

Overview of Fire Alarm Systems and Maintenance

By

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Why use a Fire Alarm System?

- A fire alarm system is intended to enable a fire to be detected at a sufficiently early stage so that people who are at risk can be made safe either by escaping from the fire, or by the fire being extinguished (also to prevent extensive property damage). Neither of these measures can be used until people are made aware of fire.
- The effectiveness of the fire detection and alarm system depends on the stage of the fire at which it is operated. In order for all the occupants to escape without too much difficulty, an early alarm should operate before the escape routes becomes smoke-logged to such an extent as will cause occupants to have difficulty finding their way out of the building.



Why use a Fire Alarm System?

Fire Alarm Systems are used to protect life and property.

It protects by:

- a. detecting a fire at an early stage
- b. alerting and evacuating occupants
- c. notifying the relevant personnel
- d. activating auxiliary functions e.g. smoke controls, lift homing etc
- e. identifying and guiding fire fighters



Is Fire Alarm System a mandatory requirement?

Mandatory - By the relevant authority

Non-mandatory - By Building Owner, Landlord & Insurance etc.

The requirements are specified in :

- Code of Practice for Fire Precautions in Buildings 2007 (Fire Code 2007) – by SCDF
- Code of Practice for Installation and Servicing of Electrical Fire Alarm System (SS CP10-2005) – by Spring Singapore



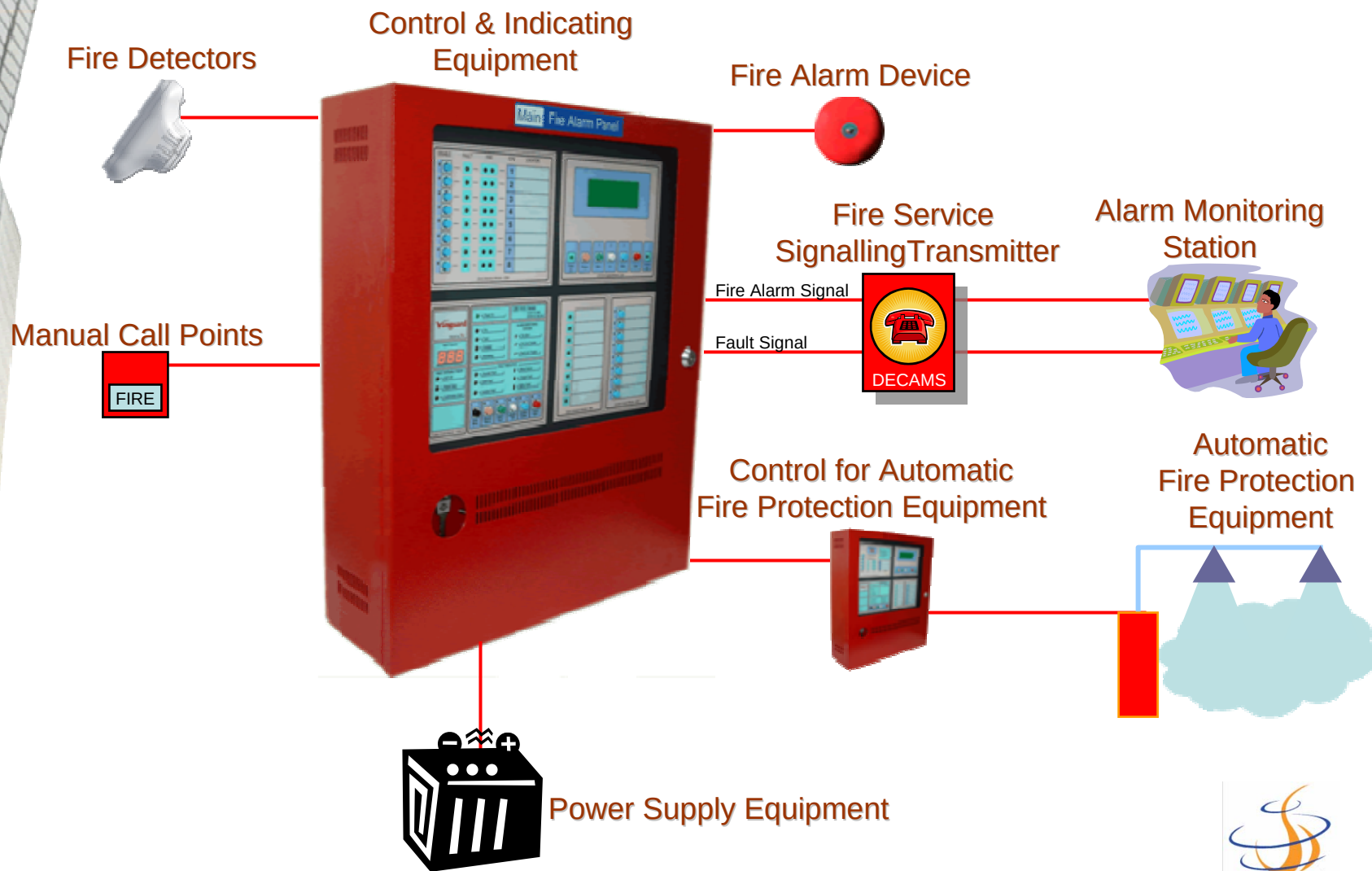
What is a Fire Alarm System made up of?

