

Part 1 General

1.1 SECTION INCLUDES

- .1 Alarm control panel.
- .2 Zone expansion panels.
- .3 Initiating Devices.
- .4 Signaling devices.

1.2 RELATED SECTIONS

- .1 Section 08 71 00 - Door Hardware - General.
- .2 Section 26 05 19 - Building Wire and Cable.

1.3 REFERENCES

- .1 CAN/ULC-S303-M91(R1999) - Local Burglar Alarm Units and Systems.
- .2 CAN/ULC-S304-06 - Signal Receiving Centre and Premise Burglar Alarm Control Units.
- .3 ULC-306-03 - Intrusion Detection Units.
- .4 ULC-S318-96 - Power Supplies for Burglar Alarm Systems.
- .5 NFPA 730 - Guide for Premises Security, 2011 Edition.
- .6 NFPA 731 - Installation of Electronic Premises Security Systems, 2011 Edition.

1.4 SYSTEM DESCRIPTION

- .1 Intrusion Detection System: Protect building and selected areas from intrusion during SECURE hours.
 - .1 Exterior Windows:
 - .1 Detect status of operable windows using magnetic contacts.
 - .2 Exterior Doors:
 - .1 Detect status of doors using magnetic contacts.
 - .3 Interior Secured Spaces
 - .1 Detect motion using passive infrared (PIR) technology.

1.5 SUBMITTALS FOR REVIEW

- .1 Section 01 33 00: Submission procedures.
- .2 Product Data: Provide electrical characteristics and connection requirements.
- .3 Shop Drawings: Indicate system wiring diagram showing each device and wiring connection required.

1.6 SUBMITTALS FOR INFORMATION

- .1 Section 01 33 00: Submission procedures.

- .2 Test Reports: Indicate satisfactory completion of required tests and inspections.
- .3 Installation Data: Manufacturer's special installation requirements.
 - .1 Indicate application conditions and limitations of use stipulated by Product testing agency.
 - .2 Include instructions for storage, handling, protection, examination, preparation, installation, and starting of Product.

1.7 CLOSEOUT SUBMITTALS

- .1 Section 01 78 10: Submission procedures.
- .2 Maintenance Contracts: Provide service and maintenance of intrusion detection system for one (1) year from Date of Substantial Completion.
- .3 Operation Data: Operating instructions.
- .4 Maintenance Data: Maintenance and repair procedures.
- .5 Record Documentation: Record actual locations of initiating devices, signaling appliances, and end-of-line devices. Indicate all cable runs complete with identification scheme.

1.8 MAINTENANCE MATERIAL SUBMITTALS

- .1 Section 01 78 40: Maintenance and extra material requirements.
- .2 Extra Stock Materials:
 - .1 Provide six (6) keys of each type.

1.9 QUALITY ASSURANCE

- .1 Manufacturer Qualifications: Company specializing in manufacturing the Products specified in this section with minimum ten (10) years of experience and with service facilities within 160 km(100 miles) of Project.

1.10 REGULATORY REQUIREMENTS

- .1 Products: ULC listed and classified by CSA and as suitable for the purpose specified and indicated.

Part 2 Products

2.1 MANUFACTURERS

- .1 The system as described herein is based on a Bosch B Series intrusion alarm system.
- .2 Substitutions: Not permitted.

2.2 ALARM CONTROL PANEL

- .1 Control Panel: Modular construction with surface wall-mounted enclosure with adequate power supply to serve control panel modules, alarm signaling devices remote annunciator keypads, remote devices, and relays.

