

PART 1 - GENERAL

1.1 Related Work

- .1 Wiring: Section 26 05 21  
Wires and  
Cables 0-1000V
- .2 Conduits: Section 26 05 34  
Conduits, Conduit  
Fastenings and  
Conduit Fittings

1.2 References

- .1 CAN/ULC-S524-M91, Installation of Fire Alarm Systems.
- .2 ULC-S525-1978, Audible Signal Appliances for Fire Alarm.
- .3 CAN/ULC-S527-M87, Control Units, Fire Alarm.
- .4 CAN/ULC-S528-M91, Manual Pull Stations.
- .5 CAN/ULC-S529-M87, Smoke Detectors, Fire Alarm.
- .6 CAN/ULC-S530-M91, Heat Actuated Fire Detectors, Fire Alarm.
- .7 CAN/ULC-S536-M86, Inspection and Testing of Fire Alarm Systems.
- .8 CAN/ULC-S537-M86, Verification of Fire Alarm Systems.
- .9 NBC-latest edition in effect, National Building Code of Canada.

1.3 System  
Description

- .1 Connect to existing fully supervised, microprocessor-based, fire alarm system.
- .2 Zoned, non-coded, single stage.
- .3 Operation of system shall not require personnel with special computer skills.
- .4 System to include:
  - .1 Power supplies.
  - .2 Initiating/input circuits.
  - .3 Output circuits.
  - .4 Auxiliary circuits.
  - .5 Wiring.
  - .6 Manual and automatic initiating devices.
  - .7 Audible signalling devices.
  - .8 End-of-line resistors.
  - .9 Local annunciators.

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| <u>1.4 Requirements of Regulatory Island Fire Agencies</u> | <p>.1 System:</p> <p>.1 Subject to Fire Commissioner of Canada (FCC) approval.</p> <p>.2 Subject to FCC inspection for final acceptance.</p> <p>.2 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.</p>  |
| <u>1.5 Shop Drawings</u>                                   | <p>.1 Submit shop drawings in accordance with Section 01340.</p> <p>.2 Include:</p> <p>.1 Details for devices.</p> <p>.2 Details and performance specifications for control, annunciation and peripherals with item by item cross reference to specification for compliance.</p>  |
| <u>1.6 Operation and Maintenance Data</u>                  | <p>.1 Provide operation and maintenance data for fire alarm system for incorporation into Maintenance Manual specified in Section 01730 and 16010.</p> <p>.2 Include:</p> <p>.1 Instructions for complete fire alarm system to permit effective operation and maintenance.</p> <p>.2 Technical data - illustrated parts lists with parts catalogue numbers.</p> <p>.3 Copy of approved shop drawings with corrections completed and marks removed except review stamps.</p> <p>.4 List of recommended spare parts for system.</p> |
| <u>1.7 Maintenance Materials</u>                           | <p>.1 Provide maintenance materials as recommended by the Manufacturer.</p> <p>.2 Include:</p> <p>.1 10 spare glass rods for manual pull stations, if applicable.</p>   |
| <u>1.8 Maintenance</u>                                     | <p>.1 Provide one year's free maintenance with two inspections by manufacturer during warranty period. Inspection tests to conform to CAN/ULC-S536. Submit inspection report to Engineer.</p>   |
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- 1.9 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.

## PART 2 - PRODUCT

- 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 ULC-S524.
- .4 Control unit: to CAN/ULC-S527.
- .5 Manual pull stations: to CAN/ULC-S528.
- .6 Thermal detectors: to CAN/ULC-S530.
- .7 Smoke detectors: to CAN/ULC-S529.

- 2.2 System Operation .1 Actuation of any alarm initiating device on to:
- .1 Cause electronic latch to lock-in alarm state at central control unit.
- .2 Indicate zone of alarm at central control.
- .3 Cause audible devices to sound continuously throughout the building.
- .4 Transmit signal to ULC monitoring agency via dialer.
- .2 Acknowledging alarm: indicated at central control unit.
- .3 Possible to silence signals by "alarm silence" switch at central 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 any supervisory device to:
- .1 Cause electronic latch to lock-in supervisory state at central control unit.
- .2 Indicate respective supervisory zone at central control unit and remote annunciators.
- .3 Cause audible signal at central control unit to sound.
- .4 Activate common supervisory sequence.
- .6 Resetting alarm or supervisory devices not to return system indications/functions back to normal until control unit is 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; visual indication to remain until trouble is cleared and system is back to normal.
- .8 Trouble on system: suppressed during course of alarm.
- .9 Trouble condition on any circuit in system not to initiate alarm conditions.

### 2.3 Control Panel

- .1 Central control unit (CCU). Existing

### 2.4 Initiating/ Input Circuits

- .1 Receiving circuits for alarm initiating devices such as manual pull stations, smoke detectors and heat detectors 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 DCLB 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 signals, wired in class B configuration to central control unit.
  - .1 Signal circuits' operation to follow system programming; capable of sounding horns 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.

