Versatile Fire
Safety Solutions for
Battery Energy
Storage Systems

Advanced – Made in the UK. Trusted around the world

At Advanced, we're committed to creating a safer future. We deliver fire and life safety solutions that protect people and property in more than 80 countries across the globe.

Our products are shaped by decades of research and development expertise as well as ongoing investment in new technologies. This ensures they provide years of high performance and reliability – for ultimate peace of mind.

Everything we deliver is rigorously tested and approved to exacting quality standards – which is why Advanced products are trusted by customers the world over and synonymous with **quality, performance** and **ease of use**.
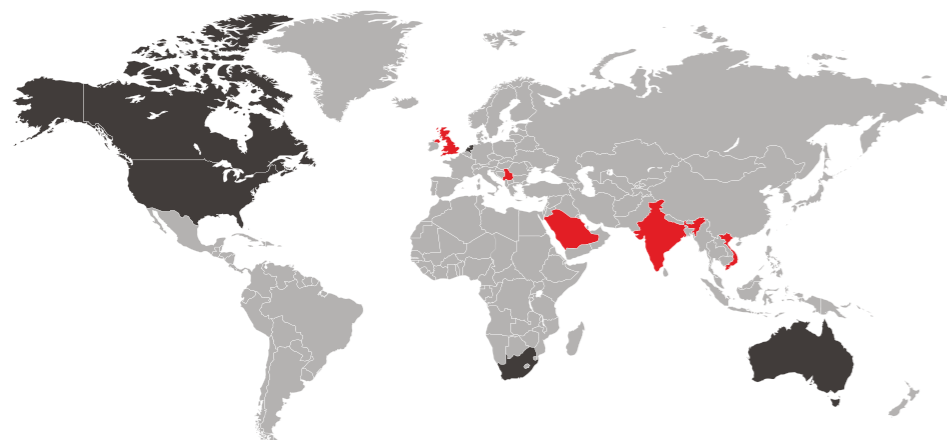

Advanced Headquarters, Newcastle, UK

We understand that few fire challenges are the same, so as well as our mass-customised ranges, we also offer fully-customised solutions. This flexibility gives you complete control over the functions, format and finish of products to suit your site's unique specification.

We are dedicated to providing excellent service and have an international network of offices and agents to help you access sales support with ease – wherever you are in the world.

In addition, our training and technical services are free of charge to all our direct customers and consistently rated as excellent.

For added reassurance, Advanced is part of the safety sector of FTSE 100 company Halma plc. This global group of life-saving technology companies has a clear purpose to grow a safer, cleaner, healthier future for everyone, every day.

● Advanced & Halma sales representatives
● Strategic and OEM partners
● Distributors and system integrators in key locations worldwide

A **Halma** company

Contents

The need for Advanced fire equipment in BESS facilities

Battery energy storage systems (BESS) have become an increasingly critical component in the global transition to sustainable energy.

As renewable energy sources continue to expand, BESS provide a way to store excess energy generated during peak production times and release it when demand is high, or production is low.

This capability not only enhances the reliability of renewable energy but also helps balance supply and demand, reducing reliance on fossil-fuel-based power plants Additionally, BESS technology supports grid stabilisation, ensures the availability of backup power, and improves the viability of the expansion of electric vehicle usage, making it an increasingly integral part of modern infrastructure.

However, BESS facilities also bring unique fire safety challenges. The high energy density and chemical makeup of lithium-ion batteries commonly used in BESS pose significant fire risks if they overheat, are damaged, or malfunction.

Fires in BESS facilities can be difficult to control and contain due to the possibility of thermal runaway. This occurs through a chain reaction where excessive heat leads to battery cell failure, releasing more energy and further accelerating the fire. Such incidents not only endanger people and property but also threaten the continuity of power supply and integrity of essential infrastructure.

To mitigate these risks, choosing appropriate early warning and fire safety systems is crucial.

Advanced offers a variety of solutions that can be used standalone or in combination with other systems to help in detecting, containing, and controlling BESS fires.

Our extensive product portfolio includes:

- Early detection equipment
- Heat/smoke alarms
- The EX-3001 extinguishing panel, which can control systems with different types of gases (FM-200, Novec, CO_2, inert gases) and aerosols.
- Real-time monitoring and fault detection, allowing facility operators to respond immediately and prevent catastrophic outcomes.

By implementing these robust fire safety measures from Advanced, fire risk within battery energy storage facilities can be significantly reduced, ensuring a safer, more reliable transition to renewable energy.

Energy generation and control of supply

Behind-the-meter and front-of-the-meter systems are two important concepts within the overall 'energy mix'. Both approaches lead to requirements for battery energy storage solutions, albeit on different scales.

Behind-the-meter-storage systems

BTMS systems encompass technologies and infrastructure on the customer's side of the utility meter i.e. they allow users to generate their own energy and store it for later use.

