

Fire Alarm System System Specification

1 of 4 - General Information

1 - Codes and Standards References

- The 2018 Canadian Electrical Code (CEC or CEC 2018)
- The 2015 National Building Code of Canada (NBC)
- CAN/ULC-S524-14-AMD1, Installation of Fire Alarm Systems
- CAN/ULC-S537-13, Verification of Fire Alarm Systems
- CAN/ULC-S561-13, Standard for Fire Receiving Centres and Transmitting Equipment

2 - System Description

- System shall be a Single-Stage CPU based, supervised, non-coded, addressable fire alarm system as referenced in the drawing package and as described within this document.
- Fire Alarm Control Panel (FACP) shall include the following functions and features:
 - CPU programmed to carry out fire alarm and protection functions including receiving alarm signals, initiating alarm events, initiating supervisory events, supervising the system continuously, and initiating trouble signals.
 - Weatherproof heated remote LCD annunciator panel
 - Manual pull stations
 - Smoke duct detectors
 - Monitor modules
 - Relay modules
 - Combination audible and visual notification devices
 - End-of-line devices
 - ULC listed Fire Monitoring system

3 - Regulatory Agencies

- Installation to be in accordance with requirements of local Authority Having Jurisdiction (AHJ).
- All provided equipment shall carry a listing by Underwriters' Laboratory of Canada (ULC) and CSA.
- Installation shall be in full compliance with the Code and Standards referenced in 1 - Codes and Standards References and, all applicable local requirements and bylaws.

4 - Shop Drawings

- Shop drawing submission shall include but not be limited to:
 - Manufactures system riser including wire types and size requirements. Should the system riser in this package accurately depicted how the manufacture would recommend the system to be configured, written confirmation shall be supplied accepting the package riser as accurate. In addition, the manufacture still shall confirm wire type, size and count required per circuit.
 - Detailed termination detail for all field mount devices or any other device that will not be assembled and wired by the fire alarm supply contractor.
 - For each piece of equipment being supplied the contractor shall supply data sheets that include:
 - Manufacture/Brand
 - Device Type
 - Device description
 - Description of use of device
 - Device part number

6 - Spare Equipment

- Provide the following spare equipment:
 - 1 Smoke Duct Detector replacement head
 - 1 Dual Input Module
 - 1 Manual Pull Station
 - 1 Wall mount Horn/Strobe
 - 1 Relay Module
 - 2 Isolator Modules
- In addition to the above noted equipment, the following the installing contractor shall provided per item:
 - Material and labour to connect and wire device into system.
- Updated documentation for any devices added after initial Shop Drawing submission.

End of Section

2 of 4 - Equipment

1 - Equipment

- Equipment and devices must be CSA and ULC listed, labelled for the purpose they will be used for and in compliance with all applicable ULC standards.
- System shall be manufactured by: Notifier by Honeywell, Simplex, or Edwards.

