FORMAN
A division of Ardent Limited

BUS & COACH SYSTEMS

SAFETY, ACCESSIBILITY AND PASSENGER EXPERIENCE, AND FIRE PROTECTION SOLUTIONS

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About Us

For over 30 years, our mission has been to inspire public confidence in buses and coaches by making them safer and more accessible for everyone. Throughout this time, we have installed over 21,000 fire suppression systems and 84,000 electronic systems in countries around the world. In 2019, we joined the Ardent Group, enabling us to serve our customers' needs even better.

As part of Ardent, we have been able to bring our safety expertise to over 50 countries around the world. We specialise in making high-risk sectors safer, including electric vehicles, underground mining, plant hire, power generation, fixed equipment, and more.

Today, at a time when a more sustainable Net Zero future is at the top of the global agenda, our mission has never been more important. If the UK is to play its part in this global change, then more people will need to be persuaded to leave the car at home and use public transport. This will only happen if operators and OEMs increase confidence in public transport by providing better, higher-capacity services that are faster, safer, and more accessible.

When it comes to bus and coach safety, Forman is the safest pair of hands in the industry. We're experts in making transport safer and more accessible for all.

Safety Solutions

In London alone, there have been 128 fatalities involving buses since 2015. The safety challenges of buses are varied due to the sheer size of the vehicles, and these challenges don't just concern the passengers on board – there were 67 collisions between buses and cyclists in 2021. Other safety concerns are more surprising, requiring innovative solutions – for example, 43 incidents between 2002-2018 involved a bus driver using the wrong pedal.

Our solutions are designed to keep everyone safe – bus operators, their passengers, and the road users around the vehicle.

V-AVAS Acoustic Vehicle Alerting System

AVAS emits an artificial sound so those with visual impairments will be aware of it when close by. This is vital as electric vehicles will run almost silently at lower speeds. Several AVAS configurations are available, with more advanced models offering extra features including visual alerts, configurable inputs, and remote updates.

V-PAF Pedal Acoustic Feedback System

PAF (pedal acoustic feedback) intuitively signals to the driver when they are pressing the accelerator by playing a tone that shifts in pitch as the pedal is depressed. It is useful in ZEVs as it simulates the tone shift of an ICE motor. The system also plays warnings when excessive force is applied to the accelerator, or when both accelerator and brake pedals are pressed at the same time, reducing the risk of pedal applications errors.

V-IS Handbrake Message System

The Handbrake Message System alerts drivers if the handbrake system is left disengaged when the doors are open, eliminating the risk of the bus rolling when it should be stationary. It can be supplied as a standalone unit with a speaker, or as part of a full speaker kit with two outputs. Both outputs are independent of one another, allowing for separation between the driver and passenger areas. Each unit is supplied configured to your requirements, meaning it can play additional warnings and bespoke alerts.

Assault Alarm

Our assault alarm presents a simple solution to a serious problem, offering extra protection to bus drivers. When activated, the alarm sounds an alert message to the bus exterior , alerting nearby road users of danger to the vehicle. Operators can choose between a male and female voice.

V-CAS Cycle Alert System

The cycle alert system sounds audio warnings to the bus exterior whenever the bus indicators are switched on and the steering wheel turns left or right. The unit features up to five hard-wired configurable inputs and two speakers on each side of the bus, warning nearby cyclists of where it is about to turn. The interface is factory programmed to client specifications, so it can deliver messages of your choice.

Accessibility & Passenger Experience Solutions

If public transport is to drive us towards a Net Zero future, it must be accessible to all. Increasingly, government transport funding for operators and local authorities is dependent on accessibility requirements. This increases the need for OEMs to include accessibility features in new specification vehicles.

V-ILS Induction Loop System

The Forman audio-frequency induction loop system allows hearing aid users to receive important information directly into their hearing aid. It can pick up separate signals from the driver's microphone in the cab and the VMMS system, as well as alerts from compatible systems in the saloon. It can be fully integrated with audio-visual systems, providing synchronised automated announcements to make public transport more accessible for hearing aid users.