Components forming the System- 9 Items

1. Smoke / Heat Detectors (Fire Detectors)
2. Alarm Panels (Control and Indicating Equipment)
3. Alarm Bells (Fire Alarm Devices)
4. Manual Call Points
5. DECAM Panel (Fire Services Signalling Transmitter)
6. DECAM Station (Alarm Monitoring Station)
7. Extinguishing Panels (Control for automatic fire protection equipment)
8. Gas/Sprinkler (Automatic fire protection equipment)
9. Charger/Battery (Power Supply Equipment)



What is a Fire Alarm System made up of?



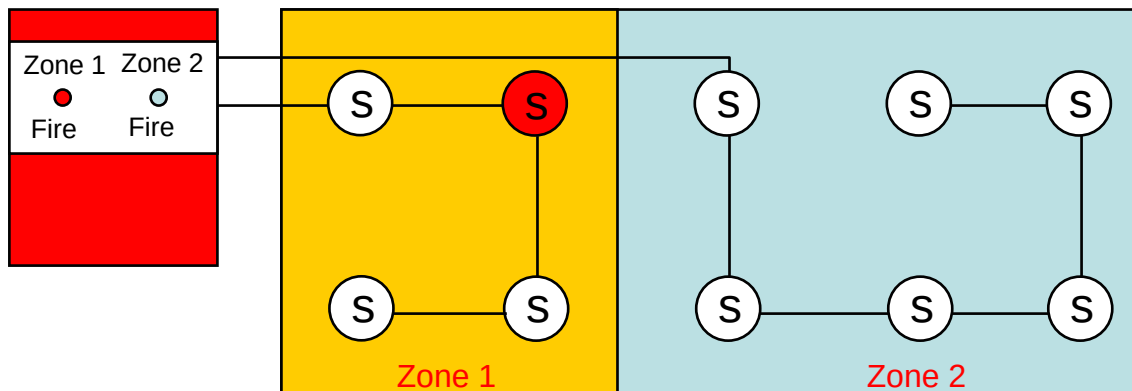


Types of Fire Alarm Systems in use today

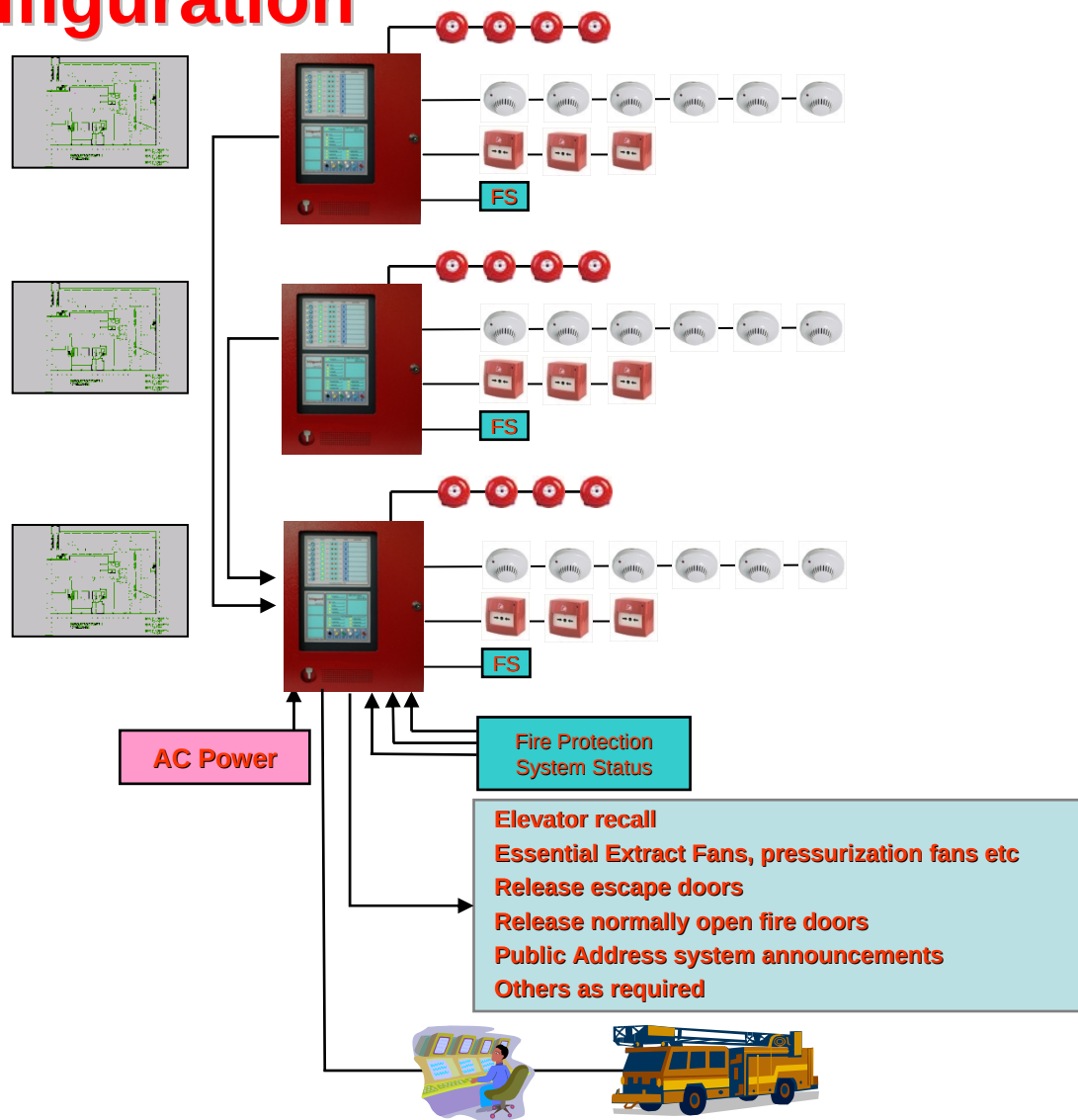


Non-Addressable System

- also commonly known as “conventional”
- fire detectors are wired to the panel in groups known as zone
- identification of alarm status by zone
- fire detectors indicates either “Fire” or “Normal” status only
- system only indicate events but without event recording feature

