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TECHNICAL BULLETIN

# SELECTION AND APPLICATION

# OF

# JOINT-SERVICES INTERIOR INTRUSION DETECTION SYSTEM

## (J-SIIDS)

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DEPARTMENTS OF THE ARMY, THE NAVY
AND THE AIR FORCE
Washington, D.C., 28 July 1986

# SELECTION AND APPLICATION OF JOINT-SERVICES INTERIOR INTRUSION DETECTION SYSTEM (J-SIIDS)

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# CHAPTER 1

# INTRODUCTION

## Section I. GENERAL

### 1-1. Purpose.

This bulletin provides guidelines for the selection of Joint-Service Interior Intrusion Detection System (J-SIIDS) components.

### 1-2. The J-SIIDS Concept.

The J-SIIDS is intended to give in-depth security to the protected room or building. The system is designed with three levels of detection capability in mind. The first level is boundary penetration detection, the second is motion detection, and the third is point detection. The outermost level, penetration detection, is provided by the penetration sensors and gives the reaction force monitoring the system the earliest notice of an attempted intrusion. The motion sensor provides the second level of protection and detects an intruder only after he has entered the secure area. Thus the allowable response time given the reaction force is shorter than that given by the penetration sensors. The innermost level of detection capability, point detection, is provided by the point sensors. These sensors detect attempted removal of protected items and give the reaction force an allowable response time which is shorter than that given by the first two levels of detection capability. It is recommended that a secure area be provided a minimum of the first two levels of detection capability. It is further recommended that a particular level, once chosen, be carried to completion; e.g., a room fitted with penetration sensors should be secured against penetration at all points of the room's boundary. Total protection consistent with the value of the protected assets and the anticipated threat is the predominant factor in system planning.

### 1-3. Reporting of Errors.

You can help improve this manual. If you find any mistake or if you know of a way to improve the procedures, please let us know. ARMY: Your letter or DA Form 2028 (Recommended Changes to Publications and Blank Forms), or DA Form 2028-2 located in the back of this publication should be mailed directly to: Commander, U.S. Army Troop Support Command, ATTN: AMSTR-MCTS, 4300 Goodfellow, St. Louis, MO 63120-1798. AIR FORCE: Completed AFTO Form 22 (Technical Order Publication Improvement Report and Reply) should be forwarded to: HQ, SA-ALC/MMEDT, Kelly AFB, TX 78241. NAVY: Completed DA Form 2028 (Recommended Changes to Publications and Blank Forms), User Activity Technical Manual Comment Sheet Feedback Report, or other suitable reporting form should be mailed to: Naval Electronics Systems Command, Training and Publications Management Office, ATTN: ELEX. Code 8122, Washington, DC 20360.

## Section II. DESIGN PHILOSOPHY

### 1-4. General.

The basic J-SIIDS is designed to meet the threat posed by the semi-skilled intruder who can be expected to attempt entry without detailed planning or sophisticated equipment and may work individually or as a member of a small group. This intruder can be expected to attack the locks, doors, windows, vents, walls, floors, and ceilings of the protected area, or he may be a "stay-behind" to remove items after the area is secured. He may be expected to resort to robbery by confronting working personnel or guards.

### 1-5. Approach.

This manual describes the J-SIIDS and the components thereof and provides guidelines for the selection of interior intrusion detection devices for secure areas. As examples, it addresses the varied construction of arms rooms and buildings and recommends components for different types of construction.

### 1-6. Scope.

a. General.

It should be emphasized that an interior intrusion detection system is designed to detect, not prevent, an attempted intrusion, Thus, a comprehensive physical security plan must contain appropriate physical security measures along with procedures for an effective reaction force. The scope of this manual is limited to guidelines for the installation of a reliable system to give the designated authorities immediate notice of attempted intrusion. The degree of protection required for a secured area is dependent upon the following:

(1) Threat.

(2) Value of assets.

(3) Location of the room or building.

(4) The construction of the room or building.

(5) The degree of physical security afforded by safes, cabinets, racks, locks, and other supportive security measures.

(6) The effectiveness of the intrusion detection system.

(7) The responsiveness of the reaction force to the reported intrusion.

**1-6. Scope - Continued**

b. Threat.

A careful evaluation of the threat posed to a particular secure area is a vital prerequisite to the formulation of an effective physical security plan for that area. The primary consideration, the general threat, is the demand for the commodity being protected whether it be weapons, currency, sophisticated electronic gear, or commissary and post/base exchange merchandise. The nature and degree of the threat varies widely with the geographical location and the operational environment; i.e., nonhostile or hostile. Variations in a nonhostile environment are primarily due to fluctuations of political or social unrest, economic factors, mobility of criminal elements, and changes in motivation or demand for stolen items at any given time. In a hostile environment, variations are due to the enemy's capabilities and tactics. On any installation, the threat to individual facilities varies because of the nature of the facility itself. The threat can be categorized as internal and external.

(1) Internal threat. Personnel who work in, or have intimate knowledge of, the area and the security system form the source of the internal threat. This threat is generally considered to be a human reliability problem. Susceptibility to this threat can be reduced by incorporating certain security measures and procedures into hardware design, system installation, and system operation. For example, boxes, sensor covers, and cables can be designed to make them less vulnerable to tampering, and communication lines can be provided with tamper detection capability to prevent knowledgeable personnel from easily defeating the system.

(2) External threat. The external threat can generally be described as follows:

(a) Intruders attempting penetration for the purpose of sabotage, conducting terrorist or paramilitary activity, and theft for profit or vandalism. Dissident groups or individuals who may be highly motivated and capable may try to reduce confidence in the military establishment, embarrass the Government, or create a dramatic incident to attract public attention. They could be expected to attempt entry without detailed planning or highly sophisticated equipment. They may evaluate the security posture by considering appropriate time factors, location vulnerability, and personnel/guard presence. They may attempt to bypass or otherwise defeat a detection system by covert means.

(b) Well organized units can be expected to use overt force and diversionary actions to gain entry. Efficiency, depth of planning, execution, sophistication of equipment, and size of force may vary greatly. Alerting intelligence information will be necessary in order to upgrade the defense or security posture required to effectively counter this threat.

c. Value of Assets.

The protection given a particular item should be in keeping with the value of the item. In this context the item's value is determined by monetary, political or social considerations or by any other criteria appropriate to the item. An item, the loss of which would do serious harm to the Government, should be given the highest degree of security. Items of a less sensitive nature or lesser value should be protected accordingly.

**1-6. Scope - Continued**

d. Location.

The location of the secure area is a predominate consideration in determining the degree of security required. Factors such as the nearness of human activity and the degree of lighting around the secure area must be weighed; likewise, the nearness of other buildings and the fencing around the area. Some questions that may be addressed are the following: Are personnel on duty in the building 24 hours a day? Is the secure area part of a larger building? What are the entrance and exit routes? What is the degree of entry control? What is the response time of the reaction force?

e. Construction.

(1) General. This manual addresses four basic types of construction: (1) Wood, (2) Reinforced concrete, (3) Non-reinforced concrete, and (4) Masonry (brick, concrete block, etc.).

(2) Primary points of attack.

(a) Doors. Doors constitute a primary point of intrusion. The intruder can be expected to attempt entry by cutting, breaking, or otherwise defeating the lock or hinges or by breaking through the door.

(b) Alarm transmission lines. A knowledgeable intruder is expected to first attempt to attack telephone or other transmission lines between the protected room and the monitoring area.

(c) Walls, ceilings, floors. A determined intruder can penetrate almost any type wall, ceiling, or floor in a matter of minutes with readily available tools.

(d) Windows. Windows, like doors, are a primary point of intrusion and are the hardest of all room features to protect.

(e) Apertures. Any rectangular opening having a minimum dimension greater than six inches with a cross-sectional area greater than 96 square inches, or any circular opening having a diameter greater than ten inches, in walls, ceilings, floors, or doors must be considered as a possible point of entry.

(f) Personnel. Guards and personnel working within the secure area can be put under duress so that access to the secure area may be gained.

f. Physical Security.

Intrusion detection systems are not intended to replace physical security features such as locks, safes, etc. The number of levels of detection capability necessary, is determined in part, by the physical security aspects of the secure area.

g. Effectiveness.

The J-SIIDS was designed to be an effective, standardized, interior intrusion detection system for the Department of Defense. Its design characteristics are ease of installation and maintenance, ease of repair, and a minimal technical knowledge requirement on the part of the user. The system has a high detection capability and a low nuisance alarm susceptibility.

**1-6. Scope - Continued**

h. Reaction Force.

Once notice of an attempted intrusion has been given, the reaction force should be available to report to the scene in sufficient time to determine the nature of the alarm and take necessary action. Two important considerations are the following: (1) The time necessary for the intruder to complete his mission once he has been detected, (2) The time necessary for the reaction force to arrive on the scene.

**NOTE**

**It is desirable to install a detection system that will give the earliest possible notice of an attempted intrusion.**

# CHAPTER 2

# SYSTEM DESCRIPTION

## Section I. SYSTEM DESCRIPTION

### 2-1. General.

The Joint-Services Interior Intrusion Detection System (J-SIIDS) is designed to provide reliable detection on a 24-hour basis of intrusions, attempted intrusions, and equipment tampering attempts. All components of the J-SIIDS, except for the monitoring and display equipment, contain internal tamper switches that are activated when the component enclosure cover is removed or opened. All sensors requiring power are designed with a fail-safe mode whereby loss of power results in an alarm output. Primary power, 110 VAC to 125 VAC, 48Hz to 62 Hz is required for the Control Unit and the Monitor Cabinets. All J-SIIDS Components are designed to operate over a temperature range of -20° F to 150° F (-28.8 to 65.5° C) with relative humidity up to 95%.

### 2-2. J-SIIDS Description (Basic System).

a. The Joint-Services Interior Intrusion Detection System (fig. 2-1) consists of a family of intrusion and duress sensors, a Control Unit, monitoring and display equipment consisting of Alarm and Status Monitor Modules and Monitor Cabinets, a secure Data Transmission System, and an Audible Alarm. The components of the J-SIIDS were developed primarily to protect the many and varied types of arms rooms. When properly installed, the system functions to detect attempted and actual intrusions and notify the designated authorities.

b. The J-SIIDS has been type-classified for use in the following areas.

(1) Nuclear storage sites.

(2) Chemical storage sites.

(3) Conventional arms, ammunition, and explosives storage facilities under the purview of National Guard, Army Reserve, ROTC, and active Army (within this group, priority to categories I, II, Ill, and IV, in that order).

(4) Classified storage facilities.

(5) Communications, command and control facilities (e.g., ADP, message switching/handling centers, etc.)

(6) Controlled substances storage facilities.

(7) Other areas as determined by the commander concerned (includes non-appropriated fund activities).

c. The sensors and the Control Unit are located in the protected area. The Control Unit receives and processes the alarms from the sensors and supplies power to the sensors. The alarm and status signals, after processing, are relayed directly to the Audible Alarm, if used (except for a duress alarm) and to the Monitor Modules via the Data Transmission System or directly by unsupervised hardwire connections.

2-2. J-SIIDS Description (Basic System) - Continued

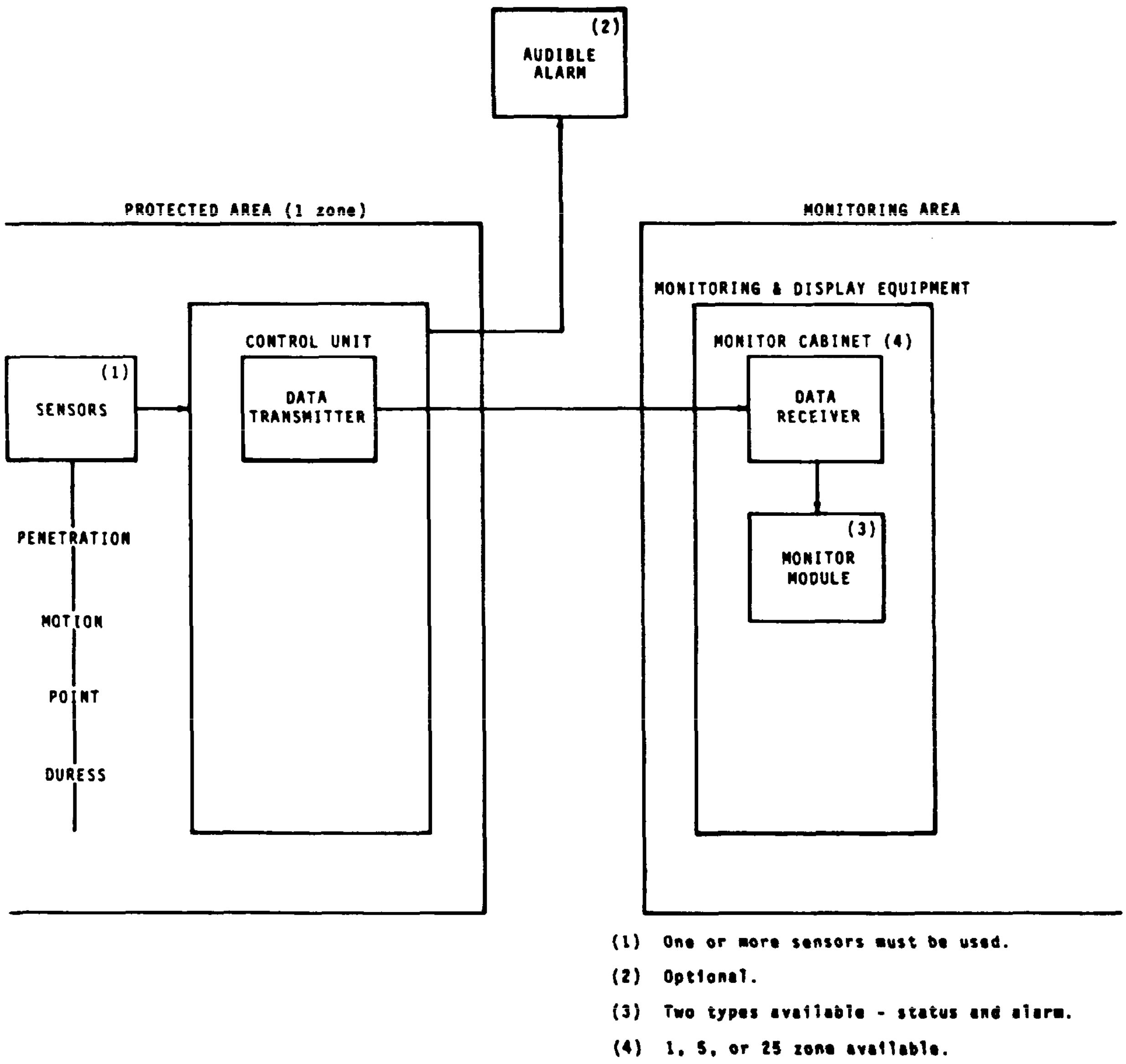


*Figure 2-1. Joint-Services Interior Intrusion Detection System Functional Diagram.*

The Audible Alarm normally is mounted on the outside of the room or building being protected and gives notice to personnel in the area that an alarm signal has been generated by the sensors. The monitoring and display equipment normally is located in an area where monitoring personnel are on duty 24 hours a day. The monitoring and display equipment consists of Monitor Cabinets and Status or Alarm Monitor Modules (one for each Control Unit). The Status Monitor Module gives an audible and visual indication of alarm and status changes. The Alarm Monitor Module only gives audible and visual indication of alarm conditions. The components of the Basic J-SIIDS System are described in Section II.

## Section II. J-SIIDS COMPONENTS

### 2-3. Control Unit.

a. The Control Unit (CU) (fig. 2-2) is the central control element of the J-SIIDS and is located within the protected area. It receives and processes the intrusion, tamper, and duress alarm signals generated at the sensors, provides for selection of the mode of operation (ACCESS, SECURE, TEST/REST) of the system, and continuously presents the status (ALARM, NO ALARM) and mode of operation to the Alarm Monitor Group.

b. The Control Unit contains an emergency standby (battery) power supply with an automatic switchover which activates upon loss of primary AC power. Operation of the Control Unit continues as normal during AC power outages. Notification of power loss is presented to the Monitor Cabinets.

c. The Control Unit dimensions are shown in Table 2-1.

*Table 2-1. Control Unit Dimensions*

| | |
|---|---|
| Dimensions | |
| Width | 14.3 inches (36.2 cm) |
| Depth | 8.3 inches (21.0 cm) |
| Height | 22.3 inches (56.5 cm) |
| Power Requirements | |
| Primary AC | 110 V to 125 V, 48 to 62 Hz @ 1.5 amps |

d. The Control Unit has five intrusion sensor inputs plus a duress sensor input. This limitation does not affect the capability to use additional Ultrasonic Motion Sensor, Passive Ultrasonic Sensor, and Vibration Sensor transducers or multiple Balanced Magnetic Switches or Grid Wire Sensor Sections on a single Control Unit intrusion sensor input.

e. The Alarm Interface Unit (AIU) J-4025/FSS-9(V) provides replacement for the J-SIIDS Data Transmission System and Monitor Cabinet by appropriate commercial components. The usual reason for using commercial components instead of J-SIIDS counterparts is to allow use of already installed commercial Monitor Cabinets located in police stations or central stations where space or standardization considerations may be preeminent.

**2-3. Control Unit - Continued**

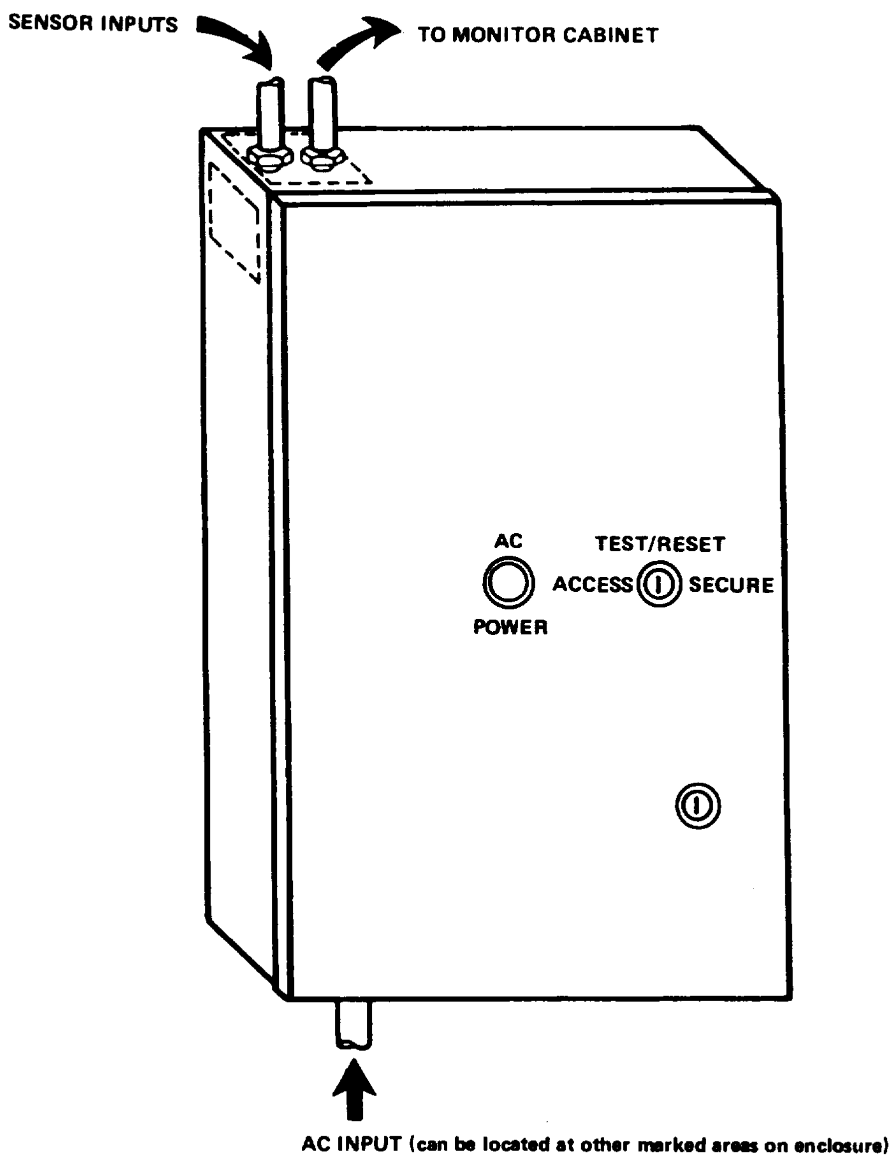


*Figure 2-2. Control Unit.*

**2-3. Control Unit - Continued**

f. The J-SIIDS mode of operation is key-switch selectable at the Control Unit. Three modes of operation are provided:

(1) SECURE - The J-SIIDS is operated in the SECURE mode when the protected area is not opened to authorized personnel. In this mode, all alarms are processed and presented to the Monitor Modules. All alarms except the duress alarm are presented to the Audible Alarm.

