 of the hazardous area classifications.

1.5.2 Power Supply Section

It has a main power source and rechargeable standby power source. The ZSC100 Gas Alarm Panel is primarily powered from public electricity mains through a supplied 5A power supply cage.

3. The ZSC100 Gas Detection System

The analogue system consists of a single loop containing gas detection and alarm devices, also known as points. The loop can be connected to Zeta combustible and toxic gas detectors, sounders and combined or individual input / output modules. Devices can also be connected on one or more spurs off the closed loop.

The loop can currently handle 48 randomly selected gas sensors and input/output modules and sounders. The maximum loop length should not exceed 2km, and you should use screened 1.5 mm² 2-wire cable.

ZSC100 is configured from the keyboard of the panel via the menu structure.

Upgrading the firmware is simplified through the in-built USB port and basic DOS commands

3.1 Main features

- The system auto searches all of the points connected to the panel.
- System configuration via PC software or through the panel's menus.
- Record up to 4000 events in the Event Log.
- Supports up to 48 points on the loop, which can be a mixture of combustible gas sensors, toxic gas sensors, sounders, and input and/or output modules.
- Two monitored conventional sounder outputs on the motherboard.
- Two voltage-free relay output at the motherboard.
- An auxiliary 24V DC output on the motherboard.
- Shortcut keys for navigation menus and sub-menu entries.

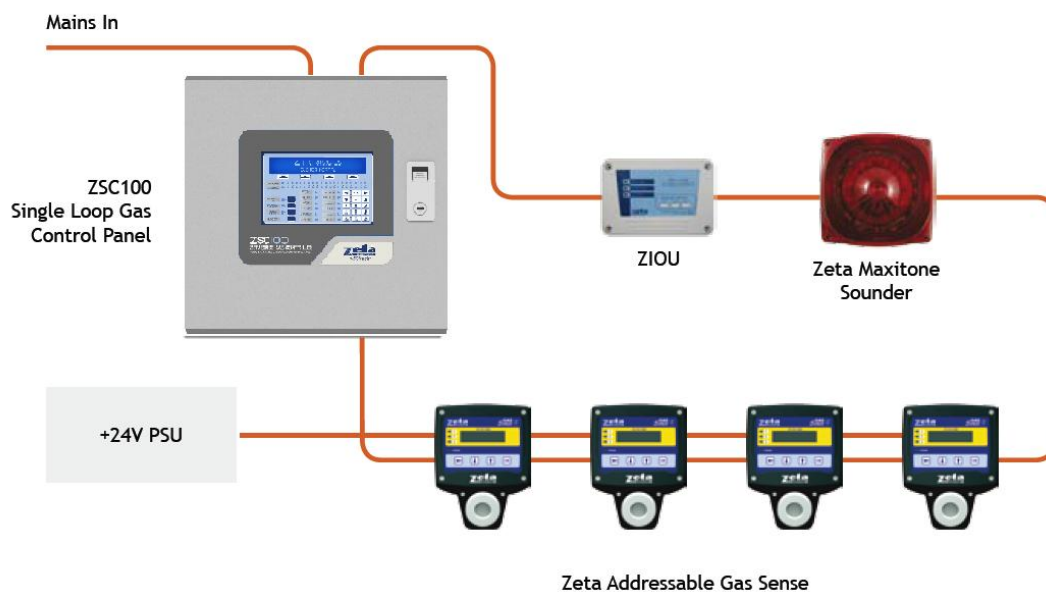
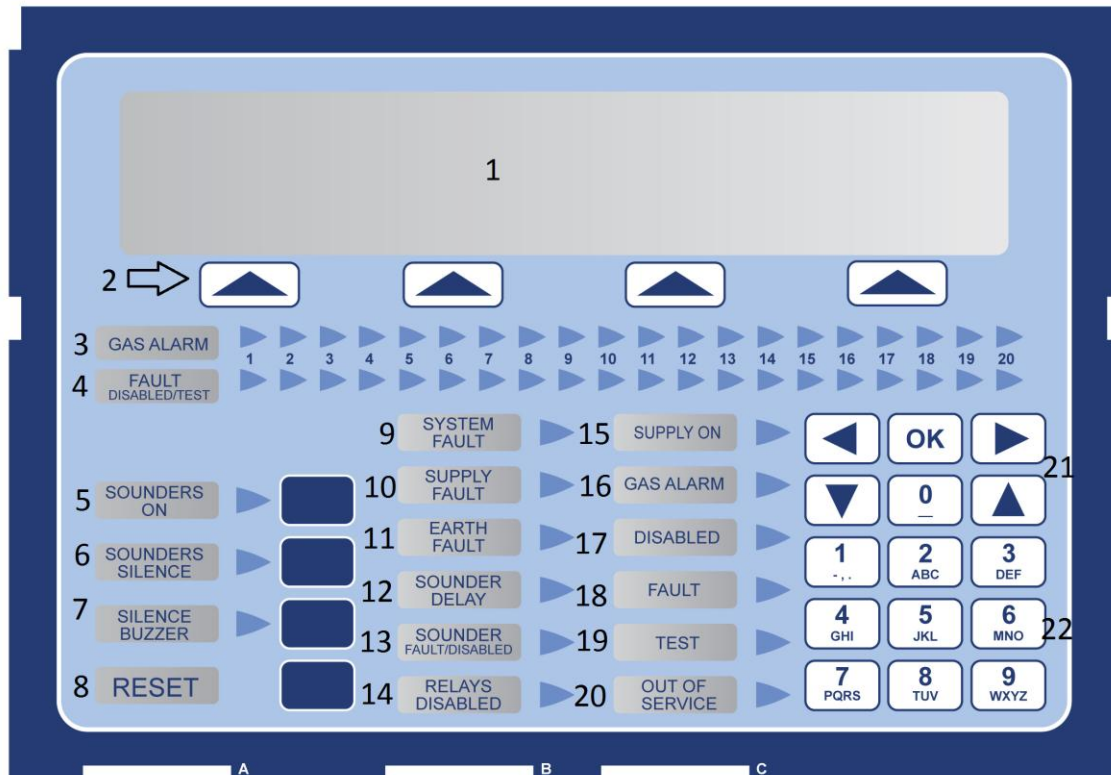


Figure 1: Typical Zeta Gas Detection System Model

A description of all equipment components and a description of indicators and control keys / buttons on the keyboard are given below:

3.2 Indications Keyboard



- | | |
|------------------------------------|---------------------------|
| 1 LCD Display | 13 Sounder Fault LED |
| 2 Navigation controls | 14 Output disablement LED |
| 3 Gas Alarm zone LEDs | 15 Service LED |
| 4 Fault-disablement-test zone LEDs | 16 Gas Alarm LED |
| 5 Start sounders control | 17 Disablement LED |
| 6 Stop sounders control | 18 Fault LED |
| 7 Buzzer Silence control | 19 Test LED |
| 8 Reset control | 20 Out of service LED |
| 9 System fault LED | 21 Navigational Keypad |
| 10 Power supply fault LED | 22 Keypad |
| 11 Earth fault LED | |
| 12 Delay ON LED | |

3.3 Panel Overview

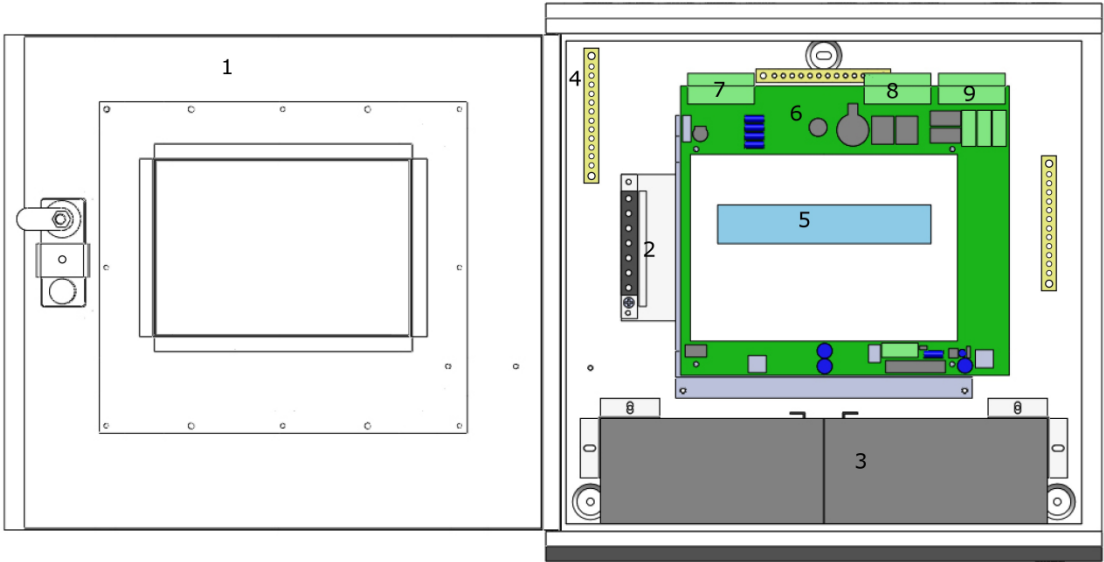


Figure 2: C.I.E Overview

1.	Front Cover
2.	5A PSU Cage
3.	Series-wired rechargeable Batteries
4.	Earth Bar
5.	LCD Display
6.	Main PCB
7.	Loop connector
8.	Fault and Alarm Connector
9.	Sounder and +24V Auxiliary Power Connector

4. Installation Guide

This chapter defines the steps for proper installation of the ZSC100 gas detection control panel. The installer must read the entire manual before installing the system. Not following the instructions in this manual can cause damage to equipment.

4.1 Environmental Checks

Before installing this equipment ensure that the following conditions are met:

- The ambient temperature should be between -10 ° C and 40 ° C.
- The relative humidity should be below 95%.
- Do not install the panel in places with mechanical vibrations or shocks.
- Do not install the panel where it obstructs access to internal equipment and wiring connections.

