1 Purpose statement

The purpose of this Technical Advisory Note is to provide advice concerning the legislative requirements for the installation, wiring connection and signals relating to alarm signalling equipment in Victoria.

2 Audience

This Technical Advisory Note is intended for:

(i) FPA Australia members;
(ii) Owners, facility managers, strata corporation managers and the like;
(iii) Building Surveyors, Building Inspectors;
(iv) Fire detection and alarm system designers, installers and certifiers; and
(v) Fire detection and alarm system routine service providers and technicians.

3 Introduction

In Victoria, alarm signalling equipment (ASE) is an item of equipment leased by the building owner from a monitoring service provider that provides the interface between an automatic fire sprinkler system or a fire detection & alarm system to the Automatic Fire Alarm Service Provider, via Emergency Services Telecommunications Authority (ESTA) and finally to the relevant fire brigade.

In simple terms, the ASE is a red box typically mounted within a fire detection & alarm system or adjacent to an automatic fire sprinkler system that receives an alarm signal from the fire detection system or sprinkler system and transmits that signal (normally via the mobile phone network) to the Monitoring Service Provider.

There are three monitoring services providers operating in Victoria:

- ADT Fire Monitoring; and
- Code Red (Chubb Fire Monitoring); and
- Romteck Grid.

In the 1990s Victorian fire brigades began the process of outsourcing the monitoring of fire systems to private monitoring providers. This process included the decommissioning of MFB Alarm Interface Units (“AIU”) and the Country Fire Authority Deltec system. The replacement for these devices was the first generation ASE, called the Centaur from ADT Fire Monitoring (most likely to AS 4428.6-1997).

The problem the fire brigades have acknowledged—and addressed in this Technical Advisory Note—is that in some circumstances the wiring for the ASE has been configured incorrectly with the intent to inhibit the transmission of the required signals to the monitoring service providers.
3.1 What is the purpose of fire alarm monitoring and alarm signalling equipment?

The primary purpose of fire alarm monitoring is to transmit fire alarms from fire detection systems and fire sprinkler systems—that are required to be installed by Regulation, Code or Standard within certain classifications of buildings—to a fire station, fire station dispatch centre or monitoring service provider.

Alarm Signalling Equipment (ASE) is the device used to receive and transmit signals from one of the following sources, typically via Fire Detection Control and Indicating Equipment (FDCIE):

- a fire detector (heat, smoke, flame or carbon-monoxide); or
- a manual call point (also known as a break glass alarm); or
- the operation of an automatic fire sprinkler system (alarm pressure switch or water flow switch); or
- the disablement (closure) of a monitored water supply valve via a valve monitoring device.

In the vast majority of cases where an ASE is fitted within the FDCIE it will likely be capable of receiving and transmitting additional signals such as the isolation of one or more alarm zones or the fault signal of the FDCIE.

Note

For ease of reading, this document uses the term “isolate”, but this is intended to be read as “isolate or disable”.

This additional monitoring of ‘isolate’ and ‘fault’ signals is used to ensure the fire detection and alarm system continues to operate in accordance with its approved design and has not been isolated in any way that adversely affects its operation.

Alarm Signalling Equipment is required to comply with AS 4428.6-1997 or AS 7240.21-2006 and is required to be capable of receiving and transmitting ‘isolate’ and ‘fault’ signals.

Where a building—or site containing multiple buildings—utilises networked or distributed FDCIE but only a single ASE to receive and provide fire alarm, isolate and fault signals to the monitoring service provider, the isolate and fault signals from those networked or distributed FDCIE should also be provided to the monitoring service provider.

3.2 Importance of providing isolate and fault signals to the monitoring service provider

The transmission of ‘isolate’ and ‘fault’ signals from the FDCIE to the monitoring service provider, via the ASE, provides a life safety benefit to building occupants. It also assists the building manager and building owner in providing a safer built environment.

A competent person carrying out routine service of the fire detection and alarm systems to AS 1851-2005 and AS 1851-2012 should be able to inspect, identify and record that the simulated FDCIE isolate/disable and fault signals are either received or not received by the monitoring service provider.