2 - Functionality Requirements

- Upon activation of any one alarm initiating field device (Smoke Duct Detector, Waterflow Switch, or Manual Pull Station) the FACP shall automatically care out the following functions:
 - Audible devices (NAC) shall activate a pulsing temporal-3 pattern throughout the facility.
 - Visual devices (NAC) shall flash in sync throughout the entire facility.
 - The fire alarm control panel (FACP) shall display the alarm event location, device address, alarm type, time and date. All event information shall be stored in the CPUs history buffer. Annunciator (FAAP) panel(s) shall carry out the same function as the FACP's display, but they do not require a history buffer log or keyboard for programming unless equipped with network functionality.
 - The audible and visual notification devices shall remain on until the system is acknowledged and silenced. The device causing the alarm shall cause the system to remain in alarm until the device is cleared and the system is reset.
 - The system shall automatically send an alarm signal to the off-site fire monitoring Central Station in accordance with CAN/ULC-S561-13.
 - Subsequent alarms from any initiating device(s) shall cause the audible and visual notification devices to reactivate. Subsequent alarms shall be displayed and recorded in the system history buffer in the order of priority and then in the order in which they occur.
- The entire system shall be electrically supervised against opens, shorts and grounds on all connected circuits powered by the system. Should a fault occur the system shall produce a trouble event. Should the fault occur on the addressable SLC, the Isolator Modules shall limit the loss of device functionality to within the isolator zone that the fault occurred.
- Installing contractor shall cross reference mechanical plans and specifications to ensure accommodations for all sprinkler and HVAC controls have been provided. All HVAC shutdowns must be done so by de-energizing the HVAC's system control circuit or connected to a contact designed for connection to a fire alarm dry contact. Shutdowns through software are not permitted.
- System shall be programmed to include the ability to provide user bypass switches for bypassing system output functions during annual testing and maintenance. Bypasses shall cause a fire trouble signal to be sent to the Central station and shall not affect the ability for an initiating device to register an alarm event at the FACP while bypassed. Bypass switched shall be included as part of the FACP.
- Activation of a Smoke Detector or Duct Detectors installed in accordance to NBC 3.1.8.11 shall close the associated smoke, fire or combination fire/smoke damper.

3 - Fire Alarm Control Panel (FACP)

- Shall include common control switches for functions such as:
 - Acknowledge
 - Signal Silence
 - System Reset
 - Alarm Signal (Drill)
 - Lamp Test
 - Output Bypass
- Shall include common system LEDs for functions such as:
 - Primary power on
 - Fire alarm
 - Supervisory
 - Trouble
 - Output bypass
 - Acknowledge
 - Signal Silence
 - System Reset
- Include one addressable Class A SLC loop. Loop shall be capable of communicating with 150 field detectors and 150 field modules. SLC loop shall have 20% spare capacity.
- SLC loop shall be configured as Class A. FACP shall operate in a manner that prevent the loss of device communication should a wire-to-wire short occur.
- Internal components that are to be wired or plug-in shall be supervised against removal, correct location/device type or failure.
- Shall include four 24VDC, 1.5A Notification circuit that include strobe synchronization and message.
- Shall continuously supervise Internal FACP components as well as fire devices and equipment for failure.
- Shall include a 2-line 80-character LCD display. Screen shall be large enough to display one events entire information without having to use a scroll function.
- Shall include LED status lights for all software zones and individual lights for each sprinkler type event. 20% spare capacity shall be included.
- Shall include bypass buttons for individual bypassing of each type of output device. 20% spare capacity shall be included.
- Shall include an alphanumeric keypad for front end user programming.
- Shall include support for remote LCD and LED type Annunciator panels.
- Shall be equipped with a protective door and lock assembly to prevent tampering and undesired control.
- Shall be surface mounted.
- Shall be equipped with adequate battery backup to allow the system to run for 24 hours plus a half hour of full alarm load should a power outage occur. Fire alarm contractor shall size batteries to include capacity for the required D-rating of the size of batteries supplied.

4 - Fire Alarm Annunciator Panel (FAAP)

- Shall include common control switches for functions such as:
 - Acknowledge
 - Signal Silence
 - System Reset
 - Alarm Signal (Drill)
 - Lamp Test
- Shall include common system LEDs for functions such as:
 - Primary power on
 - Fire alarm
 - Supervisory
 - Trouble
 - Acknowledge
 - Signal Silence
 - System Reset
- Shall include a 2-line 80-character LCD display. Screen shall be large enough to display one events entire information without having to use a scroll function.
- Shall be equipped with a protective door and lock assembly to prevent tampering and undesired control.
- Shall include LED status lights for all software zones and individual lights for each sprinkler type event. 20% spare capacity shall be included.
- Annunciator shall not have output bypass switched. Bypass switches are only permitted at the main FACP.
- Shall be equipped with a weatherproof enclosure rated for outdoor installations.
- Shall be equipped with a 120VAC heater to maintain operational temperatures during winter months.
- Shall be surface mounted.