(2) ACCESS - The J-SIIDS is operated in the ACCESS mode when the area is open to authorized personnel. In this mode all intrusion alarms are inhibited from being presented to either the Monitor Modules or the Audible Alarm. Tamper and duress alarms are presented to the Alarm Monitor and only tamper alarms are presented to the Audible Alarm.

(3) TEST/RESET - In the third mode of J-SIIDS operation, TEST/RESET, all alarms are inhibited from the Audible Alarm but are presented to the Monitor Modules. An audible sounding device is activated at the Control Unit upon receipt of an alarm as an aid to J-SIIDS testing. The sounding device activates upon receipt of the alarm and continues for 10 seconds after removal of the alarm.

g. *Alarm Display Options.* Alarm signals may be presented to the monitor modules in any one of the following four ways, selectable by choice of Control Unit alarm output wiring options and the position of a LATCH/NON-LATCH switch in the Control Unit:

(1) *Instantaneous Alarm Option.* In the SECURE mode of operation all alarm inputs to the Control Unit are instantaneously presented at the Control Unit alarm outputs for transmission to a monitor module. The Control Unit will continue to output an alarm for 10 seconds after the alarm input has ceased.

(2) *Nonlatched Delayed Alarm Option.* In the SECURE mode of operation, all intrusion alarm outputs are delayed for an adjustable interval of 10 to 90 seconds. This entrance delay permits authorized personnel to enter the protected area and turn the mode switch from SECURE to ACCESS without presenting an alarm at the monitor module. An exit time delay permits personnel to leave the protected area after turning the mode switch from ACCESS to SECURE without presenting an alarm at the monitor module. After expiration of the exit time delay, intrusion alarms to the control Unit are presented at the unit’s output terminals for transmission to the monitor module upon expiration of the entrance time delay. The Control Unit will continue to output an alarm for 10 seconds after the alarm input has ceased. Tamper and duress alarm outputs are not affected by the time delays. They are instantaneous.

(3) *Latched Delayed Alarm Option.* This alarm option is identical to the Nonlatched Delayed Alarm Option except that alarm outputs to the monitor module are latched. Using this option, the monitor module can be reset only after the mode switch on the Control Unit has been momentarily placed in the TEST/RESET position.

(4) *Instantaneous Alarm with Latched Delayed Alarm Option.* In the SECURE mode of operation, intrusion alarm inputs to the Control Unit occurring prior to expiration of the entrance time delay are instantaneously transmitted to the monitor module to which the Control Unit is connected. If the mode switch on the Control Unit is not turned to ACCESS prior to expiration of the entrance time delay, the Control Unit will transmit another alarm which will continue until reset by momentarily switching the mode switch at the Control Unit to the TEST/RESET position. After turning the mode switch on the Control Unit to SECURE, intrusion alarms generated by personnel securing the area will be instantaneously

**2-3. Control Unit - Continued**

presented at the Control Unit alarm outputs. This alarm output will continue for 10 seconds or until the alarm input has disappeared, provided an alarm input is not present upon expiration of the exit time delay. If an alarm input is still present upon expiration of the exit time delay, the Control Unit will transmit another alarm which will continue until reset. Tamper and duress alarms are transmitted instantaneously.

**NOTE**

If an Audible Alarm is installed, it will input a tamper alarm to the Control Unit while sounding, prevent the alarm output from disappearing after 10 seconds, and thereby cause the Control Unit to output a continuous alarm condition for transmission to the monitor module. The Control Unit and the Audible Alarm must then be reset by turning the mode switch at the Control Unit to TEST/RESET, thereby silencing the Audible Alarm and allowing the monitor module to be reset.

h. Local Standard Operating Procedures may require that some means of communication must be provided between the protected areas operators and the monitoring area personnel to coordinate status changes.

i. Some means of communication must be provided between the protected areas and the monitoring area to coordinate status changes.

**2-4. Monitoring and Display Equipment.**

a. General.

(1) The monitoring and display equipment (fig. 2-3) is the primary notification equipment of the J-SIIDS. It consists of Monitor Cabinets and one or more plug-in Status Monitor Modules and/or Alarm Monitor Modules. Three types or sizes of Monitor Cabinets are available; a single-zone with provisions for one plug-in Monitor Module, a five-zone with provisions for up to five Monitor Modules and a 25-zone which accepts up to 25 Monitor Modules. Each type Monitor Cabinet has a self-contained signal module and primary and emergency (battery) power supply. The signal module displays the status of the Monitor Cabinet power supply; i.e., operation on the primary or emergency source.

(2) The Monitor Cabinet dimensions are shown in Table 2-2.

(3) Each Monitor Cabinet contains an emergency standby (battery) power supply with automatic switchover which activates upon loss of primary AC power.

(4) The Monitor Cabinets and Monitor Modules interface directly with the Control Unit via, hard-wired interconnecting wiring or via a Data Transmission System over a twisted wire pair or dedicated telephone lines. The hardwired interconnection is unsupervised, however, and should only be used when the Control Unit and the monitoring and display equipment are located within the same building and the interconnecting wire is enclosed in conduit.

2-4. Monitoring and Display Equipment - Continued

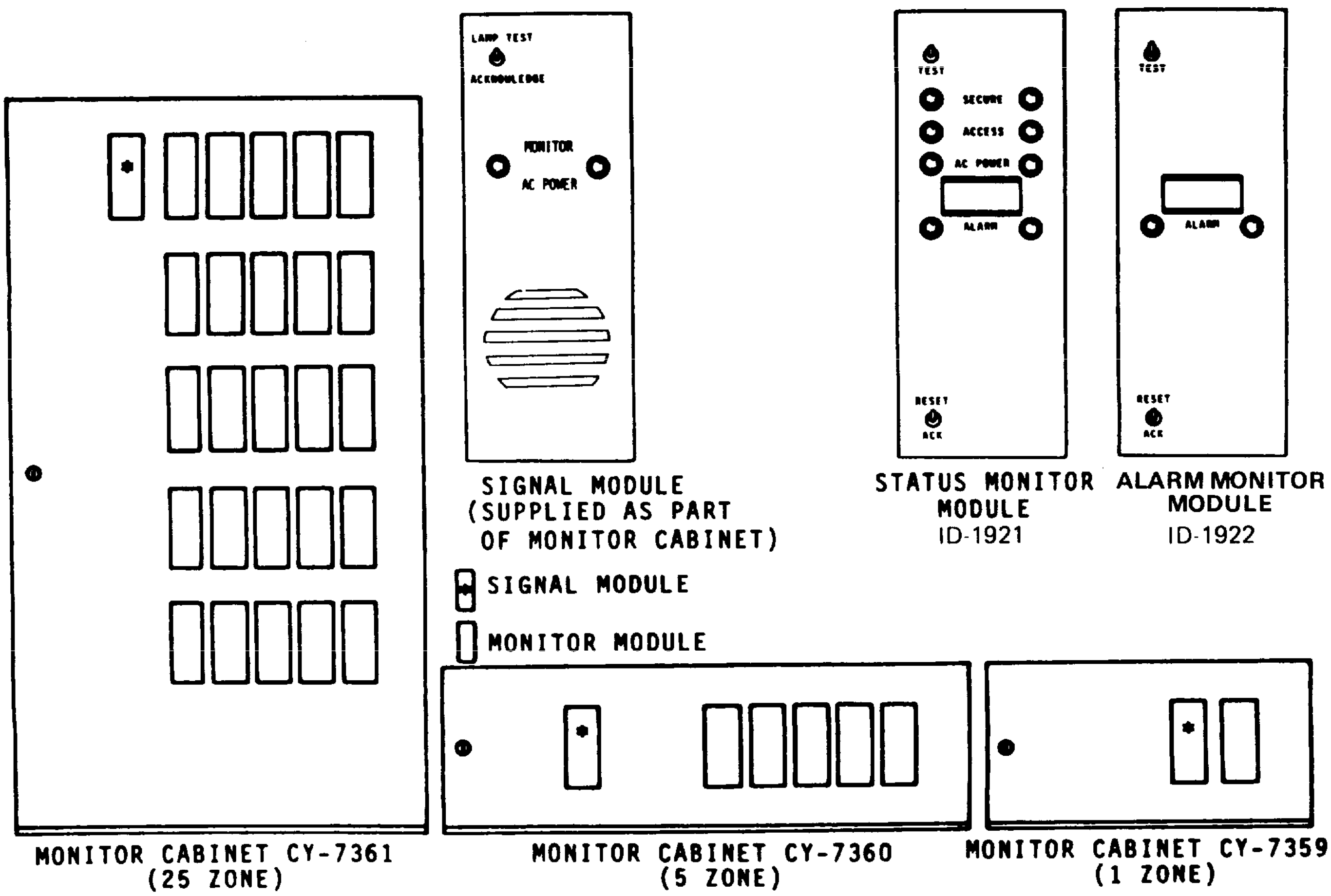


*Figure 2-3. Components of Monitoring and Display Equipment.*

**2-4. Monitoring and Display Equipment - Continued**

*Table 2-2. Monitor Cabinet Dimensions*

| | |
|---|---|
| Single-Zone Monitor Cabinet | |
| Dimensions | |
| Width | 19.0 inches (48.3 cm) |
| Depth | 14.2 inches (36.1 cm) |
| Height | 11.5 inches (29.2 cm) |
| Power Requirements | |
| Primary AC | 110 V to 125 V, 48 to 62 Hz @ 0.5 amps |
| Emergency (battery) | 24 hours operation |
| Five-Zone Monitor Cabinet | |
| Dimensions | |
| Width | 33.5 inches (85.1 cm) |
| Depth | 13.2 inches (33.5 cm) |
| Height | 13.3 inches (33.8 cm) |
| Power Requirements | |
| Primary AC | 110 V to 125 V, 48 to 62 Hz @ 1.0 amps |
| Emergency (battery) | 20 hours of operation |
| Twenty-five-Zone Monitor Cabinet | |
| Dimensions | |
| Width | 24.5 inches (62.2 cm) |
| Depth | 15.7 inches (39.9 cm) |
| Height | 59 inches (149.9 cm) |
| Power Requirements | |
| Primary AC | 110 V to 125 V, 48 to 62 Hz @ 5.0 amps |
| Emergency (battery) | 12 hours of operation |

(5) Each plug-in Monitor Module (Status or Alarm) displays information from an individual Control Unit. The Status Monitor Module displays the complete status of the secured area (Alarm, No Alarm, AC On, AC Fail) and mode of operation (Access, Secure), as processed by the Control Unit. The Alarm Monitor Module displays only the alarm status (Alarm, No Alarm) of the secured area.

**2-4. Monitoring and Display Equipment - Continued**

b. Status Monitor Module.

(1) The Status Monitor Module displays the complete status of one Control Unit. The six different status conditions (Secure, Access, Alarm, No Alarm, AC On, AC Fail) are displayed by means of four pairs of colored lights labeled SECURE (green), ACCESS (yellow), AC POWER (white), and ALARM (red). The No Alarm condition is indicated by the off state of the ALARM lights and the AC Fail condition is indicated by the off state of the AC POWER lights.

(2) Any change in status, except for a change from Alarm to No Alarm is accompanied by the flashing lights associated with the new status and by the sounding of an audible signal (located in the Monitor Cabinet signal module). When the ACKNOWLEDGE switch is momentarily depressed, the flashing lights associated with the new status change to a continuously on state (off for the AC Fail lights), and the audible signal is silenced. The alarm lights remain ON steady until the Reset switch is momentarily depressed after the alarm condition has been removed.

(3) The Status Monitor Modules interface with the Monitor Cabinets by means of plug-in connectors. The modules have an additional connector for interfacing with the Data Transmission System receiver when the Data Transmission system is used between the Control Unit and the monitoring and display equipment. The receiver plugs into the Monitor Module.

c. Alarm Monitor Module.

The Alarm Monitor Module is used in the Monitor Cabinets when it is desired that only alarm information be displayed. The Alarm Monitor Module is equipped with a single pair of red lights labeled Alarm. Operation of the alarm lights is identical to those on the Status Monitor Module. The Alarm Monitor Modules are physically interchangeable with the Status Monitor Modules.

**2.5. Data Transmission System.**

a. The Data Transmission System (DTS), illustrated in figure 2-4, is used to provide secure transmissions between the Control Unit, located in the secured area, and the monitoring and display equipment, normally located some distance from the secured area. The Data Transmission System consists of a Data Transmitter mounted within the Control Unit and a Data Receiver connected to a Monitor Module located within the Monitor Cabinet.

b. The Data Transmission System is designed to operate over a maximum of 10 miles of 600-ohm, 2-wire, balanced transmission line or over telephone systems using dedicated voice-grade lines. The Data Transmission system is used whenever there are segments of the transmission line that are open or accessible to tampering. In those cases where the transmission line can be provided with complete end-to-end physical protection; e.g., where the line is enclosed in rigid conduit and within a building, the Data Transmission System may not be required and the Control Unit and monitoring equipment can be directly connected, but with degradation in line security and a complete loss of line supervision.

c. The Data Transmission System continuously monitors the status and mode of operation of the secured area, as processed by the Control Unit. This information is encoded prior to transmission. Secure signal transmission is achieved through the use of synchronized pseudo-random binary sequence generators in the transmitter and receiver. Synchronization of these generators is automatic upon application of DC power to the transmitter. They can also be manually synchronized by momentary activation of a switch located within the Control Unit.

2-5. Data Transmission System (Type I) - Continued

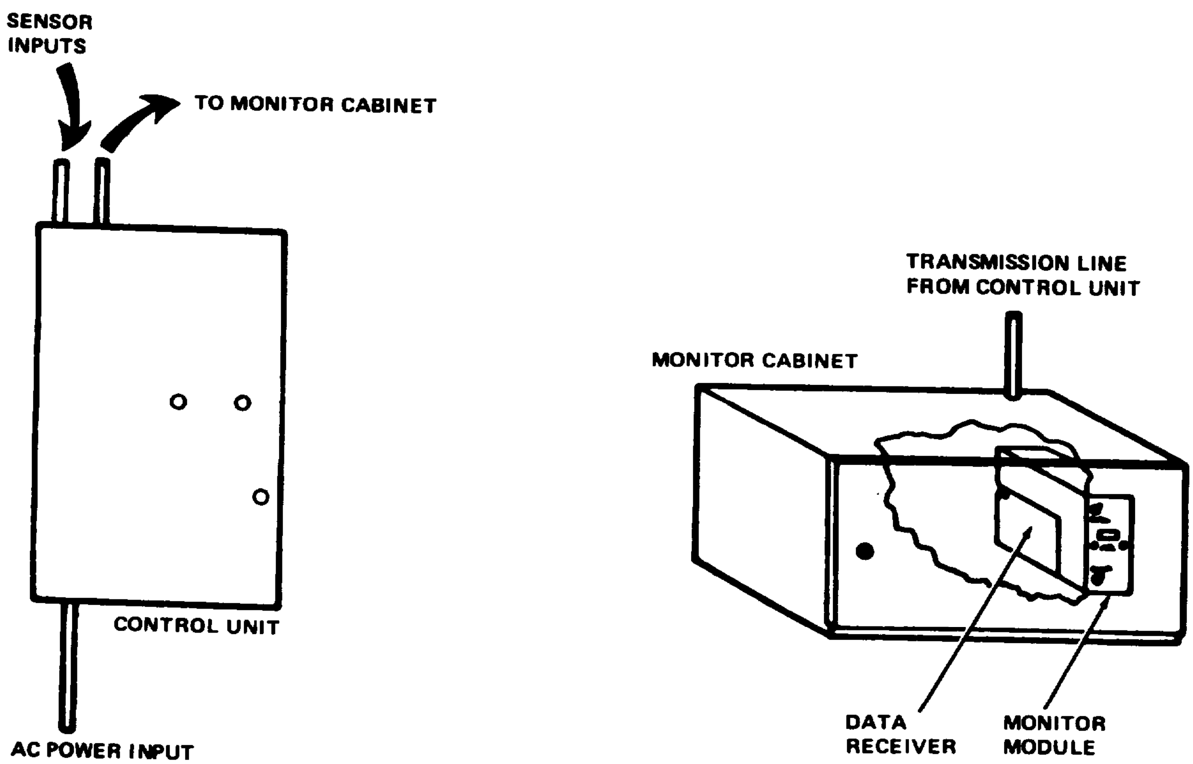


*Figure 2-4. Data Transmission System.*

**2-5. Data Transmission System. - Continued**

d. The Data Transmission System has been designed to preclude the possibility of nuisance alarms and transmission of incorrect data caused by degradation (noise, momentary dropouts, line loading) of the transmission media. The transmission line is also continuously monitored for indications of tampering and other attempts at compromise.

**2-6. Audible Alarm.**

a. The Audible Alarm (fig. 2-5) is used when a loud audible alarm signal is desired to alert personnel in the immediate vicinity to an intrusion or tamper alarm condition. The Audible Alarm interfaces directly by hardwire to the Control Unit and normally is mounted to an exterior wall in the near vicinity of the secured area. Normally only one Control Unit can be connected to a single Audible Alarm. Multiple Control Units may be connected to a single Audible Alarm if special interface circuits are used. A single Control Unit may be operated with two or more Audible Alarms.

b. The Audible Alarm dimensions are shown in Table 2-3.

*Table 2-3. Audible Alarm Dimensions*

| Dimensions | |
|---|---|
| Length | 12 inches (30.48 cm) |
| Height | 6 inches (15.24 cm) |
| Depth | 15 inches (38.10 cm) |

c. Primary AC power to the Audible Alarm is provided through the Control Unit. A separate source of AC power is not required. Emergency standby power is available from a battery which is self-contained and is sufficient to provide Audible Alarm sounding at a level of 110 dB for a minimum period of 15 minutes.

d. Since the Audible Alarm is mounted externally to the building within which the secured area is located, it is relatively vulnerable to attempt a compromise. Tamper protection is provided through the use of pry-off tamper switches which cause an alarm to be activated when the enclosure is removed from the mounting surface. Enclosure door tamper switches cause an alarm to be activated when the enclosure door is opened. A double enclosure, one within the other, causes an alarm to be activated when the enclosures are shorted together as would occur during attempts to drill through the enclosures.

e. The alarm can be heard at distances of approximately 500 feet.

**2-7. Sensor Components.**

a. General.

The various sensors available as J-SIIDS components are classified as follows:

(1) Penetration Sensors - those designed to detect penetration into the protected area, including entry through doors, windows, walls, floors, ceilings, and other openings in the room.

(2) Motion Sensors - those designed to detect movement of a person within the protected area.

