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by Honeywell

Contents

Scope of Work

To design, supply and install an Addressable Wireless Fire Alarm Detection and Alarm System in accordance with the details specified herein and in accordance with supplied drawings.

The EN54 Part 2 & 4 Fire System

The system shall include all materials, equipment and wiring required to install the complete Fire Detection and Alarm System. The system shall include but not be limited to one or more control panels, repeater panels, and detectors, call points, audible and visual alarm indicating devices and relays.

The installation shall include the laying of all cables required for connection of the gateway to panel, alarm indicating and other devices along with connections to the power supply as appropriate to the design. All cabling shall conform to the requirements and recommendations of the Fire Alarm Control Panel manufacturer. Any openings /chasings in walls, ceilings or floors shall be fire-stopped as appropriate and made good.

The system shall be designed such that no more than 80% of the available signalling / detection loop capacity is employed to allow for future requirements.

Standards

The fire detection system shall be designed, installed and commissioned in accordance with, and all elements shall meet the requirements of:
* BS5839-1: 2017 Code of Practice for automatic fire detection and alarm systems
* EN54-Part 2: Control and indicating equipment
* EN54-Part 3: Audible fire alarm devices
* EN54-Part 4: Power supply equipment
* EN54-Part 5: Heat Detectors – point type
* EN54-Part 7: Smoke Detectors – point type using scattered light
* EN54-Part 8: High temperature heat detectors
* EN54-Part 10: Flame detection
* EN54-Part 11: Manual call points
* EN54-Part 12: Beam smoke detectors
* EN54-Part 15: Multi-detector fire detectors
* EN54-Part 17: Isolators
* EN54-Part 18: Input / Output modules
* EN54-Part 20: Aspirating smoke detection
* EN54-Part 23: Visual alarm devices
* EN54-Part 25: Radio linked devices
* EN54-Part 26: Point detectors using CO elements
* EN54-Part 27: Duct smoke detectors
* BS7671 - IEE Wiring Regulations
* BS7273 Code of practice for the operation of fire protection measures Part 4: Actuation of release mechanisms for doors

The responsible company should be able to demonstrate their competence to design, install and commission the system, e.g. by certification to BAFE SP203, LPS1014 or other relevant standard.

The equipment manufacturer shall operate a quality management system in accordance with ISO 9001:2000. In addition, the equipment shall be manufactured and Third Party Certificated under a recognised factory control procedure.

All detection devices shall be independently certified as complying with the relevant EN54 standard.

The Control and Indicating Equipment (C.I.E) shall be independently certified as complying with requirements of EN54 Part 2 and EN54 Part 4, including any Network devices to connect multiple C.I.E together.

In addition to the basic requirements of EN54, the C.I.E shall offer the following EN54 optional features with requirements:

Optional Functions:		EN54-2 Clause
Indication	Fault signals from fire protection equipment	7.10.4
	Alarm counter	7.13
	Fault Signals from points	8.3
Outputs	Fire alarm devices	7.8
	Fire alarm routing equipment	7.9.1
	Fire alarm routing equipment with confirmation	7.9.2
	Fault warning routing equipment	8.9
Controls	Investigation delays to outputs	7.11.1
	Manual or automatic switching of delays to outputs	7.11.2
	Dependency on more than one alarm signal. Type B	7.12.2
	Dependency on more than one alarm signal. Type C	7.12.3
	Disablement of points	9.5
	Test condition	10

Power Supply Equipment Functions:	EN54-4 Clause
Operation from a main power supply	5.1
Operation from a standby battery	5.2
Monitor and charge the standby battery	5.3
Recognise and notify supply faults	5.4

The Fire Alarm Control Panel shall also support a number of additional functions that are not covered by EN54. These additional functions shall include:

- Programmable Cause / Effect on Outputs (E.g. Phased Evacuation)
- Auxiliary Power Supply Output
- Auxiliary Relay Outputs

Wireless Intelligent Photoelectric Smoke Detector Specification

Compliance with standards

The Wireless Intelligent Photoelectric Smoke Detector shall be third party approved to EN54 part 7 and EN54 part 25 plus Radio Equipment Directive (RED, EU directive 2014/53/EU).

