PART 1 vs. PART 6 - DO THEY MIX WELL?

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HOCHIKI

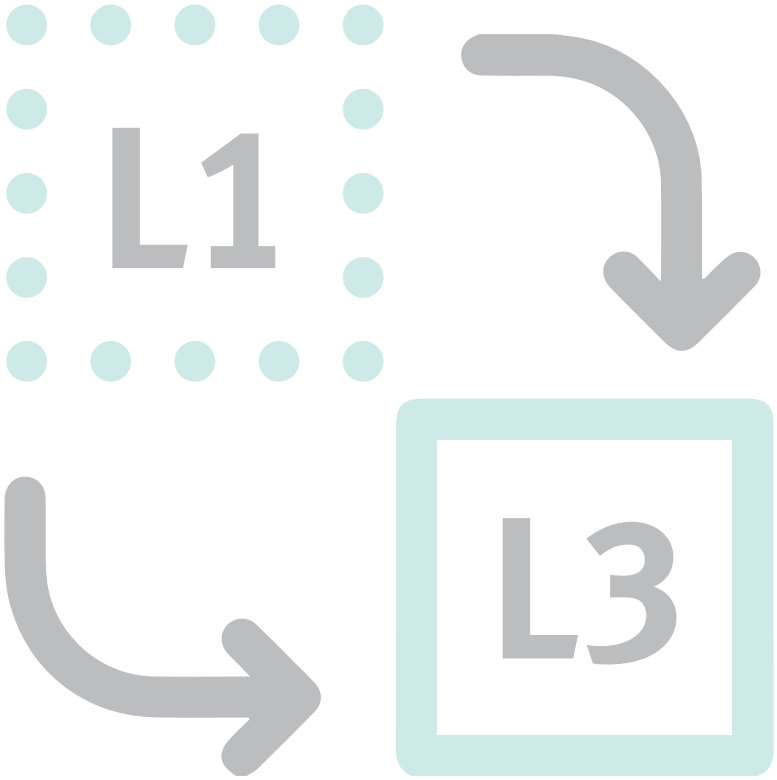
WHITEPAPER

Overview

In recent years there has been a perceived change in the advice given to landlords and building owners on the design, specification and installation of fire detections systems within housing schemes, student accommodation and sheltered housing projects. The designs are moving away from the BS5839 Part 1 "L1" system category where detection is installed throughout the building and moving towards an "L3" or even an "L4" system . These designs offer a commercial Part 1 system only in the communal areas of a property, with domestic, mains-driven Part 6 devices in the actual living accommodation.

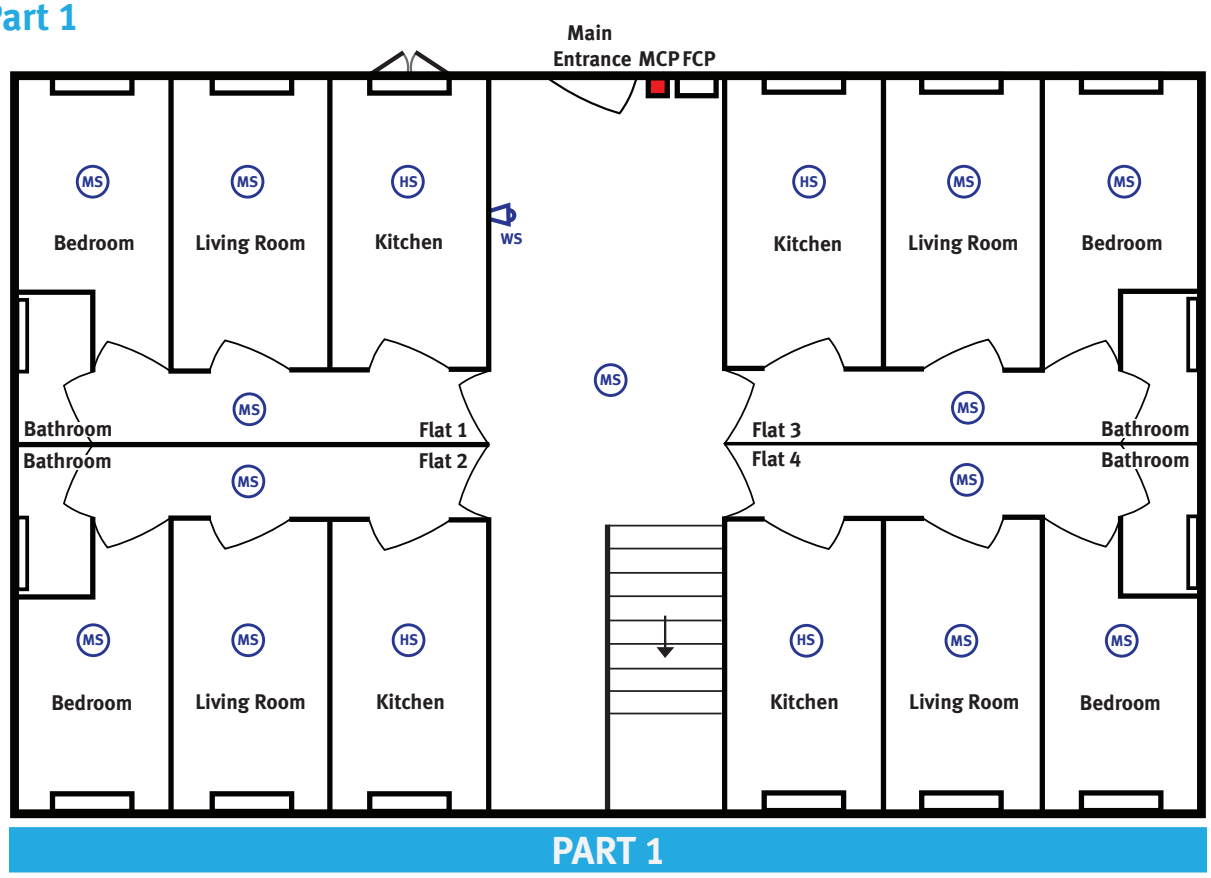
Part of the reasoning behind this shift is a possible misperception within both the fire industry and from the landlords and building owners themselves that these types of solutions help in reducing false alarm call outs. If an incident occurs, landlords/building owners do not want the whole building evacuated if it turns out to be a false alarm in one flat, for example, temporary smoke present due to burnt food.