BTMS systems directly supply electricity to buildings and homes and help minimise grid impact, integrate EV charging, and more.
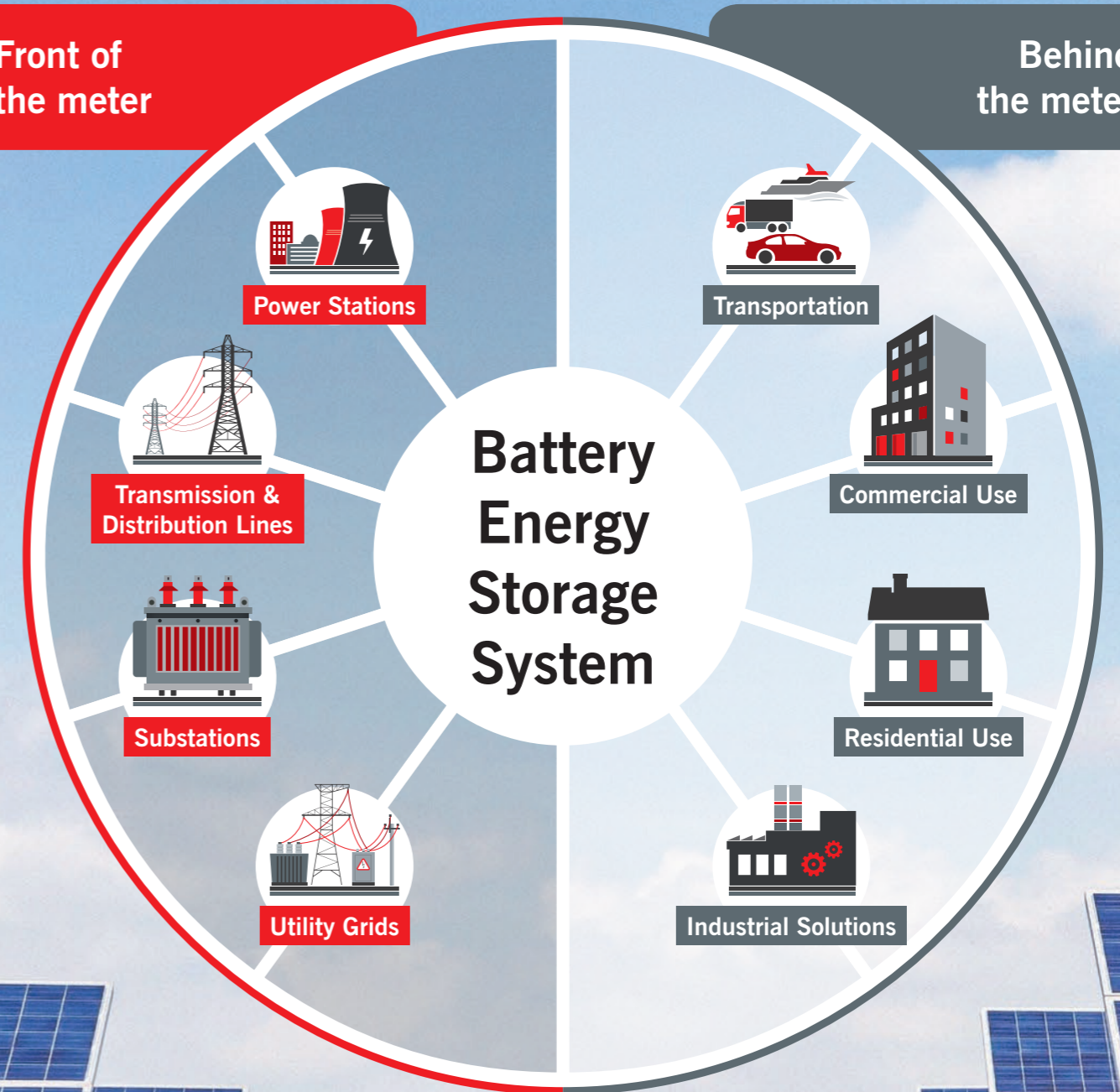
Front-of-the-meter storage systems

FTM systems encompass those on the utility side of the meter. They typically include large-scale energy generation and storage facilities such as power plants, solar parks, or wind farms.

The energy from FTM sources is used to power the grid, balance grid loads, and help ensure a reliable energy supply to residential, commercial and industrial customers. This is where Advanced fire safety equipment is being installed to bring peace of mind that FTM systems are protected in the event of fire.

Front of the meter

Behind the meter

Battery Energy Storage System

- Power Stations
- Transmission & Distribution Lines
- Substations
- Utility Grids
- Transportation
- Commercial Use
- Residential Use
- Industrial Solutions

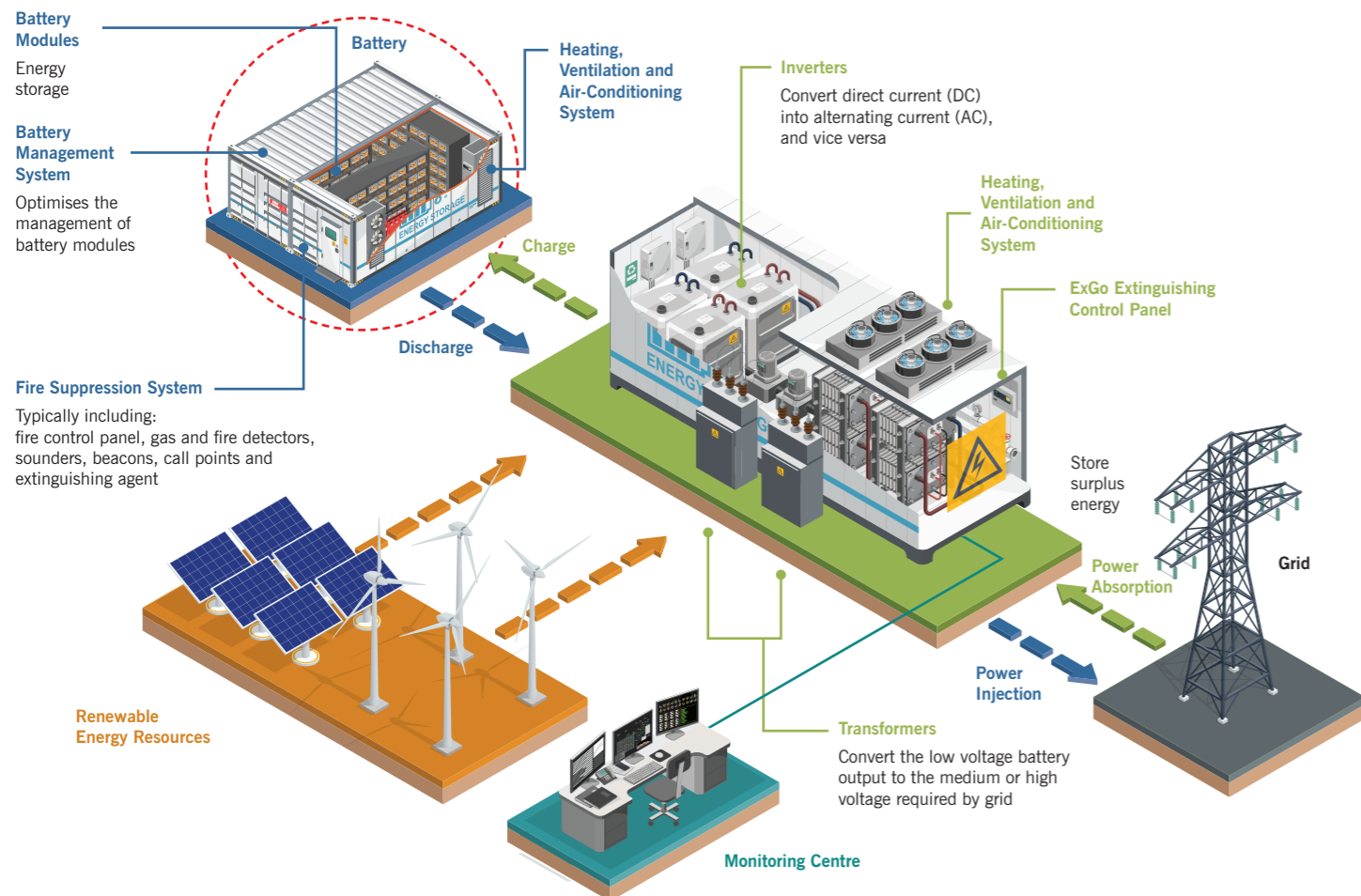# The typical battery energy storage system and fire risks

Battery energy storage system fire hazards primarily result from their reliance on lithium-ion batteries, which are prone to **thermal runaway**. This occurs when cells overheat, triggering a chain reaction that generates intense heat, flammable gases, and, potentially, explosions.

