



Section 28 16 43

PERIMETER SECURITY SYSTEMS

PART 1 – GENERAL

1.1 SUMMARY

- A. Provide and install a perimeter security system as herein specified for the purpose of detecting entry into a designated security area. The perimeter security system is to be installed complete with appropriate controls, wiring and mounting hardware per the manufacturer's recommendations. All installation work shall be accomplished in a professional manner by manufacturer approved installers.

1.2 SUBMITTALS

A. Product Data:

- 1. Catalog cut sheets, specifications, and installation instructions.
- 2. Bill of materials.
- 3. Detailed description of system operation procedures.

B. System Drawings:

- 1. Composite wiring and/or schematic diagrams of the complete system as proposed to be installed.
- 2. Conduit placement and installation plan.

C. Test Plan:

- 1. A complete plan detailing test procedures for final check out and testing of the complete system.

D. Detection System Installation Certification:

- 1. Affidavit signed by the Detection System manufacturer's representative certifying that the complete system meets the contract requirements and is fully operational per manufacturer's recommendations.

1.3 TRAINING AND DOCUMENTATION

- A. A training program produced specifically for the installed system. The content of the training program shall allow facility personnel to become familiar with the safety, operation, and routine maintenance of their complete system. At a minimum training shall include:
1. Safety.
 2. General care, maintenance, and operation.
 3. Sensor, care, maintenance, and operation. Provide instructions on sensor replacement and splices
 4. Signal Processor/Vision Board, care, maintenance, and operation.
 5. Weather Station, care, maintenance, and operation
 6. Graphic Control Unit programming and operation
 7. Graphic Control Unit report generation for maintenance personnel.

1.4 WARRANTY

- A. Integrated Security Corporation (“ISC”) warrants that under normal use and service, all equipment, and materials manufactured by ISC (“equipment”) shall be free from defects in material and workmanship for a period of three (3) years from the date the equipment is delivered, or if installed by ISC from the date placed in operation. Equipment supplied by ISC but not manufactured by ISC shall be subject to the manufacturer’s warrantee for that equipment. Equipment damaged due to neglect, abuse, act of God or otherwise not owing to a defect in material or workmanship shall be repaired or replaced at purchasers expense. Labor and other expenses are not covered. **THIS WARRANTEE IS EXPRESSLY MADE IN LIEU OF THE WARRANTEES OF MERCHANTABILITY AND FITNESS FOR USE FOR PARTICULAR PURPOSE AND ANY OTHER WARRANTIES EXPRESS OR IMPLIED.**

1.5 FENCE DETECTION SYSTEM DESCRIPTION

- A. The perimeter security system shall be the Infinity 2020 electronic shock vibration type system as manufactured by Integrated Security Corporation of Novi, Michigan.
1. The perimeter detection system shall act as an electronic barrier to detect disturbances on the fence.
 2. The system shall incorporate a meteorological device. This fully integrated monitoring

sub-system shall detect environmental changes resulting from wind and precipitation and supply the necessary "real-time" data to the system Processor. Based on this continuously updated flow of information the system Processor shall constantly adjust sensor operating parameters to minimize the generation of environmentally induced false alarms.

3. The perimeter security system shall detect perimeter intrusion attempts and indicate alarms on a color graphic display on a central monitoring computer with flashing alarm zones and custom digital audio annunciation of alarms.
4. The system shall provide relay outputs for each zone, power/communication failure and tamper from the system Processor to other site monitoring systems (if required).
5. The field sensors shall be installed on the fence material, concertina, razor ribbon, barbed wire, rigid fence and other such media as required.
6. Either U/V resistant plastic ties or stainless steel ties shall be used to attach to media.
7. The ISC S-10 sensor cable shall come pre-assembled with shock vibration sensors installed at regular intervals.
8. Sensitivity shall be software adjustable individually by zone from the central computer keyboard. No field sensitivity adjustments shall be required.
9. The system shall have separate adjustable wind and precipitation compensation settings for each zone from the central computer keyboard. No field adjustments required.
10. All sensor cable shall be UV resistant to sunlight and rated for direct burial.
11. All sensors shall come encased in UV resistant high impact plastic with gold plated internal contact points and electrical grade RTV to seal and protect internal components.
12. All sensor cables shall be fully supervised and an alarm shall be generated if any cable is cut, shorted to ground or each other. A tamper alarm shall be generated via enclosure tamper switches if the Processor enclosures are opened.
13. The Processor unit shall include Vision Card, Sensor Interface Card, and Relay Output Module and shall contain all required electronics, standby battery, power supply and other accessories as necessary.
14. The electronic barrier shall consist of a fence mounted electronic sensor to detect fence disturbances associated with an attempted breach of security. Sensors shall be configured in zones as shown on the drawings.
15. Climbing over or cutting the fence causes an alarm condition. The system sensor shall be a series of multi contact shock vibration sensors that detect fence disturbances. The sensor shall be attached to either side of the fence fabric depending on local site conditions.
16. The sensors shall be connected to the Signal Processor/Vision Board with ISC S-9 lead in cable. The processor/Vision Board shall analyze the data from the sensor and distinguish between alarm

