NUMENS

Professional Safety Products

4001 Non-addressable 2, 4, 8 Zone Fire Alarm Control Panel

Revision 2.1 Firmware

INSTALLATION AND SERVICE MANUAL

Contents

4001 non-addressable control and indicating equipment forms the central part of a fire detection and alarm system. Available with 2, 4 or 8 alarm zone circuits, 4001 control panels are easy to install and commission. A central microprocessor delivers reliable operation and requires minimum maintenance.

4001 control and indicating equipment are compatible with Numens non-addressable detectors and devices, such as manual call points. They are suitable for small and medium-sized buildings.

This Manual provides installers with instructions to install, commission and service the 4001 control and indicating equipment using revision 2.1 operating firmware.

Website

For more information, including product datasheets and other support material, please view our website at www.numens.com

1. INTRODUCTION

1.1. Features

The 4001 includes features that provide a flexible solution for small and medium-sized buildings. The equipment is easy to install and quick to configure and commission. A reliable microprocessor delivers trouble-free operation, lowering service costs and increasing up-time.

Features include:

- 2, 4 or 8 alarm zones
- Supports up to 32 non-addressable devices per alarm zone circuit
- Configurable non-latching alarm zones
- Configurable alarm dependency (zone coincidence detection)
- Capacitor end-of-line device.
- Configurable timer to delay output activation (up to 10 min)
- 3 Access Levels
- Single-person test mode
- Day/night mode configurable
- Manual activation of alarm devices
- Supervised auxiliary DC 24 V output
- 2 programmable non-addressable alarm output circuits
- 2 unmonitored relay contacts for Fire Alarm Condition outputs
- 1 unmonitored relay contact for Fault Condition output
- 3 voltage-free inputs for remote reset, evacuation start/stop, and Day/Night mode
- Clear detection zone LED indicators, with a single indicator for Fault, Disable and Test Condition indicator
- Recessed mounting enclosure
- Supports up to 7 Repeater Panels

1.2. Factory Default Settings

The 4001 control and indicating equipment is supplied ready to operate as a standard non-addressable control panel. Optional functions and their configuration are described in following sections.

The default settings for the 4001 are as follows:

- Detection zones are latching.
- Delay timers are disabled.
- Zone dependency (coincidence detection) is disabled.
- Access Level 2 passcode is set to **6688**.
- Access Level 3 passcode is set to **8765**.

2. OPTIONAL INTERFACES

The 4001 is compatible with the following optional equipment.

2.1. Remote LED Display

The 6001-04 remote LED display card is used to repeat the discrete LED indications of Numens control panels. Sixteen discrete LEDs can be configured to display multiple Alarm and Fault conditions, or system status conditions remotely from the control panel. The following configurations are available:

- Configurable for 8-zone LED display of Alarm and Fault conditions.

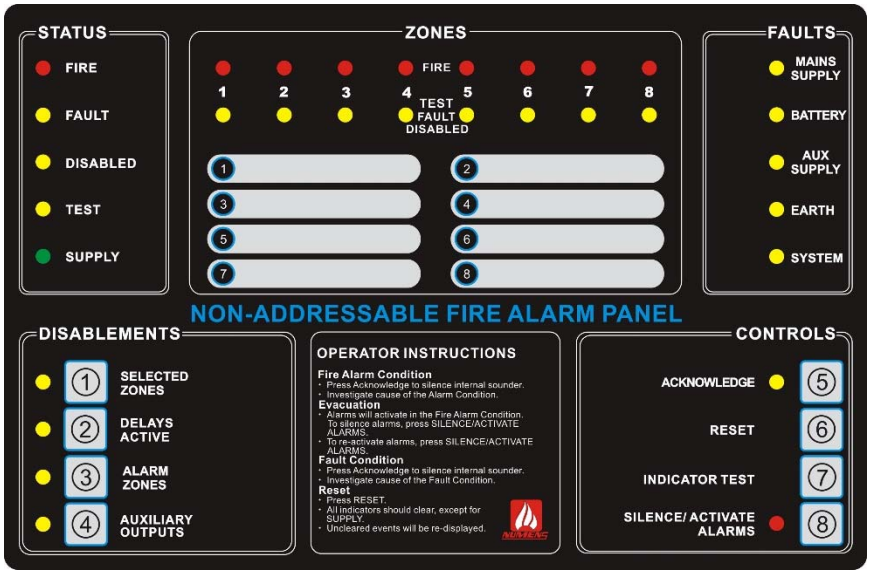
2.2. Detection Zone Output Card

The 6001-07 Detection Zone Output card provides 8 voltage-free, normally-closed relay contact outputs, available for detection zones. The relay contacts will open when a detection zone initiates an Alarm Condition.

2.3. Repeater Panel

The 4001-04 Repeater Panel provides indication and control functions in a location separate to the control and indicating equipment. The 4001 supports up to 7 Repeater Panels.

3. CONTROLS AND INDICATORS



STATUS

FIRE — Indicates the Alarm Condition. Alarm zone information will also be displayed on the ZONE indicators.

FAULT — Indicates the Fault Condition. Fault information will be displayed on the ZONES indicators or in the FAULTS area of the control panel, depending on the source of the fault.

DISABLED — Indicates at least one function (eg detection or Auxiliary Outputs) is disabled.

TEST — Indicates the Test Condition.

SUPPLY — Indicates the control and indicating equipment is active. The LED will repeatedly flash twice followed by a pause, when the control and indicating equipment is in the Access Level 2. The LED will repeatedly flash three time followed by a pause, when the control and indicating equipment is in the Access Level 3.

ZONES

FIRE — Indicates the Alarm Condition within a specific detection zone.

TEST FAULT DISABLED — Indicates when a zone is in the Test Condition, the Fault Condition or the Disabled Condition.

FAULTS

MAINS SUPPLY	Indicates the mains supply is unavailable or less than the minimum required voltage.
BATTERY	Indicates the secondary (battery) supply or battery charger is faulty.
AUX SUPPLY	Indicates a fault in the auxiliary DC output.
EARTH	Indicates an earth fault is detected in the fire detection and alarm system transmission path wiring.
ALARM	A fault (including an open- or short-circuit in the transmission path) in an alarm zone circuit is indicated by the FAULT LED in the STATUS area being on and the ALARM ZONE LED flashing.

DISABLEMENTS

SELECTED ZONES	Selects specific detection zones for disablement. Used in conjunction with Zone buttons and SILENCE/ACTIVATE ALARMS button. The indicator is active when disablements are active.
DELAYS ACTIVE	Disables and enables delays of configured alarm devices. When the indicator is on, the delay is active. Pressing the DELAYS ACTIVE button over-rides the delays and causes immediate actions.
ALARM ZONES	Disables and enables alarm devices. When the indicator is active, the alarm devices are disabled.
AUXILIARY OUTPUTS	Disables and enables relay outputs. When the indicator is active, the output devices are disabled.

CONTROLS

ACKNOWLEDGE	Acknowledges a new Alarm or Fault event and silences the internal sounder. The LED will illuminate when a new Condition occurs.
RESET	Resets the fire detection and alarm system.
INDICATOR TEST	Illuminates all LEDs and activates the internal sounder.
SILENCE/ACTIVATE ALARMS	Activates audio/visual alarm devices. The LED illuminates when the alarm devices are active.

The DISABLEMENTS and CONTROLS buttons are numbered 1 ~ 8. Buttons 5 ~ 8 are also used to enter Access Levels 2 and 3.

4. ACCESS LEVELS

Three access levels are used to operate or configure the control and indicating equipment.

4.1. Access Level 1

Access Level 1 provides open access to perform the following functions:

- Acknowledge a new event (and silence the internal sounder).
- Override any active delays in the Alarm Condition.
- Perform the indicator test.
- Place the panel into Access Level 2 or Access Level 3.
- Reset to factory default settings.

4.2. Access Level 2

Access Level 2 provides access to the following functions for authorized users:

- Acknowledge a new event (and silence the internal sounder).
- Override any active delays.
- Perform the indicator test.
- Silence and re-activate alarms (including for a building evacuation).
- Reset the fire detection and alarm system.
- Disable or enable the following:
  - Zones
  - Alarms
  - Auxiliary outputs
- Activate delays (if configured).