Key hazards include:

1. **Thermal runaway:** Internal or external heating, overcharging, or physical damage that can lead to self-sustaining reactions.

2. **Toxic and flammable gases:** Venting gases like hydrogen and carbon monoxide during failure can lead to fires or explosions if ignited.

3. **Electrical faults:** Short circuits and high voltages may ignite battery components.

4. **Fire propagation:** Once ignited, flames can spread between closely packed cells or modules.

5. **Chemical hazards:** Suppressing fires may expose responders to toxic chemicals, such as hydrofluoric acid.
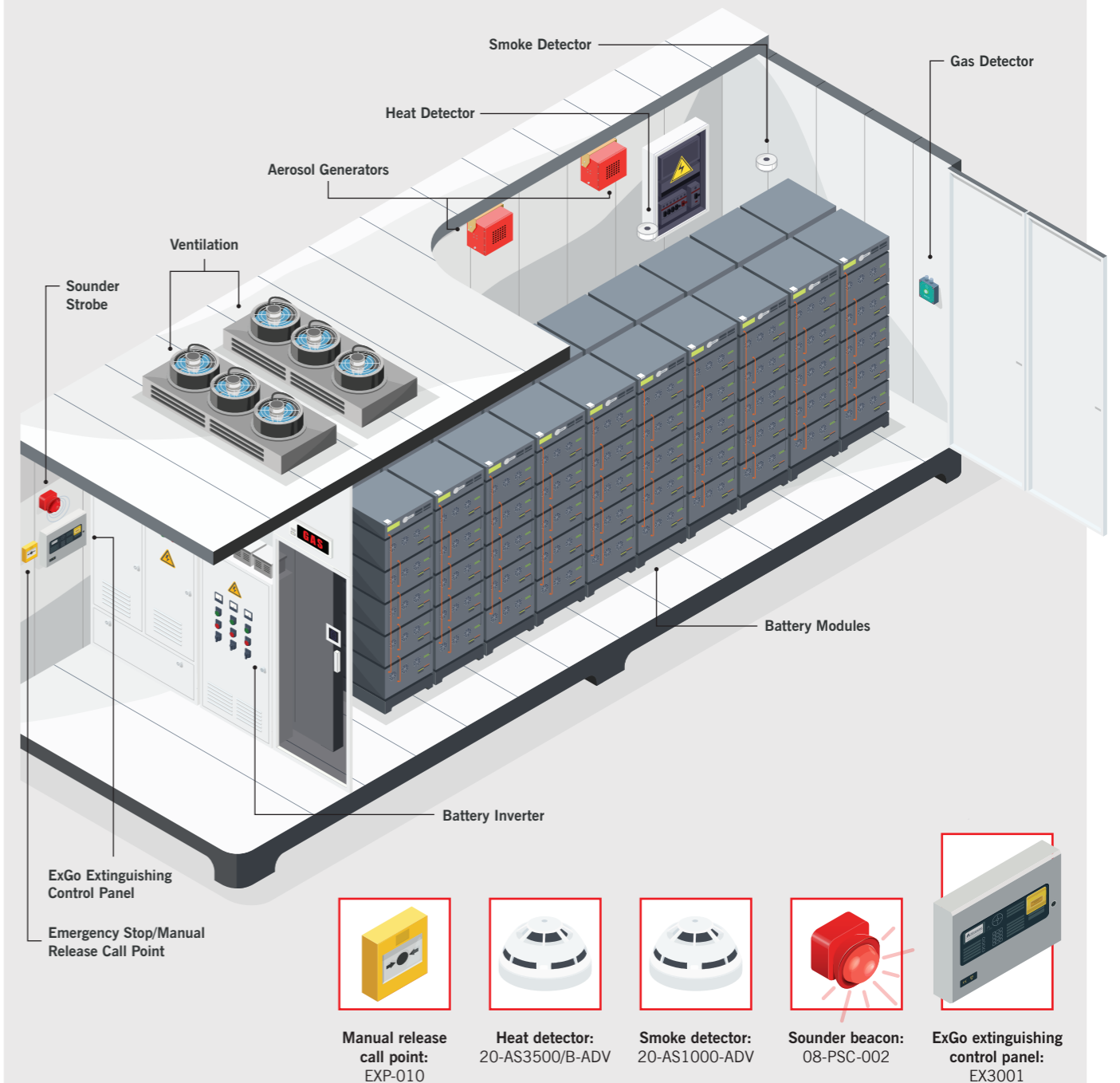
Effective fire detection, cooling systems, and suppression measures are all essential to mitigate these risks.

Battery Energy Storage System

Battery Modules
Energy storage

Battery Management System
Optimises the management of battery modules

Fire Suppression System
Typically including: fire control panel, gas and fire detectors, sounders, beacons, call points and extinguishing agent

Battery

Charge

Discharge

Heating, Ventilation and Air-Conditioning System

Inverters
Convert direct current (DC) into alternating current (AC), and vice versa

Heating, Ventilation and Air-Conditioning System

ExGo Extinguishing Control Panel

Renewable Energy Resources

Power Absorption

Power Injection

Transformers
Convert the low voltage battery output to the medium or high voltage required by grid

Store surplus energy

Grid

Monitoring Centre

Advanced offers versatile solutions to address battery energy storage system fire risks.

Typical example showing extinguishing system with aerosol generators.

Smoke Detector

Gas Detector

Heat Detector

Aerosol Generators

Ventilation

Sounder Strobe

Battery Modules

Battery Inverter

ExGo Extinguishing Control Panel

Emergency Stop/Manual Release Call Point

Manual release call point: EXP-010

Heat detector: 20-AS3500/B-ADV

Smoke detector: 20-AS1000-ADV

Sounder beacon: 08-PSC-002

ExGo extinguishing control panel: EX3001

Advanced solutions to BESS fire risks

To mitigate against the hazards associated with BESS, we offer a comprehensive range of solutions.