- .2 Include battery-operated emergency power supply with capacity for operating system in standby mode for twenty-four (24) hours.
- .3 System Supervision: Provide electrically-supervised system, with supervised alarm initiating and alarm signaling circuits. Component or power supply failure places system in AC fail condition.
- .4 Initiating Circuits: Supervised zone module with alarm and trouble indication.
- .5 Signal Circuits: Supervised zone coded signal module, sufficient for signal devices connected to system; occurrence of single ground or open condition places circuit in trouble mode and does not disable that circuit from transmitting alarm.
- .6 Remote Station Signal Transmitter: Electrically supervised, capable of transmitting alarm and trouble signals over building management Metasys System.
- .7 Auxiliary Relays: Provide sufficient SPDT auxiliary relay contacts for each detection zone to provide accessory functions specified.
- .8 System partitioning: System shall be logically separated (partitioned) to effectively protect the building's perimeter and all interior areas. Partition design should meet the following specifications:
 - .1 Perimeter partition for main library.
 - .2 Perimeter partition for mechanical room.
 - .3 Interior partition for main library.
 - .4 Interior partition for mechanical room.
 - .5 Each partition shall be capable of arming as "Stay" or "Away".
 - .6 Where separate partitions which should stay armed during normal business hours and used only under special conditions (e.g. mechanical rooms) shall be equipped with a separate audible notification device, and a provision for arming and disarming, and a provision for local temporary silencing of the audible notification device (if the partition is armed and disarmed remotely).
 - .7 Each partition shall have dedicated output points for Arm, Burg, System Trouble, Zone Fault, and Zone Tamper
 - .8 Each partition shall have a single audible notification device.
 - .9 The audible notification devices signal should not lose more than 40% of SPL at the most distant point due to attenuation, refraction, reverberation, etc.
 - .10 Perimeter partition should have external weather resistant audible and visual notification devices (e.g. sirens, light strobes, etc)
- .9 Alarm Sequence of Operation: Actuation of intrusion detecting device places system in alarm mode, which causes the following operations:
 - .1 Sound and display local alarm signaling devices with non-coded signal.
 - .2 Transmit zone-coded signal to building management Metasys System.
 - .3 Indicate location of actuated device on intrusion alarm keypad.
 - .4 Alarm Reset: Key-accessible reset function resets alarm system out of alarm if alarm initiating circuits have cleared.
 - .5 Lamp Test: Manual lamp test function causes alarm indication at each zone at remote annunciator keypad.

2.3 POWER SUPPLY AND ENCLOSURE

- .1 Control Panel: Modular construction with surface wall-mounted enclosure with adequate power supply to serve control panel modules, alarm signaling devices remote annunciator keypads, remote devices, and relays.

2.4 ARMING STATION

- .1 Arming Station shall consist of an Access Control Proximity Reader as per Section 28 13 00 Access Control, Intrusion Alarm Keypad and Device Vandal Guard.
- .2 Intrusion Alarm Keypad: Supervised intrusion alarm keypad complete with built-in tampers complete with backlit alpha-numeric keypad and LCD display including audible and visual indication of intrusion by zone, and audible and visual indication of system trouble.
 - .1 Product: Bosch...
- .3 Device Vandal Guard: Clear acrylic tamper resistant enclosure complete with opaque polystyrene wall plate, ring base, guard cover and tamper resistant tumbler lock. Outside dimensions 165mm(6-1/2inch)H x 190mm(7-1/2inch)W x 75mm(3inch)D.
 - .1 Product: Honeywell TG511A1000

2.5 INITIATING DEVICES

- .1 Motion Detector: Dual passive infrared (PIR) motion sensor complete with temperature compensation complete with RFI protection suitable for wall and ceiling mounting and up to 15m(50foot) x 18m(60foot) area of coverage. Swivel mounts are not acceptable.
 - .1 Product: Honeywell DT7550C
- .2 Door Contacts: Narrow gap recessed 1inch 2-wire magnetic door contacts.
 - .1 SPDT: Single pole double throw door contact for protected doors.
 - .2 DPDT: Double pole double throw door contact for protected doors monitored by both the intrusion alarm system and the access control system.
 - .3 Product: GE Security 1076 Series.

2.6 SIGNAL DEVICES

- .1 Interior Alarm Horn: Electric warbling tone, 125 mm(5 inch) siren. Sound Rating: 115 dB 3 m(10 ft).
- .2 Exterior Alarm Horn: Weather resistant electric warbling tone, 125 mm(5 inch) siren. Sound Rating: 115 dB 3 m(10 ft).

