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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FENCE-MOUNTED INTRUSION DETECTION SYSTEM

DIVISION 28 – ELECTRONIC SAFETY AND SECURITY

MasterFormat 2020

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 *italic* text.

FENCE-MOUNTED INTRUSION DETECTION SYSTEM

PART 1 GENERAL

1.01 SUMMARY

A. Section describes a perimeter fence-mounted intrusion detection system employing accelerometer technology.

B. Product - A fence-mounted cabling system with attached accelerometer sensors which detects all attempts at intrusion that use cutting, climbing or lifting of the fence, while disregarding meteorological phenomena such as wind, rain, snow, or other interference from vibration, up to 2400 m per system.

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 and Abbreviations
   1. Application Programming Interface (API) - A software communication interface between two programs.
   2. Climbing event – An occurrence where one attempts to climb onto a fence.
   3. Cutting event – An occurrence where one attempts to cut the wire mesh on a fence.
   4. MAXIBUS – A system to integrate and monitor one or more PIDS
   5. Modbus RTU – A serial master-slave communications protocol using RTU (Remote Terminal Unit) makes use of a compact, binary representation of the data for protocol communication.
   6. Wind event – An occurrence where wind moves several fence panels.
   7. Zones – Logical groupings of sensing elements for the purpose of establishing specific identifiable areas of coverage.
   8. TCP - Transmission Control Protocol and Internet Protocol (IP) v4
   9. VMS- Video Management System

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 44, IP 65, IP 66, IP67

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.

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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Sparks, NV 89434
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B. Models: G-Fence 2400, G-Fence 2400-IP65

The G-Fence 2400 provides up to 600 m of protection per control unit.

The G-Fence 2400-IP65 is a hardened version of the G-Fence 2400.

MAXIBUS

MAXIBUS is the alarm information hub for G-Fence.

PORTALIS

PORTALIS is an optional infrared barrier for gates to connect to G-Fence.

Smart Bridge

Smart Bridge is a software that connects PROTECH's MAXIBUS UNIVERSAL and/or G-Fence 2400 Controllers to various VMS software platforms.

C. Alternates: None

2.02 GENERAL DESCRIPTION

A. The fence-mounted intrusion detection system (IDS) shall employ a passive detector cable installed on the fence. Upon an intrusion, accelerometer-based technology sensors shall detect vibrations on the fence (caused by cutting, climbing or lifting) and send information to the control unit(s), which analyze the information before triggering an alarm.

B. The IDS shall employ accelerometer-based technology sensors which detect vibrations on the fence (caused by cutting, climbing or lifting) and send information to the control unit(s), which analyze the information before triggering an alarm.

2.03 SYSTEM COMPONENTS - The IDS shall have a maximum system length of 1968 feet (600m) and be comprised of fence cabling with integrated sensor elements, termination units, and one or more control units, as follows:

A. Detection cable/sensors, maximum 100 m long, which integrates up to 40 detector elements, attached to a fence, and is connected to a control unit.

1. Maximum number of sensors per direction 120
2. Sensor type: X-Y-Z accelerometer
3. Configuration: Individual sensitivity settings

4. Diagnostic: integrated LED in sensor

B. Control unit(s) which analyze and process the data from up to six detector cable sections and communicate status upstream.

a. Detection zones per control unit: up to 10

b. Updatable via SD card or IP

c. Auxiliary inputs per control unit: 2

Auxiliary inputs available when used with Maxibus Hub

d. Maximum number of sensors per direction 120

e. Settings via PC or Maxibus hub:

1) Sensor sensitivity

2) Zone set-up

3) Impacts per zone

4) Technical fault recovery time

5) Control unit IP address

6) Control unit Modbus ID

A G-Fence 2400 control unit provides up to 1968 feet (600 m) of protection. Multiple control units may be used in a system to increase coverage.

C. Link termination unit which terminates the detection cable in an open loop configuration or terminates and bridges two detection cables.

D. The Maxibus hub (“Hub”) which accommodates 7874 feet (2400 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.

MAXIBUS is PROTECH’s alarm information hub. See separate specification document.

1. The Hub shall provide alarm management and control unit configuration and maintenance of detection zones.
2. The control unit to Hub communication shall be RS-485 using secure Modbus protocol.
3. The Hub shall allow integration with third party software.

   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.
4. Alarm Communication - The control (units) shall transmit simultaneously via the following means:

   a. Dry contact wiring output to an alarm panel, itself connected to the Hub.

   b. RS-485 to the Hub using secure Modbus protocol.

   c. RS485 maximum wire length: 1 200 m

   d. IP output using API or secure Modbus protocol to a VMS.

E. Infrared Barrier – The IDS shall offer an optional add-on product to provide pulsed infrared optical barrier protection at gates, with the following properties:

Protech's infrared barrier for this application is PORTALIS.