### 2.6 Auxiliary Circuits

- .1 Auxiliary contacts for control functions.
- .2 Actual status indication (positive feedback) from controlled device.
- .3 Alarm and/or supervisory trouble 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 Auxiliary circuits: rated at 2 A, 24 V dc or 120 V ac, fuse-protected.

## 2.7 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 Fire alarm wiring to be in electrical metallic conduit (EMT). All conduit to use steel fittings.

## 2.8 Manual Alarm Stations

- .1 Manual alarm stations: pull lever, wall mounted surface or semi-flush type, non-coded single pole normally open contact for single stage, bilingual English and French signage.
- .2 Addressable manual pull station.
  - .1 Pull lever, semi-flush wall mounted type, single action, electronics to communicate station's status to addressable module/ transponder over 2 wires and to supply power to station. Station address to be set on station in field. Bilingual English and French signage.

## 2.9 Automatic Alarm Initiating Devices

- .1 Thermal fire detectors, combination fixed temperature and rate of rise, non-restorable fixed temperature element, self-restoring rate of rise, fixed temperature 57°C, rate of rise 8.3°C per minute.
- .2 Addressable thermal fire detectors, combination fixed temperature and rate of rise, non-restorable fixed temperature element, self-restoring rate of rise, fixed temperature 57°C, rate of rise 8.3°C per minute.
  - .1 Electronics to communicate detector's status to addressable module/transponder.
  - .2 Detector address to be set on detector base in field.
- .3 Addressable variable-sensitivity smoke detectors.
  - .1 Ionization or Photo-electric type as indicated.
  - .2 Electronics to communicate detector's status to addressable module/transponder.

- .3 Detector address to be set on detector base in field.
- .4 Sensitivity settings: 7 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 2 levels of detector contamination automatically with trouble condition at control panel.

2.10 Audible  
Alarm Signal Devices

- .1 Horns: red, 24 V dc, 94 db at 10 feet.
- .2 Designed for flush mounting on wall in four inch square outlet box.

2.11 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 alarm at main control panel and remotely as indicated.

2.12 Remote  
Annunciators

- .1 LCD type with four lines of 20 characters each. Annunciator located in new greenhouse building.
- .2 Display:
  - .1 Alarms and troubles for alarm initiating circuits.
  - .2 Supervisory alarms and troubles for supervisory initiating circuits.
  - .3 Common system trouble.
- .3 Trouble Buzzer.
  - .1 Acknowledging trouble at main panel to silence trouble buzzers in system.
- .4 Supervised, with alarms and trouble acknowledge button.
- .5 Minimum wiring configuration with main panel.

2.13 Acceptable  
Material

- .1 Acceptable Material: Siemens MXL.

### PART 3 - EXECUTION

#### 3.1 Installation

- .1 Install systems in accordance with CAN/ULC-S524.
- .2 Install node control unit and connect to ac power supply, dc standby power.
- .3 Install manual alarm stations and connect to alarm circuit wiring.
- .4 Locate and install detectors and connect to alarm circuit wiring. Do not mount detectors within 900 mm of air outlets. Maintain at least 600 mm radius clear space on ceiling, below and around detectors.
- .5 Connect alarm circuits to main node controller.
- .6 Install horns and connect to signalling circuits.
- .7 Connect signalling circuits to main node controller.
- .8 Install end-of-line devices at end of signalling circuits.
- .9 Splices are not permitted.
- .10 Provide necessary raceways, cable and wiring to make interconnections to terminal boxes, and CCU, as required by equipment manufacturer.
- .11 Ensure that wiring is free of opens, shorts or grounds, before system testing and handing over.
- .12 Identify circuits and other related wiring at central control unit and terminal boxes.

#### 3.2 Field Quality Control

- .1 Perform tests in accordance with Section 16010 - Electrical General Requirements and CAN/ULC-S537.
- .2 Fire alarm system:
  - .1 Test such device and alarm circuit to ensure manual stations, thermal and smoke detectors transmit alarm to control panel and actuate general alarm and ancillary devices.
  - .2 Simulate grounds and breaks on alarm and signalling circuits to ensure proper operation of systems.
  - .3 Addressable circuits system style DCLB:
    - .1 Test each conductor on all DCLB addressable links for capability of providing 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 3 signals. Correct imposed fault after completion of each series of tests.

.2 Test each conductor on all DCLB addressable links for capability of providing 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 3 signals. Correct imposed fault after completion of each series of tests.

.3 Provide final PROM program re-burn for system Engineer incorporating program changes made during construction at no additional cost.

### 3.3 Commissioning

.1 Commission fire alarm system as per Paragraph 3.2 above.