But what are the implications for building owners who choose to install these mixed systems over a fully compliant Part 1 system?

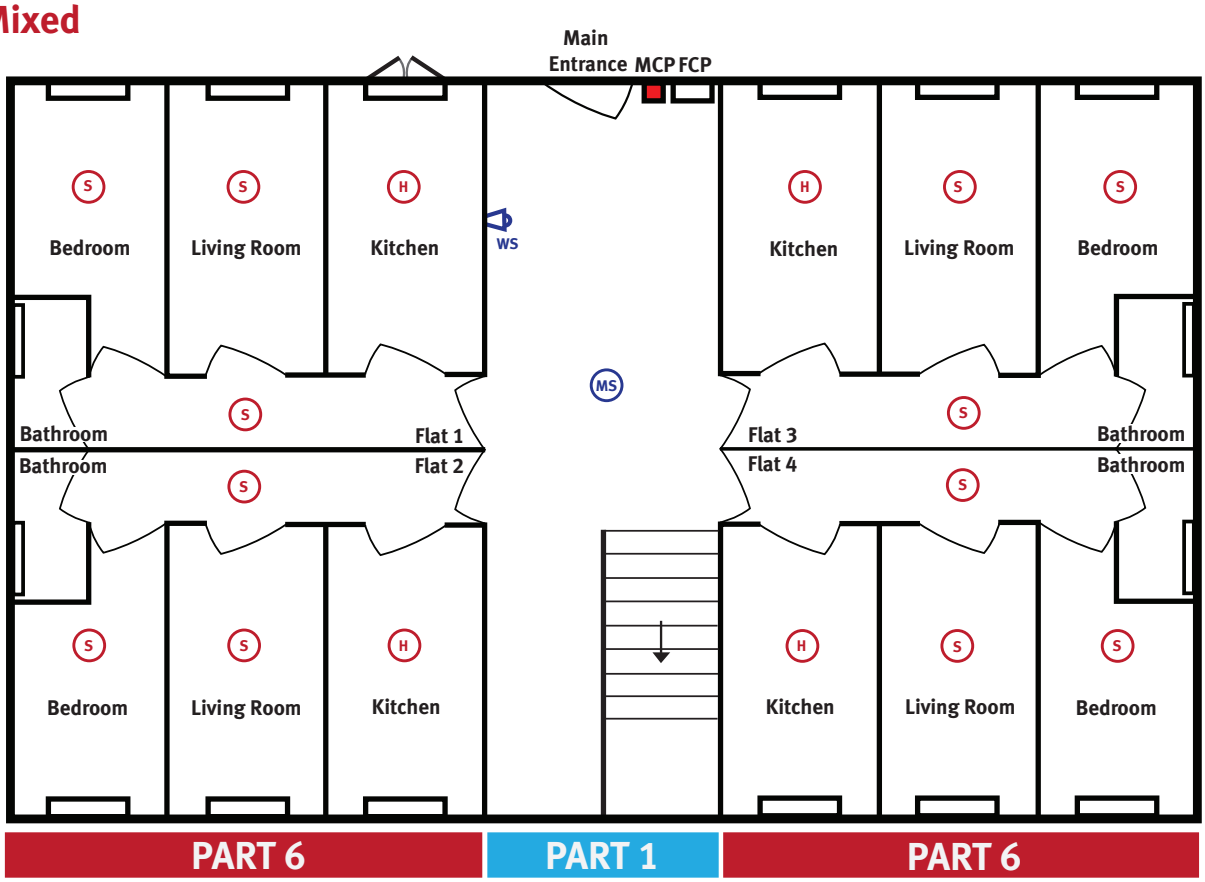


Floor Plan - Part 1 v Mixed Systems

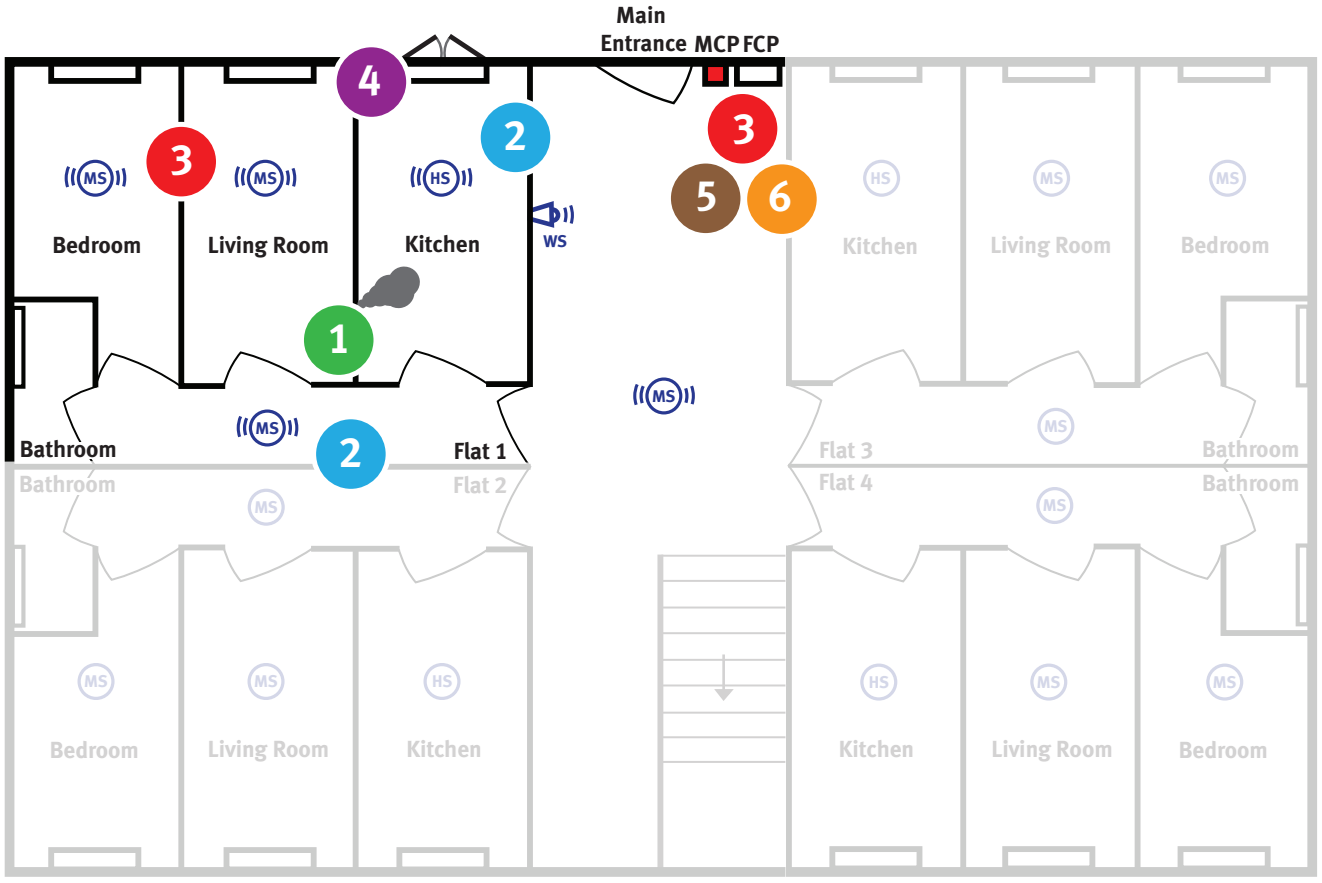
