
Introduction

Product: ESSENTIAL 2, ESSENTIAL 4

This manual contains necessary details on the FireClass Essential Panels for application design.

The following supporting documentation is also available:

- *FireClass Essential Panels User Manual (A16381AH0G_EN)*
- *FireClass Essential Panels Installation and Commissioning Manual (A16381G5K2_EN)*

General description

The panels are fully compliant with the mandatory requirements and selected optional requirements of EN 54-2, EN 54-4, and listed as part of the EN 54-13 system certificate.

The following panels are in this range:

- FireClass Essential 2 Zone Panel
- FireClass Essential 4 Zone Panel

A single plastic enclosure houses each panel in the range. Each panel has door-mounted buttons that are fitted with a polyester overlay. The buttons provide user controls and indications, and an enable key locks or unlocks user controls. All indications are represented by LEDs. The panel enclosure houses the power supply and standby batteries.

Cabinet specifications

Figure 1: FireClass Essential 2 Zone Panel



Figure 2: FireClass Essential 4 Zone Panel



- ① **Note:** The panels include top entry, 20 mm knockouts for wiring. Suitable cable glands are supported in the 20 mm knockout size.

Panel description

The main system boards are different, depending on the variant.

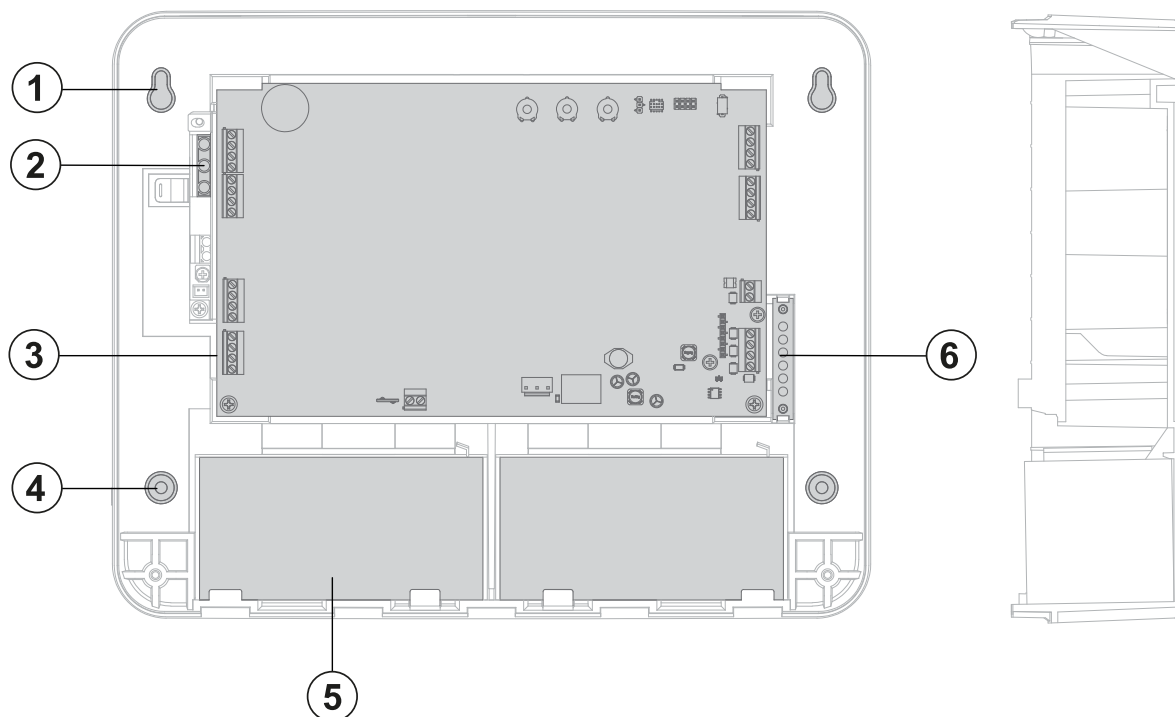
2 Zone and 4 Zone main system board

The FireClass Essential 2 Zone and 4 Zone panels support fire detection and fault status reporting. The panels also monitor conventional detectors, sounders, power supply, and battery charge. The panel provides visible LED indications, buttons, and a buzzer for audible indication.

The panels supply one supervised 24 VDC, 0.25 A auxiliary power output and one unsupervised 24 VDC, 0.5 A auxiliary power supply output along with two open collector outputs, two sounder circuits at 0.4 A each, and fire and fault relays. The panel also has two non-latching auxiliary inputs.

Field wiring is made through field terminals. The power supply unit (PSU) BAW50T24 is integrated into the panel housing. For battery connections, there is a separate terminal onboard. The micro-controller that includes the firmware, all the site-specific configuration features, jumper settings, and EEPROM are on the board. To set the delay to output feature, a potentiometer is provided.

