

SECTION 28 16 00

INTRUSION DETECTION SYSTEM

(Part of the Work for Section 260001)

PART 1 - GENERAL

1.1 GENERAL PROVISIONS

- A. Attention is directed to the GENERAL REQUIREMENTS AND COVENANTS - DIVISION I, and the SPECIAL PROVISIONS - DIVISIONS IIA and IIB, which are hereby made a part of this Specification Section.
- B. Examine all Drawings and all Sections of the Specifications for requirements and provisions affecting the Work of this Section.

1.2 TRADE CONTRACT REQUIREMENTS

- A. Work of this Section is part of the Electrical Trade Contract. Refer to Section 26 00 00 "Electrical Trade Contract Requirements" for additional information about this Trade Contract.

1.3 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.4 SUMMARY

- A. Provide combination intrusion detection control panels, including engineering, components, installation and commissioning.
- B. The Owner will be responsible for the monitoring agreement with an alarm service provider.
- C. Related Sections

- 1. Section 08 71 00 Door Hardware
- 2. Division 21 Fire Suppression
- 3. Division 26 Electrical
- 4. Division 27 Communications
- 5. Division 28 Electronic Safety and Security

1.5 ACTION SUBMITTALS

- A. Product Data: For each type of process and factory-fabricated product. Indicate component materials and dimensions and include construction and application details.

1.6 REFERENCES

INTRUSION DETECTION SYSTEM

- A. Reference Standards: Provide systems which meet or exceed the requirements of the following publications and organizations as applicable to the Work of this Section:
1. Underwriters Laboratories Inc. (UL):
 - a. UL 365: Police Station Connected Burglar Alarm Units and Systems.
 - b. UL 609: Local Burglar Alarm Units and Systems.
 - c. UL 611: Central Station Burglar-Alarm Units.
 - d. UL 636: Holdup Alarm Units and Systems.
 - e. UL 684: Local, Central Station, and Remote Station.
 - f. UL 1023: Household Burglar-Alarm System Units.
 - g. UL 1076: Proprietary Burglar-Alarm Units and Systems.
 - h. UL 1610: Central-Station Burglar-Alarm Units.
 2. Federal Communications Commission (FCC):
 - a. Code of Federal Regulations Title 47: Part 15: Radio Frequency Devices.
 - b. Code of Federal Regulations Title 47: Part 68: Connection of Terminal Equipment to the Telephone Network.

1.7 SYSTEM DESCRIPTION

- A. The system shall be fully integrated with the access control system through bi-directional communication.
1. Integration between the systems shall maintain UL compliance for the intrusion detection system. The Security Subcontractor shall wire devices to the system ensuring that UL certification is maintained.
- B. Intrusion Detection Control Panels
1. Listed for UL Commercial Burglary
 2. Supports up to 250 zones.
 3. Supports up to 8 separate partitions.
 4. Supports up to 250 users.
 5. Supports commercial wireless devices.
 6. Provides integrated security, access control, and CCTV switching capability.
 7. Provides supervision of peripheral devices.
 8. Supports up to 96 optional relay outputs.

9. Supports long-range radio (LRR) communication.
10. Provides scheduling capability to allow for automated operations.
11. Supports alarm reporting via Internet.
12. Interfaces with automation software.

1.8 SUBMITTALS

- A. Manufacturer's Product Data: Submit manufacturer's data sheets indicating systems and components proposed for use, including instruction manuals.
- B. Shop Drawings: Submit complete shop drawings including connection diagrams for interfacing equipment, list of connected equipment, and locations for major equipment components.
- C. Record Drawings: During construction maintain record drawings indicating location of equipment and wiring. Submit an electronic version of record drawings not later than Substantial Completion of the project.
- D. Operation and Maintenance Data: Submit manufacturer's operation and maintenance data, customized to the system installed. Include system and operator manuals.
- E. Field Tests: Submit results of field-testing of every device including date, testing personnel, retesting date if applicable, and confirmation that every device passed field testing.
- F. Maintenance Service Agreement: Submit a sample copy of the manufacturer's maintenance service agreement, including cost and services for a one-year period for Owner's review. Maintenance shall include, but not be limited to, labor and materials to repair the system, provide test and adjustments, and regular inspections.

