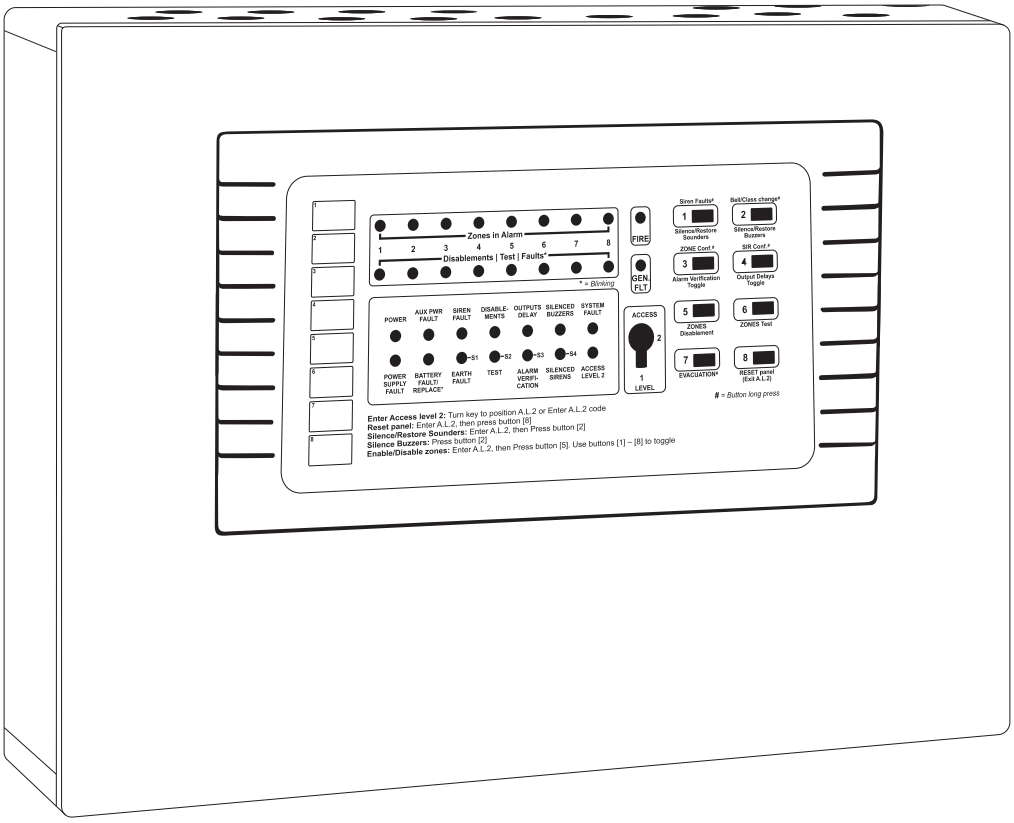
neon



Installation and Operation Manual

Conventional Fire Alarm Control Panel

Version: **1**
Revision: **5**

IMPORTANT INFORMATION

Limitation of liability

It is mandatory for the NEON panel to be installed in accordance with this manual, applicable codes, and the instructions of the Authority Having Jurisdiction. The manufacturer shall not under, any circumstances, be liable for any incidental or consequential damages arising from loss of property, or other damages, or losses owing to the failure of products beyond the cost of repair, or replacement of any defective products. The manufacturer reserves the right to make product improvements and change product specifications at any time.

The manufacturer assumes no responsibility for errors or omissions, whilst every precaution has been taken during the preparation of this manual to ensure the accuracy of its contents.

Warranty

PARADOX HELLAS warrants its products to be free from defect in materials and workmanship under normal use for a period of two (2) years (the “Warranty Period”) from the production-delivery date, identified by date code(s) indicated on the products. Because PARADOX HELLAS does not install or connect the products and because the products may be used in conjunction with products not manufactured by PARADOX HELLAS, PARADOX HELLAS cannot guarantee the performance of the fire alarm system and shall not be responsible in any way whatsoever for faulty installation or connection.

Declaration of Conformity

Fire alarm control panel NEON is certified according to European Regulation **CPR** 305/2011.

-Standards:

EN 54-2: 1997/A1: 2006/AC: 1999
EN 54-4: 1997/A2: 2006/AC: 1999

Certificates can be found online at phsvesis.com.

RoHS directive compliance

The EC RoHS guideline has been released in order to reduce the heavy metal load in electrical and electronic products caused by e.g. lead and mercury. All manufacturers are obligated to provide only RoHS-compliant products to the European market, effective from July 1st, 2006.

PARADOX HELLAS hereby states that the NEON panel is fully compliant with RoHS 2002/95/EC directive.

Disposal of your old appliance

1. When this crossed-out wheeled bin symbol is attached to a product it means the product is covered by the European Directive 2002/96/EC.

2. All electrical and electronic products should be disposed of separately from the municipal waste stream via designated collection facilities appointed by the government or the local authorities.

3. The correct disposal of your old appliance will help prevent potential negative consequences for the environment and human health.

4. For more detailed information about disposal of your old appliance, please contact your city office, waste disposal service or the shop where you purchased the product.

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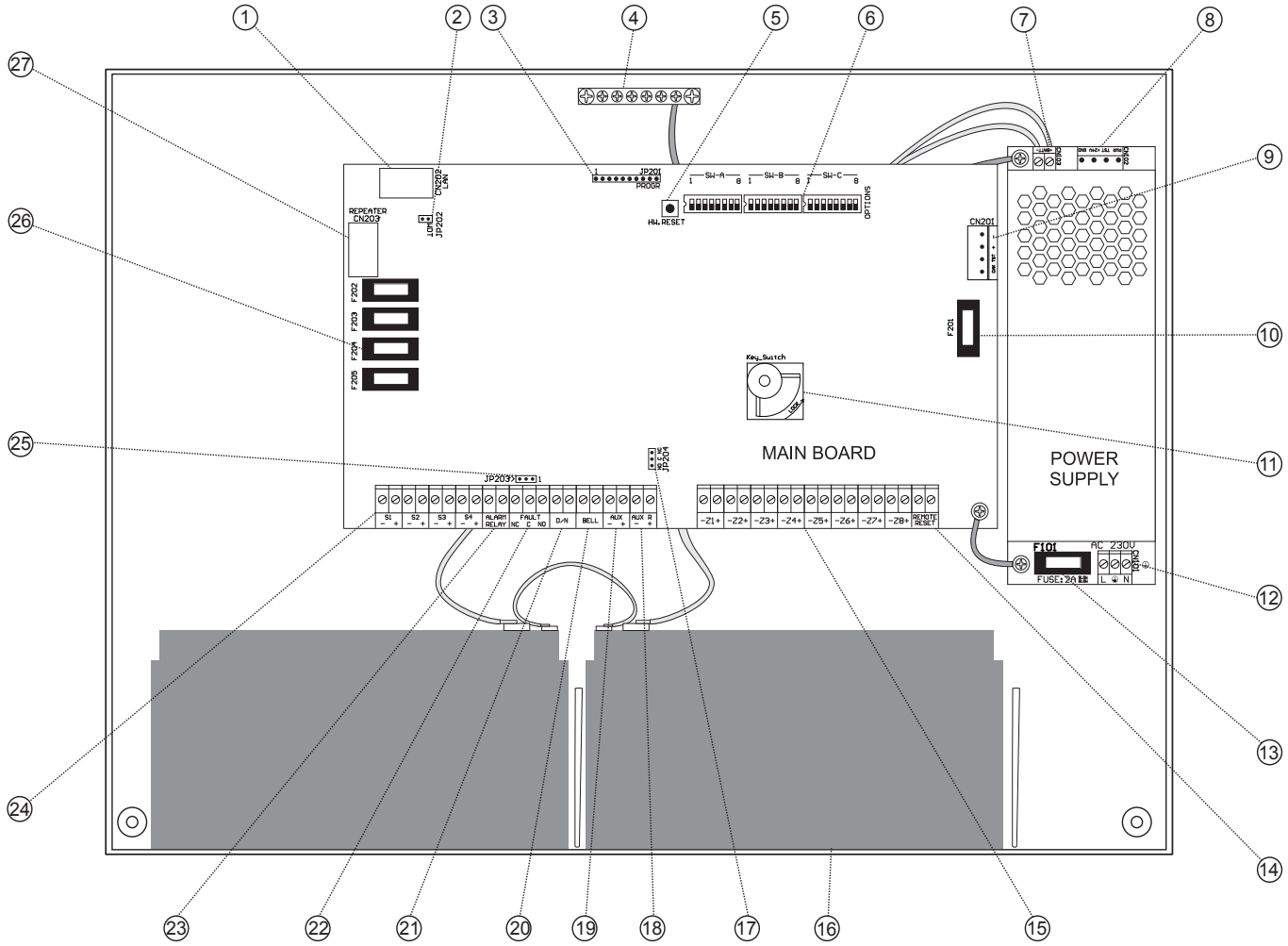
1. Components Description