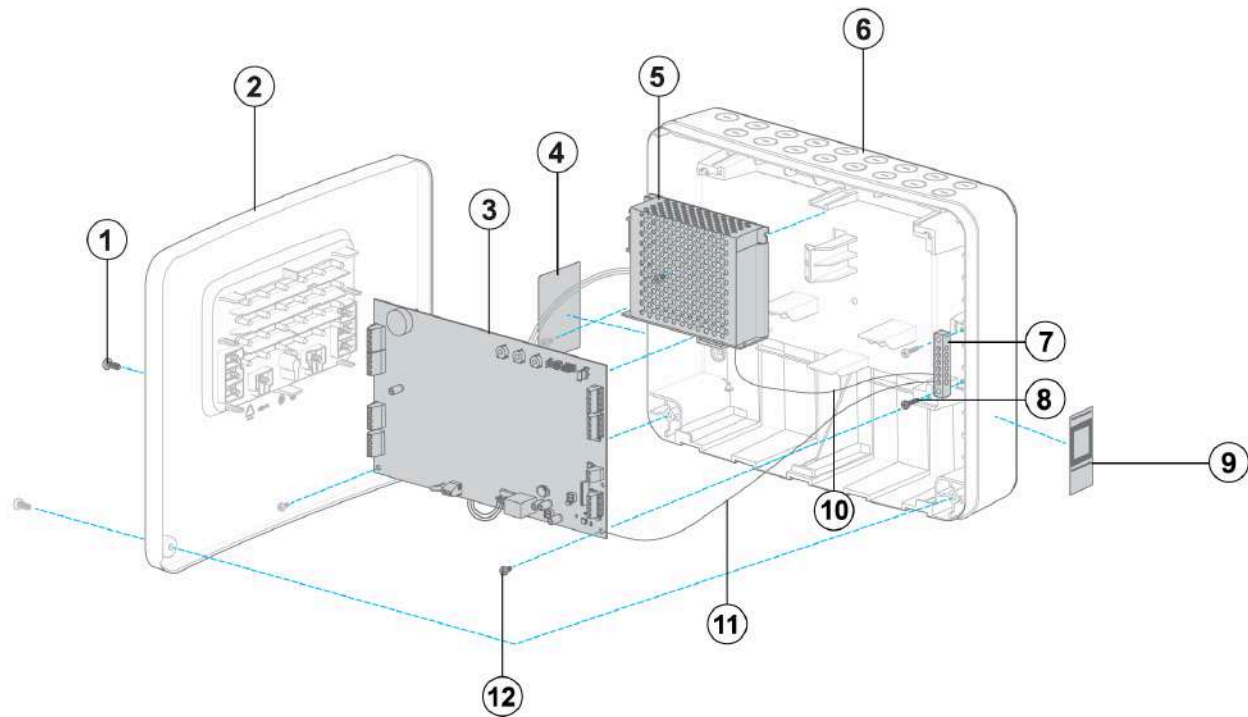
Figure 3: 2 Zone and 4 Zone main components



Callout	Component
1	Enclosure mounting hole
2	PSU
3	2 Zone or 4 Zone main system board printed circuit board assembly (PCBA)
4	Enclosure mounting hole
5	Battery
6	Earth bar

Panel assembly

Figure 4: Panel assembly



Callout	Component
1	Door screw
2	Door or cover assembly
3	2 Zone or 4 Zone main system board PCBA
4	Panel label
5	PSU
6	Cabinet enclosure
7	Earth bar
8	Earth bar screws
9	Product QR code
10	Earth wire 2
11	Earth wire 1
12	Main system board and PSU screws

Panel range

Table 1: Panel range

Panel	Enclosure dimensions	PSU output	Secondary source: Chargeable battery
2 Zone or 4 Zone panel	282 mm x 352 mm x 86 mm (H x W x D)	27.6 VDC, 1.8 A	2 x 12 VDC, 3.4 Ah

Functional specification

Panel input and output list

Table 2: Panel input and output list

Input/output	Panel	
	2 Zone panel	4 Zone panel
Detection zones	2	4
Fire relay output	1	1
Fault relay output	1	1
Sounder circuits	2, 0.4 A each	2, 0.4 A each
Buzzer	1	1
Supervised and resettable auxiliary supply	1, 24 VDC, 0.25 A	1, 24 V VDC, 0.25 A
Unsupervised auxiliary supply	1, 24 VDC, 0.5 A	1, 24 V VDC, 0.5 A
Auxiliary inputs, non-latchable	2	2
Open collector outputs	2	2