4.2 Tools Required

Listed below are the basic tools for installation of the panel:

- Screwdriver for terminal blocks.
- Phillips screwdriver for the screws on the front cover.
- Cable cutters or strippers.
- Voltmeter.
- Drill and appropriate bits to fix the panel to the wall.

4.3 Pre-Installation Checks

Before installing the equipment, verify that all material on the following list is inside the package:

- One panel
- Two end of line resistors for the sounder outputs (4K7)
- 5x20 0.5A fuse.
- Installation manual
- User manual
- Language labels
- Battery cable

If you find any of the above material missing or damaged, contact your dealer.

4.4 Installation Steps

4.4.1 Removing the front Cover

Unlock the panel with key provided. Once it is unlocked, open the cover.

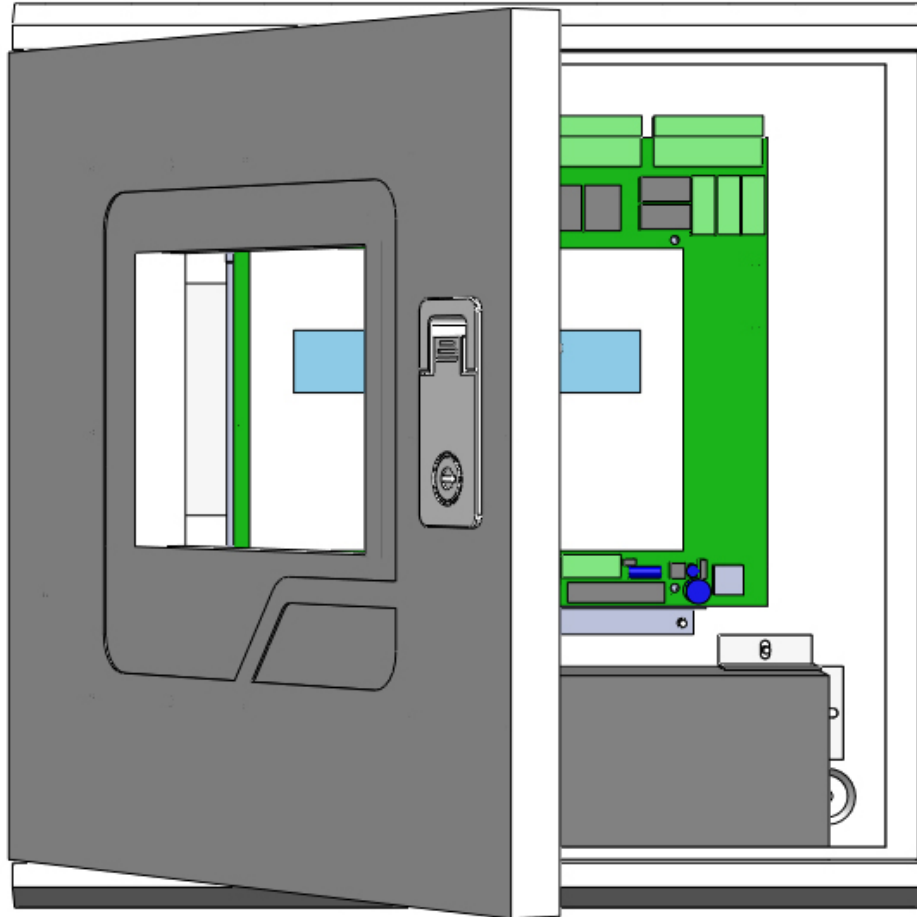


Figure 3: Assembling ZSC100

4.4.2 Panel Location on the wall

Choose a location easily accessible and free of obstacles, where the indicator lights are easily seen and the cover can be easily removed. The panel must be located at a height of 1.5m.

Remember that the weight of the batteries is significant.

4.4.3 Fixing Panel to the Wall

Place the rear housing in the proper position against the wall and mark the position of the holes to make sure the casing is level.

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Do not use the back cover as a guide when drilling the holes, as this may cause irreparable damage to the equipment.

Drill holes in the wall, and prepare the required holes for the cable installation. Screw the cabinet to the wall using the holes in the box.

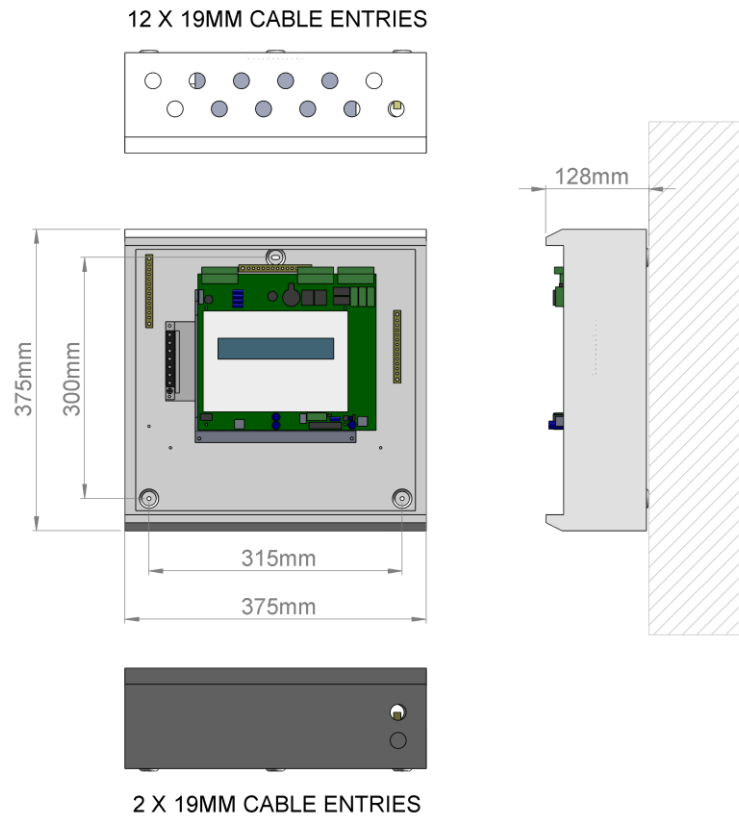
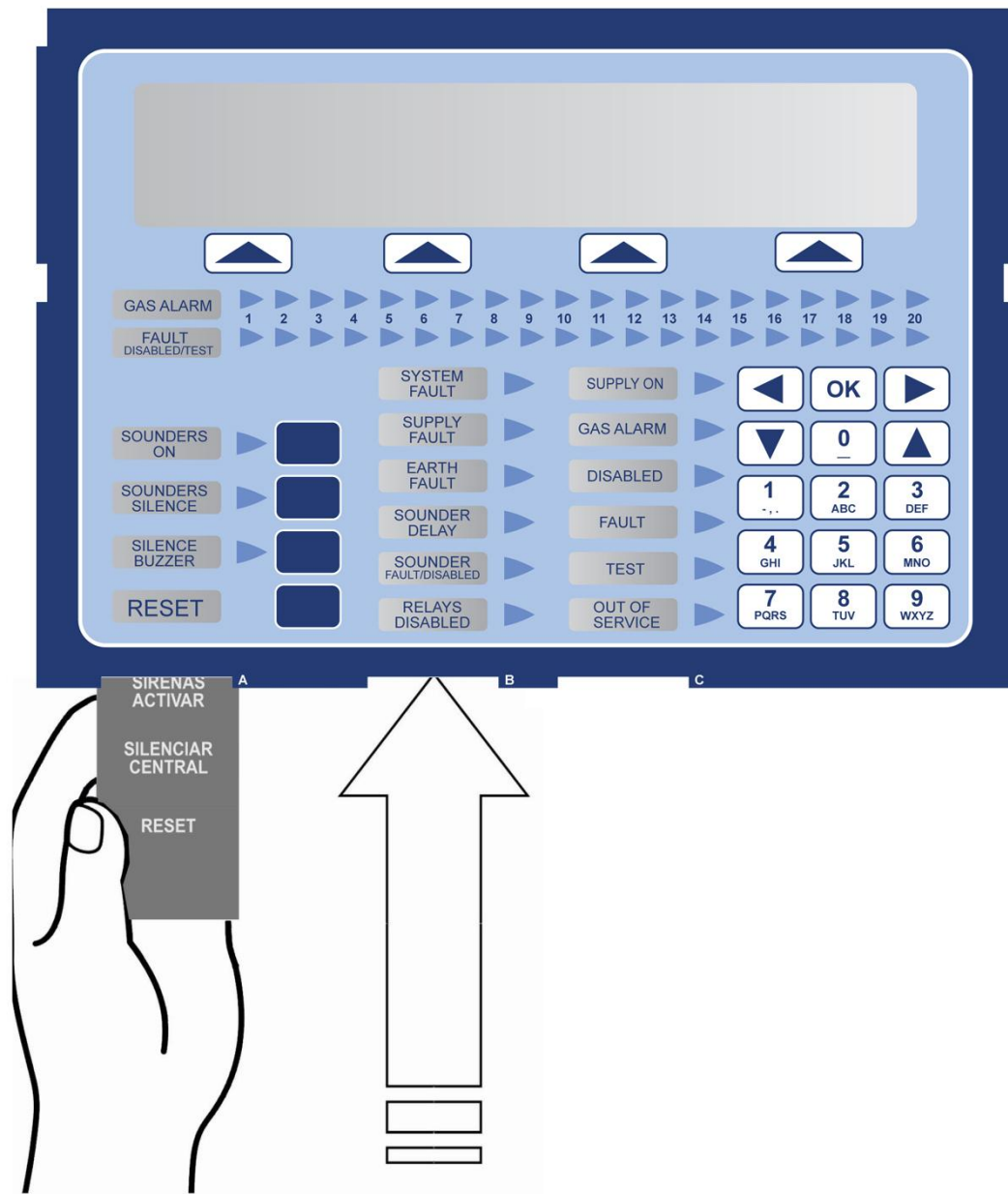


Figure 4: Side View for Surface Installation

4.4.4 Language Selection

The panel's controls are designed to be easy to customize the language. In the memory card attached to this manual, you will find the entries for Spanish and English. Select the required language and insert the card into the slot located at the bottom of the keyboard. The locations are marked with the letters ABC. Other language entries could be made on request.