2.7 ENCLOSURES

- .1 Enclosures shall be complete with tamper switches and keyed lock access. Padlocks are not acceptable.
- .2 All locks shall be keyed alike.

2.8 WIRING

- .1 All wiring shall be premium quality stranded cable Belden or equal.

Part 3 Execution

3.1 INSTALLATION

- .1 Install to manufacturer's written instructions.
- .2 Install enclosures within IT Room on plywood backboards. Enclosures shall be mounted at an accessible height minimum 915mm(36inch) to maximum 1825mm(72inch) above finished floor.
- .3 Provide conduit for interconnection between all enclosures. All conduit shall be sized to allow a minimum of 40% future fill capacity. Minimum size conduit shall be 19mm(3/4inch) EMT.
- .4 Daisy chaining of devices is not permitted. Each device shall be home run back to the head end location.
- .5 Install power supply transformers in a dedicated enclosure each. Enclosures shall be located within the same room as the controllers and expander panels.
- .6 Power supplies shall be fed from a dedicated circuit. Circuit breaker shall be lockable in the on position. Each power supply shall be loaded to 70% capacity maximum nominal load.
- .7 Provide a 7/8inch hole in the front cover of the arming station vandal guard aligned with a 1/2inch hole made in the front cover of the intrusion alarm keypad to allow users access to the right scroll button the keypad.
- .8 The arming station devices shall be installed to heights indicated in section 26 05 00 and not more than 6inches apart.
- .9 Install door magnets within 1/4inch alignment with the door contact. Secure door contacts using a bracket or woodblock.
- .10 Use minimum 4/C 22 AWG minimum size conductors for door contact connections. Door contact cabling shall be recessed at all transition points from the wall, ceiling, basement, crawlspace, etc.
- .11 Install motion detectors with ceiling mounting brackets where indicated as ceiling mounted.
- .12 Use minimum 6/C 22 AWG minimum size conductors for motion detector connections.
- .13 Use minimum 10/C 18 AWG minimum size conductors for interconnection between main control panel and expansion panels.
- .14 All wiring shall be run in conduit. J-Hooks are permitted in accessible ceiling spaces not used as air supply/returns.
- .15 Cable splicing is not acceptable. All devices shall be home run.
- .16 Field devices shall be wired for four-state supervision. Terminations and connections shall be soldered.
- .17 All cables shall be uniquely and clearly identified at both ends. Labels shall be permanent, and not susceptible to thermal or mechanical influence.

- .18 Label cables in ascending order in a clockwise direction relative to the floor plans. The labelling sequence shall start at the device installed at the primary entrance to the building or partition.
- .19 Status changing field devices shall have DEOL (Double End Of Line) supervision.
- .20 Confirm wiring with manufacturer.
- .21 All wiring shall be in conduit.
- .22 Make conduit and wiring connections to door hardware devices provided under Section 08 71 00.

3.2 MANUFACTURER'S FIELD SERVICES

- .1 Section 01 78 10: Prepare and start components.
- .2 Include services of technician to supervise installation, adjustments, final connections, system testing, and City training.

3.3 DEMONSTRATION

- .1 Section 01 79 00: Systems demonstrations.
- .2 Demonstrate normal and abnormal modes of operation, and required responses to each.
- .3 Training and System Setup: Provide a minimum of ten(10)hours of training and system setup to Citys specific requirements. Provide sign-off sheet from City personnel to confirm acceptance of training and system setup.

END OF SECTION

Part 1 General

1.1 SECTION INCLUDES

- .1 Fire alarm control panels.
- .2 Fire alarm initiating and signaling devices.
- .3 Auxiliary fire alarm equipment and wiring.

1.2 RELATED SECTIONS

- .1 Section 08 71 00 - Door Hardware - General: Door closers, electric locks, electric releases.
- .2 Section 23 33 00 - Duct Work Accessories: Smoke dampers.
- .3 Section 26 05 00 - Common Work Results for Electrical
- .4 Section 26 05 19 - Building Wire and Cable.

