GLOBAL
FIRE EQUIPMENT

ORION MINI
1 OR 2 ZONE FIRE ALARM CONTROL PANEL

INSTALLATION, OPERATION AND MAINTENANCE MANUAL
VERSION 1.0 - 03/2015

Overview

The ORION MINI is a 1 or 2 Zone microprocessor controlled conventional Fire Alarm Control Panel with all the functions necessary to control small and medium size fire detection installations.

Features

- One or Two zone non-expandable control panels
- Up to 32 conventional smoke and/or heat detectors per zone
- Active End of Line monitoring
- Programmable non-latching zones
- Programmable delay timer for sounder and relay activation. Maximum 10 minutes
- (Day/Night Function)
- Delayed operation selectable for each zone
- Zone coincidence programmable for adjacent zones. Only on models with 2 zones.
- Two Access Levels. Selectable by fixed code entry
- One man test
- Supervised auxiliary 24 volt output
- 1 supervised/ monitored sounder circuit
- 1 Relay output for fire indication. Unmonitored
- Power supply 0.5A @ 28.5V DC nominal
- Fully EN54-2 and EN54-4 compliant

Optional Interfaces

- Multiplexed output for LEDS and additional relay outputs per zone (Max 2 zones)
- Analogue interface cards available to interface ORION MINI panel to our range of addressable panels, JUNO-NET and JUNIOR. (P/N: ADLI)

Important Safety Notes

▶   This equipment must only be installed and maintained by a suitably qualified and technically competent person.
▶   This equipment must have an Earth Connection.
▶   A basic knowledge and training in the installation of Fire Detection systems is assumed.
▶   The Fire Detection system should be designed by a suitably qualified person with reference to the Local Regulations and Guidance from the fire Officer where applicable.

Mounting the Panel

The ORION MINI housing is designed for either surface or semi-recessed mounting. Cable entry points are provided at the top and back of the housing. Do not drill additional holes as cables could then interfere with the PCB or standby battery position. Maintain separation between the incoming 230 volt mains cable and the low voltage detector and sounder cabling.

The panel should be fixed to the wall using the 4 mounting holes provided and No 8-10 countersunk screws. Any dust created during the fixing process must be kept out of the control panel and care must be taken not to damage any wiring or components.

Front   **Lateral**

Top

Inside View
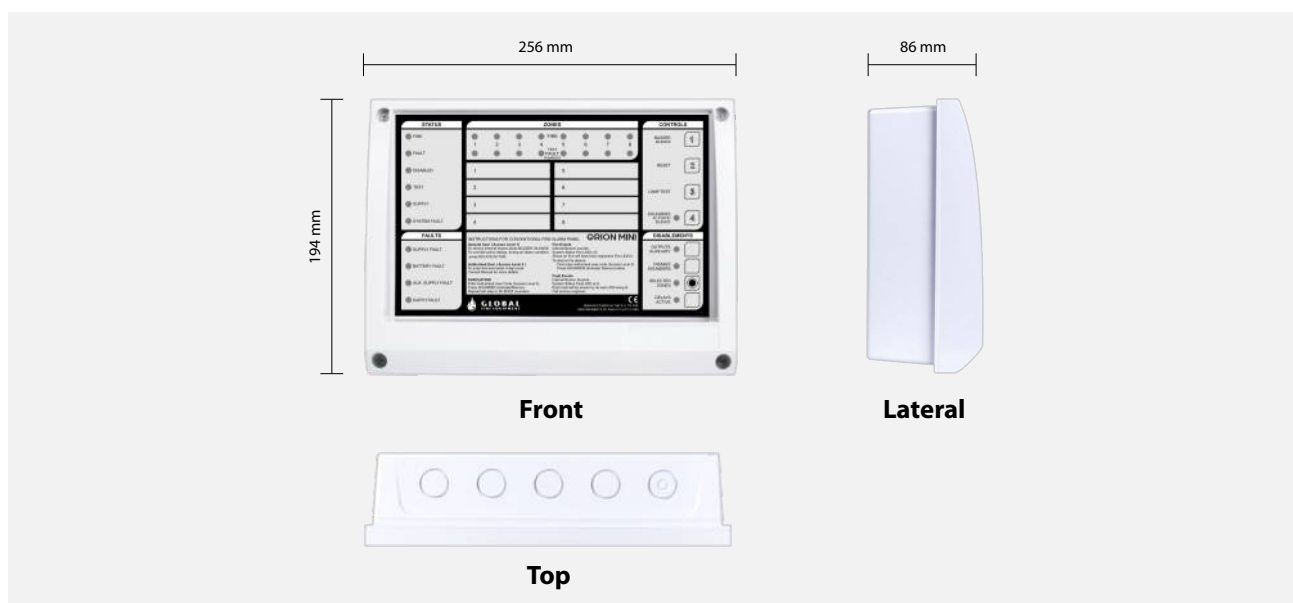
Cable Types

System wiring should be installed in accordance with National Standards and wiring regulations.