1.9 DESCRIPTION OF WORK

- A. General Requirements
 1. Provide labor, materials, tools, equipment, and services for a complete security system as indicated and in accordance with provisions of the contract documents.
 2. Although such work is not specifically indicated, provide supplementary or miscellaneous items, and devices incidental to or necessary for a sound, secure and complete installation.
 3. All system devices and components included shall be compatible.
 4. Units of the same type of equipment shall be products of a single manufacturer. Material and equipment shall be new and currently in production. Each major component of equipment shall have the manufacturer's model and serial number in a conspicuous place.

1.10 SYSTEM PERFORMANCE

- A. Control Panel: The control panel shall be an 8-partition, UL commercial and burglary control panel that supports up to 250 zones using basic hardwired, polling loop, and wireless zones, RF receivers, and relay modules. The control shall provide the ability to schedule time-driven events, and allow certain operations to be automated by pressing a single button. The system shall be capable of interfacing with an ECP long-range radio (LRR) unit that can send Contact ID messages.
- B. Intrusion Detection System components shall be connected using the following Cables:
- a. Keypads use four conductor, 22AWG or 18AWG, non-shielded cable:
 - b. Zone Expanders shall connect to a data bus using two conductor, 18AWG, non-shielded cable
 - c. Fire detection devices and two wire fire detection devices connect using two conductor, 18AWG, non-shielded fire alarm cable
 - d. Four wire fire detection devices connect using four conductor, 18AWG, non-shielded fire alarm cable
 - e. Unpowered detection devices connect to zone inputs using two conductor, 22AWG, non-shielded cable
 - f. Powered detection devices connect to zone inputs using four conductor, 18AWG, non-shielded cable
 - g. The Bell output shall use two conductor, 16AWG, non-shielded cable
 - h. Power connections for control panels shall be made using two conductor, 16AWG, non-shielded cable.
 - i. Ground connections to control panels shall be made using 14AWG solid insulated copper ground wire.
2. Basic Hardwired Zones: Control shall provide 8 style-B hardwire zones with the following characteristics:
- a. EOLR supervision (optional for zones 2-8) shall support N.O. or N.C. sensors (EOLR supervision required for UL installations).
 - b. Zones/Points shall be individually assignable to a partition.
 - c. Supports up to 16 two-wire smoke detectors on zone 1.
 - d. Supports four-wire smoke or heat detectors on a zone (power to four-wire smoke detectors must be supervised with an EOL device).
3. Optional Expansion Zones:
- a. Polling Loop Expansion: Control shall support up to 120 additional hardwire zones using a built-in two-wire polling (multiplex) loop interface. The polling

loop shall provide power and data to remote point modules, and constantly monitor the status of zones on the loop. Maximum current draw shall not exceed 128 mA. The polling loop zones shall have the following characteristics:

- 1) Interface with RPM (Remote Point Module) devices that provide Class B, Style Y (e.g., 4208U/4208SN) or a combination of Class B, Style Y, and Class A, Style Z (e.g., 4208SNF) zones.
 - 2) Individually assignable to one of 8 partitions.
 - 3) Supervised by the control panel.
 - 4) A 12,000 ft (3658 m) wire run capability without using shielded cable.
 - 5) Each RPM (Remote Point Module) enclosure shall be tamper protected.
- b. Wireless Expansion Zone: Control shall support up to 250 wireless zones using a (fewer if using hardwire and/or polling loop zones). Wireless zones shall have the following characteristics:
- 1) Supervised by control panel for check-in signals (except certain non-supervised transmitters).
 - 2) Tamper-protection for supervised zones.
 - 3) Individually assignable to one of 8 partitions.
 - 4) Individually assignable to bell outputs and/or auxiliary relays.
 - 5) Support wireless devices listed for Commercial Burglary using the 5881ENHC RF Receiver.
4. Partitions: Control shall provide the ability to operate 8 separate areas, each functioning as if it had its own control. Partitioning features shall include:
- a. A Common Lobby partition (1-8), which can be programmed to perform the following functions:
 - 1) Arm automatically when the last partition that shares the common lobby is armed.
 - 2) Disarm when the first partition that shares the common lobby is disarmed.
 - b. A Master partition (9), used strictly to assign keypads for the purpose of viewing the status of 8 partitions at the same time (master keypads).
 - c. Assignable by zone.
 - d. Assignable by keypad/annunciator.
 - e. Assignable by relay to one or 8 partitions.