1.3 REFERENCES

- .1 The latest version of the following including all amendments:
 - .1 CAN/ULC S524 - Standard for the Installation of Fire Alarm Systems.
 - .2 CAN/ULC S524 - Standard for the Installation of Fire Alarm Systems.
 - .3 CAN/ULC S525 - Audible Signal Devices for Fire Alarm Systems, Including Accessories.
 - .4 CAN/ULC S526 - Visible Signal Devices for Fire Alarm Systems.
 - .5 CAN/ULC S527 - Control Units for Fire Alarm Systems
 - .6 CAN/ULC S528 - Manual Pull Stations for Fire Alarm Systems.
 - .7 CAN/ULC S529 - Smoke Detectors for Fire Alarm Systems.
 - .8 CAN/ULC S530 - Heat Actuated Fire Detectors for Fire Alarm Systems.
 - .9 CAN/ULC S536 - Inspection and Testing of Fire Alarm Systems.
 - .10 CAN/ULC S541 - Speakers for Fire Alarm Systems, Including Accessories.
 - .11 ULC ORD-C386-1990 - Flame Detectors.

1.4 SYSTEM DESCRIPTION

- .1 Fire Alarm System: Manual and automatic, single stage addressable local fire alarm system with connections to remote monitoring station.
- .2 The Fire Alarm System shall consist of all necessary hardware equipment and software programming to perform the following functions:
 - .1 Fire alarm system detection and notification operations.
 - .2 Control and monitoring of door hold-open devices, and other equipment as indicated in the drawings and specifications.
 - .3 Transmission of signals to remote monitoring agency.

1.5 SUBMITTALS FOR REVIEW

- .1 Section 01 33 00: Submission procedures.
- .2 Product Data: Provide electrical characteristics and connection requirements.
- .3 Shop Drawings: Provide annunciator layout and system wiring diagram showing each device and wiring connection required.

1.6 SUBMITTALS FOR INFORMATION

- .1 Section 01 33 00: Submission procedures.
- .2 Test Reports: Indicate satisfactory completion of required tests and inspections.
- .3 Installation Data: Manufacturer's special installation requirements.
 - .1 Indicate application conditions and limitations of use stipulated by Product testing agency.
 - .2 Include instructions for storage, handling, protection, examination, preparation, installation, and starting of products.

1.7 CLOSEOUT SUBMITTALS

- .1 Section 01 78 10: Submission procedures.
- .2 Maintenance Contracts: Provide service and maintenance of fire alarm system for one (1) year from Date of Substantial Completion.
- .3 Operation Data: Operating instructions.
- .4 Maintenance Data: Maintenance and repair procedures.
- .5 Record Documentation: Record actual locations of initiating devices, signaling appliances, and end-of-line devices. Include zone number and device number for each device installed. Include circuit number for signalling appliances.

1.8 MAINTENANCE MATERIAL SUBMITTALS

- .1 Section 01 78 40: Maintenance and extra material requirements.
- .2 Extra Stock Materials:
 - .1 Provide six (6) keys of each type.
 - .2 Provide one (1) of the following devices:
 - .1 Addressable manual station
 - .2 Addressable heat detector
 - .3 Ceiling mounted smoke detector
 - .4 Wall mounted combination horn/strobe, standard cd rating
 - .5 Addressable multi-criteria fire/CO detector

1.9 QUALITY ASSURANCE

- .1 Design and install fire alarm system to CAN/ULC S524.

- .2 Manufacturer Qualifications: Company specializing in manufacturing the Products specified in this section with minimum fifteen (15) years documented experience and with service facilities within 160 km (100 miles) of Project.

1.10 REGULATORY REQUIREMENTS

- .1 Products Requiring Electrical Connection: Listed and classified by ULC and as suitable for the purpose specified and indicated.

