
Part 1 General**1.1 RELATED SECTIONS**

- .1 Section 01 00 10 – General Instructions.
- .2 Section 26 05 00 - Common Work Results for Electrical.

1.2 REFERENCES

- .1 Government of Canada
 - .1 NBC-2010, National Building Code of Canada.
 - .2 TB OSH Chapter 3-03, 1997-01-28, Treasury Board of Canada, Occupational Safety and Health, Chapter 3-03, Standard for Fire Protection Electronic Data Processing Equipment.
 - .3 TB OSH Chapter 3-04, 1994-12-22, Treasury Board of Canada, Occupational Safety and Health, Chapter 3-04, Standard for Fire Alarm Systems.
- .2 Underwriter's Laboratories of Canada (ULC)
 - .1 CAN/ULC-S524-06, Standard for the Installation of Fire Alarm Systems.
 - .2 CAN/ULC-S525-07, Audible Signal Devices for Fire Alarm Systems, including accessories.
 - .3 CAN/ULC-S526-07, Visual Signal Devices for Fire Alarm Systems
 - .4 ULC-S527-99, Standard for Control Units for Fire Alarm Systems.
 - .5 CAN/ULC-S528-05, Manual Pull Stations for Fire Alarm Systems
 - .6 CAN/ULC-S529-09, Smoke Detectors for Fire Alarm Systems
 - .7 CAN/ULC-S530-91 (R1999), Heat Actuated Fire Detectors.
 - .8 CAN/ULC-S536-04, Inspection and Testing of Fire Alarm Systems.
 - .9 CAN/ULC-S537-04, Verification of Fire Alarm Systems.

1.3 SYSTEM DESCRIPTION

- .1 Fully supervised, microprocessor-based, fire alarm system, utilizing digital techniques for data control and digital, and multiplexing techniques for data transmission.
- .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; initiating trouble signals and signalling to main building fire alarm system.
- .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 Fire Alarm Control Unit in separate enclosure with power supply, stand-by batteries, central processor with microprocessor and logic interface, main system memory, input-output interfaces for alarm receiving fibre optic modules, 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 Local displays.
 - .11 Event log memory chip.
 - .12 Historic event recorder.

1.4 REQUIREMENTS OF REGULATORY AGENCIES

- .1 System:
 - .1 To TB OSH Chapters 3-03 and 3-04.
 - .2 Subject to Fire Commissioner of Canada (FC) approval.
 - .3 Subject to FC inspection for final acceptance.
 - .4 To Canadian Forces Fire Marshal approval.
- .2 System components: listed by ULC and comply with applicable provisions of National Building Code, and meet requirements of local authority having jurisdiction.

1.5 SHOP DRAWINGS

- .1 Submit shop drawings in accordance with Section 01 00 10 – General Instructions.
- .2 Include:
 - .1 Detail assembly and internal wiring diagrams for control units.
 - .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.

1.6 CLOSEOUT SUBMITTALS

- .1 Provide operation and maintenance data for fire alarm system for incorporation into manual specified in Section 01 00 10 – General Instructions.

- .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.

1.7 WASTE MANAGEMENT AND DISPOSAL

- .1 Separate and recycle waste materials in accordance with Section 01 00 10 – General Instructions.
- .2 Remove from site and dispose of all packaging materials at appropriate recycling facilities.
- .3 Collect and separate for disposal all packaging material in appropriate on-site bins for recycling in accordance with Waste Management Plan.
- .4 Divert unused metal and wiring materials from landfill to metal recycling facility as approved by Departmental Representative.
- .5 Fold up metal banding, flatten and place in designated area for recycling.

1.8 DESIGNATED CONTRACTOR

- .1 Hire the services of Chubb Edwards or its authorized representative to complete the work of this section.

Part 2 Products

2.1 MATERIALS

- .1 Acceptable materials: the only acceptable materials are Chubb Edwards. System provider to match existing main building fire alarm system.
- .2 Equipment and devices: ULC listed and labelled and supplied by single manufacturer.
- .3 Power supply: to CAN/ULC-S524.
- .4 Audible signal devices: to ULC-S525.
- .5 Visual signal devices: to CAN/ULC-S526.
- .6 Control unit: to CAN/ULC-S527.
- .7 Manual pull stations: to CAN/ULC-S528.
- .8 Smoke detectors: to CAN/ULC-S529.
- .9 Thermal detectors: to CAN/ULC-S530.

2.2 SYSTEM OPERATION: SINGLE STAGE - SIGNALS ONLY

- .1 Actuation of any alarm initiating device to:
 - .1 Indicate zone of alarm at control unit display.
 - .2 Cause audible signalling devices to sound continuously throughout generator building.
 - .3 Transmit signal to main building fire alarm system.
 - .4 Cause air ventilation fans to shut down.
- .2 Acknowledging alarm: indicated at control unit.
- .3 Possible to silence signals by "alarm silence" switch at control unit, after 60s period of operation.
- .4 Subsequent alarm, received after previous alarm has been silenced, to re-activate signals.
- .5 Actuation of supervisory devices to:
 - .1 Cause electronic latch to lock in supervisory state at control unit.
 - .2 Indicate respective supervisory zone at control unit display.
 - .3 Cause audible signal at control unit to sound.
 - .4 Activate common supervisory sequence.
- .6 Resetting alarm 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 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.
- .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 Control Unit
 - .1 Suitable for DCLB 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 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.
 - .4 Integral power supply, battery charger and standby batteries.
 - .5 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.