Table 1 – AS 1851 service activities for ensuring isolate/disable and fault signals are received by the monitoring service provider

<table>
<thead>
<tr>
<th>AS 1851</th>
<th>Isolate/Disable</th>
<th>Fault</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Frequency</td>
<td>Item</td>
</tr>
<tr>
<td>2012</td>
<td>Monthly</td>
<td>Table 6.4.1.2</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Item 1.6</td>
</tr>
<tr>
<td>2005</td>
<td>Monthly</td>
<td>Table 6.4.2</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Item 2.4</td>
</tr>
</tbody>
</table>

If a required ‘isolate’ or ‘fault’ signal is in relation to an issue that is deemed a non-critical defect or a non-conformance, then the fire detection and alarm system...
or sprinkler system equipment or devices that are ‘isolated’ or in ‘fault’ should be reported to the responsible entity within one week. If deemed a critical defect, then the responsible entity should be notified of the issue before leaving site and have this confirmed in writing to them within 24 hours. Refer to Clause 1.17.1 of AS 1851-2012.

**Life safety benefit**

The life safety benefit obtained through the connection and transmission of the isolate and fault signals to the monitoring service provider are that the monitoring service provider will alert the owner of:

- Fire detection system alarm zones, detectors, input or output devices, which have been intentionally or unintentionally left isolated for an unnecessary or unsafe period of time. These isolations increase the risk to life safety by disabling required devices and equipment, which either detect a fire or initiate essential life safety actions subsequent to the detection of a fire (i.e. activating occupant warning systems, unlocking doors, activating smoke management systems and the like).

- Fire detection systems alarm zone, detector, input or output device faults. Similar to isolation above, faults in these devices or equipment can prevent the detection of a fire or prevent the initiation of essential life safety actions subsequent to the detection of a fire.

**Monitoring service provider cost**

The monitoring service providers have advised that, if there already is a ‘fire alarm’ signal being transmitted through an ASE to the monitoring service provider, then the additional transmission of the isolate and fault signals will not incur any additional cost.

You should contact your monitoring service provider to confirm this.

**4 Issue – Cause and effect**

The most common signals that have been identified as being inhibited are the fire detection and alarm system status (Isolate and Fault) signals. In addition, there have been some circumstances where the fire alarm signal may have also been isolated.

Such isolation has been observed to be achieved by “shorting out” the signal wiring. The shorting out has been observed to be in several configurations as shown in Figures 3, 4 and 5 below. The configuration in Figure 5 differs from the other shorted out signal wiring configurations, as the ‘shorting out’ occurs at the FDCIE contacts rather than the ASE contacts.

Under normal conditions, the ASE will monitor the ALARM, FAULT and ISOLATE system status signals for a change in state from a normally closed circuit to an open circuit when the signal changes state (refer to Figure 2 below). The correct wiring configuration is illustrated in Figure 2 below.

The incorrect wiring configurations illustrated in Figures 3, 4 and 5 below, shows the reconfigured wiring that ‘shorts out’ the required ‘isolate’ and ‘fault’ signals.

![Correct ASE circuit wiring](image2.png)

**Figure 2 Example of normal ASE circuit wiring**

![Incorrect ASE circuit wiring – example 1](image3.png)

**Figure 3 Incorrect ASE circuit wiring – example 1**
5 Not all fire protection systems are affected!

For a small percentage of FDCIE (typically older equipment), the “Alarm System Status” signal is not available to be provided by the FDCIE. For some sprinkler systems, only the sprinkler alarm signal is provided to the interfaced ASE.

In the case of the FDCIE (a.k.a. Fire Indicator Panel), this is most likely due to the age of the fire detection system (approximately over 25+ years). In the case of the Automatic Fire Sprinkler System, this system does not produce the ‘isolate’ or ‘fault’ signals and therefore, is not required to transmit those signals via the ASE.

In the past, alarm signalling systems such as the ‘Alarm Interface Units’ (AIU) or the Deltec System only required a one signal (fire alarm) to be sent to the fire brigade. Therefore, it is very likely that the changeover from those units/systems to the ASE only required that same one signal (the fire alarm signal) to be transmitted to the alarm monitoring service provider.