V-IU Cab Intercom Unit

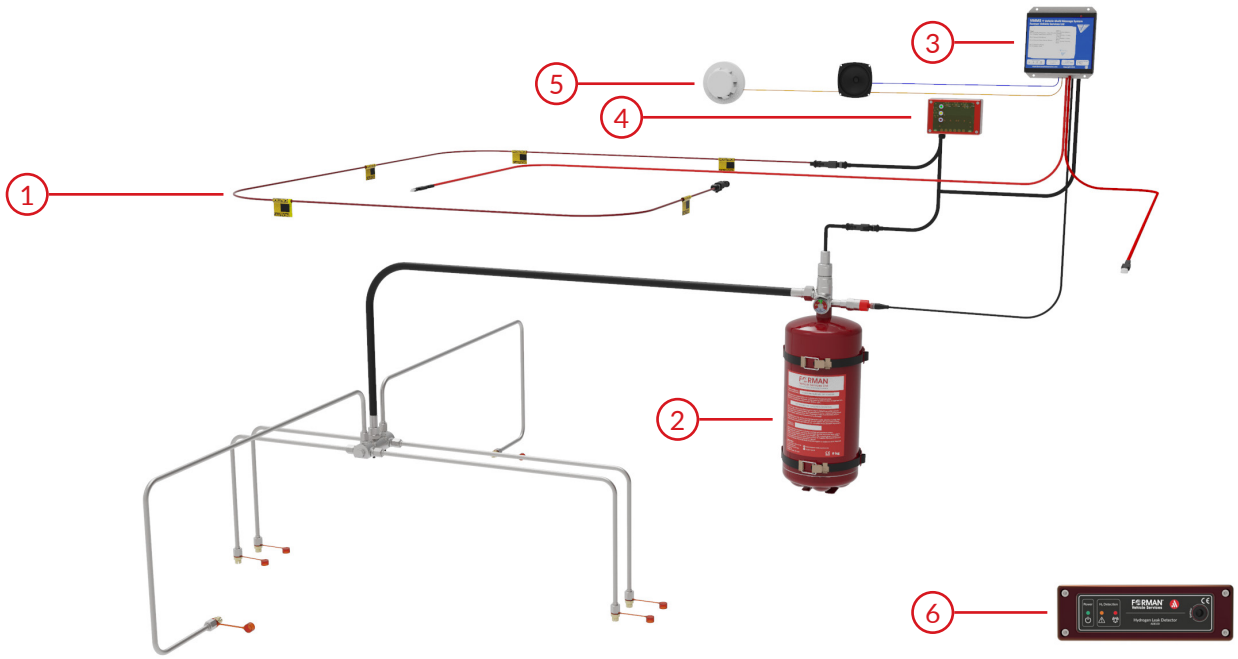
The intercom unit allows for clear two-way communication between the bus driver and their passengers as they walk on and off the bus. It means the driver's cab is as secure as possible without compromising on communication. The system is available in push-to-talk or hands-free configurations and features adjustable volume in the event background noise levels change.

VARU Audible Request Unit

The audible request unit offers up to five hard wired configurable inputs. It can be programmed with bespoke messages or sound effects to be played through separate speaker outputs in the cab and passenger area, making for clearer communication between passengers and drivers. It can play any customer-specified sound or message to replace multiple bell and buzzer combinations – for example, separate top and bottom deck bells, wheelchair ramp requests, medical emergency alerts, and more.

Fire Safety for Buses and Coaches

Each type of vehicle presents a unique challenge. Combustion engine and zero emission vehicles, like battery electric vehicles (BEVs), hybrid and plug-in hybrid vehicles (HEVs and PHEVs), and fuel cell electric vehicles (FCEVs) all work slightly differently, but all of them are made up of a complex web of electrical components. Many of these systems present a particular fire hazard that needs dedicated protection – electrical fires spread rapidly, and every second counts. That's why our fire suppression system offers multi-layered complete coverage in every zone of each bus.



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1 **Linear Heat Detection Cable**

We use an R107 approved Linear Heat Detection (LHD) cable. This cable is made of conductors surrounded by a heat-sensitive polymer. When exposed to high temperatures, the polymer melts, creating a short circuit that signals the control module to activate the suppression system. It is easily routed around every fire hazard in the vehicle for complete coverage.

2 **Fire Suppression Tanks and Agent**

Our systems use a tank of a dry chemical agent – a powder – which is released when a fire is detected. Within seconds the powder is discharged through a network of pipes and out of critically-located nozzles aimed at identified fire hazards.