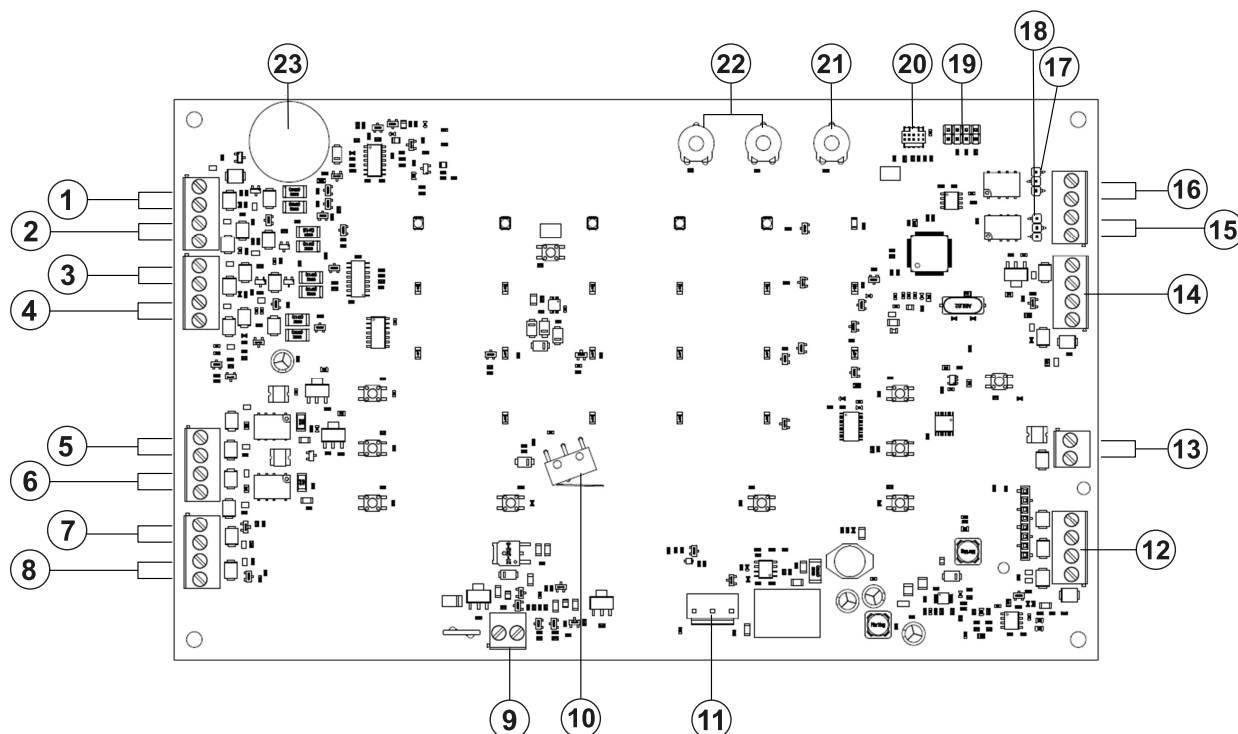
Features list

Table 3: Features list

Feature	Description
Zone detection	The panel detects alarm condition, and the following faults: open, short, missing detector, and invalid end of line resistor (EOLR).
OC1 and OC2	Two open collector auxiliary outputs connected over supervised auxiliary supply. A maximum load of 0.1 A can be connected to each of these output terminals. Reset output (OC2) turns on during the panel's reset cycle. OC2 resets the fire alarm system devices. This output remains active for 5 seconds after all other outputs have returned to normal. Remote output (OC1) turns on for any new fire alarm condition, or if you press the Silence/Resound button. This output turns off when the panel is silenced. This output does not turn on due to a change in auxiliary inputs.
Auxiliary power outputs	The panel has one supervised 24 V DC auxiliary power supply for open collector output. A load of up to 0.25 A can be connected with this output. This line is monitored for short circuit and overcurrent conditions. This is a resettable auxiliary power. The panel also provides a second unsupervised and non-resettable 24 V DC auxiliary supply. A load of up to 0.5 A can be connected with this output.
Auxiliary input	The panel has two auxiliary inputs. To activate the inputs, pull them to 0 V.
	Auxiliary 1 input, for example, alert input: When the input is activated, the sounder operates periodically, 5 seconds on and 5 seconds off.
	Auxiliary 2 input, for example, class change input: When the input is activated, the sounder is active continuously.
Zone test	When a zone is put into test and a detector or call point is activated, the sounders operate as follows until the detector or call point is reset: For each cycle the sounders turn on for 2 seconds and then turn off for 2 seconds. The number of cycles is dependent on the zone in test condition. There are n cycles for n zone number. For example, zone 3 runs three cycles of the sounder. ① Note: You have to manually restore the call point to complete the test.

Main system board features

Figure 5: Main system board layout



NO/NC: Normally Open/Normally Closed

❶ **Note:** For the 4 Zone variant, conventional zones 1 to 4 are available. For the 2 Zone variant, zones 1 and 2 are available on the board.

Callout	Component
1	Zone 4
2	Zone 3
3	Zone 2
4	Zone 1
5	Sounder 2
6	Sounder 1
7	Auxiliary input 2
8	Auxiliary input 1
9	Battery terminal
10	Front panel controls enabling switch
11	Power supply terminal
12	Repeater interface, for future use
13	Repeater supply, for future use and unsupervised auxiliary supply
14	Open collector outputs and supervised auxiliary supply
15	Fire relay output

Callout	Component
16	Fault relay output
17	Fault relay output type selection jumper (NO/NC)
18	Fire relay output type selection jumper (NO/NC)
19	Reserved connection
20	Reserved connection
21	Potentiometer R148 for delayed output mode
22	Potentiometer R146 and R144 for the minutes and hours setting
23	Buzzer

Power supply

The power supply provides 27.6 VDC nominal voltage at load current up to 1.8 A. It is designed in accordance with the requirements of EN 54-4.

The PSU is fitted below the main system board PCBA for both the 2 Zone and 4 Zone panels.

Battery charger

The power supply provides a temperature-compensated charging voltage for two series-connected sealed lead acid 12 V batteries. Charging voltage range is 26.72 VDC at 50°C to 28.25 VDC at -10°C.

Use the 12 V, 3.4 Ah battery as a secondary power source.

The battery health and battery connections are checked by a battery monitoring circuit. The battery/charge fault LED illuminates and the fault relay is activated, when the following events occur:

- The battery is disconnected or the battery voltage is less than 19.7 VDC
- The battery is overcharged above 28.5 VDC with a tolerance of +0.5 V
- The battery and interconnection resistance is greater than or equal to 1 ohm

The circuitry also protects against reversed connection of the batteries.

The thermal probe is added to the battery surface to monitor its temperature. The output of the PSU regulates according to the temperature. In the case of overheating, the charging cuts off.

4 Zone panel power supply features and connections

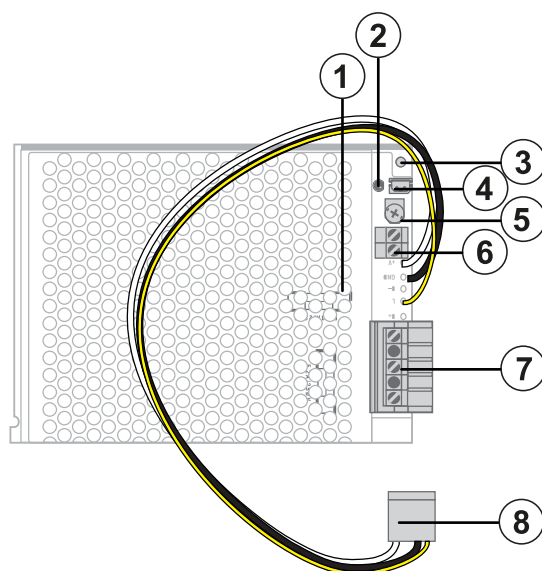
Figure 6 shows the layout of the panel power supply.

① **Note:** This is not approved for 110 VAC.

Table 4: Power supply features and connections

Item	2 Zone and 4 Zone panel
Input voltage	230 VAC -15% / +10%; 50/60 Hz
Current consumption	0.65 A/230 VAC
Output voltage/current	27.6 V/1.8 A

Figure 6: BAW50T24 switched-mode PSU



Callout	Component
1	Protection fuse, irreplaceable
2	Main power LED
3	PSU fixing hole
4	Thermo-couple cable connector
5	PSU output voltage fine trimmer
6	27.6 V auxiliary power supply terminals, inaccessible for user
7	230 VAC 50/60 Hz mains power terminals
8	Supply cable to connect with main system board

Order information

Table 5: Order information

SKU	Description
508.032.730	FireClass Essential 2 Zone Panel
508.032.731	FireClass Essential 4 Zone Panel
508.032.732	FireClass Essential 4 Zone Panel Main System Board
508.032.733	FireClass Essential 2 Zone Panel Main System Board
PS-1230	12 V, 3.4 Ah Battery
508.031.752	BAW50T24 Switched-Mode PSU/Battery Charger Max 1.8 A at 27.6 VDC

User interface

The following sections provide an overview of the indications and buttons on the panel user interface (UI).