6 Past and current fire alarm monitoring and signalling requirements

The requirements for fire alarm monitoring and ASEs are stipulated in legislation, codes and standards for certain types of fire protection systems and for certain classifications of buildings. In some cases, these requirements can be further limited by the classification of the building. These requirements have been legislated in a variety of different documents over time and has been required by Clause 7 of Specification E2.2a of the Building Code of Australia (BCA) since BCA 1996 on 1 August 1997. However, this clause did not provide any referenced document, standard or the like to comply with for connection and transmission of signals. It is likely that the requirements were contained with the respective MFB and CFA Acts. It was not until the BCA 2004 that a direct reference to AS 1670.3-2004 for fire alarm monitoring was included.
via Clause 7 of Specification E2.2a. BCA 2004 came into effect on 1 May 2004.

Appendix A of this Technical Advisory Note provides more detail with respect to the past and current requirements for fire alarm monitoring and alarm signalling equipment.

7 Risks

If ‘isolate’ or ‘fault’ signals are not transmitted to a monitoring service provider there is the likelihood that these essential life safety systems may not operate correctly when required. Where routine service is being conducted at AS1851-2012 Amendment 1 frequencies, there is an approximate 30-day window where a fire detection alarm zone, detector, device, input or output device could be isolated or in fault before the FDCIE is routinely serviced again.

An FDCIE fault signal could indicate a single faulty detection device; however, it could also indicate the failure of a critical component of the fire detection system, such as an output ‘control’ module that signals and activates other essential safety measures (e.g. occupant warning system, smoke management, unlocking of doors, etc.) Such failures negatively impact occupant life safety.

These systems can be isolated without the owner, agent, facility manager being aware. For example: systems isolated to facilitate other building work and not reinstated upon completion (end of the day).

Insurance cover may be deemed null and void by the insurer, if they determine that a part of the detection system had been isolated or in fault for a significant period, without any rectification action.

8 Using a competent person

To determine if your ASE wiring configuration is correct or carry out repair work to return an existing installed ASE to compliance, it is very important that only a competent person be engaged to do this work. A competent person can be defined as:

A person who has acquired through training, qualification, experience, or a combination of these, the knowledge and skill enabling them to correctly perform the required task. Evidence of competency can be demonstrated by participation in recognised industry accreditation schemes that have been established to independently assess competence in activities associated with essential safety measures relation to fire protection.

9 Building permit exemption

Where ASE wiring configurations are identified by a competent person as being incorrect, it is important that repair work be undertaken by a competent person to return existing installed equipment to compliance. We consider that repair work of this nature is exempted from requiring a building permit in accordance with Item 3 of the Table in Schedule 3 of the Building Regulations 2018.

10 Is there an additional cost to transmit these signals?

The monitoring service providers have advised that there would be no additional cost imposed upon building owners to transmit ‘isolate’ or ‘fault’ signals, where the fire alarm signal is already being transmitted. We are unsure if this is also applicable for the other alarm monitoring service providers and we recommend that you contact your monitoring service provider to confirm this.

11 Recommendations – What to do and how to rectify

From the above information, and in addition to the transmission of the fire alarm signal, the following is recommended:

Recommendation 1

1. Where the FDCIE, ASE, transmission paths and the like are capable of transmitting and receiving isolate and fault signals to the monitoring service provider, these ‘isolate’ and ‘fault’ signals be connected and transmitted to the monitoring service provider.
Recommendation 2

2. Confirming that the configuration of your FDCIE, ASE and transmission path is compliant by verifying that the required signals are provided to the respective alarm monitoring service provider.

This should be carried out by following the process detailed in Section 11.1 below, which outlines the tasks that are necessary to determine ASE compliance.

11.1 Confirmation of signal transmission and compliance

To confirm the signal transmission and compliance, we recommend the following process and tasks be carried out by a competent person. This process is shown in Figure 7.

Task 1

The first task is to determine if the existing system configuration in accordance with the approved design. This is done by obtaining the:

1. Existing ASE wiring configuration for the building/site; and
2. Approved ASE wiring configuration (i.e. the approved design) for the building/site.

That is, the system configuration in accordance with the approved design.

Task 2

The second task is to use the information obtained in Task 1 to determine if the existing ASE wiring configuration complies with the approved ASE wiring configuration. If it complies, ignore Task 3 and proceed to Task 4.