events and nuisance events. The Signal Processor/Vision Board shall utilize real time weather data to adapt and filter out nuisance alarm events.

17. The Signal Processor/Vision Board shall be installed in the main equipment room.

18. The detection system shall include a portable test jig that can be used to mechanically simulate the cutting of the fence fabric.

1.6 CONTROL SYSTEM DESCRIPTION

A. The system shall be installed as a zoned, supervised alarm detection system.

1. Multiple detection zones shall be accomplished with a Signal Processor/Vision Board capable of 16 zone inputs. Multiple Vision Boards configured as Transponders connected to a Vision Board configured as a Controller can be used to provide up to 256 zones. Multiple sets of Controller/Transponder groups shall be installed for additional zones.

2. The zone at which an attempt is made to tamper with the system shall be identified at the Graphic Control Unit in Central Control. The supervised circuit in the system causes a tamper alarm to signal if:

a. Sensor circuitry is disturbed (opened or shorted).

b. Tamper switches are activated.

B. The Signal Processor/Vision Board shall be the central data gathering terminal for the control system.

1. The Signal Processor/Vision Board shall analyze the alarm data from the sensors and feed this information via RS-232/Ethernet to the Graphic Control Unit.

2. The Signal Processor/Vision Board shall receive data from the Weather Station and feed this information serially to the Graphic Control Unit. The system shall be configured such that system malfunctions of the Weather Station cannot in any way affect the performance of the Signal Processor/Vision Board.

3. The Signal Processor/Vision Board shall transmit dry contact data to ancillary systems such as Roving Notification System Alarm Encoder, Mobile Map Systems or Camera Systems.

C. The Graphic Control Unit shall be the reporting terminal for the control system.

1. The Graphic Control Unit shall be located in Central Control as shown on the drawings.

2. System status including alarm conditions such as zone alarms shall be reported to the system operator on the Graphic Control Unit.

3. The Graphic Control Unit shall be a graphical representation of the fence line around the facility identifying the different zones with text. There shall not be any traditional Microsoft "minimize" icons on the display. The background of the display shall be black to reduce glare.

- a. When the zone is not in the alarm state, the associated zone shall be displayed green. When the zone is in the intrusion alarm state, open sensor circuit alarm state, or short sensor circuit alarm state; the zone shall be displayed flashing red.

When there is an intrusion alarm, the text "ALARM" shall be included near the zone. When there is an open sensor circuit alarm, the text "OPEN" shall be included near the zone. When there is a short sensor circuit alarm, the text "SHORT" shall be included near the zone. When the zone is in the access mode (disabled), the zone shall be displayed yellow and the text "ACCESS" shall be included near the zone.

4. Zone conditions shall be reported on the Graphic Control Unit via a color display.

- a. The following zone conditions shall be displayed with a unique visual display for each zone.

1. Secure state.

2. Access state.

3. Intrusion alarm state.

4. Open sensor circuit alarm.

- a. This alarm shall be generated 10 seconds after any part of the sensor circuit between the Processor/Vision Board and the fence sensor end of line resistor is cut.

5. Short sensor circuit alarm.

- a. This alarm shall be generated 10 seconds after any part of the circuit between the Processor/Vision Board and the fence sensor end of line resistor is shorted.

6. Alarm acknowledged state.

- a. The following Processor conditions shall be displayed with a unique visual display.

