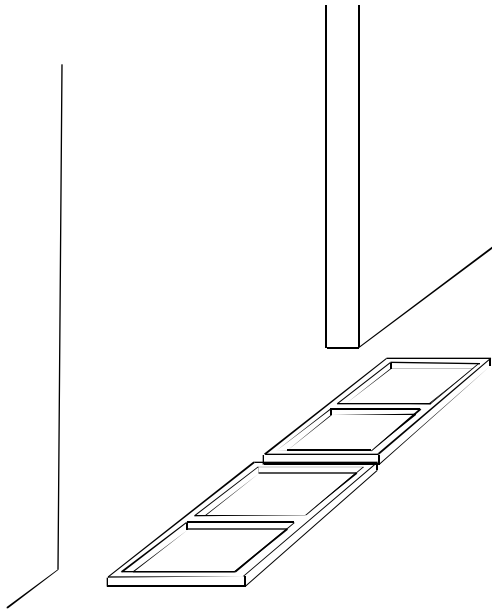


ADS Floor•Max Antennas



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PRELIMINARY – 01/31/00

About this Guide

This installation guide explains how to install ADS Floor•Max® antennas. Other related documents are:

- Planning Guide, 8000-2693-01
- Installation Guide, ADS 216 Power Pack, 8000-2693-02
- Setup and Service Guide, 8000-2693-xx
- Reference Guide, 8000-2693-xx

Note: Because placement of antenna components depends on architectural and customer requirements, your Sensormatic representative will supply this information separately.

If you need assistance...

Call Sensormatic Customer Support at:

1-800-543-9740

Limitation of Warranty

Any deviations from the materials or procedures specified herein shall void Sensormatic's warranty with the owner/buyer. In no event shall Sensormatic be liable for loss or damage caused by the use of materials or procedures that do not meet Sensormatic's specifications.

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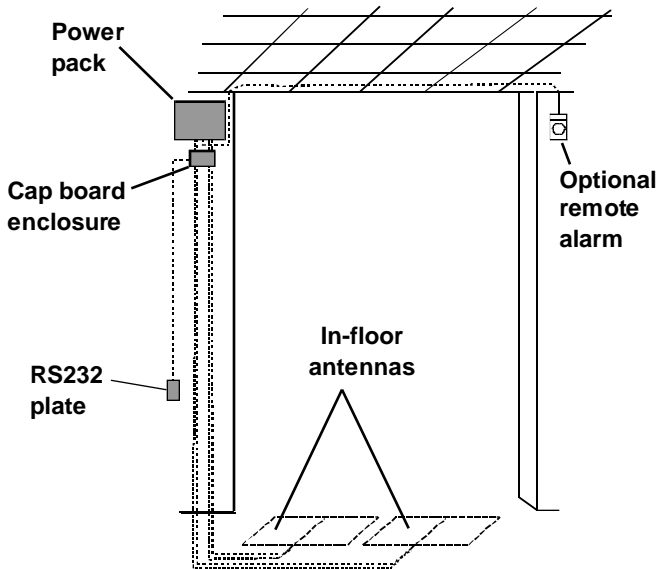
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DOJ 01/00

Antenna Overview

ADS Floor•Max antennas, positioned at an exit, are part of an Ultra•Max security label detector that deters theft. One or two ADS Floor•Max in-floor antennas are attached to a power pack through a capacitor board enclosure.

Figure 1. ADS Floor•Max Detector



Component Part Numbers

ADS Floor•Max 6' System

- 1 ADS Floor•Max Antenna (ZSFLORMX-ANT)
- ADS Enclosure Assembly (ZPFLORMX-ENC)
- RS232 Assembly (ZPFLORMX-232)
- ADS Power Pack (ZEADS216)

ADS Floor•Max 12' System

- 2 ADS Floor•Max Antennas (ZSFLORMX-ANT)
- ADS Enclosure Assembly (ZPFLORMX-ENC)
- RS232 Assembly (ZPFLORMX-232)
- ADS Power Pack (ZEADS216)

ADS Floor•Max Antenna (ZSFLORMX-ANT)

- Install kit (0351-1696-01)
- Capacitor board (0301-1536-01)
- Antenna (0300-2289-01)

ADS Floor•Max Shield (ZPFLORMX-SH)

- Shield tray - left (0300-9219-01)
- Shield tray - right (0300-9219-02)
- Shield tiles (0500-9216-01)

Installation Requirements

Verifying Equipment and Unpacking

- ❑ Verify that all equipment has arrived. Make sure the system configuration is the right one for the installation site.
- ❑ Unpack major components in a back room. At the install site, lay out parts in the order you will need them. Do not clutter the aisle or cause a trip hazard.

Note: The capacitor board is in a cardboard sleeve taped to the bottom of the antenna shipping box. The PVC leveling legs are inside one of the cardboard support ribs on the end of the box.

Installer/Contractor

- ❑ Shall have electrical work comply with the latest national electrical code, national fire code, and all applicable local codes and ordinances.
- ❑ Shall coordinate all work with other trades to avoid interference.
- ❑ Shall verify existing site conditions and coordinate with the owner's representative and appropriate utilities as required.
- ❑ Shall obtain copies of all related plans, specifications, shop drawings and addenda to schedule and coordinate related work.
- ❑ Shall thoroughly review the project to ensure that all work meets or exceeds the above requirements. Any alleged discrepancies shall be brought to the attention of Sensormatic Electronics.

Chemical Interaction



WARNING!

Do not install this product in hazardous areas where highly combustible or explosive products are stored or used.

Antenna Placement and Cabling

- ❑ Whenever possible, keep the antennas at least 2.4m (8') away from noise sources such as computer monitors, TV's, switching power supplies, and neon displays.

- ❑ Maximum cable distance from the antennas to the capacitor board enclosure is 12.2m (40'). DO NOT splice antenna cables.
- ❑ Maximum cable distance from the power pack to the cap board enclosure is 2m (7').



WARNING!

DO NOT compromise the structural integrity of the floor by cutting or removing rebar. Contractors must obtain approval for all proposed structural changes. All structural changes must meet national and local requirements.

CAUTION: To avoid adding significant time and cost to the in-floor installation, check detector performance and label detection height at the exact installation site. Do this BEFORE cutting the floor and again BEFORE pouring the concrete.

- ❑ Locate panels inside the facility and as close to exit doors as possible.
- ❑ To provide 1.8m (6') of coverage width per panel, space panels no more than 25-30cm (10-12") apart. Spacing of 25cm (10") is recommended.
- ❑ For On Grade installations, the panels must be between 3cm (1.25") and 5cm (2") below the surface of the finished floor.
- ❑ For Off Grade installation, the panels must be 1.25cm (.5") below the surface of the finished floor.
- ❑ For On Grade installations, no metal such as rebar or wire mesh should be located under or adjacent to the antenna. If metal is required, it must be spaced greater than 21cm (8") from the bottom and 31cm (12") in all other directions from the antenna.
- ❑ For conduit runs, use 3/4-inch Electrical Metal Tubing (EMT) or rigid conduit (**not plastic**) with the maximum run not to exceed 10.5m (35') to allow adequate cable length for system connections. Some local codes require rigid conduit instead of EMT for concrete burial. Some local codes require steel hardware in concrete to be coated by tape or paint before burial.
- ❑ Use two separate conduit runs for each antenna. Conduit run must be a minimum of 20cm (8") from the antennas. Conduit cannot cross above or below the antenna. It must be routed around the perimeter.