Figure 7: 2 Zone panel UI

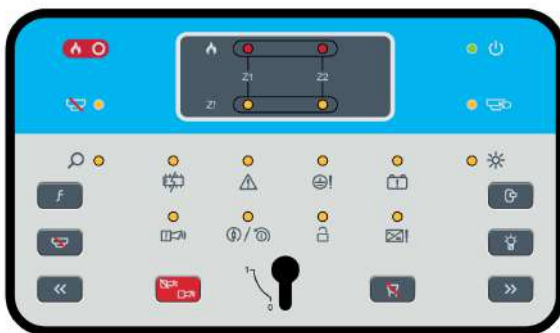


Figure 8: 4 Zone panel UI



Figure 9: Enable key



UI indications

Table 6: General indicators

Indicator icon	Indicator description	Indicator colour	Operating condition
	Power supply	Green	Illuminates steady for mains or battery power on
	Test	Yellow	Flashes when any zone is in test condition Steady on while you select the test programming
	Accessed	Yellow	Steady on in access level 3 and flashing in access level 2
	Enabled/disabled	Yellow	Flashes during enable/disable programming Steady on when any zone or sounder is disabled Steady on while you select the enable/disable programming
	General fire/zone fire	Red	Flashes for a fire alarm and turns steady on when the alarm buzzer is silenced The general fire indication and individual zone fire indications are identical
	Common fault	Yellow	See Common fault detection

Table 6: General indicators

Indicator icon	Indicator description	Indicator colour	Operating condition
	Power supply fault	Yellow	Flashes for mains failure or power supply failure
			Flashes twice continuously for panel overcurrent
			Flashes four times continuously for PSU over voltage
			See Power supply fault detection
	System fault	Yellow	Steady on for all system faults
			See System fault detection
	Earth fault	Yellow	Flashes when an earth fault occurs
			See Earth fault detection
	Sounder fault	Yellow	Flashes for any sounder fault
			See Sounder fault detection
			Steady on when the sounders are disabled
	Aux fault	Yellow	Flashes for an auxiliary fault
			See Auxiliary power fault detection
	Battery fault	Yellow	Flashes for a battery fault
			See Battery fault detection
	Reserved for future use		

Table 6: General indicators

Indicator icon	Indicator description	Indicator colour	Operating condition
	Delay	Yellow	Steady on for delay programming mode selection
			Flashes twice when the delay time is overridden
			Flashes continuously when the delay time is set
			Off when the delay is disabled for all zones
	Zone fault	Yellow	See Zone fault detection

Table 7: Zone location indicators

Indicator icon	Indicator description	Indicator colour	Operating condition
	Separate fire LED indicator for each zone	Red	Flashes when a zone is in an alarm condition
			Steady on when the alarm buzzer is silenced
	Separate fault LED indicator for each zone	Yellow	Depending on the type of fault, this flashes when a zone is in a fault condition
			Steady on when a zone is disabled

UI buttons

Table 8: UI buttons

Button icon	Button description	Button functionality	Button availability
	Enable/disable	See Using the enable/disable button	In access level 2 and 3
	Reset	See Using the reset button	In access level 2 and 3
	Buzzer silence	See Using the buzzer silence button	In access level 1, 2, and 3

Table 8: UI buttons

Button icon	Button description	Button functionality	Button availability
	Lamp test	See Using the lamp test button	In access level 1, 2, and 3
	Function	See Using the function button	In access level 1, 2 and 3
	Silence/resound/ evacuation	See Using the silence/ resound/evacuation button	In access level 2 and 3
	Right navigation	See Using the right navigation button	In access level 2 and 3
	Left navigation	See Using the left navigation button	In access level 2 and 3

Using the enable/disable button

Press the **Enable/Disable** button in the following events:

- To enable or disable the sounder and zones.
- To turn on and off the delay to output on individual zones.

Using the reset button

To reset the state of the panel, press the **Reset** button. The following events then occur:

1. The panel turns off the detectors for 2 seconds. The alarm clears from the panel after reset.
2. If an alarm condition remains, the alarm indications and sounder restart.
3. The power to auxiliary outputs turns off for 5 seconds.
4. The reset output then activates for 5 seconds and turns off.
5. Refer to the Resetting the fire alarm section in the FireClass Essential Panels User Manual (A16381AH0G_EN).

Using the buzzer silence button

- To silence the buzzer in either a fire or fault event, press the **Buzzer Silence** button.

Using the lamp test button

- When you press the **Lamp Test** button for 5 seconds, all the LEDs on the panel and the buzzer turn on for 10 seconds, then turn off again.

Using the function button

Press the **Function** button in the following events:

- To enter programming mode in access level 2 and 3.
- To navigate through functions such as test mode, enable/disable, and delay to output for individual zone programming.
- To override the delay mode, refer to the Overriding the delay mode section in the FireClass Essential Panels User Manual (A16381AH0G_EN).

Using the silence/resound/evacuation button

1. Following a fire alarm condition, to silence the sounders and deactivate the remote output, press the **Silence/Resound/Evacuation** button.

The fire alarm LED is unaffected by the sounder silence/resound/evacuation button.

2. To turn on the previously silenced sounders and reactivate the remote output, press the **Silence/Resound/Evacuation** button.
3. To turn on the sounders, fire relay, and remote output for manual evacuation, press the **Silence/Resound/Evacuation** button.

The general fire LED starts to flash in evacuation.

Using the right navigation button

Press the **Right Navigation** button in the following events:

- To navigate between zones and the sounder in enable/disable programming.
- To navigate between zones in test programming.
- To navigate between zones in delay to output programming.

Using the left navigation button

Press the **Left Navigation** button in the following events:

- To navigate between zones and the sounder in enable/disable programming.
- To navigate between zones in test programming.
- To navigate between zones in delay to output programming.

Fault detection

The following events occur for all new faults:

1. The respective fault LED flashes, depending on the type of fault in the subsystem.
2. The common fault LED flashes on and off continuously for a new fault detection.
3. The buzzer turns on.
4. The fault relay turns on.

The following events occur for restored faults:

1. The fault relay deactivates.
2. The common fault LED and respective fault LED turn off.
3. The buzzer turns off.

- ❗ **Note:** After a fault occurs, fault outputs are not active for a minimum of 10 seconds. This eliminates spurious outputs caused by such conditions as momentary brownouts on the mains supply.