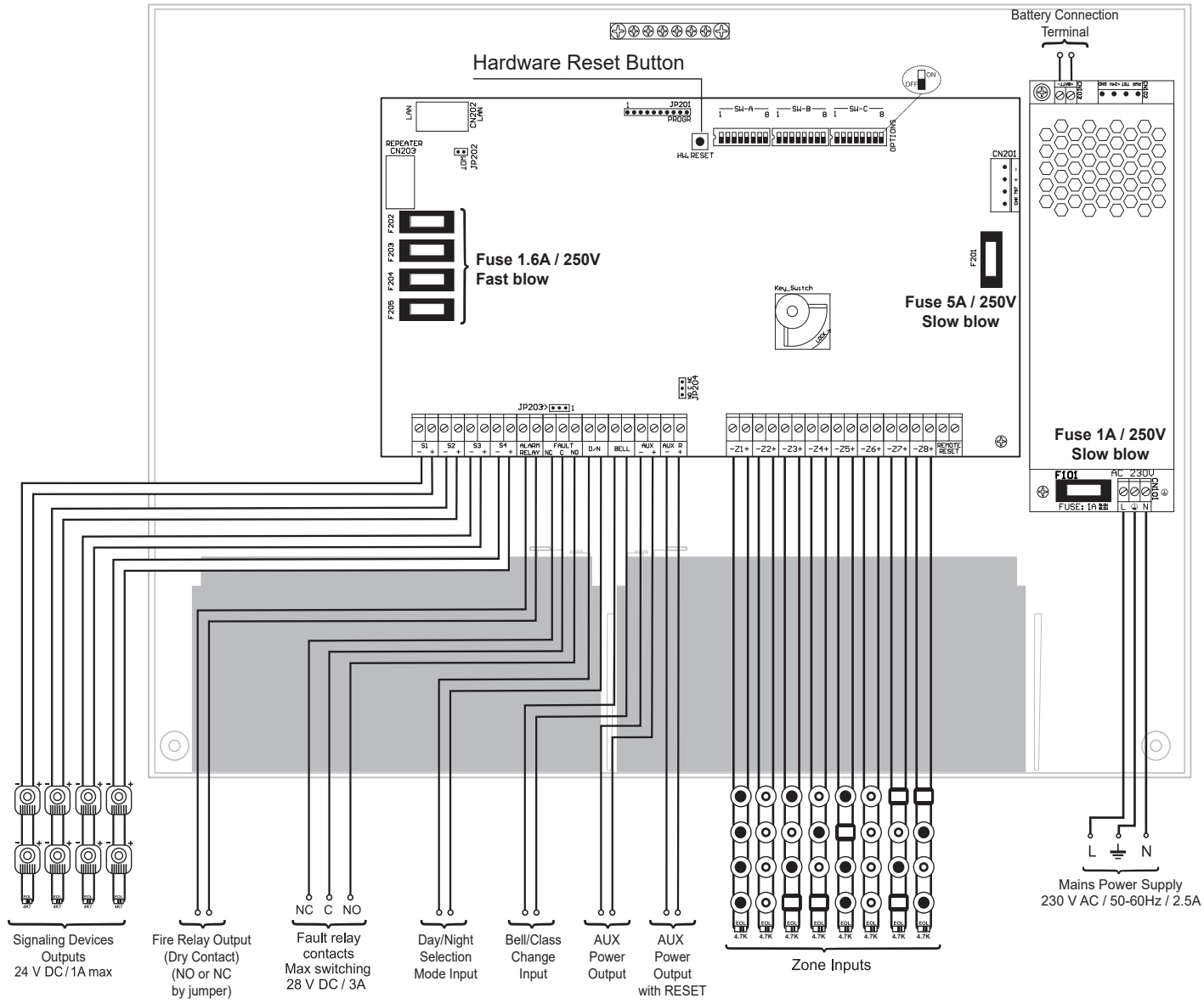
1.1 Neon Panel - Components identification - Cabinet inside view



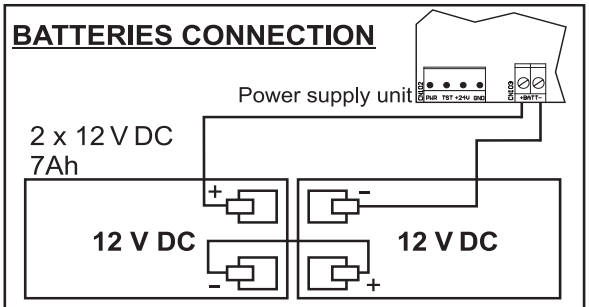
1. **Connector for communication board:** Connects to the TCP/IP module (optional).
2. **WDT (JP202):** Extra Watchdog timer selector (optional).
3. **PROGR (JP201):** Firmware updating connector.
4. **Panel's earth connector bar.**
5. **Hardware reset button.**
6. **Micro-switches** for access Level 3 settings and options (See section 8).
7. **Battery connector (CN103):** Connects to two 12V 7AH batteries in series. See section 7.2.
8. **Power connector (CN102):** Connection from main Power Supply to main board.
9. **Power connector:** Connection to main Power Supply.
10. **Main board fuse (F201):** Main power supply fuse (5 A, slow blow)
11. **Keyswitch** selects the operation of the panel in Access Level 1 or 2.
12. **Mains power connector (CN101):** Mains input for 230 V AC and earth connection.
13. **Mains power supply fuse (F101):** Mains supply is protected by a 1A slow blow fuse.
14. **Remote reset input.**
15. **Zone inputs.**
16. **Batteries:** Secondary/standby power source. See section 9.2.
17. **JP204:** NO/NC dry contacts operated during reset.
18. **'AUX R':** Auxiliary power output interrupted during reset. 24 V DC / 1 A* max for devices that need resetable power. This output is fused.
19. **'AUX':** Auxiliary power output 24 V DC / 1 A* max. This output is fused.
20. **'BELL':** Bell / class change operation input. See section 5.1, key **[4]** (A.L.1).
21. **'D/N':** Day / Night mode external timer input.
22. **Fault output relay:** Dry contacts NO/NC general fault relay. 50 V / 1.5A max (DC or AC).
23. **Alarm output relay:** Dry contact NO or NC fire alarm relay. 50 V / 1.5A max (DC or AC).
24. **S1 to S4:** Monitored siren outputs. 24 V DC / 0.4A** per output
25. **JP203:** Alarm relay contact selector (NO or NC). 50 V / 0.5A max (DC or AC).
26. **Signaling devices output Fuses (F202 to F205):** 1.6 A, fast blow.
27. **Connector to repeater board (CN203).**

**** IMPORTANT: The total current of the auxiliary outputs must not exceed 1 Amp.***
*****The total current of the siren outputs must not exceed 1 Amp.***
The total current of the connected devices must not exceed 1.5 Amp.

