

PART 1 - GENERAL

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| <u>1.1 SIMPLEX SYSTEM DESCRIPTION</u> | .1 | Modify the existing Senstar 100 alarm reporting security system located at the facility's main communications and control post (MCCP) in building #1 as required to include the additional alarm contacts. Include the required services install additional contact points. |
| <u>1.2 SHOP DRAWINGS</u> | .1 | Submit component shop drawings for approvals in accordance with Section 01 33 00. |
| | .2 | Riser diagrams showing the layout of the planned system must also be submitted to the Departmental Representative for approval. |

PART 2 - PRODUCTS

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| <u>2.1 INTRUSION ALARM CONTROL PANEL</u> | .1 | The Senstar 110 intrusion alarm control panel is to be rack mounted in the "Security Rack" as indicated on the drawings and is to have the following features:
.1 Addressable loop zones.
.2 Battery backup for 48 hours. |
| <u>2.2 DOOR CONTACT</u> | .1 | Door contacts are to be recessed, triple bias type, GE Sentrol 2700 series or equivalent. |

PART 3 - EXECUTION

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| <u>3.1 EQUIPMENT INSTALLATION</u> | .1 | Ensure that every system component is installed according to manufacturer's recommendations, all specifications herein and as indicated on the drawings. |
| <u>3.2 SYSTEM WIRING</u> | .1 | As per the latest edition of the Canadian Electrical Code. |
| | .2 | All wiring must be FT-6, insulated (1 x 2K#18 AWG) copper LVT cables with jacket coloured in accordance |
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- 3.2 SYSTEM WIRING (Cont'd) .2 (Cont'd)
with Section 26 05 00. Size as indicated on the Project Drawings.
- .3 No cable is to be apparent after installation.
- .4 Maximum length of security cable drop between flush installed ceiling device box and associated junction box within the same ceiling space is not to be greater than 1500mm.
- .5 All wiring/cabling is to be installed in conduit, unless noted otherwise.
- 3.3 EQUIPMENT TEST .1 At the end of the installation, make all necessary tests in the presence of the manufacturer's representative and Departmental Representative.
- .2 Demonstrate successful operation of the system.
- .3 Upon system user approval of the installed system, a one (1) year warranty on parts will be in effect.
- .4 Provide system user with a written list of equipment warranty periods.
- 3.4 PROGRAMMING AND TRAINING .1 Provide the initial system software programming, customizing and data entry.
- .2 Provide for two (2) days of programming.
- .3 Provide for one (1) day of training.
- 3.5 SYSTEM DRAWINGS AND MANUALS .1 Provide three (3) copies of system operation and technical manuals for inclusion into Building Operation and Maintenance Manuals.
- .2 At the close of installation, provide Contractor "Record Drawings" on the wiring/cabling, networks and system components.
- 3.6 VERIFICATION .1 Verify that the equipment installed meets the specifications and what is indicated on the drawings.
- .2 Verify wiring connections to all equipment meets applicable codes and standards.
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| 3.6 VERIFICATION
(Cont'd) | .3 | Verify the operation of all devices. |
| | .4 | Verify the wiring/cabling to all equipment is complete. |
| | .5 | Provide a copy of manufacturer technician's report to system users. |
| | .6 | Issue a certificate confirming the completion of the verification. This certificate is to be inserted into the Building Operations and Maintenance Manuals. |

