

1 GENERAL

1.01 DESCRIPTION OF SYSTEM

- .1 New intrusion detection system devices consisting of keypads, motion detectors and door contacts to be integrated with existing intrusion detection system.
- .2 New devices to be compatible with existing intrusion detection system.
- .3 Contractor to determine location of existing security system control panel.
- .4 Remote monitoring must comply with the requirements of CAN/ULC-S524 and CAN/ULC-S561 and utilize two separate and independent communication technologies.
- .5 Related Work:
 - .1 Section 01 33 00 - Submittal Procedures
 - .2 Section 01 91 13 - General Commissioning Requirements
 - .3 Section 26 05 31 - Splitter, Junction, Pull Boxes and Cabinets.
 - .4 Section 26 05 32 - Outlet Boxes, Conduit Boxes and Fittings.
 - .5 Section 26 05 34 - Conduits, Conduit Fittings and Fastenings.

1.02 REFERENCES

- .1 CAN/ULC-S524-19, Standard for the Installation of Fire Alarm Systems.
- .2 CAN/ULC-S561-13, Installation and Services for Fire Signal Receiving Centres and Systems.

1.03 SHOP DRAWINGS

- .1 Submit shop drawings in accordance with Section 01 33 00.

1.04 RELATED SECTIONS

- .1 Section 01 91 13 - General Commissioning Requirements.

2 PRODUCTS

2.01 INTRUSION DETECTION SYSTEM

- .1 Keypads:
 - .1 Two line, 32-character LCD screen.
 - .2 Built-in buzzer for key beeps.
 - .3 Liquid crystal display, adjustable keypad back light, will allow identification of each security system device, by room number, for ease of isolating an alarm condition.
 - .4 Individual LED indicators for Trouble, Armed and Ready.
- .2 Motion Detectors:
 - .1 Twin-element detection with large multi-beam lens.
 - .2 Temperature compensation.
 - .3 Ceiling or wall mounting.
- .3 Door Contacts:
 - .1 Surface mounted magnetic contact.
 - .2 1 inch gap size.
 - .3 Closed loop.
 - .4 Normally open configuration.
- .4 Hardwire Zone Expander:
 - .1 Provide hardwire zone expander to connect existing door contacts into the new system.
- .5 System Operation:
 - .1 Door contacts on generator building and fire pump building doors are to be monitored by the intrusion alarm system.
 - .2 Each building will be armed by the keypad located near the entrance to the building. At the time the arm command is received, the system shall sound a distinctive tone. Following a programmable delay, the system shall become armed.
 - .3 When the system is armed, door contacts are to initiate an alarm condition when a violation is detected.
 - .4 An audible alarm is to be sounded locally at the door (via the exit device alarm) and at the keypad.
 - .5 System will revert to normal operation when control panel is reset.
 - .6 System will supervise all zones. Any trouble or tamper condition will be annunciated, both locally and remotely.
 - .7 System to be programmed by the contractor under the direction of the Departmental Representative. Allow sufficient time for programming the system to meet the operational requirements of the Departmental Representative.

3 EXECUTION

3.01 INSTALLATION

- .1 Supply and install the security systems with all required components and wiring for complete and fully functional systems. The equipment manufacturer's certified representative will supply and install all the equipment, devices, and make all the connections.
- .2 Verify wire type and gauge with manufacturer prior to installation.
- .3 Locate all components as indicated on drawings. Do not locate a motion detector within one meter of a supply air diffuser.
- .4 Motion sensors located in a suspended ceiling are to be installed using a 100 mm square electrical box, complete with a raised 13 mm ring cover. Support of electrical box is to be independent from ceiling.
- .5 All security system wiring is to incorporate a white coloured jacket and be installed in a conduit system.
- .6 Provide all documentation associated with the security system alarm panel to the Departmental Representative, including all programming/contractor codes required for future modifications to the system.

3.02 TESTS

- .1 Prepare a written report detailing the security system verification and submit to the Departmental Representative.

3.03 COMMISSIONING

- .1 Refer to Section 01 91 13 - General Commissioning Requirements.