1. On line and operating state.

2. Processor tamper alarm state.

3. Trouble alarm state (any form of power failure).

- b. The intrusion, open sensor circuit, short sensor circuit, Processor tamper, and Processor trouble alarm states shall be annunciated audibly and with a flashing icon. Acknowledging the alarm state shall silence the audible and cause the icon to be illuminated steady.

5. Each zone shall be capable of zone access, intrusion alarm, acknowledge and alarm reset.

- a. When a zone is accessed by the system operator, the intrusion alarm function for the zone shall be disabled. The zone cannot generate a new intrusion alarm until the access mode is reset by the system operator for the zone. When the access mode is reset, the zone shall be ready to respond to new alarms. The open sensor circuit alarm and short sensor circuit alarms from a zone shall always report to the Graphic Control Unit regardless of the status of the access function.

- b. When an intrusion alarm from a zone is acknowledged by the system operator, the zone cannot generate a new intrusion alarm until the alarm is reset. The open sensor circuit alarm and short sensor circuit alarms from a zone shall always report to the Graphic Control Unit regardless of the status of the intrusion alarm.
- c. When an open sensor circuit alarm from a zone is acknowledged by the system operator, the zone cannot generate a new open sensor circuit until the alarm is reset.
- d. When a short sensor circuit alarm from a zone is acknowledged by the system operator, the zone cannot generate a new short sensor circuit until the alarm is reset.
- e. Alarm Reset:
 - 1. When the system operator selects an icon associated with an active alarm, the alarm clear code window shall be displayed. The system operator shall be able to reset the alarm by categorizing the alarm and then selecting the CLEAR icon. The categories for the alarm cause shall be able to be customized per the needs of the site.
 - 2. If the system operator is not ready to categorize and reset the alarm, the system operator may select the CLOSE icon and the maintenance window will be cleared and the alarm icon will continue to be displayed as an acknowledged but not reset alarm.
- f. Alarm Access:
 - 1. When the system operator selects the ZONE STATUS icon on the main screen a Control Window shall be displayed. The Control Window shall display all of the zones and provide a means for the System Operator to toggle individual zones between the Access mode (access), Disabled mode (disabled) and Active mode (waiting for alarm).
- g. Alarm Queue:
 - 1. When the system operator selects the VIEW ALARM QUEUE icon on the main screen the Alarm Queue Window shall be displayed. The Alarm Queue Window shall display all of the previous active alarms with an alarm description, date, time, and weather conditions. All non cleared alarms can also be cleared from this window.
- h. Weather Status:
 - 1. When the system operator selects the WEATHER STATUS icon on the main screen the Weather Window shall be displayed. The Weather Window shall display the current wind and rain activity.

6. The Graphic Control Unit shall store event data for report generation. At least 500,000 alarm messages shall be stored. The data shall be capable of being analyzed at the Operators Work Station. The events stored on the Graphic Control Unit shall include the event description including zone number, date, time, wind speed, and presence of rain. All events shall be logged to the nearest second. The events stored shall include but are not limited to:
 - a. Zone intrusion alarms
 - b. Open sensor circuit alarms
 - c. Short sensor circuit alarms
 - d. Alarm acknowledgements
 - e. Alarm resets
 - f. Maintenance explanation of the alarm events.
 - g. Zone accesses
7. The Weather Station shall be installed on a dedicated mast where it will be exposed to the greatest amount of wind to collect real time weather related data to adapt and filter out nuisance alarm events and to assist in maintenance troubleshooting. The weather station shall communicate directly with the Signal Processor/Vision Board via a six conductor cable.

PART 2 - PRODUCTS

2.1 GENERAL

- A. The Fence System shall be as follows.
 1. Integrated Security Corporation's Infinity 2020 or approved equal.
- B. Sensors shall be complete with transponders, power supplies, filters, surge protectors, sensors, cable ties, cable terminations, and other components as required for an operational system.
- C. Provide one portable test jig that can be used to mechanically and consistently simulate the cutting of the fence fabric. Test jig shall be an ISC Cut Simulator Tool.