5 - Fire Monitoring Panel (FMP)

- Shall meet the requirements of CAN/ULC-S559-13 and CAN/ULC-S561-13.
- Shall include:
 - Main control board/CPU equipped with a minimum of 8 input zones
 - Step-down 120VAC transformer
 - LTE cellular communication
 - Backlit keypad designed to display system events as well as allow for front end user programming
 - Connections to an analog phone line
 - Battery backup sized to provide backup power for 24 hours should a power outage occur.
- Shall be capable of operation in either Passive or Active communication protocols.
- Shall be installed in a location with adequate LTE cellular signal.
- Fire alarm supplier shall include for one years' subscription cost to include for off-site system monitoring by a CAN/ULC-S561-13 compliant Central Station.
- Fire alarm supplier shall include for a ULC certificate for the term of the first year.
- Analog phone line supply and leasing shall be the responsibility of the building owner.

6 - Manual Pull Station

- Shall be/include:
 - Addressable
 - Red in colour
 - Single-Stage
 - Single action pull type
 - Red LED that activates when device has been activated
- Standby status LED to provide visual confirmation of communication
- Devices used in high traffic area or where the use of the space could affect or cause the devices to false alarm shall be equipped with a protective cover. For example, a school gym.

7 - Smoke Detector

- Shall be/include:
 - Addressable
 - White in colour
 - Photoelectric dual chamber type
 - Red LED that activates when device has been activated
- Standby status LED to provide visual confirmation of communication
- When used as part of an air transfer grate, shall be installed in accordance with the National Building Code of Canada 3.1.8.11.

8 - Fixed Heat Detector

- Shall be/include:
 - Addressable
 - White in colour
 - Fixed alarm set point of 57 degrees Celsius
 - Self-restoring through the FACP
 - Red LED that activates when device has been activated
- Standby status LED to provide visual confirmation of communication

9 - Rate-of-Rise Heat Detector

- Shall be/include:
 - Addressable
 - White in colour
 - Fixed alarm set point of 57 degrees Celsius
 - An additional feature to initiate an alarm should the temperature at the detector rise by more than 8 degrees Celsius in one minute
 - Self-restoring through the FACP
 - Red LED that activates when device has been activated
- Standby status LED to provide visual confirmation of communication

10 - Smoke Duct Detector

- Shall be/include:
 - Addressable
 - Housing to mount on flat or round duct
 - Photoelectric dual chamber type
 - Sample tube to penetrate the entire width of the duct and allow smoke to pass through the other side of the duct to support the entire sensing element
 - Return port to exhaust smoke back into the duct
 - Red LED that activates when device has been activated
 - Standby status LED to provide visual confirmation of communication

11 - Relay Module

- Shall be/include:
 - Addressable
 - Equipped with one relay C type relay
 - Connections for a Common, Normally-Closed and Normally-Open terminals
 - Activation of LED that activates when device has been controlled on by the FACP
- Standby status LED to provide visual confirmation of communication
- Contact shall have a minimum rating of .5A at 120VAC.
- Contact shall carry a load with a current rating exceeding 80% of the maximum contact load as described by the system manufacturer.

12 - Isolator Module

- Shall be/include:
 - Non-addressable or non-addressable as required by the system manufacture
 - White in Colour
- Short circuit wire-to-wire protection to segments of the SLC loop to limit the loss of communication to devices only within the isolator zone that the short occurred. As described within CAN/ULC-S524-14 ADM1
- Capable of either Class A or Class B communication and protection
- Active fault LED that activates when a wire-to-wire short occurs
- Standby status LED to provide visual confirmation of communication

13 - Horn/Strobe

- Shall be/include:
 - Red in colour
 - Produce a Temporal-3 pattern
 - Operate horn and strobe with a single two wire circuit while maintaining proper sound patterns and synchronization of tone and strobe flashes between devices
 - 24VDC
 - Sound output of 96DBA
 - Selectable volume levels including:
 - Low volume
 - High volume
 - Selectable strobe candela levels including:
 - 15can
 - 30can
 - 75can
 - 110can
 - Strobe candela setting shall be set at 15.