4.2.1. Enter Access Level 2

When there are no new events to acknowledge, pressing and holding the ACKNOWLEDGE button for 3 s will cause the SUPPLY LED to flash rapidly and permit the entry of the Access Level 2 passcode.

> Access Level 2 can only be entered if there are no new events to acknowledge.

To enter the Access Level 2 passcode, take the following actions:

1) Press and hold the ACKNOWLEDGE button for 3 s. The SUPPLY LED will flash rapidly.
2) Enter the Access Level 2 passcode using the buttons numbered 1 ~ 8. Each button press will cause the following indicator to light:

First button press	Zone 1 TEST FAULT DISABLED
Second button press	Zone 2 TEST FAULT DISABLED
Third button press	Zone 3 TEST FAULT DISABLED
Forth button press	Zone 4 TEST FAULT DISABLED

> The factory default Access Level 2 passcode is **6688**.

3) Press ACKNOWLEDGE button to confirm the passcode (Note: The ACKNOWLEDGE LED does not flash during this process).

If the passcode is correct:

- The internal sounder will give a double short beep.
- The SUPPLY LED will flash twice, pause, then repeat.

If the passcode is incorrect:

- The internal sounder will give a single long beep.
- The Zone indicators will turn off.
- A new passcode can be entered.

If an Alarm Condition or Fault Condition has occurred, the conditions must be acknowledged before entering Access Level 2.

To exit Access Level 2, press RESET.

4.2.2. Change Access Level 2 Passcode

The Access Level 2 passcode may be changed from the factory default setting. The Access Level 2 passcode cannot be the same as the Access Level 3 passcode.

To change the passcode, take the following actions:

1) Enter Access Level 3.
2) Press and hold the ACKNOWLEDGE button for 10 s. The SUPPLY LED will flash rapidly.
3) Press **2**. The ACKNOWLEDGE LED and the DELAYS ACTIVE LED will both flash.
4) Press ACKNOWLEDGE button. The ACKNOWLEDGE LED will be off and the DELAYS ACTIVE LED will illuminate.
5) Enter the new 4-digit Access Level 2 passcode using the buttons numbered 1 ~ 8. Each button press will cause the following indicators to light:

First button press	Zone 1 TEST FAULT DISABLED
Second button press	Zone 2 TEST FAULT DISABLED
Third button press	Zone 3 TEST FAULT DISABLED
Fourth button press	Zone 4 TEST FAULT DISABLED

6) Press ACKNOWLEDGE button to confirm the passcode.
   Note: The ACKNOWLEDGE LED does not flash during this process until the 4 passcode numbers are entered.
7) Repeat Steps 5 and 6 to confirm the passcode. The internal sounder will give a double short beep. Passcode is now changed.

If the two passcodes entered are different:

- The internal sounder will give a single long beep.
- The Zone indicators will turn off.
- A new passcode can be entered.

4.3. Access Level 3

Access Level 3 is used to configure the control and indicating equipment and accesses the following functions.

- Configuration of coincidence detection
- Setting delay timer
- Indicator and device test
- Setting detection zone delays
- Configuring non-latching zones
- Change Access Level passcodes
- Reset to factory default settings

Changes made at Access Level 3 affect the factory default settings and the operation of the system. Changes should only be made by qualified personnel who are fully aware of their effects.

4.3.1. Enter Access Level 3

Access Level 3 can only be entered if there are no new events to acknowledge.

To enter the Access Level 3 passcode, take the following actions:

1) Press and hold the ACKNOWLEDGE button for 3 s. The SUPPLY LED will flash rapidly.
2) Enter the Access Level 3 passcode using the buttons numbered 1 ~ 8. Each button press will cause the following indicator to light:

First button press	Zone 1 TEST FAULT DISABLED
Second button press	Zone 2 TEST FAULT DISABLED
Third button press	Zone 3 TEST FAULT DISABLED
Forth button press	Zone 4 TEST FAULT DISABLED

The factory default Access Level 3 passcode is **8765**.

3) Press ACKNOWLEDGE button to confirm the passcode (Note: The ACKNOWLEDGE LED does not flash during this process).

If the passcode is correct:

- The internal sounder will give a double short beep.
- The SUPPLY LED will flash three times, pause, then repeat.

If the passcode is incorrect:

- The internal sounder will give a single long beep.
- The Zone indicators will turn off.
- A new passcode can be entered.

To exit Access Level 3, press RESET.

4.3.2. Change Access Level 3 Passcode

The Access Level 3 passcode may be changed from the factory default setting. The Access Level 3 passcode cannot be the same as the Access Level 2 passcode.

To change the passcode, take the following actions:

1) Enter Access Level 3.
2) Press and hold the ACKNOWLEDGE button for 10 s. The SUPPLY LED will flash rapidly.
3) Press **3**. The ACKNOWLEDGE LED and the ALARM ZONES LED will both flash.
4) Press ACKNOWLEDGE button. The ACKNOWLEDGE LED will be off and the ALARM ZONES LED will illuminate.
5) Enter the new 4-digit Access Level 3 passcode using the buttons numbered 1 ~ 8. The Access Level 3 passcode must be different to the Access Level 2 passcode. Each button press will cause the following indicators to light:

First button press	Zone 1 TEST FAULT DISABLED
Second button press	Zone 2 TEST FAULT DISABLED
Third button press	Zone 3 TEST FAULT DISABLED
Fourth button press	Zone 4 TEST FAULT DISABLED

6) Press ACKNOWLEDGE button to confirm the passcode.
   Note: The ACKNOWLEDGE LED does not flash during this process until the 4 passcode numbers are entered.
7) Repeat Steps 5 and 6 to confirm the passcode. The internal sounder will give a double short beep. Passcode is now changed.

If the two passcodes entered are different:

- The internal sounder will give a single long beep.
- The Zone indicators will turn off.
- A new passcode can be entered.

4.4. Reset to Factory Default Settings

If the 4001 is reset to the factory default settings, all configuration settings will be lost.

The default settings for the 4001 are as follows:

- Detection zones are latching.
- Delay timers are disabled.
- Zone dependency (coincidence detection) is disabled.
- Access Level 2 passcode is set to **6688**.
- Access Level 3 passcode is set to **8765**.

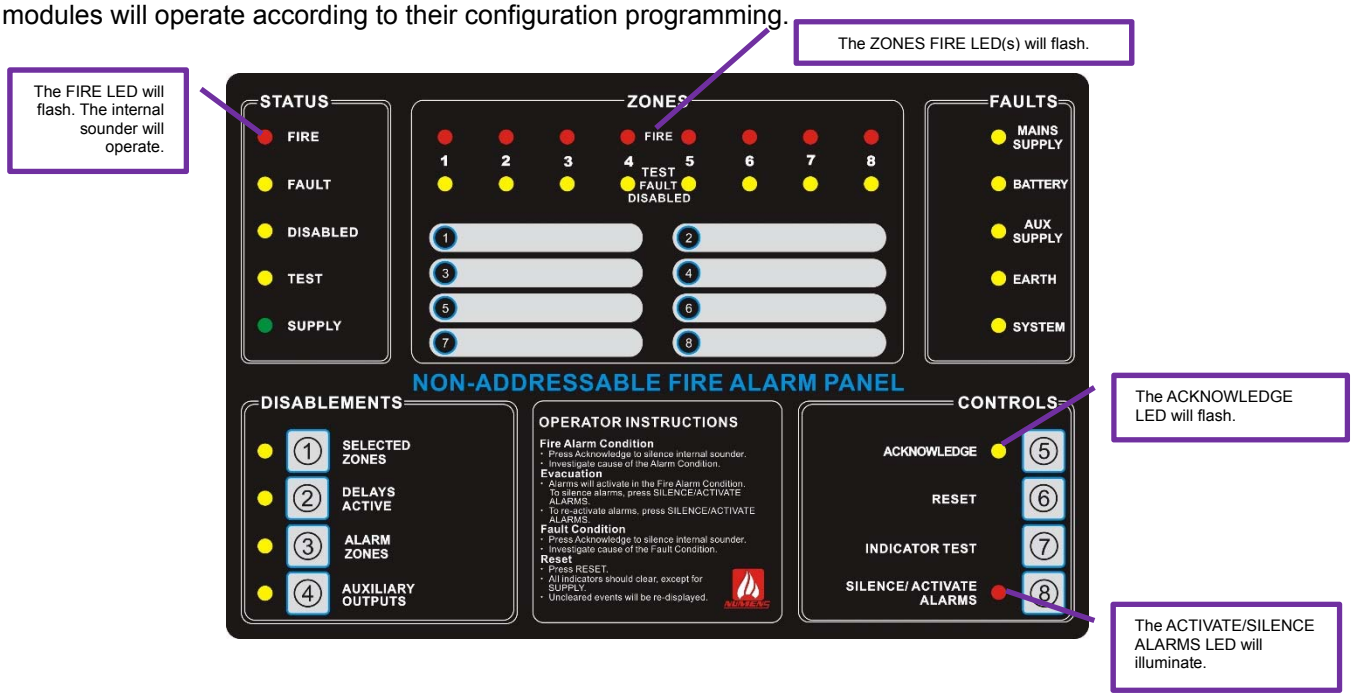
To reset the 4001 to the factory default settings, including the Access Level passcodes, take the following actions:

1) In Access Level 1, press and hold RESET. After 10 s, SUPPLY LED will flash rapidly.
2) While holding RESET button, enter 1, then 2, then 3, then 4. The relevant LEDs for buttons 1, 2, 3 and 4 will illuminate. The ACKNOWLEDGE LED will flash.
3) Press ACKNOWLEDGE button to confirm.

5. CONDITIONS

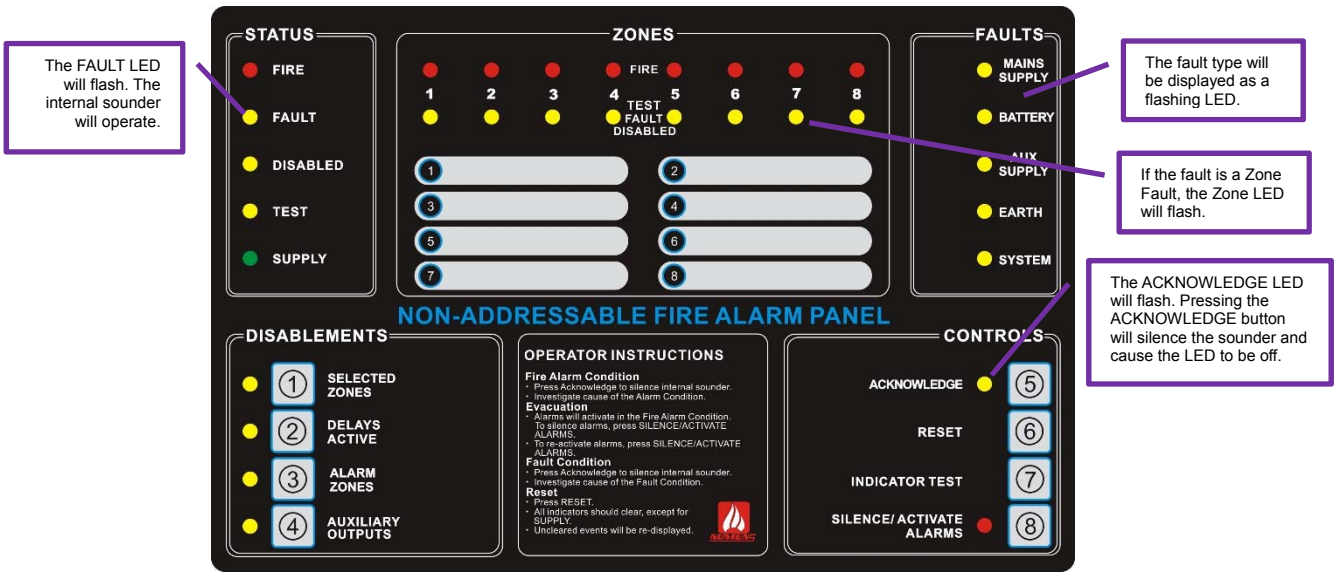
5.1. Alarm Condition

When the control and indicating equipment enters the Alarm Condition, the alarm sounders and output modules will operate according to their configuration programming.



5.2. Fault Condition

When a fault occurs with a device or within the control and indicating equipment, the control and indicating equipment will enter the Fault Condition. In the Fault Condition, the internal sounder will operate.



5.3. Disabled Condition

A function may be disabled. The Disabled Condition is used to:

- Prevent events from within the Zone (eg a detector alarm) being actioned by the control and indicating equipment.
- Actions initiated by the control and indicating equipment from occurring within the Zone (eg activation of an alarm device).
- Signals being sent to auxiliary outputs.

5.3.1. Detection Zone Disablement

To disable a detection zone, take the following actions:

1) Enter Access Level 2.
2) Press the SELECTED ZONES button. The SELECTED ZONES LED will flash and the ACKNOWLEDGE LED will flash.
3) Press the ACKNOWLEDGE button. SELECTED ZONES LED will be on and the ACKNOWLEDGE LED will flash.
4) Press the SILENCE/ACTIVATE ALARMS button to scroll through the detection zones 1 ~ 16. As the button is pressed, the selected zone TEST FAULT DISABLED yellow LED will be on.
5) Once the desired Zone LED indicator is on, confirm the selection by pressing the ACKNOWLEDGE button. The FIRE LED in the selected Zone will be on steady. The ACKNOWLEDGE LED will continue to flash. This gives the user an option to re-enable the selected Zone.
6) To exit the disablement selection, press the SELECTED ZONES button. The SELECTED ZONES LED will be off. The control and indicating equipment will remain in Access Level 2.

5.3.2. Delays Active Disablement

To disable pre-configured delays to the Alarm Condition, take the following actions:

1) When the Alarm Condition is not present, enter Access Level 2.
2) Press the DELAYS ACTIVE button. The DELAYS ACTIVE LED will flash, and the ACKNOWLEDGE LED will flash.
3) Confirm the selection by pressing the ACK button. The ACKNOWLEDGE LED will be off and the DELAYS ACTIVE LED will be off.

- In the Fire Condition, delays can be disabled at Access Level 1.
- If there is an alarm waiting to be processed when the delays are disabled, the control and indicating equipment will immediately enter the Alarm Condition.
- For the Delays Active Disabled function, the zones must first be configured to enable the delay at Access Level 3.

5.3.3. Alarm Zone Disablement

To disable alarm devices, take the following actions:

1) Enter Access Level 2.
2) Press the ALARM ZONES button. The ALARM ZONES LED will flash and the ACKNOWLEDGE LED will flash.
3) Confirm the action by pressing the ACKNOWLEDGE button. The ACKNOWLEDGE LED will be off. The ALARM ZONES LED will be on.
4) To exit the disablement selection, press the ALARM ZONES button. The ALARM ZONES LED will flash and the ACKNOWLEDGE LED will flash.
5) Confirm the action by pressing the ACKNOWLEDGE button. The ACKNOWLEDGE LED will be off. The ALARM ZONES LED will be off. The control and indicating equipment will remain in Access Level 2.

5.3.4. Auxiliary Outputs Disablement

To disable the auxiliary outputs, take the following actions:

1) Enter Access Level 2.
2) Press the AUXILIARY OUTPUTS button. The AUXILIARY OUTPUTS LED will flash and the ACKNOWLEDGE LED will flash.
3) Confirm the action by pressing the ACKNOWLEDGE button. The ACKNOWLEDGE LED will be off. The AUXILIARY OUTPUTS LED will be on.
4) To exit the disablement selection press the AUXILIARY OUTPUTS button. The AUXILIARY OUTPUTS

LED will flash and the ACKNOWLEDGE LED will flash.