To protect against electrical interference we recommend the use of screened cables throughout the system. Separate cables should be used for sounder and detection circuits, the use of multi-core cables to carry sounder circuits and detector circuits is not recommended. The cable screens should be terminated and connected to Earth at the panel only.

Maximum cross section of cables to use is 2.5mm^2 to avoid damaging the terminals in the control panel.

Mains wiring should be 3 core 1mm^2 to 2.5mm^2 fed from an isolating fused spur, fused at 3A. This should be secure from unauthorized operation and be marked "Fire Alarm Do Not Switch Off" The mains supply must be exclusive to the fire panel.

Detection Zone Wiring

One and Two zones are available for detection device wiring. Each zone has capacity for up to 32 smoke / heat detectors and an unlimited number of manual call points. This may be restricted by local regulations.

An active end of line module (capacitor) is supplied for each zone, as part of the monitoring circuit. This must be fitted to the last device of each Zone. If a detection zone is unused the end of line module must be connected at the panel, if is not fitted, a fault will be indicated for that zone.

A typical detector circuit wiring layout is shown below. Please consult the device manufacturer's instruction manual for detailed information.

If manual call points are wired on the same circuit as detectors then in order to comply with the requirements of BS5839 with respect to head removal monitoring, detector bases should have a Schottky diode fitted which permits manual call points after a removed detector to continue to operate normally. (see diagram). Manual call points should have a maximum internal resistance of (470-680) ohms in Alarm.

The wiring for each detector zone should be terminated in the relevant terminal blocks at the control panel and the cable screens connected to earth.


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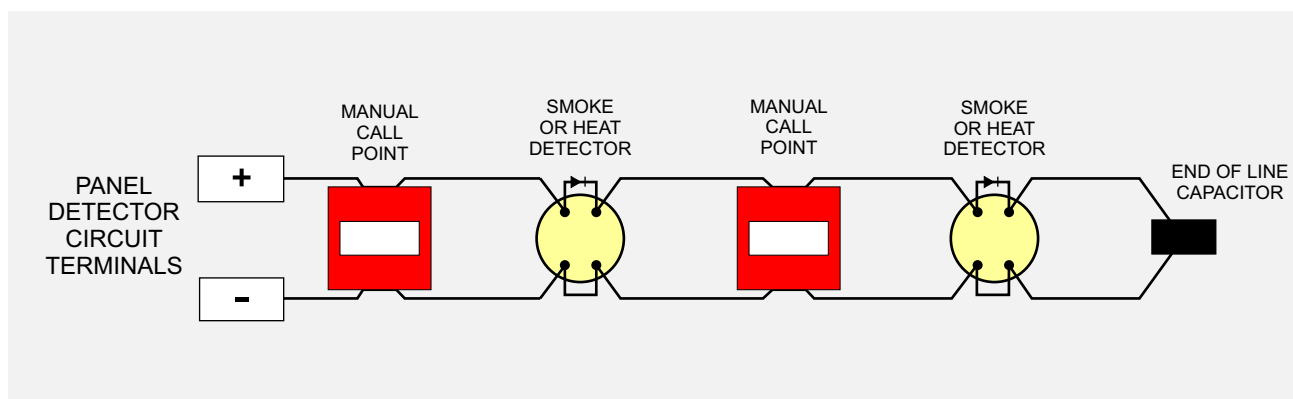
Sounder Circuit Wiring

There are two conventional sounder circuits available on the Orion Mini. The maximum current available for sounders is (500 mA) per circuit. All sounders must be polarized, non-polarized sounders will indicate a fault on the sounder circuit.

An end of line resistor (10 K Ohm) which is supplied with the panel, must be inserted in the last sounder for cable monitoring. If a sounder circuit is not used, the EOL resistor should be fitted in the control panel sounder output.

The sounder circuit is protected against short circuits, the electronic fuse will reset when the short circuit is removed and the control panel is reset.

The wiring for the sounder circuit should be terminated in its respective terminals and the cable screens connected to earth.