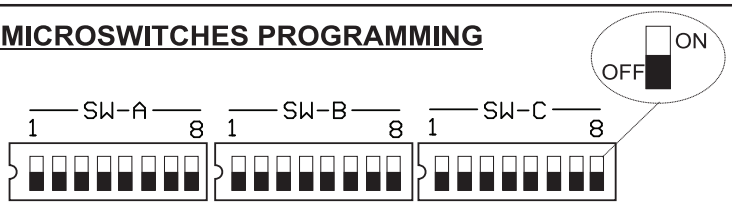
1.2 Neon Panel - Wiring diagram and information



BATTERIES CONNECTION



MICROSWITCHES PROGRAMMING



SW-A

1	Cross zones 1 and 2
2	Cross zones 3 and 4
3	Cross zones 5 and 6
4	Cross zones 7 and 8
5	Relay 2 active only during pre-alarm (Cross or Alarm Verification)
6	Binary value of Alarm Verification delay.
7	0: disabled.
8	Increments of 10 seconds.

SW-B

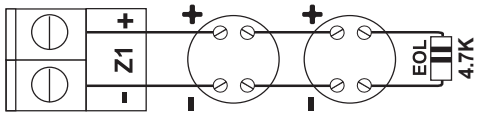
1	
2	
3	The corresponding zone belongs to the Alarm Verification group
4	
5	
6	
7	
8	

SW-C

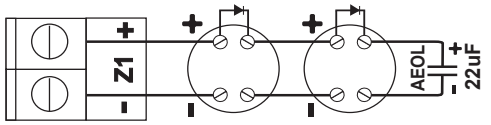
1	Binary value of Output Delay.
2	0: feature disabled.
3	Increments of 1 minute.
4	Output delay is not applicable if alarm event comes from first half zones
5	Output delay also affects relays 1 and 2 (Siren 1 & 2).
6	Siren relay 3 produces ANSI evacuation pattern.
7	Siren relay 4 produces ANSI evacuation pattern.
8	Disable evacuation from A.L.1

DETECTOR CONNECTION DETAIL

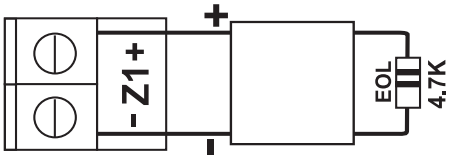
1. End Of Line Device



2. Active End Of Line Device



MANUAL CALL POINT CONNECTION DETAIL



- Signaling device **24 V DC**
- Rate of Rise Heat detector
- Photoelectric detector
- Panic button
- EOL 4.7K — End Of Line Resistor
- AEOL 22uF — Active End Of Line Capacitor

2. Typing conventions and abbreviations

Throughout this manual specific symbols and character types have special meaning. The following list summarizes the typing conventions:

- **[Button]:** A Keypad button that can be pressed.
- ***Indicator*:** A visual indicator that may be lit or not. e.g. *ALARM*.

The following terminology is used:

- **PSU:** Power supply unit
- **A.L.:** Access Level
- **ALM:** Access Level Menu
- **ALM.x.y.z:** Access Level Menu x, sub-item y, sub-item z.
- **EOL:** End Of Line (device).
- **AEOL:** Active End Of Line (device).

For indicators:

- **OFF:** The indicator is disabled.
- **ON:** The indicator is steady ON.
- **BLINKING:** The indicator is alternating between ON and OFF.

3. Installation

3.1 Installation checklist

- Prepare the site: Make sure the installation location is free from construction dust, debris, extreme temperature ranges and humidity.
- Unpack the equipment
- Install the cabinet: See 'Installing the cabinet' below (section 3.2) for cabinet dimensions.
- Install optional components
- Review wire routing.
- Connect the field wiring.

Care should be taken when connecting field wiring. Do not make any connections with main or battery power applied. The cabinet should be connected to a suitable earth point at all times.

- Check for opens, grounds, and shorts before connecting.
- Connect ground then AC power.

WARNING: Ensure that the building's AC circuit breaker is OFF before connecting high voltage wires (230V AC) to the main connector.

- Connect batteries.
- Test for proper operation.

After a system power up, the user must perform an A.L.2 Reset to remove the System fault and enter normal operational mode. This is by design.

3.2 Installing the cabinet

Cabinets can be surface or flush mounted. See Figure 1 and Table 1 for framing and mounting dimensions.

To wall mount the cabinet:

1. Position the cabinet on the finished wall surface.
2. Fasten the cabinet to the wall surface where indicated.

Cabinet dimensions

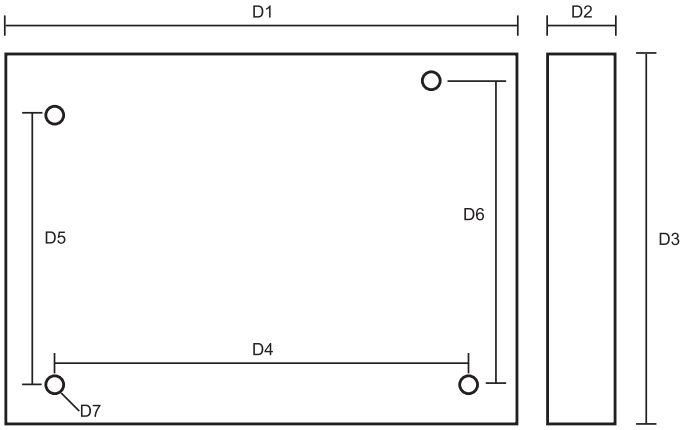


Figure 1. Neon cabinet dimensions

D1	40.5 cm
D2	7,5 cm
D3	29.6 cm
D4	38 cm
D5	22 cm
D6	23.5 cm
D7 [Ø]	0.5 cm

Table 1. Framing and mounting dimensions

4. General Description

The Neon conventional fire alarm control panels have been designed to provide full fire detection coverage to buildings or installations that require fire detection systems of 2 to 8 zones.

There are three (3) basic models for the Neon panel:

Model	Zones	Siren Outputs
Neon 2	2	2
Neon 4	4	4
Neon 8	8	4

Table 2. Neon panel models

Operating Voltage 230V AC / 50-60Hz.

The analytic indications and the simple controls of the Neon panel ensure the easy handling and controlling of the system by the operator.

5. Keyboard Indications and Controls

Operating, monitoring and programming of the panel is performed in three different access levels. In access level 1 only indicative operations are unlocked. Access to level 2 is achieved by the keyswitch on the face of the panel (Figure 2) or the use of the A.L.2 PIN. Operations at access level 2 are performed with the keypad. Access level 3 operations are accomplished with the micro switches on the main circuit board of the panel (see section 8).