Our products are trusted for their performance, quality and ease of use across a wide range of challenging settings. Manufactured in the UK and trusted around the world, our robust, reliable equipment meets, or exceeds, an array of international standards ensuring that we can provide suitable fire safety solutions for BESS installations whether you need to meet EN, UL or AS standards.

Advanced extinguishing control

ExGo

- Used all over the world to protect sensitive and strategic assets – from battery energy storage systems, server and switch rooms, to historic and cultural collections and archives.
- Suitable for almost all single-flooding area applications
- Compatible with a range of control options and devices
- Use as a standalone system or interface with any fire system
- Approved to EN12094-1 and EN54 Parts 2,4 & 13

Easy to install and use

ExGo is built on Advanced's outstanding pedigree of fire alarm and detection experience, bringing you an extinguishing control panel that is simple to install, configure and use.

- Removable chassis for easy installation
- Unique intuitive graphic LCD display menu makes setup simple and easy
- Sensitive circuits are analysed and configured by the panel menu.

In-built safety measures

For added peace of mind, every ExGo panel includes a number of safety measures.

- Automatic/manual controls to safeguard against accidental/unwanted suppressant release
- Status Indicators enable visibility of the system status inside and outside a protected area
- Large countdown timer on LCD screen
- Sensitive circuits are analysed and configured by the panel menu system and no direct adjustment of electronic components is required.

Versatile and dependable

Dependability is key and ExGo is robust and trusted for the protection of sensitive assets around the world. Its versatility means that it can be used standalone, or integrated into an Advanced MxPro or Axis EN fire system, or with any third-party fire system.

- Extensive control and programming options
- Compatible with a vast range of conventional detection devices
- Wide choice of peripherals including hold and abort buttons
- Approved to EN12094-1 and EN54.

Packed with functionality

Every ExGo panel comes with a host of advanced features built in as standard.

- Diagnostics logging
- Windows-based extraction tool software for efficient management of configuration, control data and event logs
- Time-stamped, customisable event log reporting.

Battery Energy Storage Systems   Public sector   Heritage and landmarks

Industrial and utilities   Transport and infrastucture   Data and archives   Manufacturing and technology

The Ex*Go range

ExGo Extinguishing Control Panel

- 3 conventional detection zones (inc support for I.S. barrier)
- 1 Flooding/extinguishing zone
- Support for solenoid and Metron type actuators (1A continuous rating, 3A 15ms pulse) and FirePro bulb thermal actuator
- Autolearn Actuator Output circuit. No direct manual adjustment required
- Large countdown timer on LCD screen
- 4 relay outputs (fire, fault and 2x programmable) rated 30V DC at 1A max
- 3 sounder circuits 21-28VDC rated at 700mA max
- 2 AUX supply outputs (1 switched), 21-28 VDC each rated at 500mA

- 11 monitored inputs. 4 programmable, 1 manual trigger, 6 release related (Mode, Valve Monitor, Pressure Monitor, Hold, Abort, Flow)
- Support for monitoring status of a manual isolate valve/abort input
- RS-485 link to remote status indicators and ExGo Modbus gateway
- Multiple language variants available
- 8 additional programmable relay outputs via EXP-008 relay module
- 3A universal PSU (1A reserved for battery charging)
- Pass code or optional key switch for Level 2 access

- Key switch option for mode select (Auto/Manual)
- EN54-2 switch-mode power supply
- 72hr battery standby possible
- Logo tool allows customer logo to be displayed on LCD screen
- 3-year warranty as standard
- Advanced's simple, select and click programming delivers huge configuration options
- 100 fire/trigger events and 500 general log events
- Compatible with a wide range of conventional devices
- Approved to EN12094-1 & EN54 2,4 & 13
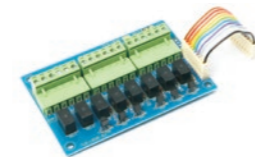
ExGo Remote Terminals

- 2 versions, each with and without manual release
- Up to 7 remote status indicators per one ExGo panel
- Key switch option for mode select (Auto/Manual)
- 12 LED status indicators (Fire, Release, Timer, Disablement, Mode and Fault Indications)
- 2 programmable relay outputs expandable to 4
- Small and compact
- RS485 network connection
- Multiple languages
- Slide-in labels
- Surface-mount or semi-flush option
- 3-year warranty as standard
- 24V DC supply input

Manual Call Points and Buttons

- Simple to install
- Surface or flush mount
- IP65 option
- Easy connection with dedicated control panel inputs

2 or 8 Way Relay Output Card

- 2 or 8 individual programmable outputs
- Fast instant response
- Each output 30V AC/DC, 1 Amp rating
- Cost effective against ancillary hardware