Part 1



Mixed



Scenario 1- Smoke from Burnt Toast



PART 1

Part 1 Throughout

1 Smoke Present in Kitchen.

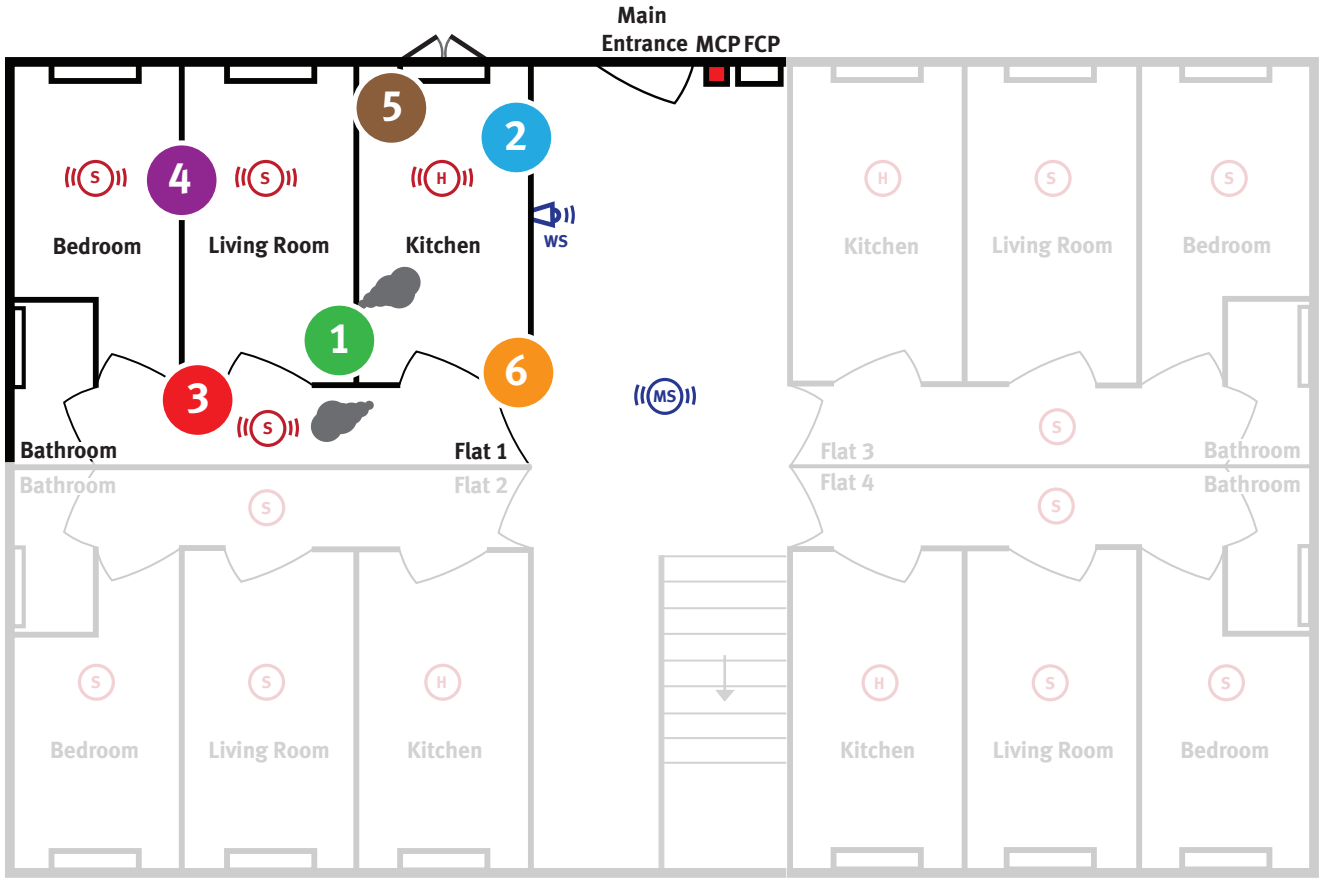
2 Heat element of sensor not activated but smoke travels into hall & smoke element is activated.