- f. Ability to display burglary and panic and/or trouble conditions at partitions' keypads.
 - g. Certain system options selectable by partition, such as entry/exit delay and subscriber account number.
5. User Codes: Control shall accommodate 250 user codes, of which can operate on partitions. Certain characteristics must be assigned to each user code, as follows:
- a. Authority level (Master, Manager, or several Operator levels). Each User Code (other than the installer code) shall be capable of being assigned the same or a different level of authority for each partition that it will operate.
 - b. Opening/Closing central station reporting option.
 - c. Specific partitions that the code can operate.
 - d. Global arming capability (ability to arm partitions the code has access to in one command).
 - e. Use of an RF (button) to arm and disarm the system (RF key must first be enrolled into the system).
6. Peripheral Devices: Control shall support up to 30 addressable ECP devices, which can be a combination of keypads, RF receivers, relay modules, and interactive phone module. Peripheral devices have the following characteristics:
- a. Each device set to an individual address according to the device's instructions.
 - b. Each device enabled in system programming.
 - c. Each device's address shall be supervisable (via a programming option).
7. Keypad/Annunciator: Control shall accommodate up to 16 keypads or six (6) touch-screen (i.e.; advanced user interface) keypads. The keypads shall be capable of the following
- a. Performing system arming and disarming functions.
 - b. Being assigned to a partition.
 - c. Providing four programmable single-button function keys, which can be used for:
 - 1) Panic Functions: activated by wired and wireless keypads; reported separately by partition.
 - 2) Keypad Macros: 32 keypad macro commands per system (each macro is a series of keypad commands). Assignable to the A, B, C, and D keys by partition.

8. Optional Output Relays: A total of 96 relay outputs shall be accommodated using relay modules. Each relay module shall provide four (4) Form C (normally open and normally closed) relays for general-purpose use. The relays shall be capable of being:
 - a. Programmed to activate in response to system events.
 - b. Programmed to activate using time intervals.
 - c. Activated manually.
 - d. Assigned an alpha descriptor.
 - e. A combination of 4204 (ECP) and 4101SN (polling loop) relays.
9. The system shall be integrated with the Access Control System: Control shall be capable of the following:
 - a. Providing a command that activates relays to allow access doors to open (e.g., lobby door), and lights to be turned on or off.
 - b. Assigning a number of access control relays to each partition (up to 96 for the system).
 - c. Supporting up to 500 access cardholders.
10. Commercial Wireless Equipment: Control shall be compatible with UL Listed Commercial Wireless Security equipment.
11. Voltage Triggers: System shall provide voltage triggers, which change state for different conditions. Used with devices such as a remote keypad sounder or keyswitch ARMED and READY LEDs.
12. Event Log: System shall maintain a log of different event types (enabled in programming). The event log shall provide the following characteristics:
 - a. Stories up to 1000 events.
 - b. Viewable at the keypad or through the use of Compass software.
 - c. Printable on a serial printer, including zone alpha descriptors.
13. Scheduling: Provides the following scheduling capabilities:
 - a. Open/close schedules (for control of arming/disarming and reporting).
 - b. Holiday schedules (allows different time windows for open/close schedules).
 - c. Timed events (for activation of relays, auto-bypassing and un-bypassing, auto-arming and disarming.).
 - d. Access schedules (for limiting system access to users by time).
 - e. End User Output Programming Mode (provides 20 timers for relay control).