1. Five (5) dual-beam cells for gates of 2.5 m or 3 m height.
2. Maximum range: 30 m /100 ft.
3. Power: Solar with battery pack
4. Alarm connections: via Control unit aux input contacts
5. Alignment tools: Integrated
6. Selectable channels: 4
7. Integrated anti-climbing cap

2.04 PERFORMANCE

A. The system shall be capable of detecting and localizing a cutting event to within 3 meters (9.8 feet).

The actual protected length is a function of the width of the fence panel. Typically, one sensor per panel is employed. For example, 40 sensors, each on an 8 ft. (2.5 m) panel, cover a protected length of 320 ft. (100 m)

B. Maximum System Coverage: Up to 1968 feet (600 meters), 300 m per direction

C. Number of perimeter zones: Up to 10, without limitations on size or location

D. Sensors per direction: 120 maximum

E. Calibration: Auto

F. Cable cut response time: **[30s] <5 seconds to 24 hours>**

G. Alarm conditions: intrusion, technical defect, tamper

H. Event log history: 50,000 events

2.05 ELECTRICAL

A. Control Unit Connections

1. Operating Voltage: 12 - 24 VDC

The system requires an external power supply, and a back-up battery is recommended.

2. Current consumption: 200 mA
3. Current consumption per sensor: 20 µA
4. Detection cable(s): bidirectional from control unit
5. Ethernet: 1 RJ-45
6. Auxiliary inputs: 2

Auxiliary inputs are only used through the Maxibus.

7. Alarm outputs:
   a. 1 RS-485 (Modbus protocol)
   b. TCP/IP to VMS via API
   c. Alarm contacts per control unit

1) 10 Intrusion
2) 1 Technical defect
3) 1 Tamper

MAXIBUS provides modular relay expansion up to 136 relays.

2.06 MECHANICAL

A. Mounting: Integral hooks or mounting tabs.

The G-Fence 2400 provides integral mounting hooks.

The G-Fence 2400-IP65 provides mounting tabs.

B. Security: Tamper switch for control unit cover.

C. Cable Jacket: Polyethylene

D. Dimensions: See Attachment A

2.07 ENVIRONMENTAL

1. The systems shall be rated for indoor or outdoor use.
2. Operating Temperature: -40°F to +158°F (-40°C to +70°C)
3. Operating humidity: 0-95% non-condensing
4. Ratings:
   a. Control unit: IP <44> [65]

The G-Fence 2400 provides an IP44 rating.

The G-Fence 2400-IP65 and termination links have an IP65/NEMA 4X rating.

   b. Termination link: IP 66/67
   c. Detector cable: IP 67

2.08 WEB SERVER AND PROGRAMMING

A. The control unit shall be capable of being programmed via an IP connection.
   1. Available settings:
      a. Individual sensor sensitivity
      b. Zone set-up
      c. Impacts per zone
      d. Recovery time for technical default
      e. Control unit IP address
      f. Control unit Modbus ID

B. Integrated Web Server
   1. The control unit shall have an integrated server to provide the following functions:
      a. remote configuration
      b. event log history
      c. remote maintenance
      d. remote sensitivity adjustment
   2. The web server shall be accessed via an IP connection using the Internet browser.

-- 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 INSTALLATION

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

B. Control units

1. Control units shall be installed at a height of five to six feet.
2. Control unit can be installed inside using up to 200m of passive cable, 18AWG per direction.