5) Confirm the action by pressing the ACKNOWLEDGE button. The ACKNOWLEDGE LED will be off. The AUXILIARY OUTPUTS LED will be off. The control and indicating equipment will remain in Access Level 2.

5.3.5. Enable Functions

To re-enable a disabled function, follow the steps above and note that the relevant disablement LED indicator is off.

5.4. Test Condition

Tests can be conducted by a single person. To enter the Test Condition and undertake tests of the 4001 and connected devices, follow these steps:

5.4.1. Indicator Test

1) Enter Access Level 1 or Access Level 2.
2) Press the INDICATOR TEST button. The internal sounder will operate. All LED indicators on the control panel and any connected remote display will be illuminate until the INDICATOR TEST button is released.

5.4.2. Device Test

1) Enter Access Level 3.
2) Press INDICATOR TEST button. The TEST LED will flash and the ACKNOWLEDGE LED will flash.
3) Press the ACKNOWLEDGE button. The ACKNOWLEDGE LED will be off. The TEST LED in the STATUS section and the TEST FAULT DISABLED LEDs in the ZONES section will be on.
4) Test a device connected to each detection zone. Upon activation of the device:
    - the FIRE LED will illuminate for 5 s;
    - the Detector Zone indicator will illuminate for 5 s;
    - any connected remote display Detection Zone indicator will illuminate for 5 s; and
    - the internal sounder, and alarm devices will operate for 1 s.

    Zones will automatically reset after 10 s.
5) At the completion of the tests and to exit the Test Condition, press the INDICATOR TEST button. The TEST LED will flash and the ACKNOWLEDGE LED will flash.
6) Press the ACKNOWLEDGE button. The ACKNOWLEDGE LED will be off. The TEST LED in the STATUS section and the TEST FAULT DISABLED LEDs in the ZONES section will be off. The control and indicating equipment will remain in Access Level 3.

5.5. Inactivity Timeouts

Timeouts are set to revert to Access Level 1 if there is not activity, and for system safety in the event that the system is left without restoring it to Access Level 1. The following timeouts apply:

- Enable Access Level passcode: No action for 20 s causes return to Access Level 1.

When in Access Level 2:

- Enter Access Level 2 passcode: No action for 20 s causes return to Access Level 1.
- When performing functions in Access Level 2, no manual input for 20 s causes the process to be cancelled. The control panel will return to Access Level 2.
- With no specific function selected, no manual input for 1 h causes return to Access Level 1.

When in Access Level 3:

- Enter Access Level 3 passcode: No action for 20 s causes return to Access Level 1.
- No activity (eg a button press) for 1 h causes return to Access Level 1.
- When in Device Test mode, no activity for 4 h causes return to Access Level 1.

6. INSTALLATION

6.1. Safety

ELECTRICAL HAZARD: Disconnect power from equipment prior to making any internal adjustments. This equipment must have an Earth connection.

FRAGILE: Inspect the equipment prior to installation. Do not install the equipment if damage is apparent. If damaged, return to the supplier.

ELECTROSTATIC HAZARD: This is sensitive electronic equipment. Apply safe ant-static practices when handling this equipment.

CIRCUIT LIMITATIONS: The maximum number of detectors connected to a single detection zone is limited by the control and indicating equipment, and may be limited by local regulations.

GENERAL CAUTIONS: This equipment must be installed by a suitably qualified and technically competent person. A basic knowledge and training in the installation of fire detection and alarm systems is assumed. The system should be designed by a suitably qualified person with reference to local regulations and guidance from the fire officer where applicable. Service should only be performed by qualified personnel.

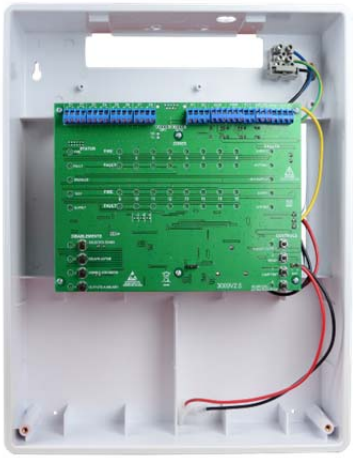
6.2. Tools and Equipment

Before commencing installation, ensure all equipment and tools to mount and connect the equipment are available, such as drills, mounting screws, cables and ladders.

6.3. Control Panel Mounting

The 4001 is designed for recessed mount, but may also be surface-mounted. 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 battery location. Maintain separation between the incoming mains voltage cable and the extra-low voltage input and output device cabling.

Fix the panel to the wall using the four 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 internal components.



Front view

Side view

Rear view

Top view

6.4. Control Panel Power-Up

Before connecting external wiring, apply power to the control panel with the end-of-line devices for detection and alarm zones installed.

Depending on panel load and standby requirements, two DC 12 V valve-regulated lead-acid batteries with a capacity up to 7 Ah may be fitted in the enclosure. The batteries should be wired in series (DC 24 V) using the supplied link. Take care not to short circuit the battery terminals.

With mains and battery power connected, there should be no fault indications.

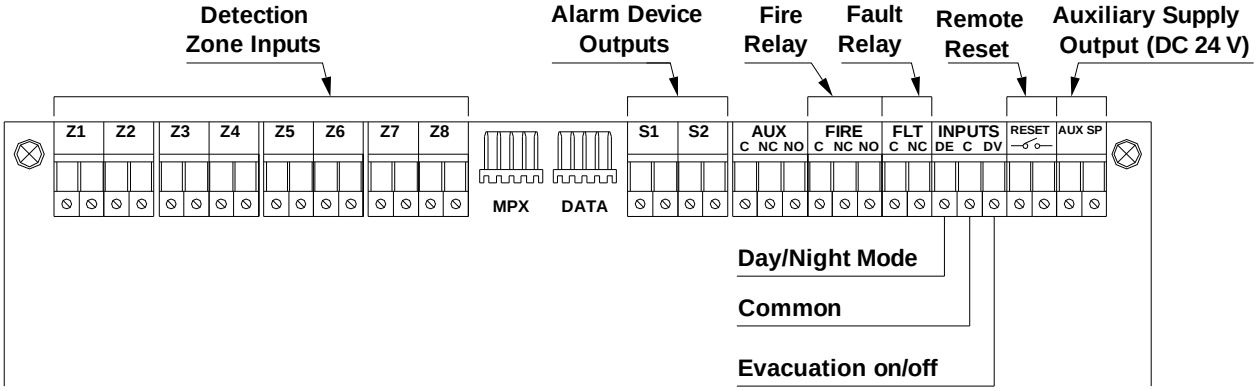
6.5. General Wiring Requirements

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

To protect against electrical interference the use of screened cables throughout the system is recommended. Separate cables should be used for alarm and detection circuits, the use of multi-core cables to carry alarm 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 2.5 mm² to avoid damaging the terminals in the control panel.

The input/output terminals are shown below.

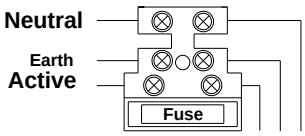


6.6. Mains Wiring

Mains supply wiring should only be undertaken by a suitably qualified and competent person.

Mains wiring should be 3-core (1 ~ 2.5) mm², fed from a dedicated 3 A (or greater) circuit breaker. The circuit should be secured from unauthorized operation and be marked “Fire Alarm Do Not Switch Off”.

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

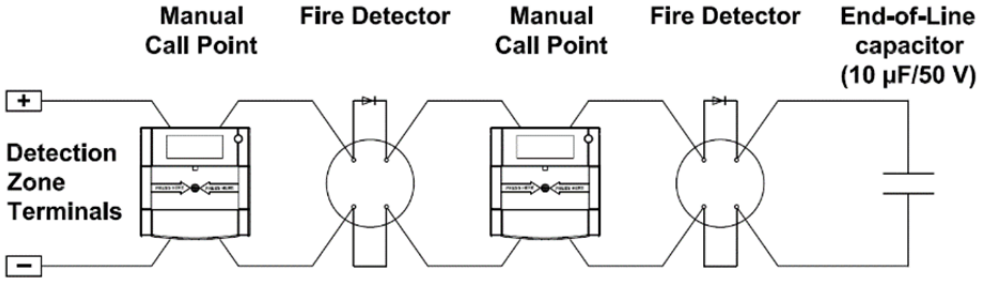


6.7. Detection Zones

Each zone has capacity for up to 32 detectors and an unlimited number of manual call points. Alarm zone limitations may also be restricted by local regulations.