14 - End-of-Line

- Shall be/include:
 - Red in colour
 - Wall mounted
 - Affixed with a label on the exterior indicating plate is used as an end-of-line device

15 - Equipment Warranty

- System supplier shall supply one year warranty on all system components.
- Labour and other required charges are required to attend site to troubleshoot and or replace devices within the term of warranty period shall be included in this contract.

End of Section

3 of 4 - Installation and Execution

1 - Fire Alarm Control Panel

- Shall be installed in accordance with CAN/ULC-S524-14 ADM1
- Shall be mounted at 1800mm from top of cabinet to finished floor.

2 - Fire Alarm Annunciator Panel

- Shall be installed in accordance with CAN/ULC-S524-14 ADM1
- Shall be mounted at 1800mm from top of cabinet to finished floor.

3 - Fire Monitoring Panel

- Shall be installed in accordance with CAN/ULC-S561-13
- Shall be mounted at 1800mm from top of cabinet to finished floor.
- Keypad shall be mounted at 1550mm from top of keypad to finished floor.

4 - Manual Pull Station

- Shall be installed in accordance with CAN/ULC-S524-14 ADM1
- Shall be installed on an approved outlet box.
- Shall be installed within 1500mm of the door.
- Where possible shall be installed on the latch side of the door.
- Shall be mounted between 1050-1150mm from top of device to finished floor.

5 - Smoke, Heat Fixed and Heat Rate-of-Rise Detector

- Shall be mounted on the ceiling in accordance with:
 - Installed in accordance with CAN/ULC-S524-14 ADM1
 - Installed on an approved outlet box.
 - Mounted at least 100mm away from a sidewall.
 - Where possible centered in the room.
 - Centered within a ceiling tile.
 - Mounted at the highest point in a stairwell or shaft. Also above a service entrance where possible.
 - A radius of 450mm in any direction shall be free from other obstructions.
 - Mounted at least 100mm away from the edge of a fan blade tip, if a ceiling fan is present.
 - Mounted at least 450mm away from an air supply outlet, return air inlet or exhaust outlet.
- Where subject to a positive or negative airflow, raceway entries into device boxes shall be sealed.

6 - Smoke Duct Detector

- Shall be mounted on a flat or round duct in accordance with:
 - In accordance with CAN/ULC-S524-14 ADM1
 - Installed after any inline filters, mixing boxes or silencers.
 - Mounted as far as possible from a change or split in direction of flow. Where this is not possible, a device shall be installed in the main branch of the split in direction of flow.
 - Installed in each branch location where possible.
 - Installed in a service shaft location where possible. Where this is not possible installing contractor shall provide an access hatch.
 - Installed so that air sampling and relay boxes are completely sealed to the duct work preventing air leakage.
 - When used as part of a fire/smoke damper in accordance with the National Building Code of Canada 3.1.8.11.
- Where subject to a positive or negative airflow, raceway entries into device boxes shall be sealed.

7 - Relay Module

- Shall be installed in accordance with CAN/ULC-S524-14 ADM1
 - Installed on an approved outlet box.
 - Installed after any inline filters, mixing boxes or silencers.
 - Where possible, installation shall be provided between the Fire Alarm SLC loop wiring and the wiring of the load being controlled.
 - Wall mounted no higher than 2400mm from top of device from finished floor.
 - Ceiling mounted recessed in ceiling or suspended grid.
- Device shall be visible and serviceable upon completion of construction.

Isolator Module

- Shall be mounted in accordance with:
 - Installed in accordance with CAN/ULC-S524-14 ADM1
 - Installed on an approved outlet box.
 - Wall mounted no higher than 2400mm from top of device from finished floor.
 - Ceiling mounted recessed in ceiling or suspended grid.
- Device shall be visible and serviceable upon completion of construction.
- When mounted on opposite sides of a horizontal fire separation, devices shall be spaced at least 400mm apart horizontally and may not share a common stud space.
- For stairwells and vertical service or egress shafts, isolator modules serving a single device shall be installed outside of the stairwell or shaft.