- All conduit fittings must be rain/concrete tight. A 3/4-inch EMT fitting is supplied with the antenna. A rigid 3/4-inch rain/concrete tight fitting may be substituted. Wrap threads with four turns of Teflon pipe tape.
- Minimize underground conduit couplings to prevent moisture intrusion.
- High strength, non-metallic, non-shrink mortar/concrete with a compressive strength of 5000 psi is required. (For example, FX-228 mortar mix and FX-752 bonding agent by Fox Industries)
- Mortar cure time depends on the mix and temperature of the mortar ingredients.
- Avoid walking on antenna cables during installation.
- Heavy forklifts can pass over the mortar after 24 hours, provided the mortar is protected by 3/4-inch steel plates.
- Have on hand tools and equipment necessary to place the mortar once it is mixed.

Enclosure

- Mount the cap board enclosure as close to the power pack as possible. Maximum distance from the power pack to the enclosure is 2m (7').
- Install a heater in enclosures in sub-freezing environments.
- If conduit is not used, use Romex connectors wherever cables enter the power pack and capacitor board enclosure.

Tools and Equipment Required

For all ADS Floor•Max system installations:

- 6 mil (minimum) plastic sheeting (to protect nearby items from dust)
- Chalk or red permanent marker
- Floor saw
- PVC pipe cutter or hacksaw
- Hammer drill with 6.5mm (1/4") and 9.6mm (3/8") masonry drill bits
- Power drill with 1.6mm (1/16"), 6.5mm (1/4"), and 9.6mm (3/8") drill bits
- Hammer
- Phillips and slotted screwdrivers
- 14-16 AWG and 16-22 AWG wire strippers
- Ratchet and socket set
- Vacuum and broom
- Wet vacuum
- Level
- Electrical tape
- Teflon pipe tape
- Caution tape
- Duct tape

Figure 2. "On Grade" installation diagram

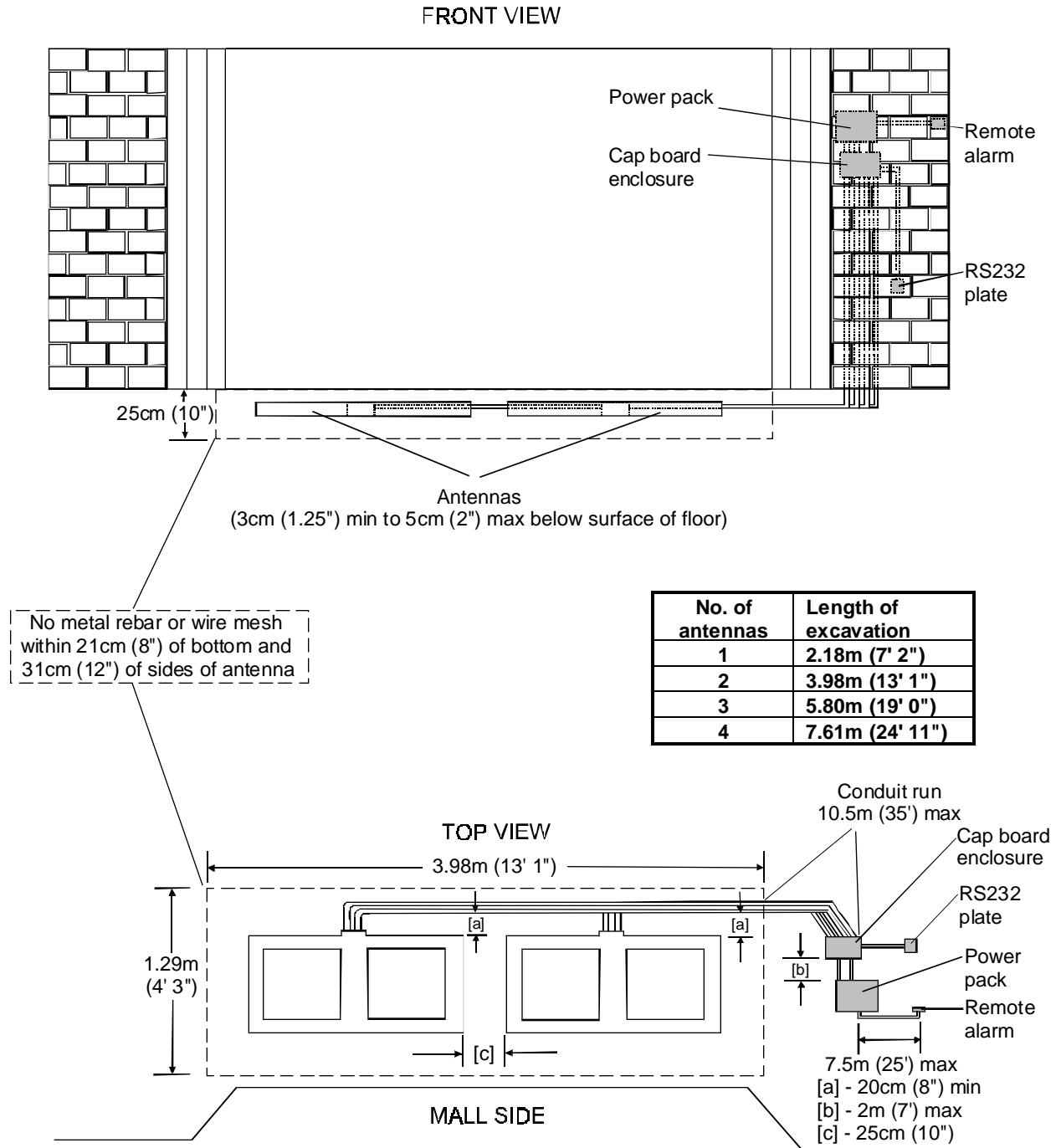
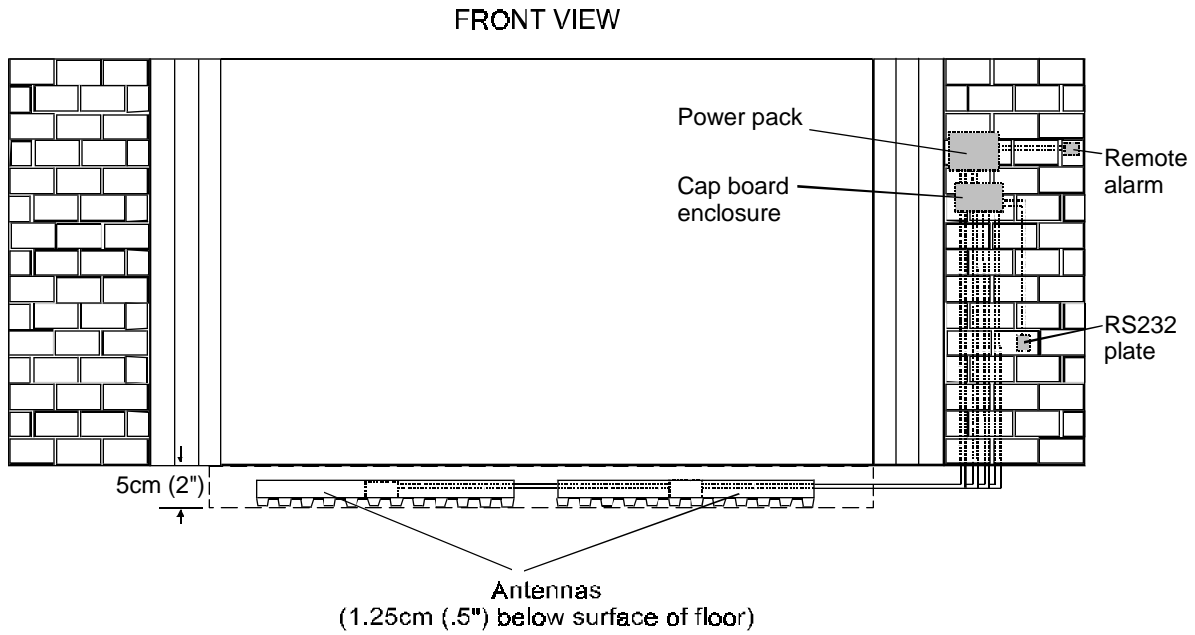
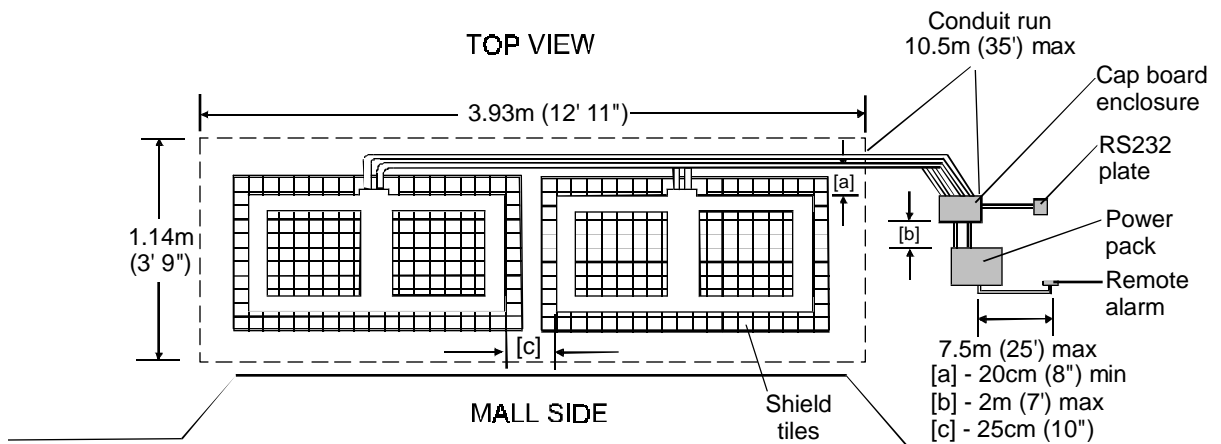