Functionality

The Detectors shall use the photoelectric (light-scattering) principal to measure smoke density and shall, on command from the C.I.E, send data to the panel digitally representing the analogue level of smoke density.

Photoelectric Smoke Detectors shall be intelligent and addressable devices and shall connect to Wireless Interface Gateway by means of a mesh topology network made of multiple radio path comprising primary links and secondary back-up links.

The detector shall use 868MHz band to communicate to Gateway.

The Wireless Intelligent Photoelectric Smoke Detector shall be battery powered by means of wide commercially available batteries format, battery lifetime must be four-year minimum and link weakness shouldn't alter the battery duration.

Up to 32 devices per Gateway and up to 99 detectors and 99 modules may be connected to a single loop.

Location of devices on the loop circuit shall with the aid of a Software Design Mapping Tool be able to identify its location, address on the loop and links between adjacent devices, allowing for a schematic layout drawing to be produced and printed for use in the O&M manual.

The Detectors shall be ceiling-mount and shall include a twist-lock base comprising a magnetic antitamper means to signal to CIE wireless detector removed from his base.

Test functions

The Detectors shall provide a means of test whereby they will simulate an alarm condition and report that condition to the C.I.E.

Such a test may be initiated at the Detector itself (by activating a magnetic switch) or initiated remotely on command from the control panel.

Address setting

The Detectors shall provide address setting on the Detector head using rotary decimal switches.

Addressable Detectors that use binary address setting methods, such as a dip switch, code cards or soft addressing are not acceptable.

The Detectors shall also feature an internal identifying code that the C.I.E. shall use to identify the type of Detector.

Visual indication

The Detectors shall provide dual bi-colour LED's. Both LED's enable red, amber and green local status indication also indicating that the Detector is operational and in regular communication with the C.I.E.

The LED's shall be configurable from the C.I.E to give visual indication of:
- Device Healthy
- Fire
- Fault
- Detector Dirty
- Test Mode
- Chamber Fault
- Battery low (in Advanced Protocol)

If required, the flashing mode operation of the Detector LED's shall be controlled through the system field program.

An additional link connectivity shall also be provided in the wireless radio system to connect an external remote alarm LED whose behaviour will be linked to up to four devices.

Sensitivity settings

The Detector sensitivity shall be set through the C.I.E, and shall be adjustable in the field through the field programming of the system.

Sensitivity may be automatically adjusted by the panel on a time-of-day basis.

Drift compensation

The Detector shall automatically compensate for dust accumulation and other slow environmental changes that may affect their performance.

The use of this function shall not contravene EN54 part 7.

Additional requirements

Up to 99, intelligent Detectors may connect to one loop.
The C.I.E software, not the detector, shall make the alarm decision.
The sensitivity of each detector shall be set in the C.I.E.
The system operator shall be able to view the current analogue or digital value of each detector at the C.I.E.

Wireless Intelligent Thermal Heat Detector Specification

Compliance with standards

The Heat Detector shall be third party approved to EN54 part 5 and EN54 part 25 plus Radio Equipment Directive (RED, EU directive 2014/53/EU).

Types A1R, A1S shall be available.

Functionality

The Detectors shall use an electronic detector to measure thermal conditions caused by a fire and shall, on command from the C.I.E, send data to the panel representing the analogue or digital level (the temperature) at the detector.

Wireless Heat Detectors shall be intelligent and addressable devices and shall connect to Wireless Interface Gateway by means of a mesh topology network made of multiple radio path comprising primary links and secondary back-up links.

The detector shall use 868MHz band to communicate to Gateway.

The Wireless Intelligent Thermal Heat Detector shall be battery powered by means of wide commercially available batteries format, battery lifetime must be four-year minimum and link weakness shouldn't alter the battery duration.