End-of-Line Modules

Switch End-of-Line Module
- Provides a simple method of connecting auxiliary contacts to any switch input circuit
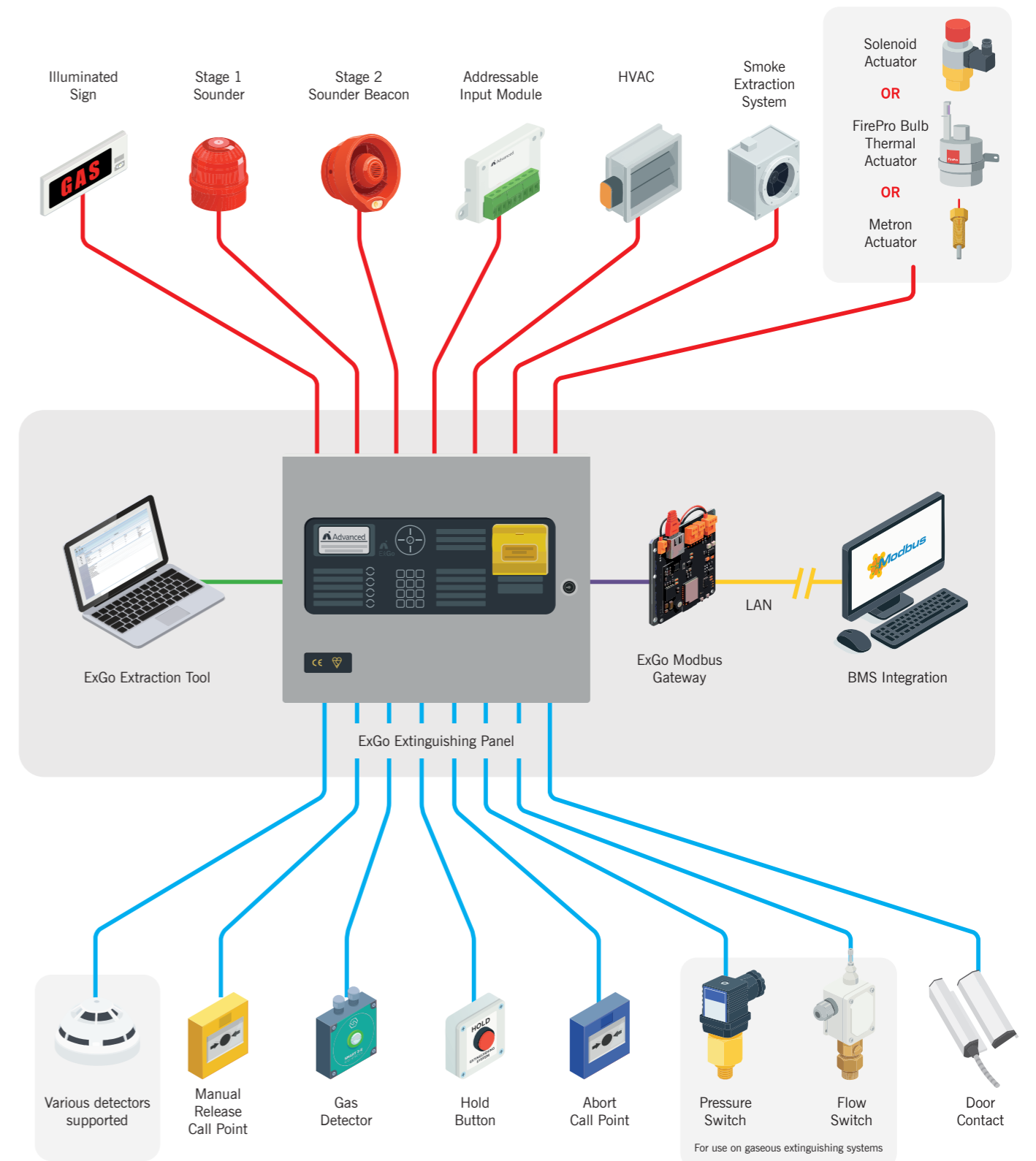- The normal end of line and trigger resistors are not required

Zone Active End-of-Line Module
- Removing a manual call point or detector from its circuit should not affect its ability to respond to an alarm signal
- Removing a detector from a standard base can affect the operation of the entire zone and potentially prevent system discharge unless a diode detector base is used
- Using a diode base prevents the panel from reporting a fault on a zone unless the Zone Active EOL is used
- Zone Active EOL allows the control panel to sense short-term interruptions and report fault conditions
- No EN54-13 compliance is declared for the use of a Zone Active EOL

Sounder Active End-of-Line Module (EN54-13)
- To comply with EN54-13 requirements, the system must check and warn (prior to an alarm condition) if the voltage at the last device cannot be maintained under the applied alarm load conditions
- The sounder circuits can be configured for compliance with EN54-13 by programming and the use of an Active EOL device. All panel sounder outputs must be fitted with the Active EOL device (MXP-505)
- The panel ensures that a fault warning condition is reported if the circuit resistance increases to a condition where the voltage at the last device may fall below its minimum operating voltage level
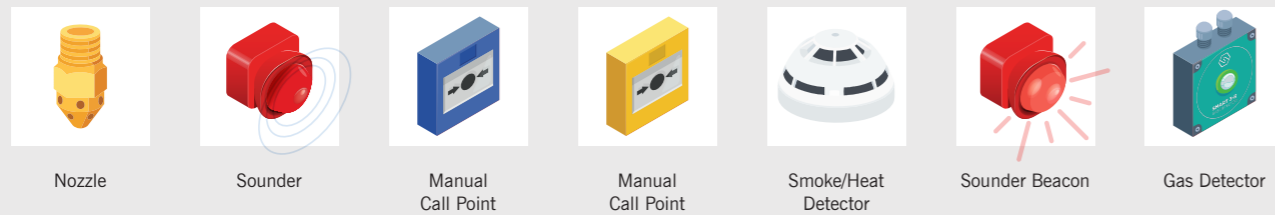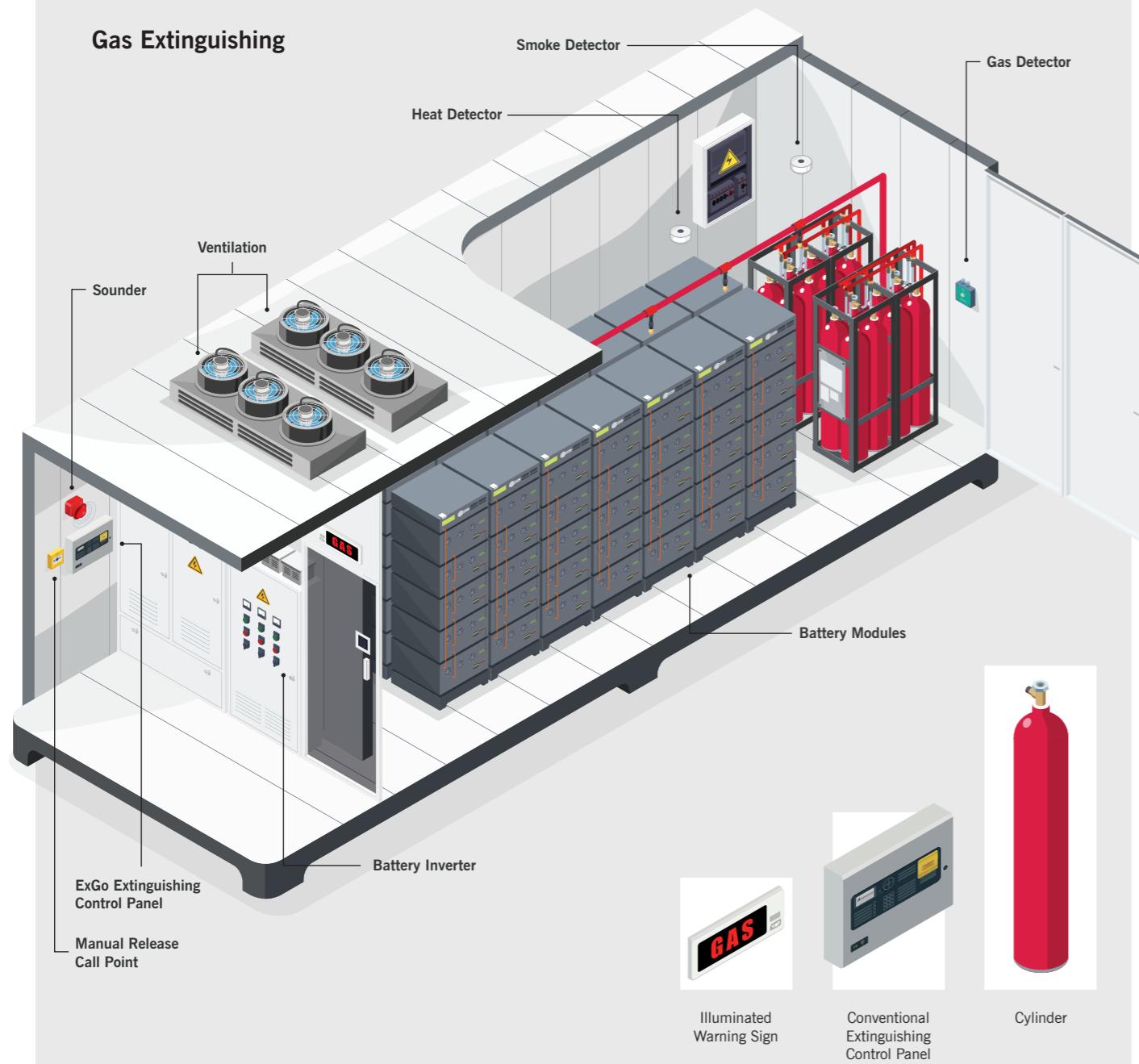
Sample System Diagram