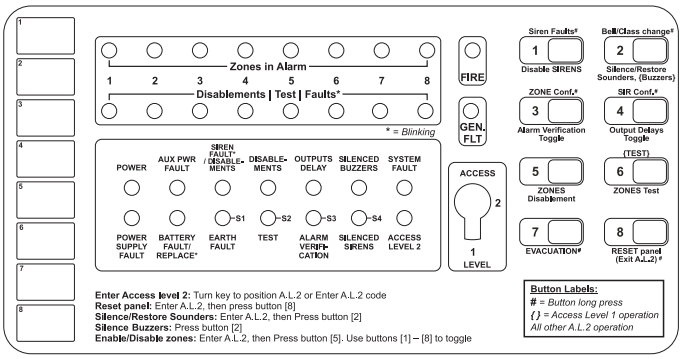


Figure 2. Neon keyboard overview

Naming:
AL1 to AL8 (Zones in Alarm): Alarm indicators ***1*** to ***8***.

FL1 to FL8 (Disablements|Test|Faults): Fault Indicators ***1*** to ***8***.

S1 to S4: Siren relay indicators ***S1*** to ***S4***.

5.1 Access Level 1 Operations

Access Level 1 operations are those that do not require authorization (by entering a pin or using the key). On the mask of the panel the A.L.1 operations are enclosed in {}.

They are mainly informational and aimed toward the installer or advanced user that wants to verify the programming of the panel or to identify faults.

The supported access level 1 operations are performed while the user keeps the required key pressed for more than 2 seconds and for as long as the information is needed.

Below is a list of the implemented functionality:

Key [1]: [Siren Faults] (Long Press)
While key **[1]** is kept pressed the panel uses the 4 LEDs marked ***S1***, ***S2***, ***S3*** and ***S4*** to indicate the Siren Relay outputs that may have a fault. While in this mode, all other indicators are turned off and only the ***SIREN FAULT / DISABLEMENTS*** indicator flashes every half a second.

The panel returns to normal indication when the key is released.

Key [2]: [Silence Buzzers]
When pressed will silence the panel's buzzer. The ***SILENCED BUZZERS*** indicator illuminates.

Any new event will automatically cancel the silence.

If the buzzer has no reason to be active, the silence operation will only momentarily activate the corresponding indicator.

Key [3]: [ZONE Conf.] (Long Press)
Configuration check: Alarm verification, Cross Zoning

While key **[3]** is kept pressed, the indicators corresponding to zone faults (FL1 to FL8) show the configuration of the input zones as below:

- **OFF:** Corresponding zone has no special programming.
- **ON:** Corresponding zone belongs to cross zone pair.
- **BLINKING (0.5 seconds period):** Corresponding zone belongs to Alarm Verification group.

While the panel is in this mode, all other indicators are turned off except for the ***Alarm Verification*** that flashes every second.

Key [4]: [SIR Conf.] (Long Press)
Configuration check: "Output delay" relays (S1-S4), "Delayed from" Zones (F1-F8), Pre-alarm Relay

While key **[4]** is kept pressed the panel shows the configuration related to the 4 Siren (relay) outputs:

- **Fault indicators (FL1-FL8):** Zones that will be delayed if triggered by an alarm are blinking.
- **Siren Indicators (S1 to S4):** Siren outputs that will be delayed are blinking.
- **Siren Indicator 2 (S2):** If allocated to Pre-alarms is ON (steady).

Key [6]: Test
On Normal press or while kept pressed, all the visual indicators along with the panel's buzzer are activated.

Key [7]: [EVACUATION] (Long Press)

This operation may be locked for A.L.1. from SW-C-8

On long press (more than 2 seconds) the panel enters evacuation mode. In this mode all Alarm Outputs are activated according to their configuration.

- All Fire Indicators (AL1 to AL8) that were not already active including the General Alarm are activated (blinking).
- Alarm indicators that were already in Alarm, keep a steady **ON** indication.
- Any new alarm event detected by a zone, changes the corresponding zone indication to steady **ON**.
- The Silence operations will not affect the system.
- All alarm outputs will be activated
- The evacuation requires an Access Level 2 reset to be canceled.

5.2 Access Level 2 Operations

To enter Access Level 2:

- **Key method:** Turn key counter-clockwise to horizontal position.
- **PIN method:** Press keys to enter AL.2 PIN: "1357".

The ***Access Level 2*** indicator illuminates.

If the PIN method is used, the panel will cancel the A.L.2 state if the keys are idle (not pressed) for 30 seconds.

In Access level 2:

Key [1]: Disable SIRENS
The use of this button will cause the disablement of all four siren outputs (S1 to S4). Successive presses will toggle the disablement ON and OFF. While disabled:

- There is no way that the system or the user will activate any of the siren outputs.
- Any already activated output(s) will be deactivated.
- Any faults on S1 to S4 will be ignored and/or suppressed.
- The ***Siren Fault / Disablements*** and the ***Disablements*** indicators will be activated (steady ON).

Key [2]: Silence / Restore Sounders
Bell / Class change (Long Press)

Silence / Restore Sounders
The initial press will silence any active sounder output devices and the panel's buzzer. The ***SILENCED SIRENS*** and the ***SILENCED BUZZERS*** indicators illuminate.

A second press will remove any previously applied silence. The ***SILENCED SIRENS*** and the ***SILENCED BUZZERS*** indicators turn off.

The affected outputs are Siren Relays 1 to 4 regardless of

configuration. The Fire relay is not affected.

Any new alarm event will automatically cancel the silence.

If no sounders are active, the silence operation will only momentarily activate the corresponding indicator.

Bell / Class change (Long Press)
While key **[2]** is kept pressed, the Sounders normally used for Fire Alarms, are activated with a constant pattern. This is typically used in schools to sound a class change.

Siren 2 output will not be used if allocated to the pre-alarm function.

While the panel is in this mode, all indicators are turned off and only the activated relay indicators (S1 to S4) are blinking every 0.25 seconds.

The panel returns to normal indication when the key is released.

Key [3]: Alarm Verification Toggle

Only useful if the installation uses the Alarm Verification functionality.

The Alarm Verification operation may be disabled and re-enabled with successive presses of key **[3]** (see section 5.3.9 for indication).

The user may verify which zones (if any) belong to the alarm verification group by pressing and holding key [3]. While this key is kept pressed the *ALARM VERIFICATION* indicator flashes at a slow rate while blinking disablement indicators show the group members (see section 5, Alarm Verification).

Key [4]: Output Delays Toggle

Only useful if the installation uses the "Output Delays" feature.

The Output Delays operation may be disabled or re-enabled with successive presses of key **[4]** (see section 5.3.8 for indication).

Key [5]: ZONES Disablement
Used to selectively place zones in disabled mode. A disabled zone is fully ignored by the system in both faults and alarms.

How to operate:
1. Press Key **[5]: *DISABLEMENTS*** indicator starts blinking: the panel is in zone selection mode.
2. Use keys **[1]** to **[8]** to toggle the disablement of the corresponding zone.
3. The ***Disablements | Test | Faults*** indicators show any zones that are disabled ("steady on" state).

Panels with 2 or 4 zones will ignore the keys with no corresponding zone.

Zone selection mode will be cancelled after 10 seconds of user inactivity.

Disabling a zone in alarm will cancel the alarm state but will not reset any automatic detectors that may have caused/ latched the alarm.

Key [6]: ZONES test
Used to place zones in the "Test" state. It is used for testing the panel as well as any automatic detectors attached to the zone of interest.