Part 2 Products

2.1 MANUFACTURERS

- .1 The fire alarm system as described here-in is based on the Notifier NFS Series fire alarm system. Approved equals are: Simplex Grinnell, and Edwards.
- .2 Substitutions: Refer to Section 01 62 00.

2.2 FIRE ALARM AND SMOKE DETECTION CONTROL PANEL

- .1 Control Panel: CAN/ULC S527, modular construction with flush or surface wall-mounted enclosure.
- .2 Power supply: Adequate to serve control panel modules, door holders, relays, remote detectors, smoke dampers, remote annunciators, and alarm signaling devices. The control unit shall be connected to a supervised, dedicated 120V/15A dedicated circuit complete with a red, lockable circuit breaker. Utilize circuit as indicated.
- .3 Emergency power supply: Include battery-operated emergency power supply with capacity for operating the entire system in standby mode for twenty-four (24) hours followed by alarm mode for thirty (30) minutes. The emergency power supply shall be supervised for low battery or depleted battery condition, or disconnection of the battery.
- .4 System Supervision: Component or power supply failure places system in trouble mode.
- .5 Initiating Device Circuits: Supervised zone module with alarm and trouble indication; occurrence of single ground or open condition places circuit in trouble mode, but does not disable that circuit from initiating an alarm.
- .6 Indicating Appliance Circuits: Supervised signal module, sufficient for signal devices connected to system; occurrence of single ground or open condition places circuit in trouble mode but does not disable that circuit from signaling an alarm.
- .7 Remote Station Signal Transmitter: Electrically supervised alarm communicator transmitter, capable of transmitting alarm and trouble signals to building management Metasys System. Typical transmitter arrangement to include ALARM, TROUBLE, SUPERVISORY, and CO DETECTION.
- .8 Auxiliary Relays: Provide sufficient SPDT auxiliary relay contacts to provide accessory functions specified.
- .9 Switches: Provide TROUBLE ACKNOWLEDGE, DRILL, PUBLIC/Common ALARM SILENCE, PUBLIC/Common VISUAL ALARM switches.
- .10 System Trouble Sequence of Operation: System or circuit trouble places system in trouble mode, which causes the following system operations:

- .1 Visual and audible trouble alarm indicated by zone at fire alarm control panel.
 - .2 Visual and audible trouble alarm indicated by zone at remote annunciator panel.
 - .3 Trouble signal transmitted to central station equipment.
 - .4 Indicate location of trouble zone on fire alarm control panel and on remote annunciator panel.
 - .5 Manual acknowledge function at fire alarm control panel silences audible trouble alarm; visual alarm is displayed until initiating failure or circuit trouble is cleared.
- .11 Alarm Sequence of Operation: Actuation of initiating device places circuit in alarm mode, which causes the following system operations:
- .1 Sound and display local fire alarm signaling devices with signal.
 - .2 Transmit signal to central station equipment.
 - .3 Indicate location of alarm zone on fire alarm control panel and on remote annunciator panel.
 - .4 Transmit signal to building mechanical systems to initiate shutdown of fans and damper operation.
- .12 Alarm Reset: System remains in alarm mode until manually reset with key-accessible reset function; system resets only if initiating circuits are out of alarm mode.
- .13 Lamp Test: Manual lamp test function causes alarm indication at each zone at fire alarm control panel and at annunciator panel.
- .14 Drill Sequence of Operation: Manual drill function causes alarm mode operation as described above.
- .15 Zoning: As indicated.
- .16 History Logs: The system shall provide a means to recall alarms and trouble conditions in chronological order for the purpose of recreating an event history. A separate alarm and trouble log shall be provided.
- .17 Recording of Events: The system shall be capable of recording all alarm, supervisory, and trouble events by means of system printer. The printout shall include the type of signal (alarm, supervisory, or trouble) the device identification, date and time of the occurrence. The printout shall differentiate alarm signals from all other printed indications.