2.2 SENSORS

- A. The sensor device shall be shock vibration type and be designed to operate in a temperature range of -55 to 155 degrees C. The sensors shall be environmentally sealed, UV resistant, high impact plastic molded assemblies that are permanently attached to a shielded (EMI/RFI protected) direct burial cable at regular intervals. There shall be maintenance free gold plated to MIL spec contact points in the detection chamber. The sensors shall be compatible with the signal Processor/Vision Board. The sensor shall be Integrated Security Corporation S-10 sensor cable.

2.3 SIGNAL PROCESSOR/VISION BOARD

A. The system Processor shall monitor electronic signals from perimeter sensors and continually analyze and evaluate these signals. The Processor shall also analyze inputs from a meteorological device and dynamically calibrate the system for each zone individually during adverse weather conditions to reduce the possibility of weather induced false alarms. The Processor shall require no field calibration and or routine maintenance and adjustment. The Processor shall indicate alarms to a central monitoring computer via encrypted Ethernet, fiber-optic, or RS-232 communication. SMS text messaging of alarms shall be supported. It shall be possible to link output relay boards to the system Processor via RS-485. The Processor shall:

1. Be equipped with transient suppression.
2. Be equipped with form C relay contact output points for each zone, one tamper alarm relay, one communications failure alarm relay, one power failure alarm relay and one general output relay.
3. Facilitate a battery backup capable of supplying 12 VDC at .500 ma. The battery will automatically recharge when 120 VAC power is restored

2.4 GRAPHIC CONTROL UNIT

A. The Graphic Control Unit shall be a PC based control unit with graphic display.

B. The Graphic Control Unit shall have the following characteristics or features.

1. Shall operate on a Windows Operating System using Web based technology.
2. Compatible with the Signal Processor/Vision Board.
3. Alarm indication per zone - Audible and visual.
4. System Control - Control shall be with the keyboard and mouse. Each zone shall be capable of being placed in access, alarm acknowledged or alarm reset.

C. Graphic Control Unit Computer shall be a desk top or optional rack mounted computer with these additional features:

1. The central monitoring computer minimum requirements: Intel Core 2 Duo, E8400, 3 GHz, 2 Gigabytes of RAM, multi Gigabyte hard disk drive, color monitor capable of 1920 x 1080 resolution, CD ROM drive and a printer.

- D. Access to site information shall be accomplished using Microsoft's Internet Explorer web browser. Multiple workstations shall be allowed simultaneous access. The software shall be capable of constantly monitoring the site for intrusions regardless of the operation being performed within the system software. The system software will provide a custom site map with flashing alarm zones, custom digital audio messages for each alarm and on screen video of alarmed zones. The central monitoring computer shall have "data log" retention of alarm activity on the computer's database. The site monitoring system shall provide multi-level password access and have software adjustable sensitivity settings for each zone from the central monitoring computer
- E. The graphic software shall be the latest version of Integrated Security Corporation's Infinity 2020 Perimeter System.

2.5 METEOROLOGICAL ASSEMBLY (WEATHER STATION)

- A. The meteorological assembly shall be capable of detecting wind speed and precipitation intensity. The meteorological device shall be a fully integrated monitoring sub-system that detects environmental changes resulting from wind or precipitation and supplies the necessary data to the system Processor. The output signals from this device shall be transmitted through a communication cable to the Processor which in turn automatically calibrates the system's thresholds for each zone individually according to the weather conditions. The Processor shall constantly adjust sensor-operating parameters to minimize the generation of environmentally induced false alarms. Through password control, the system operator shall be able to adjust wind and precipitation compensation values separately for each zone individually from the central monitoring computer keyboard.

2.6 COMMUNICATIONS CABLE

- A. Lead in cable shall be shielded multi conductor, rated for direct burial, #22 AWG.

2.7 CABLE TIES

A. Cable ties shall be provided to fasten the sensor cable wire to the fence. Cable ties shall meet the following requirements.

1. 16 gauge Stainless Steel.
2. Double loop-ends.
3. Length shall be as recommended by fence system manufacturer.

or

4. U/V resistant plastic ties.

2.8 POWER SUPPLIES:

A. Power supplies shall be furnished with characteristics as required to support the operational performance of the sensor and signal Processors. Demand load on the power supplies shall not exceed sixty (60) percent of the rated full load capacity of the power supply. Power supplies shall be at least 70% efficient.