

Technical Bulletin



Fire Industry Association

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Fitting Third-Party Equipment Inside Control and Indicating Equipment (CIE)

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1. Introduction

The integration of third-party equipment within Fire Detection and Fire Alarm Control and Indicating Equipment (CIE) is a practice that can introduce significant risks. Two primary areas of concern are LVD and EMC. the potential for Electromagnetic Interference (EMI), which the original CIE manufacturer might not have tested against the EMC (Electromagnetic Compatibility) Directive. There are also significant risks associated with the remote connection of equipment to various external third-party pieces of equipment that may or may not be compatible with the CIE. This bulletin aims to outline the potential risks and provide guidance on best practices to ensure the integrity and reliability of fire detection and alarm systems.

2. Understanding Electromagnetic Interference (EMI)

Electromagnetic Interference (EMI) occurs when an external electromagnetic field disrupts the normal operation of electrical circuits, this is caused radiated EMI. A more onerous form can be conducted EMI, which is through physical connections and terminations. In the context of fire detection and alarm systems, EMI can cause malfunctions, false alarms, or failure to respond to fire conditions. This interference can stem from various sources, including:

- Other electronic devices: Unshielded or poorly shielded third-party equipment can emit electromagnetic waves.
- Cabling issues: Incorrect installation or routing of cables can lead to increased susceptibility to EMI.
- Proximity to other systems: Placement near devices that generate significant electromagnetic fields can pose risks.
- Connecting third-party equipment that is insufficiently protected against interference that travels through the cabling and into the CIE. (This can occur even when the third-party equipment is electrically connected outside of the CIE).
- Suppression may be used to reduce EMI from equipment and cabling. This may be achieved with suppressors approved by the manufacturer of the equipment and may typically consist of a capacitor or ferrites. It is essential these are fitted according to the instructions to be effective.
- Equipment not designed to be fitted in a particular CIE may have different limits to that of the CIE. The CIE will have a specific level of EMI that it must be able to receive without causing a malfunction, which may not be the same as the third-party equipment being fitted within it.

3. Understanding LVD issues

Low Voltage Directive (LVD) issues could result in non-compliance risks and increased safety concerns resulting from varying voltages, fluctuations, and incorrect grounding of protective and functional conductors (Further information on functional earth and protective conductors can be found in FIA Technical Bulletin "[Differences Between Functional Earth and Protective Conductor](#)").

Manufacturers may design the CIE with consideration for their own internal equipment requirements. Additional space with means to segregate and terminate cables for third-party systems may not be possible and has potential to introduce safety hazards as a result.

4. EMC Directive and Manufacturer Testing

The EMC directive ensures that electronic equipment does not generate electromagnetic disturbances above prescribed levels, which could affect other equipment. When a CIE is manufactured, it undergoes rigorous testing to comply with this directive.

Introducing third-party equipment into the CIE can compromise these tests, leading to unanticipated EMI issues. Such integrations could render the EMC certification invalid, as the CIE was not originally tested with these additional components.

5. Third party equipment types

A wide range of fire alarm system supporting accessories and equipment types are available on the market, which may not be suitable for fitting within the CIE or supplied in external enclosures and may come with their own power supplies.

A few examples of commonly found (but not limited to) third-party integrations to a CIE:

1. Building management system integration systems.
2. Ethernet and Wi-Fi IP routers may be used to connect to other client systems.
3. 4G/5G alarm routers for connection to an ARC.

6. Potential Risks of Integrating Third-Party Equipment

1. System Malfunction: The introduction of untested third-party equipment could cause the CIE to malfunction, leading to failures in fire detection and alarm signaling. This could pose a risk to life and property.
2. False Alarms: EMI could trigger false alarms, causing unnecessary evacuations and potentially leading to complacency over time.
3. Detection Failures: Interference may prevent the system from responding to actual fire conditions, posing significant safety risks.
4. Non-Compliance: Modification of the CIE by fitting third-party equipment within, may result in non-compliance with relevant standards and regulations.
5. Effectiveness of the Functional Earth's and Protective Conductors may be compromised because of incorrect connection of incompatible equipment.

7. Best Practices for Maintaining System Integrity

To ensure the continued reliability and compliance of fire detection and fire alarm systems, the following practices are recommended:

1. **Avoid Third-Party Integration:** It is not recommended to install third-party equipment within the CIE. The equipment provided by the original manufacturer is assessed and certified for use within the system. Where possible, a separate enclosure is preferred to minimise issues highlighted.
2. **Use manufacturer-approved accessories:** Where possible should always use accessories and extensions that have been approved and tested by the CIE manufacturer.
3. **Regular Inspections:** Conduct regular inspections and maintenance of the CIE to ensure that no unauthorized modifications or integrations have been made. This may form part of routine system maintenance and not require any special inspection visits.
4. **Consult with Experts:** Before making any modifications to the CIE, consult with qualified professionals (such as an independent test laboratory) or the original manufacturer to assess the potential impact on EMI and overall system performance.
5. **Follow Standards:** Adhere to relevant standards such as BS 5839-1, which provides guidelines for the design, installation, commissioning, and maintenance of fire detection and fire alarm systems in buildings.
- 6.

8. Conclusion

The integration of third-party equipment within Fire Detection and Fire Alarm CIE can introduce significant risks related to Electromagnetic Interference (EMI). Such modifications can compromise the system's reliability and compliance with the Electromagnetic Compatibility (EMC) Directive and Low Voltage Directive (LVD). To maintain the integrity and safety of fire detection and alarm systems, it is crucial to avoid unauthorized third-party integrations and to adhere strictly to manufacturer guidelines and relevant standards.

When third-party equipment needs to be installed, it should be housed in a suitable enclosure to protect it from environmental factors, physical damage, and potential interference. Proper housing ensures the equipment functions correctly and does not compromise the fire detection and alarm system. Measures should be taken to limit the conducted EMI through the interconnecting cables.

The mains supply or internal auxiliary supplies for the CIE must not be used to power the third-party equipment, unless specifically provided for that purpose by the CIE manufacturer.

By following these best practices, we can ensure that fire detection and alarm systems operate as intended, providing reliable protection and safety for all building occupants.



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