Figure 3. "Off Grade" installation diagram



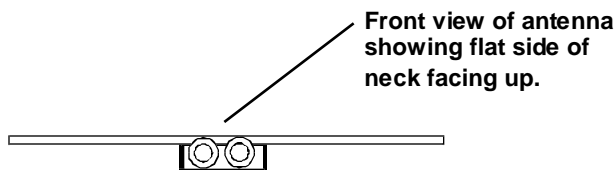
No. of antennas	Length of excavation
1	1.91m (6' 3")
2	3.93m (12' 11")
3	5.95m (19' 6")
4	7.96m (26' 2")



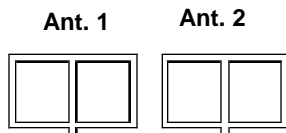
Installing ADS Floor•Max Antennas

1. Lay out ADS Floor•Max antennas as shown for proper antenna phasing (Figure 4).
Locate panels inside the facility and as close to exit doors as possible.
DO NOT space antennas more than 25-30cm (10-12") apart. Spacing of 25cm (10") is recommended.
The flat side of the cable entry neck must face up.

Figure 4. ADS Floor•Max antenna orientation for proper phasing



Top view

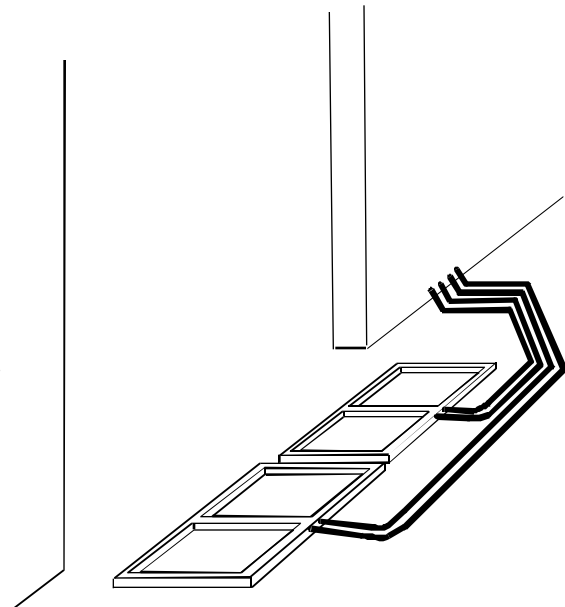


CAUTION: To avoid adding significant time and cost to the in-floor installation, check detector performance and label detection height at the exact installation site. Do this BEFORE cutting the floor and again BEFORE pouring the concrete.

2. Determine the placement of conduit runs (Figure 5).

Two separate conduit runs are required for each antenna.
Conduit must terminate at the capacitor board enclosure for proper grounding.

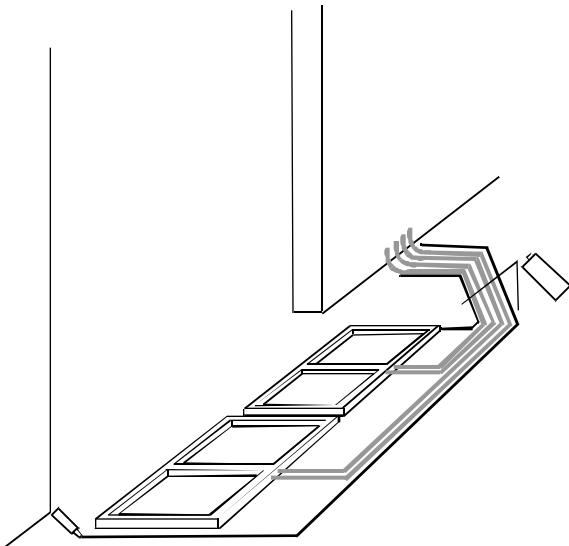
Figure 5. Antenna with conduit attached



3. Mark excavation location on floor. Refer to Figure 2 or Figure 3 for recommended length and width of excavation.

- a. With each antenna in place, use a chalk line or wide tip red permanent marker to trace an outline around the outside of the antenna and conduit. Also trace the conduit route from the antenna back to the cap board enclosure (Figure 6).
- b. Remove the antennas.
- c. Spray all floor markings with clear lacquer to prevent erasure during the floor excavation process (next).