Typical sounder circuit wiring diagram:
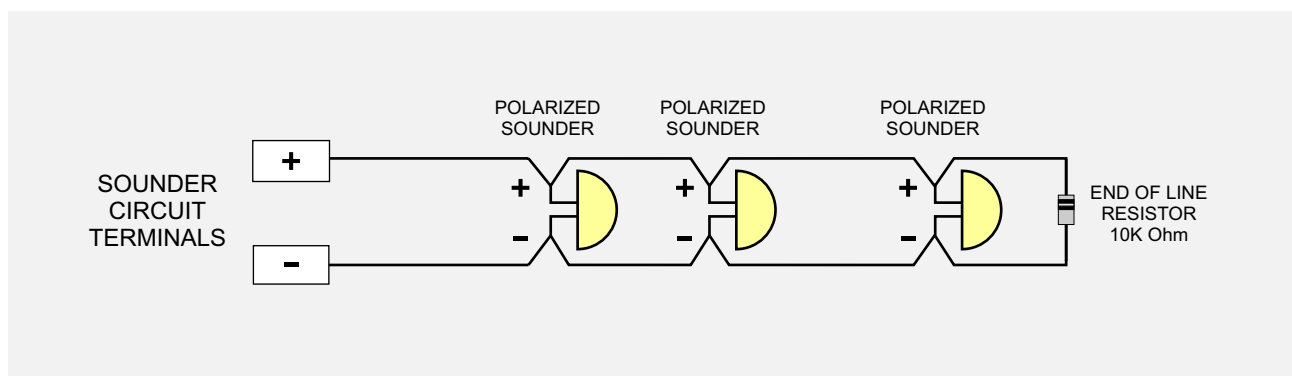
Outputs

Relay Contact Fire   Provide Fire signal to external devices.
Relay contact changeover 30V / 1A max resistive.
Active until Reset.

The wiring for each output should be terminated in their respective terminals and the cable screens connected to earth.

Optional additional Outputs

Repeater Output   Multiplexed Fire and Fault indication per zone. Remote system command.
Interface cards available for RS-485, Fibre Optics and TCP/IP (LAN) connection.

Zone Relay Outputs   Additional relay per zone follows zone status. 2 zones max.

Zone LED outputs   For remote installation. Multiplexed LED boards can reflect status of panel, i.e. Fire, Fault, Test, Disabled, etc. and/ or zone status.

Analogue Detection Loop Interface card (ADLI) available for direct interface of Orion Mini to the analogue detector loop of any of our analogue addressable panels, Junior or Juno Net, allowing the Orion Mini to be used as an effective and practical Shop Monitoring Unit.

⭐ **NOTE:** Sounder and Alarm Relay outputs only become active at the end of any programmed delay period. If during the delay period, the DELAYS ACTIVE button is pressed at access level 1 (no code entry required), delay expires and sounders activate immediately

Connecting the Panel

Before connecting zone or sounder cables, power up the control panel with the Active EOL connected to the zone inputs and the EOL resistors for the sounder lines connected. Connect mains and battery power; there should be no fault indications.

The mains supply should be routed away from the other cables and enter the control panel adjacent to the mains terminal block.

Wiring to the Mains supply should only be undertaken by a suitably qualified and competent person.

Depending on panel load and standby requirements, two 12 volt valve regulated lead acid batteries of capacity up to 1.2Ah may be fitted in the housing. The batteries should be wired in series (24 V) using the supplied link. Take care not to short circuit the battery terminals.

Check zone and sounder wiring for continuity. Short or open circuit indications must be rectified before connecting to the control panel. All cable testing must be carried out with a Multi meter….NEVER use a Megger when devices are connected.

Induced voltage higher than 1 Volt indicates possible cable problems or bad earth connection and must be rectified before connection.

Transfer Active EOL modules and EOL resistors to the last device on Detection and sounder circuits and connect the cables to their respective terminals in the control panel. See Diagram below.
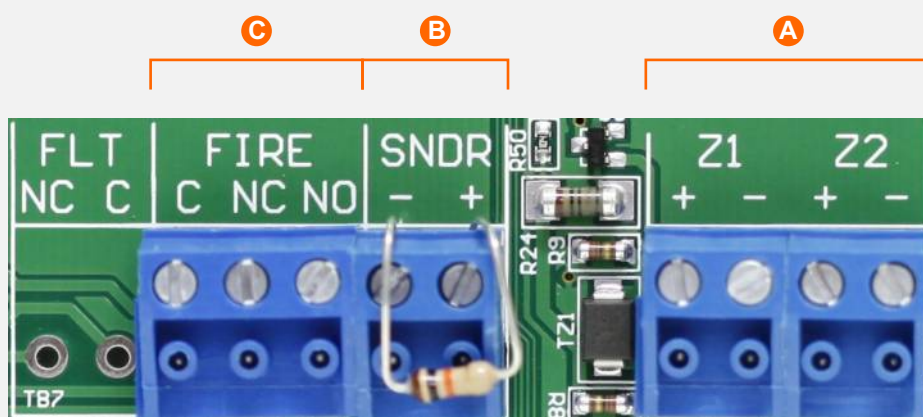
A Zones

