

Part 1 General

1.1 RELATED SECTIONS

- .1 Section 26 05 00 - Common Requirements for Electrical.
- .2 Section 26 05 21 - Wires and Cables (0 - 1000 V).

1.2 REFERENCES

- .1 Government of Canada:
 - .1 NBC-2015, National Building Code of Canada.
- .2 Canadian Standards Association:
 - .1 Canadian Electrical Code, Part I, C22.1-18.
- .3 Underwriter's Laboratories of Canada (ULC):
 - .1 CAN/ULC-S524-14, Standard for the Installation of Fire Alarm Systems.
 - .2 CAN/ULC-S529-09, Smoke Detectors for Fire Alarm Systems.
 - .3 CAN/ULC-S536-04, Inspection and Testing of Fire Alarm Systems.
 - .4 CAN/ULC-S537-13, Verification of Fire Alarm Systems.

1.3 QUALITY ASSURANCE

- .1 The system installer shall be a firm that can utilize fire alarm systems and equipment identical to that required for this project.
- .2 The contractor shall be an established fire alarm system Contractor that has had and currently maintains a locally run and operated business for at least five years. The Contractor shall be a duly authorized distributor of the equipment supplied with full manufacturer's warranty privileges.

- .3 The Contractor shall show satisfactory evidence, upon request, that he maintains a fully equipped service organization capable of furnishing adequate inspection and service to the system. The Contractor shall maintain at his facility the necessary spare parts in the proper proportion as recommended by the manufacturer to maintain and service the equipment being supplied.

1.4 SYSTEM DESCRIPTION

- .1 The new fire alarm system and devices shall be an Edwards' system and shall match the existing fire alarm network installed at the Bedford Institute of Oceanography Campus and will monitor devices and report to monitoring. Re-verify all devices within Scope of Work.

1.5 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, and Office of the Fire Marshall.

1.6 SUBMITTALS AND SHOP DRAWINGS

- .1 Submit shop drawings in accordance with Division 1.

1.7 WARRANTY

- .1 Warranty all work for a period of one year, from the date of substantial completion. Warranty shall cover parts and labour.

Part 2 Products

2.1 MATERIALS

- .1 Equipment and devices: ULC listed and labelled and supplied by single manufacturer.
- .2 Power supply: to CAN/ULC-S524.
- .3 Audible signal devices: to CAN/ULC-S525.
- .4 Speaker for fire alarm system: to CAN/ULC S541.
- .5 Visual signal devices: to CAN/ULC-S526.

- .6 Control unit: to ULC-S527.
- .7 Manual pull stations: to CAN/ULC-S528.
- .8 Smoke detectors: to CAN/ULC-S529.

2.2 SEQUENCE OF OPERATION

- .1 It shall include but not be limited to the following:
 - .1 Actuation of any alarm initiating device to:
 - .1 Announce zone of alarm on fire control panel.
 - .2 Illuminate the corresponding zone LED on all nodes.
 - .3 Energize the fire department relay and transmit the alarm signal to central monitoring facility.
 - .4 Energize auxiliary relays as programmed, to release doors throughout complex, home elevators, and send signal for fan control.
 - .5 Sound the alarm signals throughout the complex at alert rate of 20 strokes per minute. If the general alarm circuit is initiated, then alarm signals will sound at evacuation rate of 120 strokes per minute in zone of alarm only. Remainder of complex will remain at alert rate.
 - .6 Activation of any normally open initiating device which is connected to a supervisory circuit will annunciate on the control panel by illuminating the corresponding amber zone LED (or bring up message on shared display), send supervisory message to trouble printer, illuminate common trouble LED, and sound common trouble buzzer.
 - .2 Acknowledging alarm: indicated at central control unit.
 - .3 Subsequent alarm, received after previous alarm has been silenced, to re-activate signals.
 - .4 Resetting alarm or supervisory device not to return system indications/functions back to normal until control unit is reset.

- .5 Maximum system response times for audible signal appliances, remote connections, releasing device start of sequence, required annunciation, output to central alarm control facility, and ancillary circuit outputs, shall be 10 seconds.
- .6 Manually operated control activations for paging and alarm selection shall have indication to confirm output operation in a maximum of 5 seconds. Provide indication to operator within 1 second, that the function has been requested.
- .7 Trouble on system to:
 - .1 Indicate circuit in trouble on central control unit.
 - .2 Activate "system trouble" indication buzzer and common trouble sequence. Acknowledging trouble condition to silence audible indication; visual indication to remain until trouble is cleared and system is back to normal.
- .8 Troubles on system: suppressed during course of alarm.
- .9 Trouble condition on any circuit in system not to initiate alarm conditions.

2.3 POWER SUPPLIES

- .1 120V, 60 Hz as primary source of power for system; 24V, DC output.
- .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.

2.4 INITIATING/INPUT CIRCUITS

- .1 Receiving circuits for alarm initiating devices such as manual pull stations, smoke detectors, and water flow switches, wired in Class A 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 A configuration to central control unit.
- .5 Actuation of supervisory initiating device: cause system to operate as specified in "System Operation".

2.5 ALARM OUTPUT CIRCUITS

- .1 Alarm output circuit: connected to speakers, wired in class B configuration to remote nodes:
 - .1 Manual alarm silence, automatic alarm silence and alarm silence inhibit to be provided by system's common control.
 - .2 Speaker circuits operation: follow system programming; capable of reproducing tones and voice fed by audio channels.
 - .3 Audio channel available to each speaker circuit to be automatically and dynamically selected by system's microprocessor.
 - .4 Manual selection and operation of alarm tones to be provided on zone by zone basis.
 - .5 Manual selection for emergency paging to be provided on zone by zone basis.
 - .6 Proprietary evacuation control switch to be provided to shunt-out automatic system programming once manual control of system has been assumed by authorized personnel.