Figure 6. Marking the excavation location



4. Excavate the floor (Figure 7).

- a. Using a concrete saw, cut along the outline.

For "On Grade" installation, cut down to grade.

For "Off Grade" installation, cut to a minimum depth of 5cm (2").



WARNING!

DO NOT compromise the structural integrity of the floor by cutting or removing rebar. Contractors must obtain approval for all proposed structural changes. All structural changes must meet national and local requirements.

- b. Using the specified chipping hammer, break up the floor and remove the concrete.

Note: Fiberglass reinforced plastic (FRP) rebar can be used in the excavation to prevent cracking and settling. Drill 9/16" diameter holes and dowel the rebar into the sides of the excavation. Dowels should be installed in the holes using concrete adhesive. Refer to Figure 8.

- c. Remove all debris from the channels using water and a wet vacuum.

Figure 7. Excavating the floor

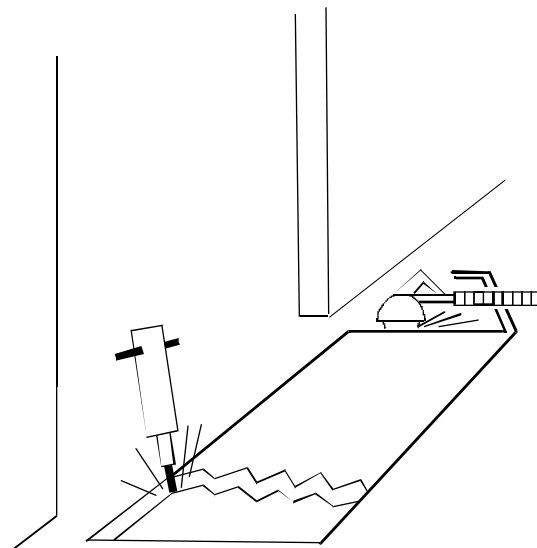
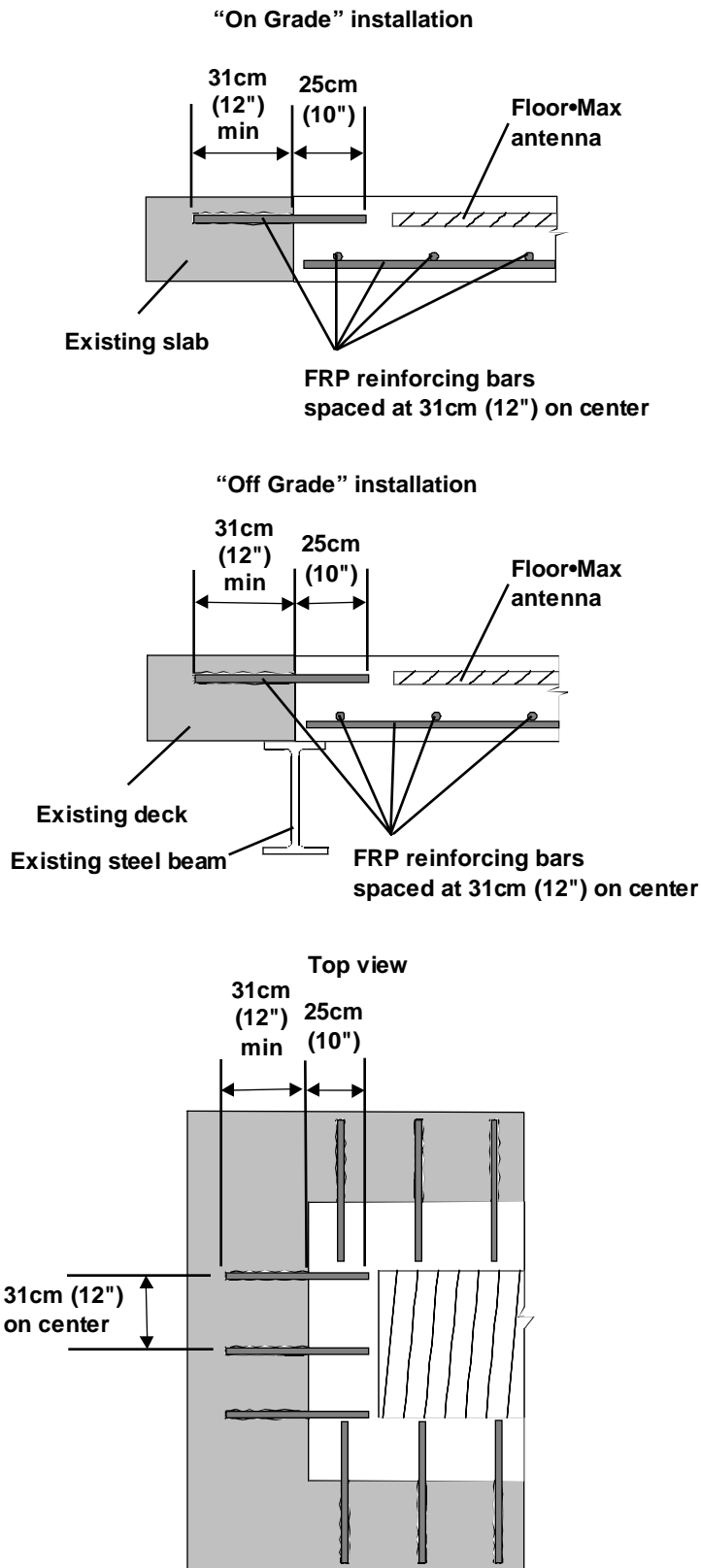


Figure 8. FRP rebar installation



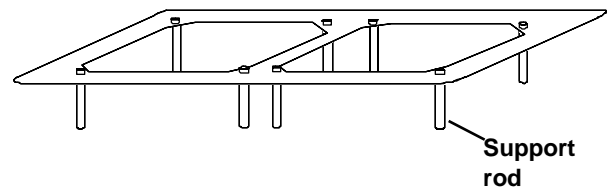
For "Off Grade" installations, proceed to "Off Grade" Installation on page 10

"On Grade" Installation

5. Assemble the antenna supports, if needed. (Figure 9).

Insert eight support rods into the antenna support holes in the antenna.

