

# FPS System

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Fence Protection System

# FPS 2/4-PAK Installation & Operation Guide

G2DA0202-001, Rev A  
First edition  
September 14, 2009



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# 1 GENERAL

The Magal-Senstar 2-Pak Fence Protection System is a unique two-zone outdoor detection system. The transducer sensor cable along with the dual zone Pre-Amp is attached to the fence and is connected by an interconnect cable to the 2-Pak Controller at the control location. The system will detect someone attempting to lift, climb or cut through the fence and provide this information at the control location via visual and audio alarm indicators and relay contact outputs. The 4-Pak fence Protection System is essentially two 2-Pak units with the controllers housed together to provide a compact four zone installation.

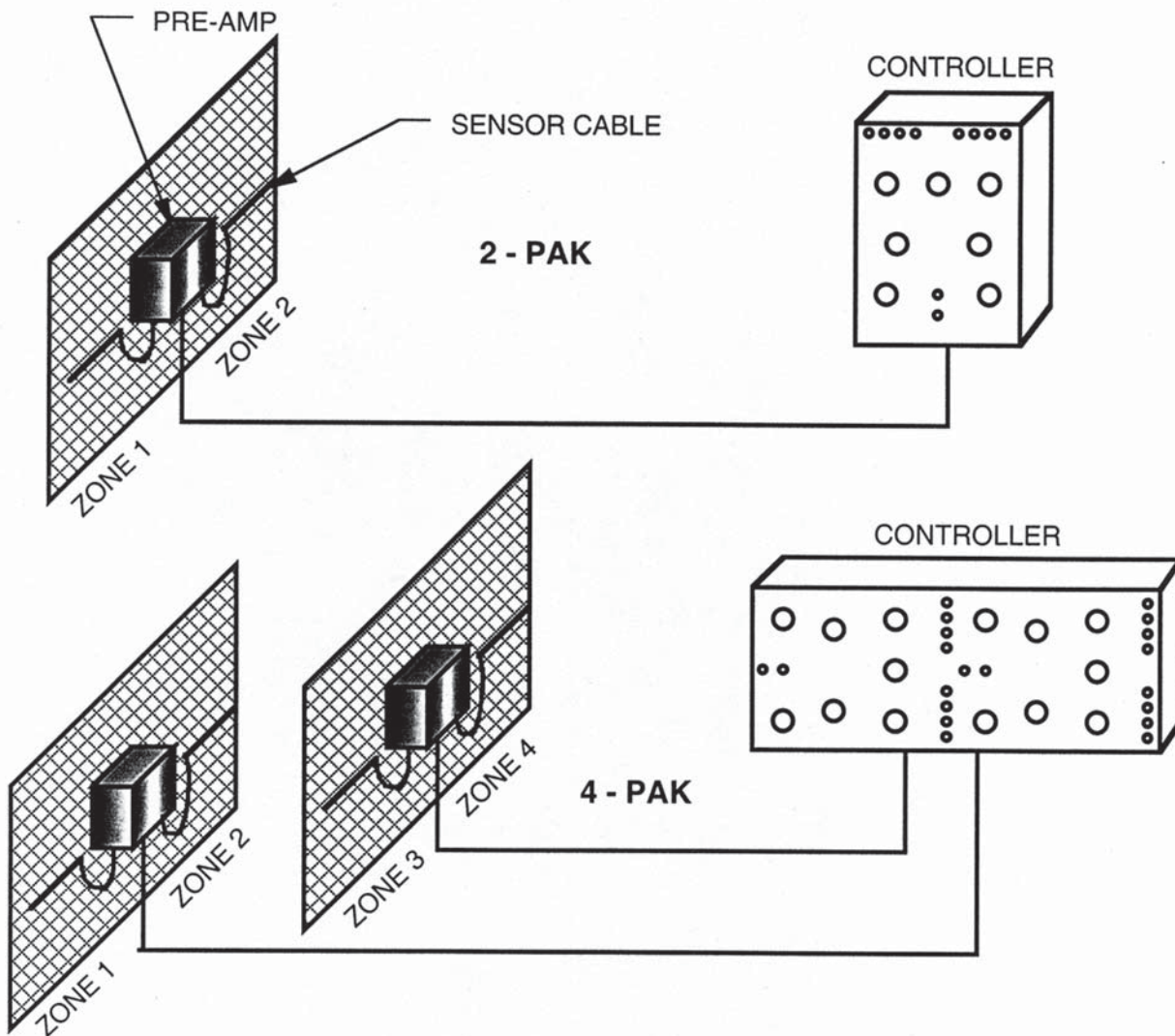


Figure 1 2-Pak System

## 2 FENCE CONDITIONS

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### Fence Conditions

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When the FPS Transducer Sensor Cable is installed on the fence, the sensor cable and the fence become the fence protection system. In effect, the sensor cable listens to the fence to detect the signals caused by climbing, jacking, or cutting the fence.

It is recommended that you walk the entire length of the fence line to determine if the fence requires maintenance prior to installation. Grab the fabric between each and every line post, pull it to you, and let it go. Listen to it! The fence can flex, but if you hear any bangs, clangs, etc., they can be a source of nuisance alarms and should be corrected. Keep a log of any potential problems so they can be identified and repaired before the fence protection system is operational. Refer to Fence Quieting later in this section.

### Typical Source or Locations of Trouble Spots

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The following photographs (Figures 2 through 11) show examples of the most common problems found with fence installations.

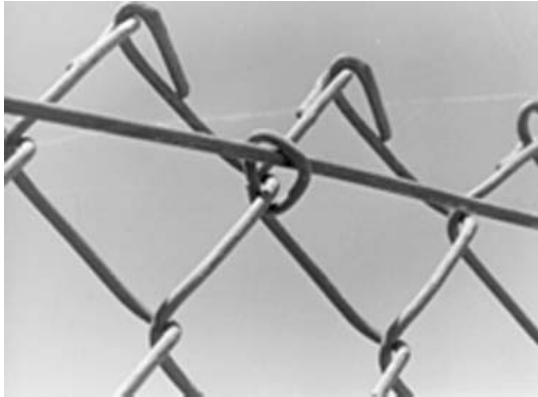


**Figure 2** Loose fabric at fence posts or horizontal rails



**Figure 3** Loose fabric at diagonal stiffeners





**Figure 4** Loose fabric or clamp rings at steel wire stiffeners



**Figure 5** Barbed wire dangling due to missing keepers



**Figure 6** Mounting pole brackets for barbed wire, concertina or razor ribbon not properly secured to the fence posts



**Figure 7** Missing vertical locking posts



**Figure 8 Excessive play between locking posts and metal insert**



**Figure 9 Chain and lock free to vibrate against gate**



**Figure 10 Too much play between rollers and rails**



**Figure 11 Signs and/or foreign objects not securely attached to the fence fabric or posts**

## Additional Sources of Nuisance Alarms

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Further inspection may disclose some of the following conditions that may need correcting:

- ▷ Cables, pipes, wires, other fences, limbs, bushes, flagpoles, etc., that may move in the wind and transfer vibrations to the fence.
- ▷ Normal gate operations during protected hours if there is no gate shunt.
- ▷ Condition of the fabric, i.e., old, rusty, loose, rough, and excessive galvanizing material.

**NOTE:** Spending the time and attention on the fence conditions noted above will result in an efficient and reliable system. Ignoring these sources of nuisance alarms will result in call backs and poor system performance.

