Although PROTECH provides high security indoor intrusion sensors for the military and government markets, our specialty is outdoor protection. Since we first introduced our PIRAMID outdoor dual technology sensor in 1993, we have been constantly improving and perfecting the adaptability to cope with the ever-changing outdoor environment. Our proprietary "Stereo Doppler" technology makes this possible and gives our sensors the ability to provide the highest level of security with the very lowest nuisance alarm rate possible.

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# SOLAR POWERED FENCE SHOCK DETECTION SYSTEM

## DIVISION 28 – ELECTRONIC SAFETY AND SECURITY

**MasterFormat 2014:**

**28 16 43 Perimeter Security Systems**

**MasterFormat 2016**

**28 31 21 Area and Perimeter Intrusion Detection**

### Notes to Specifier:

1. Where several alternative parameters or specifications exist, or where, the specifier has the option of inserting text, such choices are presented in **<bold text>, where the parameter specified in [brackets] is the normal default.**
2. Explanatory notes and comments are presented in **colored** text.

**Important Note to Security Systems Specifiers**

CSI MasterFormat 2016 incorporates numerous significant changes affecting electronic safety and security. This document is written to provide flexibility in using either format, although adoption of MasterFormat 2016 is encouraged. The following is a guide to the MasterFormat numbers relevant to the product referenced in this specification.

**Primary Specification Area:**

MasterFormat 2014:

28 10 00 Electronic Access Control and Intrusion Detection

- 28 16 00 Intrusion Detection
  - 28 16 43 Perimeter Security Systems

**MasterFormat 2016:**

28 30 00 Security Detection, Alarm, and Monitoring

- 28 15 00 Access Control Hardware Devices
  - 28 31 21 Area and Perimeter Intrusion Detection

**Related Requirements:**

MasterFormat 2014:

- 28 13 33.26 Access Control Interfaces to Intrusion Detection
- 28 16 29 Intrusion Detection Remote Devices and Sensors
- 28 16 33 Intrusion Detection Interfaces

MasterFormat 2016

- 28 05 35 Security Data Communications Wireless Transmission Equipment
- 28 16 13 Access Control Interfaces to Intrusion Detection
- 28 31 21.17 Fixed Optical Beam Area and Perimeter Security Systems
- 28 31 31 Intrusion Detection Interfaces
- 28 47 21.15 Notification Interfaces to Security Detection, Alarm and Monitoring
- 28 51 51.15 Information Interfaces to Security Detection, Alarm and Monitoring

# SOLAR POWERED FENCE SHOCK DETECTION SYSTEM

## PART 1 GENERAL

### 1.01 SUMMARY

A. Section includes a solar-powered perimeter fence intrusion detection system.

B. Product - A system to detect all attempts at intrusion that use cutting, climbing or stripping of the fence upon which the system is installed while disregarding meteorological phenomena such as wind and rain or interference from vibration.

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**Refer to MasterFormat notes at the beginning of this document to select requirements specific to the MasterFormat version being used.**

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### 1.02 REFERENCES

A. Definitions

1. Climbing event ï An occurrence where one attempts to climb onto a wire mesh fence.
2. Cutting event ï An occurrence where one attempts to cut the wire mesh on a wire mesh fence.
3. ModBus ï A serial master-slave communications protocol initially published in 1979 for use with programmable logic controllers.
4. Wind event ï An occurrence where wind moves several fence panels.
5. Zones ï Logical groupings of sensing elements for the purpose of establishing specific identifiable areas of coverage.

B. Reference Standards

1. Electromagnetic compatibility - EU EMC Directives EN 55022, EN 55024
2. IEEE 802.3 Ethernet
3. Environmental
   a. ANSI/ IEC60529 - Degrees of Protection Provided by Enclosures
   b. International Electrotechnical Commission (IEC) - Ingress Protection Rating IP55

### 1.03 SUBMITTALS

A. Product Data

1. Manufacturerôs printed or electronic data sheets
2. Manufacturerôs installation and operation manuals

B. Shop Drawings

1. Termination points and enclosures

### 1.04 QUALIFICATIONS

A. Manufacturer of system shall have a minimum of five (5) years experience in the design, manufacture, and successful implementation of perimeter fence sensing systems.

## 1.05 DELIVERY, STORAGE, AND HANDLING

A. Deliver the equipment system in the manufacturerõs original, unopened, undamaged container with identification labels intact.