2.3 INITIATING DEVICES

- .1 Manual Station: Non-coded type, double action manual station with key-operated reset lock constructed of red-colored polycarbonate. The station shall be designed that after emergency operation they cannot be restored to normal without key. Provide manufacturer's standard backbox.
 - .1 Addressable manual station shall be complete with loop polling LED (Green), and shall be equal to Notifier NBG-12LX.
 - .2 Non-Addressable manual station shall be equal to Notifier NBG-12. Non-Addressable stations shall be used in crawlspaces only, or as indicated. Connect to addressable zone module as indicated.

- .2 Heat Detector: Combination rate-of-rise and fixed temperature, rated 57 degrees C (135 degrees F) and temperature rate of rise of 8.3 degrees C (15 degrees F).
 - .1 Addressable heat detector shall be complete with inter-changeable plug-in base and loop polling LED (Green), and shall be equal to Notifier FST-851A.
 - .2 Non-Addressable moisture-proof heat detector shall be equal to Mircom CR-135-MP. Non-Addressable, moisture-proof heat detectors shall be used in crawlspaces only, or as indicated. Connect to addressable zone module as indicated.
- .3 Ceiling Mounted Smoke Detector: Addressable photoelectric type with adjustable sensitivity with inter-changeable plug-in base and loop polling LED (Green). LED shall provide (Red) visual indication of detector actuation. Provide auxiliary relay contact as indicated. Provide sounder bases as indicated. Smoke detector shall be equal to Notifier FSP-851A.
- .4 Ceiling Mounted Combination Smoke Detector and Fixed Temperature Heat Detector: Addressable photoelectric type smoke detector with adjustable sensitivity with inter-changeable plug-in base and loop polling LED (Green). LED shall provide (Red) visual indication of detector actuation. Fixed temperature shall be rated 57 degrees C (135 degrees F). Provide auxiliary relay contact as indicated. Provide sounder bases as indicated. Smoke detector shall be equal to Notifier FSP-851TA.
- .5 Duct Mounted Photoelectric Smoke Detector: Addressable photoelectric type with key-operated NORMAL-RESET-TEST switch, duct sampling tubes extending width of duct, and visual indication of detector actuation, in duct-mounted housing. Provide auxiliary relay contact as indicated. Housing shall be complete with tamper signal and shall be suitable to mount on square or rectangular duct. Provide addressable relay. Duct smoke detector shall be equal to Notifier DNR series.
- .6 Multi-Criteria Fire/CO Detector: Addressable combination detector combines smoke, CO, light/flame, and heat sensing technology in one device with adjustable sensitivity settings, and loop polling LED (Green). LED shall provide (Red) visual indication of detector actuation. Unit shall be complete with separate CO detection signal, and built-in CO cell end-of-life warning and fault. Provide dual sounder bases as indicated with separate audible signals for fire or CO alarm. Multi-Criteria Fire/CO Detector shall be equal to Notifier FCO-851(A).
- .7 Stand-Alone CO Detector: Non-Addressable complete with an audible and visual alarm, test/silence switch, built-in CO cell end-of-life warning and alarm/trouble relay outputs connected to an addressable zone module. The detector shall be suitable for wall or ceiling mounting. CO detector shall be equal to System Sensor CO1224A.

2.4 SIGNALING APPLIANCES

- .1 Alarm Horns and Strobes: The signalling device shall be 2-wire, and shall operate at 24VDC. Horn sound rating shall be rated at a sound level of at least 95dB at 3m (10ft). Horn tones and volume shall be field adjustable by way of integral switch. Strobe candela (cd) rating shall be field adjustable by way of integral switch. Standard strobe cd shall be field adjustable from 15 – 115cd. High cd strobes shall be field adjustable from 135 – 185cd. Provide ceiling or wall mounted, standard or high cd, indoor or outdoor units as indicated. All devices shall be red in color. Alarm horns and strobes shall be equal to Notifier SpectrAlert Advance series.