END OF SECTION

1 GENERAL

1.01 RELATED WORK

- .1 Electrical General Requirements: Section 26 05 00

1.02 REFERENCES

- .1 CAN/ULC S524-2019, Standard for Installation of Fire Alarm Systems.
- .2 CAN/ULC S526-2016, Visual Signaling Devices for Fire Alarm and Signaling Systems, Including Accessories.
- .3 CAN/ULC S527-2019, Standard for Control Units for Fire Alarm Systems.
- .4 CAN/ULC S528-2019, Standard for Manual Stations for Fire Alarm Systems, Including Accessories.
- .5 CAN/ULC S529-16(R2019), Standard for Smoke Detectors for Fire Alarm Systems.
- .6 CAN/ULC S536-2019, Standard for Inspection and Testing of Fire Alarm Systems.
- .7 CAN/ULC S537-2019, Standard for Verification of Fire Alarm Systems.
- .8 National Building Code of Canada (NBCC), 2015.
- .9 CAN/ULC S525-2016, Audible Signaling Devices for Fire Alarm and Signaling Systems, Including Accessories.

1.03 SYSTEM DESCRIPTION

- .1 Fully supervised, microprocessor- based, fire alarm and control system, utilizing digital techniques for data control and digital, and multiplexing techniques for data transmission. System shall be a fully addressable, two wire using intelligent devices.
- .2 System to carry out fire alarm and protection functions; including receiving alarm signals; initiating general alarm; supervising components and wiring; actuating annunciators and auxiliary functions; monitor sprinkler system devices for status

and flow; interface with elevator controller; initiating trouble signals and signalling to monitoring agency.

- .3 Zoned, non-coded single stage.
- .4 Modular in design to allow for future expansion.
- .5 Operation of system shall not require personnel with special computer skills.
- .6 System to include:
 - .1 Central Control Unit in separate enclosure with power supply, stand- by batteries, central processor with microprocessor, logic interface, main system memory, LCD and LED device and zone status annunciator, input-output interfaces for alarm receiving, annunciation/display, and program control/signalling.
 - .2 Power supplies.
 - .3 Initiating/input circuits.
 - .4 Output circuits.
 - .5 Auxiliary circuits.
 - .6 Wiring.
 - .7 Manual and automatic initiating devices.
 - .8 Audible and visual signalling devices.
 - .9 End-of-line resistors.
 - .10 Provision for remote LCD/LED annunciation interconnection.
 - .11 Integral LCD and LED zone annunciator.
 - .12 Dual technology dialer.

1.04 REQUIREMENTS OF REGULATORY AGENCIES

- .1 System components: listed by ULC and comply with applicable provisions of National Building Code Local/Provincial Building Code, and meet requirements of local authority having jurisdiction.

1.05 SHOP DRAWINGS

- .1 Submit shop drawings in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Include:
 - .1 Detail assembly and internal wiring diagrams for control units and Auxiliary cabinets.
 - .2 Overall system riser wiring diagram identifying control equipment, initiating zones, signalling circuits; identifying terminations, terminal numbers, conductors and raceways.
 - .3 Details for devices.

- .4 Details and performance specifications for control, annunciation and peripherals with item by item cross reference to specification for compliance.
- .5 Step-by-step operating sequence, cross referenced to logic flow diagram.

1.06 OPERATION AND MAINTENANCE DATA

- .1 Provide operation and maintenance data for fire alarm system for incorporation into manual specified in Section 01 78 00 - Closeout Submittals.
- .2 Include:
 - .1 Instructions for complete fire alarm system to permit effective operation and maintenance.
 - .2 Technical data - illustrated parts lists with parts catalogue numbers.
 - .3 Copy of approved shop drawings with corrections completed and marks removed except review stamps.
 - .4 List of recommended spare parts for system.
 - .5 Complete list of all points and a description for each.

1.07 MAINTENANCE MATERIALS

- .1 Include five (5) spare glass rods for manual pull box stations if applicable.

1.08 MAINTENANCE

- .1 Provide one (1) year maintenance and monitoring with two (2) inspections by manufacturer during warranty period. Inspection tests to conform to CAN/ULC S536. Submit inspection report to the Departmental Representative.
- .2 Provide individual price on tender form for temporary program changes during construction period, to include zone labels, control functions, system operation.

1.09 TRAINING

- .1 Provide on-site lectures and demonstration by fire alarm equipment manufacturer to train operational personnel in use and maintenance of fire alarm system.
- .2 Provide advance copy of training material and instructional outline 14 days prior to scheduled training.

2 PRODUCTS

2.01 MATERIALS

- .1 Equipment and devices: ULC listed and labelled and supplied by single manufacturer.