3 Panel has been programmed to activate local sounders at the first "alert" from presence of smoke, warning the occupant.

4 Occupant Deals with smoke by opening the window.

5 After a 4 minute period panel re-checks the smoke detector, if smoke cleared the panel resets without human intervention. If smoke has not cleared, sounders contiune for another 4 mins before the panel checks again.

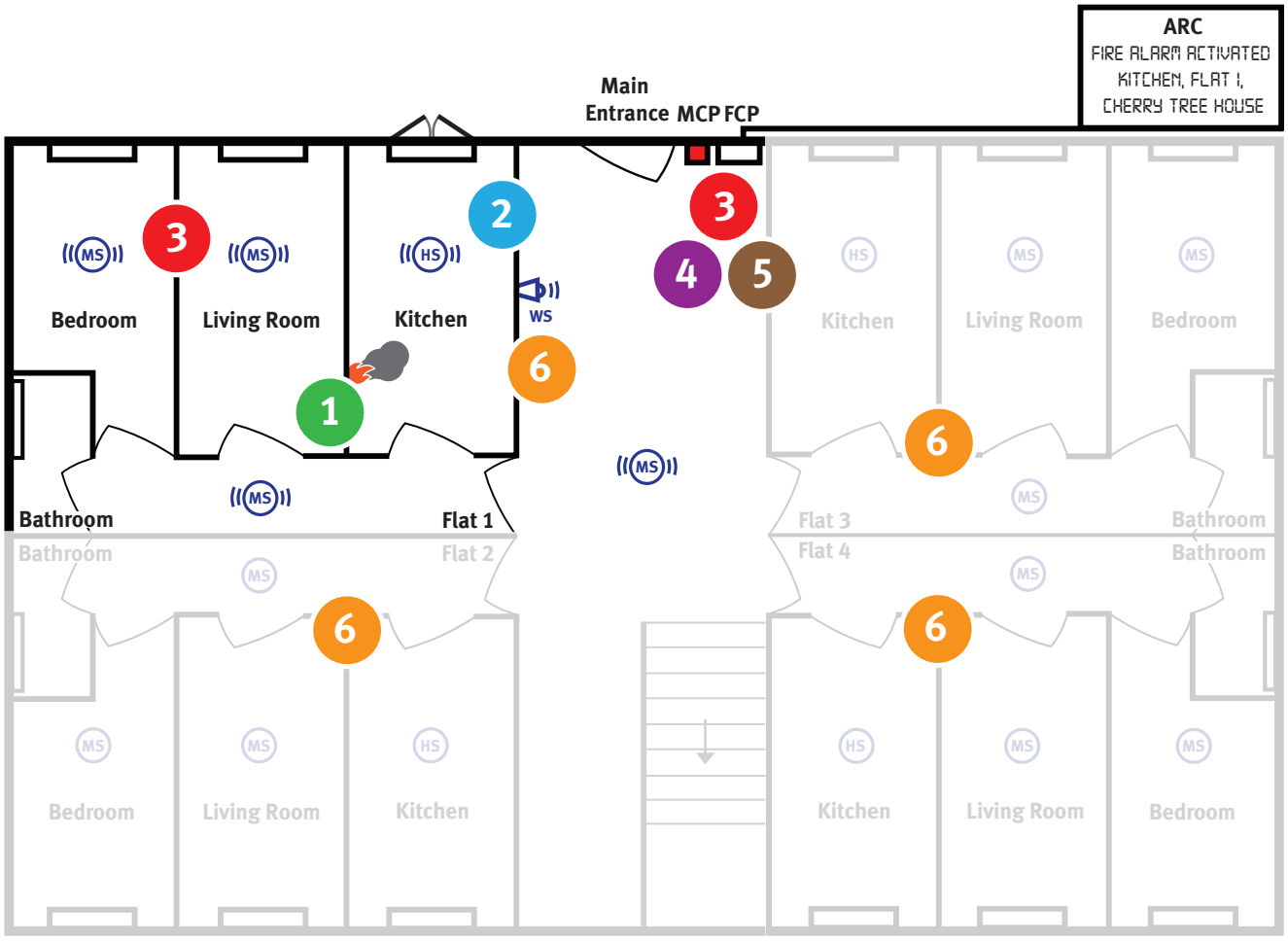
6 Panel has been programmed for a "verification" response from sensors - only if the second element of the same detector, or any other element of another detector in the same flat is activated. As the HS in the kitchen is a single sensing device this would be set to activate verified mode immediately.