Any alarm condition detected from a zone in test will cause the panel's buzzer and the local Sirens (relays 1 to 4) to be activated for 3 seconds. After the 3 second activation the panel performs a zone reset (useful for automatic detectors).

Any zone in this state is considered disabled and is so indicated.

If any zone is in test mode, the ***TEST*** indicator is illuminated.

Key [7]: EVACUATION (Long Press)

This operation requires Access level 2 if SW-C-8 is set (see section 8.3 key [7], above).

Key [8]: RESET panel
Exit A.L.2 (Long Press)
The reset operation will:
- Remove power from the zone circuits for 3 seconds, resetting all automatic detectors.
- Restore all Outputs to their idle state.
- Cancel any pending pre-alarms.
- Cancel all Alarm Verification timers (if active and running).
- Cancel all faults including the startup System Fault.

"Remote Reset" Hardware input.
The remote reset input, if used, is connected to a momentarily activating push-button (shorted while kept pressed). This will cause the panel to do an Access Level 2 reset operation.

5.3 Indications

5.3.1 POWER Indication
The ***POWER*** indication is permanently ON if the main power is present and batteries are healthy. This condition signifies normal system operation.

POWER indicator OFF signifies a total power failure of the system. This can be due to a number of reasons. Some of them are:

- Main power failure for an extended period of time during which the batteries have been depleted.
- Blown main board fuse (see section 1.1).
- Other malfunction of the power supply, main board disconnected from PSU (power supply unit) etc.

Blinking power indicator signifies one of the following:

(a) Removal or power loss of the batteries.
(b) Main power loss.[1]
(c) Blown main power fuse or PSU fuse (see section 1.1).
In the above cases the on board buzzer sounds continuously.

[1] ***The *POWER SUPPLY FAULT* indicator turns ON.***

5.3.2 AUX POWER Fault Indication
When active, this indicator signifies that an overcurrent condition at the auxiliary power outputs (section 1.1, items 18 & 19) is detected. The maximum allowed total current for the two auxiliary outputs is 1 Amp. The panel is capable of continuous operation even with a full short circuit at these outputs. Please note that a short on any one of the two outputs will disable both as well as any device powered from them.

If more than 1 Amp is required, a compatible EN 54-4 approved fire alarm power supply must be used. When such a power supply is used, the negative output of the external power supply must be connected to the negative terminal of the AUX terminal (-AUX).

IMPORTANT: The total current of the auxiliary outputs plus the siren outputs must not exceed 1.5 Amp.

5.3.3 Battery Fault / Replace Indication

The Neon panel uses a battery fault detection system that will generate a battery fault indication in the following cases:

- Battery missing: Indicator steady **ON**.
- Battery wiring open circuit: Indicator steady **ON**.
- Battery not able to charge (low voltage): Indicator steady **ON**.
- Battery wear (increased internal resistance of batteries): Indicator **BLINKING**.

  This indication means that a battery replacement is in order.

When the battery power is the only available source the supplied voltage is constantly checked. In the case that this voltage drops bellow the 21.7 V DC ±5% the panel enters a fault state with all zone fault indications activated. At the same time the power to the zone circuits is removed. This state is automatically reset once the mains power is restored.

This mechanism ensures that the low voltage from depleted batteries will prevent the zone detection circuits from giving false alarms.

5.3.4 SIREN Faults / Disablements Indication

Siren Faults (blinking)

When active (blinking), this indicator signifies a fault condition on one of the signaling devices outputs. The fault can be one of the following:

- Short circuit of the two output wires.
- Open circuit in the connecting cable between the block connector and the signalling device. The signalling device must be terminated with a 4.7K Ohm resistor (EOL).
- Blown fuses that protect the system from shorts while the signalling devices are in operation (Fuses F202 to F205 1.6A, item 26, page 4).

To identify the particular output (there are 4 siren outputs) keep key [1] pressed for more than 2 seconds. Indicators S1 to S4 will illuminate if the corresponding output is in Fault (see section 5.1).

Siren Disablements

When active (steady ON), this indicator signifies that the four siren outputs S1 to S4 have been disabled with an A.L.2 operation.

5.3.5 EARTH Fault Indication

When active (steady ON), this indicator signifies a short circuit between the panel's wiring (zones, relays, outputs etc.) and the building's earth.

The signaling device output wires are also monitored for the earth short condition.

5.3.6 Disablements Indication

The ***Disablements*** indicator is activated when:

- In access level 1 when any zone is disabled or in test mode (steady ON).
- In access level 2, in zone selection mode for disablement (blinking).
- When the sirens are disabled (steady ON)

5.3.7 Test Indication

The ***TEST*** indicator is activated when:

- In access level 1, at least one zone is in testing mode ("steady on").
- In access level 2, the system is in test selection zone mode (blinking).

5.3.8 Outputs Delay Indication

The meaning of this indication is as below:

- **OFF:** No delays to outputs are active or programmed.
- **ON:** The system has programmed and active delays to outputs.
- **BLINKING:** The system has programmed delays to outputs but they are currently disabled with an Access Level 2 operation.

See also Long Press of key **[4]**.

5.3.9 Alarm Verification Indication

The meaning of this indication is as below:

- **OFF:** No alarm verification is active or programmed.
- **ON (steady):** The system has programmed and active alarm verification.
- **BLINKING:** The system has programmed alarm verification but it is currently disabled with an Access Level 2 operation.

See also Long Press of key **[3]** section 5.2.

5.3.10 Silenced Buzzers Indication

This indicator is active when the user has silenced the panel's buzzer (with an Access Level 2 operation).

See A.L.2 key **[2]**.

5.3.11 Silenced Sirens Indication

This indicator is active (steady ON) when the user has silenced the relay siren outputs (with an Access Level 2 operation).

See A.L.2 key **[1]**.

5.3.12 System Fault indication

The system fault is active (steady ON) in one of the following cases:

- After a system startup from power down
- After a watchdog reset
- If the microprocessor is not able to operate and execute code.

After a system power up, the user must perform an A.L.2 Reset to remove the System fault and enter normal operational mode. This is by design.

5.3.13 Access Level 2 Indication

The indicator is active (steady ON) when the user has entered Access Level 2. The Access level may be elevated either by the use of the standard key or the A.L.2 Pin ("1357").

5.3.14 General Fire Alarm Indication

When the system detects a condition of fire (smoke, high temperature etc), the panel goes into Alarm Mode and the General Fire Alarm indication ***FIRE*** turns **ON** (blinking). At the same time the fire relay is activated and all siren outputs are used according to the programming (delayed or immediate). The on-board sounder is also activated producing a continuous audible alarm sound.

5.3.15 Zone ALARM indications

Zones in ALARM indicators AL1 to AL8 activate every time a detector or a manual call point from the corresponding zone is triggered.

All indications will remain **ON** (steady ON) until the system **[RESET]** button is pressed.

Activated AL1 to AL8 indicators without the General Alarm Indicator signifies a pre-alarm condition from the corresponding zones.

5.3.16 General Fault indication (General Fault)

GENERAL FAULT, indicates a problem in the system. It turns **ON** (steady ON) in case of:

- Zone wiring connection problems,
- Signalling devices output wiring problems
- Relay outputs wiring problems.
- Auxiliary and power faults
- Earth fault condition

The above mentioned problems could be open circuits, shorts between wires or shorts between wires and earth.

Consequently the Fault relay output is activated (Item 22, page 4). At the same time there will be a continuous audible notification from the on board Buzzer.

