FIRE ALARM CONTROL PANEL

FIREWALL 1 to 16 ZONES

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EC Certificate of Conformity
ref. NGQ05020008

NIBBLE – Engenharia, Lda.
Rua Júlio Dinis, 265, 1D
4785-330 Trofa
Portugal

EN 54-2 / EN 54-4

FIRE DETECTION AND FIRE ALARM SYSTEMS: CONTROL AND INDICATING EQUIPMENT, POWER SUPPLY EQUIPMENT

- FIRE ALARM CONTROL PANEL -

1 - Introduction:

Congratulations for buying the NIBBLE FIREWALL Fire Alarm Control Panel!

In this manual you will find a detailed description of all functionalities and operating modes.
The NIBBLE Fire Alarm Control Panel is suited to conventional systems, offering high security patterns in different applications.
The FIREWALL complies with **EN-54** and its main features are:

- **Up to 16 zones,** monitoring both short-circuits and open-circuits;
- Up to **32 conventional detectors**, by each zone;
- **Open-collector programmable auxiliary outputs** (one by zone);
- Up to 2 relays that can be programmed to signal several fails or fire alarm;
- Monitored output against short-circuits and open-circuits for sounder of 24VDC and up to 500mA;
- Configurable delay between detection and signaling of the fire alarm allows user to avoid false alarms that some detectors could generate (normally during the day);
- **24VDC outputs** allow to connect external circuits up to 500mA;
- Backup power-supply through **only one battery of 12 VDC / 7Ah**, or two batteries of 6 VDC / 12Ah in series.
- **User-friendly** frontal panel.

2 - Features:

2.1 Delay mode:

Some detectors could generate false alarms because of electromagnetic or light interferences. To avoid the occurrence of such false alarms, the FIREWALL could be configured to introduce a delay between the detection instant (by the detectors) and the actuation by the control panel.
This time period is programmable and allows the user to reset the control panel when he verifies the alarm doesn't exist.

2.2 Intelligent and automatic zones:

The circuits of detection can be constituted by conventional detectors and callpoints. In the case of callpoints, the signaling of the fire alarm should be immediately executed.
An intelligent zone have the ability to distinguish if the alarm was generated from a detector or from a callpoint, and when in "Delay mode" the delay is only applied to the detections which origin was a detector.
In an automatic zone, there is no difference between detectors and callpoints, and the alarm is immediately signaled.

2.3 Open-collector auxiliary outputs:

For each zone is available an auxiliary output that can be configured to signal a failure or an alarm detection in the corresponding zone. Each of these open-collector outputs can sink up to 500mA.

2.4 Automatic test: NEW

The FIREWALL has a test mode which resets the system automatically after an alarm (see 7.6) allowing the system to be tested by a single person.

2.5 Smart setup: NEW

The FIREWALL can be configured to adapt to any detector, manual callpoint, or termination resistor (see 7.7). This way, it is possible to replace another fire alarm panel by a NIBBLE FIREWALL without having to change the existing circuit.

2.6 Maintenance warning: NEW

In order to always ensure the safety of the premises, the FIREWALL can notify when it's time to perform a check-up. The maintenance period can be configured according to section 4.7.

3 - Mounting:

The FIREWALL is for indoor use with low humidity, and should be mounted in vertical position with screws.
It can be mounted either in flush or surface positions, keeping access to the frontal cover for mounting and maintenance purposes.

> **Note**: Detectors should be mounted near the fire alarm control panel. This allows to minimize the risk of control panel destruction by the fire before emitting the alarm. Automatic fire extinguish systems should be placed avoiding control panel damaging when actuated (eg. 'sprinkler').
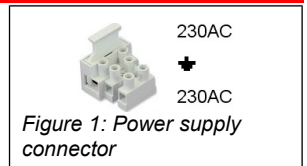
4 - Connections:

With exception for power supply and relays, it is recommended to use shielded cables with a section of at least 0,25 mm^2, and the shield should be connected to earth.