## Fence Quieting

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Section 2 states that once the FPS system is installed on the fence, the FPS and the fence become the alarm system. Therefore, noises generated on the fence can be a major cause of nuisance alarms. However, they do not have to be.

During transducer cable installation, while the work crew is walking the entire length of the perimeter fence, some simple fence quieting action will usually make the operational testing and system check-out go more smoothly.

Major defects in a fence installation will cause fence alarm problems. The major problems should be corrected by a fence contractor. But there are many small problems that can be quickly corrected using your ear, eye, and some black ultraviolet resistant cable ties. Proceed as follows:

- Step 1. Walking the perimeter fence, grab the fence fabric in the center of each fence section. Pull the fence fabric toward you as far as practical and let go.
- Step 2. Listen for noises that sound like metal hitting metal. Typical sounds are clanging, ticking, tapping, etc. The metal-to-metal sounds could be interpreted as counts by the FPS system.
- Step 3. Carefully observe where these noises are coming from. Undoubtedly, a loose piece of metal, a loose fence tie, an improperly tied stiffener, etc., is causing the problem.
- Step 4. Tie the loose item in place using the cable ties. Continue to tie off the noise makers until the fence section is quiet. Continue quieting the fence until all fence panels are quiet.

# 3 INSTALLATION

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## General

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Installation of the 2-Pak system consists of a systematic installation of dual zone pre-amp, transducer cable, special fence protection units, such as gate protection, and connection to the Controller.

In general, the installation should proceed as follows:

- Step 1 Location and installation of dual zone pre-amps.
- Step 2 Installation of sensor cable on fence.
- Step 3 Installation of Telegates or other special gate conditions.
- Step 4 Connection to 2-Pak or 4 Pak Controller.
- Step 5 Initial testing and adjustment.
- Step 6 Final Testing.

## Pre-amp Mounting

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Once the Fence Protection System has been designed, the approximate location of each dual zone pre-amp is known. Walking the fence line will allow you to identify the exact location and mounting of each unit.

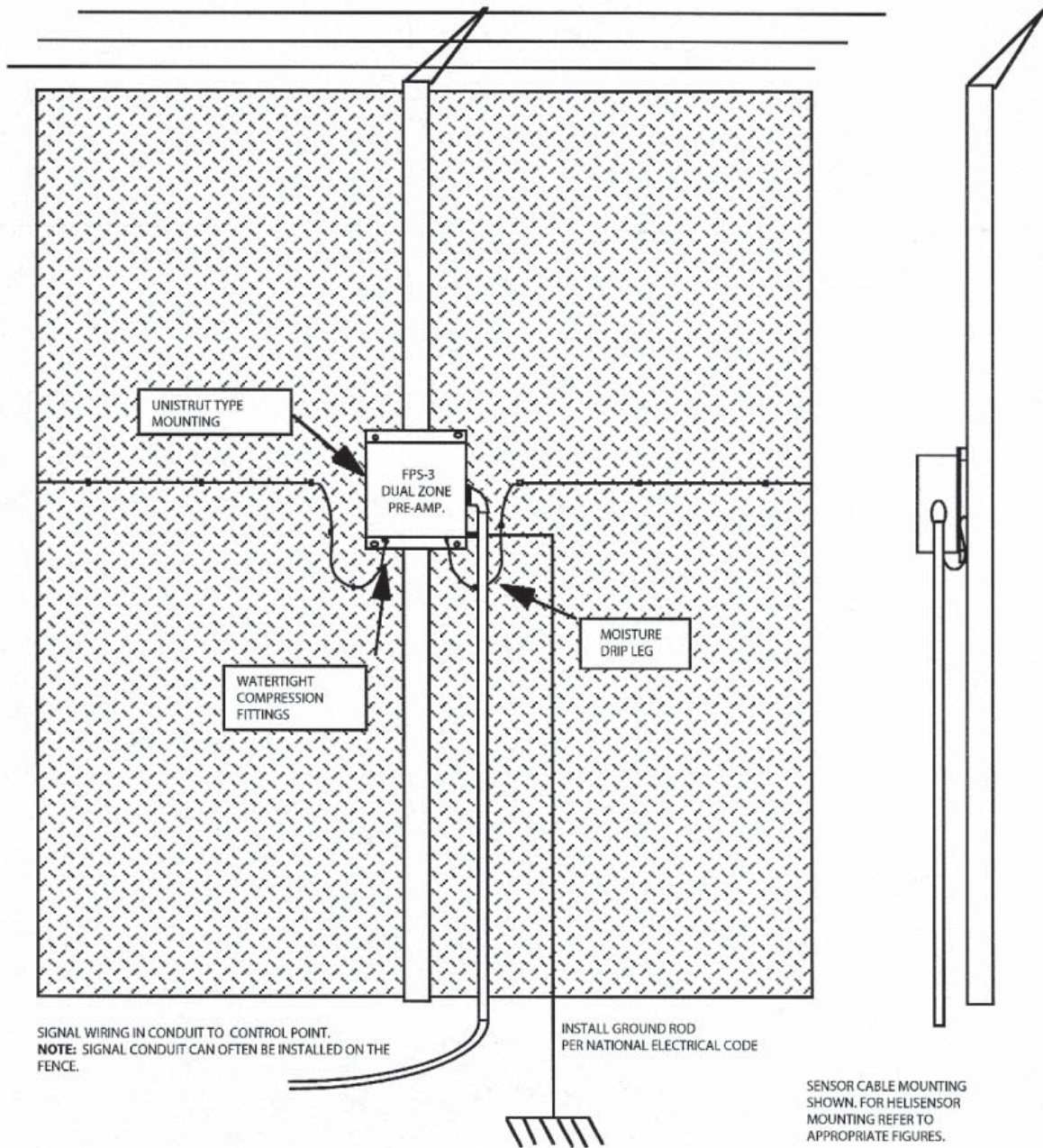
The dual zone pre-amps are housed in a moisture proof, EMI and RFI resistant enclosure that may be directly mounted to a fence post. It is important that the pre-amp be mounted with the connectors facing down to prevent moisture penetration.

**NOTE:** For maximum lightning protection and system noise reduction, each pre-amp MUST be grounded to a ground rod at the fence, using the 1/4-20 stud located on the pre-amp housing. Ground rods should be installed in accordance with the National Electrical Code.

## On-Fence Mounting

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In most cases, each dual zone pre-amp is mounted directly to the non-threat side of the fence. See Figure 12.



**Figure 12. Fence-mounted Pre-amp**

When mounting to a fence post, proceed as follows:

- ▷ Fabricate or purchase two pieces of Unistrut or similar bar-type material, for each pre-amp location. The Unistrut should be sufficient length for the pre-amp enclosure as shown. The Unistrut or similar metal should have holes to match the rear mounting holes on the pre-amp.
- ▷ Fabricate or purchase Unistrut or similar pipe clamps to match the size of the fence post. Note that the Unistrut pipe clamps are designed to slide into the Unistrut channel.
- ▷ Assemble the Unistrut pieces into the enclosures before attaching the Unistrut to the fence post. This may best be accomplished in your shop.
- ▷ Mount the pre-amp before extending the signaling conduit to the unit.