Up to 32 devices per Gateway and up to 99 detectors and 99 modules may be connected to a single loop.

Location of devices on the loop circuit shall with the aid of a Software Design Mapping Tool be able to identify its location, address on the loop and links between adjacent devices, allowing for a schematic layout drawing to be produced and printed for use in the O&M manual.

The Detectors shall be ceiling-mount and shall include a twist-lock base comprising a magnetic antitamper means to signal to CIE wireless detector removed from his base.

Test functions

The Detectors shall provide a means of test whereby they will simulate an alarm condition and report that condition to the C.I.E. Such a test may be initiated at the Detectors itself (by activating a magnetic switch) or initiated remotely on command from the C.I.E.

Address setting

The Detectors shall provide address setting on the Detector head using rotary decimal switches.

Addressable Detectors that use binary address setting methods, such as a dip switch, code cards or soft addressing are not acceptable.

The Detectors shall store an internal identifying code that the control panel shall use to identify the type of Detector.

Visual indication

The Detectors shall provide dual bi-colour LED's. Both LED's enable red, amber and green local status indication also indicating that the Detector is operational and in regular communication with the C.I.E.

The LED's shall be configurable from the C.I.E to give visual indication of:
- Device Healthy
- Fire
- Fault
- Detector Dirty
- Test Mode
- Battery low (in Advanced Protocol)

If required, the flashing mode operation of the Detector LED's shall be controlled through the system field program.

An additional link connectivity shall also be provided in the wireless radio system to connect an external remote alarm LED whose behaviour will be linked to up to four devices.

Additional requirements

Up to 99, intelligent Detectors may connect to one loop.
The C.I.E software, not the detector, shall make the alarm decision.
The system operator shall be able to view the current analogue or digital value of each detector at the C.I.E.

Wireless Intelligent Multi-Criteria SMART3 Detector Specification

Compliance with standards

The Multi-Criteria Detector shall be third party approved to EN54 part 7 & 5, CEA 4021, LPS1279 and EN54 part 25 plus Radio Equipment Directive (RED, EU directive 2014/53/EU).

Functionality

The Detector shall use the photoelectric (light-scattering) principal to measure smoke density in conjunction with thermistors to measure heat and Infra-Red detector to accelerate smoke response when detect IR compatible flame pattern signature and shall, on command from the C.I.E, send data to the panel representing the fire risk.

The Detector shall incorporate a micro-processor that combines the signals from the photoelectric smoke chamber, the thermistor heat detector and Infra-Red elements using algorithms that include a time element to provide an increased immunity to false alarm whilst maintaining the earliest warning of real fire condition.

The Infra-Red detector shall be capable of measuring Irradiance on the IR detector of between $0 - 450$ µW/cm².

Wireless Multi-Criteria SMART3 Detectors shall be intelligent and addressable devices and shall connect to Wireless Interface Gateway by means of a mesh topology network made of multiple radio path comprising primary links and secondary back-up links.

The detector shall use 868MHz band to communicate to Gateway.

The Wireless Intelligent Multi-Criteria shall be battery powered by means of wide commercially available batteries format, battery lifetime must be four-year minimum and link weakness shouldn't alter the battery duration.

Up to 32 devices per Gateway and up to 99 detectors and 99 modules may be connected to a single loop.

Location of devices on the loop circuit shall with the aid of a Software Design Mapping Tool be able to identify its location, address on the loop and links between adjacent devices, allowing for a schematic layout drawing to be produced and printed for use in the O&M manual.

The Detectors shall be ceiling-mount and shall include a twist-lock base comprising a magnetic antitamper means to signal to CIE wireless detector removed from his base.

Test functions

The Detectors shall provide a means of test whereby they will simulate an alarm condition and report that condition to the C.I.E.

Such a test may be initiated at the Detector itself (by activating a magnetic switch) or initiated remotely on command from the control panel.