A capacitor end-of-line device is supplied for each zone as part of the monitoring circuit. Fit the capacitor to the last device of each Zone. If a zone is unused, fit the end-of-line capacitor to the zone terminals. If the capacitor is not installed, a fault will be indicated for that zone.

A detector circuit wiring layout is shown below. Consult the device installation instructions for device termination requirements.



If manual call points are wired on the same circuit as detectors, then in order to comply with some local requirements regarding device disconnection monitoring, detector bases should have a Schottky diode fitted which permits manual call points to continue to operate normally after a detector is removed (see diagram). Manual call points should have a maximum internal resistance of (470 ~ 680) Ω when activated.

Terminate the wiring for each detector zone in the terminals marked at the control panel and connect the cable screens to earth.

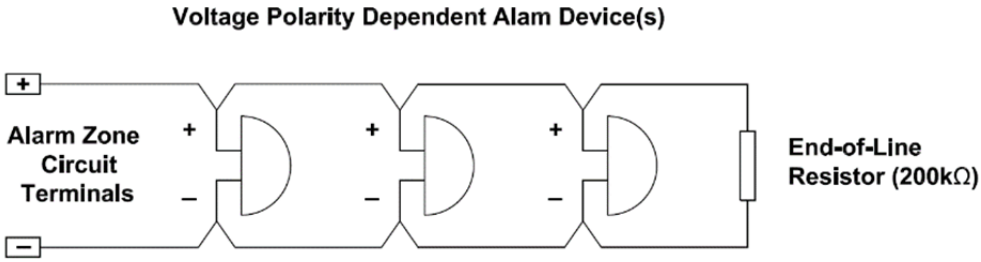
6.8. Alarm Zones

Two alarm output circuits are provided for non-addressable audio/visual alarm devices. The maximum combined output current is 910 mA. All audio/visual alarm devices must be voltage polarity sensitive. Non-polarized alarm devices will indicate a Fault Condition. The alarm zone circuits are protected against short-circuit. An electronic fuse will reset when the short circuit is removed and the control panel is reset.

Terminate the wiring for each audio/visual alarm device circuit in their respective terminals and the cable screens connected to earth.

Fit a 200 kΩ resistor (supplied with the control panel) to the last audio/visual alarm device on the alarm zone circuit. If an alarm zone circuit is not used, fit the end-of-line resistor in the control panel alarm output terminals.

An alarm zone circuit wiring layout is shown below. Consult the device installation instructions for device termination requirements.



6.9. Ancillary Outputs

Three ancillary outputs are available. Terminate the wiring for each auxiliary output in their respective terminals and the cable screens connected to earth.

6.9.1. Auxiliary Power

DC 28 V @ 300 mA is available. The output is supervised and short-circuit protected by an electronic fuse, which resets when the short-circuit is cleared and the panel is reset.

6.9.2. Fire Alarm

The Fire Alarm output provides a voltage-free change-over relay contact output that activates in the Fire Alarm Condition. The output remains active until the Fire Alarm Condition is reset.

6.9.3. Fault

The Fault output provides a voltage-free normally-closed relay contact output that opens when a Fault Condition is present.

6.10. Ancillary Inputs

There are three remote activation inputs. All remote inputs are activated using a voltage free dry contact like a relay. Terminate the wiring for each auxiliary input in their respective terminals and the cable screens connected to earth.

6.10.1. Remote Reset

The momentary closure of a contact at remote reset input will initiate a system reset.

6.10.2. Evacuation Start/Stop

Evacuation Start/Stop activates alarms immediately when a short-circuit is applied to the input. The SILENCE/ACTIVATE ALARMS LED will illuminate when active. Alarms continue to operate until the short-circuit is removed, or the SILENCE/ACTIVATE ALARMS button is pressed.

6.10.3. Day/Night Mode

A short-circuit applied to the Day/Night Mode input will enable programmed delays (Day Mode). The DELAYS ACTIVE LED will be illuminated. Removing the short-circuit will disable programmed delays (Night Mode).

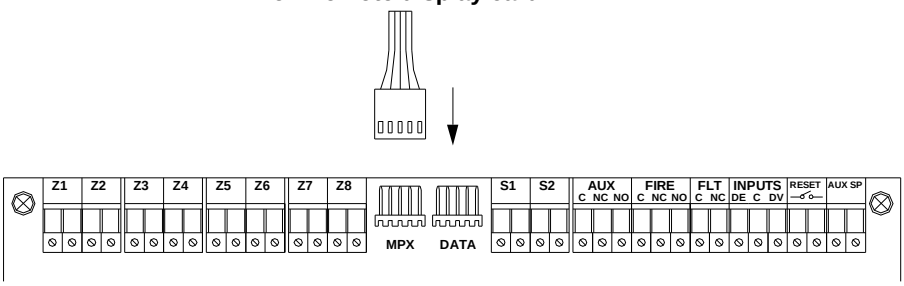
6.11. Remote Display Output

The 6001-04 Remote Display card reflects the status of the detection zones. Sixteen discrete LEDs can be configured to display multiple Alarm and Fault conditions.

Install the display card in a suitable enclosure or behind a protective panel.

Install cabling from the 6001-04 Remote Display card to the MPX port on the main board. Terminate the wiring for each indicator to their respective terminals, and the cable screens connected to earth.

From remote display card

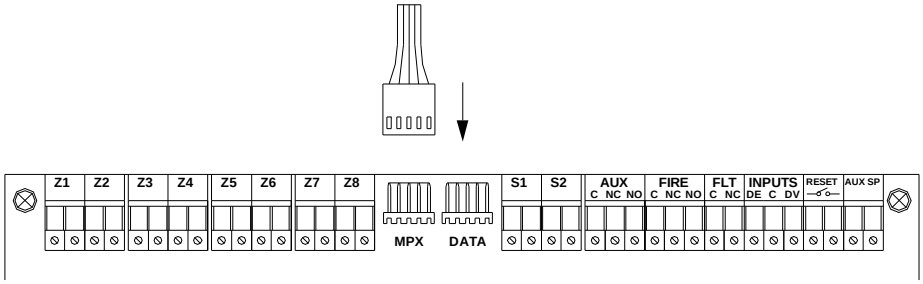


6.12. Detection Zone Output Card

The 6001-07 Detection Zone Output Relay card provides 8 voltage-free, normally-closed relay contact outputs for detection zones. The relay contacts will open when a detection zone initiates an Alarm Condition.

Install cabling from the 6001-07 Detection Zone Output Relay card to the MPX port on the main board. Terminate the wiring for each indicator to their respective terminals, and the cable screens connected to earth.

From detection zone output card

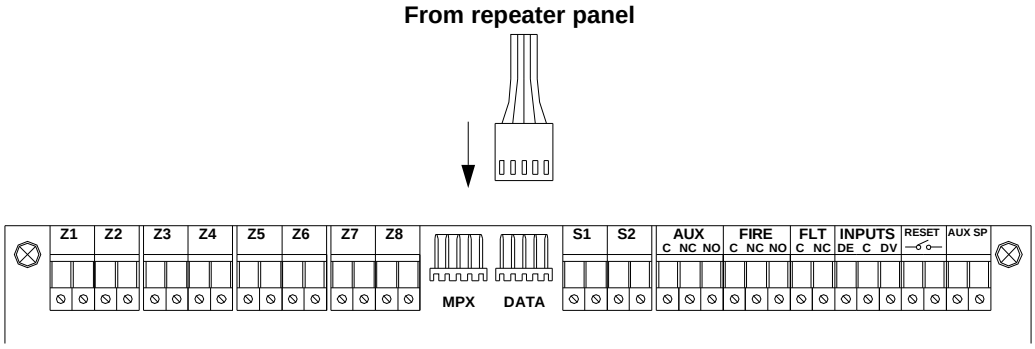


6.13. Repeater Output

The repeater output connects to the 4001-04 8-zone Repeater Panel. The Repeater displays the status and provides control of the fire detection and alarm system. The 6001-03 Network Interface Card must first be fitted to the control panel to provide the signaling interface to the Repeater Panels. The 4001 supports up to 7 Repeater Panels.