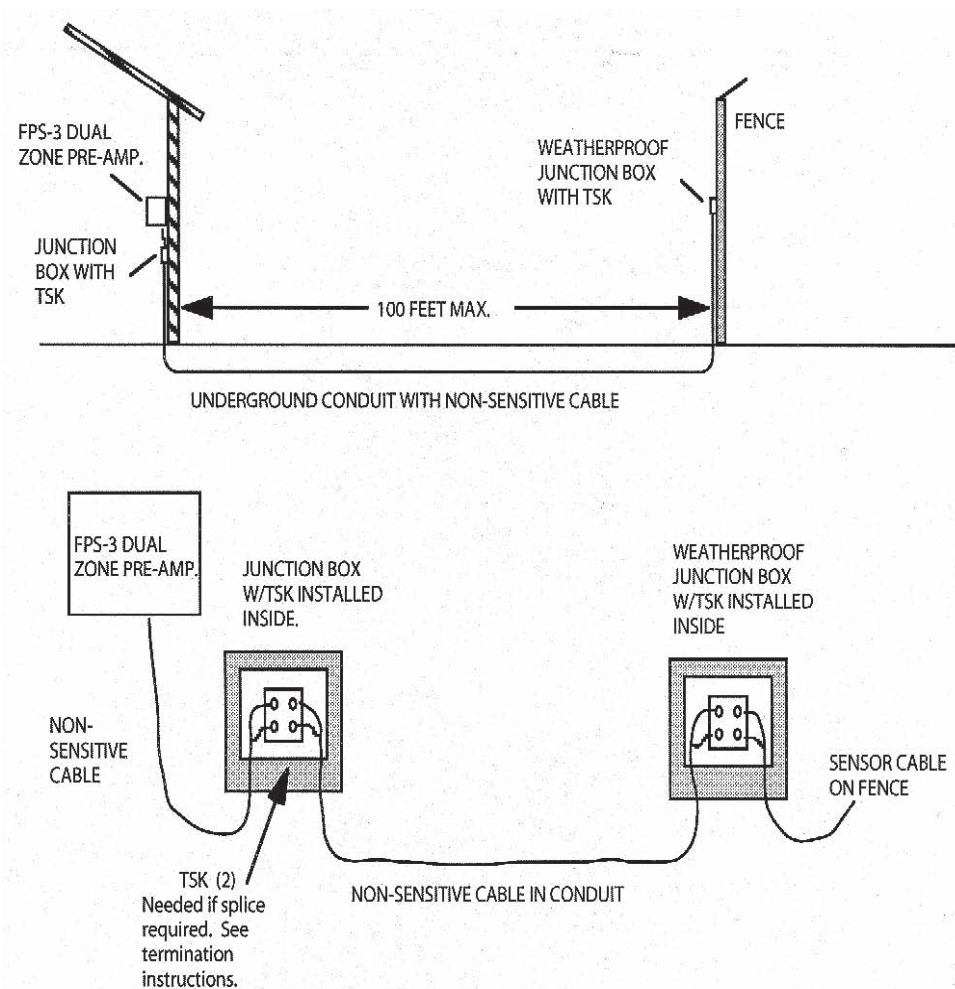
If you are installing Helisensor, the pre-amp enclosure will have flex conduit fittings for connecting the Helisensor sensor cables. Connect the Helisensor directly to the processor enclosure using the conduit fittings provided and then connect each sensor cable to the proper terminals as shown later in this manual.

### **Pedestal or Wall Mounting**

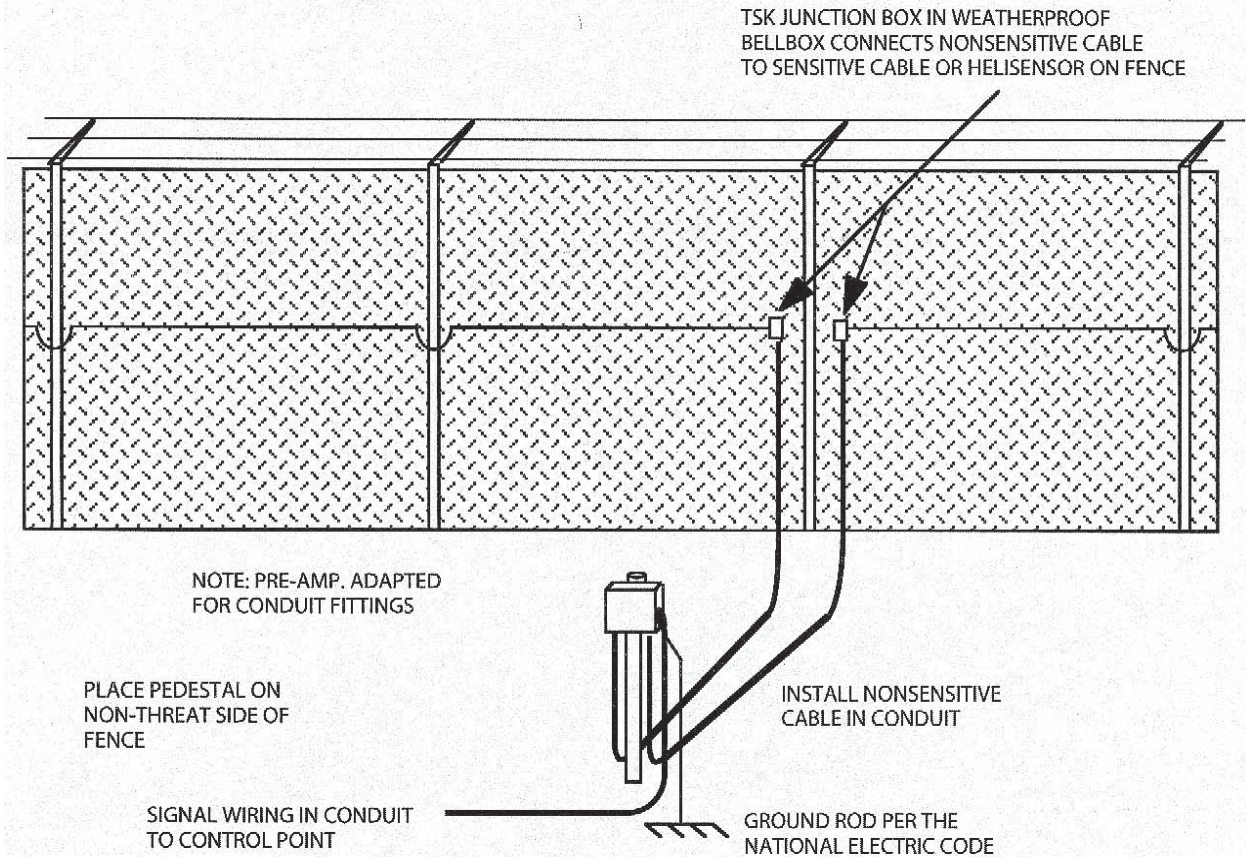
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In certain instances, it is desirable to mount the pre-amps away from the fence line or at some remote location (i.e., inside a building, in an overhead crawl space, etc.). Installing pre-amps at a remote location can be accomplished using a nonsensitized coaxial cable between the remotely located pre-amp and the fence-mounted transducer cable. The nonsensitive cable eliminates nuisance alarms that could be caused by the transducer cable connecting the two locations. The length of nonsensitive cable that can be used is controlled by the total capacitance of the sensor cable and nonsensitive cable. Generally up to 1000 feet of sensor cable can be used for each zone.

**NOTE:** For best results, use only the MSI Nonsensitive cable (Part No. 30MNS) between the pre-amp location and the fence-mounted sensor cable. Cable with a Teflon dielectric may be microphonic and must not be used.