Address setting

The Detectors shall provide address setting on the Detector head using rotary decimal switches.

Addressable Detectors that use binary address setting methods, such as a dip switch, code cards or soft addressing are not acceptable.

The Detectors shall also feature an internal identifying code that the C.I.E. shall use to identify the type of Detector.

Visual indication

The Detectors shall provide dual bi-colour LED's. Both LED's enable red, amber and green local status indication also indicating that the Detector is operational and in regular communication with the C.I.E.

The LED's shall be configurable from the C.I.E to give visual indication of:
- Device Healthy
- Fire
- Fault
- Detector Dirty

- Test Mode
- Chamber Fault
- Battery low (in Advanced Protocol)

If required, the flashing mode operation of the Detector LED's shall be controlled through the system field program.

An additional link connectivity shall also be provided in the wireless radio system to connect an external remote alarm LED whose behaviour will be linked to up to four devices.

Sensitivity settings

The Detector sensitivity shall be set through the C.I.E, and shall be adjustable in the field through the field programming of the system.

Sensitivity may be automatically adjusted by the panel on a time-of-day basis.

The detector shall be capable of 6 sensitivity settings.

Alarm Level 1 - Low false alarm resistance, high photoelectric only sensitivity
Alarm Level 2 - Medium false alarm resistance, medium photoelectric only sensitivity
Alarm Level 3 - Standard false alarm resistance, low photoelectric only sensitivity
Alarm Level 4 - High false alarm resistance, low photoelectric only sensitivity
Alarm Level 5 - Very high false alarm resistance, low photoelectric only sensitivity
Alarm Level 6 - Class A1R. Heat only alarm.

Theses sensitivity levels shall not contravene EN54 part 7 unless placed in to thermal (heat) only mode in which case the unit shall comply with EN54 part 5.

The panel threshold should be chosen according to the specific environment:
- "ULTRA-CLEAN" environments can use Level 1 ALERT
- "CLEAN" environments can use Levels 2-3 ALARM
- "MODERATE" environments can use Level 4 ALARM
- "HARSH" environments can use Level 5-6 ALARM

The Detector shall be able to be placed in to a thermal (heat) only mode of operation from command from the C.I.E. This shall be automatic on a time-of-day basis or by means of a manual operation at the C.I.E.

Drift compensation

The Detector shall automatically compensate for dust accumulation and other slow environmental changes that may affect their performance. The use of this function shall not contravene EN54 part 7.

Additional requirements

Up to 99, intelligent Detectors may connect to one loop.
The C.I.E software, not the detector, shall make the alarm decision.
The sensitivity of each detector shall be set in the C.I.E.
The system operator shall be able to view the current analogue or digital value of each detector at the C.I.E.

Wireless Intelligent Waterproof Manual Call Point Specification

Compliance with standards

The Manual Call Points shall be third party approved to EN54 part 11 and EN54 part 25 plus Radio Equipment Directive (RED, EU directive 2014/53/EU).

Only Manual Call Points of Type A shall be used.

The uses of Type B Manual Call Points are not acceptable.

Functionality

Wireless Intelligent Waterproof Manual Call Points shall be intelligent and addressable devices and shall connect to Wireless Interface Gateway by means of a mesh topology network made of multiple radio path comprising primary links and secondary back-up links.

The wireless call-point shall use 868MHz band to communicate to Gateway.

The Manual Call Points shall, on command from the Control Panel, send data to the panel representing the state of the manual switch.

All operated Manual Call Points shall have a positive, visual indication of operation by means of an LED indicator.

The Manual Call Points shall be battery powered by means of wide commercially available batteries format, battery lifetime must be four-year minimum and link weakness shouldn't alter the battery duration.

Up to 32 devices per Gateway and up to 99 detectors and 99 modules may be connected to a single loop.

Location of devices on the loop circuit shall with the aid of a Software Design Mapping Tool be able to identify its location, address on the loop and links between adjacent devices, allowing for a schematic layout drawing to be produced and printed for use in the O&M manual.