Connect the 6001-03 Network Interface Card to the DATA port on the main board, as shown below.

Install cabling from the 4001 Repeater Panel to the 6001-03 Network Interface Card. Terminate the wiring for each indicator to their respective terminals, and the cable screens connected to earth.



7. PRE-COMMISSIONING

Prior to commissioning, undertake the following pre-commissioning checks.

1) Check the 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, not a meg-ohm meter when devices are connected. Induced voltages greater than DC 1 V indicates possible cable problems or bad earth connection and must be rectified before device connection.
2) Check detection zone cables and ensure all field connections are made, and devices are connected to their bases.
3) Check that all end-of-line devices are fitted, either to the last device on the detection zone circuit, the last device on the alarm zone circuit, or to the output terminals (where the zone circuit is not used).
4) Check the earth connection is secure.

8. CONFIGURATION

Various functions can be configured. For configurable functions, follow the sections below.

8.1. Alarm Dependency (Coincidence)

Alarm Dependency requires two detection zones to report a fire before the Fire Alarm relay operates.

- Alarm Dependency only operates the Fire Relay.
- If one of the paired detection zones is disabled, the Fire Relay will not operate.
- Non-latching detection zones should not be configured for Alarm Dependency.

8.1.1. Configuration

To configure Alarm Dependency, complete the following steps:

1) Enter Access Level 3.
2) Press the AUXILIARY OUTPUTS button. Check that the AUXILIARY OUTPUTS LED is on and the ACKNOWLEDGE LED flashes.
3) Press the ACKNOWLEDGE button to confirm. Check that the ACKNOWLEDGE LED is off.
4) Use the SILENCE/ACTIVATE ALARMS button to step through the Zone pairs for Alarm Dependency (Zones 1 & 2, Zones 3 & 4, Zones 5 & 6, etc). Check that the relevant TEST FAULT DISABLED LEDs are on.
5) When the Zone pairs are selected, confirm the selection by pressing the ACKNOWLEDGE button. Check that the selected Zones FIRE LEDs are on.
6) If required, repeat steps 2 ~ 4 for additional Zone pairs.
7) Press the AUXILIARY OUTPUTS button to exit Alarm Dependency configuration. Check that the AUXILIARY OUTPUTS LED is off, the ACKNOWLEDGE LED is off, and the FIRE LEDs are off.

8.1.2. Cancel Configuration

To remove Alarm Dependency, complete the following steps:

1) Enter Access Level 3.
2) Press the AUXILIARY OUTPUTS button. Check that the AUXILIARY OUTPUTS LED is on and the ACKNOWLEDGE LED flashes.
3) Use the SILENCE/ACTIVATE ALARMS button to step through the Zone pairs for Alarm Dependency (Zones 1 & 2, Zones 3 & 4, Zones 5 & 6, etc). Check that the relevant TEST FAULT DISABLED LEDs are on.
4) When the Zone pairs are selected, confirm the selection by pressing the ACK button. Check that the selected Zones FIRE LEDs are off.
5) If required, repeat steps 2 ~ 4 for additional Zone pairs.
6) Press the AUXILIARY OUTPUTS button to exit Alarm Dependency configuration. Check that the AUXILIARY OUTPUTS LED is off, the ACKNOWLEDGE LED is off, and the FIRE LEDs are off.

8.2. Non-Latching Detection Zones

Detection zones can be configured not to latch incoming fire signals.

8.2.1. Configuration

To configure Non-latching Detection Zones, complete the following steps:

1) Enter Access Level 3.
2) Press the ALARM ZONES button. Check that the ALARM ZONES LED and the ACKNOWLEDGE LED flashes.
3) Press the ACKNOWLEDGE LED to confirm. Check that the ACKNOWLEDGE LED is off and the ALARM ZONES LED is on.
4) Use the SILENCE/ACTIVATE ALARMS button to step through the Zones. Check that the relevant Detection Zone TEST FAULT DISABLED LED is on and the ACKNOWLEDGE LED flashes.
5) When the desired Detection Zone is selected, confirm the selection by pressing the ACKNOWLEDGE button. Check that the selected Zones FIRE LED is on.
6) If required, repeat steps 2 ~ 4 to select additional non-latching zones.
7) Press the ALARM ZONES button to exit Non-latching Zones configuration. Check that the ALARM ZONES LED is off, the ACKNOWLEDGE LED is off, and the FIRE LEDs are off.

- Incoming fire signals for non-latching detection zones will activate Alarm Zones, but will not activate the Alarm Relay(s).
- Faults are non-latching. The Fault Relay will not activate.

8.2.2. Cancel Configuration

To remove Non-latching Detection Zones, complete the following steps:

1) Enter Access Level 3.
2) Press ALARM ZONES button. Check that the ALARM ZONES LED is on.
3) Use the SILENCE/ACTIVATE ALARMS button to step through the Zones. Check that the relevant Zone TEST FAULT DISABLED LED is on and ACKNOWLEDGE LED flashes.
4) When the desired Detection Zone is selected, confirm the selection by pressing the ACKNOWLEDGE button. Check that the selected Detection Zone FIRE LED is on.
5) If required, repeat steps 2 ~ 4 to remove other detection zone delays.
6) Press ALARM ZONES button to exit **Non-latching Zones** configuration. Check that the ACKNOWLEDGE LED is off and ALARM ZONES LEDs are off.

8.3. Alarm Delay

The Alarm Delay requires a sustained fire signal on selected detection zones before an Alarm Condition is recognized.

8.3.1. Time Configuration

To configure Alarm Zone Delay, complete the following steps:

1) Enter Access Level 3.
2) Press DELAYS ACTIVE button. Check that the DELAYS ACTIVE LED and the ACKNOWLEDGE LED both flash.
3) Press the ACKNOWLEDGE button to confirm. Check that the DELAYS ACTIVE LED is on and the ACKNOWLEDGE LED continues to flash. Any existing Alarm Delay Time is shown on the ZONES FIRE LEDs 1 ~ 4. The new time will be displayed on the companion TEST FAULT DISABLED LEDs.
4) Use the SILENCE/ACTIVATE ALARMS button to select the new delay time (maximum 10 min).
5) Confirm the selection by pressing the ACKNOWLEDGE button. The delay time displayed by the TEST FAULT DISABLED LEDs will be copied to the FIRE LEDs.
6) Exit the time configuration by pressing the DELAYS ACTIVE button. The DELAYS ACTIVE LED, ZONES LED, and the ACKNOWLEDGE LED will be off.

- The Alarm Delay Time is shown on the ZONES FIRE LEDs 1 ~ 4:
  Zone 1: 1 min; Zone 2: 2 min; Zone 3: 3 min; Zone 4: 4 min.
- To select the delay, add the time of the illuminated ZONE FIRE LEDs (eg for a delay of 10 minutes all 4 LEDs will be illuminated).
- If no LEDs are on, no delay time is selected.
- Manual call points should not be configured for a delay.

8.3.2. Zone Configuration

To configure Alarm Zone Delay, complete the following steps:

1) Enter Access Level 3
2) Press SELECTED ZONES button. The SELECTED ZONES LED and the ACKNOWLEDGE LED will flash.
3) Press the ACKNOWLEDGE button. The SELECTED ZONES LED will be on, and the ACKNOWLEDGE LED will flash.
4) Use the SILENCE/ACTIVATE ALARMS button to step through the Detection Zones.
5) When the chosen Detection Zone is displayed, confirm the selection by pressing the ACKNOWLEDGE button. The selected Zone FIRE LED is on.
6) If required, repeat steps 2 ~ 4 for additional Zones.
7) To exit, press SELECTED ZONES button. The SELECTED ZONES LED is off and the detection zone LEDs are off and the ACKNOWLEDGE LED is off. The control and indicating equipment will remain in Access Level 3.