**Figure 13. Pre-amp Remote Mounting**



**Figure 14. Pre-amp Pedestal Mounting**

## Transducer Cable Installation

### Installation of Standard Coaxial Transducer Cable

Installation of the standard coaxial transducer cable is best accomplished with a minimum of two people; one person to unreel the cable (see Figure 15) while the second person attaches the cable to the fence. If the transducer cable must be installed by only one person, the procedure will be slower. The transducer cable **MUST** be unrolled from the roll so that there are no kinks or spirals when the cable is installed on the fence.





**Figure 15. Unreeling Cable**

**CAUTION:** Extreme care should be used when handling the transducer cable as nicking or scraping the outer jacket, and kinking or knotting the cable will shorten the operational life and permit unwanted interference to enter the pre-amp.

The transducer cable should be left with enough length at the pre-amp for a service loop to be used as a moisture drip leg. See Figure 12. The cable should be attached to the fence in a position 3-6 feet high. This height is chosen to prevent dogs or small animals from damaging the cable and to prevent possible damage by grass fires. Sensitivity is best if the transducer is not installed close to horizontal fence stiffeners.

Cable ties should be located at approximate 12-inch intervals. The transducer cable should be installed taut enough to prevent movement in the wind, and yet not stretched to a point where excessive strain will be placed on the cable as the fence is stressed. This can normally be accomplished by pulling the transducer cable just snug as the plastic cable ties are being installed. See Figure 16.

Typically, a 10-foot high fence requires a single horizontal run of sensor cable. Fences higher than 10 feet require two horizontal runs of cable mounted at 4-5 feet and 8-10 feet.



**Figure 16. Cable Tie Installation**

When the transducer cable is routed from the fence to pass around a fence post or standard and return again to the fence, be sure to leave a slightly loose, but not drooping, loop. Otherwise, when the fence is stressed, the cable can chafe, wearing through the cable jacket.

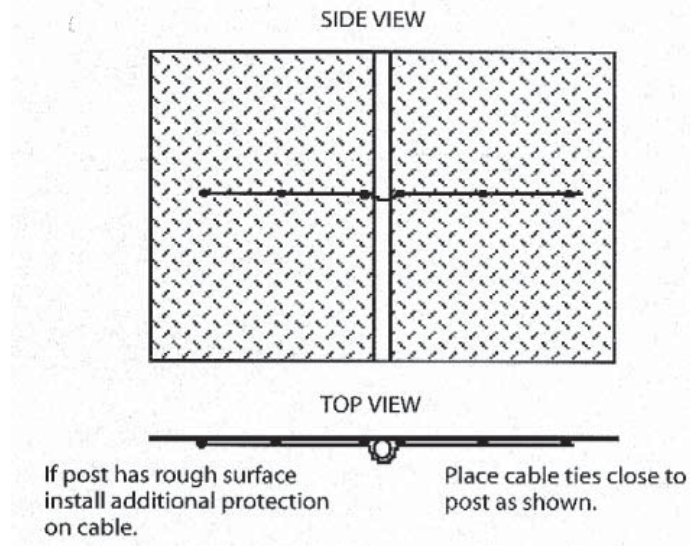
Example: You should be able to just push a pencil between the fence post and transducer cable.

See Figure 17. If the fence post or standard has a rough or sharp surface, additional insulation must be installed on the transducer cable to prevent damage from long term abrasion. A damaged jacket will permit moisture penetration and allow undesirable interference into the pre-amp. Installation of a spiral wrapped flexible protective material, such as the Panduit 1/8 T12F-0, or similar, is recommended. The protective material must be black weather resistant polyethylene.

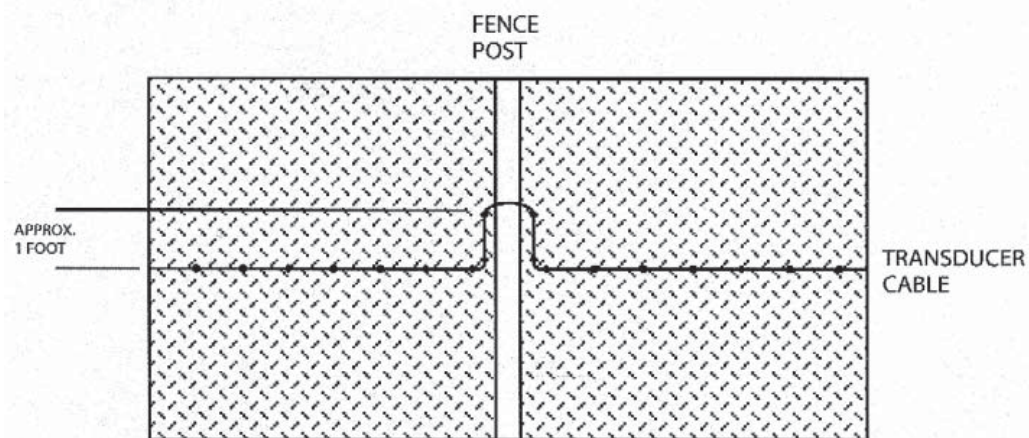
Cable ties must not be tightened so tight that the conductor insulation is damaged. To prevent this from occurring, do not use tie wrap Installation tools. Use your hands to draw each tie up until snug.

Care must be taken when installing cable ties to assure the transducer cable is not tied to the fence where sharp metal and/or excess galvanizing material may protrude and damage the cable.

To allow for future transducer cable repair, it is advisable to provide service loops (one foot offsets) approximately every 40 to 50 feet at the fence posts. See Figure 18.