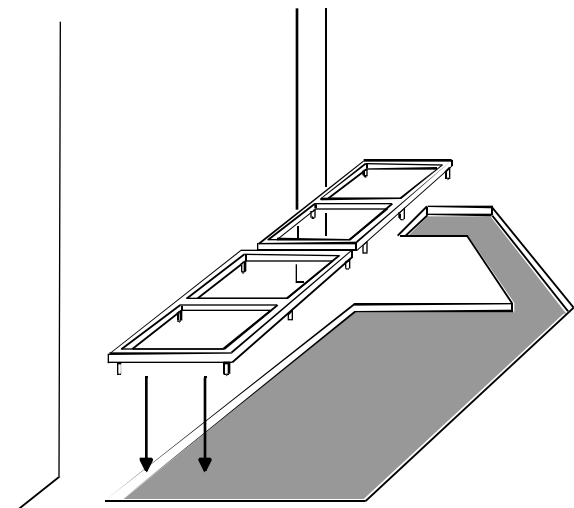
Figure 9. Antenna with support rods



6. Level the ground underneath the antenna and place the antenna with support rods into the pit.

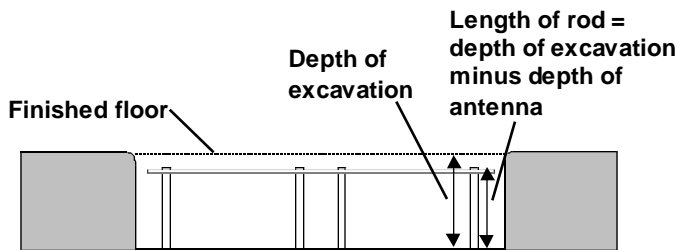
The antenna must be a minimum of 3cm (1.25") and a maximum of 5cm (2") below the surface of the finished floor.

Figure 10. Placing supports and assembly



7. **If necessary, cut the antenna support rods so that the antenna is level (Figure 11).**
 - a. For each support rod, measure the depth of the excavation from the surface of the finished floor.
 - b. Cut the support rod to the length of the depth of the excavation minus the depth of the antenna (3cm (1.25") to 5cm (2")).

Figure 11. Cutting the support rods

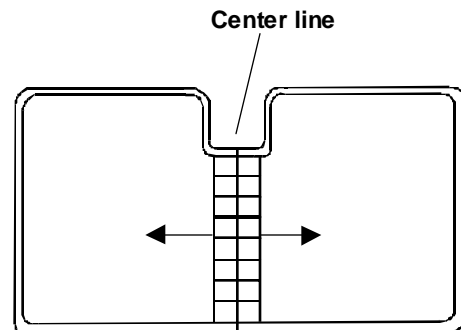


Proceed to “Connecting Conduit and Cables” on page 11.

“Off Grade” Installation

5. **Smooth the surface in the bottom of the pit.**
Remove any peaks or valleys in the bottom of the pit so that the tray will be supported firmly.
6. **Assemble the tray.**
Place the two halves of the tray together and secure with duct tape on the outside of the bottom of the tray.
7. **Place the tray in the pit.**
Orient the tray so that the cutout is on the side where the conduit attaches to the antenna.
8. **Place tiles on tray.**
Completely cover the bottom of the tray with closely packed tiles. Begin placing tiles along the center line of the tray. Work from the center to the outside of the tray. Refer to Figure 12.
9. **Place the antenna on tiles.**
Place the antenna on the tiles so that the conduit housing is over the cutout in the tray and the antenna is centered over the tiles.

Figure 12. Placing tiles on tray



Connecting Conduit and Cables

1. Attach conduit to the antenna and pull the antenna cables (Figure 5).

- a. Lay out 3/4-inch EMT or rigid conduit from the antenna to the cap board enclosure.
Two separate conduit runs are required for each antenna.
Conduit must terminate at the capacitor board enclosure for proper grounding.
- b. For DIY installations, lay out conduit from the power pack to the capacitor board enclosure. Maximum conduit run from the power pack to the enclosure is 2m (7').
- c. Pull the antenna cables from the antenna to the enclosure.
- d. Label the cables indicating the location of the attached in-floor panel for future servicing.
- e. Attach all conduit and tighten all conduit connectors. Use only rain/concrete tight EMT or rigid connectors.
- f. Ground the conduit to an earth ground by a code-approved method such as a clamp.



WARNING—RISK OF ELECTRIC SHOCK!

Failure to ground correctly could cause shock risk.

2. Connect Tx/Rx cables (5 conductor) to the power pack (Figure 15).

WARNING: Do NOT hot plug cables. Turn off the power pack before connecting cables.

- a. Install Romex-type connectors or conduit fittings in knockouts on pack.
- b. Route each Tx/Rx cable through knockout.
- c. Using a small screwdriver, attach Tx/Rx cables to connectors 2109-0351-05 according to the following table:

Pin 1 -	Black
Pin 2 -	Red
Pin 3 -	Green
Pin 4 -	White
Pin 5 -	Shield

- d. Insert Tx/Rx cable for panel A into pluggable terminal block Tx/Rx A; insert transmit cable for panel B into pluggable terminal block Tx/Rx B.

3. Connect Com cables (10 conductor) to the power pack.

- a. Route each Com cable through knockout.
- b. Using a small screwdriver, attach connectors 2109-0510-10 to each Com cable following the color-coded label.

Pin 1 -	Black
Pin 2 -	Brown
Pin 3 -	Red
Pin 4 -	Orange
Pin 5 -	Yellow
Pin 6 -	Green
Pin 7 -	Blue
Pin 8 -	Violet
Pin 9 -	Gray
Pin 10 -	Shield
- c. Insert connectors into pluggable terminal blocks on the power pack. Connect panel A to Com A; connect panel B to Com B.
CAUTION: Be sure the Tx/Rx and Com cables for a panel are attached to corresponding connectors. Incorrect connections will cause incorrect alarm signaling.

4. Determine whether the capacitor board enclosure will be mounted vertically or horizontally. Refer to Figure 13. Identify correct knockout locations for antenna conduit and connection to power pack.

5. Mount cap board enclosure close to power pack.

Mount with 3/16" Tapcons[®] on masonry wall or #10 self-tapping screws with anchors on drywall. Mounting hardware is not supplied.

6. Mount capacitor boards in enclosure and pull cables from pack to enclosure.

7. Mount RS232 plate and pull cable from enclosure to RS232 plate.

The RS232 plate can be mounted on the side of the cap board enclosure or remotely using a standard duplex junction box.

8. Connect RS232 cable to cap board and RS232 plate.

- a. Connect the 8 conductor cable to P3 - cap board A and the 2 conductor cable to P4 - cap board B.
- b. Cut cable to length leaving sufficient slack to connect to RS232 plate.
- c. Remove 6" to 8" of the outer jacket. Strip all conductors 1/8". Insert shrink tubing over drain wire to prevent shorting of printed circuit board.
- d. Connect to connector 2109-0510-10 in the RS232 plate following the color-coded label.

Pin 1 -	Black
Pin 2 -	Brown
Pin 3 -	Red
Pin 4 -	Orange
Pin 5 -	Yellow
Pin 6 -	Green
Pin 7 -	Blue
Pin 8 -	Violet
Pin 9 -	Gray
Pin 10 -	Shield

Pin 1 is on the right end of the connector as you look at the rear of the RS232 plate.