Common fault detection

The common fault indicator flashes continuously when any of the following faults occur on the panel:

- Zone fault
- Sounder fault
- Power supply fault
- Battery fault
- Aux fault
- Earth fault

The common fault indicator is steady on for a system fault or when the **Buzzer Silence** button is pressed.

Power supply fault detection

The power supply fault LED flashes as follows:

- For a mains disconnection, the LED flashes on and off continuously.
- For panel overcurrent, the LED flashes twice continuously.
- For PSU over voltage above 28.5 VDC with a tolerance of +0.5 V, the LED flashes four times continuously.

System fault detection

If a system fault is detected, the system fault LED and common fault LED turn steady on.

Earth fault detection

If an earth fault is detected, the earth fault LED flashes on and off continuously.

Sounder fault detection

The sounder fault LED flashes as follows:

- For sounder short, the LED turns on and off continuously.
 - For sounder open, the LED flashes twice continuously.
- Both sounder 1 and sounder 2 circuits use the sounder fault LED.

Zone fault detection

The following LED pattern occurs on respective zones when a zone fault is present.

1. Zone open: The respective zone fault LED flashes twice continuously.
2. Zone short: The respective zone fault LED flashes once continuously.
3. Zone disabled: The respective zone fault LED is steady on.
4. Missing detector in a zone: The respective zone fault LED flashes three times continuously.

❗ **Note:** Missing detector fault is skipped in the fire alarm.

The 601F Flame Detector, 516.600.006, is incompatible with these panels due to detector head removal monitoring and if used in the zone circuit, it will adversely affect this feature.

5. Invalid end-of-line resistor (EOLR): The respective zone fault LED flashes four times continuously.
6. Zone-in-test: The respective zone fault LED flashes continuously, in sync with the test LED.

Auxiliary power fault detection

If an auxiliary power fault or auxiliary output fault is detected, the aux fault LED flashes on and off continuously.

Battery fault detection

The battery fault LED flashes as follows:

- When the battery voltage is less than 22.7 VDC, a low battery fault occurs, and the LED flashes twice continuously.
- When the battery voltage is less than 19.7 VDC, a depleted battery fault occurs, and the LED flashes on and off continuously.

If the panel has a battery depleted fault and there is no mains supply, then the sounder, remote output, zone power, and fire relay turn off immediately, irrespective of faults or alarm events.

If the battery voltage is less than 19.0 VDC, the panel enters sleep mode, and all audio and visual indications turn off except for the following LEDs:

- Power supply fault LED
- Battery fault LED
- Common fault LED

The panel restarts all functions if the mains power supply is resumed with a system fault.

If this condition persists, the batteries are unable to function as intended in the event of a blackout.

❗ Note: New batteries are required.

- If the battery is not connected, the LED flashes on and off continuously.
- If the battery has a high internal resistance fault, the LED flashes three times continuously.
- If the battery is overcharged and the voltage is more than 28.5 VDC with a tolerance of +0.5 V, a battery overcharge fault occurs, and the LED flashes four times continuously. The charging is cut off from the battery.

Zone test condition

The following section contains information about the zone test condition.

Features of the zone test condition

The features of the zone test condition are the following:

- When any zone that is not in test condition enters alarm condition, the test condition in all zones is temporarily disabled.
- After you reset all of the alarms on the panel, the panel resumes the previous zones' test condition.
- Sounders sound differently when each zone is in test mode.

It is dependent on the number of cycles for each zone. For each cycle: Sounder on for 2 seconds and off for 2 seconds.

- Zone 1: runs only a single cycle
- Zone 2: runs two cycles
- Zone 3: runs three cycles
- Zone 4: runs four cycles

Accessing test selection mode

1. Log on to access level 2.
2. Press the **Function** button.
The test LED turns steady on in program selection mode.
3. Press the **Right Navigation** button to enter test mode.
The test LED and zone fault LED flash in sync.

Note: Only test each zone after the panel is free of faults and has no active events. Only the enabled zones are selected for the test mode.

Selecting the zone to be tested

- To select the zone to be tested, use the **Left Navigation** or **Right Navigation** buttons.
The selected zone fault LED and test LED flash in sync.

Applying the test mode to the selected zone

- To activate the test condition on the selected zone, activate a detector or a manual call point.
When the detector or call point is active, the zone fault LED, test LED, and the respective fire alarm LED flash in sync with each other until the sounder turns on and off the selected zone number of times. For example, if zone 3 is selected for test mode, the sounder turns on and off three times.

Note: Restore the call point if it is used to test a zone. Otherwise, it continues to run the test on the respective zone.

Exiting the zone test selection mode

- Press the **Function** button when the test is completed or to exit test mode.
The test LED and selected zone fault LED turn off.

Engineer functions

The following sections describe the engineer functions.

Factory default

To return the panel to the factory default condition, complete the following steps:

1. Enter access level 3.
2. Press the **Left Navigation** and **Right Navigation** buttons simultaneously and then release. The panel restarts.
3. Press the **HW RST** button to clear the system fault and common fault.
4. In access level 2 or 3, press the **Reset** button.
After reset, the database and configuration in the panel is set to the following factory default settings:
 - All zones and sounders are enabled
 - All zone delays are disabled

Engineer's configuration process

Fire and fault detection is disabled, and the LED indications are cleared, when users enter into either enable/disable or delay to output programming.

The LED indications for fault and alarm are restored when the user exits the programming mode.

To enable or disable various programmable configuration options associated with the zonal inputs and outputs, the engineer can operate the appropriate potentiometers located within the panel enclosure. The programmable configuration options include the following:

- Configure zones for delay to output
- Configure the zones and sounders as either enabled or disabled

Enable or disable the delay to output feature

ⓘ Note: Do not set delay to output feature on the zones where call points are installed.

The following sections provide instructions on how to enable or disable the delay to output feature on each zone.

The feature delays the activation of the sounders, remote output, and fire relay.

This feature is activated after an alarm input is received from a zone that has delay to output enabled.

Figure 10: Normal potentiometer denoting time in minutes for setting the delay



In default condition, the arrow of the potentiometer points to 0.