4.4.5 Electrical Wiring

It is recommended that the equipment is powered and tested before connecting devices such as sensors, sounders etc. The panel must be connected via an external circuit breaker using a 1.5mm² cable section. The voltage should be 230V.

The mains cable must be separated from the communication bus lines. If the system can be affected by an electrical disturbance, we recommend the use of a ferrite tube as close as possible to the connection.

It is essential to use the holes marked on the box. Use a drill bit to drill the box and insert the cable glands.

It is advisable to use a shielded cable. Connect the cable shield to the corresponding terminals (insulating the screen to prevent short circuits) and ensure that the facility has an approved mains Earth. Use cable ties where necessary to ensure neat and tidy wiring.

4.4.6 Powering up the panel

Always disconnect the mains power before handling the panel.

Always connect the mains first and then the batteries.

4.4.6.1 Mains Connection

Insert the wire into the plastic guide tabs using the plastic case, to prevent the wire coming loose in the case of sudden removal.

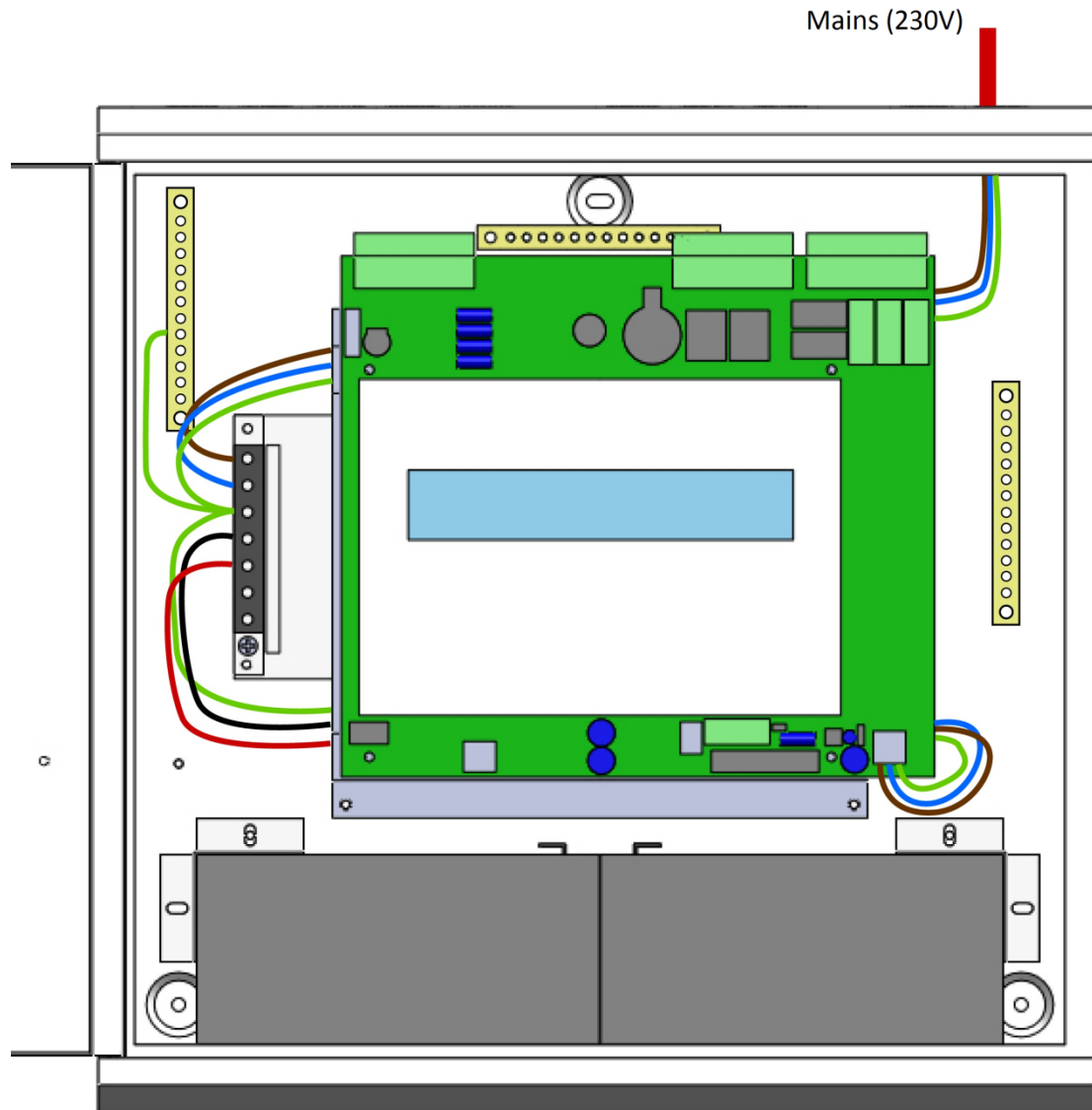


Figure 5: PCB Mains Wiring Layout

4.4.6.2 *Battery Connections*

ZSC100 gas panel requires two 12V, 7Ah batteries. The batteries must be connected in series.

The cable supplied with the unit must be connected so that the positive terminal of one battery is connected with the negative terminal of the other.

The batteries are placed in the bottom of the box, vertically in the space provided. Connect the wires from the circuit (red and black) to the unused positive and negative terminals of the two batteries.