Illuminated Sign
Stage 1 Sounder
Stage 2 Sounder Beacon
Addressable Input Module
HVAC
Smoke Extraction System
Solenoid Actuator
OR
FirePro Bulb Thermal Actuator
OR
Metron Actuator

ExGo Extraction Tool

LAN

ExGo Modbus Gateway

BMS Integration

ExGo Extinguishing Panel

Various detectors supported
Manual Release Call Point
Gas Detector
Hold Button
Abort Call Point
Pressure Switch
Flow Switch
Door Contact

For use on gaseous extinguishing systems

For guidance only.

Typical ExGo/BESS applications

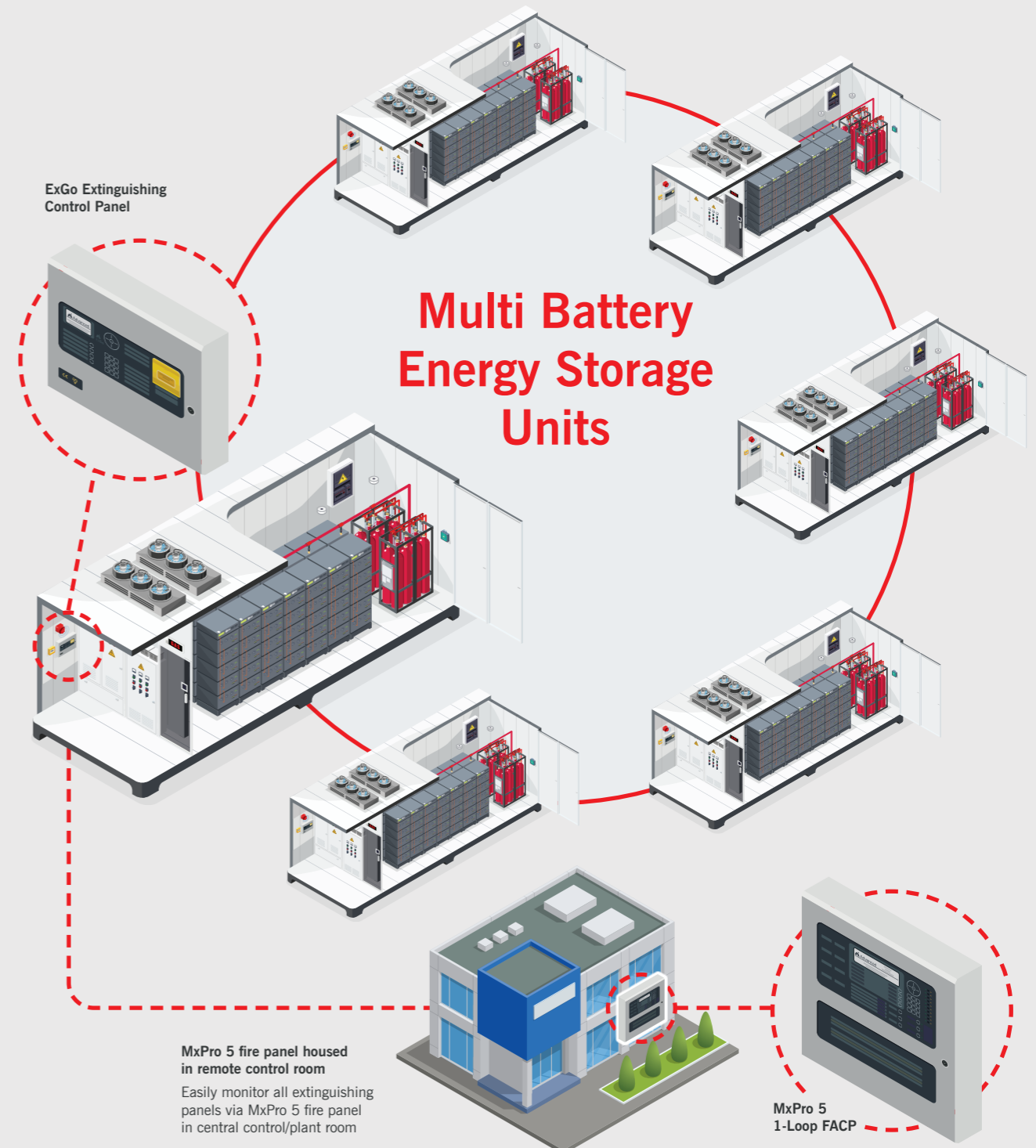## Scenario 1: Single Battery Energy Storage Unit with Extinguishing System

Nozzle

Sounder

Manual Call Point

Manual Call Point

Smoke/Heat Detector

Sounder Beacon

Gas Detector

Gas Extinguishing

Smoke Detector

Heat Detector

Gas Detector

Ventilation

Sounder

Battery Modules

Battery Inverter

ExGo Extinguishing Control Panel

Manual Release Call Point

Illuminated Warning Sign

Conventional Extinguishing Control Panel

Cylinder

Scenario 2: Multi Battery Energy Storage Units
ExGo Panel + MxPro 5 Intelligent Fire Panel Solutions

Easily expandable solution using ExGo and addressable MxPro 5 fire panel.