B Conventional Sounder Circuit

C FIRE relay

Commissioning

The ORION MINI is supplied ready to operate as a standard conventional Fire Alarm control panel. Optional functions and their programming are described in the next section. If required they may be programmed before continuing with the commissioning.

The default settings for the ORION MINI are as follows:

- All zones Latching
- All Timers Off
- No Zone Coincidence
- Remote Control Inputs set to Remote Reset and Class change and Remote Day/Night
- Engineer Access code (Access Level 3) set to :4321

Preparation

1º Check detector cables and ensure all field connections are made, ensure that all EOL devices are fitted to the last detector, call point or sounder of each circuit. EOL Capacitors should be fitted to zones. EOL Resistors should be applied to sounder circuits

2º Connect detector and sounder lines or terminate with EOL.

3º Remove the mains fuse.

4º Connect mains supply according to local mains voltage
Ensure good earth connection

**DANGER
EXTERNAL VOLTAGE**

5º Fit batteries (do not connect)

6º Insert mains fuse

7º Connect batteries - observe correct polarity

Commissioning

1º If all is normal only the Green "supply" LED should be illuminated.

2º If any Faults are indicated they should be corrected before proceeding

3º Initiate lamp test and check all LEDs operate and internal buzzer sounds

4º Test each key for correct functioning

5º Test all detectors, manual call points, sounders, relays etc. for proper operation

Testing Field Equipment

Testing Smoke Detectors

1º Set zones to Test mode
2º Introduce test smoke into the detector
3º Wait until response indicator on detector indicates Red
4º Automatic reset after (10 sec) / when smoke has cleared

Testing Heat Detectors

1º Set zones to Test mode
2º Place test unit on head and turn on heat
3º Wait until response indicator on detector indicates Red
4º Automatic reset after (10 sec)

Testing Manual Call Points

1º Set zones to Test mode
2º Activate Call point using the manufacturers instructions
3º Wait until response indicator on call point indicates Red
4º Reset the call point
5º Automatic reset after (10 sec)

After testing is completed be sure to return control panel to normal operating mode.

Pressing RESET button will EXIT TEST mode

Testing Sounder Circuits

1º Initiate sounder test by entering Access Level 2 and pressing Sounders Activate/ Silence
2º Press again to stop

Testing Relay Outputs

With the system in normal operating mode activate the Alarm and confirm operation of relay and external devices at the end of any programmed delay.

Operating & Programming The Panel

The ORION MINI has a number of programmable options to help the engineer customize the system to meet the customer's requirements. To access these options it is necessary to enter access level three.

There are three levels of Access on the ORION MINI:

Level 1: General user controls

1º   Override any active delays (Operate Day/ Night function)
2º   Perform a lamp test
3º   Silence Internal buzzer
4º   Put the panel into Access Level 2 or 3 if in possession of the required access code

Level 2: Authorised user controls (User 2244)

This higher level allows the user to:

-    Silence and resound the sounders
-    Reset after an Alarm or Fault
-    Manually activate the sounders (Evacuate function)
-    Silence Internal Buzzer
-    Test the indicator lights
-    Disable or Enable any or all of the detection zones
-    Disable/ Enable the following:
     1º   Sounders
     2º   Auxiliary Outputs - Relays
     3º   Activate Delays if set and programmed for any zone

When any zone or function is disabled the Disabled LED on the STATUS area of the Control Panel display, will be lit, together with the corresponding function or zone disablement LED. Disabled zones will have their corresponding FAULT/ DISABLED LED illuminated.

Level 2 Access is gained by entering the code **2244** using the numbered buttons.

⭐ **NOTE:** If any Fire or Fault events have occurred these must be acknowledged by pressing the Buzzer Silence button to acknowledge each Fault or Fire event before code entry will be accepted.