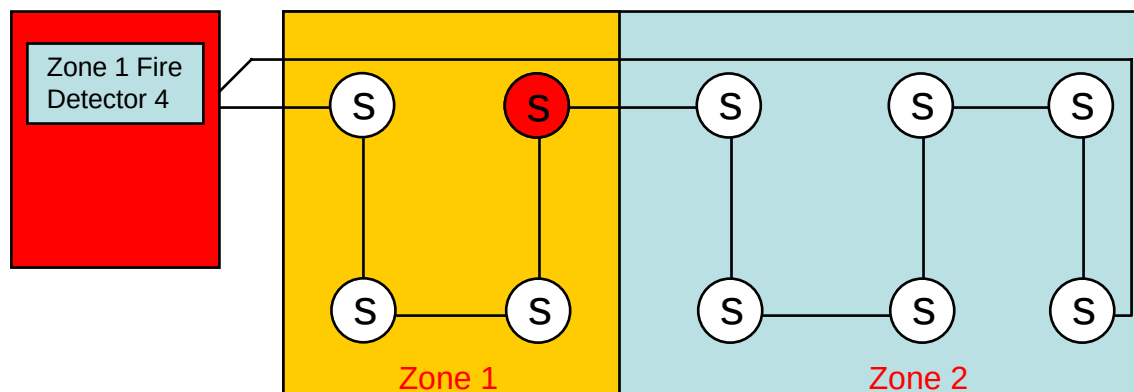


Typical Non-Addressable Fire Alarm System Configuration



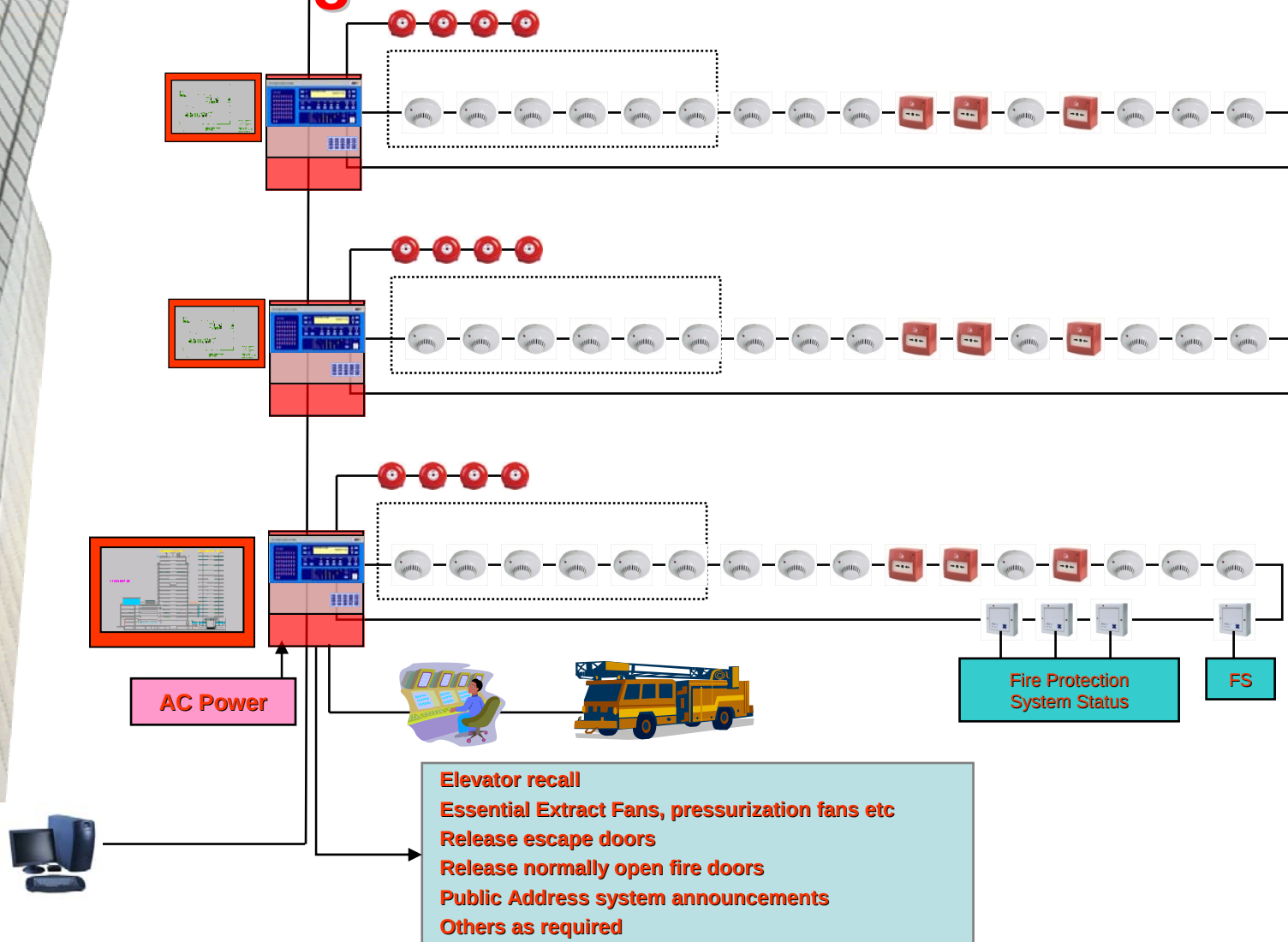
Addressable System

- each fire detector is provided with an address
- identification of alarm status by zone and by address
