



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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LONG RANGE WIRELESS ACTIVE INFRARED BARRIER

DIVISION 28 – ELECTRONIC SAFETY AND SECURITY

MasterFormat 2014:

28 16 43 Perimeter Security Systems

MasterFormat 2016

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

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 21.23 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

LONG RANGE WIRELESS ACTIVE INFRARED BARRIER

PART 1 GENERAL

1.01 SUMMARY

- A. Section includes a solar-powered perimeter long range wireless active infrared barrier.
- B. Product - A system consisting of solar-powered sensing columns which create an infrared intrusion barrier and report to a head-end hub via wireless 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. Abbreviations
 - 1. AES . Advanced Encryption Standard
 - 2. UHF . Ultra-high frequency
- B. Definitions
 - 1. ModBus . A serial master-slave communications protocol initially published in 1979 for use with programmable logic controllers.
- C. Reference Standards
 - 1. Electromagnetic compatibility
 - a. EU EMC Directives EN 55022, EN 55024
 - b. FCC-47 CFR Part 15, Class B
 - 2. Encryption . NIST Federal Information Processing Standards (FIPS) Publication 197 . Advanced Encryption Standard
 - 3. IEEE 802.3 Ethernet
 - 4. 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 and in a temperature environment of -40°F to +131°F (-40°C to +55°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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Phone: +1 775 856-7333 | Fax: +1 775 856-7658
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- B. Model: Solaris, Maxibus 3000
- 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 solar-powered sensing columns, each of which communicates alarm information to a head-end alarm processing hub via UHF radio communications.
- B. Intrusion detection shall be based upon the interruption of pulsed infrared beams between sensing columns.
1. Up to 10 beams between columns shall be available.
 2. Beams shall be multiplexed and optically synchronized.
 3. The system shall have selectable detection/triggering modes.
 4. The response time for an intrusion alarm shall be selectable from 40 ms to 800 ms.
- C. The wireless UHF communications transmissions from each sensing column shall form a secure mesh network, immune to electromagnetic interference.
- D. System information shall be encrypted using AES 256 bit data bit encryption.
- E. The system shall operate with sensing columns spaced up to 100 m (328 feet) apart.
- F. Each sensing column shall have a solar panel and back up battery.
1. The battery back-up shall provide a minimum of 4 weeks of autonomous operation time under normal operation.
- G. Each sensing column shall have an anti-climbing cap at the top, which shall detect the action of someone pushing on the cap.
- H. Each sensing column shall have a cap to prevent the formation of condensation and ice on the column.
- I. Each sensing column shall have integrated alignment tools.
- J. The sensing column shall be capable of in-line, corner, or wall mounting.

2.03 SYSTEM COMPONENTS

A. Sensing Column

1. Number of beam directions (faces): 1 or 2
2. Number of beams per direction: 3 . 10
3. Number of selectable pulse frequencies: 4
4. Power
 - a. Solar: 6 V, 250 mA
 - b. Battery pack: 4 V, 5 Amp-hour
5. Physical
 - a. Column height: <1 m (3.2 ft)><1.5 m (5 ft)> <2m (6.6 ft)> <2.5 m (8.2 ft)>
<3 m (10 ft)>

Protech Part numbers for sensing columns are as follows:

Part no.	Height	Faces	# Beams per Direction
Column 1MSF	1 m	1	3-4
Column 1MDF	1 m	2	3-4
Column 1M50SF	1.5 m	1	3-5
Column 1M50DF	1.5 m	2	3-5
Column 2MSF	2 m	1	3-5
Column 2MDF	2 m	2	3-5
Column 2M50SF	2.5 m	1	6-8
Column 2M50DF	2.5 m	2	6-8
Column 3MSF	3 m	1	6-10
Column 3MDF	3 m	2	6-10

- b. Environmental
 - 1.) Each column shall be provided with anti-ice and anti-condensation caps which, when mounted, can be removed or reinstalled as one single piece.
 - 2.) Columns shall be IP55 rated.
6. Alarms
 - a. Intrusion alarms
 - 1.) Detection shall normally require the interruption of 2 adjacent cells.
 - 2.) Detection shall be configurable to also permit detection based on the interruption of only the bottom beam.
 - b. The following types of local alarms shall be capable of being generated by the sensing column:
 - 1.) Intrusion
 - 2.) Disqualification

- 3.) Radio loss
- 4.) Tamper
- 5.) Anti-climbing cap
- 6.) Battery low voltage

Note: Intrusion alarms are only applicable to the end of the detection barrier set as a receiver.

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
 8. Settings
 - a. Response time - Intrusion alarm response time settings shall be selectable via potentiometer between 40 and 800 milliseconds.
 9. Detection
 - a. Channel
 - 1.) A common channel setting between two adjacent columns shall create an association which defines a barrier.
 - 2.) The system shall allow for 4 independent channel settings.
 - b. Identification - Available identification settings shall be:
 - 1.) network address
 - 2.) fixed radio ID
- B. Radio Coordinator
1. A radio coordinator shall provide the interface between the sensing columns in the field and a head-end alarm processor hub (head-end hub).
 - a. The radio coordinator shall receive information via wireless radio over the broadcast frequencies assigned to the sensing columns.
 - b. The radio coordinator shall communicate its received information to the head-end hub via RS-485 protocol.
 2. The radio coordinator shall be powered by 12 VDC.
 - a. Voltage range: 10.5 . 14 VDC
 - b. Power consumption: 40 mA
 3. Operating temperature: -40°F to +158°F (-40° C to +70° C)
- C. 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 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)

D. 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. Viewing sensing node (column) 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

2.04 COMMUNICATIONS

- A. Radio (column - radio controller) - Each column shall have a radio transmitter and transceiver with a unique identifier.
 1. Number of channels: 6
 2. Frequency range: 915.000 . 915.250 MHz
 3. Channel Width: 50 KHz
- B. RS-485 (radio controller . hub): 2 wire, ModBus TCP protocol, 9600 baud

- 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. Sensing column solar panels 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. All vegetation shall be cleared from the sight path between adjacent sensing columns.
- C. Radio Coordinator shall be installed on a high position (5-6m) and away from any metallic obstacle that may reduce the radio signal.

- END OF SECTION -