Mixed

1. Smoke Present in Kitchen.
2. Heat detector not activated.
3. Smoke spreads to hallway smoke detector, which activates and sounds local alarm.
4. All other detectors in flat activate and sound local alarm (they are all linked together).
5. Occupant deals with smoke (by opening window) and operates 'hush button' to silence local alarms.
6. Detectors eventually return to normal operation as smoke dissipates, no full evacuation of building triggered.

Scenario 2 - Fire & Smoke in Occupied Flat



PART 1

Part 1 Throughout

1 Smoke & flames present in kitchen.

2 Heat activates kitchen HS, activating full verified mode. Flats and communal areas are sounded.

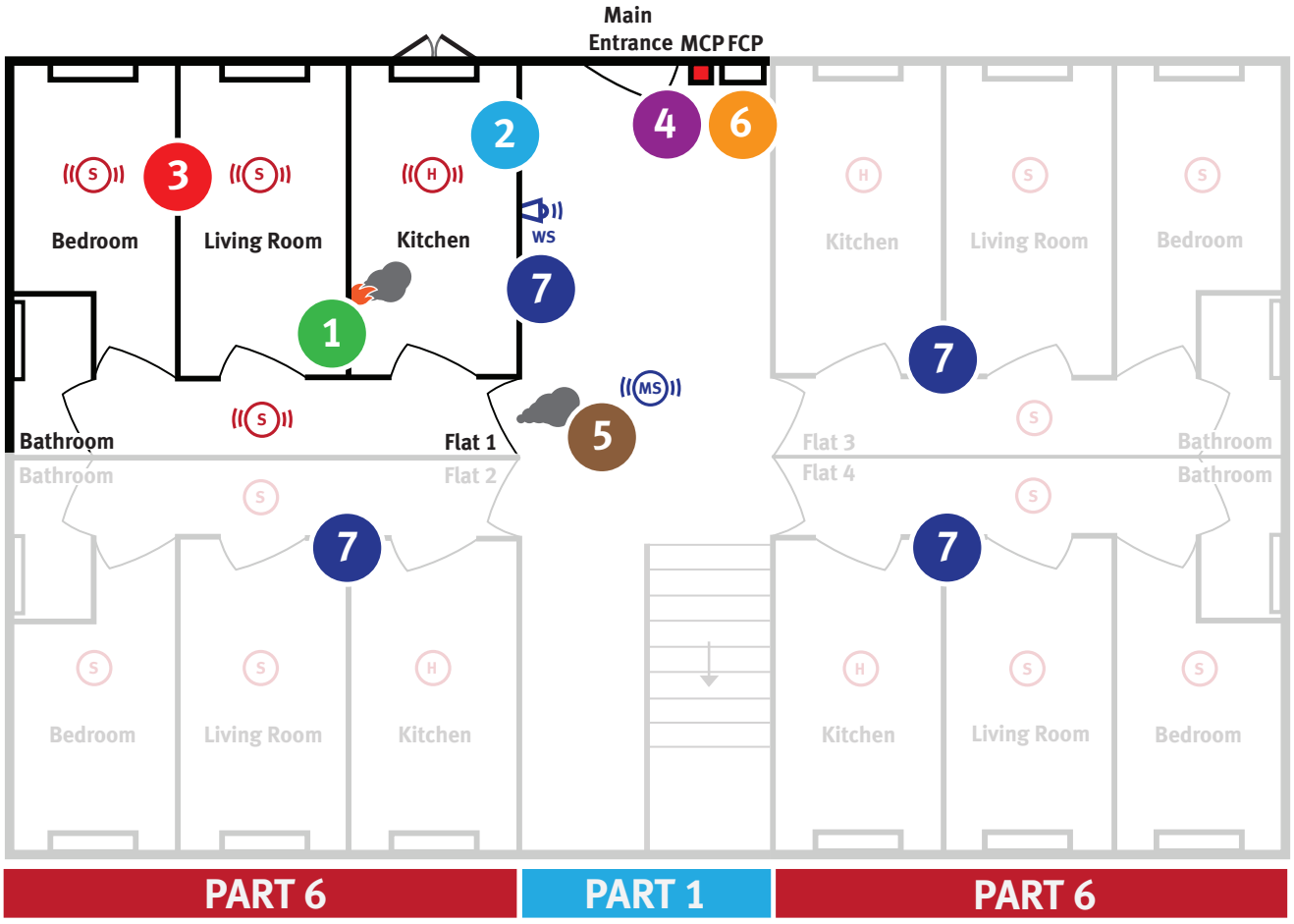
3 Panel has been programmed to activate local sounders at the first "alert" from presence of smoke, warning the occupant.

4 Panel has been programmed for a "verification" response from sensors in the flats - it will only go into fire if a heat element from the same multi-sensor is activated.

5 These two activations puts the panel into fire.

6 Communal area alarms as well as every alarm in every flat are sounded simultaneously, triggering a full evacuation.

NOTE: No manual intervention by occupant required. Same outcome if occupant is incapacitated.