2-6. Audible Alarm - Continued

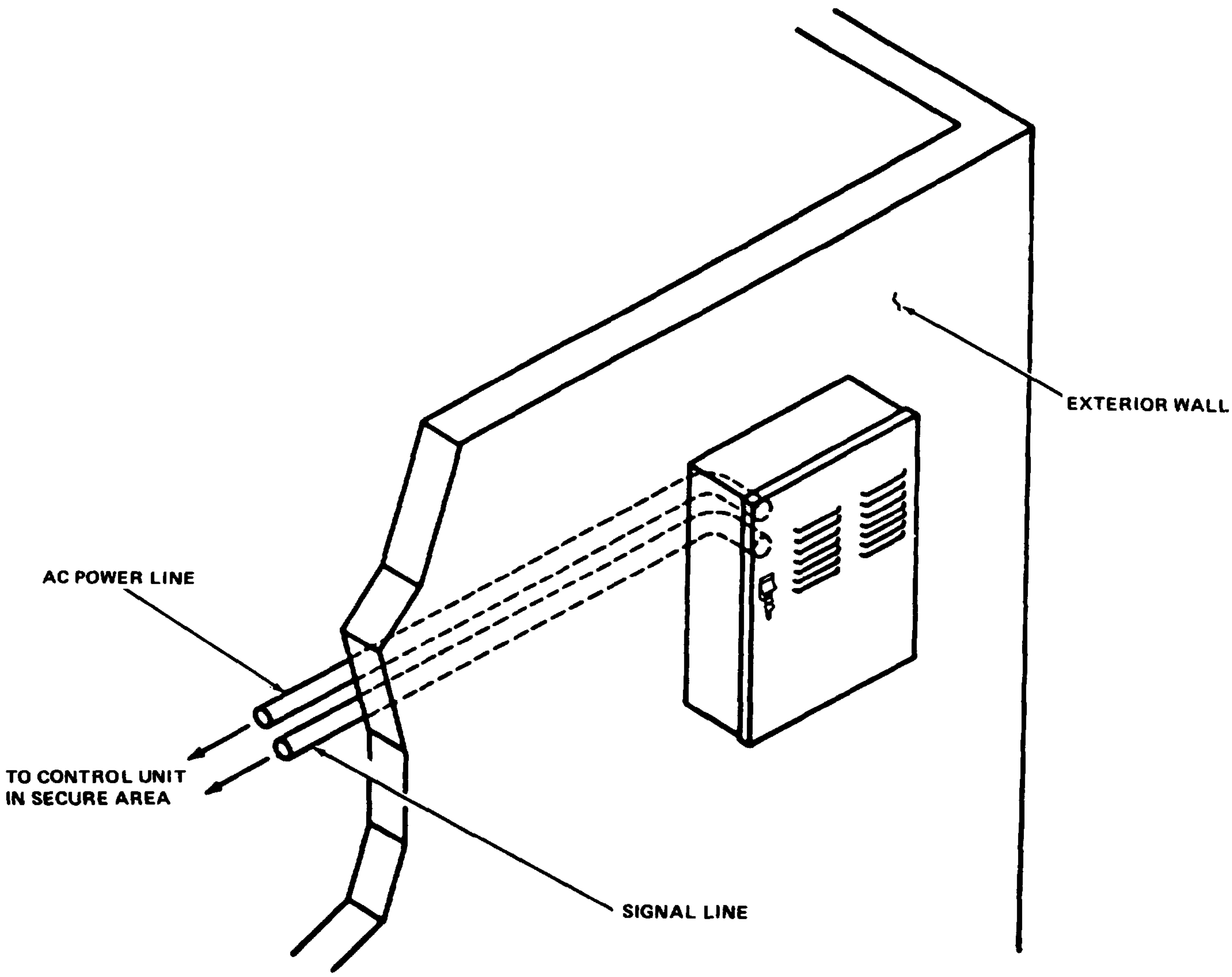


*Figure 2-5. Audible Alarm.*

**2-7. Sensor Components - Continued**

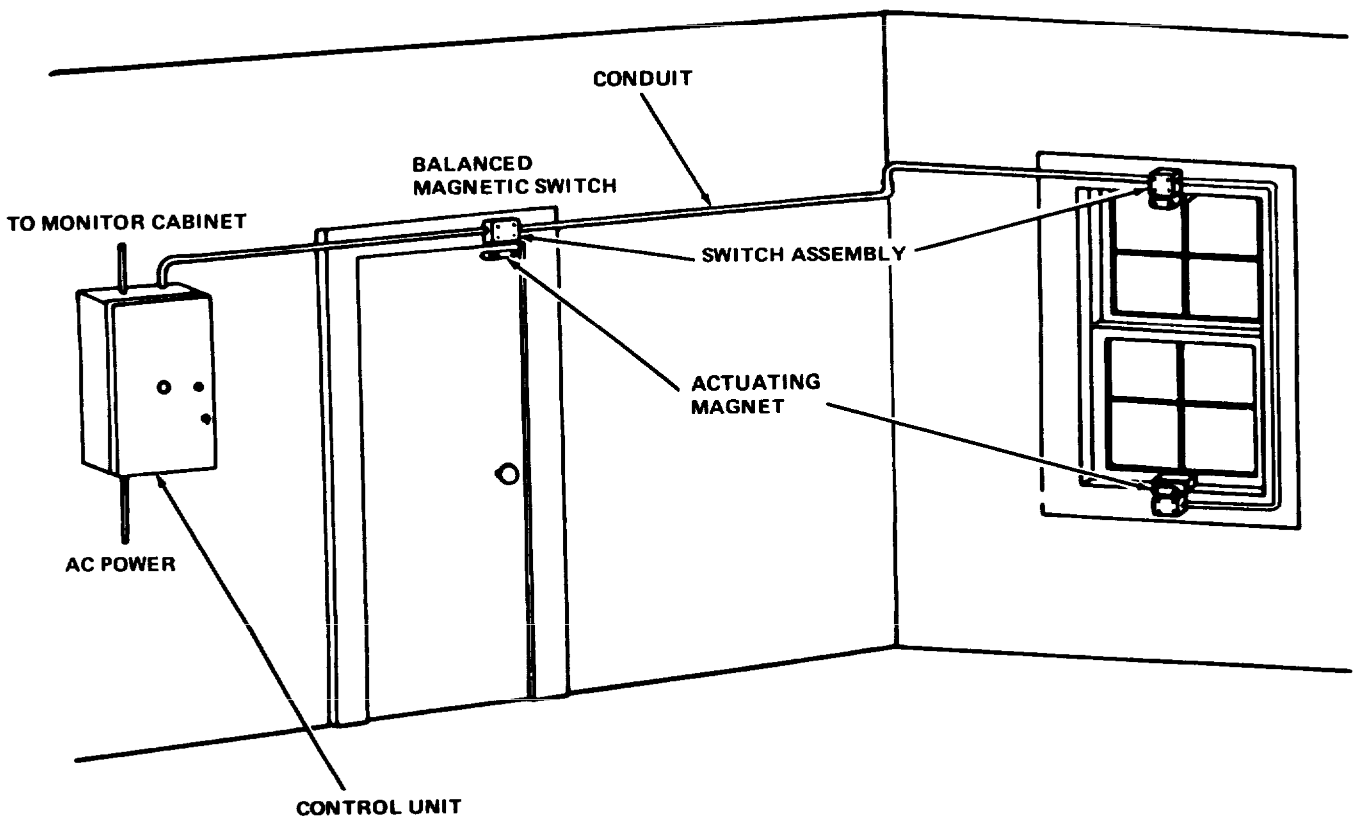


*Figure 2-6. Balanced Magnetic Switch.*

**2-7. Sensor Components. - Continued**

(3) Point Sensors - those designed to detect the attempted removal of an item from its normal position within the protected area.

(4) Duress Sensors - those designed to be activated by guard personnel to call for assistance under situations of duress.

b. Penetration Sensors.

(1) Balanced magnetic switch (fig. 2-6). The balanced magnetic switch (BMS) is a magnetically operated switch used to detect the opening of a secured door (or window). It consists of a switch assembly and an actuating magnet assembly. Refer to Table 2-4 for dimensions. The switch assembly mounts on the inside of the door frame, and the actuating magnet mounts on the door as shown in figure 2-6. When the door (or window) is closed, the field from the actuating magnet interacts with a second field inside the switch assembly to balance the magnetic field and allow the switch to close. When the (secured) door (or window) is opened the actuating magnet is moved away from the switch assembly, the field inside the switch assembly becomes unbalanced and forces the switch to open, and an intrusion alarm is signaled. With the door closed, any change in the external field, either by the addition of an external magnet to the outside of the switch assembly case, or by the insertion of a shield between the switch assembly and the actuating magnet, will disturb the balance, cause the switch to open, and initiate an alarm.

*Table 2-4. Penetration Sensor Dimensions*

| | |
|---|---|
| Balanced Magnetic Switch | |
| Switch Assembly Dimensions | |
| Length | 4.8 inches (12.1 cm) |
| Width | 2.5 inches ( 6.4 cm) |
| Depth | 1.7 inches ( 4.3 cm) |
| Actuating Magnet Assembly Dimensions | |
| Length | 4.5 inches (11.5 cm) |
| Width | 0.9 inches ( 2.2 cm) |
| Depth | 1.7 inches ( 4.3 cm) |
| Capacitance Proximity Sensor | |
| Signal Processor Dimensions | |
| Length | 8 inches (20.3 cm) |
| Width | 6 inches (15.2 cm) |
| Depth | 4 inches (10.2 cm) |

**2-7. Sensor Components - Continued**

*Table 2-4. Penetration Sensor Dimensions - Continued*

| | |
|---|---|
| **Vibration Sensor** | |
| Signal Processor Dimensions | |
| Height | 9.7 inches (24.6 cm) |
| Width | 10.2 inches (25.9 cm) |
| Depth | 2.1 inches ( 5.3 cm) |
| Detector Dimensions | |
| Height | 6.0 inches (15.2 cm) |
| Width | 4.8 inches (12.2 cm) |
| Depth | 2.1 inches ( 5.3 cm) |
| **Passive Ultrasonic Sensor** | |
| Signal Processor Dimensions | |
| Length | 9.7 inches (24.6 cm) |
| Width | 10.2 inches (25.9 cm) |
| Depth | 2.1 inches ( 5.3 cm) |
| Receiver Dimensions | |
| Height | 6.0 inches (15.2 cm) |
| Width | 4.8 inches (12.2 cm) |
| Depth | 2.1 inches ( 5.3 cm) |
| **Ultrasonic Motion Sensor** | |
| Signal Processor Dimensions | |
| Height | 9.7 inches (24.6 cm) |
| Width | 10.2 inches (25.9 cm) |
| Depth | 2.1 inches ( 5.3 cm) |
| Transceiver Dimensions | |
| Height | 17.9 inches (45.5 cm) |
| Width | 3.4 inches ( 8.6 cm) |
| Depth | 2.2 inches ( 5.6 cm) |

**2-7. Sensor Components - Continued**

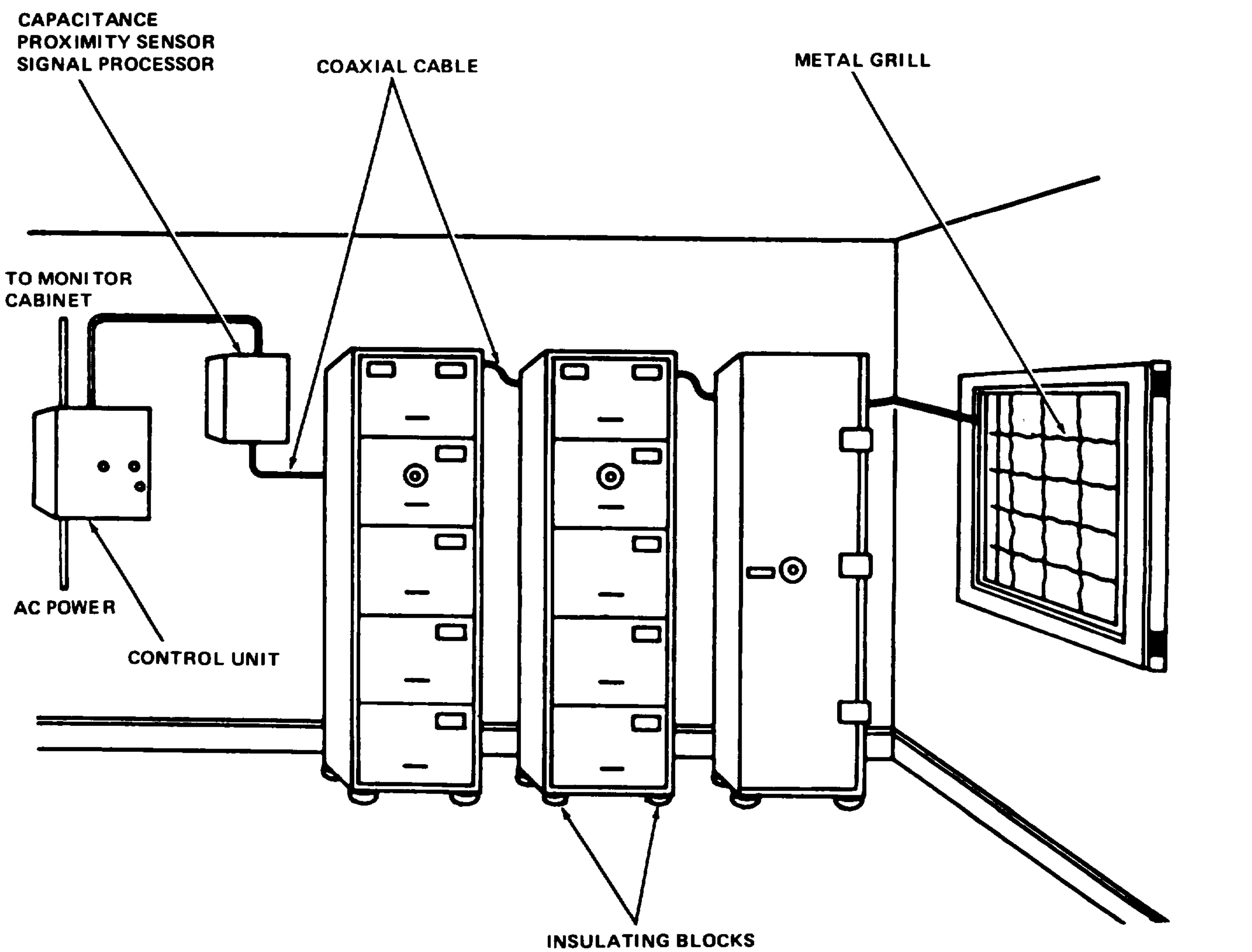


*Figure 2-7. Capacitance Proximity Sensor.*

**2-7. Sensor Components - Continued**

(2) Capacitance proximity sensor (fig. 2-7).

(a) In addition to being used as a point sensor, as described in paragraph 2-7d(2), the Capacitance Proximity Sensor (CPS) may also be used to detect penetration through windows, ventilators, and other similar openings. The sensor continually monitors the net capacitance between sensor protected metal objects and a reference ground. When used as a penetration sensor, the metal objects consist of metal grills which are insulated from ground and mounted over the openings.

**NOTE**

The grills are fabricated locally out of any conducting material (e.g., metal fencing material or expanded metal) and are not supplied as part of the sensor.

(b) When an intruder approaches or touches the metal grill, the capacitance between the grill and ground is changed. This change in capacitance is sensed by the signal processor, and an alarm is generated. The sensor is designed such that slowly changing capacitance caused by normal changes in environmental conditions will not cause an alarm to be generated. Operating power is supplied by the Control Unit.

(c) The items furnished as part of the Capacitance Proximity Sensor are a signal processor (see Table 2-4) and 50 feet of RG 58/U coaxial cable. Insulation blocks, available in sets of four, must be ordered separately.

(3) Grid wire sensor (fig. 2-8).

(a) The grid wire sensor (GWS) is used to detect forced entry through walls, floors, ceilings, doors, windows, and other barriers. The surface of the barrier is covered by a continuous wire in a four-inch-square grid pattern. Fire-resistant wood panels are then installed over the wire grid to protect the grid from day-to-day abuse and to hide the exact location of the grid. Any penetration or attempted penetration of the barrier larger than the four-inch square breaks the wire at one or more points and causes an intrusion alarm to be generated.

(b) Use of wooden materials for the foundation board of the Grid Wire Sensor is contingent upon availability of fire resistive materials and compliance with appropriate fire prevention criteria. If the arms room is located in such a position within a building where combustion would block an exit route or door, Class A ratings (flame spread rating not over 25 with smoke developed not over 50) must be applied. In all other cases, Class B, rating (flame spread rating not over 75 with smoke developed not over 100) are applicable (Reference DoD Construction Criteria Manual 4270.1M, 1 Oct. 72).

(c) If the barrier to which the wire grid is to be attached is not suitable for stapling, e.g., concrete, cinder block or plaster, the wire grid should be applied to a fire-resistant foundation board of plywood which has been securely fastened to the barrier.

(4) Vibration sensor (fig. 2-9). The Vibration Sensor (VS) is designed to protect against forced entry through expanded metal room liners and metal barriers placed over windows and other openings in the protected area. The sensor detects structurally transmitted vibrations imposed on the metal barrier by sawing, drilling, and other similar penetration attempts and generates an alarm when the energy generated satisfies certain design criteria. The sensor consists of a signal processor and multiple vibration

**2-7. Sensor Components - Continued**

detectors. Detectors are not provided with the signal processor. The detectors must be ordered separately. Refer to table 2-3 for dimensions. While up to 20 vibration detectors can be connected to one signal processor, it is recommended that no more than 10 detectors be connected to insure a good signal-to-noise (S/N) ratio. Each detector is designed to detect vibrations caused by penetration attempts within a radius of four feet from the detector. Operating power is supplied by the Control Unit.

(5) Passive Ultrasonic Sensor (fig 2-10).

(a) The Passive Ultrasonic Sensor (PUS) is designed to protect against forced entry through metal and masonry walls, ceilings, and floors and through metal doors, metal mesh, and barred or shuttered windows and ventilation openings when these openings are properly sealed against outside sounds. The sensor detects repetitive ultrasonic energy that is generated when a penetration is attempted through these barriers by sawing, hammering, drilling, or burning with a torch, and alarms when the energy generated satisfies certain design criteria.

(b) The Passive Ultrasonic Sensor can also be used to protect against forced entry through wooden walls, when these walls are sealed against outside ultrasonic energy and when this sensor is used in conjunction with a motion sensor.

(c) The sensor consists of a signal processor and multiple ultrasonic receivers. The receivers are not provided with the signal processor and must be ordered separately. While up to 20 receivers can be connected to one signal processor to achieve large area coverage, it is recommended that not more than 10 receivers be connected to insure a good signal-to-noise (S/N) ratio. Each receiver is designed to detect ultrasonic energy between 50 and 80 decibels (dB). Normally one receiver will protect an area of floor space of approximately 15 X 20 feet. In order to achieve coverage of all four walls, a minimum of two receivers must be used, preferably located in opposite corners, as shown in figure 2-10. Operating power is supplied by the Control Unit.

c. Motion Sensors.

(1) Ultrasonic Motion Sensor (fig. 2-11.)

(a) The Ultrasonic Motion Sensor (UMS) is designed to detect intruder motion inside the protected area. The sensor utilizes the Doppler frequency shift principle to detect motion of the intruder. A transmitter transducer radiates an ultrasonic signal which is reflected from the surfaces within the protected room. A receiving transducer receives the reflected signals. The reflected signal is compared to the transmitted signal in the signal processor. If no relative motion exists within the protected room the received and transmitted signals are at the same frequency. Radial motion, however, causes the received signal to differ in frequency (doppler shift) from the transmitted signal. The signal processor detects this frequency change and initiates an alarm condition when certain design criteria have been met. The sensor is designed to recognize and discriminate against air turbulence, blowing curtains, vibrating walls, and similar nuisance alarm creating phenomena.