2.02 SYSTEM OPERATION SINGLE STAGE SIGNALS ONLY

- .1 Actuation of any alarm initiating device to:
 - .1 Cause electronic latch to lock-in alarm state at central control unit (and data gathering panel/transponder when installed).
 - .2 Indicate zone of alarm at central control unit and at the remote annunciator.
 - .3 Cause audible and visual signalling devices to operate continuously throughout building and at central control unit.
 - .4 Transmit signal to Building Automation System network via addressable output.
 - .5 Cause all ventilation equipment to shut down or to function to provide required control.
 - .6 Transmit signal to remote ULC monitoring station.
 - .7 Transmit signal to Access Control System.
 - .8 Transmit signal to Lighting Control System.
 - .9 Transmit signal to elevator controller.
- .2 Acknowledging alarm: indicated at central control unit.
- .3 Possible to silence signals by "alarm silence" switch at control unit, after 60 s period of operation.
- .4 Subsequent alarm, received after previous alarm has been silenced, to re- activate signals.
- .5 Actuation of supervisory devices to:
 - .1 Indicate respective supervisory zone at central control unit and at the remote annunciator.
 - .2 Cause audible signal at central control unit to sound.
 - .3 Activate common supervisory sequence.
- .6 Resetting alarm and supervisory device not to return system indications/functions back to normal until control unit has been reset.
- .7 Trouble on system to:
 - .1 Indicate circuit in trouble at central control unit.

- .2 Activate "system trouble" indication, buzzer and common trouble sequence. Acknowledging trouble condition to silence audible indication; whereas visual indication to remain until trouble is cleared and system is back to normal.
- .3 Transmit signal to Building Automation System network via addressable network.
- .4 Transmit signal to remote ULC monitoring station.
- .8 Trouble on system: suppressed during course of alarm.
- .9 Trouble condition on any circuit in system not to initiate alarm conditions.

2.03 CONTROL PANEL

- .1 Central Control Unit (CCU):
 - .1 Suitable for Class B communication style, to CAN/ULC S524.
 - .2 Features specified are minimum requirements for microprocessor- based system with digital data control and digital multiplexing techniques for data transmission.
 - .3 Minimum capacity of 250 addressable monitoring and 250 addressable control/signal points per loop: expandable to a minimum of two loops.
 - .4 System to provide for priority reporting levels, with fire alarm points assigned highest priority, supervisory and monitoring lower priority, and third priority for troubles. Possible to assign control priorities to control points in system to guarantee operation or allow emergency override as required.
 - .5 Integral SPD protected point for power source termination, power supply, battery charger and standby batteries.
 - .6 Basic life safety software: retained in non-volatile Erasable Programmable Read-Only-Memory (EPROM). Extra memory chips: easily field-installed. Random- Access-Memory (RAM) chips in panel to facilitate password-protected field editing of simple software functions (e.g. zone labels, priorities) and changing of system operation software.
 - .7 Circuitry to continuously monitor communications and data processing cycles of microprocessor. Upon failure, audible and visual trouble indication to activate.
 - .8 Equip with software routines to provide Event-Initiated-Programs (EIP); change the status of one or more monitor points, may be programmed to operate any or all of system's control points.
 - .9 Software and hardware to maintain time of day, day of week, day of month, month and year.
 - .10 Software to operate variable sensitivity addressable smoke detectors and annunciate their status and sensitivity settings at control panel.

- .11 Integral front panel backlit LCD display indicating event, device, diagnostic and programming information.
- .12 Integral LED status indicators for zones as required by ULC and NBCC.

2.04 POWER SUPPLIES

- .1 120 V, 60 Hz as primary source of power for system.
- .2 Voltage regulated, current limited distributed system power.
- .3 Primary power failure or power loss (less than 102 V) will activate common trouble sequence.
- .4 Interface with battery charger and battery to provide uninterruptible transfer of power to standby source during primary power failure or loss.
- .5 During normal operating conditions fault in battery charging circuit, short or open in battery leads to activate common trouble sequence and standby power trouble indicator.
- .6 Standby batteries: sealed, maintenance free.
- .7 Continuous supervision of wiring for external initiating and alarm circuits to be maintained during power failure.
- .8 SPD protected point integral to fire alarm panel to be provided for power source termination.