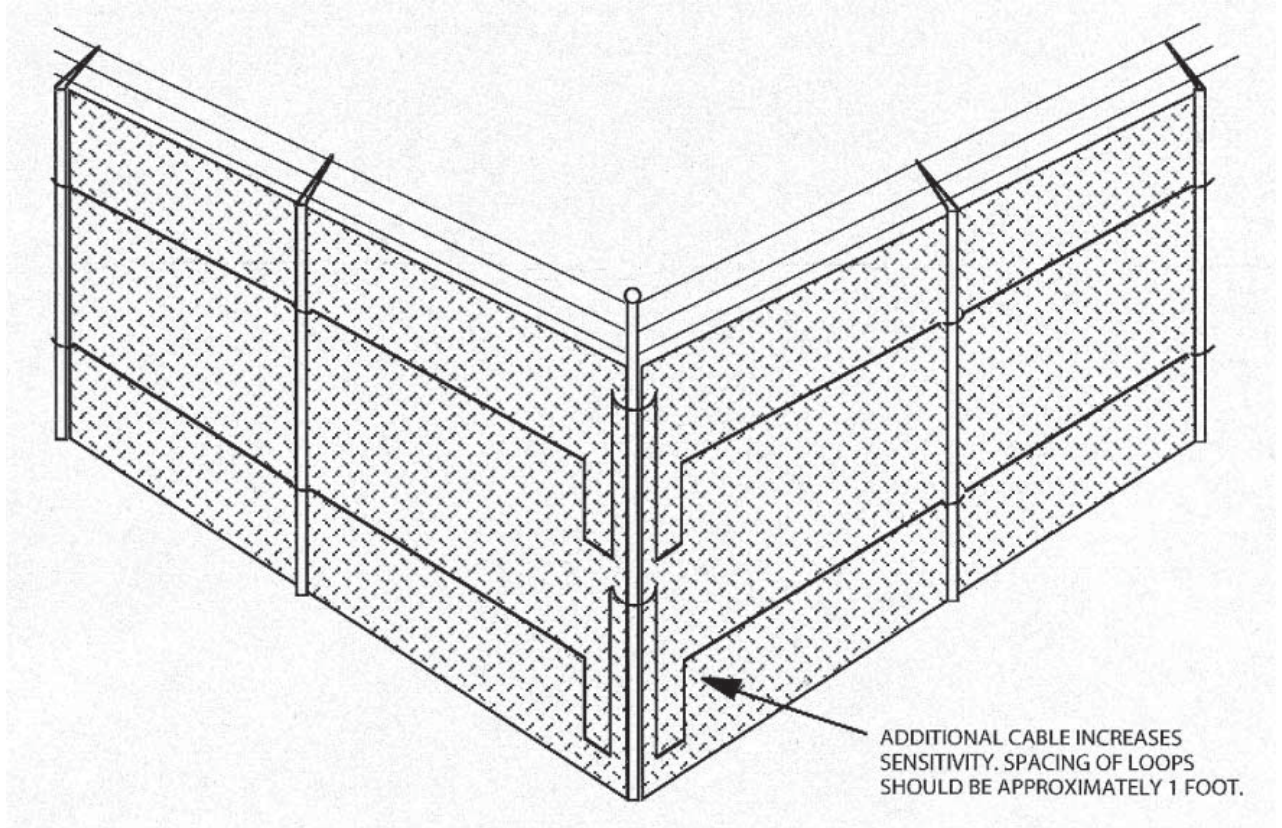


**Figure 17. Transducer Cable Around Fence Post**



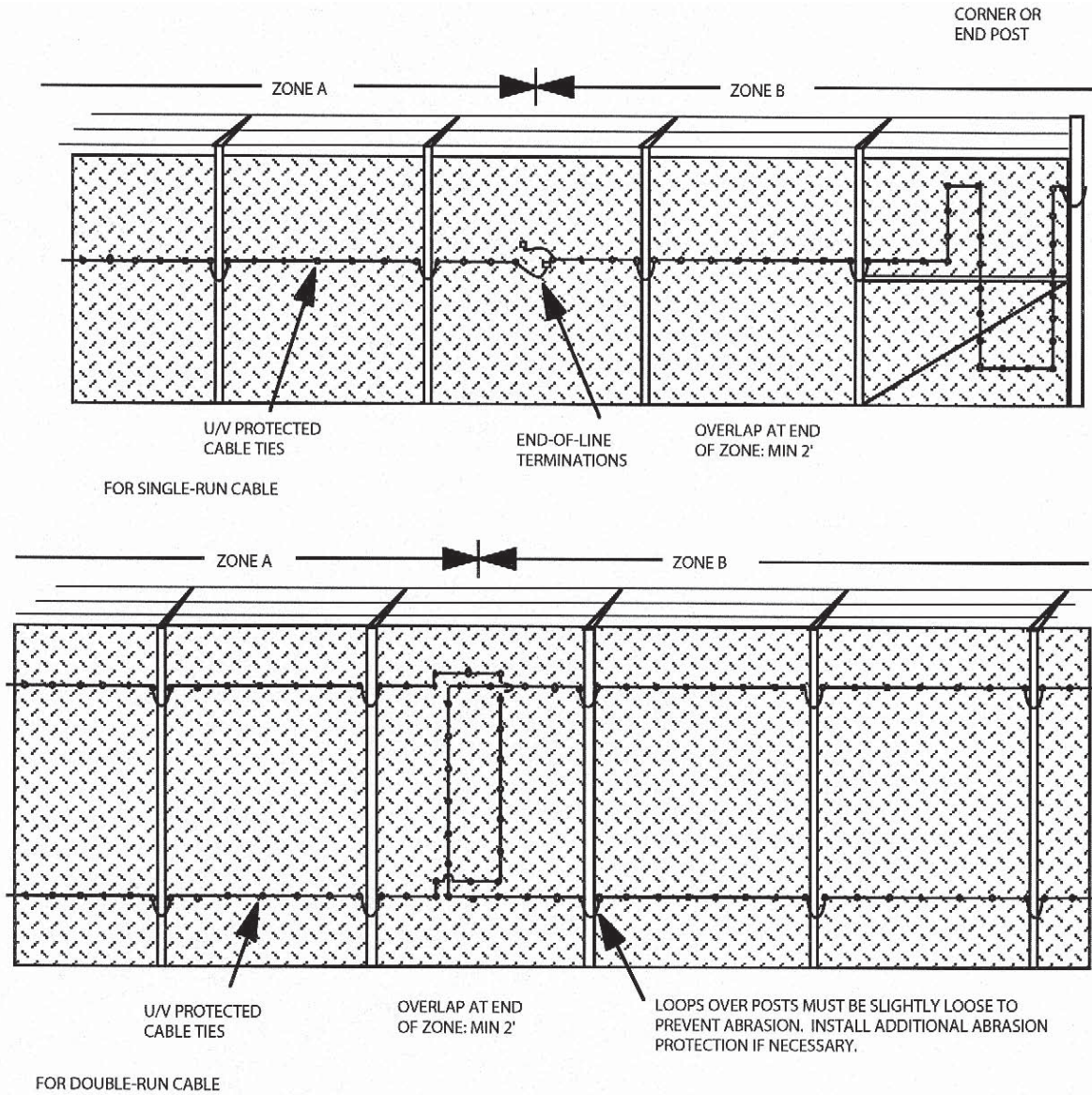
**Figure 18. Transducer Cable Service Loop**

The fence fabric on either side of a corner post is quite rigid due to both horizontal and diagonal stiffeners. To better ensure detection of a climber, increase the sensitivity by vertically looping the transducer cable several times on either side of the corner post. See Figure 19.



**Figure 19. Increasing Transducer Cable Sensitivity**

Overlap of adjacent zones is not required but may be desired by some customers. Refer to Figure 20 if overlap is desired. If, at the end of a zone there is an excess of transducer cable, do not coil excess cable as this may become hypersensitive and be the source of nuisance alarms. Cut the cable to the actual length and terminate with the transducer service kit (TSK) and the 1 meg resistor provided. See TSK installation later in this section. Double runs of sensor cable will have both ends terminated in the pre-amp enclosure. See Figure 22.



**Figure 20. Zone Overlap**

### Transducer Cable Installation With Two or More Persons

Begin at one end of a zone with one person unrolling the cable and one person loosely tying the cable to the fence. Using cable ties, loosely tie the cable to the fence every 20 to 30 feet to keep it off the ground. Start by leaving a sufficient service loop, then loosely tie the cable at the proper height over the length of the zone. It is best not to cut and terminate the transducer cable until the cable is completely attached to the fence.

Starting at one end of the loosely tied transducer cable (leaving sufficient cable for routing and termination) begin tying the transducer cable to the fence at the approximate 12-inch intervals as shown in Figure 27. Observe special precautions at each post as previously detailed. Continue to the end of the zone and terminate properly. It is recommended that you continue to attach one zone at a time until the entire perimeter is complete.

### Transducer Cable Installation With One Person

**NOTE:** This procedure is not recommended for zones over 100 meters (300 feet) in length.

Start at the beginning of each zone and tie loose (3-inch loop) cable ties at the proper fence height and at intervals of approximately 10 feet. This provides a row of open cable ties that will allow quick threading of the cable to the fence. Place the transducer cable on a suitable cable reel dispenser so the cable will roll directly off the reel with no kinks or knots.