8 - Horn/Strobe

- Shall be mounted in accordance with:
 - Installed in accordance with CAN/ULC-S524-14 ADM1
 - Installed on an approved outlet box.
 - Listed for installation orientation.
 - Minimum clearance required to remove device shall be maintained.
 - Wall mount shall be no higher than 2400mm from top of strobe lens to finished floor.
 - Ceiling mount shall be no higher than 9000mm from top of strobe lens to finished floor. Where ceiling heights exceed 9000mm installing contractor shall install a pendant type drop to allow for device to be mounted at 9000mm.

9 - End-of-Line

- Shall be mounted in accordance with:
 - Installed in accordance with CAN/ULC-S524-14 ADM1
 - Shall be installed on an approved outlet box.
 - Shall be mounted no higher than 1800mm from top of device to finished floor.

10 - Installation

- Installation shall be in compliance with all codes and standards referenced throughout this document as well as any applicable local AHJ requirements.
- Wire and conduit shall be CSA approved FAS rated.
- All wiring shall be run in EMT conduit or armoured cabling.
- All materials must be CSA approved and ULC listed for use.
- Overall coordination of final device placements in conjunction with other trades shall be the responsibility of the installing contractor. All changes in location shall comply with the codes and standards referenced within this documents, shall not alter the design intent of the device without approval from the design engineer and be reflected on the as-built documentation.
- Devices required to be installed in unheated or outdoor locations shall be properly sealed in accordance with the manufactures instructions to prevent water leakage or accumulation. All conduit entries shall be bottom entry.
- Installing contractor shall select type and size of wire and conduits in accordance with manufactures recommendations and voltage drop calculations. All circuits shall be sized to allow for 40% spare capacity upon completion of construction.
- All conduits shall be sized to allow for 50% spare capacity upon completion of construction.

11 - Verification

- Verification of all system components shall be in compliance with all codes and standards referenced throughout this document as well as any applicable local AHJ requirements.
- Fire Alarm contractor to provide system programming required to supply a fully functioning system.
- Installing contractor shall provide required personnel to assist the Fire Alarm contractor with troubleshooting and verification.
- Installing contractor shall provide safe means of access to all required devices during the verification.
- A copy of the CAN/ULC-S537-13 verification report shall be submitted to the engineer for review and record keeping.
- A copy of the CAN/ULC-S561-13 verification report shall be submitted to the engineer for review and record keeping.

12 - Integrated Systems Testing

- All of the buildings life safety interconnection relationships shall be tested once the individual system verifications have been completed in accordance with CAN/ULC-S1001-11 AMD1.
- Integrated Systems Testing shall be performed by a trained, qualified and authorized individual.
- A copy of the CAN/ULC-S1001-11 ADM1 Integrated Systems Testing report shall be submitted to the engineer for review and record keeping.

13 - Training

- Fire Alarm contractor shall provide a separate trip for one factory trained personnel to attend site to and provide one, one hour training session to end users.

14 - Overall Warranty

- Installing contractor and Fire Alarm contractor shall provide one year warranty of the system to include costs associated with replacing faulty components and the labour, materials and any other fees required to do so.
- Installing contractor and Fire Alarm contractor shall provide a certificate of warranty defining the start and end date of the one-year term.



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Certificate of Authorization:

Professional Seal:

Project Name:

SAMPLE - Complete Fire Alarm Design of a Standard Strip Mall Style Building

Drawing Title:

SAMPLE - Fire Alarm System Specification

SCALE:
NTS

APPROVED BY:
xxx

BR	Issued for Sample	01/01/01
By	Drawing Revision	Date

Drawing #: Revision #:

FA-01

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