230AC
230AC
Figure 1: Power supply connector

4.1 Main power supply:

There is a connector to connect the control panel to main power supply. It is recommended to use cable type A05VV-F with 3 wires with section of 1,5 mm^2.
This connector have also the main fusible (F4A L250V).
To power the control panel on and off the circuit switch, located upstream, should be used with a minimum of 16A.

> **Note**: Power on the control panel only after finishing all connections.

4.2 Zones:

For each zone there are available 4 terminals, 2 for the detection circuit and 2 for an open-collector auxiliary output (Figure 2).

The auxiliary output signals the detection of an alarm in the corresponding zone. When activated, it closes the circuit between AUXn+ and AUXn–

Figure 2: Zone connectors.

Figure 3: Zone with detectors and termination resistor.
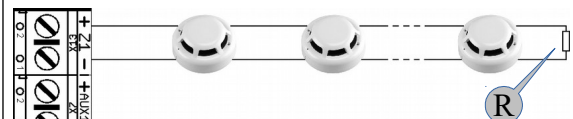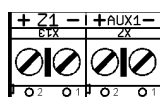
terminals, and supports up to 500mA, and 80VDC.

The detection circuit is connected in Zn+ and Zn- terminals. This circuit must always be terminated by a resistor of 3300Ω, 1/4W.

In each zone can be connected up to 32 detectors and any number of callpoints. When mounting callpoints, it should be used a zener diode, in series, of 5V1, 1/4W.

Figure 3 shows a circuit only with detectors. The termination resistor (R: 3300Ω, 1/4W) should be connected at the end-of-line, in parallel with the detectors.

A zone can also have only callpoints in its circuit.

Figure 4 shows how to make the connections between callpoints, zener diodes (Z: 5V1, 1/4W) and termination resistor (R: 3300Ω, 1/4W). In such case, delays will be ignored and the alarm is immediately activated.

In the example shown in Figure 5, it is possible to see how to connect detectors and callpoints in the same zone. Such zone, when configured as 'intelligent', will distinguish if an actuation comes from a detector or from a callpoint. If delay mode is activated, the delay will only be applied to detectors.

Auxiliary outputs that are available for each zone can be used as switches that close a connection when actuated. Figure 6 represents a circuit with a lamp (L), using an external power-supply (P). (Maximum specifications: 80 VDC, 500mA).
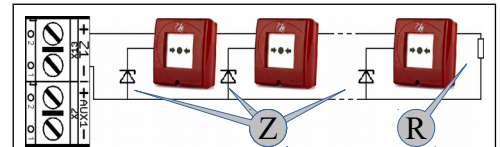

Figure 4: Zone with callpoints, zener diodes and termination resistor.
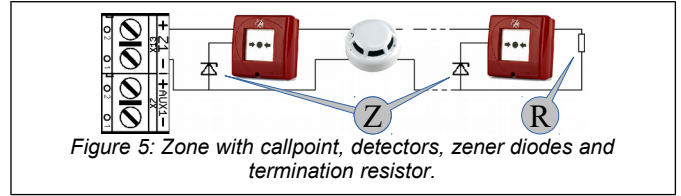
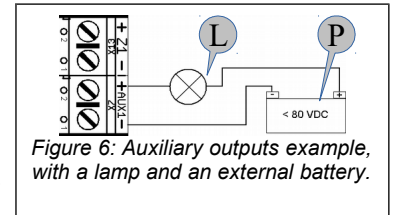Figure 5: Zone with callpoint, detectors, zener diodes and termination resistor.

4.3 Relays:

For each relay there are 3 terminals, as shown in Figure 7. Terminal C is the common. Terminals NC and NO are, respectively, normally-closed and normally-opened.

The relays in the FIREWALL are capable of controlling voltages up to 250VAC and currents up to 10A.

The cables to use with these circuits should be in accordance with the current to use. As an example, for 10A@250VAC it should be used a cable similar to the one of main power supply (A05VV-F with 3 wires of section of 1,5 mm^2).