- f. The system shall automatically adjust for daylight savings time.
14. Communication Features: Supports the following formats and features for the primary and secondary central station receivers:
- a. Backup reporting: The system shall support backup reporting via the following: Secondary phone number; ECP long-range radio (LRR) interface; option to select long range radio (LRR) or dialup as the primary reporting method (dynamic signaling feature).
 - b. Internet reporting: The system shall be capable of communicating with the central station via the internet. It shall provide the user with the ability to control the system via a browser interface. Packet data transmitted to the monitoring station shall be encrypted with a minimum of 1024 bits of encryption.
15. Audio Alarm Verification Option: Provides a programmable Audio Alarm Verification (AAV) option that can be used in conjunction with an output relay to permit voice dialog between an operator at the central station and a person at the premises.
16. Cross-Zoning Capability: Helps prevent false alarms by preventing a zone from going into alarm unless its cross-zone is also faulted within 5 minutes.
- a. Alarm notification appliances, including but not limited to sirens horns, bells and strobes.
 - b. Auxiliary devices capable of operating using full-wave rectified unfiltered voltage.
17. Exit Error False Alarm Prevention Feature: System shall be capable of differentiating between an actual alarm and an alarm caused by leaving an entry/exit door open. If not subsequently disarmed, the control panel shall:
- a. Bypass the faulted E/E zone(s) and/or interior zones and arm the system.
 - b. Generate an Exit Error report by user and by zone so the central station knows it was an exit alarm and who caused it.
18. Built-in User's Manual and Descriptor Review: For end-user convenience, the control panel shall contain a built-in User's Manual. It shall include the following capabilities:
- a. By depressing the function keys on the keypad for five (5) seconds, a brief explanation of that function shall scroll across the alphanumeric display.
 - b. By depressing the READY key for five (5) seconds, programmed zone descriptors shall be displayed (one at a time). This feature shall provide a check for installers and ensure descriptors have been entered properly.
19. Programming: Control shall be capable of being programmed locally or remotely and shall be capable of:
- a. Uploading and downloading programming information at 300 baud.

b. Uploading and displaying firmware revision levels from the control.

20. Automation Software: The Control shall be capable of interfacing with automation software via an RS232 input on a single partition.

1.11 COMPONENTS

A. System Integration: System shall integrate with facility doors and windows. The system shall also integrate with external systems, such as building appliances and building alert systems for remote control and central collection of external system alerts. When integrated with external systems, the system shall connect to the external system to receive status changes by way of a dry contact output from the external system. The system shall use its user interface to provide local status messages from external systems, providing for the initiation of local building policies. Optionally, the system may transmit information to an off-site monitoring service to provide initiation of remote policies when appropriate. The installer shall follow manufacture's instructions when installing and programming system equipment.

1. Zone Input: System zone inputs allow the system to sense the change in state of an output from an external device, such as a door/window position sensor, a motion detector, a relay output from an appliance, the output of an external alert system, or other devices that provide a dry closure output.
2. Hollow Metal Frame Doors: Monitor the opened and closed position of doors in the facility.
3. Filled Metal Frame Doors: Monitor the opened and closed position of doors in the facility.
4. Hollow Steel Frame Doors: Monitor the opened and closed position of doors in the facility.
5. Filled Steel Frame Doors: Monitor the opened and closed position of doors in the facility.
6. Wood Frame Doors: Monitor the opened and closed position of doors in the facility.
7. Roof Hatches: Monitor the opened and closed position of hatches and access doors to the roof of the facility.
8. Overhead Doors: Monitor the opened and closed position of overhead bay doors in the facility.
9. Glass Break Detector: Selected areas in the protected site will use glass-break detectors to sense the breaking of windows.
10. Dual-Tec Motion Detector, Wall-Mounted: Selected areas in the protected site will use motion detectors to sense motion in rooms or areas of rooms.
11. Panic Buttons: Monitor panic buttons in the facility.