- .6 Circuitry to continuously monitor communications and data processing cycles of microprocessor. Upon failure, audible and visual trouble indication to activate.
- .7 Fibre optic network module and summary alarm controls provided in control panel for remote summary annunciation.
- .8 Equipped with software routines to provide Event-Initiated-Programs (EIP); change in 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 On-board, 20-column, DC strip printer, thermal head with automatic paper take-up, and silent operation; operational while system is operating on standby power. Expanded font available for selected printing conditions.
- .11 Software to operate variable sensitivity addressable smoke detectors and annunciate their status and sensitivity settings at control panel.

2.4 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.

2.5 INITIATING/ INPUT CIRCUITS

- .1 Receiving circuits for alarm initiating devices such as manual pull stations, smoke detectors, heat detectors and fire protection system red in DCLA configuration to 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 DCLA configuration to control unit.

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- .5 Actuation of supervisory initiating device: cause system to operate as specified in "System Operation".

2.6 ALARM OUTPUT CIRCUITS

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

2.7 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 Two sets of separate contacts for elevator capture (to main floor of egress and to alternate floor of egress).
- .5 Upon resetting system, auxiliary contacts to return to normal or to operate as pre-programmed.
- .6 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 Control unit.
- .7 Auxiliary circuits: rated at 2 A, 24 Vdc or 120 Vac, fuse protected.

2.8 REMOTE ANNUNCIATION AT BUILDING

- .1 Main Fire Alarm System:
 - .1 Modify existing fire alarm system transponder. Provide network fibre modules to communicate with control panel in the exterior enclosures for annunciation of alarms, supervise and trouble.

2.9 WIRING

- .1 Twisted copper conductors: rated 300V.
- .2 To initiating circuits: 18 AWG minimum, and in accordance with manufacturer's requirements.
- .3 To signal circuits: 16 AWG minimum, and in accordance with manufacturer's requirements.
- .4 To control circuits: 14 AWG minimum, and in accordance with manufacturer's requirements.

2.10 MANUAL ALARM STATIONS

- .1 Manual alarm stations: pull lever, wall mounted semi-flush and surface type, non-coded single pole normally open contact for single stage bilingual signage.
- .2 Addressable manual pull station.
 - .1 Pull lever, surface and semi-flush wall mounted type, single action, single stage, 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.

2.11 AUTOMATIC ALARM INITIATING DEVICES

- .1 Heat detectors, fixed temperature, rated 57°C.
- .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 Smoke detector: photo-electric type
 - .1 Twistlock Plug-in type with fixed base.
 - .2 Wire-in base assembly with integral red alarm LED and terminals for remote relay alarm LED.
- .4 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 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.
- .5 Flame Detector
 - .1 Connect to fire alarm system using addressable input modules.
 - .2 Supervised wiring from input module to device.
 - .3 Local indicator alarm.
 - .4 Aim device as directed on site.
 - .5 Device to respond to open flame (diesel oil). Field of view 110°

2.12 AUDIBLE SIGNAL DEVICES

- .1 Bells: vibrating motorized type, gongs of special alloy steel, 24 V dc, 150 mm, 90 db.

2.13 VISUAL ALARM SIGNAL DEVICES

- .1 Strobe type: flashing, red, 24 V dc.

- .2 Designed for surface mounting on walls as indicated.

2.14 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 and remotely as indicated.

2.15 AS-BUILT RISER DIAGRAM

- .1 Fire alarm system riser diagram: in glazed frame minimum size 600 x 600 mm.

2.16 ANCILLARY DEVICES

- .1 Remote relay unit to initiate fan shutdown.

Part 3 Execution

3.1 INSTALLATION

- .1 Install systems in accordance with CAN/ULC-S524 and TB OSH Chapter 3-04.
- .2 Install control unit and connect to ac power supply and 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 1 m of air outlets. Maintain at least 600 mm radius clear space on ceiling, below and around detectors.
- .5 Connect alarm circuits to main control panel.
- .6 Install signal bells and visual signal devices and connect to signalling circuits.
- .7 Connect signalling circuits to main control panel.
- .8 Install end-of-line devices at end of alarm and signalling circuits.
- .9 Connect summary alarm and supervisory circuits to main building system
- .10 Install remote relay units to control fan shut down.
- .11 Fire suppression system: wire alarm and supervisory contacts and connect to control panel.
- .12 Connect fire suppression systems to control panel.
- .13 Splices are not permitted.
- .14 Provide necessary raceways, cable and wiring to make interconnections to terminal boxes, equipment and Control Unit, as required by equipment manufacturer.
- .15 Ensure that wiring is free of opens, shorts or grounds, before system testing and handing over.

- .16 Identify circuits and other related wiring at control unit, annunciators, and terminal boxes.

3.2 FIELD QUALITY CONTROL

- .1 Perform tests in accordance with Section 26 05 00 - Common Work Results for Electrical and CAN/ULC-S537.
- .2 Fire alarm system:
 - .1 Test such device and initiate alarm circuit to ensure field devices transmit alarm to control panel.
 - .2 Check annunciator panels to ensure zones are shown correctly.
 - .3 Simulate grounds and breaks on alarm and signalling circuits to ensure proper operation of systems.
 - .4 Addressable circuits system style DCLA:
 - .1 Test each conductor on all DCLA addressable links for capability of providing 3 or more subsequent alarm signals on each side of single open-circuit fault condition imposed near midmost point of 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 DCLA addressable links for capability of providing 3 or more subsequent alarm signals during ground-fault condition imposed near midmost point of each link. Operate Acknowledge/Silence switch after reception of each of the 3 signals. Correct imposed fault after completion of each series of tests.
 - .5 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.

3.3 DEMONSTRATION AND 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.

END OF SECTION