PART 1 - GENERAL

- 1.1 RELATED WORK
- .1 Wiring: Section 26 05 21
 - .2 Conduits: Section 26 05 34
- 1.2 REFERENCES
- .1 CAN/ULC-S524-1991, Installation of Fire Alarm Systems.
 - .2 ULC-S525-1978, Audible Signal Appliances for Fire Alarm.
 - .3 CAN/ULC-S527-M99, 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-M97, Inspection and Testing of Fire Alarm Systems.
 - .8 CAN/ULC-S537-M97, Verification of Fire Alarm Systems.
 - .9 NBC, National Building Code of Canada.
- 1.3 SYSTEM DESCRIPTION
- .1 The existing facility's fire alarm system is manufactured and maintained by Simplex. The new WMF fire alarm system must communicate with the remainder of the facility fire alarm system via a two (2) pair fiber interface and report all pertinent data including, but not limited to: trouble, alarm and supervisory events including device addresses and zones to the facility's reporting software located at the facilities main communications and control post (MCCP) in building #1. Include all peripheral devices and programming required to provide a fully functional system.
 - .2 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.
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| 1.3 SYSTEM DESCRIPTION
(Cont'd) | .3 | 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 monitoring agency. |
| | .4 | Zoned, non-coded two stage. |
| | .5 | Modular in design to allow for future expansion. |
| | .6 | Operation of system shall not require personnel with special computer skills. |
| | .7 | System to include: <ul style="list-style-type: none"> .1 Central Control Unit with power supply, stand-by batteries, central processor with microprocessor and logic interface, main system memory, 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 signaling devices. .9 End-of-line resistors. .10 LCD annunciation and control panel. .11 Dual line dialer. .12 Fibre network interface. |
| 1.4 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. |
| 1.5 SHOP DRAWINGS | .1 | Submit shop drawings in accordance with Section 01 33 00. |
| | .2 | Include: <ul style="list-style-type: none"> .1 Detail assembly and internal wiring diagrams for control units and Auxiliary cabinets. .2 Overall system riser wiring diagram identifying control equipment, initiating zones, signaling circuits; identifying terminations, terminal numbers, conductors and raceways. .3 Details for devices. |

- 1.5 SHOP DRAWINGS (Cont'd) .2 Include:(Cont'd)
- .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 OPERATION AND MAINTENANCE DATA .1 Provide operation and maintenance data for fire alarm system for incorporation into manual specified in Section 01 78 00.
- .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.
- 1.7 MAINTENANCE .1 Provide one (1) year's free maintenance and monitoring with two inspections by manufacturer during warranty period. Inspection tests to conform to CAN/ULC-S536. Submit inspection report to Departmental Representative.
- .2 Provide individual price on tender form for temporary program changes during construction period, to include zone labels, control functions, system operation.
- 1.8 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.
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PART 2 - PRODUCTS

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| <u>2.1 MATERIALS</u> | .1 | Equipment and devices: ULC listed and labelled and supplied by single manufacturer. |
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| <u>2.2 SYSTEM
OPERATION TWO
STAGE SIGNALS ONLY</u> | .1 | Actuation of any one (1) alarm initiating device to:
.1 Cause electronic latch to lock-in alert state at central control unit and data gathering panel/transponder for five (5) minutes.
.2 Indicate zone of event at central control unit.
.3 Cause an audible and visual signal from signaling throughout building and at central control unit for five (5) minutes.
.4 Transmit signal to Building Automation System network via addressable output. |
| | .2 | Upon completion of "alert" sequence or actuation of a second initiating device during "alert" sequence to:
.1 Cause electronic latch to lock-in alarm state at central control unit and data gathering panel transponder.
.2 Indicate zone of alarm at central control unit.
.3 Cause audible and visual "alarm" signal from signaling devices 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. |
| | .3 | Acknowledging alert: key activation at pull station in same zone causing an "alert" event. |
| | .4 | Acknowledging alarm: indicated at central control unit. |
| | .5 | Possible to silence signals by "alarm silence" switch at control unit, after 60 s period of operation. |
| | .6 | Subsequent events, received after previous alarm has been silenced, to re- activate signals. |
| | .7 | Actuation of supervisory devices to:
.1 Indicate respective supervisory zone at central control unit and at the graphic annunciator.
.2 Cause audible signal at central control unit to sound.
.3 Activate common supervisory sequence. |

2.2 SYSTEM
OPERATION TWO
STAGE SIGNALS ONLY
(Cont'd)

- .8 Resetting alarm and supervisory device not to return system indications/functions back to normal until control unit has been reset.
- .9 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.
- .10 Trouble on system: suppressed during course of alarm.
- .11 Trouble condition on any circuit in system not to initiate alarm conditions.