Each successful button press is indicated by the illumination in succession of the Fault LEDs for zones 3,4,5 and 6.
If the code is not completed within 20 seconds of the last key press, the system reverts to level 1.
The green (Supply) LED will flash slowly to confirm entry to level 2.

Level 3: Engineer controls for use by trained and competent personnel only

Is accessed from Level 1 and allows:

- Programming of coincidence
- Setting delay timer
- System Test
- Setting delayed zones
- Setting Non-latching Zones

⭐ NOTES

1º Changes made at this level affect the factory default settings and the operation of the system. They should only be made by qualified personnel who are fully aware of their effects.

2º If any Fire or Fault events have occurred, these must be acknowledged by pressing the Buzzer Silence button to acknowledge each fault and Fire event before code entry will be accepted.

3º When in Access Level 3, the occurrence of any Fire or Fault condition the system will automatically exit from Level 3 and revert to Level 2.

To enter Engineering Mode (Access Level 3) enter the factory programmed code, using the numbered keys (from 1 to 4), which are available on the top right hand side of the control panel display.
Each successful button press is indicated by the illumination in succession of the Fault LEDs for zones 3,4,5 and 6.
If the code is not completed within 20 seconds of the last key press, the system reverts to Level 1.

Once this mode is entered the GREEN LED (SUPPLY) will flash once every 0,5 seconds.

To exit this mode at any time, press the RESET button. The panel will revert to Access Level 1.

Total removal of power during the programming phase may lose the changes entered.

Programmable Options

Coincidence:

After entering access level 3, using the code provided for this effect, press the OUTPUTS AUXILIARY button in the disablements area of the control panel. The associated LED will light up. Coincidence only operates on the FIRE relay.

Select in turn, using the RED (4) button, the pair of zones required to work in his mode. The first 4 Zones FIRE LED's indicate the Zone pairs: LED 1= Zones 1&2, LED 2= Zones 3&4, etc.
 After selecting the zone required press the GREEN (1) button to confirm selection. The selected Red LED will be illuminated.

Press the OUTPUTS AUXILIARY to exit this mode. On exit LED is OFF.

★ **NOTE:** If one of the Paired Zones is disabled, the Fire Relay will not activate in the event of a Fire in the other Zone of the pair. Non-Latching Zones should not be set to coincide.

Delayed Zones:

After entering Access Level 3; press the Selected Zones button. The associated LED will be turned on.

Select the zone required by pressing the RED (4) button consecutively until the zone required to have a delayed operation, has its FAULT LED lit up.

Confirmation of this selection is achieved by pressing GREEN (1) key. Upon confirmation the RED (FIRE) LED will be turned ON for the selected zone.

★ **NOTE:** Delay time must be set for delayed zones to function. See next page.

One man Test:

After entering Engineering Mode (Access Level 3) press the LAMP TEST button.

Release button and the TEST LED will be on along with the fault LED for all zones that are available for testing indicating that the panel is in TEST mode. Zones that are in Fault or are Disabled will not have their LED illuminated.

Test zones as required. At each zone activation, the corresponding zone FIRE LED will light up for 5 seconds. Zones will automatically reset after 10 seconds. Internal Buzzer and SOUNDERS will operate for 1 second.

To end TEST mode press LAMP TEST button.

Delay setting

To set the delay time, press the DELAYS ACTIVE. After pressing button the associated LED will be ON.
The delay time will shown using the first 4 ZONE FIRE ZONE LEDS. A maximum delay of 10 minutes can be programmed. Each LED will have its own associated weight in minutes, namely:

Zone 1 - 1 Minute   Zone 2 - 2 Minutes   Zone 3 - 3 Minutes   Zone 4 - 4 Minutes

In order to obtain the programmed delay, use the red button to light the required number of LEDs adding the weights of activated LED's: Example: for a delay of 10 minutes all 4 LEDs will be ON.

1+2+3+4 = 10 minutes

To end the programming of the delay time press DELAYS ACTIVE.

Non-Latching Zones

After entering Access Level 3, press the Disable Sounders button. The associated LED will be turned on.
Select the zone required by pressing the RED (4) button consecutively until the zone required to be Non-Latching, has its FAULT LED lit up.
Confirmation of this selection is achieved by pressing GREEN (1) key. Upon confirmation the RED (FIRE) LED will be turned ON for the selected zone.