Carefully pull the cable from the reel and thread through the loose ties, one after another, throughout the entire zone length. You must be very careful that the cable does not get caught, scraped or cut. You should periodically check the cable reel and the cable you have pulled through the cable ties. As an alternate to the temporary cable ties for threading the sensor cable, you can make a set of S-hooks from #10 insulated solid wire, such as #10 THHN. The S-hooks should be hung on the fence at 10-15 foot intervals and the sensor cable hung through them. Walk the cable reel along as you place the cable in the hooks. It is recommended that you not string more than 100 feet of sensor cable through the S-hooks at one time.

After threading the cable, begin at one end (leaving sufficient cable for routing and termination) and secure the cable at approximate 12-inch intervals as shown in Figure 27. Observe special precautions at each post as detailed above. Continue to the end of the zone and terminate properly.

### Helisensor Transducer Cable Installation

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Helisensor transducer cable uses the same FPS fence protection technology, but incorporates a flexible conduit around the coaxial transducer cable to protect from damage or abuse. Helisensor transducer cable is only available in the 100 meter (328 feet) length; however, up to 3 sections can be combined for zone lengths up to 300 meters.

Each length of Helisensor includes a 1/2-inch conduit fitting for attaching to the pre-amp and a conduit with terminations inside. When zone lengths greater than 100 meters are required, the second (or third) length of Helisensor is connected by screwing a 1/2-inch conduit fitting (2nd section) into the conduit (1st section) and terminating the sensor cable to the connector provided in the conduit.

Helisensor can be fastened to the fence fabric using either the conventional ultraviolet resistant plastic cable ties or stainless steel ties. The stainless steel ties can be used where abuse or other damage may result.

**NOTE:** Do not use ordinary cable ties because they will not withstand the effects of sunlight. MSI provides the proper cable ties with each roll of sensor cable.

The Helisensor installation procedure is very similar to the installation of standard coaxial transducer cable, with added requirements for trimming the zone to size.

Begin by rolling the Helisensor out on the ground alongside the fence. Do not unroll Helisensor in damp or wet areas. Due to the size and weight of the Helisensor cable reels, a suitable cable reel holder is recommended. Lift the Helisensor to the fence and attach at approximate 12-inch intervals using the cable ties furnished. The Helisensor should be pulled straight between the cable ties, but **DO NOT OVERSTRETCH**. The spiral covering must remain flexible or the sensor will not function properly. Allow for extra sensitivity at corner posts (see Figure 30).

In most cases, the zone length will not coincide with the length of the Helisensor so the cable length will have to be adjusted to match the length of the zone. If the zone is longer than 100 meters, connect a second length of Helisensor and continue to the pre-amp end of the zone. If the Helisensor is too long when you reach the pre-amp end, it is best to leave the extra length connected until you have completely tied the Helisensor to the fence at approximate 12-inch intervals. Then cut and terminate the excess Helisensor as detailed below.

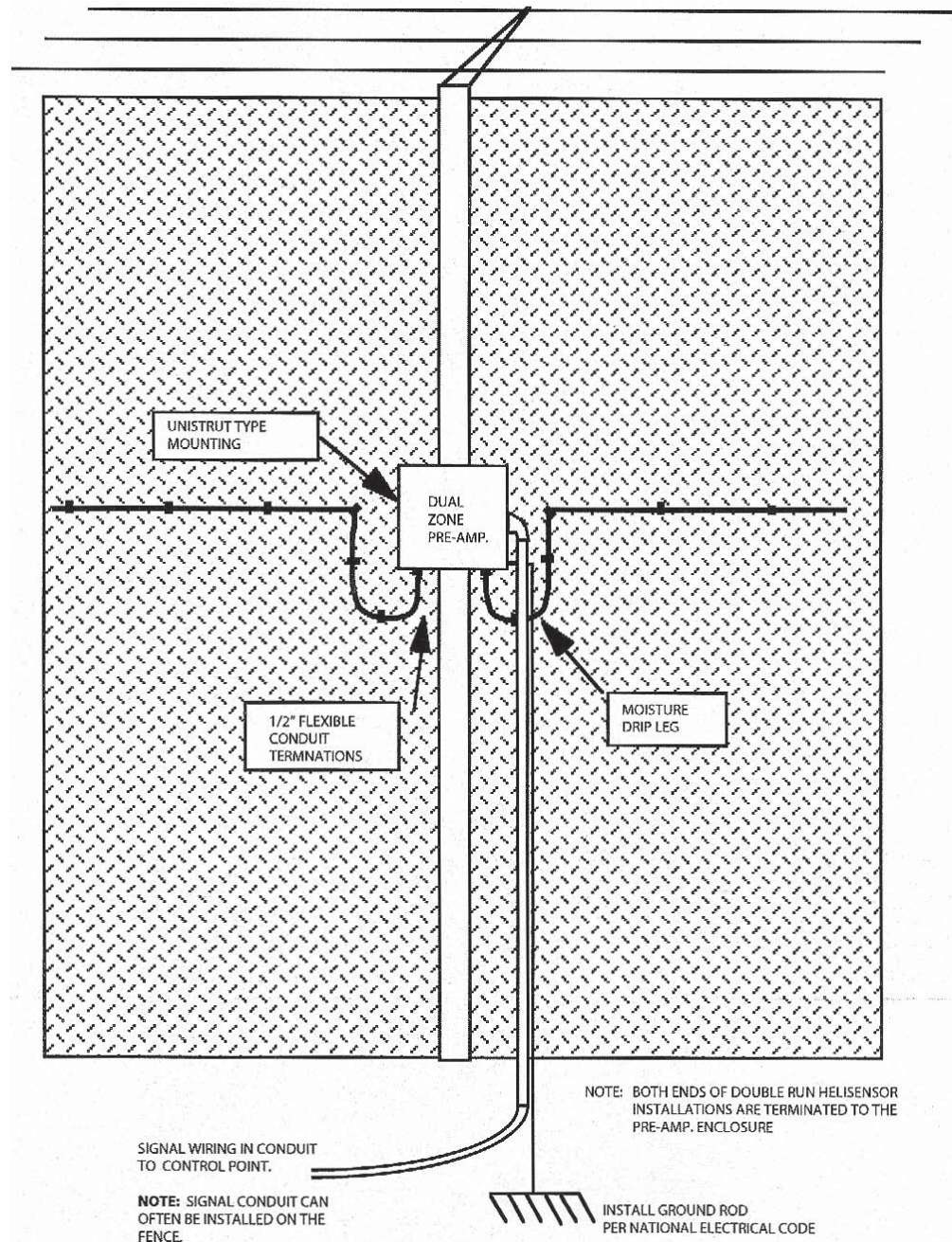
The pre-amp end of the Helisensor has a 1/2-inch conduit termination. The dual zone pre-amp enclosure is available with two cable entry configurations: The standard pre-amp enclosure provides up to four compression fittings for the sensor cable. The optional 2-Pak/H configuration, (H suffix for Helisensor) has up to four flex conduit fittings in place of the compression fittings. The H configuration allows Helisensor termination directly to the pre-amp enclosure, as shown in Figure 32, and is recommended for new installations. A double run Helisensor should be terminated to the pre-amp enclosure as shown in Figure 33. The enclosure completes the full mechanical protection of the sensor cable.

**NOTE:** Always install condulets slightly higher than the Helisensor to form a drip loop and prevent moisture from entering the conduit.