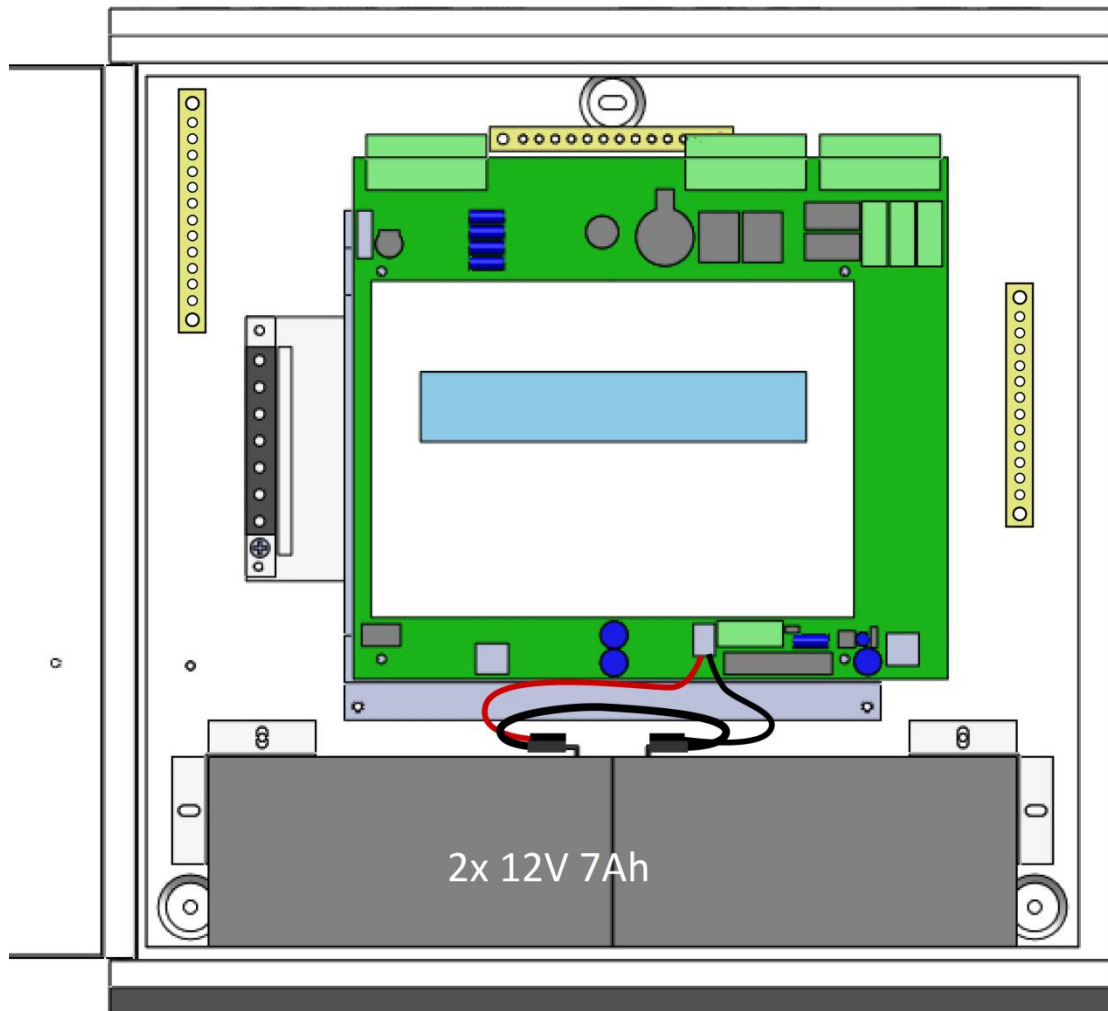


Figure 6: PCB Battery Connection Layout

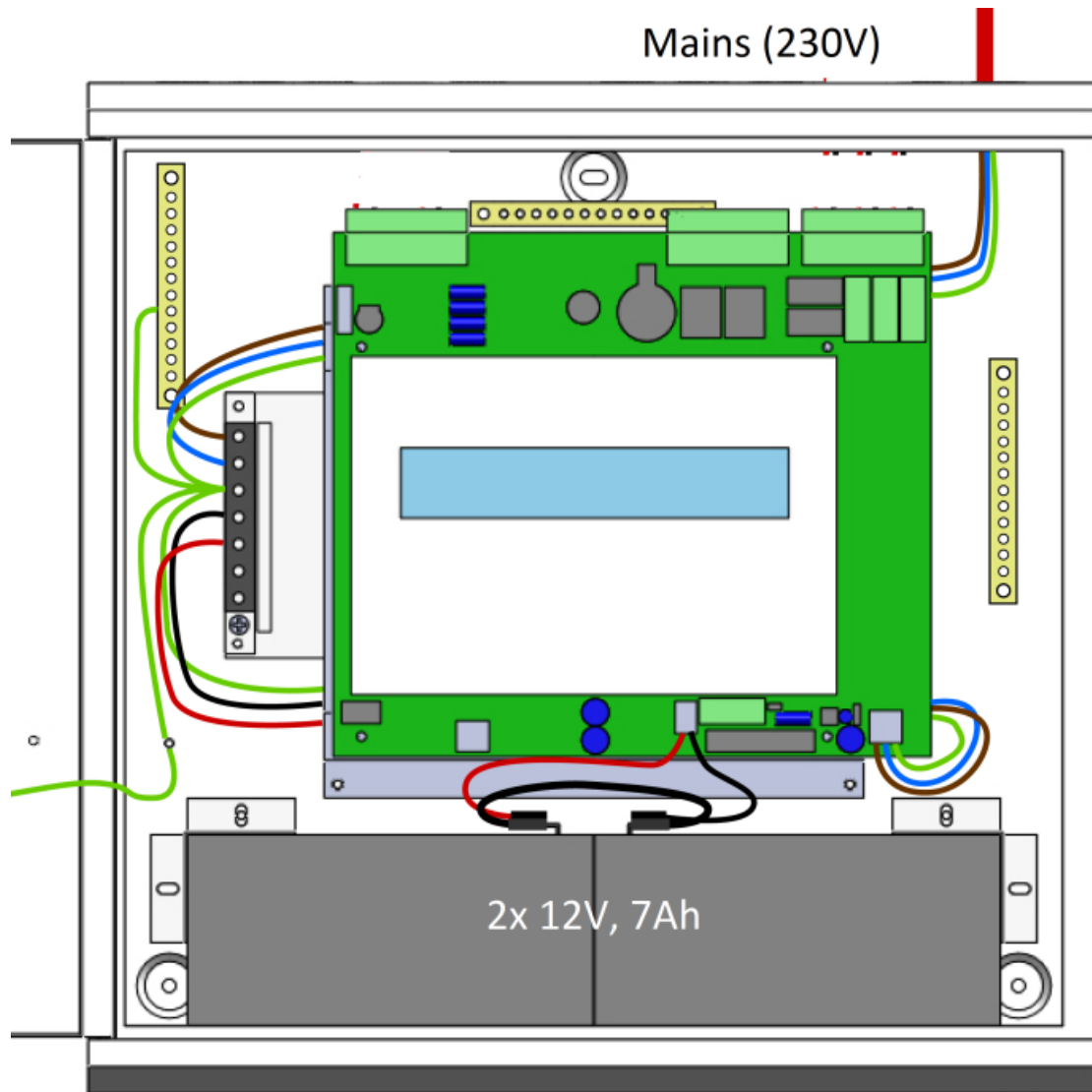


Figure 7: Mains and Battery Bank Wiring

4.4.7 Loop Connection

The facility should be closed loop, i.e. the two-wire shielded cable should come out of the panel and return to it, this cable will connect all devices in the system.

The cable used must be at least 1.5mm^2 , braided shield should be used to avoid interference. The maximum length of the loop cable is 2km. The resistance of the loop must be less than 44ohms, and the maximum capacity of the line should be less than 500nF.

Connect the loop output cables at the connector marked S+ & S-, and the screen to the terminal indicated as Earth, and the return of the loop at the connector marked R+ and R-, and the screen returns to terminal indicated as Earth. It is essential to have a continuous screen on each loop.

4.4.8 Gas Sensor Connection

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The system is designed to communicate with:

- A range of Zeta Gas Sense for combustible gas detection
- A range of Zeta Gas Sense for toxic gas detection

The single loop panel, ZSC100 can support up to 48 devices wired in series.

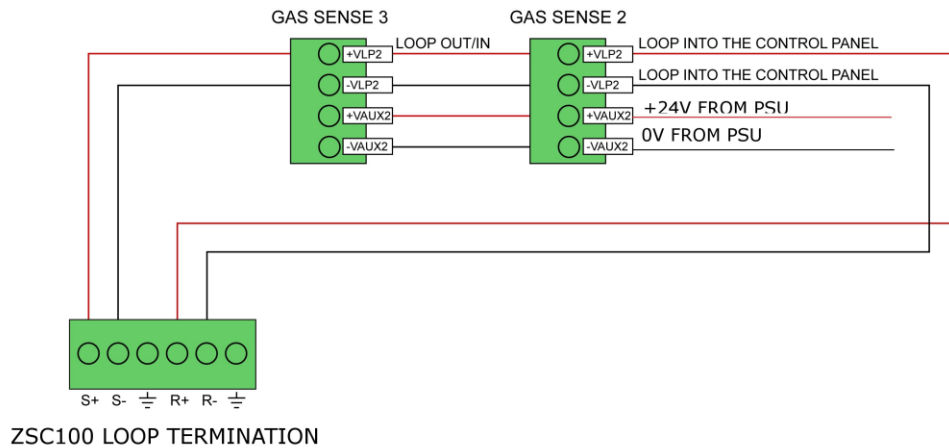


Figure 8: Wiring Gas Sensors

When commissioning more than 4 and/or, up to 48 gas detectors in the field, it is recommended that detectors are powered from external power supply unit. Figure 9 below shows the wiring instruction. Any other loop powered device such as input/output interfaces or sounders are connected in series with detectors via the loop data cable. The engineer is required to choose suitable bench PSU after current consumption analysis.

However, if the engineer decides to power detectors from the supplied 5A cage he must ensure he is connecting detectors to the DC output. The panel has a +24V auxiliary output which can be used to power limited loop devices also. The auxiliary output is fused at 0.5A. Please avoid overloading this output!

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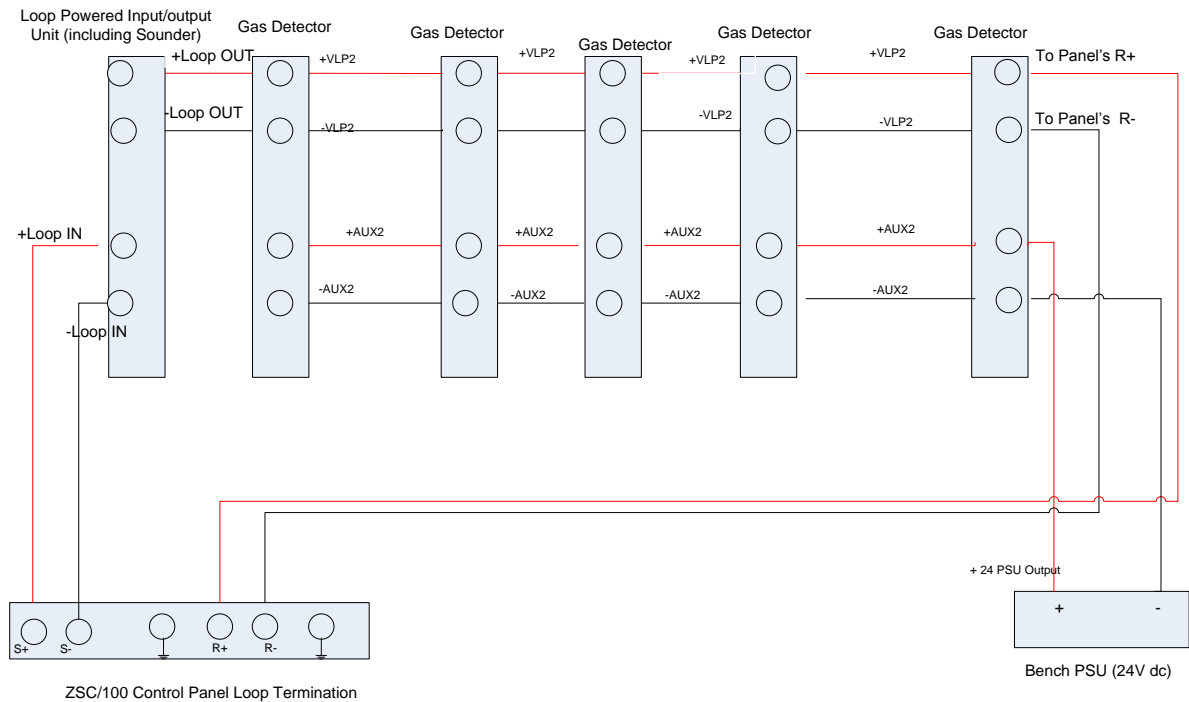


Figure 9: Powering Gas Detectors from External PSU

4.4.9 Input/output Modules

The system is designed to communicate with the following modules.

- An input/output module (low voltage) and mains switch version
- Zeta analogue sounder devices.

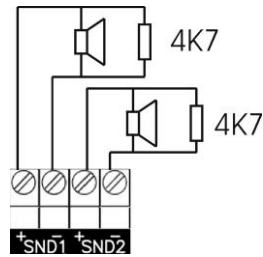
See the installation manual of each module.

4.4.10 *Sounder Connection*

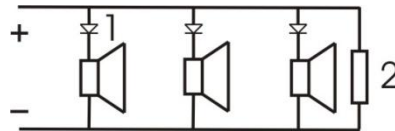
ZSC100 has 2 sounder outputs, listed on the motherboard as SND1 and SND2. Each monitored output can power conventional sounders with a total consumption of 500 mA.

It is imperative that the sounders are polarized, or else it is necessary to insert a diode to prevent the sounders from activating in the quiescent condition. A 4k7 end-of-line resistor is required.

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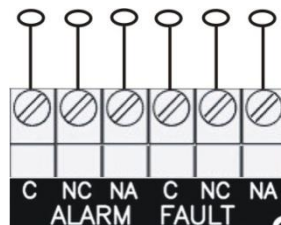


When using sounders or bells which are not polarized, you must install a type 1N4007 diode to prevent reverse current effect.