⭐ **NOTE:** Non-Latching Zones do not activate the Alarm relays. Sounder circuits will activate at the end of any programmed delay and remain active until the Zone returns to normal state. If the input returns to the normal state during the delay period, the sounders will not sound. Pressing Sounders Activate/Silence while the sounders are activated will silence the sounders and extinguish the adjacent LED. Pressing again will reactivate the sounders if the Zone is still in Alarm.

Faults on non-latching Zones are also non-latching and do not activate the fault relay.
To exit Engineering Mode (Access Level 3), press the RESET button.

The Panel Buttons
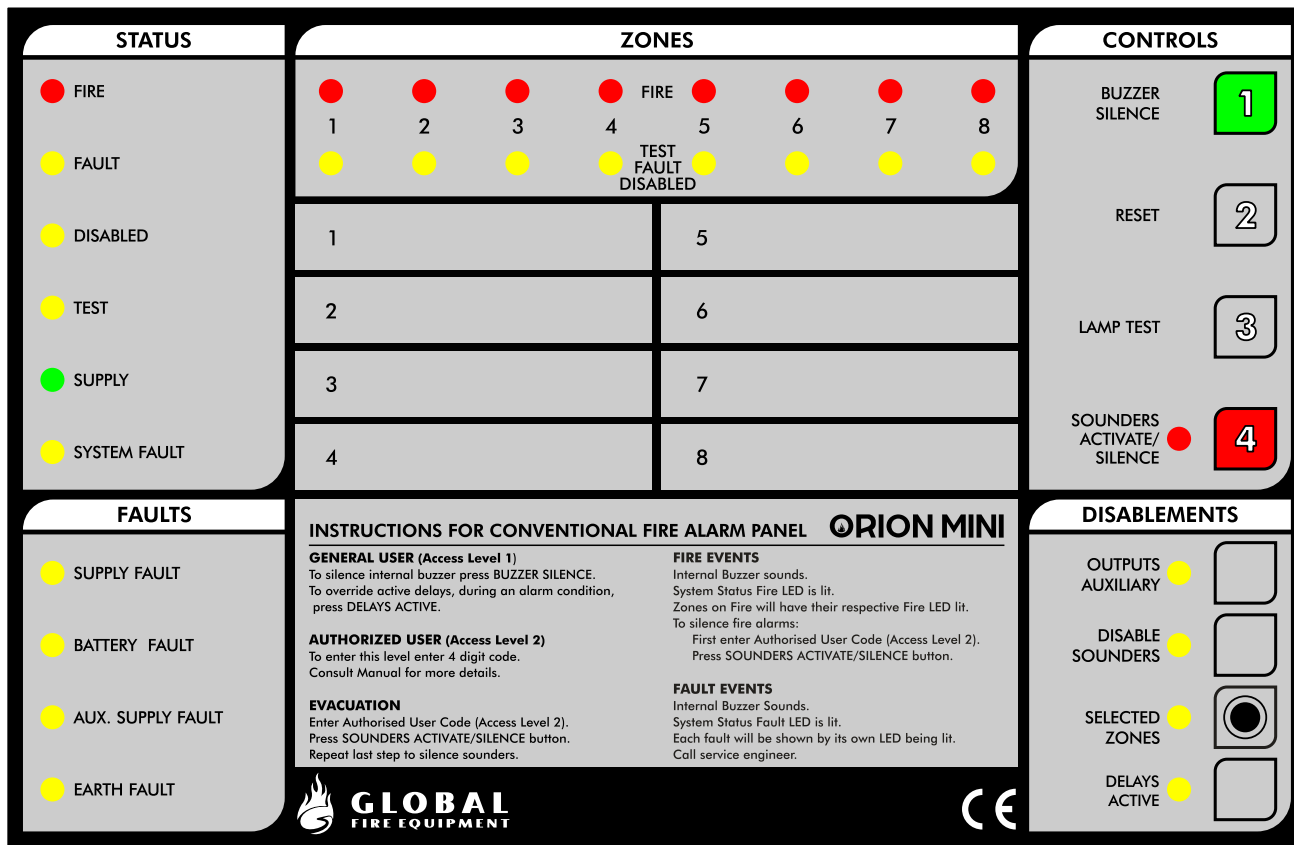
STATUS

FIRE   LED used to indicate any FIRE ALARM condition present on panel.

FAULT   LED used to indicate any FAULT condition present on panel.

DISABLED   Disabled Status LED used to indicate that the panel has features that have been disabled in either Access Level 2 or 3 modes.

TEST   This LED is active whenever panel is in TEST MODE. Only LIT when in Engineering Mode and TEST mode has been selected.