2-7. Sensor Components - Continued

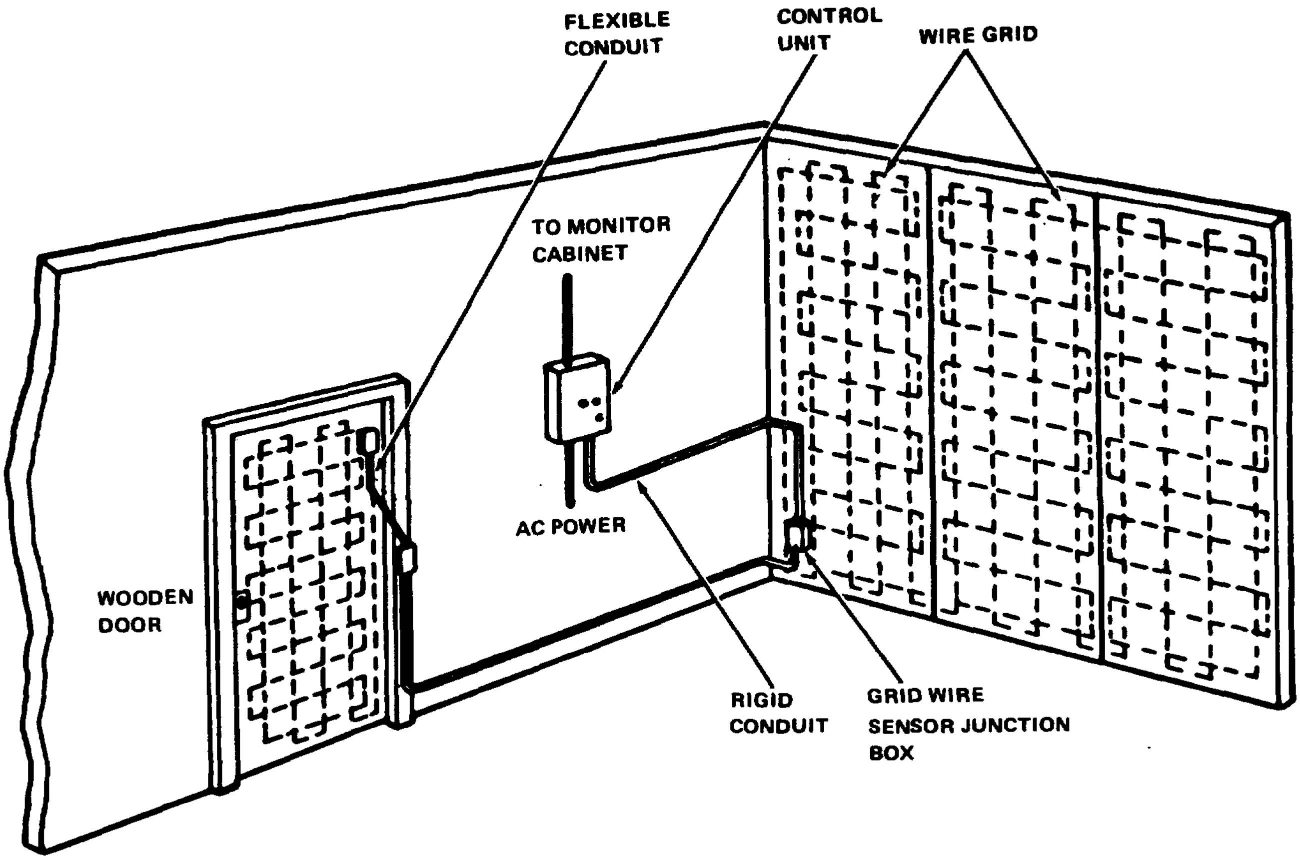


*Figure 2-8. Grid Wire Sensor.*

2-7. Sensor Components - Continued

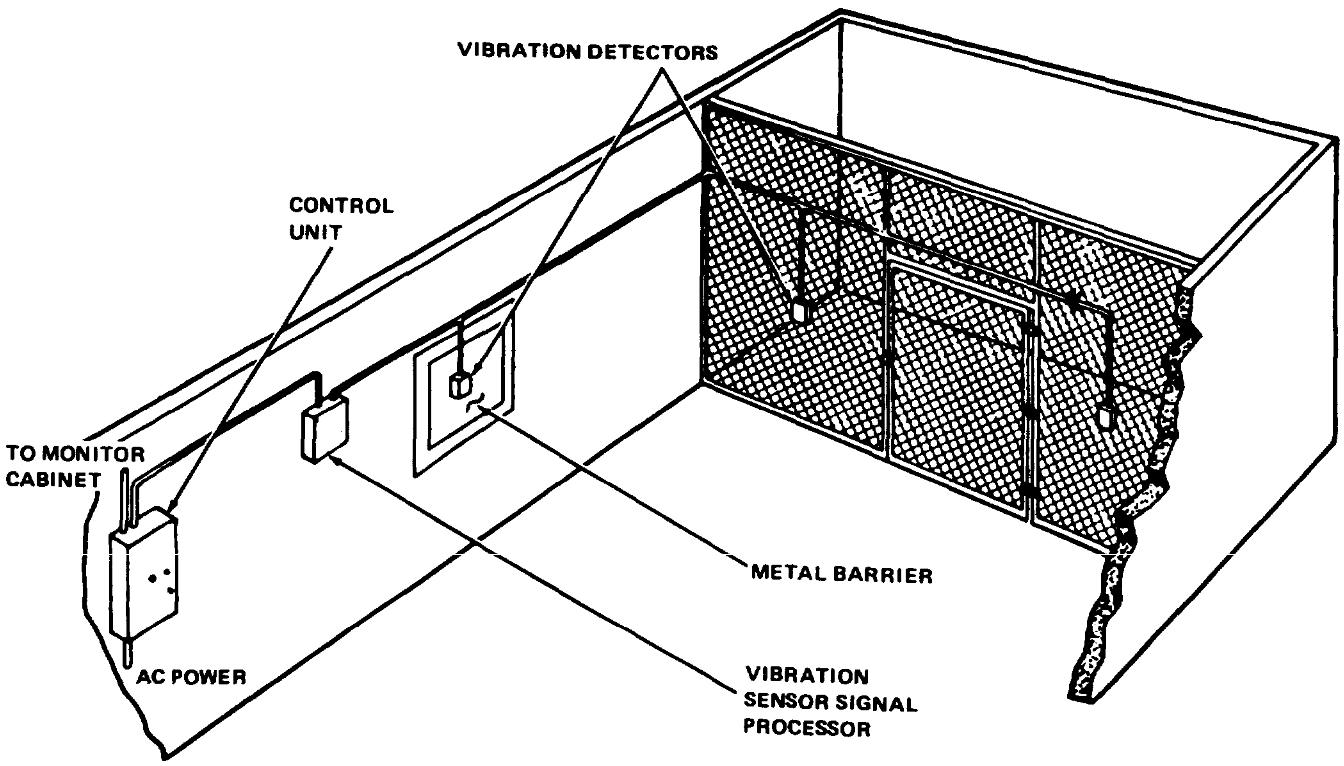


*Figure 2-9. Vibration Sensor.*

2-7. Sensor Components - Continued

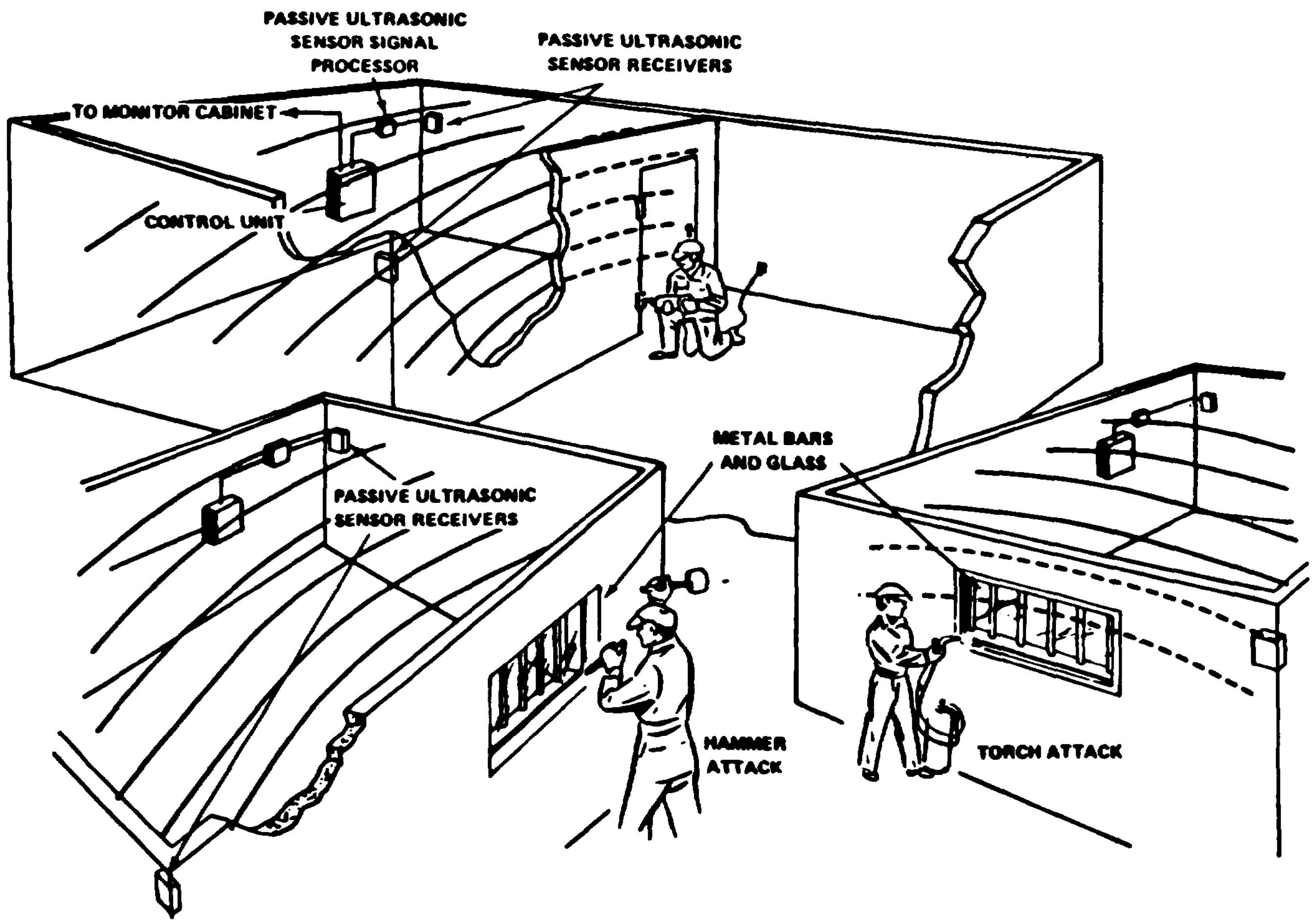


*Figure 2-10. Passive Ultrasonic Sensor.*

2-7. Sensor Components - Continued

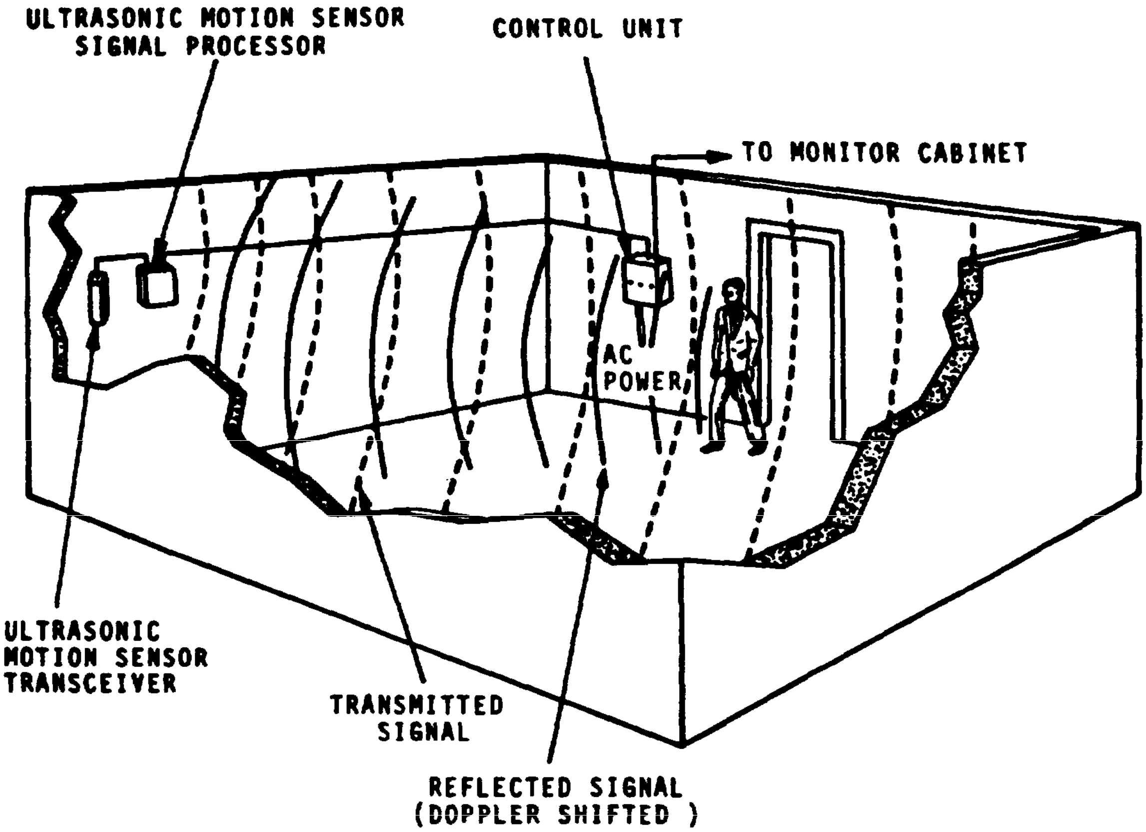


*Figure 2-11. Ultrasonic Motion Sensor*

(b) The sensor consists of a signal processor and multiple ultrasonic transceivers. The transceivers are not provided with the signal processor and must be ordered separately. Refer to table 2-4 for dimensions. While up to 20 transceivers can be connected to one signal processor to achieve large area coverage, it is recommended that no more than eight transceivers be connected to insure a good (SIN) ratio. Each transceiver is designed to provide coverage over a floor area of approximately 30 X 20 feet except as noted in figure 3-2. Operating power is supplied by the Control Unit.

d. Point Sensors.

(1) Magnetic Weapon Sensor (fig 2-12).

(a) The Magnetic Weapon Sensor (MWS) is designed to detect the removal of weapons from the weapons rack. The sensor detects perturbations in the ambient magnetic field caused by motion of the ferrous weapon in the vicinity of the sensor loopwire.

**2-7. Sensor Components - Continued**

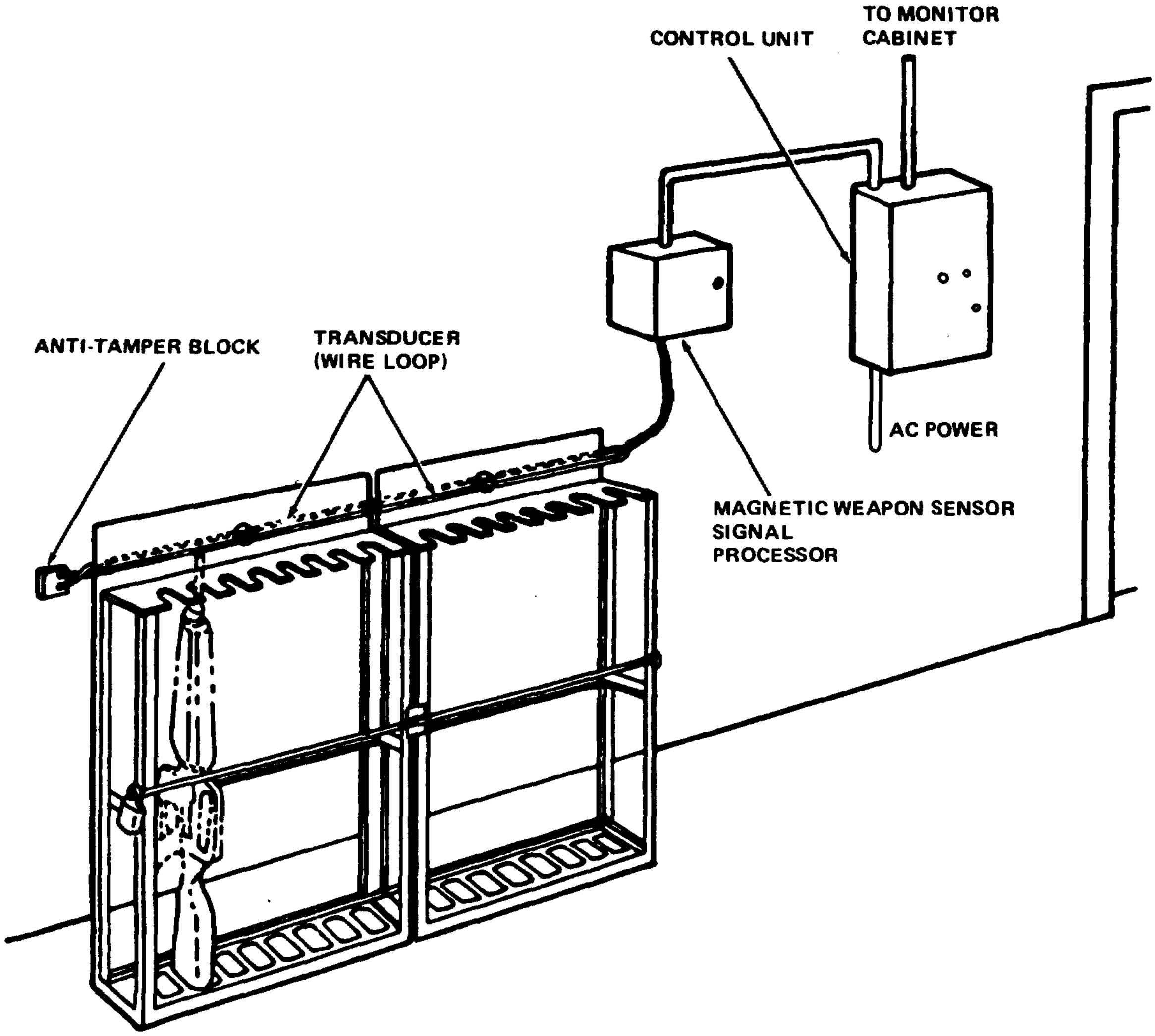


*Figure 2-12. Magnetic Weapon Sensor.*

(b) The sensor consists of a signal processor and a wire loop positioned on the weapons rack behind the weapons. When the wire loop is installed properly, up to 30 weapons racks can be protected. The wire loops are fabricated of #16 AWG wire, 1000 feet of which is supplied with the sensor. Fixtures are also available to facilitate fabrication of wire loops on pistol racks.

(c) Operating power is supplied by the Control Unit.

**2-7. Sensor Components - Continued**

(2) Capacitance proximity sensor. This sensor, described in paragraph b (2) above, can also be used as a point sensor. When used as a point sensor, it is used to protect metal containers such as safes and file cabinets. Operation is as described in paragraph b(2), i.e., the sensor initiates an alarm when a hand or tool is brought within close proximity of the container or upon actual contact with the container. The container is insulated from the floor using insulating blocks. The insulating blocks are not supplied with the sensor and must be ordered separately.

e. Latching Alarm Switch (Duress Sensor) (fig. 2-13)

This sensor is a hold up notification device. It is used by personnel to manually initiate an alarm. It can be mounted to the wall or on the floor in close proximity to personnel stations and can be hand or foot operated. Operating power is supplied by Control Unit.