Figure 6: Auxiliary outputs example, with a lamp and an external battery.

Note: Relays are programmable so they can be used to signal alarms and/or fails. When programmed to signal at least a fail, a relay will have a complementary behavior, i.e., in standby, the internal coil of the relay remains activated, and, in case of fail, it is deactivated.

Figure 7: Relay connector

4.4 Sounders:

This output allows to control one or more sounders in parallel (maximum specifications 500mA @ 24VDC).

It is protected by a fuse and it is monitored for detection of fails due to short-circuit or open-circuit.

It should be used a termination resistor of 3300Ω, 1/4W, at the end-of-line and in parallel with the sounder(s).

Figure 8: Sounder connector

4.5 Auxiliary power:

It is available an auxiliary output to power external equipments up to: 500mA @ 24VDC.

4.6 Battery:

It is mandatory to use a battery (lead-acid), not included with the equipment, of 12VDC, 7Ah; or two batteries of 6VDC, 12Ah (connected in series) that allows a greater autonomy in the event of main-power shutdown.

Figure 9: Auxiliary power connector

Note: Pay attention to the polarity. When using 2 batteries, the voltage of each one must be 6VDC and not 12VDC. Do not use other type of batteries to avoid explosion!

4.7 Maintenance:

To ensure the correct operation of the control panel, periodically test the functions of all systems.

With a minimum periodicity of 6 months, verify if the battery level is above 12VDC (with 1 battery) or 6VDC (with 2 batteries).

When exchanging fuses use only the same reference.

Note: Before any maintenance take place, the control panel should be turned off.

5 - Testing the system:

Once all connections are made, the entire system should be tested.

When powered on, the control panel should not be signaling any fault (unused zones must be deactivated).

Disconnect the battery and check if the battery fault is signaled. Connect it again and then check if the control panel returns to its initial state.

Break a zone circuit (removing a detector) and verify that the open-circuit condition is detected. Establish a short circuit between the terminals of the zone and verify that the fault is signaled. Repeat for all zones in use.

Follow similar procedures for the circuit of the Sounder (remove the sounder and establish a short circuit). Verify that the sounder is off.

Using appropriate mechanisms to simulate a fire situation by activating a detector. Check that the control panel signals the alarm, activating the sounder (may have a delay if the delay mode is active). Since version FW 3.20, the FIREWALL has an autotest mode, which resets the system when an alarm occurs, see 7.6.

Also check if the relay(s) switch properly according to your programming.

6 - Control and Indication:
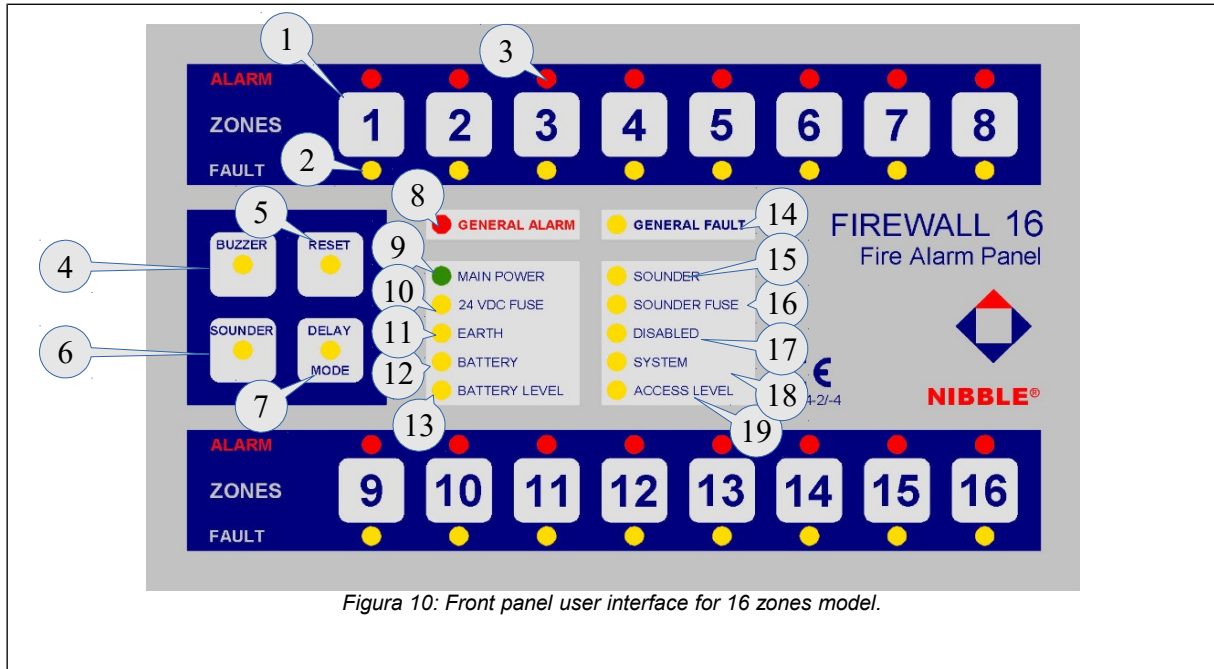
6.1 Front panel user interface:

Figura 10: Front panel user interface for 16 zones model.

1	Zone activation key	10	24VDC fuse fault indication LED
2	Zone fault indication LED	11	Earth circuit fault indication LED
3	Zone alarm indication LED	12	Battery presence indication LED
4	Internal buzzer silence key	13	Battery charging indication LED
5	External sounder silence key	14	General fault indication LED
6	Reset key	15	Sounder fault indication LED
7	Delay Mode key	16	Sounder fuse fault indication LED
8	General Alarm indication LED	17	Disabled indication LED
9	Main-power indication LED	18	System fault indication LED
		19	Access level indication LED

Table 1: Legend of Front panel user interface

6.1.1 Zone activation key:

With this key is possible to activate or deactivate the corresponding zone.

> **Note**: Action only available with level 2 access (after the introduction of the access code or key).

6.1.2 Zone fail indication LED:

The detection circuits of each zone are monitored to make possible to detect short-circuits or open-circuits. If a short-circuit is detected this LED blinks fast, in case of open-circuit it will blink slowly.
This LED also indicates if a zone is active or not. When permanently ON it indicates inactive zone.

6.1.3 Zone alarm indication LED:

This LED indicates an alarm in the corresponding zone. If it blinks fast, it means that the alarm was signaled at a callpoint. If it is permanently ON, it means that the alarm was signaled by a detector.

6.1.4 Internal buzzer silence key:

With this key, it is possible to silence the internal buzzer which is activated every time that an alarm or a fail occurs.

> **Note**: Once silenced, the buzzer will only be activated when a new alarm or fail occurs.

6.1.5 External sounder silence key:

Once detected a fire alarm, the sounder will be activated. It is possible to silence the sounder pressing this key, or reactivate it by pressing again the key. Even when there is not any alarm, it is possible to activate the sounder manually.

> **Note**: Action only available with level 2 access (after the input of the access code or key).

6.1.6 Reset key:

Even when the conditions that had conduced an alarm disappear, the FIREWALL remains in that state until the reset key is pressed. This action is not needed with fail conditions because once they disappear the FIREWALL will leave that state.

> *Note: Action only available with level 2 access (after the input of the access code or key).*

6.1.7 Delay Mode key:

This key allows to activate/deactivate the Delay Mode. In this operating mode, a (configurable) delay time is considered between the detection and the indication (through auxiliary outputs, sounders, relays). This delay allows the user to verify if it is or not a false alarm, and act conveniently.

It is also possible to use this key when occurring the delay count-down to force the alarm immediately.

> *Note: Action only available with level 2 access (after the input of access code or key).*

6.1.8 General Alarm indication LED:

This red LED indicates a fire alarm. It is permanently ON during a fire alarm, and blinking during delay countdown (in Delay Mode).