Manual Call Points shall be constructed of flame retardant plastic with clearly visible operating instructions provided on the glass. The 'house burning' symbol shall appear on the front of the Call Points. The waterproof manual call point shall be resist to temporary water immersion accordingly to IP67 rating (IEC standard 60529).

The Call-point shall be wall-mount and shall include a snap-in base comprising a magnetic antitamper means to signal to CIE wireless detector removed from his base.

Test functions

Manual Call Points shall use a key operated test without the need to break the glass, and shall be designed so that after Emergency operation, they cannot be restored to normal use except by the replacement of the glass element.

Address setting

The Manual Call Points shall provide address-setting means using rotary decimal switches.

Addressable Manual Call Points that use binary address setting methods, such as a dip switch code cards or soft addressing are not acceptable.

Visual indication

The Manual Call Points shall provide bi-colour LED's. The LED's enable red, amber and green local status indication also indicating that the Manual Call Point is operational and in regular communication with the C.I.E.

The LED's shall be configurable from the C.I.E to give visual indication of:
- Device Healthy
- Fire
- Fault
- Test Mode
- Battery low (in Advanced Protocol)

If required, the flashing mode operation of the Call Point LED shall be controlled through the system field program.

Additional requirements

Up to 99, addressable Manual Call Points may connect to one loop.

Intelligent Radio Interface Gateway Specification

Compliance with standards
Radio Interface Gateway shall be designed to meet the requirements of EN54 Part 25, 17, and 18 & BS5839 Part 1.

General
Radio Interface Gateway shall be provided to connect one zone of radio detectors to one of the C.I.E loops. Gateway is designed to be installed on the Loops
Gateway shall fit to a common mounting plate incorporating a twist-lock bayonet fitting to facilitate maintenance and replacement.
The radio gateway has status LED to monitor health status of radio network and health of Loop connection

The Radio Interface Modules shall be Loop powered and the power consumption shall be low enough to don't interfere or reduce the capacity to connect other devices on the same loop.

Functionality
The Radio Interface Modules shall use 868MHz to communicate with up to 32 approved radio devices, additional slots of communication can be used for accessories like Remote Indicator.

The Radio Interface Gateway shall be loop powered addressable devices, and shall connect with two wires to loop terminals of the C.I.E. Signalling Line Circuits.
The Radio Interface Modules shall include loop isolation in each unit.

The Radio Interface Gateway shall translate all the analogue and digital messages from radio devices into Loop protocol messages and properly forward this messages to the C.I.E.

The Gateway shall be ceiling-mount and shall include a twist-lock base comprising an antitamper mechanical means to prevent gateway is removed from his base.

Address setting
The Radio Interface Gateway shall provide hardware address setting on the Gateway device using clearly identifiable rotary decimal switches, the Gateway shall occupy only one address on the loop.

Addressable Modules that use binary address setting methods, such as a dip switch, code cards or soft addressing are not acceptable.

The modules shall also feature an internal identifying code that the control panel shall use to identify the type of Module.

Visual indication
The Radio Interface Modules shall provide two RGB visible LED indicators.

The first LED's shall be configurable from the C.I.E to give visual indication of:
- Device Healthy
- Fire
- Fault – Isolation in use
- Test Mode

The second LED's shall give visual indication of Radio communication status like:
- Gateway Device Health
- Network and link health
- Commissioning in progress

Test functions

The Radio Interface Gateway shall pass test requests invisibly to the radio devices which, in turn, will respond in the same way as other loop powered devices.

Additional requirements

Up to 32, addressable Radio Interface Modules may connect to one standard loop, more device can be connected using a power booster on the loop.

The C.I.E software, not the Radio Interface Modules, shall make the alarm/normal decision, thereby allowing the system operator to view the status of each radio device.

A comprehensive report of whole network connected to each Radio Interface Gateway containing all information about link quality status and battery capacity status shall be available by means of a download from the gateway, information shall be made available on clear visual format for reporting purposes.