2-7. Sensor Components - Continued

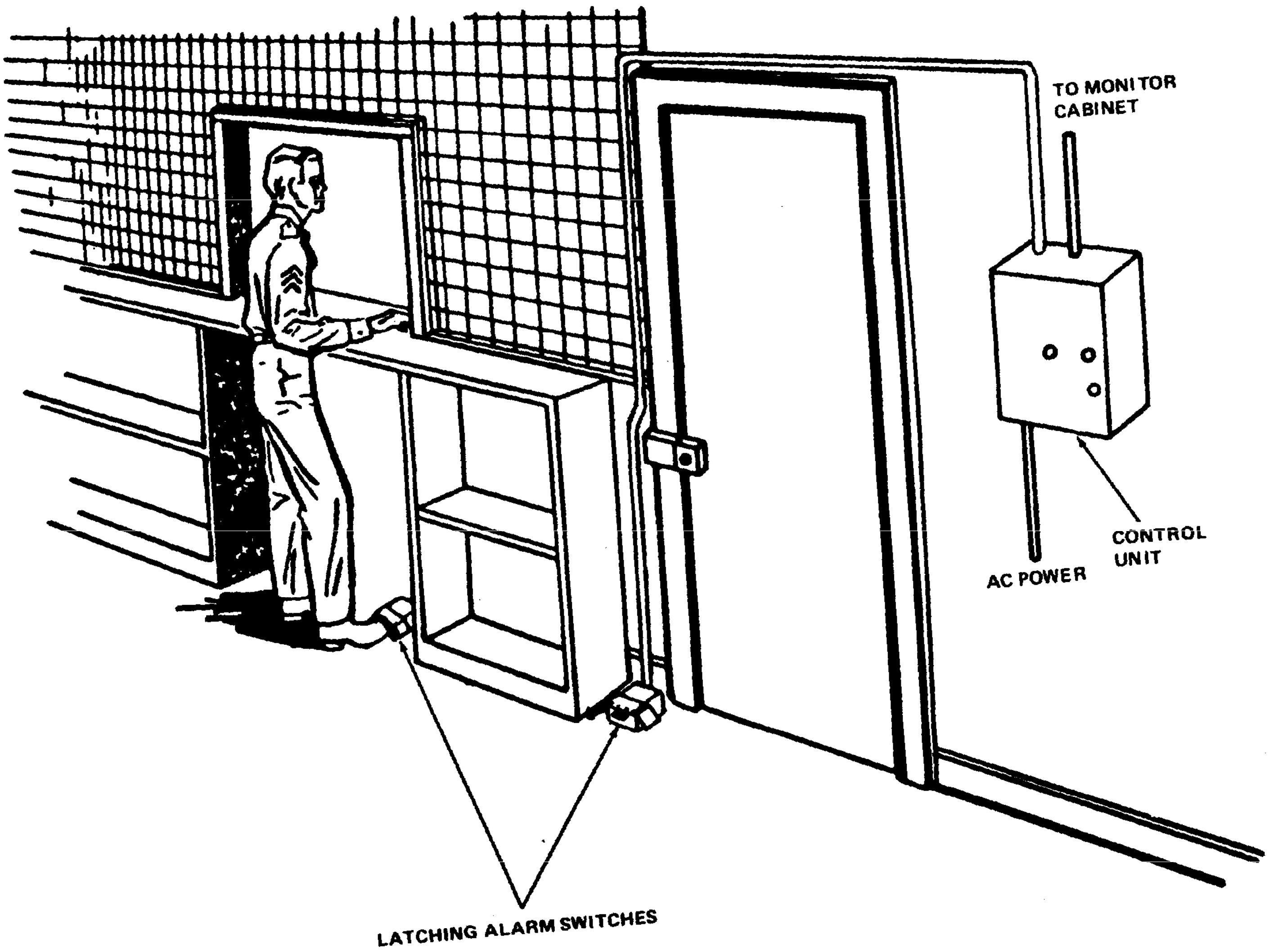


*Figure 2-13. Latching Alarm Switch.*

# CHAPTER 3

# COMPONENT SELECTION AND APPLICATION

## Section I. GENERAL

In-depth security can be achieved by equipping the secure area with a minimum of two levels of detection capability chosen from the three listed below. The preferred two levels for these applications are penetration and motion, as they provide the earliest notification of an intrusion. Higher level security applications will require the use of point detection as well.

Penetration detection. Detection of penetration attempts into the secure area. This includes entry through doors, windows, wails, floors, ceilings, and any other openings in the room.

Motion detection. Detection of movement of a person inside the secured area.

Point detection. Detection of attempts at removal of protected items inside the secure area.

## Section II. PENETRATION DETECTION

### 3-1. General.

This outermost level of detection capability, the “early warning”, is the level that should be applied with the most thorough and painstaking planning. When a particular secure area is to be fitted with penetration detection components, care must be taken to ensure the entire perimeter of the secure area (including windows, ceilings, and floors) is penetration protected. A thorough evaluation of the structure should be made to identify all possible points of attack.

### 3-2. Doors.

a. General.

Doors constitute a primary point of intrusion through the boundaries of the secured area. The intruder can be expected to attempt entry through a door by cutting or breaking the lock or by breaking through the door. Doors need to be monitored for unauthorized opening and for breakthrough. The Balance Magnetic Switch is used to detect the opening of a door. Breakthrough detection is achieved by use of either the Passive Ultrasonic Sensor, the Vibration Sensor, or the Grid Wire Sensor. The Balanced Magnetic Switch should always be mounted on the inside of the doors leading into the secured area. Locating the switch on the outside of the door makes the switch more susceptible to compromise. Loose fitting doors are a potential source of nuisance alarms when the Balanced Magnetic Switch is used. Prior to installation of a Balanced Magnetic Switch, every effort should be made to ensure that the door is tight and well-fitting. Openings in the door and in the other boundaries of the room can cause nuisance alarms when using the Passive Ultrasonic Sensor. This is discussed in paragraph 3-3.

**3-2. Doors. - Continued**

b. Exterior Doors.

Exterior doors are those doors that lead into the secured area, i.e., are not wholly contained within the area. The Balanced Magnetic Switch is used to detect the openings of these doors. The Passive Ultrasonic Sensor, Vibration Sensor, or Grid Wire Sensor is used to detect actual breakthrough of the door. The sensor chosen is dependent upon the construction of the door. A door made of steel, or of wood covered with steel with the steel cladding inside the protected area, cannot be penetrated without producing ultrasonic energy. The Passive Ultrasonic Sensor, therefore, gives adequate protection against penetration through such a door. A door that is made entirely of wood or wood substitute could be broken through without creating sufficient ultrasonic energy to activate the Passive Ultrasonic Sensor. This type of door can be protected against breakthrough by installing the Grid Wire Sensor on the inside surfaces of the door, or the inside of the door can be covered with sheet steel and the Vibration Sensor or the Passive Ultrasonic Sensor can be installed to detect penetration attempts.

c. Interior Doors.

Interior doors are those doors that are wholly contained within the secured area, but are to be monitored for unauthorized opening. The degree of security required on an interior door can be reduced to that provided by a Balanced Magnetic Switch. Breakthrough monitoring or detection is not necessary unless the contents of the area behind the interior door are particularly sensitive.

**3-3. Walls, Floors and Ceilings.**

a. Walls, floors and ceilings, the main body of the secure area, must be monitored for breakthrough at all points if a complete blanket of penetration detection is to be achieved. The detectors designed for this purpose are the Grid Wire Sensor, the Vibration Sensor, and the Passive Ultrasonic Sensor. The choice among these is dependent on the construction of the room as discussed herein.

b. Concrete and masonry structures can be monitored for penetration by installing the Passive Ultrasonic sensor. For the purpose of sensor component selection, there is little difference between reinforced concrete and masonry construction and nonreinforced concrete and masonry construction; however, it must be kept in mind that the time required to accomplish penetration of a reinforced concrete or reinforced masonry wall is longer than that required in the case of nonreinforced concrete or masonry wall.

c. A wooden structure is the easiest to penetrate and the most difficult to protect. Penetration detection can be afforded a wooden building by covering all surfaces (ceiling and floor included) with the Grid Wire Sensor. An alternate approach is to install an expanded metal cage around the protected items, thus creating a secondary boundary and use a Vibration Sensor on the the cage. This modification will greatly improve the physical security aspects of the building and give the reaction force a longer allowable response time. A third approach is the use of the Passive Ultrasonic Sensor in conjunction with a Motion Sensor. It is imperative, however, that the room be sealed against outside sources of ultrasonic energy as discussed in paragraph 3-3e.

d. A structure that is a combination of construction materials must be protected as the unique characteristics of the structure dictate. Where only a small section of wood or plaster is involved in an otherwise all concrete or masonry structure, this small section can be covered with sheet metal, thereby making the entire secure area suitable for use with the Passive Ultrasonic Sensor. The deciding factor in the choice between the Grid Wire Sensor and Passive Ultrasonic Sensor is whether ultrasonic energy is generated when an attempt is made to penetrate the perimeter of the secure area. If the ultrasonic energy is not generated, the procedures outlined in paragraph 3-3c should be followed.

### 3-3. Walls, Floors and Ceilings. - Continued

e. Openings in walls, doors, floors, and ceilings can create special problems in the use of the Passive Ultrasonic Sensor as they may allow outside ultrasonic energy to enter the secure area and cause nuisance alarms. All openings (such as vents and exhausts) should be permanently sealed or covered with shutters. Where a ventilation opening is required to be opened when the area is secured, the vent must be fitted with an ultrasonic baffle. Instructions for fabricating the baffle are contained in the J-SIIDS Maintenance Manual. The ringing of a normal telephone bell may produce ultrasonic energy which can cause nuisance alarms, thus all telephone bells in the secure area should be replaced with tone ringers available from the telephone company.

f. In areas where high ambient ultrasonic noise level makes the Passive Ultrasonic Sensor unusable, thought should be given to fabricating a secondary boundary within the secure area using an expanded metal cage to completely enclose the protected items and installing a Vibration Sensor. Because of the limited range of the vibration detectors (4 foot radius) and the limited number of detectors that can be connected to one signal processor (ten), it may be necessary to use more than one Vibration Sensor to cover the entire cage.

g. In areas, where structural vibrations are caused by nearby heavy traffic, or nearby heavy machinery operation, the Vibration Sensor may be subject to nuisance alarms. This may also be true when transducers are mounted to barriers (metal roofs, metal outer walls, etc.) which are exposed to uncontrolled human or environmental activity (rain, hail, etc.). Under these circumstances a different sensor should be used. The Vibration Sensor should never be mounted on a nonmetallic barrier.

### 3-4. Open Wails and Ceilings.

Wire walls and ceilings (i.e., steel mesh, expanded metal, steel bars, etc.) forming the outer walls of the secure area present distinct problems. To adequately protect this type of structure with intrusion detection equipment, construction modifications are necessary. If the wire wall is within a room, steps may be taken to secure the room. If the wire wall itself must be secured, this can be accomplished in a variety of ways. The outside of the wire enclosure can be covered with fire-resistant wood and a Passive Ultrasonic Sensor installed, or fire-resistant wood can be installed on the inside of the wire enclosure and a Grid Wire Sensor installed.

### 3-5. Windows.

a. These are another source of problems as they are particularly susceptible to penetration. Whenever possible, windows should be eliminated. If they are sealed over and their function replaced by artificial lights and ventilators, the window areas become part of the wall.

b. Where windows are necessary, consideration should be given to the use of interior metal shutters which can be closed and locked when the area is secured. Shutters give an added degree of penetration prevention and allow use of the Passive Ultrasonic Sensor to monitor the window for intrusion. If the use of metal shutters is impractical, Balanced Magnetic Switches can be used to detect unauthorized opening of the windows.

c. Where open work metal barriers (such as expanded metal grillwork or iron bars) cover the inside of a window, the Passive Ultrasonic Sensor is recommended when the window is closed against outside ultrasonic energy. If the character of the room does not permit use of the Passive Ultrasonic Sensor, the window may be secured with a Vibration Sensor or a Capacitance Proximity Sensor. If the metal barrier is outside the window, an additional insulated-from-ground expanded metal grill should be installed on the inside of the window and coupled to the Capacitance Proximity Sensor. If a non-insulated expanded metal grill covers the inside of the window, a Vibration Sensor should be installed on the grill. If the inside barrier consists of iron bars, an expanded metal grill can be welded to the bars and the Vibration Sensor mounted on the grill.

**3-6. Ventilation Openings.**

a. These are openings in the ceiling, walls, and doors to allow the free passage of air. They are generally covered with steel mesh or louver barriers and are often large enough to admit an intruder (para 1-6e(2)). Some are required to ventilate only when the room is occupied and some are required regardless of the status of the room. All can admit ultrasonic energy generated outside the room.

b. For maximum protection against unwanted ultrasonic energy, consideration should be given to the elimination of ventilators. Sealed ventilators become part of the wall (para 3-3).

c. Where it is not feasible to seal the ventilators, consideration should be given to the use of locked metal shutters when the room is secured. This seals against the transmission of ultrasonic energy and allows the use of ultrasonic sensors in the room. Intrusion through the ventilator can be detected with the Passive Ultrasonic Sensor. Intrusion can also be detected with the Vibration Sensor mounted to the metal barrier or seal.

d. Where the ventilators are required to be open all the time, the aperture can be sealed against the passage of ultrasonic energy with a baffle over the inside; however, consideration must be given to the impeded air flow into or out of the room. Installation of the baffle (detailed instructions for fabrication and installation are provided in the J-SIIDS Maintenance Manual) allows the use of the Passive Ultrasonic Sensor in the room. If ultrasonic baffles cannot be implemented, metal grills can be placed over the ventilator openings. This then allows the use of the Vibration Sensors mounted to the metal grill or the Capacitance Proximity Sensor connected to the grill. The metal grill would be placed over the inside of the ventilator opening.

**3-7. Construction Openings.**

These are unsecured openings from incomplete construction. They should be completed and sealed over, in which case they become part of the wall. Where this is not feasible, a temporary expedient is to cover the opening with a Grid Wire Sensor installed on fire-resistant plywood. Where the opening is required to stay open, a Capacitance Proximity Sensor can be used with an insulated metal grill over the inside of the opening.

**3-8. Air Conditioners.**

Air conditioners are generally set into a wall or window and are sometimes protected on the outside with a steel-bar barrier. To monitor for intrusion through the air conditioner aperture, the Capacitance Proximity Sensor can be used on an insulated metal grill extending into the room in front of the unit.

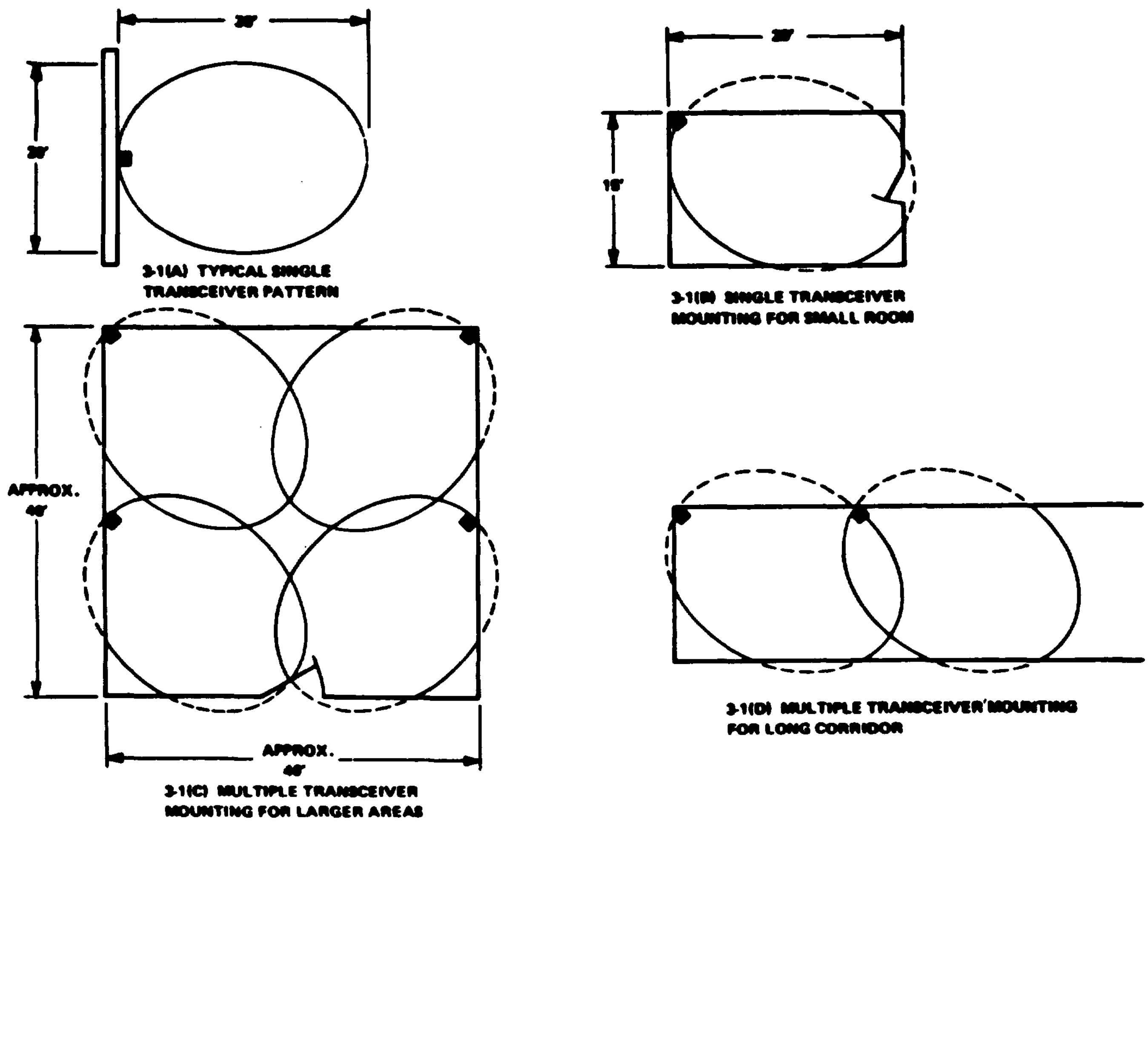


*Figure 3-1. Ultrasonic Motion Sensor Transceiver Emplacement.*

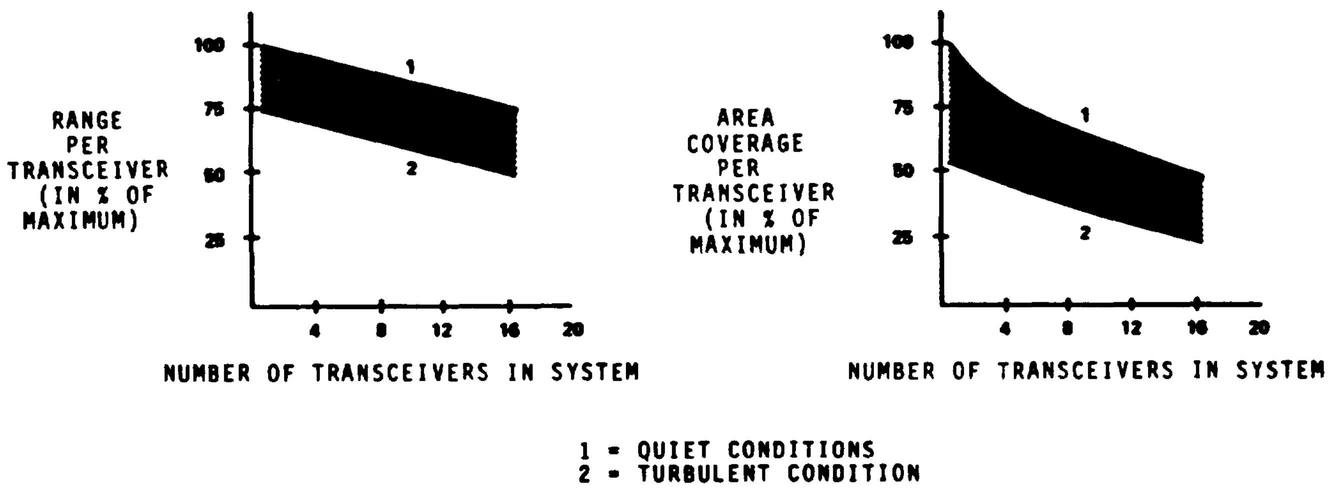


*Figure 3-2. Shrinkage of Transceiver Coverage with Multiple Transceiver.*

### 3-9. Ambient Noise.

High ambient noise or occasional noise that is generated by the equipment in the room or by equipment outside the room and transmitted into the room through the walls, ceiling, floor, or openings will require care in the application of the Passive Ultrasonic Sensor. Alarms may result from a series of short "banging," "cracking," or "popping" noises generated by steam pipes, water hammer, relief of structural stresses, or other causes.