Setting the value of the delay to outputs

1. Log on to access level 3.

2. Use a suitable screwdriver to turn the potentiometer anti-clockwise to 0.
3. Turn the potentiometer clockwise to the required delay in minutes.
The potentiometer wiper points to a number. When the number is set, the potentiometer beeps to acknowledge the delay, in minutes.
4. Set the potentiometer value to between 1 to 10.
5. Log off of access level 3.

Accessing the delay to output feature

1. Enter access level 2 or 3.
2. Press the **Function** button three times.
The delay LED turns on.
3. Press the **Right Navigation** button to enter the delay to output selection.
4. To browse to the required zone, press the **Left Navigation** or **Right Navigation** button.
The respective zone fault LED flashes in sync with the delay LED if the delay is enabled on that zone.
The zone fault LED turns steady on to indicate that the delay is disabled on that zone.

Enabling and disabling the delay

1. To enable or disable the delay for a selected zone, press the **Enable/Disable** button.
The respective zone fault LED alternates between flashing and steady on.
 - Flashing zone fault LED - Delay to output enabled
 - Steady on zone fault LED - Delay to output disabled
2. To save the delay status and to exit from the delay to output feature, press the **Function** button.
Note: Do not configure the zone with manual call points for delay to output.

Display the outputs configured for delay

The delay LED is off when delay to output is not set for any zone or if it is set and the delay is less than 1 minute.

The delay LED flashes once continuously when delay to output is enabled on any zone.

After an alarm, the particular delay enabled zone's fire LED flashes once continuously. The buzzer turns on for fire indication. The sounders, fire relay, and remote output remain off.

When the delay expires, the delay LED flashes twice continuously. The sounders, remote output, and fire relay turn on immediately.

Selecting detection zones or sounders for disablement and enablement

To select the sounder outputs and zones that are to be disabled or re-enabled, complete the following steps.

- Note:** Fire and fault detection is disabled when the user enters test, enable/disable or delay to output programming.
- Note:** The LED indications for fault and alarm clear if the user enters test, enable/disable or delay to output programming. The LED indications are restored when the user exits the programming mode.

Entering enable or disable programming

1. Enter access level 2.
2. Press the **Function** button twice, to select the programming mode.
The enable/disable LED turns steady on.
3. To select a zone or sounder, press the **Right Navigation** button.
The zone 1 fault LED flashes in sync with the enable/disable LED if the zone is enabled, or is steady on if the zone is disabled.

Selecting a zone or sounder

- To select a zone or sounder for enabling or disabling, use the **Left Navigation** or **Right Navigation** buttons.

Enabling/disabling the zone or sounder

Before you begin:

See [Entering enable or disable programming](#) and [Selecting a zone or sounder](#).

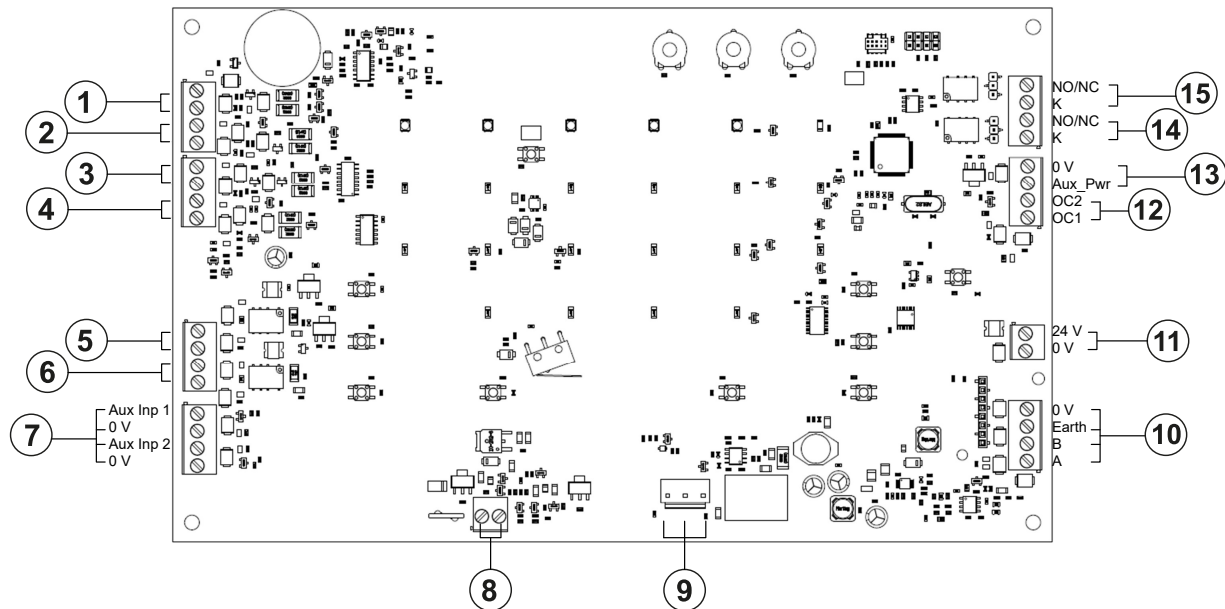
- Press the **Enable/Disable** button.
The selected zone or sounder fault LED either flash in sync with the enabled/disabled LED or turn steady on, depending on the state:
 - Flashing zone or sounder fault LED - enabled
 - Steady on zone or sounder fault LED - disabled

Exiting the enable/disable mode

- Press the **Function** button to save the enable/disable status of respective zones or sounders.
The enabled/disabled LED turns on or off depending on the enable/disable status.
 - If any of the zones or sounders are disabled, the enabled/disabled LED turns steady on.
 - If all of the zones and sounders are enabled, the enabled/disabled LED turns off.
- ❗ **Note:** A disabled output is prevented from operating under any circumstances.
- **Important:** When a zone is disabled, power is still supplied to the zone, but alarms and faults are prevented from triggering in that zone. If devices in disabled zones are activated for any reason, their LEDs light up as power is supplied to those zones.

Circuit connection details

Figure 11: 2 Zone and 4 Zone main system board termination details



NO/NC: Normally Open/Normally Closed

Note: For the 4 Zone variant, conventional zones 1 to 4 are available. For the 2 Zone variant, zones 1 and 2 are available on the board.