4.4.11 Relay Connection

The panel has a fault relay and an alarm relay for outputs that act as an alarm or malfunction. The maximum relay contact current is 2A.



4.4.12 USB Connection

The unit features a USB communications port. This port allows us to connect with a PC and upload/upgrade the panel software through the Windows DOS command.

5. System Configuration

5.1 Main Menu

After entering the access level 2 passcode, the installation engineer can access the configuration menus. (See below). To move through the menus, press the '↑' and '↓' buttons. Press the OK button to select the menu you want to access. Then press OK button again to access the selected menu.

■

Loop

Zones

Points

Actions

▶|

▶|

▶|

▶↓

INSTALLER

Event Log

General

Network

Date-Time

▶|

▶|

▶|

▶↓

5.1.1 Loop submenu

* LOOP

▶|

■

Autosearch

Autocheck

|

|

On the menu Loop, we can access the following submenus-Autosearch and Autocheck.

5.1.1.1 Autosearch submenu

AUTOSEARCH performs a scan of all points that are connected to the loop. This may take a few minutes.

SELECT LOOP SEARCH

LOOP : [01]

[Accept]

[Cancel]

To select the loop that we want to auto search, enter the number in the square brackets or select the loop number using the '↑' and '↓' buttons. Once selected click on OK and the following screen appears.

SEARCHING LOOP

01

15%

[Cancel]

Once the loop AUTOSEARCH has finished, a summary of the search result is displayed, indicating all points that are connected to the loop. This report should be compared to the actual points installed to ensure that the devices are correctly detected and there are no connection errors.

SEARCH LOOP REPORT 01

VALID:30 DOUBLE ADDRESSES:02

CHANGED TYPE:05

[Accept]

[Cancel]

[Reports]

The meaning of the fields is as follows:

- VALID field is the number of addresses where they have found an item, both detectors and modules.
- DOUBLE ADDRESSES field are addresses where they found more than one item.
- The CHANGED TYPE field shows the addresses which have changed from the last AUTOSEARCH accepted.

Pressing the **Accept** button validates the Autosearch, and the system will work with the points detected in the loop.

Pressing the **Cancel** button means that the AUTOSEARCH is not recorded, and the system will work with the previous AUTOSEARCH accepted.

Pressing the **Reports** button allows access to 2 types of reports which can be helpful for the implementation of the system.

The first report is a summary by type of points found in the loop. As the summary is several screens, the engineer can jump from one screen to the next using the + and – keys.

TYPE LOOP REPORT 1			
BU-1.8% :000 O2-25%: 000 I/O: 000			
NH3-500: 000 Error: 000 Sounder: 000			
[+]	[-]	[Addresses]	[Exit]

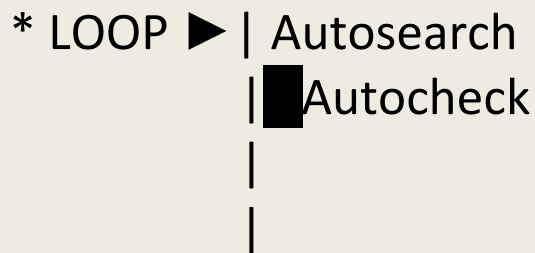
The second type of report accessed by pressing the function key Addresses. This reports all addresses that have been found in the loop, indicating the type of point found at the address.

ADDRESSES LOOP REPORT 1 (1/25)			
001 002 003 004 005 006 007 008 009 010			
TOX COM TOX SDR I/O COM I/O DAD SDR			
[+]	[-]	[Exit]	

Again the + and – keys can be used to navigate through the screens of the report.

If there is no abbreviation under an address, it means that this address is free, and if you see DAD, double address, it means there is more than one point that responds to that address.

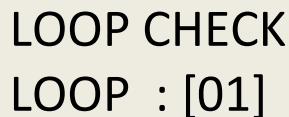
5.1.1.2 Autocheck submenu



```

* LOOP ► | Autosearch
          | Autocheck
          |
          |
  
```

The autocheck submenu checks for problems on the loop, by checking how many points are connected to the start of the loop (S) and how many are connected to the end of the loop (R). This helps find the position where the loop is open circuit.



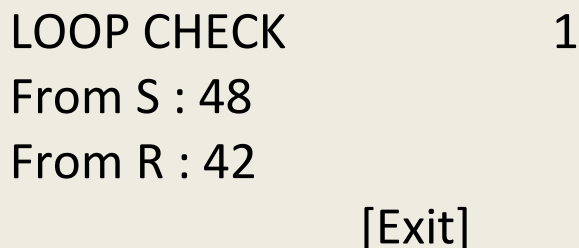
```

LOOP CHECK
LOOP : [01]
  
```

[Accept]

[Cancel]

To select the loop to be checked, either enter its number or select it using the '↑' and '↓' buttons. Once selected click on OK, and the following screen is displayed.



```

LOOP CHECK                1
From S : 48
From R : 42
                        [Exit]
  
```

This report shows that from the output connector on the loop (S) 48 points have been found, and from the return connector on the loop (R) 47 points have been found. This tells us that we must look for problems between the 48th point from the output connector and the 42nd point from the return connector. Numeral 1 on the right top tells us that it is loop one that is being auto checked.

To access the previous menu, press the Exit button.

5.1.2 Zone submenu

The installation can be divided into zones which are geographical sub-divisions of the protected premises in which one or more points are installed and for which a common zone

indication is provided. The maximum number of zones is 250. The following options are available in the zone menu:

```
* Zones ► | ■ Zone edit
           | Add point
           |
           |
```

Use the '↑' and '↓' buttons to move the cursor, and then select using the OK button.

5.1.2.1 Zone Edit submenu

This allows the installer to assign a name for each zone number, to indicate the area of the building covered by the zone.

```
ZONE EDIT
ZONE:<001>    MODE : [ENABLED]
TEXT : [012345678901234567890123456789]
[-]  [+]    [Points]    [Exit]
```

The fields can be edited by using the '↑' and '↓' buttons, or with the alphanumeric keypad. The next field can be selected using the '→' and '←' buttons.

The mode field shows the status of the zone, i.e. enabled or disabled.

Use the alphanumeric keypad to edit the name of the zone.

Use the + or – keys to edit the next or previous zone, respectively.

The option 'Points' permits the installer to assign points to the specified zone on a given loop.

```
ADD POINTS
ZONE : [001]    LOOP:[001]
RANGE : [001]    TO :[001]
Accept]        [Exit]
```

5.1.2.2 *ADD POINTS submenu*

In the Assign option, points can be assigned to specific zones on a loop.

```

ADD POINTS
ZONE  : [001]      LOOP:[001]
RANGE : [001]      To  :[001]
[Accept]           [Exit]
  
```

As with the previous menu, the '↑' and '↓' buttons, or the alphanumeric keyboard, can be used to increment or decrement the numeric fields, and the '→' and '←' buttons are used to move to the next or previous field.

5.1.3 *Point submenu*

```

*Points ► | ■ Edit Point
          | Setup Points
          | Toggling LED
          |
  
```

5.1.3.1 *Edit Point*

In the Edit Point menu, the name of points can be provided, and a zone can be assigned. The mode of the point is also displayed, i.e. enabled or disabled.

```

LOOP:[01]  ADR [001]  ZONE : [001]
Type :H2S-100 MODE : Enable  AV : 000 P
TEXT: [You can name the point  ]

[-]  [+]           [Exit]
  
```

The fields can be edited by using the '↑' and '↓' buttons, or with the alphanumeric keypad. The next field can be selected using the '→' and '←' buttons. The address field can also be increased or decreased using the + or – keys, regardless of the position of the flashing cursor. Of course, the text field can only be edited with the alphanumeric keypad. AV is the analogue value of the point being displayed. The AV value for combustible gas sensors would be reported in percentage of lower explosive limit %LEL and if it is a toxic gas sensor as in the case of H2S-100 above, the AV value would be displayed in parts per million abbreviated as P.

Pressing the Exit key will return to the previous menu and save the values.

5.1.3.2 Setup Points

This option is used to set points already configured in the panel to standalone mode, STD from System mode, SYS. It enables the instrument engineer operate on the points as if they are not connected to the gas panel. Use this option for maintenance practises such as full calibration of Zeta GasSense, setting up and/or, adjustment of alarm thresholds on the Zeta GasSense.

SETUP POINT

[Exit]

Pressing the Exit key will return to the previous menu and save the work.

For further information on working on Zeta GasSense see the instrument instructional manual supplied with the detector.

5.1.3.3 Toggling LED

This option is helpful to locate a particular point in the loop. Select the loop number and address of the point to be located, and the point's indicating LED will automatically light until either another address is chosen or the Exit option is selected.

LOOP <1> ADR : [001] ZONE:001

TYPE: MODE: ENABLE AV:

TEXT:

[-]

[+]

[Exit]

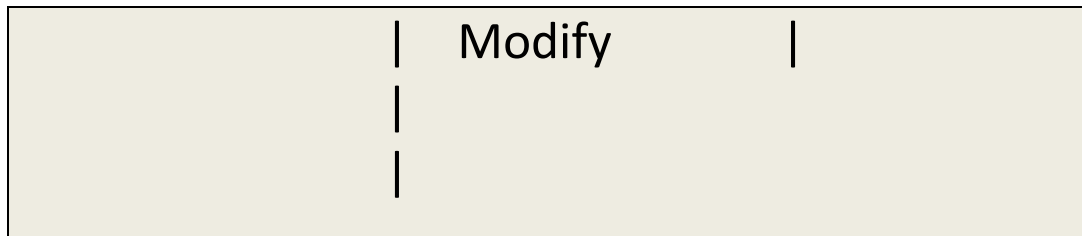
5.1.4 Actions Menu

Cause and effect actions are created from this menu.