## Section III. MOTION DETECTION

### 3-10. General.

This type of detection is also called volumetric or space detection. This intermediate level of detection is very effective against the stay-behind intruder, the person who hides himself during hours of operation and carries out his theft after the room has been secured for the evening. This motion sensor also provides back up detection, with a corresponding decrease in allowable response time, to the penetration detectors.

### 3-11. Ultrasonic Motion Sensor.

a. The Ultrasonic Motion Sensor (UMS) is the only motion sensor currently incorporated into the J-SIIDS. It should be used in any secure area that is adequately sealed against outside sources of ultrasonic energy.

b. Transceiver placement is important for optimum operation (See figure 3-1). Each transceiver can cover an area up to 30 feet long and 20 feet wide when used in a "quiet location", i.e., relatively free of air turbulence. Actual coverage is a function of the reflection properties of a room to ultrasonic energy, the number of transceivers connected to the signal processor, and the general level of air turbulence and background ultrasonic noises (See figure 3-2).

c. Each transceiver provides an egg-shaped volume of coverage with its maximum dimensions approximately as shown in figure 3-1(a). These areas will shrink as the number of transceivers connected to the signal processor and air turbulence increases.

d. The most effective protection is given to areas within line-of-sight of a transceiver. Additional coverage is obtained through reflections, and is dependent on the particular geometry. Large objects in a room may produce insensitive areas on the side away from the transceiver. This is called "shading". Large rooms which are compartmentalized by high furniture, equipment, racks, stacks of stored materials, etc., are best protected when they are regarded as several smaller rooms with each open (line-of-sight) area covered by a transceiver.

e. Transceivers should be placed so that the most likely intruder motions, such as through a doorway or along a corridor, are towards or away from the transceiver, rather than across the beam, in order to maximize the Doppler signal. If more than one transceiver is necessary to protect an area, they should all face in one direction so that they may reinforce one another.

> For example: To protect a long hail, do not place transceivers at each end. Instead, place one at one end, and the second at the midway point, also facing the other end as shown in figure 3-1(d). An exception to this rule is when the corridor is more than 100 feet long. Transceivers may then be placed at each end facing each other. Transceivers should not be located higher than eight feet above the floor.

**3-11. Ultrasonic Motion Sensor - Continued**

f. Substantial air turbulence near the transceiver is a potential source of nuisance alarms and reduces the maximum target-detection range. Maximum coverage is obtained in still air. The transceivers should not be located adjacent to air ducts or radiators. Transceiver vibration can also cause reduced sensitivity; therefore, ensure that wall vibrations cannot be felt at the transceiver mounting location when after-hours-operated machinery is on.

g. The number of transceivers required to cover a given area or number of rooms can be judged by the graphs in figure 3-2 which relate the typical maximum range for each transceiver to the number of transceivers in the system and levels of the background turbulence.

## Section IV. POINT DETECTION

### 3-12. General.

This innermost level of detection capability is the so-called “last line of defense” as it detects the attempted removal of protected items. It gives the last warning, in terms of time, to the reaction force. For this reason point sensors should never be used alone. They must always be used in combination with penetration sensors and, preferably, in combination with penetration and motion sensors.

### 3-13. Weapons.

a. To detect the removal of weapons from a standard rack, a Magnetic Weapon Sensor can be used. This sensor responds only to the actual removal of a weapon and not to movements near the rack. The wire loop is site-installed and is connected from rack to rack as a twisted wire pair. Up to 30 adjacent standard M-16 weapon racks can be protected with each Magnetic Weapon Sensor.

b. A set of fixtures for the M-1920 pistol rack is available through the J-SIIDS supply channels. These fixtures simplify the routing of the loop wires of the Magnetic Weapon Sensor. Other standard and nonstandard arms racks can also be protected by the Magnetic Weapon Sensor. Information on the proper installation of the loop wire is available in the J-SIIDS maintenance manual.

c. Care should be taken to ensure the Magnetic Weapons Sensor is at least 50 feet from large power transfromers and 10 feet from large electric motors. By the same token, this sensor should not be mounted near high-power radio transmitters.

### 3-14. Storage Cabinets.

a. The Capacitance Proximity Sensor is designed for use on metal cabinets and will detect movement near a cabinet or contact with any part of the cabinet. As a metal cabinet is an all-purpose storage facility, the Capacitance Proximity Sensor can be used in a variety of secure areas. One Capacitance Proximity Sensor can protect up to 1200 square feet of container surface area (total surface area to include all sides, top and bottom).

b. A Balanced Magnetic Switch alone mounted on the door of a metal cabinet does not provide adequate protection. The switch will become unbalanced and alarm if someone opens the cabinet door, but offers no protection against the intruder who seeks to cut throught the cabinet with a hacksaw or torch.

**3-14. Storage Cabinets - Continued**

c. Use of the Capacitance Proximity Sensor is subject to the following constraints:

(1) It cannot be applied to any items that cannot be electrically insulated from ground.

(2) It should not be used close to high power radio transmitters.

**3-15. Safes, Security Containers, Desks and Other Applications.**

The Capacitance Proximity Sensor will find a variety of uses in an office as it can be used to protect safes, security containers, desks, and filing cabinets.

## Section V. DURESS SENSOR

**3-16. General.**

The duress sensor is not included in the discussions concerning the three levels of detection capability; it is recommended for use wherever it is anticipated that duty personnel may be forced to yield protected items to unauthorized persons.

**3-17. Latching Alarm Switch.**

The Latching Alarm Switch is a duress sensor used to call for help. It consists of a switch that can be operated by hand or by foot. It should be located at a position most likely to be occupied by personnel in the secure area, but where it will not attract attention or be set off accidentally. Any number of switches may be used in series with one duress sensor input of the Control Unit.

## Section VI. CONTROL UNIT

Each secure area must have a Control Unit to monitor the sensors in that secure area, supply DC power to the sensors, provide standby power and process and relay the alarm and status signals to the Monitor Modules and Audible Alarm. The number of sensors that can be applied to a particular secure area is limited by the maximum available current (350 ma) from the Control Unit. The Control Unit has five intrusion sensor inputs plus a duress sensor input.

## Section VII. MONITORING AND DISPLAY EQUIPMENT

**3-18. Monitor Cabinet.**

The Monitor Cabinet supplies power to the enclosed Monitor Modules, maintains standby power, and gives notice of its own power status. Depending on the type of Monitor Cabinet ordered, from one to twenty-five Monitor Modules may be inserted into the Cabinet. If the Data Transmission System, Type I is part of the system, the Data Receiver is also housed in the Monitor Cabinet. It is advisable to order a Monitor Cabinet that will allow for future expansion rather than just meet present needs.

**3-19. Status and Alarm Monitor Modules.**

Each Control Unit will transmit its alarm and status signals to a separate Monitor Module located in the Monitor Cabinet. Thus for every Control Unit used, a corresponding Monitor Module must be used. Two types of Monitor Modules are available. The first is the Status Monitor Module. This module notifies duty personnel of the system's (system here meaning a Control Unit and associated sensors) mode of operation, AC power status, and alarm condition. The second type of module, the Alarm Monitor Module only gives notice of an alarm condition. The Status Monitor Module is used whenever complete system status is to be monitored.

## Section VIII. LINE SECURITY

All hardwire (unsupervised) connections between the sensors in a particular secure area and their corresponding Control Unit must be encased in rigid steel conduit to make line-tampering more difficult. Line security between the Control Unit and Monitor Module can be acheived in two ways. The hardwire (unsupervised) connection can be encased in conduit from end to end and then buried underground or encased in concrete. This becomes difficult and costly when the monitoring station is located at a great distance from the particular secure area. In such case, a Data Transmission System should be used to provide for transmission security and line supervision. It is recommended that a Data Transmission System be installed whenever the lines between the Control Unit and the Monitor Module cannot be provided with complete end-to-end physical protection or when line supervision is required.

## Section IX. AUDIBLE ALARM

The Audible Alarm may be located inside or outside the protected room or building. It can serve as a deterrent to scare a would-be intruder away and to alert guard forces and other personnel in the area. The use of this device alone, without a remotely located monitoring capability, is not recommended.

# CHAPTER 4

# SYSTEM SELECTION PROCEDURE

## Section I. SELECTION PROCEDURE

### 4-1. General.

The purpose of this section is to provide a procedure for the selection of the appropriate intrusion detection system for a particular facility. Important to this selection process is a complete understanding of the information regarding the operating characteristics of the available devices (chapter 2), and the use of these devices to provide security for various physical situations (chapter 3). The selection process is implemented by first conducting a detailed survey of the facility and then selecting the appropriate devices using the Component Selection Tables.

### 4-2. Physical Survey.

In order to select the appropriate type and number of J-SIIDS devices, it is necessary to conduct a detailed survey of the facility. The location of the rooms and the size, shape, and materials of construction of the walls, ceilings, floors, doors, windows, and other openings, should be noted. The distribution, size, and shape of arms racks, safes, cabinets, and other objects in the room should also be noted. Once this information has been gathered, the appropriate types and numbers of devices can be selected.

### 4-3. Selection Procedure.

a. General.

Tables 4-1 and 4-2 are provided as an aid in selecting the appropriate system component. The tables list the various features of the room to be identified during the pre-selection survey and the recommended sensor to be used to provide detection of intrusion. References to specific paragraphs in the other sections of this manual are also given to provide additional information on the recommended sensor.

b. Penetration Sensors.

As per Section II, Chapter 3, detection of penetration through the perimeter of the facility provides the reaction force with the maximum “time to respond”. The facility should be provided with this level of detection and care should be taken that the entire perimeter of the facility is protected against penetration. Table 4-1 is provided to aid in selection of sensors that will provide this detection.

**4-3. Selection Procedure. - Continued**

*Table 4-1. Selection guide to penetration sensors*

| Intrusion Through: (method) | Construction Material | Recommended Sensor | Paragraph Reference | Area Coverage Per sensor | Notes |
|---|---|---|---|---|---|
| Exterior Door* (Breakthrough) | Metal or Metal Clad on Inside | Passive Ultrasonic | 3-2b | 15 ft. by 20 ft. per receiver | Room must be sealed from outside sounds per paragraph 3-3e. |
| | | Vibration | 3-2b | 4 ft. radius per detector | Mounted at approximate center of door |
| Exterior Door* (Breakthrough) | Wood or wood Substitute | Grid Wire Kit | 3-2b | 160 sq. ft. per kit | |
| Exterior Door* (Opening) | N/A | Balanced Magnetic Switch | 3-2b | One door. | Double doors require one Balance Magnetic Switch for each door. |
| Interior Door* (Opening) | N/A | Balanced Magnetic Switch | 3-2c | One door. | Double doors require one Balance Magnetic Switch for each door. |
| Interior Door* (Breakthrough) | Metal or Metal Plate Covered on Same Side as Sensor | Passive Ultrasonic | 3-2c | 15 ft. by 20 ft. per receiver | Room sealed from outside sounds |
| | | Vibration | 3-2c | 4 ft. radius per detector | Mounted at approximate center of door |
| Solid Walls, Floors, Ceiling | Wood Plaster | Grid Wire Kit | 3-3 | 160 sq. ft. per kit | |
| | | Passive Ultrasonic and Ultrasonic Motion Sensors | 3-3 | Limited to individual sensor coverage. | Must always be used in combination |
| Expanded Metal Cage | Expanded Metal | Vibration | 3-3 | 4 ft. radius per detector | Refer to paragraph 3-3c and 3-3f. |
| Solid Walls, Floors, Ceiling | Metal Masonry | Passive Ultrasonic | 3-3 | 15 ft. by 20 ft. per receiver | Max 10 receivers per processor-room sealed from outside sounds |
| | | Vibration | 3-3g | 4 ft. radius per detector | |
| Open Walls, Ceiling | Metal Wire Mesh Bars | Grid Wire Kit | 3-4 | 160 sq. ft. per kit | Additional fire-resistant wooden wall inside required. |

**4-3. Selection Procedure. - Continued**

*Table 4-1. Selection guide to penetration sensors - Continued*

| Intrusion Through: (Method) | Construction Material | Recommended Sensor | Paragraph Reference | Area Coverage Per Sensor | Notes |
|---|---|---|---|---|---|
| Open walls, Ceiling | Metal Wire Mesh Bars | Passive Ultrasonic | 3-4 | 15 ft. by 20 ft. per receiver | Additional fire-resistant wooden wall inside required. |
| | | Vibration | 3-3g | 4 ft. radius per detector | |
| Windows (Breakthrough) | Glass and Open Work Metal Barrier (Bars/ Mesh) | Passive Ultrasonic | 3-5c | 15 ft. by 20 ft. per receiver | Room sealed from outside sounds. |
| Windows (Breakthrough) | Glass and Open Work Metal (Bars/Mesh) Barrier (outside) | Capacitance Proximity | 3-5 | 1200 sq. ft. of surface area per sensor | When passive ultra-sonic cannot be used |
| Windows (Breakthrough) | Glass and Open Work Metal (Bars/Mesh) Barrier (inside) | Vibration | 3-5 | 4 ft. radius per detector | When passive ultra-sonic cannot be used Max. of 10 detectors per processor |
| Windows (Opening) | N/A | Balanced Magnetic Switch | 3-5b | N/A | Double hung windows require two Switches |
| Windows | Glass with Met-al Shutter on Same Side as Sensor | Passive Ultrasonic | 3-5 | 15 ft. by 20 ft. per receiver | Room sealed from outside sounds |
| | | Vibration | 3-5 | 4 ft. radius per detector | 10 Detectors per processor |
| Ventilation Openings | With Metal Shutters or Baffled | Passive Ultrasonic | 3-6 | 15 ft. by 20 ft. per receiver | Room sealed from outside sounds |
| Ventilation Openings | With Metal Shutter or Grill | Vibration | 3-6 | 4 ft. radius per detector | Max. of 10 detectors per processor |
| Ventilation Openings | N/A | Capacitance Proximity | 3-6 | 1200 sq. ft. of surface area per sensor | Add metal grill over inside of opening. |

**4-3. Selection Procedures. - Continued**

*Table 4-1. Selection guide to penetration sensors - Continued*

| Intrusion Through: | Construction Material | Recommended Sensor | Paragraph Reference | Area Coverage Per Sensor | Notes |
|---|---|---|---|---|---|
| Construction Openings | Temporary Wood covering | Grid Wire Kit | 3-7 | 160 sq. ft. per kit | When opening can be covered with fire-resistant plywood or equivalent |
| Construction Openings | N/A | Capacitance Proximity | 3-7 | 1200 sq. ft. of surface area per sensor | Add insulated metal grill over opening |
| Air Conditioners | N/A | Capacitance Proximity | 3-8 | 1200 sq. ft. of surface area per sensor | Add insulated metal grill covering inside of unit |

*Exterior door is any door opening into the secure area whether indoors or out; interior door is any door wholly within the secure area.

*Table 4-2. Selection guide to point sensors*

| Intrusion Through: (method) | Construction Material | Recommended Sensor | Paragraph Reference | Area Coverage Per Sensor | Notes |
|---|---|---|---|---|---|
| Weapon Removal Detection (Rifle Racks) | N/A | Magnetic Weapons | 3-14 | One Wire loop per weapon rack, up to 30 racks can be protected with one sensor | Detect weapon removal from storage rack |
| Weapon Removal Detection (Pistol racks) | N/A | Magnetic Weapons | 3-14 | Up to 30 racks can be protected with one sensor | Requires fixture to be mounted to rack |
| Storage Cabinets, File Cabinets Safes | N/A | Capacitance Proximity | 3-15<br>3-16 | 1200 sq. ft. surface area per sensor | Require insulating blocks under protected device. Additional blocks can be ordered |

c. Motion Sensors.

Only one motion sensor, the Ultrasonic Motion Sensor, is available at the present time. Selection of this sensor is based upon the requirements and constraints discussed in Section III, Chapter 3. If the Ultrasonic Motion Sensor is unsuitable for a particular area, commercially available passive infrared or microwave motion sensors should be considered. Commercial sensors which either operate off 20 volt dc and will not exceed the 350 ma current available from the Control Unit or which have their own power supply and which provide a normally closed relay contact which opens on alarm can be directly used with the J-SIIDS Control Unit.

**4-3. Selection Procedure. - Continued**

Areas considered unacceptable for use of the Ultrasonic Motion Sensor are areas near airfields where high levels of ultrasonic energy are generated and large storage facilities such as warehouses. The passive infrared sensors should be considered for smaller areas near airfields. Microwave motion sensors should be considered for warehouses, when the warehouse is large enough to require more than thirty-two transceivers (one master signal processor with three slave processors and with 8 transceivers attached to each processor).

d. Point Sensors.

Point sensors can be selected to provide the second level of detection as recommended. As pointed out in Section IV, Chapter 3, these sensors detect attempted removal of the protected item. Table 4-2 is provided to aid in selection of sensors that will provide this detection capability.

e. Duress Sensor.

Only one duress sensor, a Latching Alarm Switch, is available at the present time. Selection of this sensor is based on the requirements and constraints discussed in Section V, Chapter 3. Note that any number of duress sensors can be connected to the single duress sensor input of the Control Unit.

f. Commercial Sensors.

Commercially available point sensors, such as the money clip for cash drawers, and portable duress sensors should be considered, where required, to augment J-SIIDS. Commercial sensors must operate off 20 Vdc, or have their own power supply, and have normally-closed relay contacts which open on alarm.

g. Control Unit.

One Control Unit is required for each area to be secured and uniquely identified by its own status or alarm module. Reference information is provided in Section VI, Chapter 3.

h. Monitor Cabinet.

Three sizes of Monitor Cabinets are available: a single zone cabinet, a five zone cabinet, and a 25 zone cabinet, as described in paragraph 2-4. Judgement should be exercised in selection of a Monitor Cabinet to allow for system expansion; e.g., it may be more cost-effective to select a five zone cabinet rather than two or three single zone cabinets. Note that the Status and Alarm Monitor Modules which plug into the Monitor Cabinet are not an integral part of the Monitor Cabinet and must be ordered separately. One Monitor Module is required for each Control unit that is to be monitored.

i. Data Transmission system.

A Data Transmission System is recommended to interconnect the Control Unit and Monitor Cabinet whenever:

(1) Telephone systems are to be used.

(2) The Control Unit and Monitor Cabinet are not within the same building.

(3) Line supervision is required.

**4-3. Selection Procedure. - Continued**

A Data Transmission System is required for each control Unit and Monitor Module combination. Multiple (up to five) Data Transmission Systems can be multiplexed onto a single transmission line pair.

j. Audible Alarm.

The Audible Alarm is not recommended for use in remote areas except where its use is to be limited to a deterrent. The use of the Audible Alarm as the only system notification device is not recommended. When used in conjunction with the Monitor Modules, it is useful to alert local guard forces and personnel in the immediate area to an alarm condition and can often be used as a deterrent by alerting would-be intruders to the fact that their attempted intrusion has been detected.

k. Other Criteria.

After the facility has been thoroughly surveyed and evaluated and selection of sensors has been completed, the following questions should be addressed:

(1) Do the sensors that have been selected give complete and dual levels of protection? If not, are additional sensors required or are construction modifications required?

(2) Have possible sources of nuisance alarms been considered in the selection of sensors?

## Section II. SAMPLE APPLICATIONS

**4-4. General.**

This section gives an example of the use of the selection procedure given in Section I. It will treat arms rooms as examples of two basic types of construction: wood and concrete or masonry.