6.1.9 Main-power indication LED:

The presence or absence of main-power is indicated by this green LED. It is permanently ON when main-power is present and blinking when a problem is detected.

6.1.10 24VDC fuse indication fail:

The 24VDC outputs are fuse protected. When the maximum specifications are not respected, the fuse opens the circuit and the yellow LED will indicate it.

6.1.11 Earth circuit fail indication:

The FIREWALL is capable of detecting earth leakage currents from 1mA. When it occurs the yellow LED indicates it.

6.1.12 Battery presence indication LED:

When the secondary power-supply (battery) is not present, the yellow LED will indicate such fail.

6.1.13 Battery charging indication LED:

When the battery (secondary power-supply) is not fully loaded, the yellow LED will indicate that the battery is charging, until it is fully loaded.

6.1.14 General Fail indication LED:

Every time a fail occurs, this LED will be ON.

6.1.15 Sounder fail indication LED:

The output for external sounder is monitored to detect fails. When a short-circuit occurs, the LED blinks fast, and when an open-circuit is detected, the LED blinks slowly.

6.1.16 Sounder fuse fail indication LED:

When the maximum specifications for sounders output is not respected (500mA), the fuse opens the circuit to prevent damages. When this happens the yellow LED indicates it.

6.1.17 Disabled indication LED:

When any functionality of the FIREWALL is deactivated (a zone, for example) this LED indicates it.

6.1.18 System fail indication LED:

The FIREWALL has a microcontroller that controls all the system. When it fails, it will be indicated through this yellow LED.

6.1.19 Access level indication LED:

This LED remains ON while the FIREWALL is in level 1, blinks fast when someone is entering access code and blinks slowly when in level 2.

> *Note: After entering level 2, if nobody presses any key for 1 minute, the FIREWALL goes back automatically to level 1.*

6.2 Fire Alarm Panel Control:

It is possible to change several functionalities using the front panel keys. While some functions are directly available, others are only accessible by entering an access code or turning ON an access key. These two access levels are called level 1 and level 2.

6.2.1 Introducing access code to level 2:

1. Press *Buzzer* key for 2 seconds (approx.).
2. *Keyboard* LED starts blinking fast, indicating that the control unit is waiting for the input of the access code.
3. Enter the access code. The default code is ***Buzzer, Sounder, Sounder, Buzzer***. The user has 7 seconds between keys to enter the code. If this condition is not satisfied, a beep will be emitted and the user has to start from step 1.
4. Press *Z1* key to validate the entered code.
5. If the entered code is correct, a double beep will be emitted and the *Keyboard* LED will start blinking slowly. If the entered code is not correct, the *Keyboard* LED will be permanently ON indicating level 1.
6. To leave level 2, press *Buzzer* key for more than 2 seconds (approx.). Otherwise, if no key is pressed within 1 minute, the control unit will enter level 1 automatically.

> *Note: The default access code is Buzzer, Sounder, Sounder, Buzzer. To change the default access code to a new one please proceed as described in point 7.1.1. After step 1, and until the entered code is accepted or rejected, the internal buzzer is automatically muted.*

6.2.2 Activating/deactivating zones:

1. Enter the access code.
2. Press the zone key to activate/deactivate it.
3. Fail indication LED of each zone will be ON when the zone is not active and OFF when the zone is active or in steady-state.

6.2.3 *Sounder silencing:*

1. Enter the access code.
2. Press the *Sounder* key to silence the sounder and press it again to reactivate it.
3. *Sounder* key has a LED that blinks fast when the sounder is muted and remains ON when the sounder is active.

6.2.4 *Reset:*

1. Enter the access code.
2. Press *Reset* key to reset the fire alarm panel.

> *Note: Zone circuits are supplied and monitored only 30 seconds after fire alarm panel reset.*

6.2.5 *Activating/deactivating 'Delay Mode':*

1. Enter the access code.
2. Press Delay Mode key to activate/deactivate 'Delay Mode'.

7 - Configuration:

To enter configuration mode it is necessary to remove the frontal and switch the position of the jumper *JP1* to ON position.