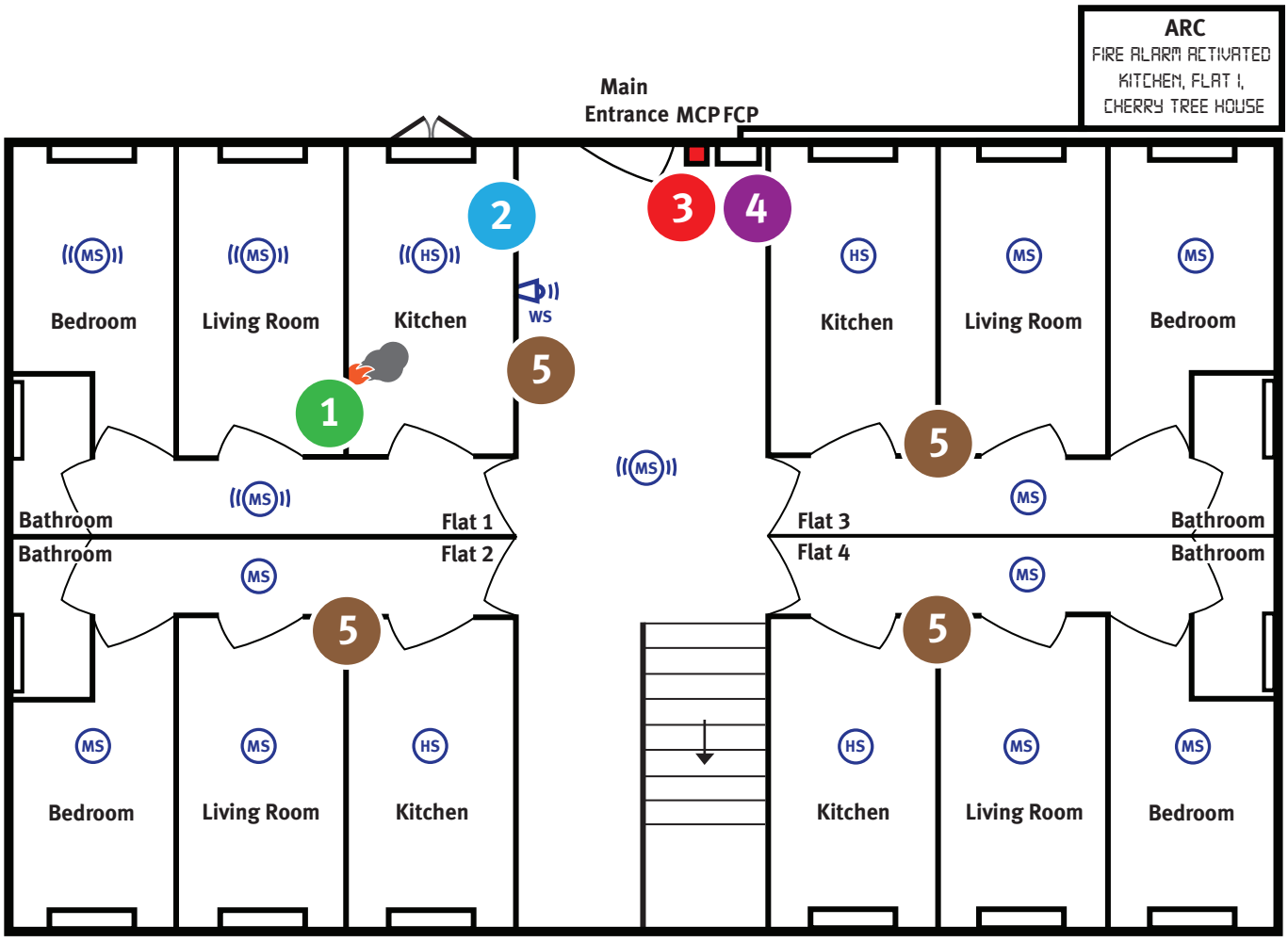


Mixed

1. Smoke and flames present in kitchen.
2. Heat of flames activates heat detector which sounds local alarm.
3. This then activates ALL detectors in the flat which ALL sound a local alarm (they are linked together).
4. If occupant escapes flat, they can manually activate an MCP which will activate all communal sounders, triggering full evacuation.
5. If occupant is incapacitated, smoke from the flat will eventually enter communal area (time dependent on robustness of fire door into flat) and activate a smoke sensor.
6. These two activations puts the panel into fire.
7. Communal area alarms as well as every alarm in every flat are sounded simultaneously, triggering a full evacuation.

NOTE: If any occupant cannot hear communal sounders (hard of hearing, asleep, under the influence etc.) they may not evacuate at this stage.