2.6 AUXILIARY CIRCUITS

- .1 Auxiliary contacts for control functions.
- .2 Actual status indication (positive feedback) from controlled device.
- .3 Alarm and supervisory trouble on system to cause operation on 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 2A, 24 VDC or 120 Vac, fuse-protected.

2.7 INTELLIGENT MANUAL ALARM STATIONS

- .1 Intelligent manual pull station:
 - .1 Two stage (pre-signal).
 - .2 GA key with tag for pre-signal station.
 - .3 Break glass operation.
 - .4 Non-volatile memory.
 - .5 Automatic device mapping.
 - .6 Electronic addressing.
 - .7 Integral microprocessor.
 - .8 Twin status LED'S.

2.8 AUTOMATIC ALARM INITIATING DEVICES

- .1 Intelligent ionization sensor:
 - .1 Integrates photoelectric smoke, and fixed temperature heat sensing technologies.
 - .2 Non-volatile memory.
 - .3 Automatic device mapping.
 - .4 Electronic addressing.
 - .5 Environmental compensation.
 - .6 Integral microprocessor.
 - .7 Self-diagnostic.
 - .8 Twin status LED'S.

- .9 Every eight (8th) device shall have an isolation base.
- .10 Polyethylene vapour barrier extender over detector back box where required.
- .2 Intelligent control relay module:
 - .1 One N/O, N/C contact.
 - .2 Rated 2 amps at 24V (0.5 V at 120 V).
 - .3 Non-volatile memory.
 - .4 Automatic device mapping.
 - .5 Electronic addressing.
 - .6 Integral microprocessor.
 - .7 Twin status LED'S.
- .3 Intelligent input module:
 - .1 Non-volatile memory.
 - .2 Automatic device mapping.
 - .3 Electronic addressing.
 - .4 Integral microprocessor.
 - .5 Twin status LED's.
 - .6 Single or dual module addresses.

2.9 SIGNAL DEVICES

- .1 Horn/Strobes:
 - .1 Field configurable dB level.
 - .2 Field configurable candela output (15 to 110 cd).
 - .3 Flush wall mounted.
 - .4 24V DC.
 - .5 Red housing with "FIRE" marking.

2.10 END OF LINE DEVICES

- .1 End-of-line devices to control supervisory current in 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.

Part 3 Execution**3.1 INSTALLATION**

- .1 Disconnect and reconnect fire alarm speakers as per CAN/ULC-S524.
- .2 Keep detector 1 m (minimum) away from air outlets. Maintain at least 600 mm radius clear space on ceiling, below and around detectors.
- .3 Splices are not permitted.
- .4 Ensure that wiring is free of opens, shorts or grounds, before system testing and handing over.
- .5 Maintain Fire Alarm System in operation during construction. Advise Construction Manager and obtain approval prior to interrupting fire protection system. At no time shall any part of the building be left unprotected. If the fire alarm system has to be shut down, the Construction Manager shall provide fire watch for the entire affected area after working hours.
- .6 Modify existing firework system located in Holland Building (Commissionaire's Office) including all maps and programming required to add new MCI Heavy Equipment Storage Building as a separate stand-alone building capable of displaying specific individual device alarms at the workstation level (point by point annunciation).
- .7 The general contractor shall be responsible to coordinate with the fire alarm provider and provide a copy of the update fire alarm programming software at the completion of work to the Departmental Representative. Copy shall be sent electronically and handed over stored on a USB key to the Departmental Representative. This will be mandatory and shall be part of the closeout submittal.

3.2 FIELD QUALITY CONTROL

- .1 On completion of all the work shown on drawings and described herein, the fire alarm system shall be in perfect working order.

- .2 To ensure that all components are working properly, the Electrical Contractor shall arrange an inspection of the renovated installation by ULC approved, factory trained personnel.
- .3 The approved ULC supplier shall make an inspection of the fire alarm system, including those components necessary to the direct operation of the system, such as manual stations, ionization detectors, sprinkler monitoring devices and speakers. The inspection shall comprise an examination of such equipment for the following:
 - .1 That the wiring connection to all equipment components are correct and meet CAN/ULC-S537 and CSA requirements.
 - .2 That equipment is installed in accordance with the approved ULC supplier's recommendations, and that all devices (where possible without destructive testing) have been operated and/or tested to verify their operation.
 - .3 That the supervisory wiring of those items of equipment connected to a supervised circuit, is operating properly and that the Governmental Regulations, if any, concerning such supervisory wiring, have been met to the satisfaction of the Inspecting Officials.
 - .4 All such tests and inspection shall be in conformance with CAN/ULC-S536 and CAN/ULC-S537.
 - .5 Verification shall be performed by a firm other than the firm performing the installation.
 - .6 On completion of the inspection and tests, and when all of the above conditions have been complied with, including any necessary corrective measures, the approved ULC supplier shall issue an inspection report, and a certificate of verification. The inspection report shall include a detailed list showing the location of each device and certifying the test result of each device. The certificate of verification shall confirm that the inspection has been completed and is satisfactory.
 - .7 Submit a copy of the verification report to the Fire Inspector.

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- .8 All costs involved in this inspection, both from the approved ULC supplier and the Contractor's work, shall be included with the Contractor's total Tender price.
- .9 The Contractor shall notify the Construction Manager of the date of the inspection, so the Construction Manager may attend if he so desires.
- .10 All cost associated with final commissioning system shall be included in the contractors tender price.

END OF SECTION