SUPPLY   Multi function indicator used to indicate the presence of supply. When in Access Level 1 this LED is permanently lit. If in Access Level 2 (enter this mode using USER CODE) this LED will flash at a rate of once per second. And finally if in Access Level 3 mode (enter using ENGINEERING CODE) this LED will flash faster at a rate of once every 0,5 seconds.

SYSTEM FAULT   This LED will be lit whenever there is a processor failure or corruption of the panel firmware.

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FAULTS

SUPPLY FAULT — This LED will be ON whenever the Main Supply has been removed or has dropped below 20 Volts.

BATTERY FAULT — Indicates that there is low voltage level on the batteries or the battery charger circuit has failed.

AUX. SUPPLY FAULT — Indicates that the Auxiliary Supply has a fault.

EARTH FAULT — When this indicator is ON there is leakage current flowing from the earth connection/ wiring and any conductor in coming into the panel.

SOUNDER FAULT — If there is a conventional sounder circuit fault, the General Fault LED will be lit and the Disable Sounders LED in the disablements section will also be lit and flashing.

ZONE INDICATORS — Individual zone indicators are provided for both FIRE and FAULT conditions.

If any zone is disabled then its FAULT LED will also be used to indicate the disablement of that particular zone. The Zone LED will be ON along with the Disabled status LED. Flashing Zone Fault LED along with General fault LED indicates fault on that zone.

CONTROLS

These four keys can have more than one function.

They are numbered to indicate that they are used to enter digits from 1 to 4 for code entry.

BUZZER SILENCE (1) — At Access Level 1 this button is used to silence the panel's internal buzzer. Access level 3 used to confirm/accept changes in programming.

RESET (2) — Press this button to reset the panel at access level 2 or 3.

LAMP TEST (3) — Press this button at access level 1 or 2 to test all LED indicators and the panel's internal buzzer. Release when test is finished.

SOUNDERS (4) — Press once to activate/silence sounders. If sounders are active, for example, during a FIRE condition or in the event of an Evacuation action, pressing this button will stop the sounders. Auxiliary Relays are not affected by this action. Used in Access level 3 programming to select Zones

DISABLEMENTS

These buttons are only active at access levels 2 or 3.

They can perform different functions depending on the present panel mode of operation.

At Access Level 2 (USER MODE)

These buttons have a toggle action. One press will disable the particular feature being selected another press of the same actuator will re-enable the function.

When a particular function is disabled, its associated LED will be active and OFF otherwise.

OUTPUTS AUXILIARY   Pressing this button will ENABLE/ DISABLE the auxiliary relays.

DISABLE SOUNDERS   The user can use this button to enable/ disable the conventional sounder circuits. Note: Disables both sounder circuits.

SELECTED ZONES   Use this button to select the zone disablement feature. Press once, associated LED will light up and by using the GREEN (1) button select the zone to be disabled. Selected zone will have its FAULT/DISABLED LED ON. Confirm selection by pressing RED (4) button. Zone Disablements will only be active after RESET. Once the disablement procedure is finished press again this button to exit.

DELAYS ACTIVE   Pressing this button will enable the previously programmed delay. The
(Day/Night)   corresponding LED will be ON during this time. In access level 1, during the delay time which started due to a FIRE alarm, pressing this button over rides the delay timer and the sounders and Fire relay will be activated immediately.

For information regarding special functions associated with these buttons, in access level 3 (Engineering Mode), please consult the Programming section of this manual.

Troubleshooting - Fault Indications

❗ **TROUBLESHOOTING WORK OF ANY FAULT ON THE PANEL SHOULD ONLY BE CARRIED OUT BY QUALIFIED TECHNICIANS.**

General Fault
The General fault LED is illuminated whenever there is a fault on the system. It is always lit along with at least one other fault indicator which gives more detail relating to the fault.

Zone Fault
This type of fault will indicate that there is either a short or open circuit condition on zone circuit. Revise wiring.

Power Supply Faults

Supply Fault
Associated with a low voltage (below 22 V) present at the input of the power supply or the removal of the main power supply. Measure voltage levels and verify electrical mains fuse.

Battery Fault
This fault is present when there is a low voltage below 22 V DC at the battery terminals or if there is a battery charger problem. Charger problems can be caused by panel's hardware failure or batteries that have not been connected in the specified manner as indicated in this manual, on the installation section. Verify if batteries are properly connected. Measure the voltage at the battery terminals. If it is below 21V DC replace batteries. Remember to verify also the main electrical fuse.