9. Connect power pack com cable to cap board.

- a. Route cable through knockout.
- b. Using a small screwdriver, attach connectors 2109-0510-10 to each Com cable following the color-coded label.

Pin 1 -	Black
Pin 2 -	Brown
Pin 3 -	Red
Pin 4 -	Orange
Pin 5 -	Yellow
Pin 6	Green
Pin 7	Blue
Pin 8	Violet
Pin 9	Gray
Pin 10	Shield

- c. Insert connectors into pluggable terminal blocks on cap board. Connect panel A to P2 on cap board A; connect panel B to P2 on cap board B.

10. Connect antenna coil cables to cap board.

Use a separate conduit and knockout for each coil start and finish pair (two per antenna). Refer to Figure 15.

- a. Route each antenna cable pair through knockout and secure away from cap board with cable clamps located on partition and sidewall.
- b. Attach panel A to TB1-TB4 on cap board A; attach panel B to TB1-TB4 on cap board B. Attach using the following table:

TB1 -	Bottom coil start (black)
TB2 -	Bottom coil finish (white)
TB3 -	Top coil start (black)
TB4 -	Top coil finish (white)



CAUTION!

For proper operation and reliability, connect the large diameter, white, coil-finish cables to TB2 and TB4 only.

- c. Attach ground wires from enclosure chassis to TB5 on cap boards A and B.

11. Connect power pack Tx/Rx cable to cap board.

- a. Route each Tx/Rx cable through knockout and secure away from cap board with cable clamps located on partition and sidewall.
- b. Using a small screwdriver, attach Tx/Rx cables to connectors 2109-0254-04 according to the following table:

Pin 1 -	Black
Pin 2 -	Red
Pin 3 -	Green
Pin 4 -	White
Pin 5	Shield

- c. Insert Tx/Rx cable for panel A into pluggable terminal block P1 on cap board A; insert Tx/Rx cable for panel B into pluggable terminal block P1 on cap board B.

Proceed to "Antenna Tuning" on page 15.