Scenario 3 - Fire & Smoke in Unoccupied Flat



PART 1

Part 1 Throughout

1 Smoke & flames present in kitchen.

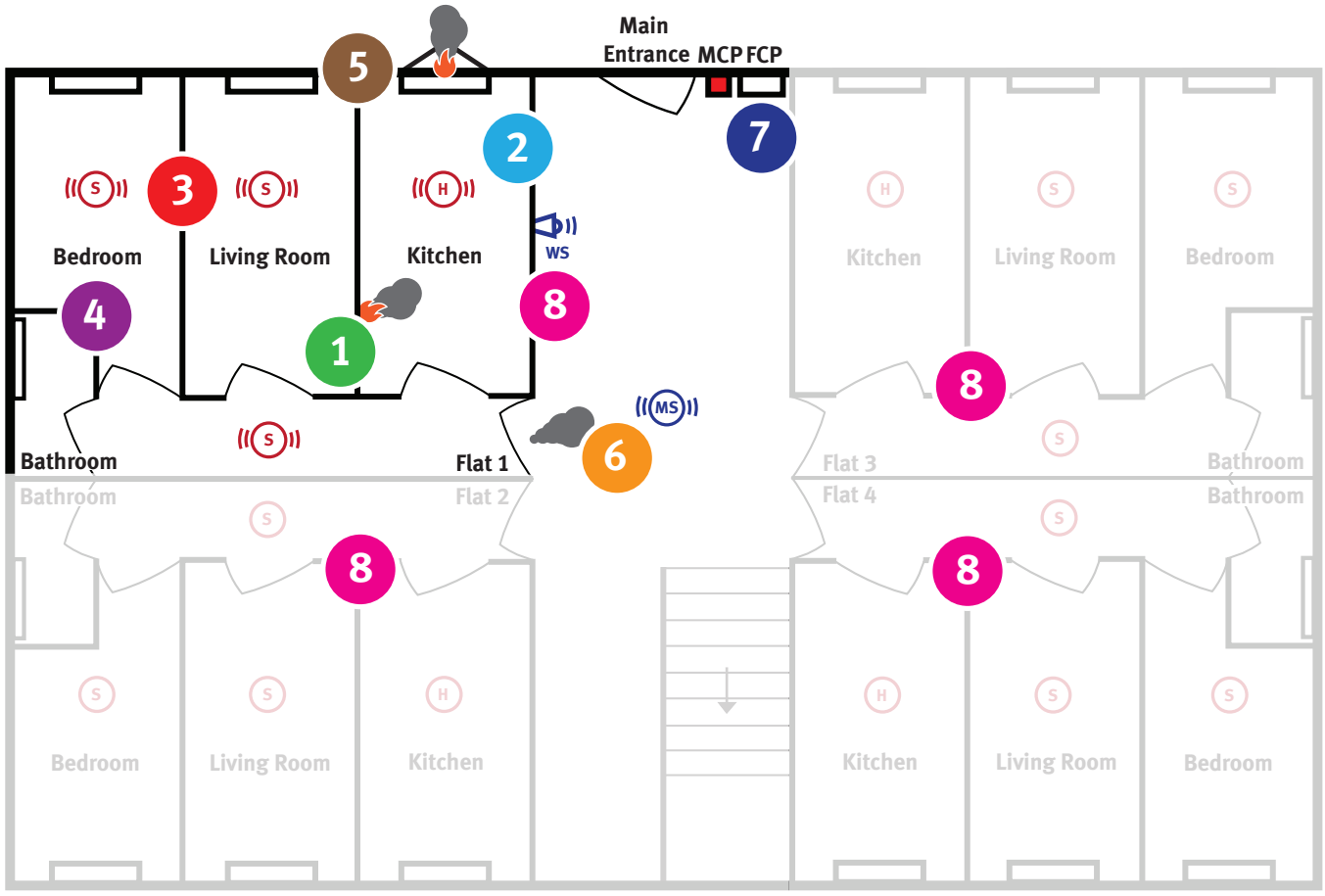
2 Heat from flames activates heat sensor.

3 Panel has been programmed for a "verification" response - it will only go into fire if an element from another sensor is activated.

4 Smoke reaches Multi-Sensor in hallway and activates smoke element. These two activations put the panel into fire.

5 Communal area alarms as well as every alarm in every flat are sounded simultaneously, triggering a full evacuation.

NOTE: Property is evacuated quicker, emergency services are notified quicker - system isn't waiting for a communal area smoke sensors to activate. Panel displays exact location of fire activations.



Mixed

1. Smoke & flames present in kitchen.
2. Heat of flames activates heat detector which sounds local alarm.
3. This then activates ALL detectors in the flat which ALL sound a local alarm (they are linked together).
4. Smoke will eventually enter communal area (time dependent on robustness of fire door into flat) but during this time fire takes a hold of entire flat.
5. If any windows are open, flames could potentially spread upwards to other flats.
6. As fire door begins to fail, smoke enters communal area, the communal area smoke (or multi) sensor activates.
7. Normally these sensors will be programmed to initiate a fire condition at the panel immediately.
8. Communal sounders are activated, triggering a full evacuation.

Device inside a flat is damaged/tampered with/removed

1 Every addressable device on the loop is **CONTINUOUSLY MONITORED** at the fire control panel in the communal area. The panel will display a fault if any device is faulty, maliciously damaged or removed indicating the device type and its exact location.

M **NO IMMEDIATE INDICATION** outside of the flat, will become apparent with a visual inspection on the next maintenance visit (see below).

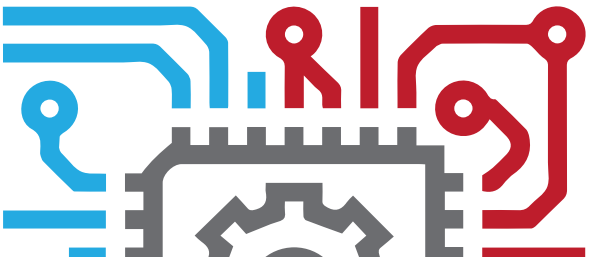
Fire-rated Cable

According to BS5839 Part 1- ALL devices on a fire detection system MUST be cabled using a fire-rated cable. This means that the loop connecting all devices back to the fire control panels remain connected even during the most intense fire. The devices themselves will melt before the cable fails.

