



Since 1980, PROTECH has been designing, manufacturing, and marketing Perimeter Intrusion Detection Systems (PIDS) to protect personnel, property, and assets at sensitive sites. We manufacture systems that give early warning of potential threats at the perimeter. PROTECH offers a complete range of perimeter intrusion detection systems and technologies including – G-FENCE fence-mounted intrusion detection, infrared beam technology (invisible fences), PIRAMID dual technology motions sensors and video analytic object detection and tracking. Our technology can be integrated with monitoring applications including Protech's MAXIBUS, Smart Bridge, or Spectra.

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## ACTIVE INFRARED BARRIER

### DIVISION 28 – ELECTRONIC SAFETY AND SECURITY

#### MasterFormat 2020

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

#### 28 31 21.17 Fixed Optical Beam Area and Perimeter Security Systems

##### 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 *italic* text.

## ACTIVE INFRARED BARRIER

### PART 1 GENERAL

#### 1.01 SUMMARY

- A. Section includes an active infrared barrier system.
- B. Product - A system consisting of sensing towers which create an infrared intrusion barrier, capable of sensing in one or two directions with up to three detection zones.
- C. Related Requirements
  - 1. 28 01 30 Operation and Maintenance of Security Detection, Alarm and Monitoring
  - 2. 28 06 30 Schedules for Security Detection, Alarm and Monitoring
  - 3. 28 31 31 Intrusion Detection Interfaces

#### 1.02 REFERENCES

- A. Definitions
  - 1. Cell – A mono directional Infrared transmitter-receiver device installed in a tower. A pair of cells, installed in 2 different towers, will create an Infrared detection beam between these towers.
  - 2. Beam – communication between paired cells
  - 3. Single face – Infrared beam transmission or reception, or both, from one surface (face) of a sensing tower.
  - 4. Double face – Infrared beam transmission or reception, or both, from opposing surfaces (faces) of a sensing tower.
  - 5. Modbus – A serial master-slave communications protocol initially published in 1979 for use with programmable logic controllers.
- B. Reference Standards
  - 1. Electromagnetic compatibility
    - a. EU EMC Directives EN 55022, EN 55024
    - a. FCC-47 CFR Part 15, Class B
  - 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. Manufacturer's printed or electronic data sheets
  - 2. Manufacturer's 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 sensing systems.

**1.05 DELIVERY, STORAGE, AND HANDLING**

- A. Deliver the equipment system in the manufacturer's 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.

**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 two years from the date of product shipment.

- END OF SECTION -

## **PART 2 PRODUCT**

### **2.01 EQUIPMENT**

- A. Manufacturer: PROTECH/Protection Technologies, Inc.  
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- B. Model: MAXIRIS 3100
- C. Alternates: None

### **2.02 GENERAL DESCRIPTION**

- A. The system shall detect all attempts at intrusion by using adjustable infrared barriers formed by two or more externally powered sensing towers, each of which communicates alarm information to a head-end alarm processing hub via dry contact, RS-485.
- B. Intrusion detection shall be based upon the interruption of pulsed infrared beams between sensing towers.
1. Sensing towers shall be configurable for height and number of infrared beams.
    - a. Beams shall be multiplexed and synchronized through a cable.
  2. Sensing towers shall be available for single or bi-directional infrared beam operation in both single face and double face operation.
  3. Sensing towers shall be available configured as infrared transmitters, infrared receivers, or both.
  4. The system shall have selectable detection/triggering modes.
  5. The response time for an intrusion alarm shall be selectable from 40 ms to 500 ms.
- C. The system shall operate with sensing towers spaced up to 100 m (328 feet) outdoors or 500 m (1640 feet) indoors.
- D. Each sensing tower shall have an integrated anti-climbing cap.
- E. Each sensing tower shall have integrated alignment tools.
- F. The sensing tower shall be capable of in-line, corner, floor, or wall mounting.

### **2.03 SYSTEM COMPONENTS AND OPERATION**

- A. Sensing towers shall be configurable for height and number of infrared beams.
1. Sensing towers shall be available for infrared beam operation in both single face and double face operation.
  2. Sensing towers shall be available configured as infrared transmitters, infrared receivers, or both.
  3. The response time for an intrusion alarm shall be selectable from 40 ms to 500 ms.
- B. The system shall operate with sensing towers spaced up to 100 m (328 feet)
- C. Alarm outputs per tower: Intrusion, disqualification, tamper
- D. Alarm indicator: Buzzer and LED in each tower
- E. Each sensing tower shall have an integrated anti-climbing cap.