Trim the Helisensor to the required length for termination as follows:

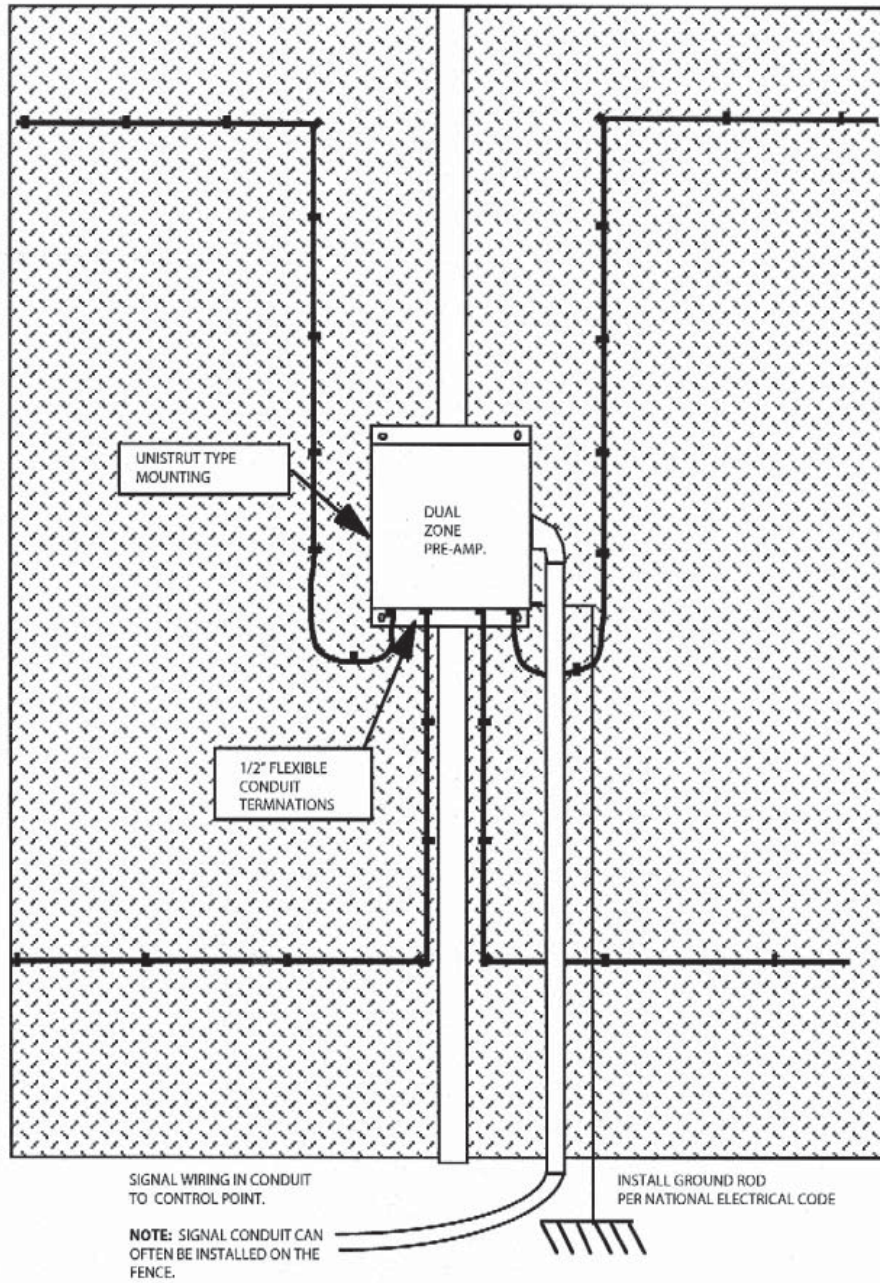
- ▷ With the pre-amp installed, measure and mark the Helisensor metal jacket length to mate with the enclosure. Be sure to leave sufficient Helisensor for a drip loop.
- ▷ Using a flexible conduit cutter or a hacksaw, score and break the Helisensor metal jacket making sure you do not cut the transducer cable inside.
- ▷ Remove the excess Helisensor jacket, leaving enough of the black transducer cable to route through the termination box and conduit and to the terminations inside the pre-amp enclosure.
- ▷ Terminate the Helisensor to the enclosure as shown in Figures 32 or 33, using the 1/2-inch conduit termination provided. Helisensor should be attached to 1/2-inch conduit fitting before it is secured to the pre-amp enclosure.
- ▷ Terminate the black transducer cable inside the pre-amp as detailed under Transducer Cable Connections.

- ▷ Mount each conduit slightly above the line of Helisensor to create a drip loop to prevent moisture buildup at conduit terminations.
- ▷ For remote mounted pre-amps, follow instructions in “Pre-amp Mounting” (page 13) through “Pedestal or Wall Mounting” (page 15) sections (see Figures 13-14) and terminate Helisensor to bell box.



**Figure 21. Helisensor/Sensor Cable Termination - Single Run**



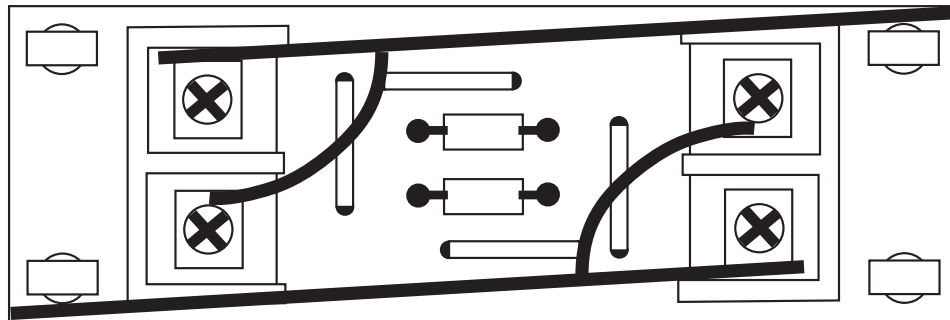


**Figure 22. Helisensor/Sensor Cable Double Run Installation/Termination**

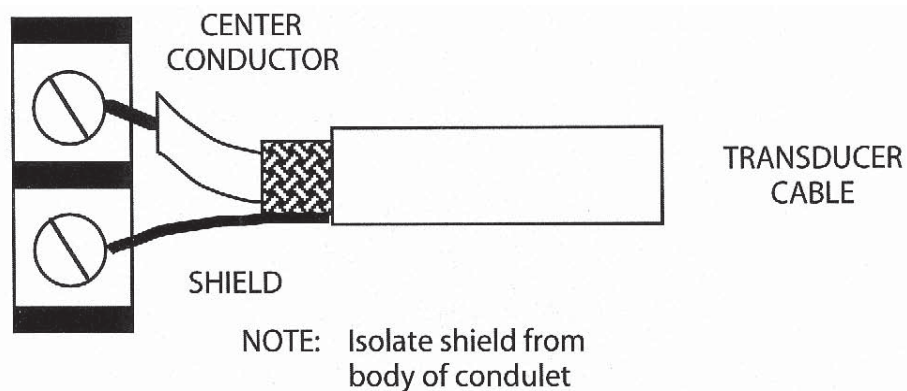
### Condulet Installation

The condulet circuit board has been re-designed with the end-of-line resistors built into the board and conformal coating to prevent moisture in the condulet from shorting the EOL resistors - a common cause of tamper alarms. This Condulet may be used for single or double end-of-line terminations or for splices. It may also be used for supervised "T" tap end-of-line terminations requiring a 2 meg-ohm end-of-line resistor.