- fire detectors indicates various condition such as smoke level
- indicates and records system events



2. Types of Fire Alarm Systems in use today

Typical Addressable Fire Alarm System Configuration



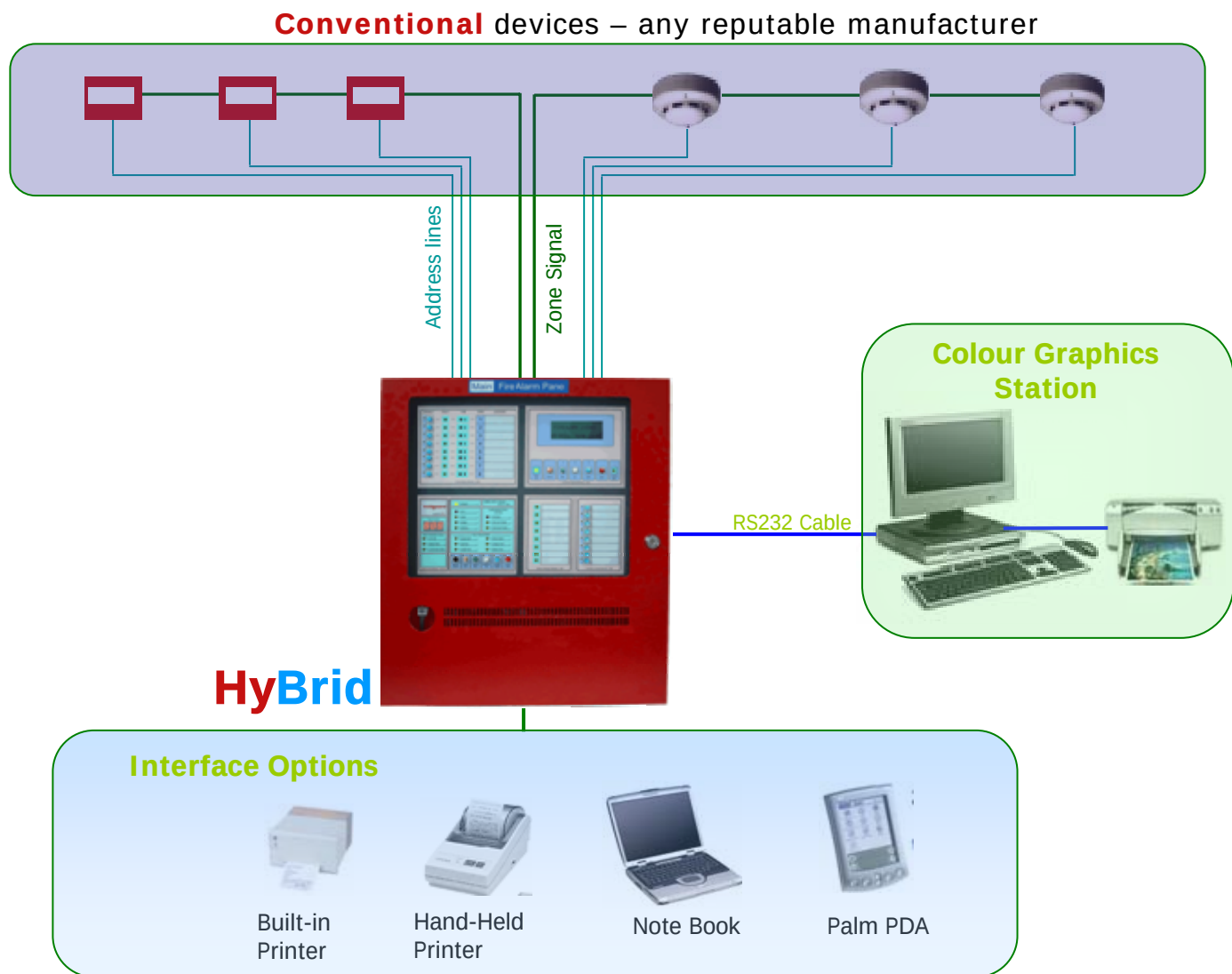
Hybrid System (conventional + addressable)