It is possible to silence the Buzzer by pressing the **SILENCE BUZZERS** key **[2]**, with the keyswitch in A.L.1 position.

When the problems causing the fault(s) are restored all the above indications will turn off automatically.

	Short		Normal		Open	
	Min	Max	Min	Max	Min	Max
Signaling devices	0	400	1.6K	7K	10K	∞
Zone	0	15	1.5K	7K	10K	∞

Table 4. Fault detection values (Ohm)

Zones also recognize the range of 40 to 1200 Ohms as alarm.

5.3.17 Zone Disablements, Test, Fault indications

These indicators, referenced as FL1 to FL8, show that the corresponding zone is:

- In “zone open” Fault if blinking at 1 sec interval
- In “Zone Shorted“ fault if blinking at 0.5 sec interval.
- Disabled by an A.L.2 operation, if continuously ON with the ***DISABLEMENTS*** indicator also active (steady ON).
- In test (and thus disabled), if continuously ON with ***TEST*** indicator also active (steady ON).

Zone faults

Possible causes of a zone fault indication are:

(a1) Disconnection or interruption of wiring of the zone.
(a2) Short-circuit in the wiring of the zone.
(a3) Removal of sensor from its base.
(a4) Removal of the terminating resistor or capacitor (EOL).

See also section 10.3.

Watchdog System

The Neon panel contains a watchdog circuit that will activate when the microprocessor is either faulty or unable to execute the programmed firmware. Upon detection, the Fault relay, the on board sounder and the system and general fault indicators on the user interface are all activated.

6. Alarm Verification

(also called Intellizone in this manual)

6.1 System Overview - Alarm Verification

The purpose of the Alarm Verification feature is to minimize false alarms. The concept of alarm verification is to have the system receive a Second Alarm signal from the same or another zone within a predefined time after the First Alarm signal. Only then will the General Alarm condition be activated. To prevent the First Alarm signal from causing a General Alarm, it must originate from an intellizone.

Please note that the terms Alarm Verification and intellizone are treated as synonymous in the following sections.

6.2 System Operation - Alarm Verification

Each zone may be programmed to be an “Intellizone” (from microswitch SW-B). The sum of the intellizones form the intellizone group.

The operation of the intellizone system is as follows:

When an alarm condition is detected on an intellizone (First Alarm):

- The **“Intellizone Delay”** is activated (can be set from SW-A 6,7,8).
- The “Automatic Alarm Cancel Delay” (5 minutes) timer is activated.
- The pre-alarm is indicated on the corresponding Alarm Indicator (AL1-AL8). The General Alarm Indicator is not activated.
- The system buzzer produces a notification sound.
- The Main Siren relays are NOT activated (General Alarm condition is not established).
- The Siren 2 relay, if configured so by SW-A-5, is activated.
- After the “Intellizone Delay” time, the automatic detectors are reset.
- During the “Intellizone Delay” any other zone (NOT only intellizones) except the initial may provide the Second Alarm signal (see below).
- The intellizone pre-alarm will remain active for the remainder of the 5 minutes before the initial alarm is completely canceled.

During the above delay (Automatic Alarm Cancel Delay) any zone (not only intellizones), including the initially triggered intellizone may provide the Second Alarm.

The Second Alarm will:

- Activate the General Alarm Condition.
- Activate the alarm siren relays.
- De-activate the Siren 2 relay, if configured for pre-alarms by SW-A-5.

The Intellizone feature may be disabled/re-enabled from Access Level 2, Key **[3]** “Alarm verification toggle”. The system status is indicated accordingly with the “Alarm Verification” as below:

- **OFF:** No Alarm verification programmed.
- **ON:** Alarm verification active for selected zones.
- **BLINKING:** Alarm verification is programmed but not active at the moment, either due to Day/Night or manual disablement.

6.3 Day/Night hardware input

The disablement of the Alarm Verification system, can also be controlled by the “Day/Night input” hardware input. If left unused (nothing connected to the input) the system will use Alarm Verification, unless the user has disabled it.

If connected to a switch (for example to a periodic timer), when the contacts are closed (shorted together) the Alarm Verification is disabled. The panel will indicate the disabled condition by blinking the ***ALARM VERIFICATION*** indicator.

This input may also be used with a manual external switch, to provide an easier operation of the “Alarm Verification Disable/enable” functionality.

6.4 System Setup - Zone connections - Intellizone

The system should have one or more zones connected to automatic detectors. Manual call formats may also be connected to intellizones but the alarm signal will be delayed by the Intellizone Delay time.

6.5 System Setup - Zone assignment - Intellizone

To assign zones to the intellizone group set the required corresponding microswitches on SW-B to ON (top position).

Zones assigned to cross-zoning cannot be assigned to the intellizone group. If both micro-switches are set, the cross zone configuration takes precedence.

6.6 System Setup - Intellizone time delay

The Intellizone Delay can be set from the three microswitches SW-A-6,7,8. The three switches form a binary value from 0 to 7. Each unit corresponds to 10 seconds.

The table below summarizes the settings:

SW-A-6	SW-A-7	SW-A-8	Alarm Verification
OFF	**OFF**	**OFF**	**No Alarm Verification**
ON	OFF	OFF	10 sec
OFF	ON	OFF	20 sec
ON	ON	OFF	30 sec
OFF	OFF	ON	40 sec
ON	OFF	ON	50 sec
OFF	ON	ON	60 sec
ON	ON	ON	70 sec

Table 5. Alarm Verification time set

IMPORTANT: To configure an EN54-2 compliant installation, do not exceed 30 seconds of Intellizone delay time.

7. Outputs delay operation

The Neon panel implements the “Output delays” feature as defined in the EN54-2 standards.

“Output delays” refers to the process of delaying the activation of an alarming output, after the system enters the general fire alarm state.

Indications

The ***OUTPUTS DELAY*** indicator shows the status of the system as below:

- **OFF:** No output delays have been programmed.
- **ON:** Output delays are in effect for selected outputs (once an alarm occurs).
- **BLINKING:** Output delays have been programmed but are currently disabled due to user operation.

7.1 Operation Overview and operation

The system consists of the following:

- A group of zones that, when trigger an Alarm event, will activate some Siren outputs with delay (called “Delayed Zones”).
- A group of zones that, when trigger an Alarm event, will activate all Siren outputs without delay (called “Immediate Zones”)
- A group of outputs (relays) that will always activate without delay (called “Immediate Outputs”)
- A group of outputs (relays) that will activate with delay if the Alarm is triggered by a “Delayed zone”(called “Delayed Outputs).

Additionally, there is a predefined delay in access level 3 (dip switches SW-C-1,2,3) called “Output Delay”.

7.2 System behavior

The term “Delayed Zone” is only meaningful in the context of Delayed outputs. Even “Delayed Zones”, will activate the General Fire Alarm without delay.

The following list describes the behavior of the output delay system:

- As soon as an alarm event is triggered by an “Immediate Zone” all Siren output relays are activated immediately.
- As soon as an alarm event is triggered by a “Delayed Zone”:
  - The timer of the output delays is started with “Output Delay” time.
  - Siren output relays not in the “Delayed Outputs” group are activated immediately.
  - Siren output relays in the “Delayed Outputs” group are activated after the “Output Delay” time has passed.