Figure 13. Cap board enclosure

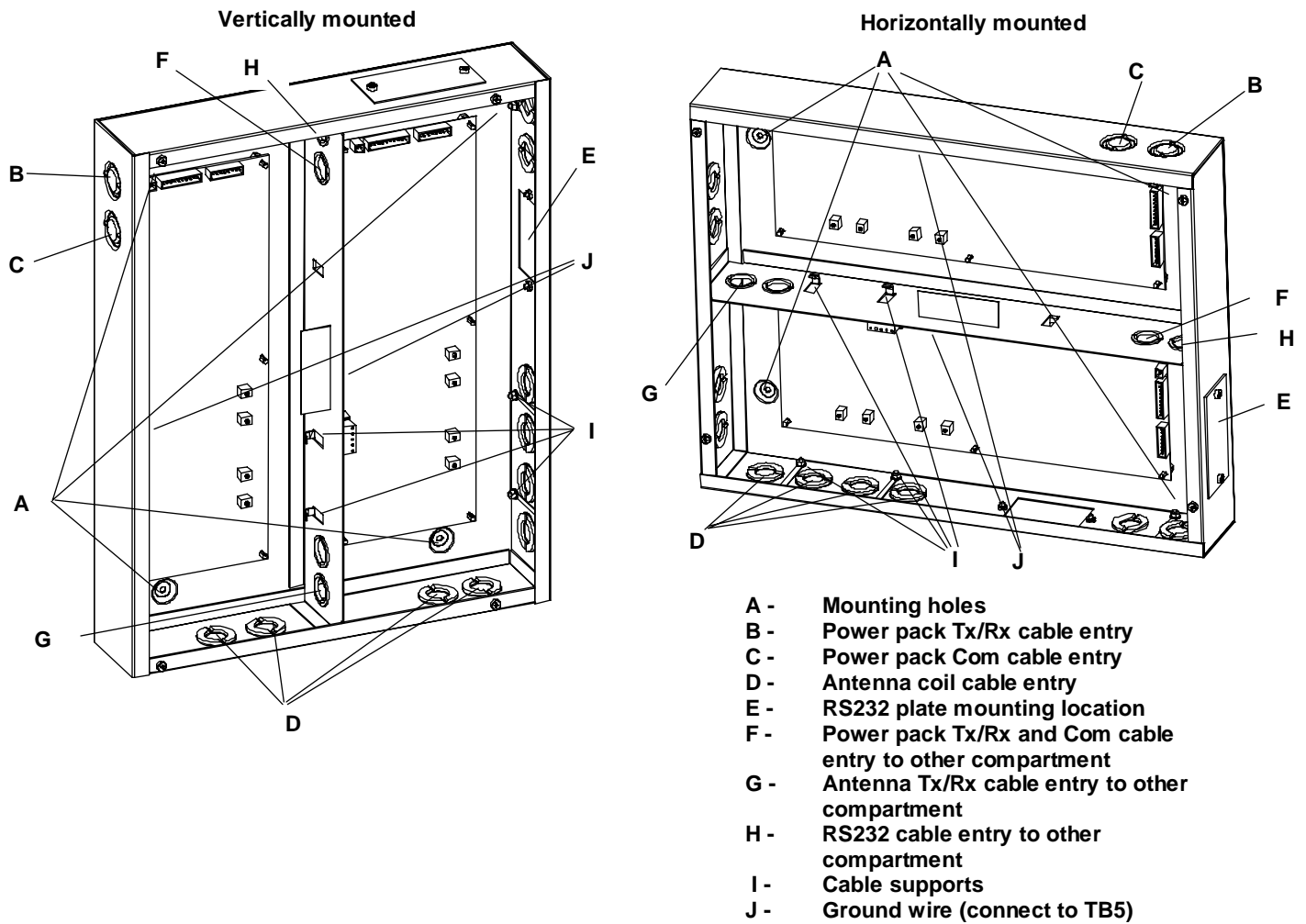


Figure 14. Capacitor board 0301-1536-01

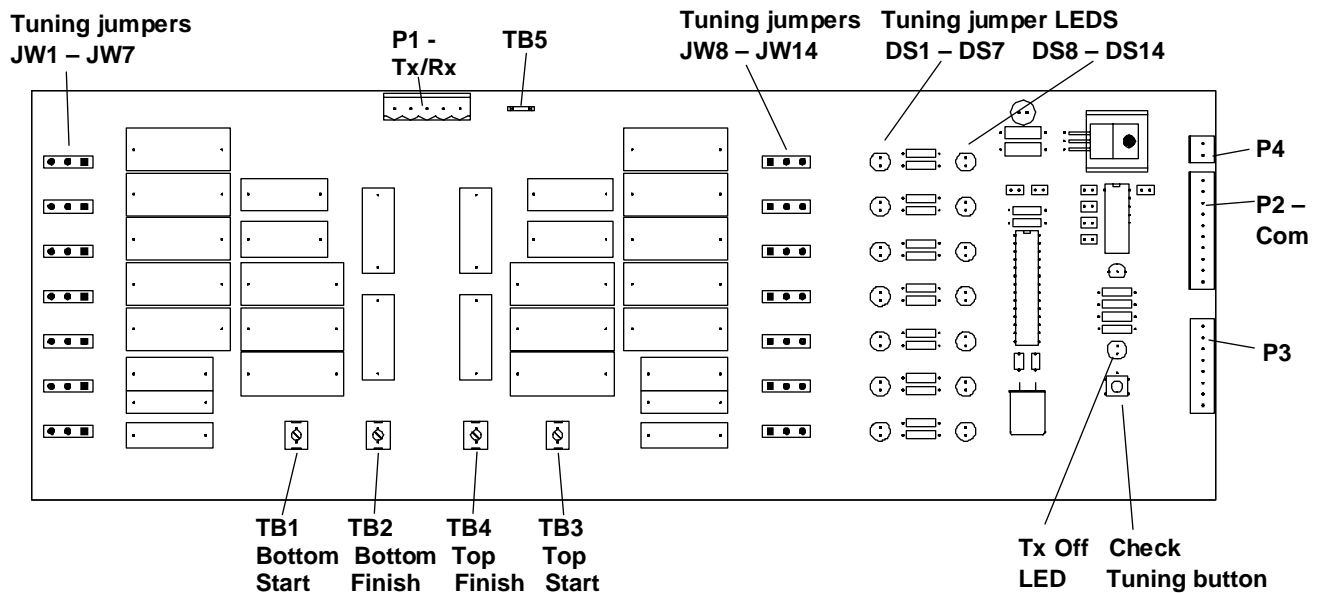
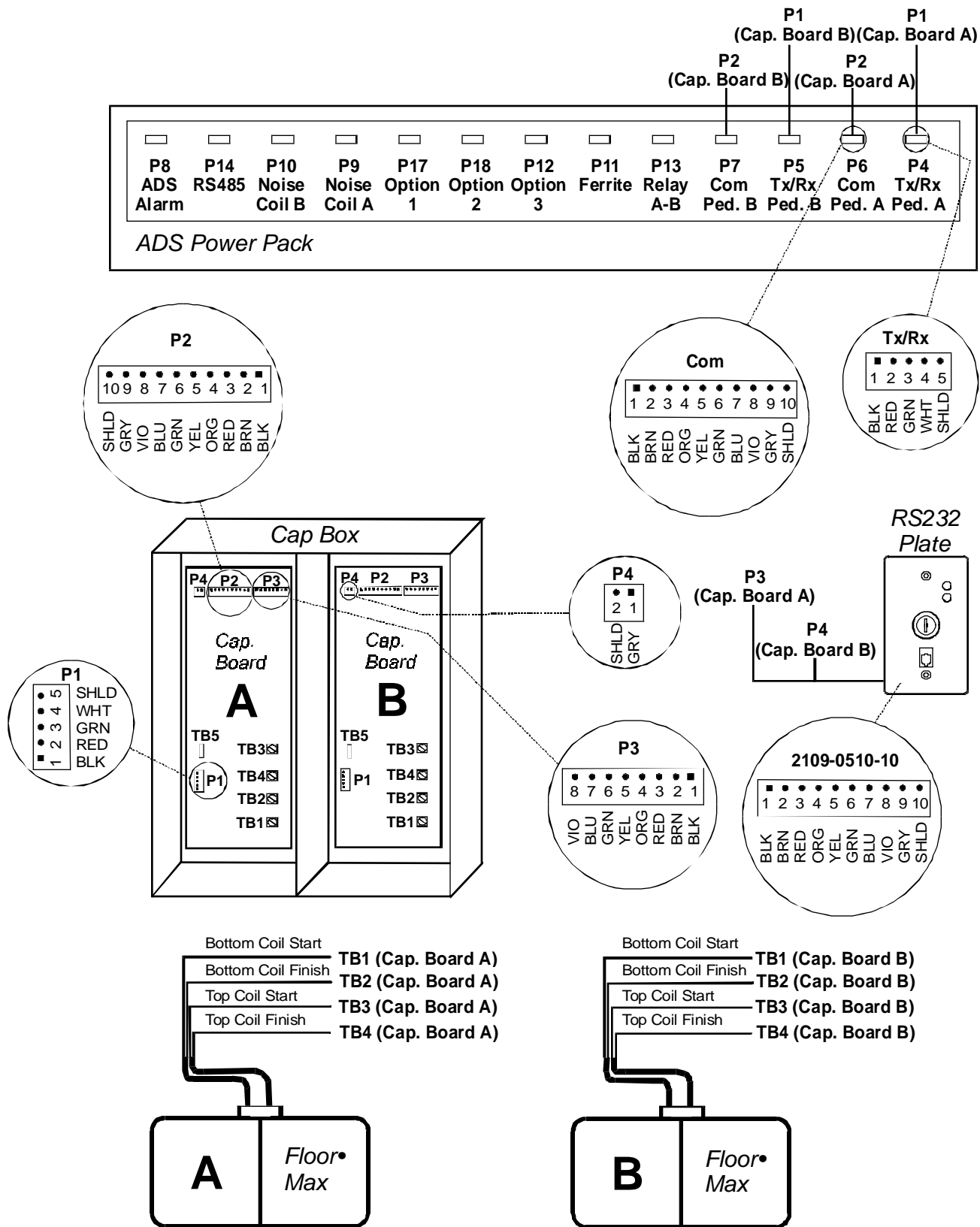


Figure 15. Wiring diagram



Antenna Tuning

The antenna is shipped with default settings that are acceptable for most installations. However, the antenna may require tuning to adjust for conditions at the installation site.

The antenna is tuned by changing jumper settings on the capacitor boards in the enclosure. The power pack assists tuning by lighting LEDs to indicate the correct jumper settings.

To tune the antenna, do the following for each antenna:

- 1. If necessary, turn off the power pack.**
- 2. Access the capacitor board in the enclosure.**
- 3. Make sure the jumpers are set to the defaults.**
 - JW1 -
 - JW2 -
 - JW3 -
 - JW4 -
 - JW5 -
 - JW6 -
 - JW7 -
 - JW8 -
 - JW9 -
 - JW10 -
 - JW11 -
 - JW12 -
 - JW13 -
 - JW14 -
- 4. Turn on the power pack.**
- 5. Check the green status LED on the RS232 plate.**

If the green status LED is ON continuously, the antenna is tuned.

If the green status LED is blinking, the antenna needs tuning. Proceed to step 6.

- 6. Change the jumpers on the capacitor board to the settings indicated by the yellow LEDs on the capacitor board. Refer to Figure 14.**



WARNING—RISK OF ELECTRIC SHOCK!

The green Tx Off LED on the capacitor board must be ON before changing jumpers. It indicates there are no high voltages on the board.

If a yellow jumper LED is on, place the corresponding jumper in the 1-2 position. If a yellow jumper LED is off, place the corresponding jumper in the 2-3 position.