- .2 Interior Remote Annunciator: Provide semi-flush mounted, lockable supervised remote annunciator(s) complete with minimum eighty (80) character backlit LCD display. The annunciator(s) shall display all alarm, trouble and supervisory conditions in the system and will provide an audible indication of the alarm. The annunciator shall include control switches for SYSTEM ACKNOWLEDGE, SIGNAL SILENCE, DRILL and SYSTEM RESET. Include LED's for ALARM, TROUBLE, SUPERVISORY, and CO DETECTION.

2.5 AUXILIARY DEVICES

- .1 Door Release: Magnetic door holder with integral diodes to reduce buzzing. Coil voltage 24 VDC.
- .2 Door Release: Door closer as specified in Section 08 71 00.

2.6 FIRE ALARM WIRE AND CABLE

- .1 Fire Alarm Power Branch Circuits: Building wire as specified in Section 26 05 19.
- .2 Initiating Device and Indicating Appliance Circuits: Power limited fire-protective signaling cable classified for fire and smoke characteristics, copper conductor, 300 volts insulation rated 105 degrees C, suitable for use in air handling ducts, hollow spaces used as ducts, and plenums.
- .3 Wiring shall be as per manufacturer's recommendations. All wiring shall be in conduit unless noted otherwise.

Part 3 Execution

3.1 INSTALLATION

- .1 Install products to manufacturer's written instructions and CAN/ULC S524, local and national codes, as indicated, and as recommended by the manufacturer.
- .2 All initiating and signalling devices, control panels and remote annunciators shall be flush mounted unless indicated otherwise.
- .3 Install devices at heights indicated in Section 26 05 00.
- .4 Mount end-of-line devices in separate box adjacent to last device in circuit.
- .5 Mount outlet box for electric door holder to withstand 36 kg (80 lbs) pulling force.
- .6 Make conduit and wiring connections to duct smoke detectors.
- .7 Circuiting for fire alarm devices shall be as follows:
 - .1 Provide Class "A" addressable initiating/alarm circuits throughout unless indicated otherwise.
 - .2 Provide Class "B" audible/visual signal circuits for signal circuits throughout unless indicated otherwise.
 - .3 Provide Class "A" audible/visual signal circuits for residential dwelling unit signal circuits only.
 - .4 Circuits shall have a minimum 15% spare capacity for future system expansion.

- .5 All SLC, signal and power riser wiring shall be supervised, including internal wiring between modules.
- .8 Where wiring is required to be surface mounted within finished areas, wiring shall be installed in a single piece metal raceway unless noted otherwise. Color of raceway shall be white unless noted otherwise.
- .9 Where devices are surface mounted in finished areas, provide a surface mounted metal raceway device box. Color of box shall match the device.
- .10 Branch circuit breakers supplying fire alarm equipment shall be red in color from factory and shall be lockable in the "ON" position. Painted circuit breakers are not acceptable. A red lamacoid nameplate shall be affixed on the electrical adjacent the associated circuit breaker indicating "FIRE ALARM PANEL" or other approved wording.

3.2 FIELD QUALITY CONTROL

- .1 Section 01 45 00: Field inspection and testing.
- .2 Test to CAN/ULC S536 and local inspection authority requirements.
- .3 Include services to re-test system one (1) month prior to

3.3 MANUFACTURER'S FIELD SERVICES

- .1 Section 01 78 10: Prepare and start components.
- .2 Include services of certified technician to supervise installation, adjustments, final connections, and system testing.

3.4 FIRE ALARM WIRE AND CABLE COLOUR CODE

- .1 Power Branch Circuit Conductors: [Black, red, white].
- .2 Initiating Device Circuit: [Black, red].
- .3 Detector Power Supply: [Violet, brown].
- .4 Signal Device Circuit: [Blue (positive), white (negative)].
- .5 Door Release: [Grey, grey].
- .6 Municipal Trip Circuit: [Orange, orange].
- .7 Municipal Fire Alarm Loop: [Black, white].

3.5 CLOSEOUT ACTIVITIES

- .1 Demonstration: Demonstrate normal and abnormal modes of operation, and required responses to each.

END OF SECTION