Wireless Intelligent Sounder Specification

Compliance with standards

Intelligent Addressable Sounders shall be third party approved to EN54 part 3, 25 plus Radio Equipment Directive (RED, EU directive 2014/53/EU) and shall be the primary means of evacuation.

Functionality

Wireless Intelligent Sounders shall be intelligent and addressable devices and shall connect to Wireless Interface Gateway by means of a mesh topology network made of multiple radio path comprising primary links and secondary back-up links.

The wireless Sounder shall use 868MHz band to communicate to Gateway.

The Wireless Intelligent Sounder shall be battery powered by means of wide commercially available batteries format, battery lifetime must be four-year minimum with up to 30 operative seconds of test each week, link weakness shouldn't alter the battery duration.

Up to 99 Wireless Sounders or modules and up to 99 Detector may be connected to a single loop.

Location of devices on the loop circuit shall with the aid of a Software Design Mapping Tool be able to identify its location, address on the loop and links between adjacent devices, allowing for a schematic layout drawing to be produced and printed for use in the O&M manual.

The warning devices shall fit to a common mounting radio plate and shall include a twist-lock base comprising a magnetic antitamper means to signal to CIE wireless detector removed from his base.

Address setting

The warning devices shall provide address setting on the device using rotary decimal switches.

Addressable warning devices that use binary address setting methods, such as a dip switch, code cards or soft addressing are not acceptable.

The warning device shall also feature an internal identifying code that the C.I.E. shall use to identify the type of device.

Tone and volume settings

The audible warning devices shall have 28 different tone settings, which shall be site configurable.

The audible warning devices shall have three volume settings, which shall be site configurable, from the C.I.E. or at the device.

Additional requirements

Up to 32 Wireless sounders can be connected to one Gateway and up to 99, Sounder devices may connect to one loop.

Wireless Intelligent Remote Indicator Specification

Compliance with standards

Wireless Intelligent Remote Indicator shall be third party approved to Radio Equipment Directive (RED, EU directive 2014/53/EU). and shall be the primary means of evacuation.

Functionality

Wireless Intelligent Remote Indicator shall be an accessory device paired with a detector and shall connect to Wireless Interface Gateway by means of a mesh topology network made of multiple radio path comprising primary links and secondary back-up links.

The Wireless Remote Indicator shall use 868MHz band to communicate to Gateway.

The Wireless Intelligent Remote Indicator shall be battery powered by means of wide commercially available batteries format, battery lifetime must be four-year minimum and link weakness shouldn't alter the battery duration.

Up to 17 Wireless Remote Indicator shall not use nodes dedicate to devices, exceeding Wireless Remote Indicator can use nodes dedicated to approved devices.

Shall be possible to associate up to 4 Wireless Remote Indicator to a single Wireless detector and up to 4 wireless detectors shall be associable to a single Wireless Remote Indicator.

Location of devices on the loop circuit shall with the aid of a Software Design Mapping Tool be able to identify its location, address on the loop and links between adjacent devices, allowing for a schematic layout drawing to be produced and printed for use in the O&M manual.

Address setting

The Wireless Remote Indicator shall provide address setting on the device using rotary decimal switches as a mean to associate clearly to their paired wireless detector.

Addressable Wireless Remote Indicator that use binary address setting methods, such as a dip switch, code cards or soft addressing are not acceptable.

Visual indication

The Wireless Remote Indicator integrate bi-colour LED's replicating LED behaviour from detector or as programmed by C.I.E. LED's enable red, amber and green local status indication also indicating that the associated Detector is operational and in regular communication with the C.I.E.

The LED's shall be configurable from the C.I.E to give visual indication of:
- Device Healthy
- Fire
- Fault
- Detector Dirty
- Test Mode
- Battery low (in Advanced Protocol)

If required, the flashing mode operation of the Detector LED's shall be controlled through the system field program.