8.3.3. Cancel Zone Configuration

To remove Alarm Zone Delay, complete the following steps:

1) Enter Access Level 3
2) Press SELECTED ZONES button. The SELECTED ZONES LED and the ACKNOWLEDGE LED will flash.
3) Press the ACKNOWLEDGE button. The SELECTED ZONES LED will be on, and the ACKNOWLEDGE LED will flash.
4) Use the SILENCE/ACTIVATE ALARMS button to step through the Detection Zones.
5) When the chosen Detection Zone is displayed, confirm the selection by pressing the ACKNOWLEDGE button. The selected Zones FIRE LED is off.
6) If required, repeat steps 2 ~ 4 for additional Zones.
7) To exit, press SELECTED ZONES button. The SELECTED ZONES LED is off and the detection zone LEDs are off and the ACKNOWLEDGE LED is off. The control and indicating equipment will remain in Access Level 3.

9. COMMISSIONING

9.1. Control Panel

To commission the control and indicating equipment, undertake the following actions and tests.

1) Activate the mains supply.
2) Fit the batteries, taking care to ensure the correct voltage polarity. The green SUPPLY LED should be the only indicator illuminated. If fault or other indicators are active, resolve the cause(s) of the indication before proceeding.
3) Undertake the indicator tests specified in 5.4.1.
4) Configure any required Alarm Dependency, Alarm Zone Delay, and Non-Latching Detection Zone functions.
5) Test each function for correction operation.

9.2. Detection Devices

To commission the detection devices installed and connected to the control and indicating equipment, undertake the detection device tests specified in 5.4.2.

> When testing devices, the Alarm Condition will be affected by Alarm Dependency, Alarm Zone Delay and Non-Latching Detection Zones configured for the system.

9.3. Alarm Devices

To commission the alarm devices installed and connected to the control and indicating equipment, undertake the following actions and tests:

1) Enter Access Level 2.
2) Press SILENCE/ACTIVATE ALARMS button. Check that the SILENCE/ACTIVATE ALARMS LED flashes and the ACKNOWLEDGE LED flashes.
3) Press the ACKNOWLEDGE button. Check that the ACKNOWLEDGE LED is off, that the alarm devices operate, and that the SILENCE/ACTIVATE ALARMS LED is on.
4) Press SILENCE/ACTIVATE ALARMS button. Check that the SILENCE/ACTIVATE ALARMS LED flashes and the ACKNOWLEDGE LED flashes.
5) Press the ACKNOWLEDGE button. Check that the ACKNOWLEDGE LED is off, that the alarm devices silence, and that the SILENCE/ACTIVATE ALARMS LED is off.
6) To exit to Access Level 2, press RESET. The ACKNOWLEDGE LED will flash.
7) Press the ACKNOWLEDGE button. Check that the ACKNOWLEDGE LED is off.

9.4. Relay Outputs

To check the operation of the relay outputs, undertake the following actions and tests:

Alarm Relay

1) Activate a detection zone device. Check that the Alarm Relay operates, the ACKNOWLEDGE LED flashes, and the internal sounder operates.
2) Enter Access Level 2.
3) Press the ACKNOWLEDGE button. Check that the ACKNOWLEDGE LED is off and the internal sounder silences.
4) Press RESET. Check that the ACKNOWLEDGE LED flashes.
5) Press the ACKNOWLEDGE button. Check the relay resets, ACKNOWLEDGE LED is off, the control panel resets and reverts to Access Level 1.

> If alarm zones are active, the alarm zones must be silenced prior to reset.

Fault Relay

1) Disconnect the wiring for a Detection Zone. Check that the Fault Relay operates, the ACKNOWLEDGE LED flashes, and the internal sounder operates.
2) Enter Access Level 2.
3) Press the ACKNOWLEDGE button. Check that the ACKNOWLEDGE LED is off and the internal sounder silences.
4) Reconnect the zone wiring. Check that the ACKNOWLEDGE LED flashes and the internal sounder operates.
5) Press the ACKNOWLEDGE button. Check that the Fault Relay resets, the ACKNOWLEDGE LED is off and the internal sounder silences.

9.5. Remote Display

To commission a Remote Display connected to the control and indicating equipment, undertake the indicator tests specified in 5.4.1.

9.6. Detection Zone Output Relays

To commission the Detection Zone Output Relays, undertake the following actions and tests:

1) Enter Access Level 3.
2) Test one connected device in each Detection Zone. Check that the relevant detection zone output relay operates.
3) Press RESET. Check that the ACKNOWLEDGE LED flashes.
4) Press the ACK button. Check the ACKNOWLEDGE LED is off and the relay resets. The control and indicating equipment will revert to Access Level 1.

9.7. Repeater Panel

To commission the Repeater, undertake the following actions and tests:

1) Enter Access Level 3.
2) Test one connected device in each Detection Zone. The relevant FIRE LED will illuminate on the Repeater.
3) On the Repeater, press RESET. Check that the ACKNOWLEDGE LED flashes.
4) Press the ACKNOWLEDGE button. Check the ACKNOWLEDGE LED is off and the relay resets. The control and indicating equipment will revert to Access Level 1.

10. TROUBLE SHOOTING GUIDE

General Fault Indicator

The FAULT indicator in the STATUS area of the display is always illuminated whenever the control and indicating equipment is in the Fault Condition. The General fault indicator is associated with a specific fault that will be indicated in the ZONES or FAULTS area of the display.

Condition	Description	Actions
Zone Fault	Indicates a fault in the alarm zone transmission path between the control and indicating equipment and connected devices (eg detectors, manual call points, modules, etc). The causes include short- and open-circuit of the wiring.	Check the wiring for damage or disconnection.
Mains Supply Fault	Indicates the unavailability of the mains power.	Check the power supply fuse. Replace the fuse if it is faulty. Check the incoming mains supply voltage.
Battery Fault	Indicates the unavailability of the battery power, or a voltage level less than DC 20 V. The battery may be depleted because the mains supply has been unavailable for an extended period of time, or there is a fault in the battery charger that prevents the batteries from being charged.	Check that the battery connections are secure. Measure the battery voltage. If the battery voltage is less than the manufacturer's minimum voltage, replace the batteries. Measure the battery charging voltage to ensure the battery charger is operating correctly. Measure the battery internal resistance to ensure it is less than 0.5 Ω.
System Fault	Indicates a fault with the internal supply voltages used to supply power to the microprocessor, or to the running of the control program.	Contact the service company to replace the main controller.
Earth Fault	Indicates a current leakage from any of the fire detection and alarm system wires to Earth. This may occur if there is damage to a single conductor, and it contacts some conductive equipment connected to Earth.	Isolate each of the transmission paths in turn until the wires causing the Earth have been identified. Trace the faulty wires to locate the source of the connection to Earth, and prevent the connection path.

11. SERVICE

Service intervals may be set by local regulations.

11.1. Inspections

Conduct the following inspections every 6 months.

1) Inspect detectors for any condition that is likely to adversely affect their operation, such as excessive deposition of dust or coating of paint.
2) Inspect battery condition for signs of corrosion.
3) Inspect manual call points for clearance and ease of access.
4) Inspect alarm devices for clearance, visibility, and marking.
5) Inspect the documentation to ensure it is available and complete.

11.2. Tests

11.2.1. 6 Monthly Tests

Conduct the following tests every 6 months.

1) Test that an alarm simulated from a detection zone causes the Alarm Condition and all required outputs (e.g. alarm devices, output relays) activate, including any delayed outputs. Confirm that all required visual and audible indications and outputs activate at the control panel.
2) Test that a Fault Condition occurs for the following events:
   a) The removal of a detector from the addressable loop;
   b) The failure of the transmission path between the control panel and other connected equipment (eg repeater panel);
   c) The failure of the transmission path to networked equipment.
3) Test that disabling a detector in a detection zone causes the control and indicating equipment to enter the Disabled Condition. Confirm that all required visual and audible indications and outputs activate at the control panel.