2.05 INITIATING/ INPUT CIRCUITS

- .1 Receiving circuits for alarm initiating devices such as manual pull stations, smoke detectors, heat detectors and water flow switches, wired in DCLB configuration to central control unit.
- .2 Alarm receiving circuits (active and spare): compatible with smoke detectors and open contact devices.
- .3 Actuation of alarm initiating device: cause system to operate as specified in "System Operation".
- .4 Receiving circuits for supervisory, N/O devices. Devices: wired in Class B configuration to central control unit.
- .5 Actuation of supervisory initiating device: cause system to operate as specified in "System Operation".

2.06 ALARM OUTPUT CIRCUITS

- .1 Alarm output circuit: connected to signals, wired in class B configuration to central control unit.
 - .1 Signal circuits' operation to follow system programming; capable of sounding horns and strobes continuously. Each signal circuit: rated at 2 A, 24 VDC; fuse-protected from overloading/overcurrent.
 - .2 Manual alarm silence, automatic alarm silence and alarm silence inhibit to be provided by system's common control.

2.07 AUXILIARY CIRCUITS

- .1 Auxiliary contacts for control functions.
- .2 Actual status indication (positive feedback) from controlled device.
- .3 Alarm and supervisory on system to cause operation of programmed auxiliary output circuits.
- .4 Upon resetting system, auxiliary contacts to return to normal or to operate as pre-programmed.
- .5 Fans: stagger-started upon system reset; timing circuit to separate starting of each fan or set of fans connected to auxiliary contact on system. Timing circuit: controlled by CCU.
- .6 Auxiliary circuits: rated at 2 A, 24 V dc or 120 V ac, fuse-protected.

2.08 WIRING

- .1 Twisted copper conductors: rated 300 V.
- .2 To initiating circuits: 18 AWG minimum, and in accordance with manufacturer's requirements.
- .3 To signal circuits: 14 AWG minimum, and in accordance with manufacturer's requirements.
- .4 To control circuits: 14 AWG minimum, and in accordance with manufacturer's requirements.
- .5 Install all wiring in approved conduit system. Initiating and signalling wiring in separate conduits.

2.09 MANUAL ALARM STATIONS

- .1 Addressable manual pull station.
 - .1 Pull lever, semi-flush wall mounted type, single action, single stage, electronics to communicate station's status to addressable module/transponder over two (2) wires and to supply power to station. Station address to be set on station in field.

2.10 AUTOMATIC ALARM INITIATING DEVICES

- .1 Addressable thermal fire detectors, combination fixed temperature of 73°C. Electronics to communicate detector's status to addressable module/transponder.
 - .1 Detector address to be set on detector base and head in field.
 - .2 Standard of Acceptance: Chubb Edwards Signature Series.
- .2 Addressable variable-sensitivity smoke detectors.
 - .1 Photo-electric type.
 - .2 Electronics to communicate detector's status to addressable module/transponder.
 - .3 Detector address to be set on detector base and head in field.
 - .4 Sensitivity settings: determined and operated by control panel. No shifting in detector sensitivity due to atmospheric conditions (dust, dirt) within certain parameters.
 - .5 Ability to annunciate minimum of two (2) levels of detector contamination automatically with trouble condition at control panel.
 - .6 Duct mounted where indicated. Provide duct mount detectors complete with relay base for fan shut down.
 - .7 Standard of Acceptance: Chubb Edwards Signature Series Multi-sensor detector Relay base as indicated.
- .3 Addressable Interface Modules (AIM):
 - .1 To provide ability to communicate with CCU for sprinkler supervisory devices and other equipment.
 - .2 Supervise wiring between module and device.
 - .3 Standard of Acceptance: Chubb Edwards Signature Series.
- .4 Addressable Relays:
 - .1 To allow the CCU to selectively monitor and control equipment.
 - .2 Provide as indicated.
 - .3 Standard of Acceptance: Chubb Edwards Signature Series.
- .5 Detector Base mounted auxiliary relay module:

- .1 Form 'C' (No. NC) dry relay contact coupled to detector.
- .2 Relay contacts wired directly to control circuit of remote equipment.
- .3 Standard of Acceptance: Chubb Edwards Signature Series.

2.11 HORN/STROBE DEVICES

- .1 Temporal horn and strobe.
- .2 Semi-flush mounted, adjustable Candella output and adjustable audio output.
- .3 Alarm output synchronizing module(s) as required to synchronized tone and strobe throughout facility.