12. Keypad: Color Graphic Touch Screen Display: The system keypad shall employ a dynamic, interactive graphic touch screen display.
13. Automatic Door Locking: Selected doors in the facility will use system automatic door locking capabilities to restrict entry to into the facility, yet allow free exit by those who have completed their business.
14. Automatic Door Holders: Selected doors in the facility will use system automatic door holder capabilities to hold doors open until particular system events release the door.

1.12 QUALITY ASSURANCE

- A. Manufacturer: Minimum ten years experience in manufacturing and maintaining similar systems. Alarm manufacturer shall be certified compliant with ISO 9001.
- B. Installer: Minimum two years experience installing similar systems, and acceptable to the manufacturer.
- C. Environmental Conditions: System shall be designed to function in the following environmental conditions:
 1. Storage Temperature: Designed for a storage temperature of -10° C to 70°C.
 2. Operating Temperature: System shall be designed for an operating temperature of 0° C to 50°C (32° F to 120°F).
 3. Humidity: System shall be designed for normal operation in an 85% relative humidity environment.
 4. Electromagnetic Interference: System shall meet or exceed the requirements of FCC Part 15, Class B devices, FCC Part 68, IEC EMC directive.
- D. Power Requirements: Components shall have the following electrical specifications. The system shall operate using standard 120 VAC, 50 Hz/60 Hz power.
- E. Control Primary Power: Transformer power shall be 16.5 VAC, 40 VA.
- F. Backup Battery: Rechargeable 12 VDC, gel type, lead acid backup battery shall be provided. The battery shall be rated between 12 and 34-ampere hours (AH).
- G. Alarm Power: 12 VDC, 1.7 amps for each bell output
- H. Auxiliary Standby Power: 12 VDC, 0.75 amp maximum.
- I. Total Power: Combined auxiliary standby and alarm currents shall be 2.3 amps.
- J. Fusing: The battery input, auxiliary, and bell outputs shall be protected using PTC circuit breakers. Outputs shall be power limited.
- K. Control Panel Enclosure: A metal cabinet, suitable for wall mounting. Dimensions shall not exceed 14.5 inches (36.8 cm) in height, 12.5 inches (31.8 cm) in width or 3 inches (7.6 cm) in depth.

1.13 WARRANTY

- A. Manufacturer's Warranty: Submit manufacturer's standard warranty.

1.14 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials in manufacturer's labeled packages. Store and handle in accordance with manufacturer's requirements, in a facility with environmental conditions within recommended limits.

1.15 PROJECT CONDITIONS

- A. Inspect locations where installation work will be performed and verify that conditions found are in accordance with the Contract Drawings and are acceptable for installation work. Report discrepancies in writing to the Engineer requesting clarification.
- B. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's absolute limits.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

- A. Bosch B or G Series
- B. Digital Monitoring Products XR Series
- C. Vanderbilt SPC
- D. Or approved equal

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine site conditions prior to installation. Notify Architect and Owner in writing if unsuitable conditions are encountered. Do not start installation until site conditions are acceptable.

3.2 INSTALLATION

- A. Intrusion detection and fire alarm control panel system shall be installed and tested in accordance with manufacturer's installation instructions.
 - 1. Coordinate interfaces with Owner's representative where appropriate.
 - 2. Provide backboxes, pullboxes, connectors, supports, conduit, cable, and wire for a complete and reliable installation. Obtain Owner's approval for exact location of boxes, conduit, and wiring runs prior to installation.

3. Install conduit, cable, and wire parallel and square with building lines, including raised floors areas. Do not exceed forty percent fill in conduits. Gather wires and tie to create an orderly installation.
4. Coordinate with trades to provide proper sequencing of installation.

3.3 FIELD COMMISSIONING AND CERTIFICATION

- A. Field Commissioning: Test system as recommended by manufacturer, including the following:
 1. Conduct complete inspection and testing of equipment, including verification of operation with connected equipment.
 2. Test devices and demonstrate operational features for Owner's representative and authorities having jurisdiction as applicable.
 3. Correct deficiencies until satisfactory results are obtained.
 4. Submit written copies of test results.

3.4 PROTECTION

- A. Protect installed system from damage during construction.

END OF SECTION