Domestic, mains powered fire detection devices do not have to be cabled using fire rated cables. Therefore, if a fire burns through a flat these cables will perish, meaning power is cut-off from the devices. If for any reason the batteries are damaged or run-down, the devices will fail.

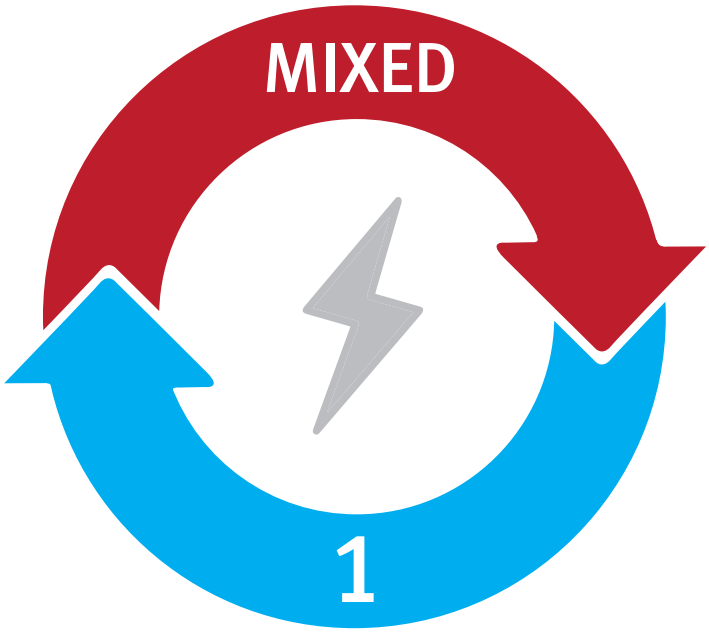
Intelligence of Devices

Analogue addressable fire detection equipment installed as part of a BS5839 Part 1 system is intelligent. Sensors can be programmed to react to various stimuli in various ways. Addressing means each device is uniquely identified at the fire control panel with type and locational text. Each device is 'polled' by the panel to check that it is (a) still there and (b) it is operating within its acceptable parameters. This constant communication ensures the system is fully functional at all times.



Domestic, mains powered fire detection devices are not intelligent, they will react to a prescribed stimulus (fire or heat) and react in only one way – straight into an alarm state.

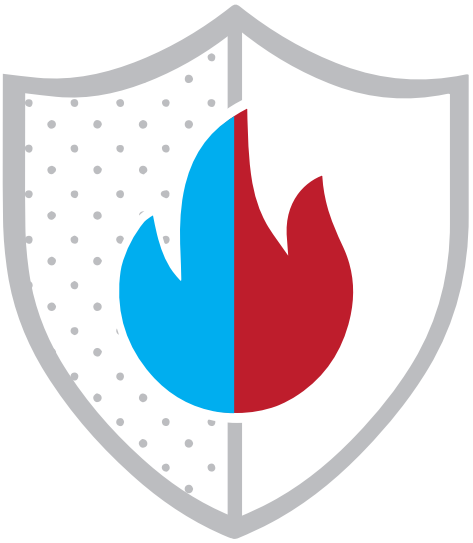
Cause & Effect Programming



1 Utilising the capabilities of a Part 1 addressable fire control panel, the fire detection system across the whole building can be programmed to react to a variety of events and scenarios. For instance an alert (where one device has been activated) can be programmed to activate the sounders intermittently as a warning for all flats on the floors immediately above and immediately below the floor where the activation occurred.

M Domestic, mains powered fire detection devices cannot be controlled or programmed from a central location. They can only react to other devices that are wired to them and they react in only one manner.

Future-proofing a building's fire detection system



Part 1

Any changes in the standard for a fully Part 1 system are likely to be changes to existing parameters within the fire control panel software.

Reprogramming a panel in the communal area might only take half a day to implement by one engineer, with no need to access any of the flats.

Part 1 & Part 6

Currently, the practice of mixing a Part 1 system in communal areas with Part 6 equipment in individual flats is accepted.

But if at some point in the future the standards were to change and this type of installation becomes non-compliant, Building Control Departments in Local Authorities across the UK will force landlords and building owners to upgrade their fire detection systems.

With a mixed system this will involve replacing all mains-powered domestic device with Part 1 intelligent devices within flats at huge expense (new stock, labour and fire-rated cabling) and major disruption to residents. Non-compliancy may result in heavy fines. Depending on size of property the existing panel may also have to be replaced to cope with the additional devices and increased loop loading.

Conclusion of Part 1 v Mixed

Landlords and owners of accommodation or shelter type buildings are being actively advised that fire detection systems designed by mixing Part 1 and Part 6 equipment are an acceptable, lower cost and hassle-free option. But when analysing the above scenarios it becomes clear that installing a fully compliant Part 1 system throughout the building, both within the separate accommodation areas as well as the communal areas means that landlords and building owners can future-proof their systems, remain fully compliant and avoid unnecessary risks to both their properties and their residents.

Other Resources

For further information on Part 1 fire alarm systems, download the BS5839 - Part 1 guide from our website.

A Guide To BS5839 PART 1: 2017

To learn more about Hochiki's fire detection systems visit our web site:

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For Fire Safety information on BS5839 Part 6: 2013 visit firesafe.org.uk:

Fire Safety Advice Centre

Hochiki Europe are also an approved supplier of CPD seminars.