3 **Optional Vehicle Multi-Message System (VMMS)**

The VMMS delivers audio messages directly to the driver or passengers when warnings, alarms, or safety measures are triggered. We are experts in developing audio feedback systems for electric vehicles, having previously created the AVAS (Acoustic Vehicle Alerting System) and PAF (Pedal Acoustic Feedback System).

4 **Control Module**

VCM Mk2 is our most advanced control module yet. Featuring an LCD screen, it provides intuitive visual feedback on the status of your fire suppression system.

5 **Optional Smoke Detector**

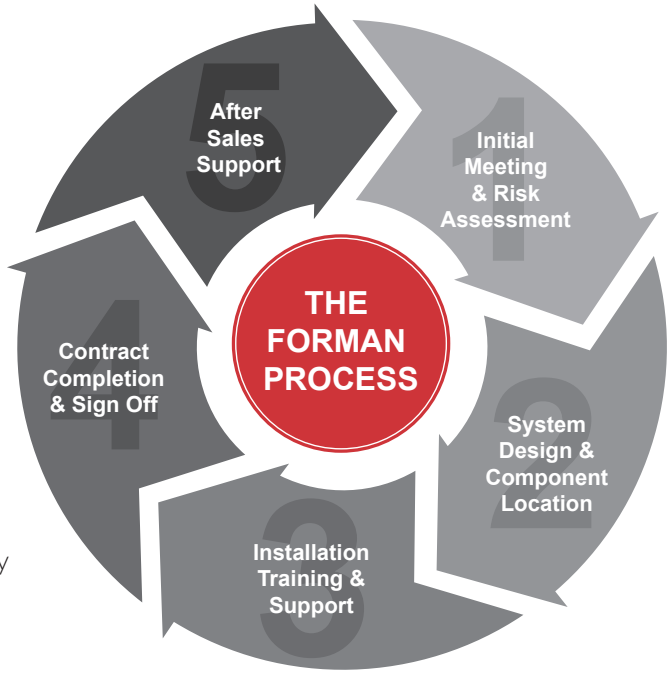
This unit is recommended for the upper deck of double-decker buses. It can link to the VMMS system to alert the driver if smoke is present on the top deck of the bus.

6 **Hydrogen Leak Sensors**

This module, designed for FCEVs, uses advanced catalytic sensors which can detect even minute amounts of hydrogen. It can detect from 0-100% of the lower flammability limit (LML), communicating this to the driver.

Our Process

We have a thorough five-step process to ensure your needs, the needs of your staff, and the needs of your passengers are all met.



Step 1

We set up an on-site meeting with our engineering team. We will complete a full risk assessment for each vehicle type and review the location of any hazardous components.

Step 2

We send a detailed dossier laying out the system design and component location to the vehicle manufacturer for approval.

Step 3

We deliver a first kit on-site. We go through all the necessary training and support needed to complete an initial installation with your production engineers.

Step 4

We will provide further training if required and will return to sign off the second installation. Once this is done, our contract is completed and signed off.

Step 5

We have the largest network of field engineers across the UK and offer 24 hour VOR response.

Choosing Your Fire Suppression Agent

While there are many different fire suppression agents including water-based, foam-based, powder-based, gaseous, or aerosol agents, not all of these are suitable for use on electric buses. We are entirely led by fire hazard analysis and are not committed to one particular solution. Fire suppression is not a one-size-fits-all problem.

As part of the Ardent Group, we have access to a wide range of agents, which we use to provide the best protection for a particular application. However, a recent study commissioned by the Fire Protection Research Foundation compared the extinguishing times of various fire suppression agents and found that a dry chemical powder-based solution extinguished a fire the fastest while using the least amount of agent. If an electrical fire breaks out, every second counts, so we predominantly focus on using dry chemical solutions for ZEV applications.

One issue with lower-quality powder is that it can become compacted when stored for long periods, requiring agitation of the tanks. This is why we use a formulation of high-quality powders so the agent stays loose without the need for agitation. This ensures it is rapidly dispersed when required. It is highly effective against Class A, Class B, and Class C fires.

We also use clean gaseous agents when dealing with enclosed fire hazards such as electrical panels. This is because gas can be discharged from the extinguisher very quickly and its extinguishing time is comparable to that of dry chemicals.

To find out how we can help you enhance the safety and accessibility of your vehicles, call us on

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