> *Note: This actions should only be performed by specialized technicians.*

The control unit will reset and enter configuration mode. Main alarm LED and main fail LED will blink slowly.
The available configurations are grouped and the selected group in each moment is indicated through LEDs associated to keys *Buzzer, Sounder, Reset* and *Delay Mode*.
It is possible change the selected group using *Buzzer* (forward) and *Sounder* (backward) keys.
To select a group press *Delay Mode* key (enter) and to leave a group press *Reset* key (cancel).
Whenever a group is selected, LEDs of keys *Buzzer*, *Sounder*, *Reset* and *Delay Mode* blink fast, and stay ON when the group is not selected.
A double beep is emitted to signal a successful operation, and a single beep otherwise

7.1 General:

These general configurations allow to change the access code and to reset all parameters to the default ones.

> *Note: Resetting the parameters to the default values will also set the access code to the default one (Buzzer, Sounder, Sounder, Buzzer).*

Figure 11: General group selected.

7.1.1 Change access code:

1. Press *Z1* key.
2. A double beep is emitted.
3. Enter new code using any combination of keys **Buzzer, Sounder, Reset** and *Delay Mode*. Code maximum length: 9 keys; if exceeded the extra keys will be rejected and an error beep will be emitted.
4. Press *Z1* key to confirm and *Z2* key to cancel.
5. A double beep will be emitted in case of a successful operation and a single beep otherwise, backing to the previous state.
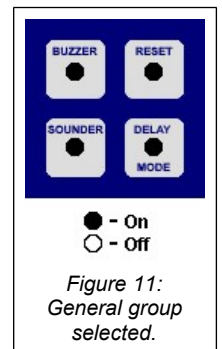
7.1.2 Replace original parameters:

1. Press *Z2* key.
2. The parameters will be replaced to the default ones (Table 2) and a double beep will be emitted, backing to the previous state.

Relay 1	Signals general alarm.
Relay 2	Signals all faults.
Delay Mode	Active, 30 seconds
Intelligent zones	All
Automatic zones	None
Auxiliary outputs	All signal fire alarm at corresponding zone
Access code	Buzzer, Sounder, Sounder, Buzzer
Maintenance	Disabled

Table 2: Original parameters

7.2 Delay mode:

The delay of a fire alarm, used in Delay Mode, is configurable and can be set to: 0s, 15s, 30s, 1min, 2min, 3min.
1. Press **Buzzer** and **Sounder** keys to increase and decrease the delay time.
2. The delay is associated to LEDs: *Main power*, *24VDC Fuse*, *Earth*, *Battery* and *Battery state*. A delay of 0s corresponds to all LEDs OFF and the maximum delay time corresponds to all LEDs ON.
3. Press **Delay Mode** key to accept and *Reset* key to cancel.
4. A double beep will be emitted in case of a successful operation, and a single beep otherwise, backing to the previous state.

Figure 12: Delay mode group selected.
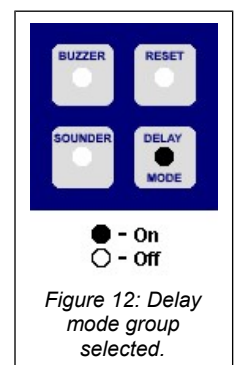
7.3 Intelligent and automatic zones:

1. The zone keys (**Z1, Z2, ...**) allow to change between modes (intelligent and automatic). When a zone is in intelligent mode, the corresponding fail LED remains ON, when it is in automatic mode the alarm LED turns ON. When the mode is changed, the corresponding LED blinks until user confirmation.
2. Press *Delay Mode* key to accept and *Reset* key to cancel.
3. A double beep will be emitted in case of a successful operation, and a single beep otherwise, backing to the previous state.
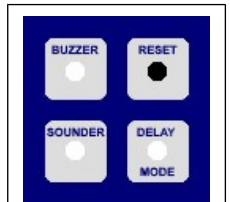
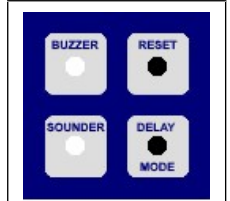*Figure 13: Zones group selected.*