- a combination of features from both addressable and non-addressable systems
- either built from a basic conventional system with add-on hardwire addressable features
- or built from an addressable system with conventional module
- event recording and alarm management feature



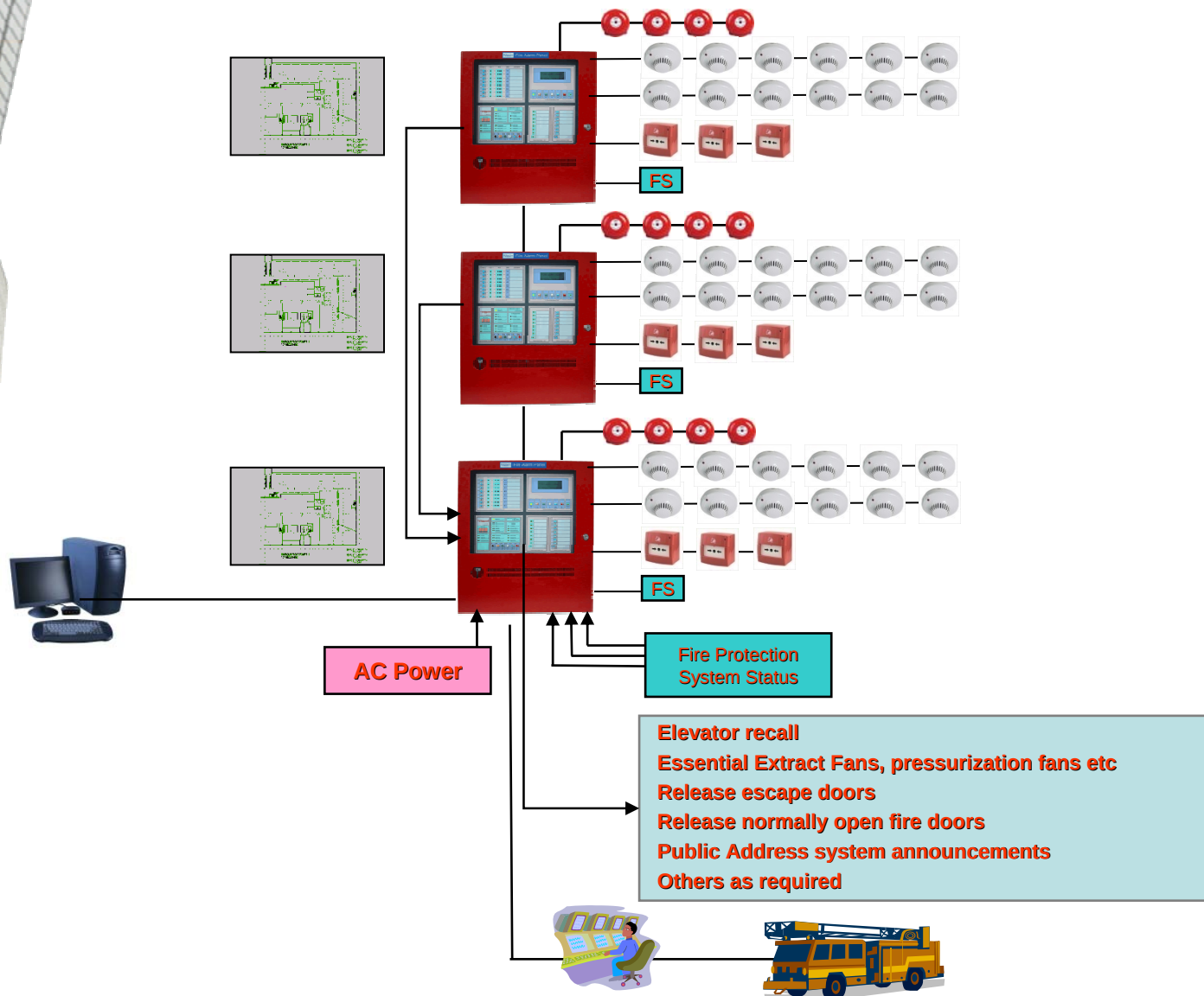
2. Types of Fire Alarm Systems in use today