1. Ship and store the system protected from mechanical and environmental conditions as designated by the manufacturer and in a temperature environment of -40°F to +158°F (-40°C to +70°C)

## 1.06 WARRANTY

A. The Manufacturer shall provide a limited warranty for the system to be free of defects in workmanship and material under normal operating conditions for a period of one year from the date of product shipment.

- END OF SECTION ï

## PART 2 PRODUCT

### 2.01 EQUIPMENT

A. Manufacturer: PROTECH/Protection Technologies, Inc.
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Sparks, NV 89434
Phone: +1 775 856-7333 | Fax: +1 775 856-7658
sales@protechusa.com
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B. Model: G-Fence

C. Alternates: None

### 2.02 GENERAL DESCRIPTION

A. The system shall detect all attempts at intrusion that use cutting, climbing or stripping of the fence upon which the system is installed while disregarding meteorological phenomena such as wind and rain or interference from vibration.

B. The system shall employ a sensing/detection cable which integrates 40 detector elements spaced at 3 m intervals on a wire meshed fence.

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**The actual protected length is a function of the width of the fence panel. Typically, one sensor per panel is employed.**

**40 sensors, each on a 2.5 m panel, yield a protected length of 100m.**

**40 sensors, each on a 3 m panel, yield a protected length of 120m.**

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C. The system shall be capable of detecting a cable cut to within 3 meters (9.8 feet).
   1. Both the sensing element and the control unit connected to the detection cable shall have indicators to assist in locating a cable fault.

D. The system shall have the ability to set the number of impact occurrences before triggering the alarm.

E. The system's control unit(s) shall analyze and process the data from the detector cables and communicate status to a head-end unit.

F. The system shall have the capacity to be deployed to provide up to 3200 meters of coverage.

G. The system shall have the capability to be logically configured in up to 128 zones without limitations on size or location on the perimeter.

H. The system shall be auto-calibrating.

I. The system shall employ solar power with a battery back-up.
   1. The battery back-up shall provide a minimum of 4 weeks of autonomous operation time.

J. The system shall be hardened for operation in the temperature range of -40°F to +158°F (-40°C and +70°C)

## 2.03 SYSTEM COMPONENTS

A. Detection Cable

1. The detection cable shall contain shock sensing elements spaced at 3 m intervals.
   a. Each shock sensing element shall have an LED which blinks if there is a cable malfunction in an adjacent cable segment.
2. The cable shall have a 1.5 m lead-in section on each end prior to reaching a sensing element.
3. Each sensing element in the detection cable shall contain its own signal processing intelligence, thereby distributing the system intelligence along the cable length.
4. Each sensing element shall be auto-calibrating.
5. The detection cable shall be resistant to bending and traction.
6. The detection cable and sensing elements shall have the following properties:
   a. Jacket construction: polyethylene
   b. Maximum cable section length: 120 meters (394 feet)

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**The length of the protected area may be less than the physical cable length, depending on the fence panel widths.**

**See previous note.**

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   c. Maximum number of sensors per section: 40
   d. Sensor type: X-Y-Z accelerometer
   e. Area of sensitivity per sensor element: 3 meters ( 9.8 feet)

B. Link Termination Unit

1. A link termination unit shall terminate the detection cable in an open loop configuration or terminate and bridge two detection cables between adjacent control units.

C. Control Unit

1. A control unit shall be capable of terminating one or two 100 meter cable sections to provide fence coverage up to 200 meters (656 feet).
2. The sensing system shall be able to accommodate up to 16 control units to provide coverage up to 3200 meters (2 miles).
3. Each control unit shall be powered by a solar array and contain battery back-up.
   a. The battery back-up shall provide a minimum of 4 weeks of autonomous operation time.
4. The control unit shall be designed for mounting directly on the fence via integral mounting hooks.
5. The control unit shall be assigned a unique address for purposes of RS-485 communication to a head end unit hub.
6. The control unit shall have a tamper protection switch and low battery alarms.
7. The control unit shall have an LED indicator which is activated when there is a cable malfunction.