2.12 END-OF-LINE DEVICES

- .1 End-of-line devices to control supervisory current in alarm circuits and signalling circuits, sized to ensure correct supervisory current for each circuit. Open, short or ground fault in any circuit will alter supervisory current in that circuit, producing audible and visible alarm at main control panel.

2.13 REMOTE ANNUNCIATOR

- .1 Provide a remote mounted annunciator having the following features:
 - .1 Flush mounted with trim.
 - .2 Lockable hinged door.
 - .3 LCD/LED display to ULC requirements.
 - .4 Modular construction.
- .2 Remote annunciator to mimic and display all alarm and trouble status information of the Central Control Unit.

2.14 ANCILLARY DEVICES

- .1 Remote relay unit to initiate equipment shutdown, as indicated.
- .2 Devices and accessories as required to monitor the status of fire suppression systems as required by NBCC.
- .3 Refer to Division 21 for details of fire suppression systems.
- .4 Loop isolation modules to isolate faulted section of initiating loop circuitry from healthy sections.

3 EXECUTION

3.01 INSTALLATION

- .1 Install systems in accordance with CAN/ULC S524.
- .2 Install central control unit and connect to ac power supply.
- .3 Install manual alarm stations and connect to alarm initiating circuit wiring.
- .4 Locate and install detectors and connect to alarm initiating circuit wiring. Do not mount detectors within 40" of air outlets. Maintain at least 24" radius clear space on ceiling, below and around detectors. Locate duct type detectors in straight portions of ducts.
- .5 Connect alarm circuits to main control panel.
- .6 Install signal horns and visual signal devices and connect to signalling circuits. Confirm load on circuit is with circuit capacity.
- .7 Connect signalling circuits to main control panel.
- .8 Install end-of-line devices at end of alarm and signalling circuits as required.
- .9 Install annunciator panel where indicated and connect to annunciator circuit wiring.
- .10 Install door releasing devices as indicated.
- .11 Install remote relay units to control equipment shut down and shunt trips.
- .12 Sprinkler and fire suppression system: wire alarm and supervisory switches and connect to control panel as indicated and as required by authority having jurisdiction. Coordinate installation with sprinkler and fire suppression installations.
- .13 Connect fire suppression systems to control panel.
- .14 Splices are not permitted.
- .15 Provide necessary raceways, cable and wiring to make interconnections to terminal boxes, annunciator equipment and CCU, as required by equipment manufacturer.

- .16 Confirm wiring is free of opens, shorts or grounds, before system testing and handing over.
- .17 Identify circuits and other related wiring at central control unit, annunciators, and terminal boxes.
- .18 Coordinate installation of remote annunciator and pull station in Showroom entry vestibule with architectural vestibule panel details.
 - .1 Route wiring from basement to remote annunciator and pull station.
 - .2 Provide gas seal around floor slab sleeves.
 - .3 Provide appropriate fire stopping at floor penetrations.

3.02 FIELD QUALITY CONTROL

- .1 Perform tests in accordance with Section 26 05 00 and CAN/ULC S537.
- .2 Fire alarm system:
 - .1 Test alarm initiating circuits to confirm manual stations, thermal and smoke detectors, sprinkler and fire suppression system transmit alarm to control panel and actuate general alarm and ancillary devices.
 - .2 Check annunciator panels to confirm zones are shown correctly.
 - .3 Simulate grounds and breaks on alarm and signalling circuits to confirm proper operation of systems.
 - .4 Addressable circuits system Class B:
 - .1 Test each conductor on all Class B addressable links for capability of providing three (3) or more subsequent alarm signals on line side of single open-circuit fault condition imposed near electrically most remote device on each link. Operate Acknowledge/Silence switch after reception of each of the three (3) signals. Correct imposed fault after completion of each series of tests.
 - .2 Test each conductor on addressable links for capability of providing three (3) or more subsequent alarm signals during ground- fault condition imposed near electrically most remote device on each link. Operate Acknowledge/Silence switch after reception of each of the three (3) signals. Correct imposed fault after completion of each series of tests.
- .3 Test complete operation of fire alarm system ventilation unit control. Coordinate commissioning with commissioning Agent and other trades.

- .4 Verification agency to provide Verification Certification to the Departmental Representative upon completion of all testing.
- .5 Confirm transmission of signals to ULC monitoring agency.

END OF SECTION