Typical Hybrid Fire Alarm System Configuration (conventional with hardwire addressable add-on)



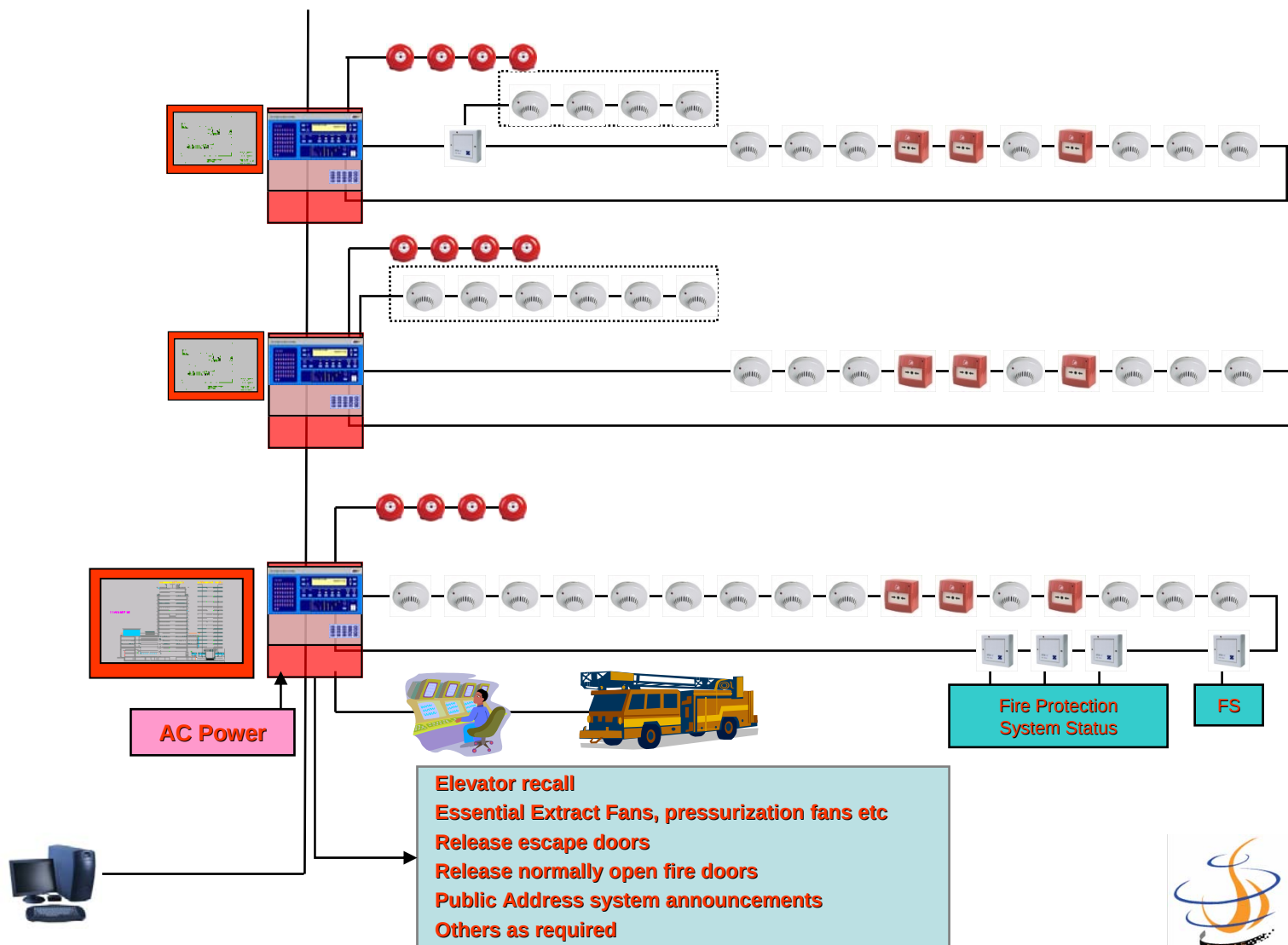
2. Types of Fire Alarm Systems in use today

Typical Hybrid Fire Alarm System Configuration (conventional with hardwire addressable add-on)



2. Types of Fire Alarm Systems in use today

Typical Hybrid Fire Alarm System Configuration (addressable with conventional module add-on)





Maintenance



Maintenance

- **Regular Testing and Inspection**
- **False Alarm Management**
- **Common Maintenance Problems And Troubleshooting**



Maintenance

Objectives

- a. to ensure continuous reliability of the fire alarm system

Responsibility

- a. building owner or owner representatives
 - to engage manufacturer's representative or
 - competent contractor
 - owner representative with suitable experience and special training