*Actions



New



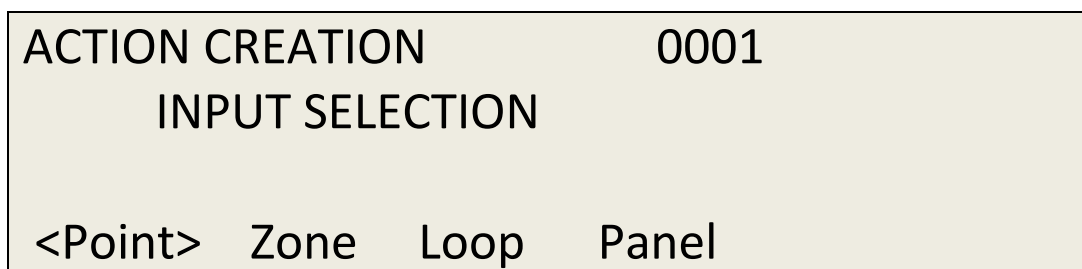
5.1.4.1 New Actions (Action Creation)

An action is the cause and effect generated by an event in the building protected by ZSC100. It allows you to activate, deactivate or reset any output of the installation based on the configured cause and effect actions. When a detector, or other kind of input device is triggered, the output which is generated depends on the input and output actions which have been programmed in to the panel. The input can be from a point or a zone or a loop or a panel. Likewise, the effected output may be one or more individual points, or one or more zones, or one or two loops, or all the points connected to the panel.

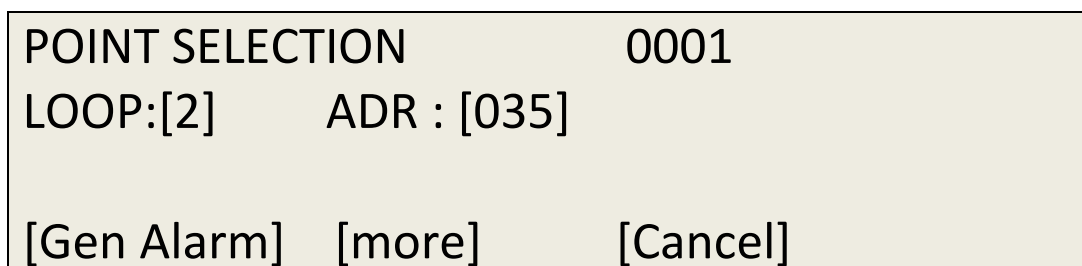
To set up an action, you first define an input generated by the event and then define the type output you require. It is possible to associate a delay time (in seconds) with the output, to prevent false alarms occurring if the output is immediate. NB the maximum delay time permitted by the European standard is 600 seconds (i.e. 10 minutes).

5.1.4.1.1 Input Selection-Point

Press the first of the 4 buttons which are directly under the LCD in order to select "Point" as the Input in Action number 0001.



Then select the address of the point for which we want to activate the operation.



By pressing the More you can change the type of event that is generated by the point. These events are as follows:

- General alarm.
- Alarm Two.
- Alarm One.
- Pre-Alarm.

Once you are satisfied with the event to be generated, by pressing the first of the 4 buttons you have selected and set the event.

Pressing the Cancel key will return to the Actions menu and leave your work unsaved.

5.1.4.1.2 Zone as an Input

Below is an input generated by a zone or by a range of zones:

ACTION CREATION		0002	
INPUT SELECTION			
Point	<Zone>	Loop	Panel

ZONE SELECTION		0002	
RANGE:[001] to [007]			
[Gen Alarm]	[More]	[Cancel]	

By pressing the More you can change the type of event that is generated by the zone or range of zones. These events are as follows:

- General alarm.
- Alarm Two.
- Alarm One.
- Pre-Alarm
- Multi Point Alarm.

Once you are satisfied with the event to be generated, by pressing the first of the 4 buttons you have selected and set the event.

Pressing the Cancel key will return to the Actions menu and leave your work unsaved.

5.1.4.1.3 Loop as an Input

Below is an input generated by a loop:

ACTION CREATION	0003
INPUT SELECTION	

Point	Zone	<Loop>	Panel
-------	------	--------	-------

LOOP SELECTION	0003
RANGE : [1] to [2]	
[Gen Alarm] [More] [Cancel]	

Similarly, by pressing the More you can change the type of event that is generated by the loop or range of loops. These events are as follows:

- General alarm.
- Alarm Two.
- Alarm One.
- Pre-Alarm

Once you are satisfied with the event to be generated, by pressing the first of the 4 buttons you have selected and set the event.

Pressing the Cancel key will return to the Actions menu and leave your work unsaved.

5.1.4.1.4 Panel as an Input

Below is an input generated by the panel

ACTION CREATION	0004
INPUT SELECTION	

Point	Zone	Loop	<Panel>
-------	------	------	---------

PANEL SELECTION	0002
[General Alarm] [More] [Cancel]	

Pressing the More button changes the type of alarm that is generated by the panel. These are as follow:

- General Alarm.
- Alarm Two
- Alarm One
- Pre-Alarm
- Multi Point Alarm.
- Multi Zone Alarm.

Once you are satisfied with the event to be generated, by pressing the first of the 4 buttons you have selected and set the event.

Pressing the Cancel key will return to the Actions menu and leave your work unsaved.

After selecting the input of the Action, the required output must then be chosen, which may be point(s), zone(s), loop(s) or the entire panel.

5.1.4.1.5 Point as an Output

0001			
OUTPUT SELECTION			
RMT EVENT : <NO >			
<Point>	Zone	Loop	Panel

POINT SELECTION	0001		
LOOP: [01]	ADR [101]	DELAY:[030]	
[ON]	[OFF]	[Cancel]	

The actions on the points may be of ON or OFF, i.e. activate the output point such as a sounder point or switch it off.

5.1.4.1.6 Zone as an Output

The following shows how to select one or more zones as the outputs to be activated.

0002			
OUTPUT SELECTION			
RMT EVENT : <NO >			
Point	<Zone>	Loop	Panel


```

ZONE SELECTION          0002
RANGE:[003]      TO :   [013]
DELAY: [090]
[Outputs ON]  [More]    [Cancel]
    
```

Pressing the More button changes the type of output that can be activated or de-activated in the zone(s). The following outputs can be configured:

- Outputs ON
- Outputs OFF.
- Sounders ON.
- Sounders OFF.
- Relays ON.
- Relays OFF.

5.1.4.1.7 Loop as an Output

Next is shown how to activate one or two loops as outputs.

```

                                0003
                        OUTPUT SELECTION
RMT EVENT : <NO >
Point   Zone   <Loop>   Panel
    
```

```

LOOP SELECTION
RANGE: [1]      TO:      [1]
DELAY: [000]
[Outputs ON]    [More]    [Cancel]
    
```

Pressing the More button changes the type of loop output that is activated or de-activated. The following options are available:

- Outputs ON
- Outputs OFF.
- Sounders ON.
- Sounders OFF.
- Relays ON.
- Relays OFF.

5.1.4.1.8 *Panel as an Output*

Next is shown how to select an output that activates the panel as an action.

0004			
OUTPUT SELECTION			
RMT EVENT : <NO >			
Point	Zone	Loop	<Panel>

PANEL SELECTION		
DELAY : [120]		
[Outputs ON]	[More]	[Cancel]

Pressing the More button changes the type of output that is activated on the entire panel. The outputs that can be selected are as follows:

- Outputs ON
- Outputs OFF.
- Sounders ON.
- Sounders OFF.
- Relays ON.
- Relays OFF.
- PCB sounder 1 ON.
- PCB sounder 1 OFF.
- PCB sounder 2 ON.
- PCB sounder 2 OFF.

After selecting an input and an output, an action will be set up and stored in the panel. The system can be configured with up to 1024 different actions. Each action number is displayed in the top right of the LCD. All actions are started simultaneously so be careful that you do not configure conflicting actions.

5.1.4.2 *Modify Actions*

In this sub-menu you can modify a previously programmed action. You can change both the input and the output. To modify an action, use the alphanumeric keypad or the '↑' and '↓' buttons.

ACTION MODIFICATION <0001>:0003 DLY:030	
I Point LOOP 2 ADR 001	Alarm
O Zone RANGE 001 TO 100	Sounders ON

[Input]	[Output]	[Erase]	[Exit]
---------	----------	---------	--------

The above display is showing previously configured Action no. 1, and the total number of programmed actions is 3.

Press the Input button to modify the Input.
Press the Output button to modify the Output.
Press the Erase button to cancel the displayed action.

When the modification is completed, press the Exit button to save the action and to leave the sub-menu.

5.1.5 Event Log

In the Event Log menu you can access the list of events which have been detected by the system. For greater flexibility you can select the type of event you want to see. Alternatively you can list all events.

*Event Log	▶	█	Faults	
			Alarms	
			Test	
		↓	All	↓
Erase				

As a last option in this menu, the Erase option; this deletes all events from Event Log. This process is recommended to be used after commissioning the installation, so that information will only be saved from the date the system begins to operate.

ERASE LOG	
Are you sure?	
[YES]	[NO]

5.1.6 General Menu

In the General menu you can enter the installation name, choose the menu language, change the passwords, and check & upgrade the firmware versions.

*General	▶	█	Installation Name	
----------	---	---	-------------------	--

	Language	
	Passwords	
	Check Version	
↓	SW Upgrade	↓

5.1.6.1 *Installation Name*

In this submenu the installation engineer can enter the name of the facility, the company responsible for maintaining the facility and a helpline.

When the system operates in the normal condition the panel displays the name of the facility.

When a fault occurs in the alarm system, the panel shows the maintenance company and its phone number.

The editing of the fields is done with the alphanumeric keypad, and you can move from one field to another using the '→' and '←' buttons.

REFERENCE	:	[]
MAINTENANCE	:	[]
PHONE	:	[]
[Accept]				[Exit]

5.1.6.2 *Language Selection*

The system can operate in different languages to suit local requirements. The available languages include English and Spanish. It could be translated to other European languages on request.