7.3 System setup - Dip switches - Delay and Zone allocation

The dip switches SW-C-(1 to 5) define the operation and options of the output delays as follows:

SW-C-1,2,3: This is the binary value of the output delay. An output delay of 0 means that no outputs are delayed. In this case the rest of the switches are ignored. Delay time other than 0 activates the output delays. Values are shown below:

SW-C-1	SW-C-2	SW-C-3	Output Delays
OFF	**OFF**	**OFF**	**No Output Delay**
ON	OFF	OFF	1 min
OFF	ON	OFF	2 min
ON	ON	OFF	3 min
OFF	OFF	ON	4 min
ON	OFF	ON	5 min
OFF	ON	ON	6 min
ON	ON	ON	7 min

Table 6. Outputs delay time set

SW-C-4: Delayed Zone selection
This option defines if all or half of the available zones are used as “Delayed Zones”.

0: All available zones are “Delayed Zones”
1: The first half zones are “Immediate Zones”

SW-C-5: Delayed Outputs selection
The setting of this switch defines the Output relays that form the “Delayed Outputs” group.

0: Only outputs 3 and 4 (Siren3 and Siren4) are “Delayed Outputs”.
1: All 4 Siren relays are “Delayed Outputs”.

If Relay Output 2 is allocated to the pre-alarm feature, it is not affected by the above operation.

8. Access Level 3 - Panel Configuration

Settings in Access Level 3 can be performed via the micro switches on the main board. This procedure must be performed only by the installation engineer. On the main

board of the panel there are three (3) sets of micro switches modules SW-A to SW-C. Every module consists of 8 micro switches No.1 to No.8 as shown on Figure 3. Their position during hardware reset define the effective configuration. Hardware reset is performed either during power up or after pressing the button labeled SW-RESET on the PCB (see section 1).

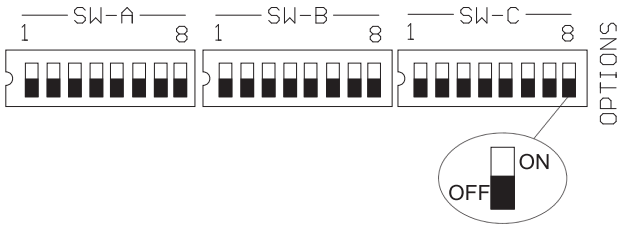


Figure 3. Micro switches

The ON position of the micro switches equals to ENABLED status.
The OFF position of the micro switches equals to DISABLED status
All switches that are not used must be set to the OFF position.

The various settings of the micro switches along with their operation are listed in the following sections.

8.1 Micro switches SW-A

Micro switches SW-A	
1	Cross zones 1 and 2
2	Cross zones 3 and 4
3	Cross zones 5 and 6
4	Cross zones 7 and 8
5	Relay 2 active only during pre-alarm (Cross or Alarm Verification)
6	Binary value of Alarm Verification delay. 0: disabled. Increments of 10 seconds.
7	
8	

Table 6. Micro switches SW-A

8.1.1 Cross zoning (Coincidence)

The Neon fire panel may be configured to require two simultaneous and different zone alarms to trigger the general fire alarm. This minimizes the chances of false alarms.

The operation of the system is based on the definition of zone pairs. A zone pair is activated by the corresponding microswitch as shown in table above (SW-A-1,2,3,4).

A zone pair is considered by the system as one zone. Both zones have to be in alarm for the general fire alarm to be active.

If only one zone has been triggered, the pre-alarm state is activated. In this state:

- the panel's buzzer is activated.
- the relay output 2 (S2) is activated if dedicated to pre-alarms (SW-A-5)
- The user can cancel the pre-alarms condition and reset the triggered zone with the Reset operation (in A.L.2).
- If the second zone of the pair gets activated as well, then the system enters the Fire Alarm state. Both zones of the pair are indicated in alarm.

8.1.2 System setup - Zone inputs

To enable the cross zoning function place the appropriate micro-switches to the ON position according to Table 6. Example: switching SWA-1 to ON, will activate cross-zoning on zones 1 and 2. The two zones (1st and 2nd) should be connected to the detectors that are installed in the protected area. A common practice is to install different types of detectors. Example: the first zone has a photoelectric smoke detector and the second zone has a temperature detector (Rate of Rise Heat detectors).

8.1.3 Alarm outputs pattern

The Neon main board provides four supervised* outputs for the connection of Notification appliances (signalling devices) namely S1 to S4.

The alarm outputs S3 and S4 may be set to one of two different patterns:

The first option is to provide constant power.

The second option is to provide a periodic and interrupted pattern that conforms to the ANSI standards for evacuation (Figure 4).

The ANSI evacuation sound has three (3) half second ON periods that repeat after a silence of 1.5 seconds.

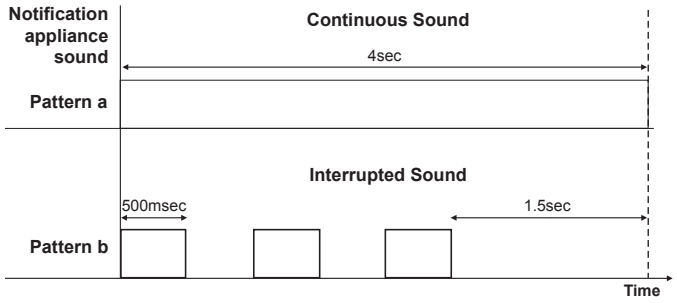


Figure 4. Alarm outputs pattern

If the ANSI pattern is selected the activation of Sirens 3 and 4 is synchronized. This makes possible the use of notification appliances without the need for extra synchronization modules, thus lowering the cost of the system.

The option is controlled by switches SW-C-6 and SW-C-7 for relays S3 and S4 respectively.

****A supervised output is one that is monitored by the system for fault conditions.***

8.2 Micro switches SW-B

Micro switches SW-B	
1	The corresponding zone belongs to the Alarm Verification group
2	
3	
4	
5	
6	
7	
8	

Table 7. Micro switches SW-B

8.3 Micro switches SW-C

Microswitches SW-C	
1	Binary value of Output Delay. 0: feature disabled. Increments of 1 minute.
2	
3	
4	Output delay is not applicable if alarm event comes from first half zones
5	Output delay also affects relays 1 and 2 (Siren 1 & 2)
6	Siren relay 3 produces ANSI evacuation pattern
7	Siren relay 4 produces ANSI evacuation pattern
8	Disable evacuation from A.L.1

Table 8. Micro switches SW-C

8.4 H/W Reset button

The PCB RESET button (Item 5, page 4) should only be used by the installer. It is used to restart the microcontroller or to make effective any changes made via the micro dip switches.

In order to activate changes of settings via the micro dip switches a PCB RESET is required (by pressing the PCB RESET button on the main board, item 5 page 4). To distinguish this reset operation from the System (Zones) reset, the term "PCB reset" is used through out this manual.

9. Power Supply

Neon panel uses a switching power supply for a stabilized output of 27.6V DC, 2.5A. The connection to the mains power is through the Mains Power Connector (item 12, page 4).

The Switching Power Supply connects to the main board through a 4-wire power connector.

To avoid equipment damage, the connection of the main power and the batteries must be done only AFTER the connection of all the required wiring including peripherals and detection devices.

9.1 Power Consumption

On Table 9 the current consumption of the Neon panel is listed.

Model	ZONES	POWER SUPPLY	CURRENT IN STANDBY MODE	CURRENT IN ALARM MODE	MAX No OF DETECTORS PER ZONE
Neon 2	2	27.6V DC	55 mA	165 mA	20
Neon 4	4	27.6V DC	55 mA	180 mA	20
Neon 8	8	27.6V DC	55 mA	210 mA	20

Table 9. Panels' current consumption

The above numbers do not include consumption from the detectors. They do include consumption of the EOL resistors.