2.3 CONTROL PANEL

- .1 Central control unit (CCU):
 - .1 Suitable for DCLA and 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 Minimum capacity of 250 addressable monitoring and 250 addressable control/signal points per loop.
 - .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 TVSS 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.
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- 2.3 CONTROL PANEL .1 (Cont'd)
- (Cont'd)
- .8 Support up to two (2) RS-232-C I/O ports. CCU output: parallel ASCII with adjustable baud rates to allow interface of any commercially available printer, terminal or PC.
- .9 Equipped 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.
- .10 Software and hardware to maintain time of day, day of week, day of month, month and year.
- .11 Software to operate variable sensitivity addressable smoke detectors and annunciate their status and sensitivity settings at control panel.
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- 2.4 POWER .1 120 V, 60 Hz as primary source of power for system.
- SUPPLIES
- .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 TVSS protected point integral to fire alarm panel to be provided for power source termination.
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- 2.5 INITIATING/ .1 Receiving circuits for alarm initiating devices such
- INPUT CIRCUITS
- .2 Alarm receiving circuits (active and spare): compatible with smoke detectors and open contact devices.
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2.5 INITIATING/
INPUT CIRCUITS
(Cont'd)

- .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 central control unit.
- .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 central control unit.
 - .1 Signal circuits' operation to follow system programming; capable of sounding bells horns and strobes continuously at 20 spm. 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.

2.7 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.

2.8 WIRING

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

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| 2.8 WIRING
(Cont'd) | .4 | To control circuits: 14 AWG minimum, and in accordance with manufacturer's requirements. |
| | .5 | All wiring to be in approved conduit system. Initiating and signalling wiring to be installed in separate conduit. |
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| 2.9 MANUAL ALARM STATIONS | .1 | Addressable manual pull station.
.1 Pull lever, semi-flush wall mounted type, single action, dual 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 | Standard of Acceptance: Simplex 4099-9001CB Series. |
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| 2.10 AUTOMATIC ALARM INITIATING DEVICES | .1 | Addressable thermal fire detectors, combination fixed temperature of 57 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 | 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. Duct mounted detectors to come complete with relay base for fan shut down.
.7 Standard of Acceptance: Simplex 4098-9714 Series. |
| | .3 | Addressable Interface Modules (AIM).
.1 To provide ability to communicate with CCU for sprinkler supervisory devices and other equipment which would otherwise be unaddressed.
.2 Provide as indicated and as coordinated on-site with sprinkler system installed.
.3 Standard of Acceptance: Simplex 4090-9002 Series. |
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2.10 AUTOMATIC ALARM INITIATING DEVICES (Cont'd)	.4	Addressable Relays. .1 To allow the CCU to selectively monitor and control equipment. .2 Provide as indicated. .3 Standard of Acceptance: Simplex 4099-9001CB Series.
2.11 SIGNALLING DEVICES	.1	Combination horn/strobe unit.
	.2	Surface mounted, red in colour.
	.3	High-low dB setting.
	.4	Selectable candila output.
	.5	Standard of Acceptance: Simplex.
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 ANCILLARY DEVICES	.1	Remote relay unit to initiate equipment shutdown, as indicated.
2.14 STANDARD OF ACCEPTANCE	.1	Simplex 4100ES Series.
PART 3 - EXECUTION		
3.1 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 circuit wiring.
	.4	Locate and install detectors and connect to alarm circuit wiring. Do not mount detectors within 1m of air outlets. Maintain at least 600mm radius clear

3.1 INSTALLATION
(Cont'd)

- .4 (Cont'd)
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.
- .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, elevator and shunt trips.
- .12 Sprinkler system: wire alarm and supervisory switches and connect to control panel as indicated.
- .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 Provide all programming required at the facility's MCCP. Site graphics and communication are to be updated as required to include the new WMF.

3.2 FIELD QUALITY
CONTROL

- .1 Perform tests in accordance with Section 26 05 00 - 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,

- 3.2 FIELD QUALITY .2 Fire alarm system:(Cont'd)
CONTROL
(Cont'd)
- .1 (Cont'd)
sprinkler system transmit alarm to control panel and actuate general alarm and ancillary devices.
 - .2 Check annunciator panels to ensure zones are shown correctly.
 - .3 Simulate grounds and breaks on alarm and signaling circuits to ensure proper operation of systems.
 - .4 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 three (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 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 Departmental Representative upon completion of all testing.
 - .5 Confirm transmission of signals to ULC monitoring agency.