LANGUAGE SELECTION				
LANGUAGE: English				
[-]	[+]	[Accept]		[Cancel]

Use the + and – buttons to choose a language and press the Accept key to select the chosen language.

5.1.6.3 Password Modification

The system uses two passwords, both of which may be changed using this submenu. The level 1 password is for use by the system user, and the level 2 password by the installation engineer.

Each panel may be programmed with up to 15 different user level passwords. The default value of the user password is 1111.

CHANGE PASSWORD	LEVEL:[1]
USER :[01]	
PASSWORD :[1111]	
[Accept]	[Exit]

You can move between levels 1 and 2 using the '↑' and '↓' buttons, or by simply pressing the number on the alphanumeric keypad. Move to the next field at any level selected using the '→' and '←' buttons.

The default value of the installer password is 2222.

CHANGE PASSWORD	LEVEL:[2]
CURRENT PASSWORD :[2222]	
NEW PASSWORD :[2222]	
[Accept]	[Exit]

Press Accept to store password in memory, and then Exit to return to the previous menu.

5.1.6.4 Checking Software Version

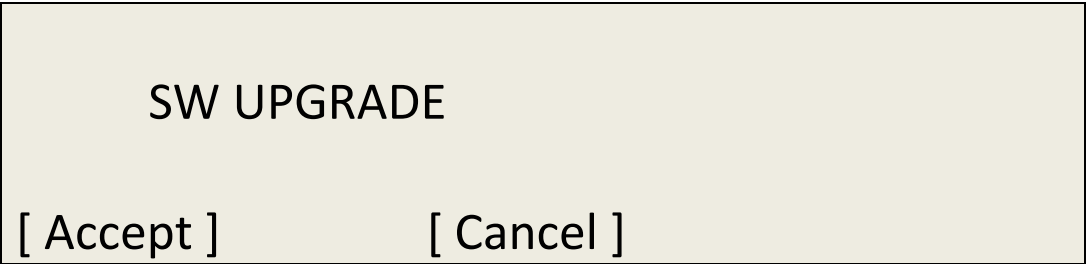
Panel : 1.0
Loop (1): 1.0
[Exit]

The Panel and Loop fields give the software version of the firmware programmed onto the panel and the loop card respectively.

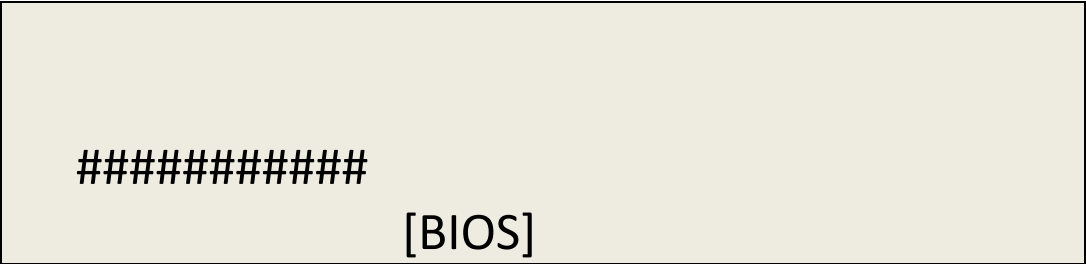
Pressing the Exit key will return to the previous menu.

5.1.6.5 Software Upgrade

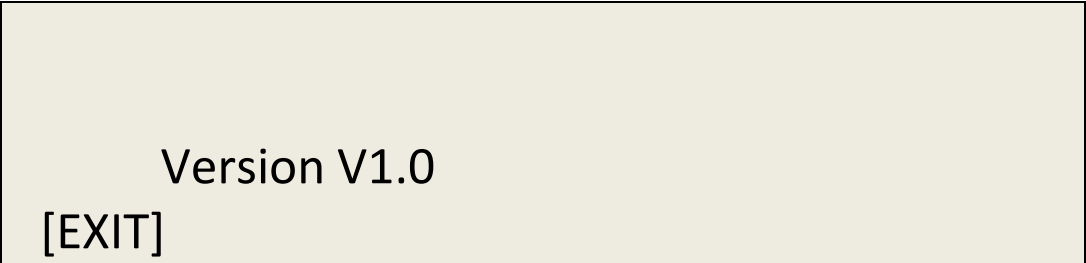
This menu allows us to update the firmware of the computer through the USB port.



Press the Accept key, and the next screen is displayed



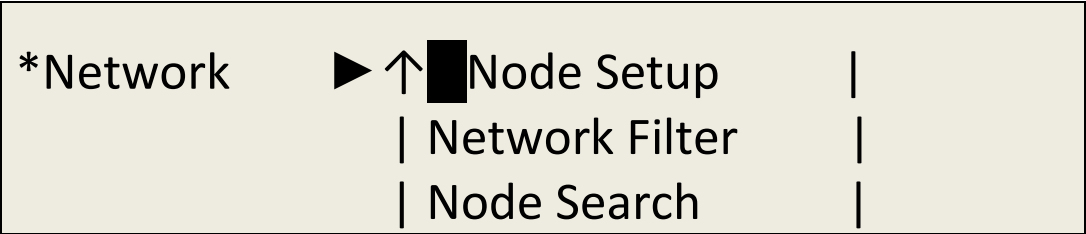
Press the BIOS button before the # symbols reaches the far right of the row to start updating the firmware / software.



Press Exit to exit the application.

5.1.6.6 Network Menu

Use this menu to access the network card. Note that current version of ZSC100 does not have a network card.



5.1.7 Day-Time Show

Use this submenu to change the date and time displayed on the panel.

DATE-TIME

Date:[15]:[09]-[11]

Time:[10]:[00]

[Accept]

[Cancel]

5.2 Basic Configuration Installation

The basic configuration of the panel can be made entirely from the keypad of the panel itself.

Here are the steps for a basic installation.

- **Select the Language.** See section 6.1.6.2
- **Date and Time Settings.** To set the date and time on the panel see section 6.1.7
- **Name the installation.** To enter the name of the installation, and the maintenance company & phone number see section 6.1.6.1 of this manual.
- **Set a loop.** Use loop auto search so the system will scan and show all the items it finds. This search should match the items found with the plans for the installation. To access the AUTOSEARCH LOOP menu. See Section 6.1.1.1 of this manual.
- **Configure zones.** The installation can be divided into zones; this allows the installation to be structured according to installation requirements. To create and assign zones see section 6.1.2 of this manual.
- **Configure the points.** A point can be assigned a name that identifies its location and zone. The points can be disabled if necessary. To name and assign the points see section 6.1.3 of this manual.
- **Set actions.** An action is the “cause and effect” rule which applies when a gas alarm event occurs. To set up a move, you first define an input generated by the event and then define the output that is required. The outputs may be associated with a time delay in seconds, to avoid false alarms in case of immediate actions. To access the programming menu for ACTIONS see section 6.1.4 of this manual.

Once all the steps outlined above have been carried out, the system is configured to protect the site.

6. Start-up Guide System

This chapter defines step by step how you should correctly install the ZSC100 gas panel.

6.1 System Check

Before connecting the mains supply check the points listed below carefully:

- Check that the equipment has been installed correctly.
- With the help of a voltmeter to verify that there are no short or open circuits.
- Use the tester to verify continuity of the line. Verify that the circuits connected to zone modules have 4k7 ends of line resistors.
- Verify that the sounder circuits are connected with the correct polarity, and have 4k7 EOL resistors.
- Check output connections on the motherboard. Make sure they are properly installed.
- Set the desired delay for the sounders.
- Check that the mains voltage is 230V by using a voltmeter and check the batteries have a voltage greater than 24V.

6.2 System supply

After reviewing all the points described above, the correct order to connect the power is:

- Connect the mains power supply.
- Connect the batteries.

If necessary, you can turn the panel on with only the battery connected, but it is essential to press TAB to start the panel.

Once both power supplies are connected all the panel indicators should be turned off except the green power LED. If you have programmed a sounder delay, you should also see the sounder delay LED on.

If you notice any indication other than those described above, the origin of the problem in the installation should be detected and the fault repaired before proceeding (see problems).

6.3 System Test

A quick test of the system can be performed as follows:

- Create a fault, such as a loop open circuit or a power failure, and check that the fault relay operates and the fault is indicated on the LEDs and LCD.
- Cause an alarm to occur and check that the alarm relay outputs are activated and the correct sounders operate (after the correct delay, if programmed).

Note: A power failure may take several minutes to be indicated.

6.4 How to solve common problems

6.4.1 Earth Fault

The ZSC100 detects whether there is any earth fault on the installation, i.e. where any part of the system has a low resistance connection. This will be indicated by the Earth fault LED. Even if there is an earth fault, the system will probably operate correctly, but it is important to solve the problem, since it can affect communications. If an Earth fault occurs check the following points.

- Verify that the fault is not caused by the panel itself, by disconnecting all circuits connected to the panel.
- If the panel itself is OK, next check circuit by circuit, disconnecting and connecting all one by one, to find out what causes the Earth fault.
- Once the circuit that causes the Earth fault is ascertained, disconnect the return loop, and create an open circuit halfway round the loop. If the Earth fault disappears then the problem is in the part of the loop that was disconnected. If not, it is in the half still connected. Continue this process until the exact location of the Earth fault is found.

6.4.2 Communication Problems

The system may have problems that are caused mainly by the following reasons.

- Removal of any point of the loop.
- Short circuit on a loop.
- Interference with communication wires.

If the panel shows that the item is no longer receiving power, then:

In the event of any open or short circuit of the loop proceed as follows.

- Check the voltage with a meter, the output of the loop located at the panel motherboard should be 32V.
- Introduce a diagnostic loop which cuts out the location of the power loss. In the case of cutting the system at the exit loop only communicate to the point where it is cut and return the same loop. Are there cross the system from both the output and input from only communicate to the nearest crossing insulators.

