

CONVENTIONAL FIRE DETECTION & EXTINGUISHANT CONTROL SYSTEM

CONSULTANT SPECIFICATION

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1 Scope

Furnish a complete 24VDC Conventional, electrically supervised, combined fire detection and extinguishant release system as specified herein and indicated on the drawings.

The system shall include but not be limited to, a control panel or panels with integral power supply to provide 24VDC power and supervision of detection devices, manual initiating devices, solenoid or explosive actuator releasing devices, hold devices, audible and visual alarm devices and all accessories required to provide a complete and operating system.

The fire detection and extinguishing system shall be wired in accordance with the drawings and according to the appropriate standards and codes of practice.

All circuits shall be electrically supervised for open and short circuit faults. Status indicator units shall be connected as necessary to provide additional indication of critical system status at entrances to the protected area.

Ancillary relay boards shall be available to interface to other systems as required.

2 Codes and Standards

The following codes and standards shall apply to this document.

- EN 54-2 and EN 54-4:1998 - Fire detection and fire alarm systems –Control and indicating equipment and Power supply equipment
- BS EN 12094-1:2003 - Fixed firefighting systems – Components for gas extinguishing systems – Requirements and test methods for electrical automatic control and delay devices
- BS EN ISO 9001:2000 - Quality management systems. Requirements
- BS 5839-1:2002 - Fire Detection and fire alarm systems for buildings – Code of practice for design, installation, commissioning and maintenance
- BS 7273-1:2006 - Code of practice for the operation of fire protection measures

2.1 Qualifications of Manufacturers

Manufacturers of the products supplied for the fire detection and extinguishant system shall have been in the business of manufacturing Fire Alarm products for at least five years. The manufacturer shall be assessed and approved as complying with the requirements of BS EN ISO 9001:2000.

3 Single Area Conventional Extinguishant Control Panel (ECP)

3.1 Functional Description

The Single Area Conventional Extinguishant Control Panel (ECP) shall be the central processing unit of the system, receiving and analysing signals from fire detectors or manual releasing devices, providing audible and visual information to the user, initiating automatic alarm response sequences and providing the means by which the user interacts with the system. It shall also have the capability to electronically activate and release extinguishant by means of control of a solenoid valve or explosive actuator device.

The ECP shall be certified as meeting the requirements of **EN 12094-1** by a suitable, notified body. A certificate and test report shall be made available for inspection as evidence of certification.

The ECP shall have the capability to support up to three zones of conventional detection any or all of which may be configured to contribute to the release of the extinguishant. Each conventional detection zone shall be capable of supporting up to 20 conventional fire detectors.

The ECP shall have the capability to operate in either manual mode or automatic and manual (combined) mode. The mode of the system shall be selectable by means of a key operated switch. In manual mode the extinguishant will not be released by automatic detection.

The ECP shall have the capability to connect to and provide power for, a range of Status Units via a serial connection using a four-core cable. It shall be possible to change from manual only to automatic and manual mode and manually release the extinguishant from a Status Unit. Status Unit variants shall be available which include indication only or mode select and manual release controls.

It shall be possible to connect up to seven status units to the ECP.

Status Units shall be available in both flush and surface mounting versions.

The ECP shall incorporate a display on the control panel and on all status indicator units which in the activated condition, shall show the time remaining in seconds until the extinguishant will be discharged. Time delays before extinguishant release and extinguishant flooding time shall be programmable in 5 second steps.

In addition to the activation of the extinguishant output, the ECP shall be capable of halting the release of the extinguishant by the operation of a "hold-off" input.

The ECP shall have a facility for connecting door interlock switches to change the mode of the system from automatic and manual to manual only.

The ECP shall have the facility to monitor a pressure switch connected to the extinguishant cylinder and indicate loss of pressure in the cylinder.

The ECP shall have the facility to monitor a pressure switch connected to the extinguishant cylinder which indicates release of extinguishant from the cylinder.

The ECP shall contain a manual control to provide a 24VDC output to operate an extractor fan after the extinguishant has been released.

The ECP shall provide 2 sounder outputs which operate when any alarm is detected (first stage alarm). It shall be possible to programme a delay from 30 seconds or 1 minute to 10 minutes before the first stage alarm outputs activate.

The ECP shall contain one sounder output which operates when the ECP is in the activated condition (second stage alarm).

The ECP shall provide a volt free changeover contact which operates when any alarm is detected (fire relay). This relay shall de-activate only when the ECP is reset.

The ECP shall provide a volt free changeover contact which operates when any alarm is detected (alarm relay). This relay shall de-activate when the alarms are silenced or when the ECP is reset.

The ECP shall provide a volt free changeover contact which operates when any alarm is detected but not if the activated zone is in test mode or the remote alarm input is activated (Local fire relay). This relay shall de-activate when the alarms are silenced or when the ECP is reset.