9.2 Recommended batteries

The batteries recommended for the Neon panel are 12V, 7AH Sealed lead acid batteries (two units per panel). The standby time of the panel obtained with these batteries depends on the panel type, the quantity/type of the connected peripheral appliances and the quantity/type of the connected detectors. See Appendix B for battery autonomy calculation.

10. Wiring Connections of Inputs / Outputs

10.1 Alarm output

In case of an alarm, the **ALARM** output relays (Notification appliance outputs S1 to S4) provide 24V DC to the notification appliances that are connected to the panel. Maximum current for each output is 0.4 Amp (fused at 1.6A). Total current for alarm outputs must not exceed 1 Amp.

IMPORTANT: The total current of the auxiliary outputs plus the siren outputs must not exceed 1.5 Amp.

The Alarm output also monitors the notification appliances wiring for open lines and short circuits. The connection of a 4.7K Ohm EOL resistor is required as shown in below (see section 1.2).

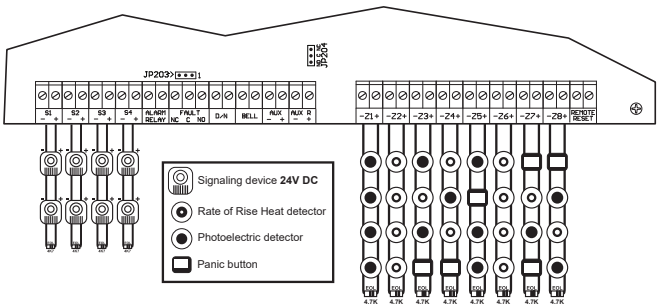


Figure 5. Zone inputs and Siren outputs wiring connections.

Pay special attention when connecting loads less than 2.2K Ohm! They may interfere with the fault detection circuit causing a fault condition. In this case use a diode between the output "+" and the load. Connect the anode of the diode to the output "+" terminal. The diode must be able to withstand the maximum current during the operation of the load. See Figure 6 for an example connection.

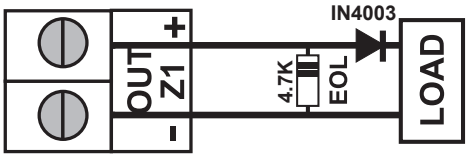


Figure 6. Typical load connection

10.2 Fault output

Neon provides an output to activate external devices in the case of faults. The output is activated on zone faults, output relay faults, power faults (auxiliary, main or battery) and earth fault. Dry relay contacts are provided on the **"FAULT"** terminal that may activate any device or indicator. Maximum handling current is 3 A.

10.3 Fire detection zones wiring connections

The fire detection zones have 18V DC in standby mode with the positive power supply terminal common and are terminated via a 4.7K Ohm EOL resistor or a 22uF capacitor.

The circuit recognizes five different resistances which correspond to four different states of the system.

The four different resistance ranges are:

Resistance Ranges			
0	up to	15 Ohm	Short-circuited Zone
40	up to	1.2K Ohm	Zone in alarm state
1.5K	up to	7K Ohm	Zone in standby state
10K	up to	∞	Open-circuited Zone

Table 10. System's resistance ranges

Each zone that is not used must be terminated with EOL resistor of 4.7K Ohm.

IMPORTANT! Smoke detectors must be installed in the same room as the control panel and in rooms used by the system for the connection of alarm transmission wiring, communications, signaling, and/or power. If detectors are not so located, a developing fire may damage the alarm system, impeding the ability to report a fire.

Wiring connections of detectors and other devices to the main board with 4.7K Ohm EOL resistors are analytically shown in section 1.2.

In case the installation requires Active End Of Line termination, the EOL devices must be 22uF electrolytic capacitors (25V DC).

The Active EOL (AEOL) method of detection,recognizes the removal of a single detector while the rest of the detectors down the zone remain in operation (alarms are recognized).

ZONES DESCRIPTION

Zone 1:_____

Zone 2:_____

Zone 3:_____

Zone 4:_____

Zone 5:_____

Zone 6:_____

Zone 7:_____

Zone 8:_____

Installed by

Name:_____

Company:_____

Address:_____

Phone:_____

For service contact

Company:_____

Address:_____

Phone:_____

Acceptance Inspection by

Date:_____

DEVELOPED BY
PARADOX HELLAS S.A.
Korinthou 3, Metamorfosi
144 51 - Athens, Greece

Compliance Statement
Neon panel is designed and manufactured so that it fulfils the requirements of CPR 305/2011 european regulation and are certified to directive CPR 305/2011 and EN 54 Part 2 and 4,1998 Standards.

Appendix A: Panel Specifications

	Neon 2	Neon 4	Neon 8
Number of zones	2	4	8
Maximum number of detectors per zone	20		
Notification appliances outputs (e.g. sirens)	2	4	4
Notification appliances current	4 x 400mA (total maximum current 1Amp)		
Mains Power	230V AC 50/60Hz		
Zones input voltage (with EOL & AEOL)	16 to 21 V		
Maximum input power	100 VA max input power (0.5 Amp)		
Battery placement	2 x 12V 7Ah VRLA batteries will fit in the panel		
Standby Power	5 VA (25 mA)		
Auxiliary power outputs	24V DC 1Amp total ('AUX' + 'AUX R')		
Zone termination	4,7 KOhm 5% 1/2W resistors or 22uF / 25V electrolytic capacitors		
Monitored output termination	4,7 KOhm resistors 5% 1/2W		
Fire relay output	Dry contacts NO or NC selectable. 50 V / 1.5 A max (DC or AC)		
Fault relay output	Dry contacts NO or NC selectable. 50 V / 1.5 A max (DC or AC)		
Environmental	Temperature: -2 to 45 °C (32 to 120 °F) Humidity: 5 to 95% RH, non condensing		
Panel's dimensions (HxWxD) [mm]	315 x 425 x 105 mm. In semi flash wall mounting extruding depth: 25mm		
Weight (without the batteries)	2.800gr		

Appendix B: Calculations

Battery calculation worksheet

Use this worksheet to determine the minimum capacity required for the panel's standby battery. You can obtain operating current requirements for notification appliances from their respective installation sheets.

	Standby Current (mA)		**Alarm Current (mA)**	
Base panel [1]				
Aux current				
Detector's consumption		[3]		
Total current				
Required standby and alarm time				

x [ ] Standby time 24hr = [ ] mAh

+ [ ] Alarm time x [ ] = [ ] mAh

5 min = 0.083 hr
10 min = 0.167 hr
15 min = 0.250 hr
30 min = 0.500 hr

[ ] mAh ÷1000 = Battery amp hour total = [ ] Ah

x 1.2

Minimum battery size[2] = [ ] **Ah**

[1] Base panel includes the main controller board with no load, only EOL resistors. Consumption on Standby mode: See Appendix A.
[2] The maximum battery size the panel can charge is 2x7 Ah 12 V.
[3] Use maximum value or actual calculated value from the Form below.

Zones detector's consumption calculation

Zones	Quantity of Detectors	Detectors consumption	**Total standby consumption[4]** (quantity x consumption in mA)
Zone 1			
Zone 2			
Zone 3			
Zone 4			
Zone 5			
Zone 6			
Zone 7			
Zone 8			
		Total consumption for all zones =	

[4] Maximum standby consumption per zone may not exceed 15 mA.

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