In the case of interference from communication cables operate as follows:

- Verify that you have voltage in the output and return of the loop (32V), to ensure that there is indeed interference with the communications.
- To locate the point where there is interference, perform the following procedures:

- Make a bridge between the output and input of the loop, so avoid cutting fault.
 - Disconnect half of the loop.
 - Perform an AUTOSEARCH. If the system works correctly and the communication problems disappear, this means that the communication problem interference is in the other half of the installation. If problem persists this means that the communication problems are in the half of the loop still connected to the power.
 - Repeat the above procedure to narrow the area of the search for the interference problem.
 - Once you reach the area, the normal solution is to remove from the loop installation any electrical or electronic equipment which is possibly interfering with our communications.
- Once solved the problem, reconnect the loop in all its entirety and carry out another AUTOSEARCH. The communication problems should be gone.

6.4.3 Double Address

During the installation of the system, it can fail because of the same address at different points of the loop.

By auto searching the loop, the system will show the report:

SEARCH LOOP REPORT	01
VALID:30	DOUBLE ADDRESSES:02
CHANGED TYPE:05	
[Accept]	[Cancel] [Reports]

Press the Reports button to go to the next screen:

TYPE LOOP REPORT	1
BU-1.8% :000	O2-25%: 000 I/O: 000
NH3-500: 000	Error: 000 Sounder: 000
[+] [-]	[Addresses] [Exit]

Pressing the Addresses button will obtain a report of all addresses that have been found in the loop indicating the type of the point at the address.

```
ADDRESSES LOOP REPORT   1   (1/25)
001 002 003 004 005 006 007 008 009 010
TOX COM TOX SDR I/O    COM I/O DAD SDR
  [ + ]   [ - ]     [ Exit]
```

If there is not any abbreviation under an address, it means that this address is free, and if you see DAD, it means there is more than one point that responds to that address. In the screen above we see that address 6 does not answer, because no point has been given that address, and address 9 shows that there is more than one point that responds to that address. In this case it is likely that the detector with the desired address of 6 has accidentally been given an address of 9.

- After locating items with double addresses, give them the correct address, and perform another AUTOSEARCH. This eliminates double address fault.

6.4.4 CPU System Fault

If the System Fault LED lights, disconnect all power from the panel and then re-connect the power to the panel. If the problem persists, contact your dealer, since the service technician should check the central microprocessor.

6.4.5 Power Supply Fault

The system is capable of showing different types of power failure.

- Mains Power Fault: Check the input voltage, if correct, check the fuse of the terminal network and fuse board.
- Battery Power Fault: It is possible that the battery voltage is low. Disconnect the mains power so that the panel is only connected to the batteries, and check the battery voltage. This should be 27.6V. If the voltage is correct, check the fuses on the motherboard under the batteries. If the fuses are correct, check the power cable to the circuit. Finally check that the batteries are in good condition.
- 24V Auxiliary Output Fault: Check the auxiliary output voltage; it should be at least 24V. If not, check the output fuse. If the fuse is OK, contact your dealer.
- Battery charger Fault: If the panel displays a battery charger fault, contact your dealer.

6.4.6 Password incorrect

All panels have user and installer level Access passcode, which can be changed by users and installers, respectively. If you forget the passcode, contact your dealer.

6.4.7 Display Fault

It is possible that the display does not look good because of the contrast of the screen. To change it, slowly turn the knob next to the display.

7. Maintenance

The care recommendations of should be followed, in addition to the recommendations found in this section.

7.1 User Maintenance

The user must make daily and monthly checks:

- **The user must check daily as follows:** Any faults are to be recorded in the incident logbook, and the company responsible for maintaining the equipment advised.
- **In compliance to ISEA Requirements:** Bump-testing of gas detectors should be carried out regularly. It is recommended that these tests be carried out in stand-alone and system modes while examining the response of the panel.
- **The user must check each month:** The state of the installation by triggering a detector. A different area should be tested every month. Any anomaly detected in these tests shall be recorded in the incident logbook, taking corrective action as soon as possible.

7.2 Maintainer Maintenance

The maintenance and installation companies must make quarterly and annual checks:

- **The company in charge of maintenance of the facility shall test every six months as follows:**
 - Check the entries in the incident logbook, carrying out the necessary corrective actions.
 - Examine the battery connections and load voltage.
 - In each area, check the functions of alarm, fault and auxiliary equipment.
 - Visually inspect the equipment to detect any increase in moisture or any other deterioration.
 - Find out if there has been some structural changes at the facility, which could alter the normal operation of the facility
- **The company responsible for maintenance of the facility must demonstrate annually that:**
 - Put the panel on test mode, and verify that all sensors and other points operate according to the manufacturer's specifications.
 - Inspect all connections to the panel and its attachments to verify that there has been no deterioration.
 - Examine the state of the batteries and replace if necessary.
 - We recommend replacing the batteries every 4 years.

8. PCB Terminations and Technical Information

8.1 Electrical Wiring and Loop Connections Diagram

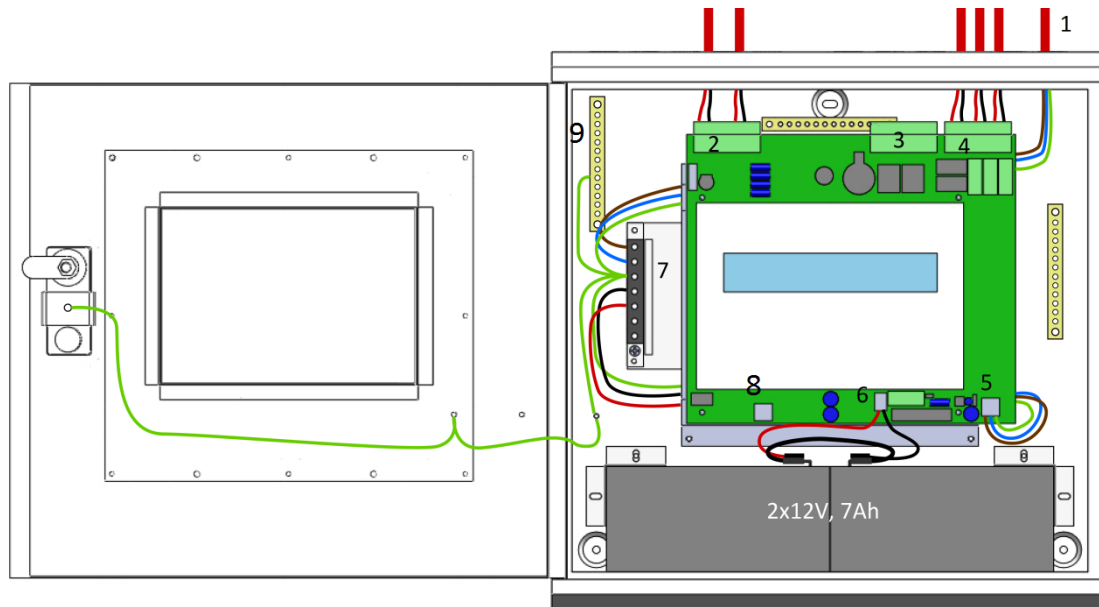


Figure 10: PCB Terminations and System Wiring

Connection	Description	Use
1	230V AC Supply (Mains)	Connect to detector wiring
2	Loop Connector	Connect up to 48 devices
3	Fault & Alarm Connector	
4	Sounder Connector and +24V, 0.5A Auxiliary	Connects panel to sounder modules and supplies power to a limited number of loop detectors. (Please use external power supply unit when commissioning more than 4 detectors in a loop!) .
5	+24V DC	Input voltage from 5A PSU cage
5	+24V DC (Standby Power Supply)	Supply voltage from rechargeable batteries
6	Battery connector	Standby power supply from battery
7	5A PSU Cage	AC to DC supply
8	USB Port	Connects ZSC100 to installer PC
9	Earth Bar	Grounding of the wiring

8.2 Technical Data

Mechanical Features	
▪ Dimensions (height-width-depth)	375mm x 375mm x 125mm
▪ Material	ABS
Environmental Features	
▪ Working temperature	Between -5 °C & 40 °C

ZSC100 Analogue Gas Controller

▪ Relative Humidity	Maximum 95% dry
▪ IP Rating	IP30
▪ Class type	3k5 of EN60721-3-3-1995
Loop Features	
▪ Maximum points per loop	48 points
▪ Loop voltage	Min 25Vdc Max 32Vdc
▪ Loop maximum output current	300mA
▪ Quiescent Current	175mA
▪ Maximum loop length	2Km
▪ Maximum loop capacitance	500nF
▪ Recommended wire	Shielded and twisted 2x 1.5 mm ²
▪ Maximum loop resistance	44 ohms
Alarm Relay Features	
▪ Voltage-free relay	1 relay with C, NC, NO contacts
▪ Contact rating	2A @ 30V dc
Fault relay Features	
▪ Voltage-free relay	1 relay with C, NC, NO contacts
▪ Contact rating	2A @ 30V dc
▪ Quiescent status	Energized
Sounder Output Features	
▪ Number of monitored sounder outputs	2
▪ Quiescent output voltage	Between -5Vdc & -9Vdc
▪ Activated output power	Min 18Vdc Max 29Vdc
▪ Maximum output current	400mA per sounder output
▪ Recommended wire	Twisted 2x 1.5 mm ²
▪ End of line resistor	4K7 Ohms 1/4W
▪ Protecting fuses SND1 and SND2	500mA 5X20 (Quick Blow).
24V Auxiliary Power Output Features	
Use external PSU for more than 4 Detectors!	
▪ Output voltage	Min 18Vdc Max 29Vdc
▪ Maximum output current	400mA
▪ Recommended wire	Twisted 2x 1.5 mm ²
▪ Protecting fuses 24V Aux	500mA (Quick Blow).
Power Supply Cage Features	
▪ Mains voltage	230 Vac +10% -15%
▪ Output voltage	Max 29Vdc
▪ Protecting fuse	250 Vac 4A 5X20 (Time Delay Fuse).
▪ Maximum output current	5A
Manufacturing Passwords	
▪ User level passcode	1111
▪ Installer level passcode	2222