- 7. Press the Check Tuning button on the capacitor board and return to step 5.**

After repeating steps 5 and 6 several times, the antenna should be tuned with the green status LED on continuously. If not, contact Sensormatic Customer Service.

Pouring the Concrete

CAUTION: To avoid adding significant time and cost to the in-floor installation, check detector performance and label detection height at the exact installation site. Do this BEFORE cutting the floor and again BEFORE pouring the concrete.

1. **Prepare the high-strength mortar mix. FX-228 by Fox Industries is recommended but not required.**

Fox products may be replaced by other mortar materials as long as they have a compressive strength of 5000 psi and contain no ferrous metal. For product specifications, call Technical Support.

CAUTION: Work time is greatly reduced at temperatures above 80°F. Complete mortar placement within the time specified.

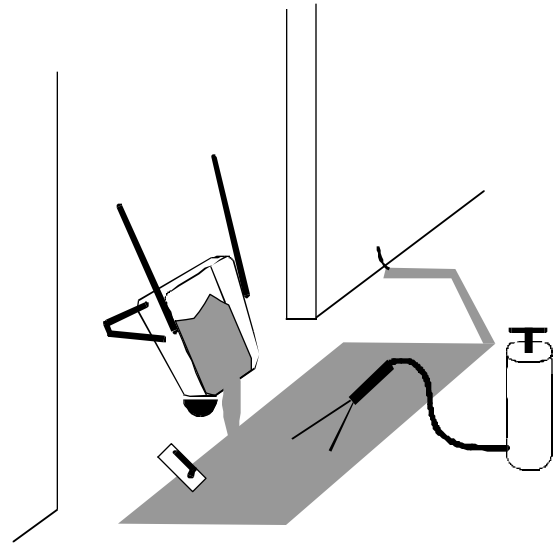
2. **Rough up the surface and work mortar into the sawed face of the concrete to promote bonding and hand shovel mortar around all support rods before filling the rest of the pit.**

CAUTION: Bottom of antennas must be 100% supported by mortar—NO VOIDS! Do not lift antenna assemblies once they have been placed in the mortar.

3. **Completely fill the pit with additional mortar. Apply the final layer by troweling it into place (Figure 16).**

CAUTION: Use only a small amount of water when troweling the final top surface to avoid potential shrinkage cracks. Do not over trowel - doing so will entrap air or leave blisters in the mortar.

Figure 16. Adding the final layer



4. **Using a garden sprayer, thoroughly coat the surface of the concrete with curing compound (refer back to Figure 16).**

Wait five minutes for the compound to set.

5. **Protect the installation for at least 72 hours.**

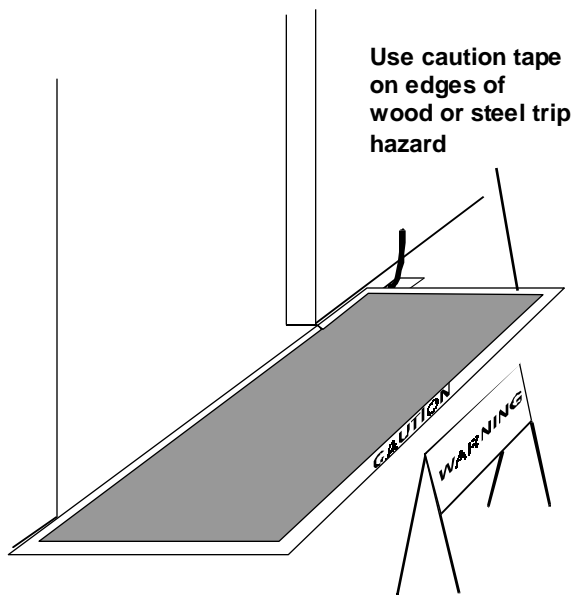
After the initial set, cover mortar with 1.3cm (1/2") plywood in retail installations and 2cm (3/4") steel plates in DIY installations.

NOTE: Place signs and caution tape around the installation to warn of potential trip hazards.

After 24 hours—The wood protected installation can be opened to pedestrian traffic.

After 72 hours—Remove the steel plate and plastic sheeting. The floor is now ready for the desired floor covering (tile, carpet, wood, etc.).

Figure 17. Protecting the installation



STOP!

Wait at least 24 hours before allowing forklift traffic over the steel plates.

Wait 72 hours before removing the plates.

Specifications

Electrical

Power Supply (Non-European Power Pack)

Primary Input:100-120Vac or
220-240Vac
@ 50–60Hz

Primary Power Fuse:5A, 250V slo-blow

Current Draw:2.0A peak

Input Power:<180W

Transmitter

Outputs:.....2 ports (two antennas,
multiplexed)

Operating Frequency:58 or 60kHz (± 200 Hz)

Transmit Burst Duration.....1.6ms

Transmit Current:16A peak

Burst Repetition Rate:

Based on 50Hz ac.....37.5Hz (Normal)
75Hz (Validation)

Based on 60Hz ac.....45Hz (Normal)
90Hz (Validation)

Receiver

Inputs:2 ports (two antennas,
multiplexed)

Center Frequency:.....58 or 60kHz

Receive Coil Resistance: ...1.6 ohms ($\pm 5\%$)

Alarm

Alarm Relay OutputDPDT contacts

Contact Switching Current .1.0A max.

Contact Switching Voltage .28V max.

Lamp/Audio Duration.....1–30 sec.
(1 sec. increments)

Environmental

Ambient Temperature:.....0°C to 50°C
(32°F to 122°F)

Relative Humidity:0 to 90%
non-condensing

Mechanical

ADS Floor•Max Panel

Length.....156cm (61 ¼")

Width.....67cm (26 ½")

Depth2cm (.9")

Weight.....kg (lbs.)

Antenna Shield

Length.....180cm (71")

Width.....91cm (36")

Depth3cm (1.3")

Weight.....kg (lbs.)

Capacitor Board Enclosure

Length.....47.5cm (18.7")

Width.....37.8cm (14.9")

Depth8.5cm (3.3")

Weight.....kg (lbs.)

RS232 Plate

Height11.5cm (4.5")

Width.....7cm (2.7")

Depth1.7cm (.7")

Weight.....kg (lbs.)

Declarations

Regulatory Compliance (Non-European Power Pack)

Safety:..... UL 1950
Can/CSA C22.2
No. 950

EMC:..... 47 CFR, Part 15

FCC COMPLIANCE: This equipment complies with Part 15 of the FCC rules for intentional radiators and Class A digital devices when installed and used in accordance with the instruction manual. Following these rules provides reasonable protection against harmful interference from equipment operated in a commercial area. This equipment should not be installed in a residential area as it can radiate radio frequency energy that could interfere with radio communications, a situation the user would have to fix at their own expense.

EQUIPMENT MODIFICATION CAUTION: Equipment changes or modifications not expressly approved by Sensormatic Electronics Corporation, the party responsible for FCC compliance, could void the user's authority to operate the equipment and could create a hazardous condition.

Other Declarations

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