- F. Each sensing tower shall have integrated alignment tools.
- G. The sensing tower shall be capable of in-line, corner, floor, or wall mounting.
- H. Each tower shall have an active heater set to deactivate at 89.6° F (32° C)

## 2.04 DETAILED SPECIFICATIONS

### A. Sensing Tower

1. Number of tower faces: 1 or 2
2. Number of cells per direction: 3 – 14 available
3. Effective beam angle: Horizontal +/- 90°, vertical +/- 10°
4. Beam Wavelength: 950 nm
5. Zoning:
  - a. Number of intrusion zones: Up to 3
  - b. Cells per sensing tower: 6-10
6. Beams shall have the ability to be selectively deactivated or activated.
7. Power: 24/48 VDC
8. Physical
  - a. Tower height: <3 ft (1 m)> <5 ft (1.5 m)> <6 ft (2m)> <8 ft (2.5 m)>  
<10 ft (3 m)>

*The following table enumerates Protech's product options in this series:*

| <i>Part no.</i>     | <i>Height</i>        | <i>Faces</i> | <i># Beams per Face</i> |
|---------------------|----------------------|--------------|-------------------------|
| <i>Tower 1MSF</i>   | <i>3 ft. (1 m)</i>   | <i>1</i>     | <i>3</i>                |
| <i>Tower 1MDF</i>   | <i>3 ft. (1 m)</i>   | <i>2</i>     | <i>3</i>                |
| <i>Tower 1M50SF</i> | <i>5 ft. (1.5 m)</i> | <i>1</i>     | <i>6</i>                |
| <i>Tower 1M50DF</i> | <i>5 ft. (1.5 m)</i> | <i>2</i>     | <i>6</i>                |
| <i>Tower 2MSF</i>   | <i>3 ft. (2 m)</i>   | <i>1</i>     | <i>6-10</i>             |
| <i>Tower 2MDF</i>   | <i>3 ft. (2 m)</i>   | <i>2</i>     | <i>6-10</i>             |
| <i>Tower 2M50SF</i> | <i>8 ft. (2.5 m)</i> | <i>1</i>     | <i>8</i>                |
| <i>Tower 2M50DF</i> | <i>8 ft. (2.5 m)</i> | <i>2</i>     | <i>8</i>                |
| <i>Tower 3MSF</i>   | <i>10 ft. (3 m)</i>  | <i>1</i>     | <i>10-14</i>            |
| <i>Tower 3MDF</i>   | <i>10 ft. (3 m)</i>  | <i>2</i>     | <i>10-14</i>            |

### b. Environmental

- 1) Rating: IP55
- 2) Each tower shall have an active heater set to deactivate at 89.6° F (32° C)
- 3) Operating temperature: From -40°F to +158°F (-40°C and +70°C)

9. Communications:

- a. Sensing tower to hub: RS-485 with Modbus TCP protocol
- b. Sensing tower to PC: Ethernet 10/100 Mbps

10. Alarms

- a. Intrusion alarms
  - 1) Detection shall normally require the interruption of 1-3 beams.
  - 2) Detection shall be configurable to also permit detection based on the interruption of only the bottom beam.
  - 3) The system shall provide for independent management of the bottom or other beams.
- b. The following types of local alarms shall be capable of being generated by the sensing tower:
  - 1) Intrusion by zone
  - 2) Disqualification
  - 3) Tamper
  - 4) Anti-climbing cap
  - 5) Auxiliary Input

11. Integrated alignment tools shall indicate the quality of the incoming signal and include all of the following:

- a. optical sight
- b. LED's
- c. audible buzzer

12. Settings

- a. Response time - Intrusion alarm response time settings shall be selectable via potentiometer between 40 and 500 milliseconds.
- b. Web Interface
  - 1) A tower's settings shall be accessible via web browser by direct connection of a PC via Ethernet
    - a) Web browser: Internet Explorer, version 7 or higher; Google Chrome, Mozilla Firefox
    - b) The following settings shall be available:
      - i. network address
      - ii. Modbus TCP RS-485
      - iii. passwords
      - iv. clock
      - v. zone names and settings
      - vi. inputs and outputs
      - vii. assignment of relay outputs
      - viii. alarm settings
      - ix. beam deactivation
      - x. synchronization of towers
      - xi. detection mode

- xii. Train discrimination feature setting
  - c) The web interface shall allow for visualization of barrier status
- B. An alarm information hub (Maxibus hub) which accommodates 10498 feet (3200 m) of protection by aggregating signal streams from up to four control units per communication port and communicating to mapping software or a VMS system via Modbus protocol.
  - 1. The Maxibus hub shall provide alarm management and incorporate graphic software for configuration and maintenance of detection zones.
  - 2. The sensing towers shall connect with the Hub via RS-485 to provide alarm communication.
  - 3. The Hub shall allow integration with third party software.

*MAXIBUS is PROTECH's alarm information hub. See separate specification document.*  
*Smart Bridge is a software that connects PROTECH's MAXIBUS UNIVERSAL and/or G-Fence 2400 Controllers to various VMS software platforms. The Smart Bridge software resides on the VMS Event Server and connects up to 256 Maxibus Universal devices and/or G-Fence 2400 Controllers and sends alarm events to the VMS platform.*
- C. Configuration and Maintenance software ("software") shall be available as a PC-based graphical tool intended for configuration and basic monitoring of the system.
  - 1. Functions
    - a. Viewing sensing node (tower) status
    - b. Import a site layout in image file format
    - c. Display all system components on a map
    - d. Display the location of an intrusion alarm on a map
    - e. Display a current event log

- END OF SECTION -

## **PART 3 EXECUTION**

### **3.01 INSTALLERS**

- A. The Contractor's 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.

### **1.02 INSTALLATION**

- A. The Contractor shall adhere to all Manufacturer's published installation procedures, diagrams, and guidance.
- B. Sensing Towers
  - 1. All vegetation shall be cleared from the sight path between adjacent sensing towers.

- END OF SECTION -