The ECP shall provide a volt free changeover contact which operates when any zone which will contribute to extinguishant release is activated (1st stage relay). This relay shall de-activate only when the ECP is reset.

The ECP shall provide a volt free changeover contact which operates when the activated (release imminent) condition is established. This relay shall de-activate only when the ECP is reset.

The ECP shall provide a volt free changeover contact which operates when any fault is detected (fault relay). This relay shall de-activate only when the ECP is reset.

4 Additional Components

4.1 Ancillary Board

It shall be possible to fit the ECP with an ancillary board to enable the extinguishing systems to communicate with additional plant control such as interfaces to BMS systems or other fire alarm systems.

Ancillary boards shall provide volt free relay contacts which signal the following conditions:

- Zone 1 fire
- Zone 2 fire
- Zone 3 fire
- Manual only mode
- Disabled
- Released
- Activated
- Hold
- Extract operated
- Manual release operated

Ancillary boards shall be connected via a four-core cable which provides power and data.

4.2 Hold Device

It shall be possible to fit Hold devices to the ECP or to status indicator units.

Hold devices shall be white in colour with a red, momentary pushbutton.

Hold devices shall be positioned as indicated on the drawings.

4.3 Manual Release Devices

It shall be possible to fit Manual release devices to the ECP or to status indicator units.

Manual release devices shall be grey in colour with a red, momentary pushbutton behind a yellow lift flap.

Manual release devices shall be positioned as indicated on the drawings.

4.4 Enclosure

The housing containing the ECP shall be of metal construction and shall be capable of being surface or semi-flush mounted. It shall be complete with cable knocks-outs in sufficient quantity to accommodate all likely cabling requirements.

The housing shall afford a minimum ingress protection to IP30 and it shall not be possible to open the ECP without the use of a key.

The enclosure shall be capable of housing 7Ah sealed lead acid batteries.

4.5 Front Panel Controls

The ECP shall have the following front panel controls:

- Silence/sound alarm (first stage)
- Alarm/fault warning silence (buzzer)
- Reset
- Lamp test
- Mode
- Select
- Enter
- Enable controls (Key operated switch)
- Manual only or Automatic and manual (Key operated switch)
- Manual release (Lift flap, push button)

4.6 Front Panel Indications

The ECP shall have the following front panel indications:

- Fire
- Power on
- Delay on
- Test mode
- General disablement
- Power fault
- Sounder fault/disabled
- General fault
- System fault
- Alarm/fault warning silenced
- Fire zone 1
- Fire zone 2
- Fire zone 3
- Fault zone 1
- Fault zone 2
- Fault zone 3
- Extinguishant disabled
- Manual release disabled
- 1st stage contact disabled
- 2nd stage contact disabled
- Extract fan disabled
- Extinguishant released
- Release imminent
- 1st stage activated
- Hold activated
- Flooding zone fault
- Low pressure
- Manual only
- Automatic and manual

4.7 Internal Controls

The ECP shall have the following internal controls:

- Terminate extinguishant release
- Watchdog reset
- Processor reset
- Adjust extinguishant monitor circuit
- Write enable

4.8 Internal Indications

The ECP shall have the following internal indications:

- Mains fail
- Battery fail
- CPU fault
- Aux 24V fault
- Battery low
- Comms fault
- Earth fault
- System fuse fault
- First stage sounders 1 fault (S1)
- First stage sounders 2 fault (S2)
- Second stage sounders fault (S3)
- Extinguishant fault
- Hold off fault
- Manual release fault
- Mode select fault
- Released pressure switch fault
- Low pressure switch fault
- Manual release operated tell tale

4.9 Configuration

The ECP shall have configurable options which are programmed via the front panel pushbuttons and stored in non-volatile memory.

Configuration options shall be as follows:

FUNCTION	COMMENTS
CONFIGURATION UPDATE COUNT	Number incremented each time access level 3 config changed. Counter resets to 00 when 99 is reached.
SOUNDER DELAY TIME = 30 SECONDS	Introduces a time delay before sounders operate. Note: Only one delay period can be selected.
SOUNDER DELAY TIME = 1 MINUTE	
SOUNDER DELAY TIME = 2 MINUTES	
SOUNDER DELAY TIME = 3 MINUTES	
SOUNDER DELAY TIME = 4 MINUTES	
SOUNDER DELAY TIME = 5 MINUTES	
SOUNDER DELAY TIME = 6 MINUTES	
SOUNDER DELAY TIME = 7 MINUTES	
SOUNDER DELAY TIME = 8 MINUTES	
SOUNDER DELAY TIME = 9 MINUTES	
Z1 & Z2 DETECTORS TRIGGER AUTOMATIC RELEASE	Coincidence detection selection options. Only one option can be selected.
Z2 & Z3 DETECTORS TRIGGER AUTOMATIC RELEASE	
Z1 & Z3 DETECTORS TRIGGER AUTOMATIC RELEASE	
Z1 & Z2 OR Z2 & Z3 OR Z1 & Z3 DETECTORS TRIGGER AUTOMATIC RELEASE	
Z1 & Z2 & Z3 DETECTORS TRIGGER AUTOMATIC RELEASE	
Z1 OR Z2 OR Z3 DETECTORS TRIGGER AUTOMATIC RELEASE	
Z1 DETECTORS TRIGGER AUTOMATIC RELEASE	
Z2 DETECTORS TRIGGER AUTOMATIC RELEASE	
Z3 DETECTORS TRIGGER AUTOMATIC RELEASE	
DISABLE FIRE BUZZER	
DISABLE FIRE OUTPUT	Fire relay.
DISABLE FAULT OUTPUT	Fault relay.
DISABLE EARTH FAULT MONITORING	
PULSE ROV OUTPUT	
REMOVE AUX 24V ON SYSTEM RESET	To enable resetting of systems using panels Aux supply.
INDICATE EXTING RELEASED WHEN EXTING OUTPUT IS ACTIVE	Rather than upon receipt of signal from flow switch.
NO ACTIVATION DELAY UPON MANUAL	Delay remains active on automatic