Standby Power Source Tests

1) Measure the battery voltage. The battery voltage should be DC (27.5 +± 0.2) V.
2) Disconnect the mains supply and ensure the battery voltage does not fall below DC 27 V.
3) Place the equipment into the Alarm Condition and ensure the battery voltage does not fall below DC 26.5 V.

11.2.2. Annual Tests

Conduct the following tests every 12 months:

1) Test the operation of 20 % of point-type heat detectors using a heat source so that all heat detectors are tested over 5 years.
2) Test the operation of 50 % of point-type smoke detectors using smoke or suitable aerosols so that all smoke detectors are tested over 2 years.
3) Test the operation of 50 % of flame detectors using flame or simulated flame so that all flame detectors are tested over 2 years.
4) Test the operation of 50 % of CO detectors using CO or a suitable gas so that all detectors are tested over 2 years.
5) Test the operation of all manual call points.
6) Test that the audible alarm devices are audible throughout the building and ensure the sound pressure level meets the requirements of the commissioning report.
7) Test that the light output level from visual alarm devices is no less than the design requirements.
8) Test that the standby power source capacity is equal to or greater than the calculated requirements.

11.3. Preventive Maintenance

Unless the batteries have been tested and found to have sufficient capacity to fulfil the fire detection and alarm system power requirements, replace the batteries after the manufacturer's recommended battery service life.

11.4. Mains Fuse Replacement

The AC Mains fuse is housed in the mains wiring terminal block.

If the mains fuse is blown, replace it with 4 A / AC 250 V slow blow (20 mm).

12. SPECIFICATIONS

12.1. Technical Data

Power Supply	4001-01	4001-02	4001-03
Operating voltage	AC (85 ~ 260) V / 50/60 Hz		
Mains supply current limit	720 mA @ AC 230 V		
Mains supply fuse	4 A / AC 250 V slow blow (20 mm)		
Mains supply fault threshold voltage	≤ AC 60 V		
Power supply	2.2 A @ DC 28.5 V		
Standby battery maximum capacity (2 × DC 12 V)	7.2 Ah		
Maximum battery current draw	1.5 A @ maximum operating temperature		
Battery fuse	6 A resettable (electronic fuse)		
Battery fault threshold voltage	< DC 20 V		
Quiescent current	30 m A @ DC 28 V		
Detection Zones			
Detection zone circuits	2	4	8
Number of connected devices per detection zone circuit	32		
Detector zone quiescent current	5 mA		
Detector zone alarm current	40 mA	80 mA	160 mA
Detector zone wiring characteristics (max)	40 Ω / 0.47 µF		
Detection zone end-of-line capacitor	22 µF / DC 50 V		
Manual call point resistor value	(470 ~ 689) Ω		
Alarm Zones			
Alarm zone outputs	2		
Alarm zone current	910 mA		
Alarm zone end-of-line resistor	(20 ~ 40) kΩ		
Alarm zone monitoring	Open- and short-circuit		
Alarm zone voltage (max)	DC 27.5 V		
Alarm zone fuse	1.1 A resettable (electronic fuse)		
Ancillary Outputs			
Number of programmable output relays	2		
Ancillary fire C/O relay	2 × (1.0 A @ DC 30 V / 1 A @ AC 240 V)		
Ancillary fault N/C relay	1.0 A @ DC 30 V / 1 A @ AC 240 V		
Auxiliary supply	DC 28 V @ 300 mA		
Ancillary Inputs			
Evacuation start / stop	Non-latching, voltage-free		
Day / Night mode	Non-latching, voltage-free		
Remote reset	Non-latching, voltage-free		
Miscellaneous			
Terminal wiring	(0.4 ~ 2.5) mm^2		
Operating temperature	(0 ~ +50) °C		
Operating humidity	(0 ~ 95) % RH, non-condensing		
Storage temperature	(-25 ~ +80) °C		
Storage humidity	(0 ~ 98) % RH, non-condensing		
Dimensions (h × w × d)	(402 × 337 × 99) mm		
Weight (excluding batteries)	4.0 kg		

For current technical data, refer to the 4001 Control Panel datasheet. Document number 31-0002.

12.2. Ordering Information

Model	2 Alarm Zone Circuits	4 Alarm Zone Circuits	8 Alarm Zone Circuits
4001-01	✓	—	—
4001-02	—	✓	—
4001-03	—	—	✓

12.3. Battery Calculations

Calculate the required battery capacity for the installation using the following formula.

$$[(I_Q \times t_S) + (I_A \times t_A)] \times 1.2$$

Where:

I_Q is the total quiescent current (in amps)

t_S is the required battery operating time (in hours) when the mains supply is unavailable

I_A is the total Alarm Condition current (in amps) with all devices operating

t_A is the required Alarm Condition operating time (in hours) following t_S

13. COMPATIBILITY

The following devices are compatible with the 4001 non-addressable control panel.

Device	Part Number
Smoke/heat detector	403-001; SNC-300-C2; SNC-300-C2-U
Smoke/heat detector with remote LED output	403-002; SNC-300-CL; SNC-300-CL-U
Smoke detector	403-006; SNC-300-S2; SNC-300-S2-U
Smoke detector with remote LED output	403-007; SNC-300-SL; SNC-300-SL-U
Heat detector	403-012; HNC-310-H2; HNC-310-H2-U
Heat detector with remote LED output	403-013; HNC-310-HL; HNC-310-HL-U
CO gas alarm	400-001
CO gas alarm with remote LED output	400-002
Propane gas alarm	402-001
Natural gas alarm	402-003
Flame detector	401-001
Flame detector with remote LED output	401-002
Relay base	480-001; 480-002
Manual call point	460-001; 460-002; 460-003; 460-004; 460-005; 460-006 461-001; 461-002; 461-003
Alarm bell	440-001
Audio/visual alarm device	441-001
Audio alarm device	442-001; 442-002
Visual alarm device	442-003
Audio/visual alarm device	442-004
8-zone repeater panel, DC 24 V	4001-04
8-zone repeater panel, AC	4001-09
Network interface card	6001-03
Remote LED display card, 16 indicators	6001-04
Detection zone output relay card	6001-07

14. SPARE PARTS

The following spare parts are available for the 4001 non-addressable control panel.

Description	Part Number
Control panel power supply, 24V, 2.2A	4000-04
Control panel operating face label, 2 ~ 8 detection zones	4000-05

15. GLOSSARY AND REFERENCES

The following terms are associated with the 4001 non-addressable control panel.

Term	Description	Reference
Access levels	Hierarchical levels to gain access to specific control and configuration functions.	EN 54-2, *Control and indicating equipment*
Alarm Condition	When an event from an input device (eg detector) is recognized as a fire.	EN 54-2, *Control and indicating equipment*
Control and indicating equipment	This equipment, that monitors devices displays events, initiates alarm devices, and allows control of the fire detection and alarm system.	EN 54-1, *General and definitions*
Disable Condition	When an alarm zone (input devices or outputs) will not report alarm or fault events, nor respond to any event even reported by another zone.	EN 54-2, *Control and indicating equipment*
Fault Condition	When an event (either from an input device, a transmission path, or within the control and indicating equipment) is recognized as a fault.	EN 54-2, *Control and indicating equipment*
Fire detection and alarm system	All detection, control and alarm equipment, including detectors, manual call points, control and indicating equipment, and audio & visual alarm devices.	EN 54-1, *General and definitions*

The following documents are associated with the 4001 non-addressable control panel.

Description	Reference
4001 Control panel	31-0002 datasheet; 32-0002 installation manual; 33-0012 user manual
6001-03 Network interface card	31-0048 datasheet
6001-04 Remote LED display card, 16 indicators	31-0049 datasheet
6001-07 Detection zone output relay card	31-0052 datasheet

Website

For more information, including product datasheets and other support material, please view our website at www.numens.com

Contact Us

For sales and specific enquiries, please contact our sales office by telephone or email. Enquiries can also be submitted through our website.

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