Task 3

If the result of the determination in Task 2 is that it doesn’t comply then rectify/repair the existing ASE wiring so that it complies with the approved ASE wiring configuration.

Task 4

If it does comply or is rectified/repairs to comply, you should provide confirmation of this to the owner by providing:

1. A copy of the documentation that confirms the approved ASE wiring configuration for each ASE.
2. A Confirmation Statement as per Appendix B of this document confirm that the ASE wiring configuration is in accordance with the approved design; and
3. Confirmation from the alarm monitoring service provider of the signals received for the respective ASE.

To ensure your Fire Detection and Alarm System—via the ASE—transmits the ‘isolate’ and ‘fault’ signals to the monitoring service provider, you may need to rectify/repair the existing ASE wiring so that these signals are transmitted and provide this confirmation to the owner.

Important

It is important that compliance is achieved. Compliance is typically a minimum life safety requirement. However, there is nothing preventing an owner providing more than the minimum level of life safety.

This should include transmission of the ‘isolate’ and ‘fault’ signals to the monitoring service provider (where they were not originally required to be transmitted by the building approval/permit). This is provided the work is carried out by a competent person in compliance with the respective standards.

Also, note that it is an offence under Section 75B of the MFB Act or Section 106A of the CFA Act to damage or interfere with a fire indicator panel (fire detection control and indicating equipment) or other apparatus without a reasonable excuse. Providing the ‘isolate’ and ‘fault’ signals to the monitoring service provider is not considered to be damaging or interfering.
12 References


2. Fire Protection Association Australia (FPA Australia) Technical Advisory Committee for fire detection and alarm systems (TAC/2).

3. The Building Code of Australia 1996—Volume One, Class 2 to Class 9 Buildings—as released by the Australian Building Codes Board on behalf of the Commonwealth of Australia and States and Territories of Australia.


5. Australian Standard AS 1670.1-1995, Fire detection, warning, control and intercom systems—System design, installation and commissioning—Fire—Published by Standards Australia International Ltd.

6. Australian Standard AS 1670.1-2015, Fire detection, warning, control and intercom systems—System design, installation and commissioning—Fire—Published by Standards Australia International Ltd.


8. Australian Standard AS 4418.2 2000, Supervisory control and data acquisition (SCADA)—Generic telecommunications interface and protocol—Fire Alarm Systems—Published by Standards Australia International Ltd.

9. Australian Standard AS 4428.6-1997, Fire detection, warning, control and intercom systems—Control and indicating equipment—Alarm signalling equipment—Published by Standards Australia International Ltd.

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Appendix A  Past and Current Fire Alarm Monitoring and Signalling Requirements

BCA direct requirement for fire alarm monitoring

As shown in the diagram on the last page of this Appendix, system monitoring of certain smoke and fire detection systems became a requirement of the Building Code of Australia (BCA) 1996 on 1 August 1997 through Clause 7 of Specification E2.2a. However, this clause did not provide any referenced document, standard or the like to comply with for connection and transmission of signals. It is likely that the requirements were contained with the respective MFB and CFA Acts.

However, in Clause 7 of Specification E2.2a BCA 2004, the direct reference to AS 1670.3-2004 for fire alarm monitoring was included and came into effect on 1 May 2004.

BCA indirect requirement to Australian Standards for fire alarm monitoring

The BCA 1996 first required fire alarm monitoring and ASE to comply with the following specific Australian Standards:

- AS 4428.6-1997, *Fire detection, warning, control and intercom systems—Control and indicating equipment—Alarm signalling equipment*; and
- AS 1670.3-1997, *Fire detection, warning, control and intercom systems—System design, installation and commissioning—Fire alarm monitoring*

which are secondary reference standards to the following primary reference standards:

- AS 1670.1-1995 (incorporating Amdt 1), *Fire detection, warning, control and intercom systems—System design, installation and commissioning—Fire, included in the BCA 1996 Amdt 3 on 1 July 1998, and

The current NCC 2016 Amdt 1 requirements differ slightly from the above, though the reference to AS 1670.1-2015, which also permits Routing Equipment to AS 7240.1-2006, *Fire detection and alarm systems—Routing equipment* to be used.