RELEASE	detection.
EXTINGUISHANT OUTPUT CAN BE RESET DURING IMMINENT PHASE	Allows extinguishant output to be reset before countdown timer has expired for testing/commissioning
LOCAL FIRE RELAY OPERATES UPON RELEASED SIGNAL	Local fire relay operates only when extinguishant is released rather than upon a fire condition
ZONE 1 ALARM FROM DETECTOR DELAYED	Sounder outputs will be delayed by time set at options 0-9 when selected zone(s) triggered by detector only. Note: Any combination can be selected.
ZONE 2 ALARM FROM DETECTOR DELAYED	
ZONE 3 ALARM FROM DETECTOR DELAYED	
ZONE 1 ALARM FROM CALL POINT DELAYED	Sounder outputs will be delayed by time set at options 0-9 when selected zone(s) triggered by call point only. Note: Any combination can be selected.
ZONE 2 ALARM FROM CALL POINT DELAYED	
ZONE 3 ALARM FROM CALL POINT DELAYED	
ZONE 1 OPERATES THROUGH I.S. BARRIER	Select only when detectors are connected via compatible I.S. barriers. Note: Any combination can be selected.
ZONE 2 OPERATES THROUGH I.S. BARRIER	
ZONE 3 OPERATES THROUGH I.S. BARRIER	
ZONE 1 SHORT CIRCUIT INDICATES ALARM	Changes the trigger threshold of the zone so that the control panel can be used on older systems that had no short circuit monitoring. Note: Any combination can be selected.
ZONE 2 SHORT CIRCUIT INDICATES ALARM	
ZONE 3 SHORT CIRCUIT INDICATES ALARM	
ZONE 1 NON-LATCHING	Renders the zone self-resetting so that it can be used to receive signals from other systems and will reset when the input is removed. Note: Any combination can be selected.
ZONE 2 NON-LATCHING	
ZONE 3 NON-LATCHING	
Z1 DEVICE ALARM MUST BE PRESENT FOR 30 SECONDS	Input delay. Note: Any combination can be selected.
Z2 DEVICE ALARM MUST BE PRESENT FOR 30 SECONDS	
Z3 DEVICE ALARM MUST BE PRESENT FOR 30 SECONDS	
PANEL CAN BE RESET IMMEDIATELY DISCHARGE OUTPUT HAS OPERATED	To allow reset of the panel to be prohibited before the extinguishant discharge has fully completed.
PANEL CAN BE RESET 1 MINUTE TO 29 MINUTES AFTER DISCHARGE OUTPUT HAS OPERATED	
PANEL CAN BE RESET 30 MINUTES AFTER DISCHARGE OUTPUT HAS OPERATED	
NO EXTINGUISHANT DELAY	Time delay between activation and extinguishant release output operating. This menu is accessed using the lamp test
5 SECONDS EXTINGUISHANT DELAY	
INCREMENT EXTINGUISHANT DELAY IN FIVE	

SECOND STEPS	(+100) button. The time is adjusted using the Mode button for 10's and the Select button for 5's. Once the time is selected the Enter button is used to store the value.
60 SECONDS EXTINGUISHANT DELAY	
EXTINGUISHANT DURATION TIME IN SECONDS	Time that extinguishant release output is activated. Note: Panel can not be reset until this time has expired except by operating the terminate extinguishant switch located under the front cover. This menu is accessed using the lamp test (+100) button. The time is adjusted using the Mode button for 10's and the Select button for 5's. Once the time is selected the Enter button is used to store the value.
INCREMENT EXTINGUISHANT DURATION IN FIVE SECOND STEPS	
EXTINGUISHANT DURATION TIME IN SECONDS	

All equipment shall be supplied with a suitably detailed operation and maintenance manual.