7.4 Auxiliary outputs:

Auxiliary outputs can signal fails, alarms or both for corresponding zone. They can also be deactivated.
1. Zone keys (*Z1*, *Z2*, ...) allow to change between modes:

Alarm LED	Fail LED	Mode
Off	Off	Auxiliary output deactivated.
Off	On	Auxiliary output indicates failure at the zone.
On	Off	Auxiliary output indicates alarm at the zone.
On	On	Auxiliary output indicates both failure and alarm at the zone.

Table 3: Auxiliary outputs modes

2. Press *Delay Mode* key to accept and *Reset* key to cancel.
3. A double beep will be emitted in case of a successful operation, and a single beep otherwise, backing to the previous state.


*Figure 14: Auxiliary outputs group selected.*

7.5 Relays:

The available relays can be configured to actuate under any combination of fails and/or alarms.
1. Press **Buzzer** and **Sounder** keys to select a failure or an alarm indicated in the front panel.
2. Press **Z1** key to associate/disassociate the failure or alarm to relay. The failures and alarms previously configured are indicated maintaining the corresponding LED ON. For the selected failures and alarms but not yet confirmed, the LEDs that signal them blink slowly.
3. To configure the relay in sounder repetition mode (mutable), press the **Buzzer** or **Sounder** key to navigate to the *Sounder* LED and press **Z2** key. (**NOTE**: All the other failures and alarms related to the relay must be removed for this mode to work properly, or else the relay will be synchronized with those. By default, the *General Alarm* is selected and must be removed).
4. Press *Delay Mode* key to accept or *Reset* key to cancel.
5. A double beep will be emitted in case of a successful operation, and a single beep otherwise, backing to the previous state.
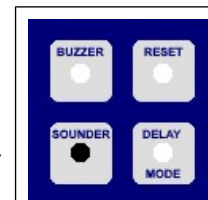

Figure 15: Relay 1 group selected.
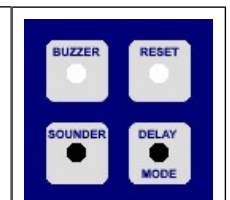
Figure 16: Relay 2 group selected.

7.6 Test mode:

The FIREWALL has a test mode with the ability to reset after the occurrence of an alarm. To enter the test mode, follow the next procedure:
1. Press the Buzzer and Siren keys to increase or decrease the alarm time, before perform the automatic reset. It can be configured with the values of 1s, 5s, 10s, 15s, 30s and 1min.
2. The selected delay is represented by the LEDs **Main power**, **24VDC Fuse**, **Earth**, **Battery** and **Battery state**. A delay of 1s is represented by all LEDs off and the maximum delay by all LEDs on.
3. Use the **Delay mode** key to confirm and the **Reset Key** to cancel.
4. A double beep will be emitted in case of a successful operation, and a single beep otherwise, backing to the previous state.
5. The FIREWALL will enter test mode and the General alarm LED will remain blinking. In this mode, it will work normally but will reset in case of an alarm after the configured delay.
6. Press the **Reset** key to leave the test mode and return to the configuration menu.
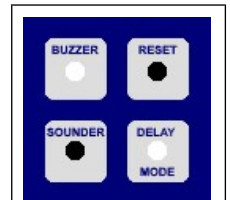
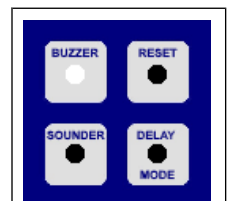*Figure 17: Test mode group selected.*