ExGo Extinguishing Control Panel

Multi Battery Energy Storage Units

MxPro 5 fire panel housed in remote control room

Easily monitor all extinguishing panels via MxPro 5 fire panel in central control/plant room

MxPro 5 1-Loop FACP

E**xꞏGo** Parts list

Product Code	Description
ExGo Extinguishing Control Panel	
EX-3001	Extinguishing Control Panel, 3 Detection Zones + Single Release Output
Key Switches	
EXP-001	Enable Controls (trapped) Key Switch Assembly
EXP-001F	Enable Controls (trapped) Key Switch Assembly. Fitted
EXP-002	Mode Select (Un-trapped) Key Switch Assembly
EXP-002F	Mode Select (Un-trapped) Key Switch Assembly. Fitted
EXP-012	2 position 45° MOM Key Switch
Hold/Abort Switches	
EXP-003-001	Hold Switch, Plastic Enclosure
EXP-003-002	Hold Switch, Stainless Steel Trim Cover Plate
EXP-003-003	Hold Switch, Brass Trim Cover Plate
EXP-003-065	Hold Switch, IP65 Plastic Enclosure
EXP-004-001	Abort Switch, Plastic Enclosure
EXP-004-002	Abort Switch, Stainless Steel Trim Cover Plate
EXP-004-003	Abort Switch, Brass Trim Cover Plate
EXP-004-065	Abort Switch, IP65 Plastic Enclosure
End Of Line Units	
EXP-005	Switch End-of-Line Module (5 off)
EXP-006	Spare Zone Active End-of-Line Module (5 off)
MXP-505	Sounder Active End-of-Line Module (EN54-13)
Remote Status Indicators	
EX-3020	RSI c/w LCD + LED Indicators
EX-3021	RSI c/w LCD + LED Indicators with Mode Select Key Switch
EX-3030	RSI c/w LCD + LED Indicators with Manual Release Button
EX-3031	RSI c/w LCD + LED Indicators with MR Button and MS Key Switch
Call Points	
EXP-010	Manual Release Call Point (EN12094-3 Type B) – no key included
EXP-011	Emergency Stop Call Point (EN12094-3 Type B) – no key included

Product Code	Description
Output Cards	
EXP-007 (F)*	2-Way Relay Output Card (for use with RSI)
EXP-008 (F)*	8-Way Relay Output Card (for use with Ex-3001 only)
* F - Fitted	
Bezels	
EXM-001	Semi-flushing Bezel for Ex-3001 Panel
EXM-002	Semi-flushing Bezel for RSI
Software	
PC-NET-007	Ex-Logo Programming Software
PC-NET-013	Ex-Extraction Software c/w USB Lead
UP-015	USB Lead (2M A-B Type) for Ex-Extraction Software
Spares	
EXS-001	Spare Manual Release Cover
EXS-002	EX-3001 Spare Chassis c/w PCB
EXS-004	Spare Ex-3001 Main PCB
MXS-050	Spare 24V 3A EN54-4 Psu & Battery Charger Card
Devices	
20-AS1000-ADV	Conventional Optical Smoke detector
20-AS3500/B-ADV	Conventional Class B Thermal Detector
20-AS3500-ADV A1R	Conventional Class A1R Thermal Detector
20-ABR100-ADV	Universal resistor base
Axis-WP	Silicon base Gasket
08-PSC-0002	Sonos Sounder Beacon Red (PSS-0068) – Shallow Base (PSO-0001)
08-PSC-0013	Sonos Sounder Beacon Red (PSS-0068) – Deep Base (PSO-0003)
08-ESC-5001	Sonos Pulse Wall Sounder Beacon DB White
08-ESC-5002	Sonos Pulse Wall Sounder Beacon SB White
08-ESC-5003	Sonos Pulse Wall Sounder Beacon DB Red
08-ESC-5004	Sonos Pulse Wall Sounder Beacon SB Red
Language variants available – please contact us for details.	

Software

Advanced software is designed to be easy to operate, easy to understand and makes the complicated simple.

The ExGo ExtractionTool allows the full download of gas system configuration and event log data. The user-friendly software provides a log book, showing full system configuration, all event logs and a quick guide to customise system reports for end users.
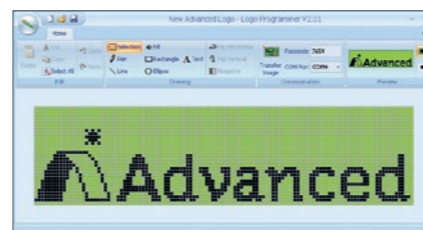
ExGo ExtractionTool

- USB connection
- User-friendly Windows-based software
- Export information to Office applications
- Download event logs and system configuration
- Customised printouts

LogoTool

- Allows the installer's logo to be displayed on the panel's graphical LCD display during normal operation
- Uploads standard bitmap images
- Allows the creation of logos
- JPG and GIF images can be imported

Custom-built panels

Advanced fire panels can be designed and manufactured to your specifications.

When you're facing a complex fire challenge, our AdSpecials team will work with you to design and manufacture customised fire panels, control interfaces and enclosures to meet the needs of your site.

The scope of customisation ranges from simple colour coordination to fully bespoke panels and housings that offer environmental protection and specialist control and indication.
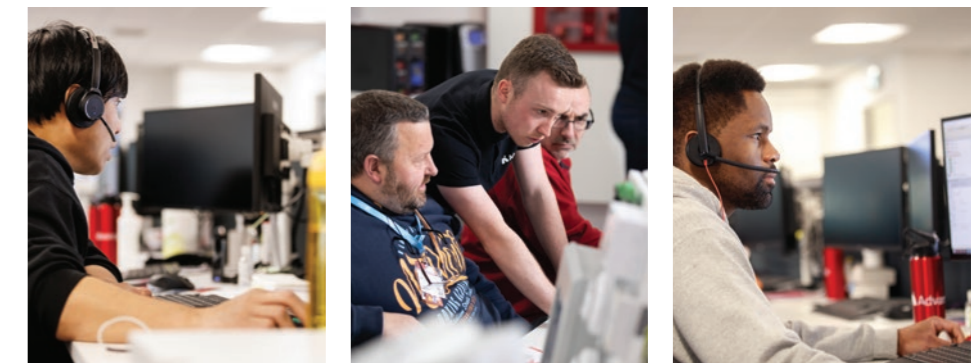
Contact us now to discuss your needs

Technical support

Highly rated support. Available by telephone and online.