Regular Testing and Inspection

As per SS : CP10-2005 Requirements

- **Daily Check**
- **Weekly Test**
- **Monthly Test**
- **Annual Test**



Regular Testing and Inspection

Daily Checks

- Checks to ensure system is operating normally.
- Rectify and record any faults found

Weekly Tests

- Checks to ensure signal to monitoring station are functioning
- Check battery and voltage conditions
- Rectify and record any faults

Monthly Tests

- Simulate fire and fault conditions on all zones
- Check that power supply, indicator, alarm outputs etc are operating correctly
- Rectify and record any faults

Yearly Tests

- All monthly tests
- Test 20 percent of all detectors over as many zones as possible such that all detectors will be checked over a 5 year period
- Test interlocking circuits to ancillary equipment
- Check and cleaning of dirty detectors
- Rectify and record any faults



5. Maintenance

Log Record

Building Name _____

Address _____

DATE	TIME	DESCRIPTION OF EVENTS	REMARKS	INITIALS	FOLLOWUP ACTION	DATE COMPLETED	INITIALS



False Alarm Management

1. false alarm causes disruption to the normal operation of business and create a drain to the fire services
2. responsibility for reducing false alarms rest with every party involved in
 - specification
 - design
 - installation
 - commissioning
 - management at the operation level
 - maintenanceof the fire alarm system



False Alarm Management

Category of False Alarms

Unwanted Alarms / False Alarm

- a. environmental influences
- b. fire like phenomena
- c. inappropriate action by people in building
- d. accidental damage
- e. alarms arising out of faulty equipment



False Alarm Management

Common Causes of False Alarms

- fumes from cooking process
- steam from bathrooms, showers etc
- tobacco smoke
- dust (whether built up over time or not)
- insects
- incense, candle
- high humidity
- accidental damage (manual call point)
- aerosol spray
- high air velocities
- water egress
- testing or maintenance of the system without proper disablement.
- arises from fault in equipment



False Alarm Management

Recommendations

- a. system designer should ensure that the system design takes into account of the guidance provided the Code of Practices
- b. installer identifies any circumstances that might lead to a high rate of false alarm and inform the designer, or user accordingly
- c. at commissioning, checks should be carried out to ensure there is no obvious potential for an unacceptable level of false alarms
- d. the designer and supplier should jointly provide sufficient information to user who may not be familiar with the technology of the Fire Alarm system.



False Alarm Management

Recommendations – cont'd

- e. the user should arrange for suitable investigation and if appropriate, action to be taken on every occasion that a false alarm occurs and record the details which should include the following details :
- date & time
 - identity and location of device
 - category of false alarm
 - reason for false alarm (if known)
 - activity in the area (if the reason of false alarm is unknown)
 - action taken
 - the person responsible for recording the information



False Alarm Management

Some Useful Tools to help minimize False Alarms



False Alarm management

Sensitivity Settings

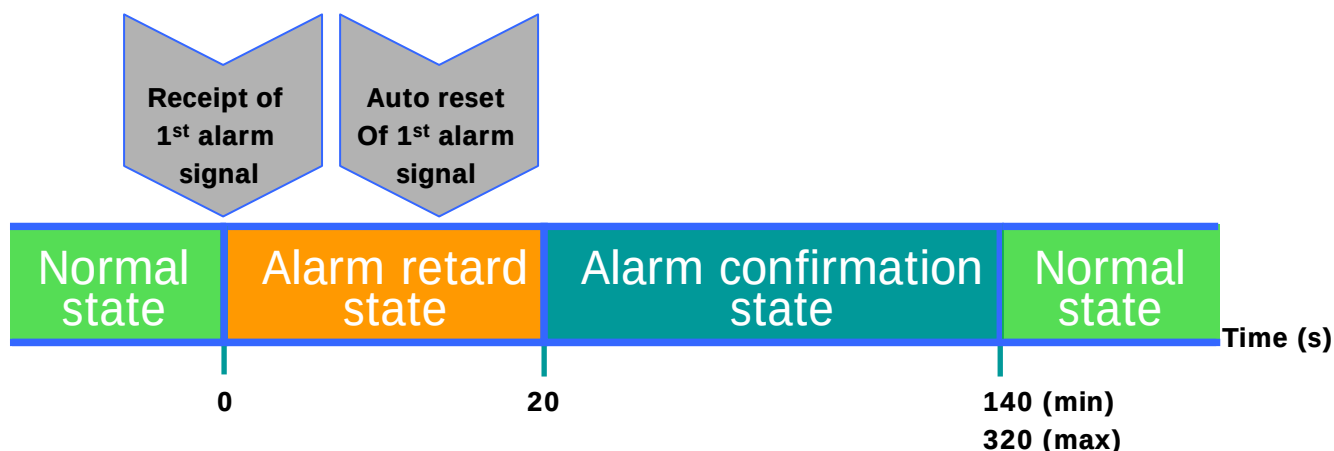


- This is a feature normally in both addressable and non addressable type Fire Alarm System.
- Addressable – Adjusted from Panel
- Non-Addressable – Physical Device Selection



False Alarm Management

To reduce the effects of transient environmental conditions which may cause various types of detectors to be activated, an automatic fire alarm system may be provided with an alarm verification feature, subject to the approval of the relevant authority.