Automatic fire sprinkler systems

Independent of the Clause 7 of Specification E2.2a BCA requirement for system monitoring, automatic fire sprinkler systems to AS 2118.1-1995 have been required under the BCA to transmit the alarm signal to the fire brigade since BCA 1996 Amdt 0 on 1 August 1997. This was also a requirement of the subsequent version AS 2118.1-1999; however, this version referenced both AS 1670.3-1997 and AS 4428.6-1997.

For certain aged care buildings (Class 3, 9a and 9c), the BCA also required system monitoring of AS 2118.4 automatic fire sprinkler systems. It first came into effect for Class 9c buildings in the BCA 1996 Amdt 11 on 1 July 2002.

Intent of standards applicable to fire alarm monitoring and alarm signalling equipment

Since 1 July 1998, the NCC/BCA requirements and referenced standards for fire detection systems, fire alarm monitoring and ASEs:

- AS 1670-1995;
- AS 1670.1-2004 & 2015;
- AS 1670.3-1997 & 2004;
- AS 4428.1;
• AS 4428.6-1997;
• AS 7240.2-2004; and
• AS 7240.21-2006

include requirements that the required hardware, software receiving equipment, transmitting equipment, transmission paths and monitoring equipment **be capable** of receiving and transmitting fire alarm, isolate and fault signals, amongst other signals.

For example:

**Clause 2.1.1 of AS 4428.6-1997** states:

The interface point between a fire detection system and the network connection point of a monitoring service provider shall be the ASE. ASE notifies the monitoring service provider of status changes within the fire detection system and transfers data and commands from the monitoring service provider to the fire detection system.

**Clause 5.1.1 of AS 7240.21-2006** states:

The routing equipment shall be capable of unambiguously indicating the following functional conditions, as described in Clauses 6 to 11.

**Clause 7.1.1 of AS 7240.21-2006** states:

The routing equipment shall report the fire alarm condition to the fire alarm receiving station when fire alarm signals are received from the control-and-indicating equipment.

**Clause 9.1.1 of AS 7240.21-2006** states:

The routing equipment shall report the fault warning condition to the fault warning (trouble signal) receiving station when fault warning signals are received from the control and-indicating equipment.

**Clause 10.1.1 of AS 7240.21-2006** states:

The routing equipment shall report the disabled condition to the disabled signal receiving station when disabled signals are received from the control-and-indicating equipment.

Another Australian Standard applicable to ASE and alarm monitoring service providers is AS 4418.2 2000, **Supervisory control and data acquisition (SCADA)—Generic telecommunications interface and protocol—Fire Alarm Systems**.

The objective of 4418.2 2000 is to provide fire equipment manufacturers and fire alarm monitoring organizations with a telecommunications protocol for connecting fire alarm systems to monitoring centres, in order to achieve system and equipment interoperability.
Past and Current Alarm Signalling Legislative Requirements
### Appendix B  Confirmation Statement

**CONFIRMATION STATEMENT**  
Alarm Signalling Equipment Connection

<table>
<thead>
<tr>
<th>Building/Site/Facility Name:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Address:</td>
</tr>
<tr>
<td>ASE Number:</td>
</tr>
</tbody>
</table>

I, ____________________________ (name of competent person), have:

- Inspected the ASE connection at the above address on: ____________________________ (insert date)
- Have obtained evidence of the approved ASE connection as detailed in:
  ____________________________________________________________________________
  (Document reference)

and confirm that:  
(tick if applicable)

- The inspected ASE connection **complies** with the approved ASE connection.
- The FDCIE **is** capable of transmitting the ‘isolate’ and ‘fault’ signals.
- The FDCIE **is not** capable of transmitting the ‘isolate’ and ‘fault’ signals.
- The ‘isolate’ and ‘fault’ signals **have** been voluntary rectified to transmit to the monitoring service provider (in addition to the fire alarm signal).
- The ‘isolate’ and ‘fault’ signals **have not** been voluntary rectified to transmit to the monitoring service provider.
- The alarm signal interface/transmitting device **is not** capable of transmitting ‘isolate’ and ‘fault’ signals (for example Alarm Interface Unit or the like).

Signature:__________________________ Date:__________________________

Company: ____________________________  

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Technical Advisory Note