8. The control unit shall provide settings adjustment for the following:
   a. sensitivity thresholds for individual or all sensing elements in a detection cable
   b. alarm detection requirement based on one or two sensing element activations
   c. adjacent sensor delay window
   d. cable cut response time between 5 and 30 seconds
   e. sensor sample parameters
   f. filtering levels
9. Electrical ï The control unit shall have the following connections:
   a. Connections
      1) Detection cable(s): 1 or 2
      2) 12 VDC power
      3) RS-485 2 wires data, 2 wires 12 V port power
      4) Auxiliary inputs (2) ï via external contact closure
   b. LED indicator conditions
      1) faulty wiring
      2) no communication to first sensing element
      3) improper link termination unit settings
      4) communication problem on link termination unit
      5) disconnected cable
   c. Solar panel 5 V aggregate output
   d. Battery: 4 V 5 Ah lead-acid

D. Head-End Hub
1. A head-end hub shall centralize all system alarm information from the radio coordinators and from other sensing systems provided by the Manufacturer.
2. The head-end hub shall be based upon a Linux operating system.
3. The head-end hub shall provide for automatic configuration of the sensing network, including detection of the sensors connected to the network and number of available contacts.
4. The head-end hub shall provide diagnostic information for each sensor.

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**The Maxibus 3000 head-end hub provides processing capability for the following SORHEA/Protech systems through its 4 COM ports:**

**Solaris – up to 24 radio boards (1 per sensing column) and 64 control boards (1 per 5TX and 1 per 5RX beams) per COM port**

**Maxiris RX Columns – up to 32 per COM port**

**Apiris Columns - up to 32 per COM port**

**G-Fence control units – up to 16 per COM port**

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5. Communications

a. RS-485 - The head-end hub (ñhubò) shall connect to the control unit and other system radio coordinator units via ModBus protocol over an RS-485 connection.
    a) number of RS-485 COM ports: 4
b. Ethernet ï The hub shall connect to an Ethernet network using an RJ45 connection.
c. Alarm outputs ï The hub shall be capable of providing alarm information via any of the following:
    1) dry contact outputs
    2) ModBus over RS-485, with hub functioning in Master or Slave mode
    3) ModBus over Ethernet, with hub functioning as Server or Client

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**The hub has 8 on-board relay contacts and provision for up to 16 additional relay extension cards, each of which provides 8 additional relays.**

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6. Events ï The head-end hub shall provide a detailed event log, including alarms, accessible through a web server, for up to 1000 events.
    a. For each event, the log shall maintain the following data:
        1) event timing to include date, hour, minute, and second
        2) specific column triggered during an intrusion event and type of event
7. Settings
    a. The head-end hub shall maintain the following settings in its memory:
        1) relay assignments
        2) site configuration
        3) its own hub settings
    b. The hub shall have the capability of exporting its settings to a file and restoring settings from a saved file.
8. Web Server - The head-end hub shall have an integrated web server to support configuration and maintenance.
    a. The web server shall be capable of
        1) assigning an administrator and securing access through login ID and password
        2) setting the real time clock in the hub
        3) mapping one or more alarms to one or more relay contact outputs
        4) setting Ethernet network parameters
        5) configuring the COM ports for the sensing network(s)
        6) displaying a log of events
        7) displaying relay assignments
    b. The web server interface shall be available in English, Spanish, or French.
    c. The web server shall be accessed via any web standard browser
9. Electrical - Voltage
    a. 10.5 - 14 VDC @ 230 mA
    b. Optional 110/230 VAC to 13.6 VDC/2.2 A power supply with battery back-up

10. Operating temperature: 32°F to +131°F ($0^{o}$ C to $+55^{o}$ C)

E. Configuration and Maintenance Software

1. Configuration and Maintenance software (ñsoftwareò) shall be available as a PC-based graphical tool intended for configuration and basic monitoring of the system.
2. Functions
   a. Configuration of up to 128 detection zones
   b. Store zone configurations in a hub
   c. Import a site layout in image file format
   d. Display all system components on a map
   e. Display multiple fence shock detection systems on a map
   f. Display the location of an intrusion alarm on a map
   g. Display a current event log

- END OF SECTION -

## PART 3 EXECUTION

### 3.01 INSTALLERS

A. The Contractorôs installers and technicians shall be factory trained and certified to install, service, and maintain the system.

B. Contractor personnel shall comply with all applicable state and local licensing requirements.

### 3.02 PREPARATION

A. Contractor shall insure that all products to be installed have been verified to possess the latest version of available firmware.

### 3.03 INSTALLATION

A. The Contractor shall adhere to all Manufacturerôs published installation procedures, diagrams, and guidance.

B. Control Units

1. Control units shall not be installed in front of a hedge, in a shaded area, or in any other location that would impede sunlight from reaching the solar panel.
2. Control units shall be installed at the top of the fence.

C. Detector Cable

1. Detector cables shall be installed at mid-height of the fence.

- END OF SECTION -