Callout	Component
1	Zone 4
2	Zone 3
3	Zone 2
4	Zone 1
5	Sounder circuit 2, 0.4 A
6	Sounder circuit 1, 0.4 A
7	Auxiliary inputs
8	Battery terminals
9	Mains supply input
10	Signals of repeater, reserved for future use
11	Unsupervised auxiliary power, 24 VDC, 0.5 A
12	Open collector outputs
13	Supervised auxiliary power, 24 VDC, 0.25 A
14	Fire relay output
15	Fault relay output

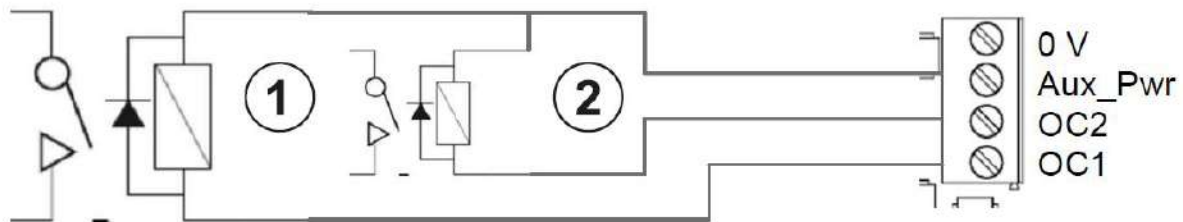
Auxiliary supply

An auxiliary DC supply is available to power external field equipment from the panel. This is nominally rated at 27.6 VDC but varies during mains failed conditions. See [Appendix](#) for details of maximum load.

The auxiliary supply terminals are labelled Aux DC 0 V and 24 VDC. A load of up to 0.25 A can be connected with it. Open collector outputs OC1, OC2 are connected through auxiliary power.

Auxiliary outputs

Figure 12: Auxiliary outputs



Callout	Description
1	Remote output
2	Reset output

Figure 12 shows how both the auxiliary outputs drive the connected circuit to GND or 0 V when active. This then drives the devices connected to them. Make the connections to the devices considering the equivalent circuit.

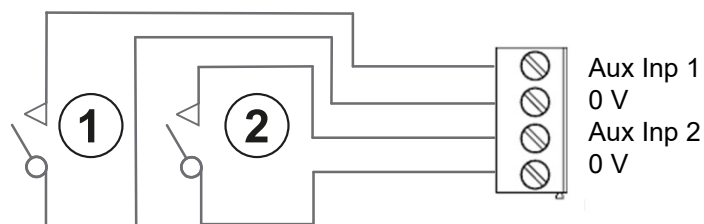
1. OC1 or Remote output: Drives the remote outputs when fire is detected by the panel.
2. OC2 or Reset output: Used to reset the devices when the panel is reset. It is only active for 5 seconds.

Using auxiliary inputs

The auxiliary inputs are pulled up internally in the circuit with 24 VDC. To activate the auxiliary input, complete the following steps.

1. You must connect this pin to one terminal of the switch and connect the other terminal of the switch to GND.
See Figure 13.
2. **Aux 1 input, alert input:**
 - When the switch is turned on, the sounder activates periodically, 5 seconds on and 5 seconds off.
 - When the switch is off, the panel stops the sounders.
3. **Aux 2 input, class change input:**
 - When the switch is turned on, the sounder activates continuously.
 - When the switch is turned off, the sounder deactivates.

Figure 13: Auxiliary I/P connection detail

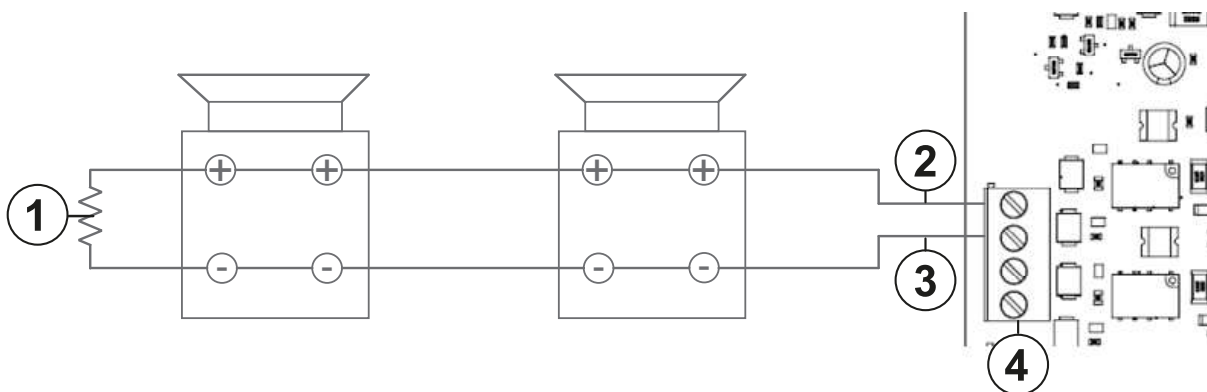


Callout	Component
1	Auxiliary input 1, alert
2	Auxiliary input 2, class change

Sounder circuits

The panels have two sounder circuits with a 0.4 A maximum current rating for each sounder, the total rating is 0.8 A. The circuits are reverse-polarity monitored for open and short circuit faults. For monitoring, all devices must be polarized. The circuit must be terminated with a 3k9 EOL resistor.

Figure 14: Sounder circuit configuration



Callout	Component
1	3.9 K EOLR
2	Sounder 2+
3	Sounder 2-
4	TB6

Sounder 1 connections are the same as sounder 2. They are present on the remaining two terminals of TB6.

The voltage drop on each sounder circuit is calculated to ensure that the minimum voltage at the end of each circuit exceeds the minimum required by each sounding device. The voltage at the end of the circuit is given by:

$$V_{Amin} = V_{Omin} - (I_A \times 2 \times L \times R_C)$$

V_{Amin} = Minimum alarm voltage

V_{Omin} = Minimum output voltage (See [Note](#))

I_A = Alarm current in amps

L = Alarm Circuit length in metres

R_C = Cable resistance (Ohms per metre)

❶ **Note:** Min output voltages: Panel = 21 V

Maximum number of devices on a zone

The maximum number of devices supported by a zone depends on the quiescent current drawn by each device. The quiescent current is listed on the device data sheet provided by the manufacturers and can be used as a guide, but it is advisable to use a multimeter and read the actual current drawn.