As an Advanced customer, you have access to a host of helpful advice and support.

This includes a wealth of online information, from 'how to' videos to datasheets and detailed product manuals. Simply complete one of our online forms and you'll be able to access a range of additional services.

Services include:

- **Technical support** – available by telephone and online by raising a support ticket, which one of our experienced technical support engineers will answer.
- **Training** – direct customers can book training online and will be sent training certificates by email. All non-direct customers should book training through their distributor.
- **Software** – download software and save your software packages by installation/site.
- **Literature** – download manuals, specifications, approved partner certificates, technical information and more.
- **Warranty** – download our warranty statement.

advancedco.com/training-support

Fire system integration

In addition to the ExGo gas extinguishing range, Advanced offers versatile fire systems to meet EN, UL and AS standards. These can be integrated with other Advanced and third-party equipment to create a comprehensive BESS fire safety solution.

Whichever standard you need to meet, we offer the convenience of familiar controls, software, configuration and programming shared across our ranges.

Our products also offer the benefit of easy integration. There is no need for engineers to learn how to use entirely different panels and platforms, making setup faster and therefore more cost effective without compromising on safety or effectiveness.

To discuss how we can help you meet your BESS fire safety needs, please get in touch with a member of our team.

We have decades of experience in successfully finding the best standard and customised solutions to meet our customers' requirements.

Email: enquiries@advancedco.com or call us on +44 (0)345 894 7000.

UK & Europe

Axis EN
EN54 approved products

Axis EN

North America

Axis AX
UL approved products

Axis AX

Australia

Axis AU
AS 7240 approved products

Axis AU

Halma plc

Advanced is part of Halma plc, a global group of life-saving technology companies made up of 50 purpose-driven businesses providing innovative solutions to many of the key problems facing the world today.

As such, Advanced BESS fire safety solutions are complemented by a comprehensive range of further hazard protection equipment manufactured by other companies from across the Halma Group. Many of our products can be integrated with our partners' equipment, providing you with complete protection for your site. Here is an overview of our partners, what they offer and how you can contact them to discuss your needs:

Advanced

The ExGo extinguishing range detailed in this brochure is a versatile option, allowing integration with other Advanced equipment and a wide range of solutions from other Halma Group partners.

Having Advanced equipment at the heart of your system makes it is easy to add further safety equipment to meet your specific requirements.

advancedco.com
+44 (0)345 894 7000

Apollo

Apollo offers high-spec analogue addressable detectors approved to EN, UL and FM standards.

Their detector range includes Discovery, XP95 and Soteria, combining optical, heat, and CO sensing for improved accuracy and fewer false alarms.

They also provide REACH to meet wireless detection needs. Their products are designed for reliability and to minimise false alarms in demanding applications.

apollo-fire.co.uk
+44 (0) 23 9249 2412

BEA

BEA Sensors' access control solutions provide physical security and monitoring for BESS facilities, which are crucial for preventing unauthorised access to prevent theft, tampering, or other incidents that could compromise the safety and integrity of the storage system.

These sensors can trigger alarms, monitor entry/exit points, and enhance overall site security, protecting valuable physical assets and ensuring operational continuity.

eu.beasensors.com
+32 4 361 65 65

Crowcon

Crowcon's primary BESS solution is the BESafe, a fixed, dual-channel gas detector designed to simultaneously monitor critical gases like hydrogen, CO, and methane, which are released during battery thermal runaway.

Key features include smart, pre-calibrated sensors, remote sensor placement up to 15 metres, integrated alarms, and Modbus/relay outputs for easy system integration. The BESafe aims to provide fast response, reduce maintenance costs through smart sensors, and offer flexible installation in space-constrained BESS environments.

crowcon.com
+44 (0) 1235 557 700

FirePro

FirePro helps with BESS fire safety by using a condensed aerosol agent that activates when a fire starts. This aerosol, made of potassium salts, rapidly disperses to interrupt the chemical chain reaction of the fire, suppressing it without significantly depleting oxygen or causing major cooling. This chemical reaction also neutralises toxic byproducts like hydrogen fluoride, preventing the creation of highly flammable gases such as hydrogen.

The system is safe for occupied spaces, requires no pressurised cylinders, and offers a compact, space-saving solution for protecting BESS from various fire classes.

fireprouk.com
+44 (0) 800 031 4333

Firetrace

Firetrace technology enhances BESS fire safety by offering an early intervention system that detects and suppresses fires at their inception within battery racks and electrical cabinets - factors often overlooked by other systems.

By providing early detection of fire hazards, activating its suppression system before a full-blown fire escalates, and offering holistic protection for the entire BESS asset—not just the lithium-ion cells—Firetrace minimises the risk of catastrophic thermal runaway events, protects costly electrical components, and reduces reliance on water deluge systems.

firetrace.com
+44 (0) 1473 744090

Fortress

Fortress Interlocks provides robust, configurable safety access control systems, including both mechanical trapped key interlocks like mGard and amGard, and electrical safety gate switches like eGard, amGardpro, and tGard.

These systems are designed for the demanding BESS industry, creating safe workplaces by ensuring access to hazardous areas is restricted to authorised personnel, controlling the sequence of operations, and protecting against hazards like fires and chemical leaks through customisable, TUV-approved solutions.

fortress-safety.com
+44 (0) 1902 349 000

Sensitron

Sensitron provides gas detection systems that are integrated with BESS to detect and monitor hazardous gases like hydrogen, which can be released during battery failures. These systems offer critical safety features by alerting users to potential issues like thermal runaway, electrolyte leakage, or off-gassing, enabling rapid intervention and prevention of accidents within BESS installations.

Their gas detectors, such as the SMART 3G can be placed at various levels of the system for comprehensive monitoring and linked to alarm systems for a complete safety solution.

sensitron.it
+39 0293548155

Advanced

Advanced

Advanced Fire

NBS Source
PARTNER

Made in
the UK

A **Halma** company

SSD5658