❗ **DON'T EVER SHORT CIRCUIT BATTERY TERMINALS IN ORDER TO VERIFY BATTERY CHARGE ONLY USE BATTERIES WHICH ARE LEAD ACID VRLA TYPE 12 V DC.**

Aux Supply Fault
This fault will show when the voltage at the auxiliary supply output is below 22 Volts DC. This can be caused by the current limit for this output being exceeded. This output is limited to 300 mA. Other causes for faults on this point are short circuits on the wiring or faulty hardware attached to this supply output. Verify voltage, if below the required acceptable level remove wiring connected to this output. If voltage now returns to normal this confirms that connected equipment or cable is damaged.

Earth Fault
This FAULT will indicate that there is some level of current leakage between any of the wire conductors and the EARTH connections. VERIFY WIRING.

System Fault
This FAULT indicates that there is a fault at the main processor level. In this particular fault, the panel's main board needs to be replaced or repaired.

Standby Battery Calculation

Min battery capacity 2 x 2 Ah 12 V DC

Max Battery capacity 2 x 7 Ah 12 V DC

Always use Lead- acid VRLA Batteries

The battery Ah required for a given installation is calculated from the following formula:

$$\left(\begin{array}{c} \text{Quiescent current in} \\ \text{mA of the panel with} \\ \text{everything connected} \end{array} \times \begin{array}{c} \text{Standby time} \\ \text{required in hours} \\ \text{divided by 1000} \end{array} \right) + \left(\begin{array}{c} \text{Alarm current in Amps} \\ \text{(sounder load)} \end{array} \times \begin{array}{c} \text{Alarm time in} \\ \text{hours} \end{array} \right) + 20\%$$

Round up to the next available battery size.

Quiescent current of the panel with everything is found by adding the standby current of all connected devices to the standby current of the panel (38mA).
Consult the manual for the individual devices to confirm the standby current.

Technical Specifications

POWER SUPPLY SPECIFICATION	
MAINS SUPPLY VOLTAGE	230 V AC +10% -15%
INTERNAL POWER SUPPLY	Min. 22 V DC - Max. 30 V DC (28.5 V DC nominal) Max. Ripple 1 V peak-peak
TOTAL OUTPUT CURRENT	0.5 A @ 230 Vac
SUPPLY AND BATTERY CHARGER MONITORED?	YES
BATTERIES MONITORED	YES
MAX BATTERY SIZE	2 x 12 V 1.2AH VRLA
MAINS FUSE	4 A - 250 V Slow Blow - 20 mm
BATTERY FUSE	0.3 Amp Resettable - Electronic Fuse
MAX CURRENT DRAW FROM BATTERY (MAINS FAIL)	0.3 Amp Max. @ Max. Operating Temperature
DETECTION CIRCUIT SPECIFICATION	
NUMBER OF CIRCUITS	1 or 2 / non-expandable
MAX CABLE RESISTANCE	40 Ohms
MAX CABLE CAPACITANCE	0,470 uF
ZONE CURRENT QUIESCENT	Max 5 mA
ZONE CURRENT ALARM	60 mA max
END OF LINE MONITORING	Active EOL - CAPACITOR
BS5839 DETECTOR REMOVAL COMPLIANT	YES provided diodes are fitted to detector base
MAX. NUMBER OF SMOKE/HEAT DETECTORS PER ZONE	32 - according to EN54-2
CALL POINT RESISTOR VALUE	470 to 680 Ohms
SOUNDER CIRCUIT SPECIFICATION	
NUMBER OF CIRCUITS	1
END OF LINE RESISTOR VALUE	10 K Ohms
MONITORING	Open and short circuit
ALARM VOLTAGE	27.5 V DC
SOUNDER CIRCUIT FUSE	0.3 Amp resettable (Electronic Fuse)
MAX. CURRENT AVAILABLE	0.3 @ 27,5 V DC Nominal
AUXILIARY OUTPUTS	
AUX POWER OUTPUT	27.5 V DC Nominal - Max. Current Drawn 300 mA
FIRE RELAY	Active in Fire condition, load 30 V DC/1A resistive
FAULT RELAY	Active in Fault condition, load 30 V DC/1A resistive
DIMENSIONS & OPERATING SPECIFICATIONS	
SIZE	256 (W) x 194 (L) x 86 (H) mm
WEIGHT WITHOUT BATTERIES	1,1 Kgs
OPERATING TEMPERATURE	-5 to +50ºC
MAX RELATIVE HUMIDITY	95% non condensing