The maximum current available is 47 mA, with 3.9 K EOL.

 **Note:** To comply with BSEN 54-2, the maximum number of devices connected to a panel is limited to 32; 25 detectors and 7 manual call points.

Specifications

Detection zone inputs	FireClass Essential Panel	
	4 zone	2 zone
Qty	4	2
Specification	Conventional open and short circuit fault monitored. Short circuit threshold: 47 mA. Quiescent: < 3 mA. Open circuit: N/A (active monitoring through EOLR).	
Cable requirements	2 core, 14 to 24 AWG, unshielded	

Environmental specifications	All panels
Operating temperature	-5 to +40 °C
Operating humidity	Relative humidity: Up to 95 % RH, non-condensing

Alarm circuits (sounders)	2 zone panel	4 zone panel
Qty	2	2
Maximum current for each circuit	0.4 A	0.4 A
Output voltage (battery operation)	21 V - 27.6 V, battery charge dependent	
Output voltage (mains operation)	27.6 V, temperature dependent	
Fault monitoring	Open, and short circuit faults detection	
Cable requirements	14 to 24 AWG, 2 core, unshielded cables	

Auxiliary supply	2 zone panel	4 zone panel
Maximum current	0.25 A	0.25 A
Auxiliary supply, battery operation	21 V - 27.6 VDC, battery charge dependent	
Auxiliary supply, mains operation	27.6 VDC, temperature dependent	
Electronic protection	Monitored for short and overcurrent or resettable	
Cable requirements	0.25 mm ² to 2.5 mm ² , 2 core unshielded	

Appendix

EN 54 optional functions with requirements

The panel has the following EN 54 optional functions.

- Clause 7.8 (a, b, c) Outputs to fire alarm devices
- Clause 7.11 Delays to outputs
- Clause 8.3 Fault Signals from Points
- Clause 10 Test condition

Calculating the power supply load

To determine the maximum power supply load, perform the following steps:

1. Add the zone current for each zone.
Measure the zone current because it depends on the type and quantity of detectors, and the type of EOL device used. The lowest acceptable values are 5 mA for a standard zone with 3.9 K EOL.
2. Enter this value as I_{panel} .
3. Calculate the maximum load on the alarm circuits in mA in alarm condition.
 - a. Enter this value as I_{alarms} .
4. Calculate the load on the auxiliary supply in mA in alarm condition.
 - a. Enter this value as I_{aux} .
5. Calculate the maximum power supply load using the following formula:

I_{panel} 54.4 mA

I_{alarms} 29.4 mA

I_{aux} 250 mA

$$\begin{aligned} I_{pse} &= (I_{panel} + I_{aux} + I_{alarms}) / 1000 \text{ A} \\ &= (54.4 + 29.4 + 250) / 1000 \text{ A} \\ &= (333.8) / 1000 \text{ A} \\ &= 0.3338 \text{ A} \end{aligned}$$

❶ **Note:** These are the reference calculations.

Calculating the battery standby capacity

- The Mains failed fault battery current = 57 mA, measured.
- The zone current in standby mode = $(8.3 \text{ mA} * 4) = 33.2 \text{ mA}$, for 3.3 KOhm as EOL
The panel fault current (**$I_{panel\text{fault}}$**) = **$(57+33.2) \text{ mA} = 90.2 \text{ mA}$**
- The alarm condition current consumption is the sum of the panel current and zone current,
 $I_{panel\text{alarm}} = 57 \text{ mA} + 220 \text{ mA} = 277 \text{ mA}$. The alarm current of each zone is 55 mA.
- In alarm mode, the sounders are activated. As stated in datasheet of H201 and HS201, the maximum current consumption of these sounders is 37.4 mA.
A maximum load on the alarm circuits in an alarm condition is $(37.4 * 2 = 74.8 \text{ mA})$.
For example: **$I_{alarms} = 74.8 \text{ mA}$**
- The load on the auxiliary supply in an alarm condition is **$I_{aux\text{fault}} = 277 \text{ mA} + 74.8 \text{ mA} = 351.8 \text{ mA}$**
- Battery load in fault is the as same as the panel fault current.

For example: **90.2 mA Ifault = 90.2 mA**

Battery load current in alarm is 351.8 mA

For example: **Ialarm = 351.8 mA**

- The required standby time in hours is **Tfault = 24**
- The required alarm time in hours is **Talarm = 0.5**

The minimum battery capacity required is:

$$C_{min} = 1.25 \times ((T_{fault} \times I_{fault}) + 2 \times (T_{alarm} \times I_{alarm}))/1000 \text{ Ah}$$

$$C_{min} = 1.25 \times ((24 \times 90.2) + 2 \times (0.5 \times 351.8))/1000 \text{ Ah}$$

$$C_{min} = 1.25 \times ((2164.8) + 2 \times (175.9)) / 1000 \text{ Ah}$$

$$C_{min} = 1.25 \times (2516.6/1000 \text{ Ah})$$

$$C_{min} = 1.25 \times 2.5166$$

$$C_{min} = 3.145 \text{ Ah}$$

① **Note:** These are the reference calculations.

- Select the next highest available battery size.

The maximum battery capacities that can be charged according to BFPSA recommendations are listed in Table 9.

Table 9: Maximum battery capacities

Panel	Max Battery Capacity
FireClass Essential 2 Zone and 4 Zone Panel	2 x 12 V, 3.4 Ah

Panel configuration design chart

Table 10: Jumper settings

Reference Design	Function	Settings	Positions
CON 1.1	Factory mode	Open (default)	Normal Op
CON 1.2		Closed	Factory program mode
CON 1.3	Repeater selection	Open (default)	Repeater not connected
CON 1.4		Closed	Repeater connected
CON 1.5	Reserved for future use	Closed (default)	Reserved for future use
CON 1.6			
CON 1.7	Reserved for future use	Open (default)	Reserved for future use
CON 1.8			
CON 2	Fire relay output	NO (default)	2-3
		NC	1-2
CON 3	Fault relay output	NO	2-3
		NC (default)	1-2