> *Note: This feature is available since version **FW 3.20**.*

7.7 Thresholds configuration:

Detection thresholds can be configured to work with termination resistors values between 1000Ω and 8000Ω. To configure the thresholds follow this procedure:
1. Press the Zone keys (**Z1, Z2, Z3, …**) according to the zone you want to configure. It is possible to configure multiple zones at the same time by pressing multiple keys.. The zone's fault LED will turn on if the zone is selected;
2. Press the **Delay Mode** key to begin configuring the selected zones. The fault LED of each zone should be blinking;
3. The **Battery Level** LED will start blinking, indicating that the zone should be in rest mode (with the line termination resistor and all fire detectors and manual callpoints inactive). If the value of a zone is not acceptable by the FIREWALL, then the zone's alarm LED will remain on until it reads a correct value;
4. Press the **Delay Mode** key to move to the next step. A double beep will sound in case of success, or an error beep in case of failure returning to step 3;
5. The **Battery** LED will start blinking, indicating that the zone should be activated using a detector (if more than one zone is being configured, then all of them should be activated before proceeding). If the value of a zone is not acceptable by the FIREWALL, then the zone's alarm LED will remain on until a correct value is read;

Figure 18: Test mode group selected.

6. Press the **Delay Mode** key to move to the next step. A double beep will sound in case of success, or an error beep in case of failure returning to step 5;
7. The **Earth** LED will start blinking, indicating that the zone should be activated using a manual callpoint (if more than one zone is being configured, then all of them should be activated before proceeding). If the value of a zone is not acceptable by the FIREWALL, then the zone's alarm LED will remain on until a correct value is read. If the zones in configuration do not have a callpoint, then this step can be ignored by pressing the **Buzzer** key and jumping to the last step;
8. Press the **Delay Mode** key to move to the next step. A double beep will sound in case of success, or an error beep in case of failure returning to step 7;
9. A double beep will be emitted in case of a successful operation returning to the group selection.
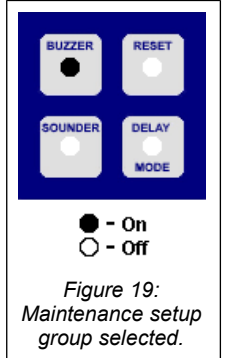
> **Note**: This feature is available since version **FW 3.30**.

7.8 Maintenance setup:

The maintenance warning can be configured with the values disabled, 6 months, 1 year and 2 years.
1. Press **Buzzer** and **Sounder** keys to increase and decrease the maintenance period.
2. The delay is associated to LEDs **Earth**, **Battery** and **Battery state**. All LEDs OFF corresponds to maintenance disabled and the maximum maintenance period corresponds to all LEDs ON.
3. Press **Delay Mode** key to accept and **Reset** key to cancel.
4. A double beep will be emitted in case of a successful operation, and a single beep otherwise, backing to the previous state.

When the period is reached the FIREWALL will enable its sounder and the **Buzzer** LED will blink fast. The timer can be reset by entering test mode (see 7.6) or by setting factory defaults (see 7.1.2).

Figure 19: Maintenance setup group selected.

> **Note**: This feature is available since version **FW 3.30**.

8 - Specifications:

Main power	100 – 240 VAC 50/60Hz 45VA		
Battery	12VDC 7Ah	,or 2x	6VDC [1] 12Ah
Standby current	60mA		
Maximum current	1A		
Peak current	1,3A		
24 VDC auxiliary output	24VDC 500mA		
Fuses	Main power	4A	
	24V	1,6A	
	Sounder	500mA [2]	
Sounder(s) output	24VDC 500mA		
Relay contacts	250VAC 10A		
Zones	24V < 60mA up to 32 conventional detectors, with termination resistance of 3300Ω, 1/4W in parallel (Callpoints with zener diodes of 5V1, 1/4W in series)		
Auxiliary outputs by zones (open-collector)	80VDC 500mA		
Dimensions	Length:	255 mm	
	Height:	360 mm	
	Depth:	93 mm	
	Cable entries:	8 x Ø20mm	

Table 4: Technical specifications

[1] – Recommended for 16 zones models.

[2] – Depending on version, sounder circuit may be protected by a PTC instead of a fuse.