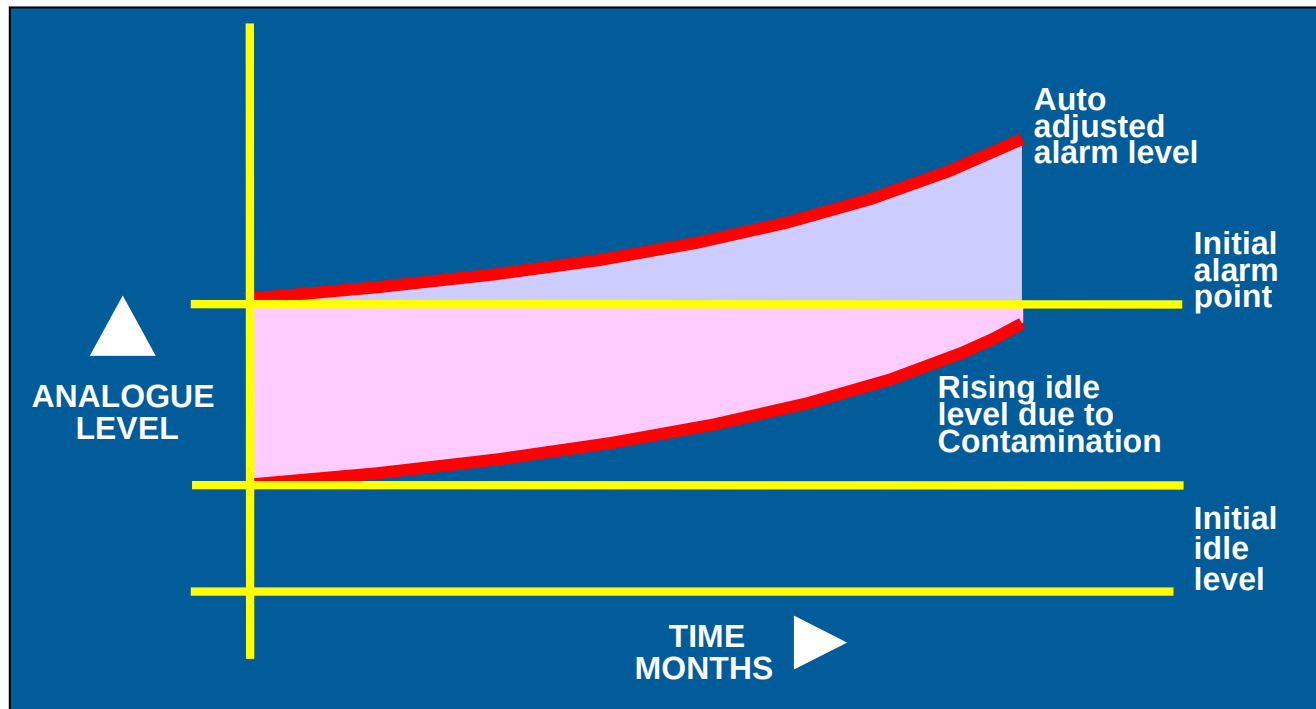
The following components of the fire alarm system shall not be subject to this feature;

- Alarm Zone facilities containing only manual call points;
- Circuit between sub-alarm panels and the main alarm panels;
- Detectors used to activate fire suppression systems;
- Detectors installed in high risk areas; and
- Alarm zone circuits from fire suppression systems.



False Alarm Management

Sensor Auto Contamination Adjustments





Common Maintenance Problems



Common Maintenance Problems

4 Storey High Atrium that is protected by point type smoke detectors

Problem:

Detectors cannot be tested

Faulty detectors cannot be reach for replacement

Detector insensitive due to the mounting height exceeding 10metre

Solution :

Select an alternative detection system

Able to comply with the Listed Installation Requirements

Easy to maintain without having to access from the atrium

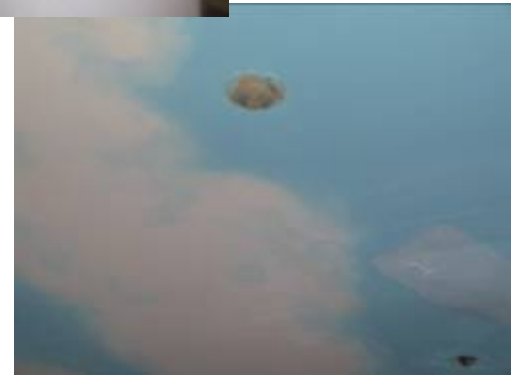
Floor



5. Maintenance



5. Maintenance



5. Maintenance





**Thank You
for
your attention**

