



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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HIGH PERFORMANCE INTRUSION DETECTION BARRIER 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 21.13 Microwave Area and Perimeter Security Systems
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

HIGH PERFORMANCE INTRUSION DETECTION BARRIER SYSTEM

PART 1 GENERAL

1.01 SUMMARY

- A. Section includes a perimeter fence intrusion detection system employing multiple intrusion detection technologies.
- B. Product - A system consisting of sensing columns which utilize active infrared, microwave, and Doppler technologies and report to a head-end hub via RS-485 transmission..

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

1.02 REFERENCES

- A. Definitions
 - 1. ModBus . A serial master-slave communications protocol initially published in 1979 for use with programmable logic controllers.
 - 2. Zones . 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 IP 35 and IP 55.

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 fence 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 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 .

PART 2 PRODUCT

2.01 EQUIPMENT

A. Manufacturer: PROTECH/Protection Technologies, Inc.
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B. Model: Apiris

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 columns, each of which communicates alarm information to a head-end alarm processing hub via RS-485 communications.
- B. The system shall further employ microwave and Doppler sensing technologies to supplement the infrared beam detection.
- C. Detection shall be configurable to employ any or all of the detection technologies available in the sensing columns.
- D. Intrusion detection shall be based upon the interruption of pulsed infrared beams between sensing columns.
 - 1. Sensing columns shall be configurable for height and number of infrared beams.
 - a. Beams shall be multiplexed and optically synchronized.
 - 2. Sensing columns shall be available for operation in both single face and double face operation.
 - 3. Sensing columns 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.
- E. The system shall operate in an outdoor environment with sensing columns spaced up to 100 m (328 feet).
- F. Each sensing column shall have an integrated anti-climbing cap.
- G. Each sensing column shall have integrated alignment tools.
- H. The sensing column shall be capable of mounting on a concrete base or on a wall.
- I. 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. Sensing Column

1. Infrared characteristics
 - a. Number of beam directions (faces): 1 or 2
 - b. Number of beams per direction: up to 28
 - c. Beam Wavelength: 950 nm
 - d. Zoning:
 - 1) Number of intrusion zones: Up to 3
 - 2) Cells per sensing column: 5 to 10
 - e. Beams shall have the ability to be selectively deactivated or activated.
 - f. IP Rating IP 55
2. Microwave characteristics
 - a. Operating frequency: 10.525 GHz +/- 20 MHz
 - b. Radiated power: 25 dBm
 - c. Number of channels: 5
 - d. Sensitivity adjustment: potentiometer
 - e. IP rating: IP 35
3. Doppler characteristics
4. Power: 110 VAC/230 VAC
5. Physical
 - a. Column height: **<2 m (6.6 ft.)> <2.5 m (8.2 ft.)> <3 m (9.8 ft.)>**
 - b. Each column shall have a heater set to activate at 71.6° F (22° C)
6. 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 detection technologies.
 - b. The following types of local alarms shall be capable of being generated by the sensing column:
 - 1) Intrusion ~~AND gate+ / OR gate+~~
 - 2) Intrusion by zone
 - 3) intrusion by technology
 - 4) Disqualification
 - 5) Tamper
 - 6) Anti-climbing cap
 - 7) Auxiliary Input
 - 8) AC Power failure
 - 9) 12 VDC Interface failure

7. Integrated alignment tools shall indicate the quality of the incoming signal and include all of the following:
 - a. optical sight
 - b. LEDs
 - c. audible buzzer
 - d. voltmeter
 8. Settings
 - a. Response time - Intrusion alarm response time settings shall be selectable via potentiometer between 40 and 500 milliseconds.
 - b. Web Interface
 - 1) A column'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 columns
 - xi. Detection mode
 - c) The web interface shall allow for visualization of barrier status
- B. 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.

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

5. Communications

- a. RS-485 - The head-end hub (hub) 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 . The hub shall connect to an Ethernet network using an RJ45 connection.
- c. Alarm outputs . 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

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.

6. Events . 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° C to +55° C)
- C. Configuration and Maintenance Software
 - 1. Configuration and Maintenance software (~~software~~) 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 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.

3.03 INSTALLATION

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

- END OF SECTION -