



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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## PASSIVE INFRARED AND MICROWAVE MOTION DETECTOR

### DIVISION 28 – ELECTRONIC SAFETY AND SECURITY

#### MasterFormat 2020

#### 28 31 21.23 Area and Perimeter Intrusion Detection Devices and Sensors

##### 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.

## **PASSIVE INFRARED AND MICROWAVE MOTION DETECTOR**

### **PART 1 GENERAL**

#### **1.01 SUMMARY**

- A. Section includes an outdoor intrusion detection system employing dual intrusion detection technologies.
- B. Product - A system which utilizes passive infrared and microwave Doppler technologies to detect an intruder and designed for outdoor operation.
- 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. Reference Standards
  - 1. Electromagnetic compatibility - EU EMC Directives EN 55022, EN 55024
  - 2. Environmental
    - a. ANSI/ IEC60529 - Degrees of Protection Provided by Enclosures
    - b. International Electrotechnical Commission (IEC) - Ingress Protection Rating IP 65.

#### **1.03 DEFINITIONS**

- A. Gated Configuration - Technologies must be activated simultaneously to create an alarm.

#### **1.04 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

#### **1.05 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.
- B. Installers shall be trained and authorized by the Manufacturer to install, integrate, test, and commission the system.

**1.06 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.

**1.07 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: PIRAMID XL2, XL-MIL, XL-HS, XL-DIR, XL-MW-DIR, XL-MW-VD
- Protech part numbers:*  
*XL2 Version: SDI-76XL2-105XX , SDI-77XL2-105XX*  
*MIL Version: SDI-76XL-MIL, SDI-77XL-MIL*  
*Outdoor High Security: SDI-76XL-HS, SDI-77XL-HS*  
*DIR Version: SDI-76XL-DIR, SDI-77XL-DIR,*  
*SDI-76XL-MW-DIR, SDI-77XL-MW-DIR,*  
*Vehicle Detector: SDI-76XL-MW-VD, SDI-77XL-MW-VD*
- The PIRAMID XL-MIL is an enhanced detection version of the XL2 model and is used for slow moving, and crawling intruders.*
- The PIRAMID XL-HS outdoor high security has added anti-masking and self-test features.*
- The PIRAMID XL-DIR is an XL2 version with added direction control for targets approaching, receding, or both.*
- The PIRAMID XL-MW-VD is a Stereo Doppler microwave sensor with direction control for vehicles approaching, receding or both.*
- C. Alternates: None

**2.02 GENERAL DESCRIPTION**

- A. The passive infrared and microwave motion detector ("detector") shall combine stereo doppler microwave and passive infrared technologies whereby both technologies activate simultaneously to create an alarm.
- B. The stereo doppler microwave portion of the detector shall activate in a gated configuration, whereby an alarm is created upon both movement of an intruder and the change in infrared radiation caused by the intruder.
- C. The detector shall have the ability to ignore randomly moving objects, such as birds.
- D. Detection range and sensitivity shall be adjustable.
- E. The detector shall be suitable for outdoor operation.
- F. Parameters of detection:
1. Direction of movement - differentiation between approaching and receding motion

2. Speed of movement
  3. Distance of movement
- G. Coverage pattern – The detector shall offer lens options to provide a minimum of the following coverage areas:
1. Wide angle(1): 50' L x 50' W (15 m x 15 m) with pet lens option
  2. Wide angle (2): 90' L x 50' W (27 m x 15 m) with pet lens option
  3. Medium angle: 100' L x 35' W (30 m x 10.5 m) with pet lens option
  4. Long Narrow: 125' L x 20' W (38 m x 6 m) with pet lens option
  5. Vertical Barrier: 100' L x 10' W (30 m x 3 m)
  6. Wide angle- high density (1): 50' L x 50' W (15 m x 15 m)
  7. Wide angle- high density (2)): 100' L x 50' W (30 m x 15 m)
- Lenses 6-7 are applicable to the MIL version and are designed for crawling intruders.*
- The HS versions add anti-masking to these lenses.*
- H. Balanced Temperature Compensation: The detector shall maintain stable, consistent detection response when ambient temperature increases or decreases.
- I. Multiple sensors shall be compatible in the same area without mutual interference.

## 2.03 DETAILED SPEIFICATIONS

### A. Electrical

#### 1. Sensors:

##### a. Microwave

- 1) Operating frequency: 10.525 GHz +/- 25 MHz
- 2) Radiated power: 25 dBm
- 3) Number of channels: 5
- 4) RF Power density 120  $\mu$ W/cm<sup>2</sup> maximum (at device face)
- 5) Doppler characteristics continuous wave

##### b. Passive Infrared

- 1) Detector: dual element pyro-electric
- 2) Lenses: replaceable Fresnel

*The MW-DIR and MW-VD does not include the passive infrared.*

##### c. Adjustments:

- range control, sensitivity, bird/animal immunity
- 1) Range adjustment: 10% - 100% of stated range
  - 2) Sensitivity adjustment 1-10 multiplier switch
  - 3) bird/animal immunity on/off (not included on MIL or HS)
  - 4) Directional Switch 3-pos switch. Approach, recede, or both

*The Directional switch is only on the XL-DIR, XL-MW-DIR and XL-MW-VD models.*

2. Output relay: Form C, solid state, 100 mA @ 50 V
  3. Power: 10.5 – 28 VDC , 100 mA @12 VDC
    - a. Indicator: Power on.
  4. External connections: Removable terminal strip
  5. LEDs:
    - a. Testing: Walk Test LED  
*The Protech XL-MiniSOUNDER audible tester is recommended in addition to the LED.*
    - b. Power on
- B. Alarm Conditions
1. Intrusion
  2. Power failure
  3. Microwave antenna failure
  4. Tamper
- C. Mechanical
- a. Housing: aluminum, vandal resistant, with weather shroud
    - 1) The weather shroud shall minimize direct sunlight on the IR lens and have a rain diverter to keep precipitation away from sensor face.
    - 2) Fitting: standard ½" conduit liquid-tight elbow fitting
  - b. Mounting: Wall mount bracket with swivel range 180° horizontal and 90° vertical.  
*Protech offers optional pole mounts for all models.*
  - c. Dimensions:
    - 1) Housing: 10.25" (L) x 6.60" (W) x 4.90" (H) (14.9cm x 13.7 cm x 8.9cm)
    - 2) Bracket 7.125" (L) x 2.5" (W) x 4.5" (H) (18.1cm x 6.35 cm x 11.4cm)
- D. Environmental
1. Operating Temperature: -40°F to +158°F (-40°C and +70°C)
  2. Rating: IP65
  3. Operating Humidity: 0 – 100% relative humidity

-- 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.

### **3.03 INSTALLATION**

- A. The Contractor shall adhere to all Manufacturer's published installation procedures, diagrams, and guidance.

- END OF SECTION -

**Attachment A**

**Exterior dimensions:**