C. Detector cable

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

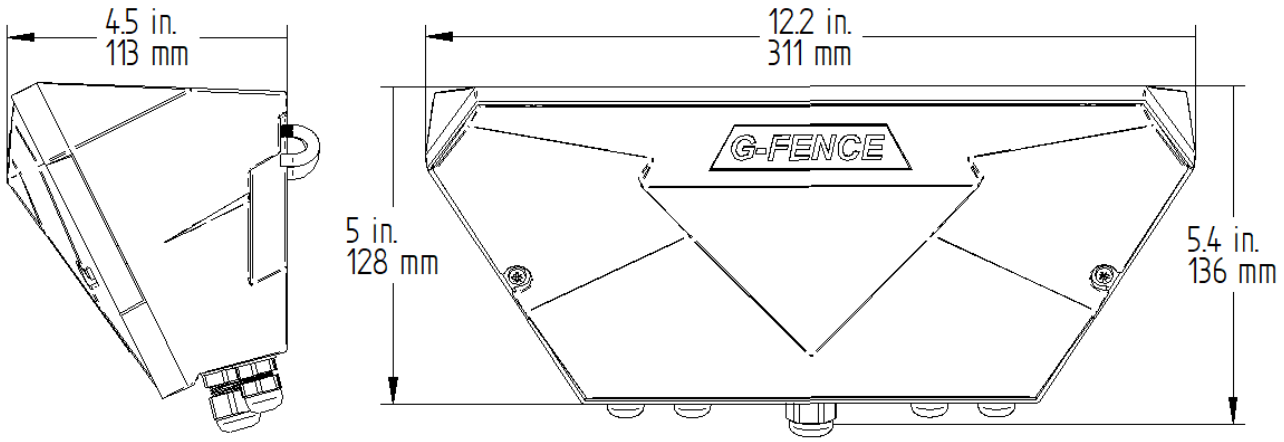
- END OF SECTION -

Attachment A

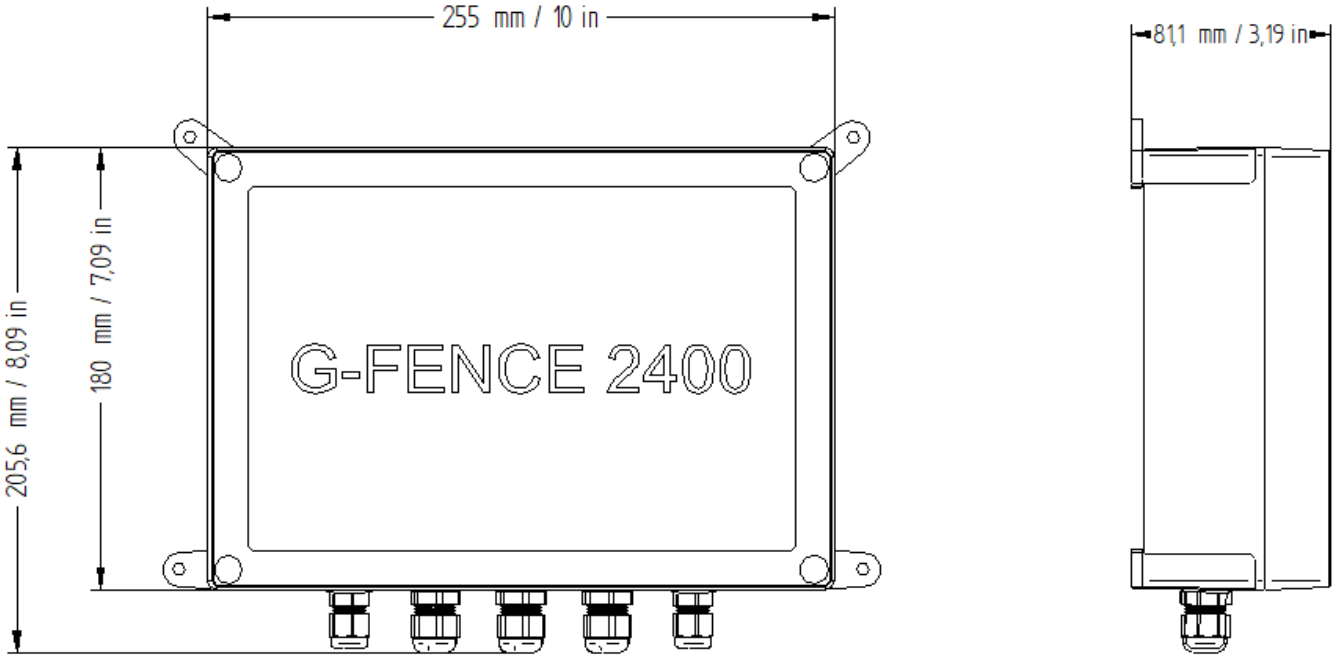
Exterior dimensions:

- Control Unit (UG) housing

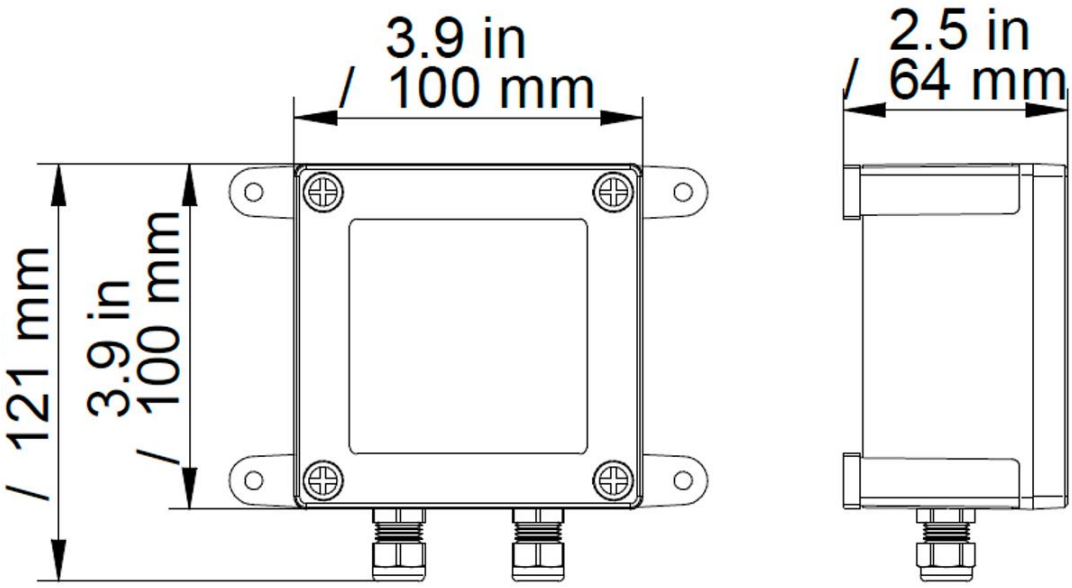
G-Fence 2400



G-Fence 2400-IP65



- Link / Termination Unit (UR/UT) housing



- Detector cable drum