**4-5. Wooden Arms Rooms.**

Figure 4-1 depicts a representative wooden arms room. The building rests on a concrete slab foundation. The walls are of frame construction with several windows and finished interiors. The building has a double door; both doors are of wooden construction. There is a ventilation opening at one end of the building near the roof. This vent is equipped with an exhaust fan. The walls and ceiling are assumed to be finished with sheetrock, plaster, masonite, or wood paneling. The room is furnished with both rifle racks and steel cabinets for weapons storage.

b. The first step in securing this room is to give it penetration detection capability. As directed in Section II of Chapter 3, care must be taken to ensure all vulnerable points on the arms room perimeter are penetration protected. This building's vulnerable points are the wooden walls and ceiling, wooden doors, windows, and the ventilation opening.

c. Penetration protection can be provided in a number of ways. In figure 4-1, the Grid Wire Sensor has been installed on the walls (para 3-3c) ceiling, and inner door of the double door pair (para 3-2b). The inner door has also been fitted with a Balanced Magnetic Switch.

d. The windows (para 3-5) have been covered with building material and can now be treated as part of the wall. Thus the window areas, also, are protected with the Grid Wire Sensor.

4.5. Wooden Arms Rooms - Continued

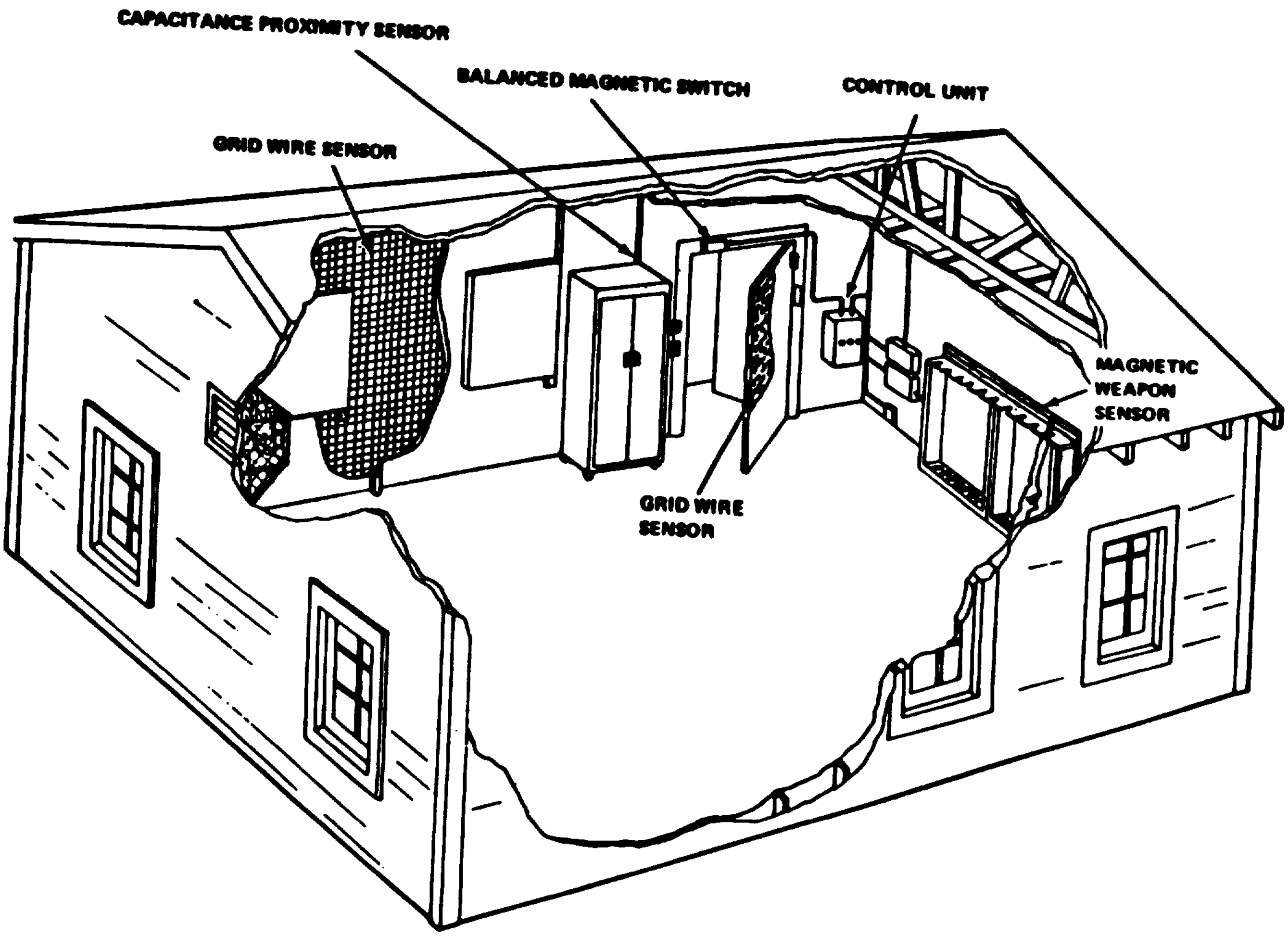


*Figure 4-1. Wooden Arms Room.*

4-5. Wooden Arms Rooms - Continued

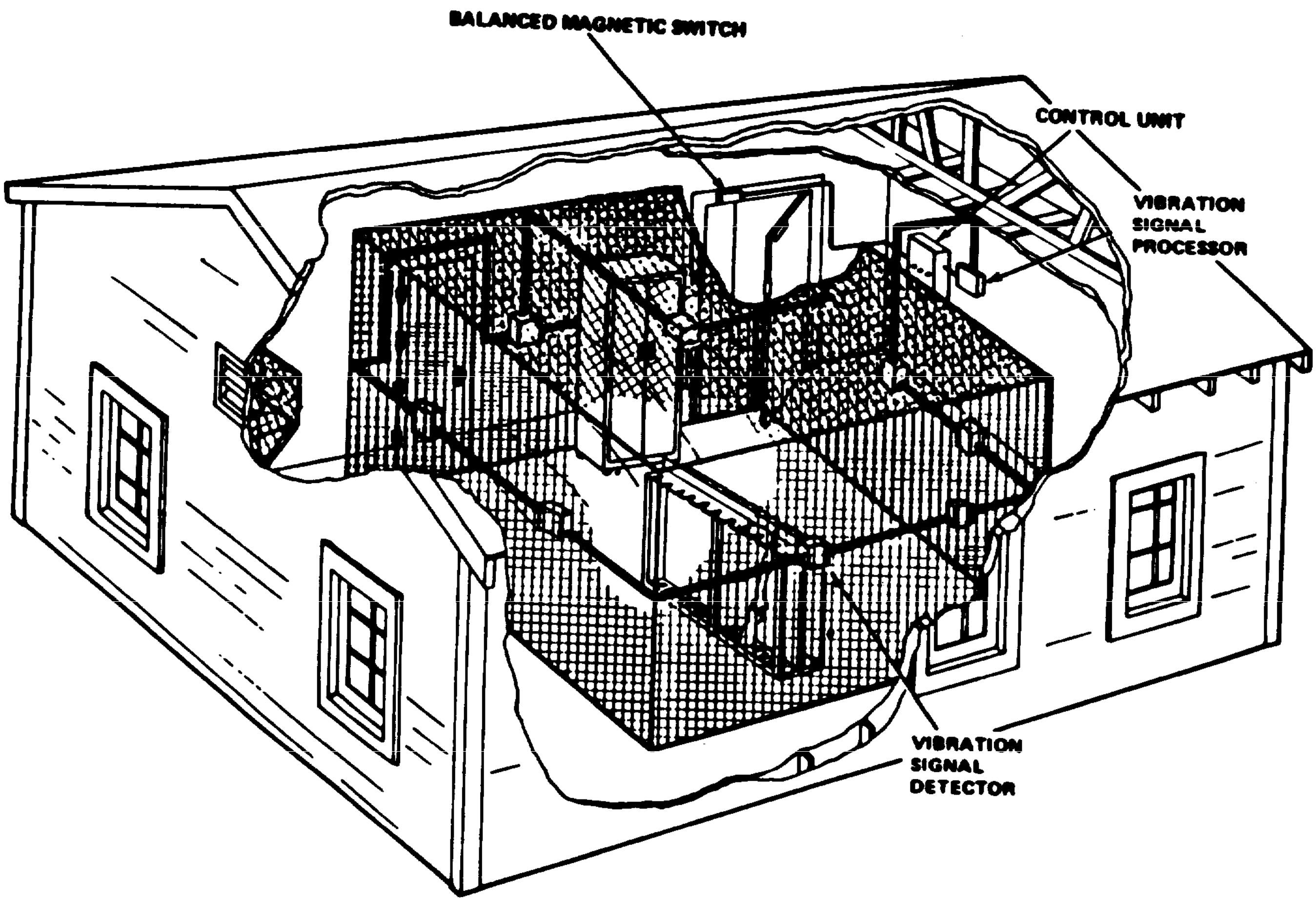


*Figure 4-2. Wooden Arms Room (Internal Expanded Metal Cage).*

**4-5. Wooden Arms Rooms. - Continued**

e. The exhaust fan (para 3-6d) is covered on the inside with an expanded metal grill, and the grill is coupled to a Capacitance Proximity Sensor.

f. The question must now be asked, is this room penetration protected for all possible avenues of approach? In this case the answer is no, since an intruder could conceivably tunnel under the building, batter through the concrete floor, and enter the room without sounding an alarm. This method of entry, in many instances, may be highly unlikely making penetration protection for the floor unnecessary. However, to give this arms room complete penetration protection, one should install the Passive Ultrasonic Sensor to detect penetration through the floor.

g. Figure 4-2 illustrates an alternate approach in securing the protected items. An expanded metal cage, enclosing the protected items, has been fabricated within to create a secondary boundary. The cage is completely protected by the Vibration Sensor.

h. In many instances, economic or other factors may preclude the use of an expanded metal cage within the room. In these cases penetration protection can be achieved through the use of the Passive Ultrasonic Sensor in conjunction with the Ultrasonic Motion Sensor (paras 2-6b and 3-11). The Passive Ultrasonic Sensor should not be used alone in a wooden arms room.

i. After the room has been given complete penetration protection a second line of defense should be provided. This second line of defense can be provided with point sensors. In figures 4-1, 4-2, and 4-3 a Magnetic Weapons Sensor is installed on the rifle racks and a Capacitance Proximity Sensor coupled to the steel weapons cabinet. In each of these three configurations for the wooden arms room two levels of detection capability, penetration and point, are provided. Three methods of providing penetration detection capability are illustrated. Point detection capability is achieved in the same manner in all three configurations.

**4-6. Masonry Arms Room.**

a. Figure 4-4 depicts a masonry arms room that is part of a larger structure. The front room is the armorer's room. The rear room is the arms storage area and contains rifle racks inside a locked expanded metal cage. Construction is reinforced concrete throughout (ceilings included).

b. Entry to the armorer's room from the hallway is through a single steel door. Entry to the arms storage area is only by way of the armorer's room. A single steel door separates the two rooms. Each room has an air conditioning vent in the wall near the ceiling. How is complete penetration protection achieved for this arms room?

c. The avenues of attack are the concrete walls, floors, and ceilings, the steel doors, and the air conditioning vents.

d. The masonry and steel construction makes the area compatible with the Passive Ultrasonic Sensor (para 3-3). Figure 4-4 shows the two rooms with a Passive Ultrasonic Sensor (para 3-3). Figure 4-4 shows the two rooms with a Passive Ultrasonic Sensor installed in each. The air conditioning vents have been covered with sheet metal shutters. A Balanced Magnetic switch has been mounted on each door. This installation gives the two rooms complete penetration protection. Second-line protection is afforded by an Ultrasonic Motion Sensor in each room. Figure 4-5 shows the transceivers mounted in positions such that entry through the doorways produces maximum radial motion toward the transceivers. As the armorer may be subject to duress by intruders, a Latching alarm Switch is installed under the armorer's desk.

e. This proposed installation provides two complete levels of detection capability, penetration and motion detection. Provision is also made for an alarm in the event of a duress situation.

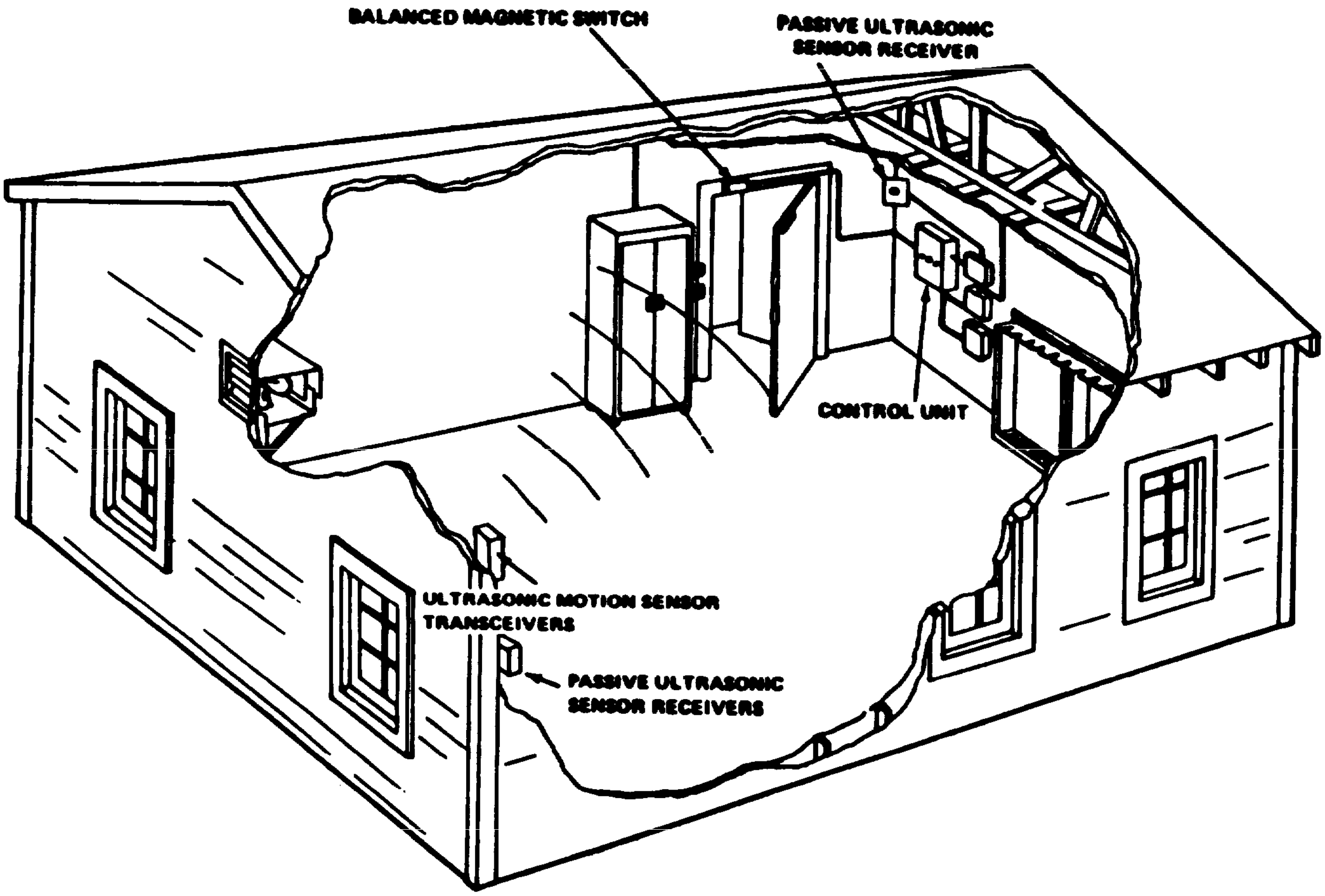


*Figure 4-3. Wooden Arms Room.*

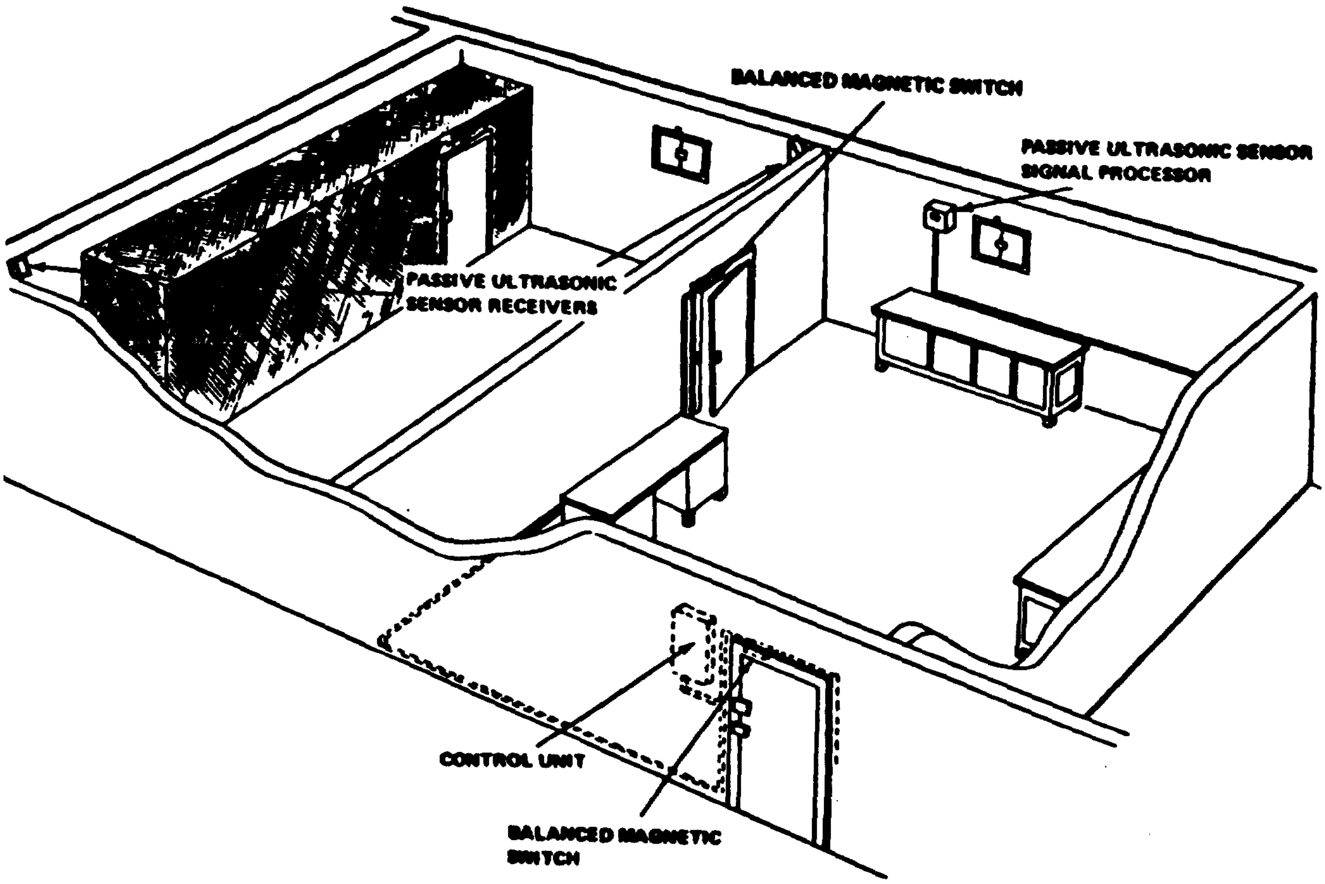


*Figure 4-4. Masonry Arms Room.*

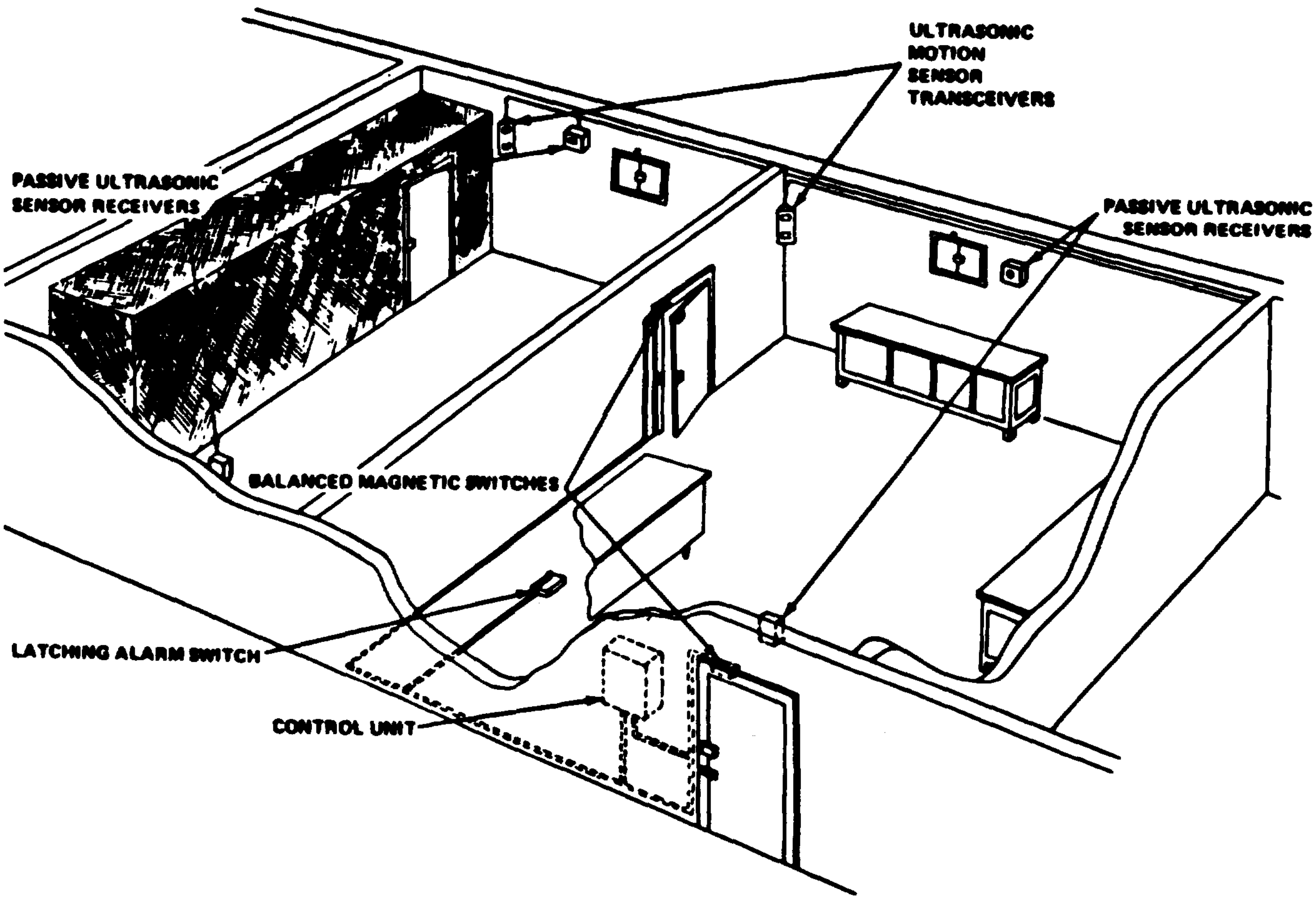


*Figure 4-5. Masonry Arms Room.*

# APPENDIX A

## REFERENCES

| | |
|---|---|
| A-1. DEMOLITION<br>TM 750-244-3 | Procedures for Destruction of Equipment to Prevent Enemy Use |
| A-2. FIRE PROTECTION<br>TB 5-4200-200-10 | Hand Portable Fire Extinguishers Approved for Army Users |
| A-3. MAINTENANCE<br>DA Pam 738-750 | The Army Maintenance Management System |
| A-4. TRI-SERVICE MANUALS | |
| DMWR 5-6350-264<br>NAVELEX EE181-AA-MMD-010/E121<br>J-SIIDS MWR<br>AIR FORCE T.O. 31S9-4-1-213 | Depot Maintenance Work Requirement |
| TM 5-6350-264-14-1<br>NAVELEX EE181-AA-INM-020/E121<br>J-SIIDS INS<br>AIR FORCE T.O. 31S9-4-1-201 | Installation, Operation and Checkout Procedures |
| TM 5-6350-264-14&P-2<br>NAVELEX EE181-AA-OMI-03A/E121<br>RT1161 M9443<br>AIR FORCE T.O. 31S9-2FSS9-1-2 | Transceiver, Ultrasonic Signal and Processor, Ultrasonic Motion Signal |
| TM 5-6350-264-14&P-3<br>NAVELEX EE181-AA-OMI-04A/E121<br>R1860 M9443<br>AIR FORCE T.O. 31S92FSS9-1-3 | Receiver Passive Signal, Ultrasonic and Processor, Passive Signal, Ultrasonic |
| TM 5-6350-264-14&P-4<br>NAVELEX EE181-AA-OMI-05A/E121<br>DT546 M9442<br>AIR FORCE T.O. 31S9-2FSS9-1-4 | Detector, Vibration Signal and Processor, Vibration Signal |
| TM 5-6350-264-14&P-5<br>NAVELEX EE181-AA-OMI-06A/E121<br>SA-1955<br>AIR FORCE T.O. 31S9-2FSS9-1-5 | Switch, Balanced Magnetic |

**A-4. TRI-SERVICE MANUALS - Continued**

| | |
|---|---|
| TM 5-6350-264-14&P-6<br>NAVELEX EE181-AA-OMI-07A/E121<br>DT-545<br>AIR FORCE T.O. 31S9-2FSS9-1-6 | Sensor, Grid Wire |
| TM 5-6350-264-14&P-7<br>NAVELEX EE181-AA-OMI-08A/E121<br>DT-548<br>AIR FORCE T.O. 31S9-2FSS9-1-7 | Sensor, Capacity Proximity |
| TM 5-6350-264-14&P-8<br>NAVELEX EE181-AA-OMI-09A/E121<br>SA-1954<br>AIR FORCE T.O. 31S9-2FSS9-1-8 | Switch, Alarm Latching |
| TM 5-6350-264-14&P-9<br>NAVELEX EE181-AA-OMI-10A/E121<br>DZ-204<br>AIR FORCE T.O. 31S9-2FSS9-1-9 | Alarm, Audible |
| TM 5-6350-264-14&P-10<br>NAVELEX EE181-AA-OMI-11A/E121<br>C-9412<br>AIR FORCE T.O. 31S9-2FSS9-1-10 | Control Unit, Alarm Set |
| TM 5-6350-264-14&P-11<br>NAVELEX EE181-AA-OMI-12A/E121<br>C-7359-60-1<br>AIR FORCE T.O. 31S9-2FSS9-1-11 | Cabinet, Monitor, Type A, Type B, Type C and Monitor Module, Status Monitor Module, Alarm |
| TM 5-6350-264-14&P-12<br>NAVELEX EE181-AA-OMI-13A/E121<br>R1861-T1257<br>AIR FORCE T.O. 31S9-2FSS9-1-12 | Receiver, Data and Transmitter, Data |
| TM 5-6350-264-14&P-13<br>NAVELEX EE181-AA-OMI-140/E121<br>DT-547<br>AIR FORCE T.O.31S9-2FSS9-1-13 | Sensor, Magnetic Weapons (DT-547) |
| TB 5-6350-264<br>NAVELEX EE181-AB-OMI-01A/E121<br>J-SIIDS<br>AIR FORCE T.O. 3159-4-1-111 | Selection and Application of Joint Services Interior Intrusion Detection System |

| | |
|---|---|
| A-5. PAINTING<br>SB 11-573 | Painting and Preservation Supplies Available for Field Use for Electronic Equipment |
| TM 43-0139 | Painting Instructions for Field Use |
| A-6. RADIOACTIVE MATERIAL<br>TB 43-0141 | Instructions for Safe Handling, Maintenance, Storage, and Disposal of Radioactive Commodities |
| A-7. SHIPMENT AND STORAGE<br>TM 740-90-1 | Administrative Storage of Equipment |

# APPENDIX B
# APPLICABLE REGULATIONS AND GUIDELINES

This appendix lists security-related publications that are applicable to J-SIIDS considerations, installation, and operation.

| | |
|---|---|
| AR 103 | Finance and Accounting for Installations, Disbursing Operations |
| AR 103-1 | Finance and Accounting for Installations, Impressed Funds |
| AR 50-5 | Nuclear Surety Program |
| AR 50-6 | Chemical Surety Program |
| AR 190-11 | Physical Security of Arms, Ammunitions, and Explosives |
| AR 190-13 | Army Physical Security Program |
| AR 190-15 | Security of Army Property at Unit and Installation Level |
| AR 190-18 | Physical Security of US Army Museums |
| AR 190-50 | Physical Security for Storage of Controlled Medical Substances and Other Medically Sensitive Items |
| AR/NGR 190-51 | Security of Army Property at the Unit and Installation Level |
| AR 190-5 | Evidence Procedures |
| AR 380-5 | Department of the Army Information Security Program Regulation |
| AR 380-40 | Policy for Safeguarding and Controlling COMSEC Information |
| AR 380-380 | Automated System Security |
| FM 19-30 | Physical Security |
| AFR 125-37 | The USAF Resources Protection Program |
| DIA 50-3 | Chapter III, dtd 2 May 80, Model Designation of Items Specifically Approved for Use in Protection of US Classified Information |
| DOD 3224.3 | Physical Security Equipment: Assignment of Responsibility for Research, Engineering, Procurement, Installation, and Maintenance |
| DOD 5100.76 | Physical Security of Arms, Ammunition, and Explosives |

## APPENDIX B (Contd)

## APPLICABLE REGULATIONS AND GUIDELINES

| | |
|---|---|
| DOD 5160.65 | Part 12, Joint Conventional Ammunition Security Policies and Procedures |
| DOD 5210.41 | Security Criteria and Standards for Protecting Nuclear Weapons |
| TC 19-16 | Countering Terrorism on US Army Installations |

# APPENDIX C

## J-SIIDS COMPONENTS

| NOMENCLATURE | NSN |
|---|---|
| Passive Processor | 6350-00-228-2548 |
| Passive Receiver | 6350-00-228-2534 |
| Motion Processor | 6350-00-228-2581 |
| Motion Transceiver | 6350-00-228-2566 |
| Vibration Signal Processor | 6350-00-228-2524 |
| Vibration Signal Detector | 6350-00-228-2521 |
| Control Unit | 6350-00-228-2735 |
| “A” Cabinet | 6350-00-228-2690 |
| “B” Cabinet | 6350-00-228-2697 |
| “C” Cabinet | 6350-00-228-2705 |
| Monitor Status | 6350-00-228-2661 |
| Monitor Alarm | 6350-00-228-2678 |
| Audible Alarm | 6350-00-228-2514 |
| Balanced Magnetic Switch | 6350-00-228-2500 |
| Alarm Latching Switch | 6350-00-228-2510 |
| 600’ Grid Wire | 6350-00-360-7760 |
| Grid Wire Sensor (GWS) | 6350-00-228-2504 |
| GWS Junction Box Only | 6350-00-368-8210 |
| Magnetic Weapon Sensor | 6350-00-228-2590 |
| Capacitance Sensor | 6350-00-228-2606 |
| Pistol Rack | 6350-00-228-2601 |

## APPENDIX C (Contd)

## J-SIIDS COMPONENTS

| NOMENCLATURE | NSN |
|---|---|
| Capacitance Proximity Sensor Mounting Blocks | 6350-00-228-2609 |
| Data Receiver | 6350-00-228-2655 |
| Data Transmitter | 6350-00-251-5749 |
| Code Plugs (Set of 3) | 6350-01-071-5519 |
| Code Plugs (Set of 2) | 6350-01-071-5520 |
| Control Unit Battery | 6350-00-111-0500 |
| “B” and “C” Monitor Cabinet Battery | 6350-00-111-0520 |
| AA Battery | 6350-00-111-0512 |
| “A” Monitor Cabinet Battery | 6350-00-111-0508 |

# GLOSSARY

The following acronyms are used in the manual:

AC - Alternating Current

BMS - Balanced Magnetic Switch

CPS - Capacitance Proximity Sensor
CU - Control Unit

DC - Direct Current
DTS - Data Transmission System

GWS - Grid Wire Sensor

HZ - Hertz

J-SIIDS - Joint-Services Interior Intrusion Detection System

MWS - Magnetic Weapons Sensor

PUS - Passive Ultrasonic Sensor
PWB - Printed Wiring Board

RFI - Radio Frequency Interference

UMS - Ultrasonic Motion Detector

VAC - Volts Alternating Current
VS - Vibration Sensor

**By Order of the Secretaries of the Army, the Navy, and the Air Force:**

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DISTRIBUTION:
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RECOMMENDED CHANGES TO EQUIPMENT TECHNICAL PUBLICATIONS


**SOMETHING WRONG WITH THIS PUBLICATION?**

FROM: (PRINT YOUR UNIT'S COMPLETE ADDRESS)
PFC JOHN DOE
COA, 3d ENGINEER BN
FT. LEONARDWOOD, MO 63108

DATE SENT

| PUBLICATION NUMBER | PUBLICATION DATE | PUBLICATION TITLE |
|---|---|---|
| TB 5-6350-264 | 28 July 1986 | Joint-Services Interior Intrusion DetectionSystem |

BE EXACT. PIN-POINT WHERE IT IS

| PAGE NO | PARA-GRAPH | FIGURE NO | TABLE NO | IN THIS SPACE TELL WHAT IS WRONG AND WHAT SHOULD BE DONE ABOUT IT: |
|---|---|---|---|---|
| 6 | 2-1 a | | | In line 6 of paragraph 2-1a the manual states the engine has 6 Cylinders. The engine on my set only has 4 Cylinders. Change the manual to show 4 Cylinders. |
| 81 | | 4-3 | | Callout 16 on figure 4-3 is pointing at a bolt. In key to figure 4-3, item 16 is called a shim - Please correct one or the other. |
| 125 | line 20 | | | I ordered a gasket, item 19 on figure B-16 by NSN 2910-00-762-3001. I got a gasket but it doesn't fit. Supply says I got what I ordered, so the NSN is wrong. Please give me a good NSN |

PRINTED NAME, GRADE OR TITLE, AND TELEPHONE NUMBER
JOHN DOE, PFC (268) 317-7111

SIGN HERE John Doe
JOHN DOE

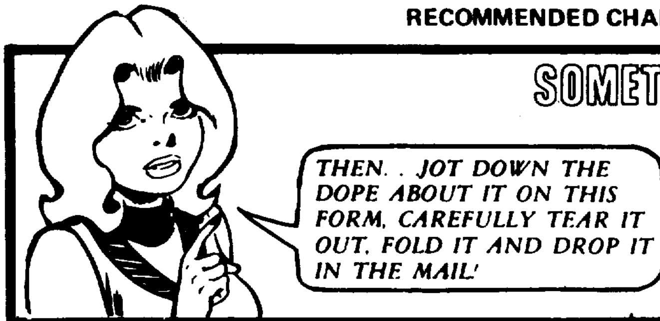
DA FORM 1 JUL 79 2028-2 — PREVIOUS EDITIONS ARE OBSOLETE.

DRSTS-M Overprint 1, 1 Nov 80

P.S.--IF YOUR OUTFIT WANTS TO KNOW ABOUT YOUR RECOMMENDATION MAKE A CARBON COPY OF THIS AND GIVE IT TO YOUR HEADQUARTERS

TEAR ALONG PERFORATED LINE

RECOMMENDED CHANGES TO EQUIPMENT TECHNICAL PUBLICATIONS

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| | | | | |

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TEAR ALONG PERFORATED LINE

REVERSE OF DA FORM 2028-2 Reverse of DRSTS-M Overprint 2, 1 Nov 80

TEAR ALONG PERFORATED LINE

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DEPARTMENT OF THE ARMY

OFFICIAL BUSINESS

COMMANDER
U S ARMY TROOP SUPPORT COMMAND
ATTN: AMSTR-MCTS
4300 GOODFELLOW BOULEVARD
ST. LOUIS, MO 63120-1798

# The Metric System and Equivalents

*Linear Measure*

1 centimeter = 10 millimeters = .39 inch
1 decimeter = 10 centimeters = 3.94 inches
1 meter = 10 decimeters = 39.37 inches
1 dekameter = 10 meters = 32.8 feet
1 hectometer = 10 dekameters = 328.08 feet
1 kilometer = 10 hectometers = 3.280.8 feet

*Weights*

1 centigram = 10 milligrams = .15 grain
1 decigram = 10 centigrams = 1.54 grains
1 gram = 10 decigram = .035 ounce
1 dekagram = 10 grams = .35 ounce
1 hectogram = 10 dekagrams = 3.52 ounces
1 kilogram = 10 hectograms = 2.2 pounds
1 quintal = 100 kilograms = 220.46 pounds
1 metric ton = 10 quintals = 1.1 short tons

*Liquid Measure*

1 centiliter = 10 milliters = .34 fl. ounce
1 deciliter = 10 centiliters = 3.38 fl. ounces
1 liter = 10 deciliters = 33.81 fl. ounces
1 dekaliter = 10 liters = 2.64 gallons
1 hectoliter = 10 dekaliters = 26.42 gallons
1 kiloliter = 10 hectoliters = 264.18 gallons

*Square Measure*

1 sq. centimeter = 106 sq. millimeters = .155 sq. inch
1 sq. decimeter = 100 sq. centimeters = 15.5 sq. inches
1 sq. meter (centare) = 100 sq. decimeters = 10.76 sq. feet
1 sq. dekameter (are) 100 sq. meters = 1.076.4 sq. feet
1 sq. hectometer (hectare) = 100 sq. dekameters = 2.47 acres
1 sq. kilometer = 100 sq. hectometers = .386 sq. mile

Cubic Measure

1 cu.centimeter = 1006 cu. millimeters = .06 cu. inch
1 cu. decimeter = 1000 cu. centimeters = 61.02 cu. inches
1 cu. meter = 1000 cu. decimeters = 35.31 cu. feet

# Approximate Conversion Factors

| *To change* | *To* | *Multiply by* | *To change* | *To* | *Multiply by* |
|---|---|---|---|---|---|
| inches | centimeters | 2.540 | ounce-inches | newton-meters | .007062 |
| feel | meters | .305 | centimeters | inches | .394 |
| yards | meters | ,914 | meters | feet | 3.280 |
| miles | kilometers | 1.609 | meters | yards | 1.094 |
| square inches | square centimeters | 6.451 | kilometers | miles | .621 |
| square feet | square meters | .093 | square centimeters | square inches | .155 |
| square yards | square meters | .836 | square meters | square feet | 10.764 |
| square miles | square kilometers | 2.596 | square meters | square yards | 1.196 |
| acres | square hectometers | .405 | square kilometers | square miles | .386 |
| cubic feet | cubic meters | .028 | square hectometers | acres | 2.471 |
| cubic yards | cubic meters | .765 | cubic meters | cubic feet | 35,315 |
| fluid ounces | milliliters | 29,573 | cubic meters | cubic yards | 1.308 |
| pints | liters | .473 | milliliters | fluid ounces | .034 |
| quarts | liters | .946 | liters | pints | 2.113 |
| gallons | liters | 3.785 | liters | quarts | 1.057 |
| ounces | grams | 28.349 | liters | gallons | .264 |
| pounds | kilograms | .454 | grams | ounces | .035 |
| short tons | metric tons | .907 | kilograms | pounds | 2.205 |
| pound-feet | newton-meters | 1,356 | metric tons | short tons | 1.102 |
| pound-inches | newton-meters | .11296 | | | |

# Temperature (Exact)

| | | | |
|---|---|---|---|
| °F Fahrenheit temperature | 5/9 (after subtracting 32) | Celsius temperature | °C |

P/N: 041196-000