1. Open cover and remove circuit board. Note that the circuit board is installed sideways with a plastic shield to insulate the board terminals from the Condulet enclosure. The 4 stand-offs lift the circuit board to prevent moisture accumulation on the board.
2. Clip the required jumpers according to the type of termination. See Figure 25-27.
3. Attach sensor cable(s) to terminal strip(s). Note that the sensor cable entering the left end of the Condulet attaches to the terminals on the right end of the circuit board and vice-versa for the right sensor cable. See Figure 23.
4. Re-insert circuit board sideways making sure that the plastic shield covers the terminals. Replace cover.
5. Condulet should be attached to the fence at a 45 degree angle with the cover facing out as shown. Allow a drip loop as shown to prevent water drainage into the Condulet. Do not position the Condulet with the cover facing up. See Figures 27 and 30.

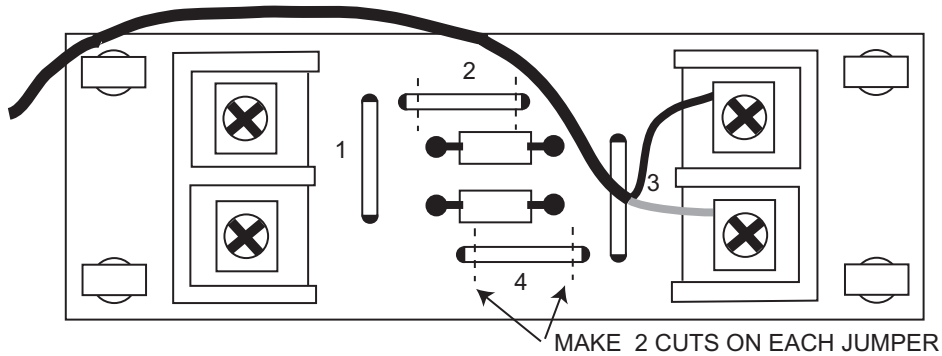


**Figure 23. Transducer Cable Routing in Condulet**



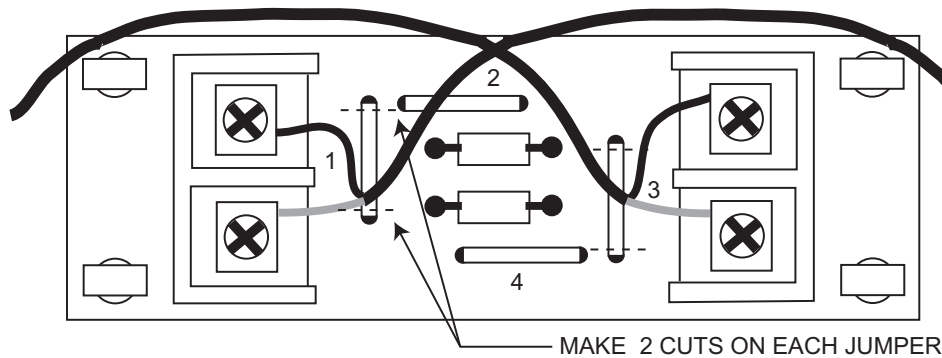
**Figure 24. Transducer Cable Connection**

For end-of-line termination, attach sensor cable to terminals as shown in Figure 25. Clip jumpers 2 & 4. For double end-of-line terminations, attach sensor cables to both terminals.



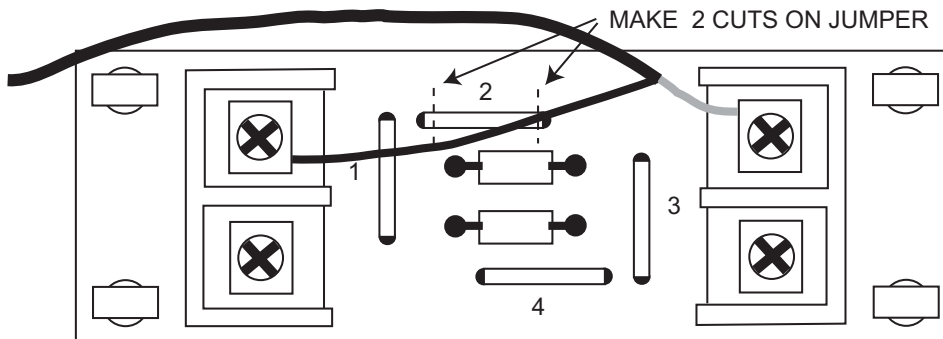
**Figure 25. End-of-Line Termination**

Helisensor is provided in standard 100 meter lengths. Some applications may require longer zone lengths. The additional length is threaded into the conduit and the transducer cable is connected as shown in Figure 26. Clip jumpers 1 & 3.

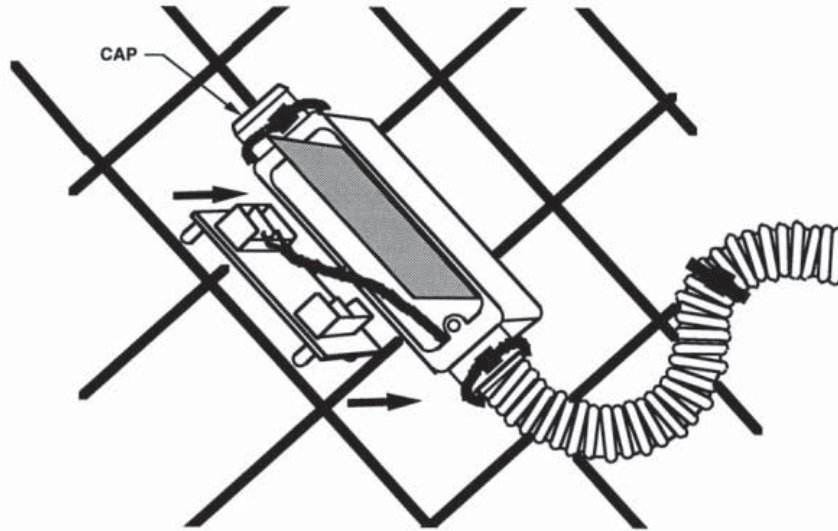


**Figure 26. Splice Termination**

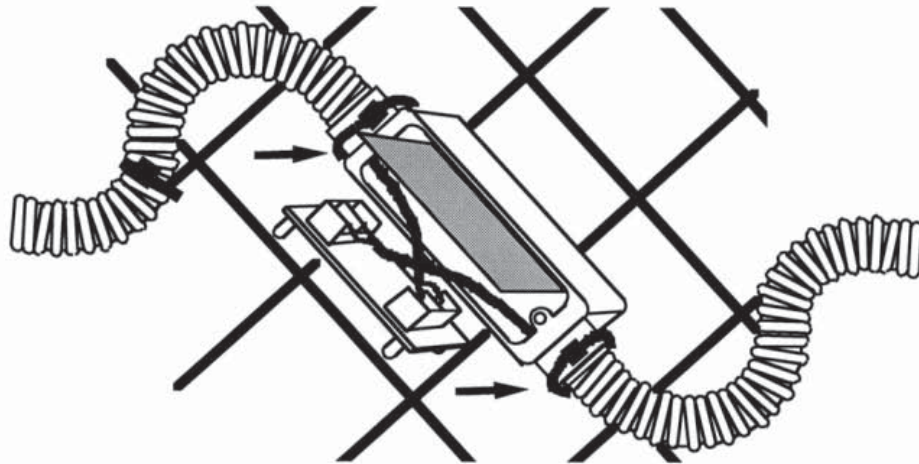
In cases where the transducer cable is "T" tapped as in applications involving Telegates for gates, it is necessary to provide for supervision of both cables. This requires a 2 megaohm resistor at both the "T" section and the normal end-of-line. Attach the sensor cable as shown in Figure 27 and clip jumper 2.



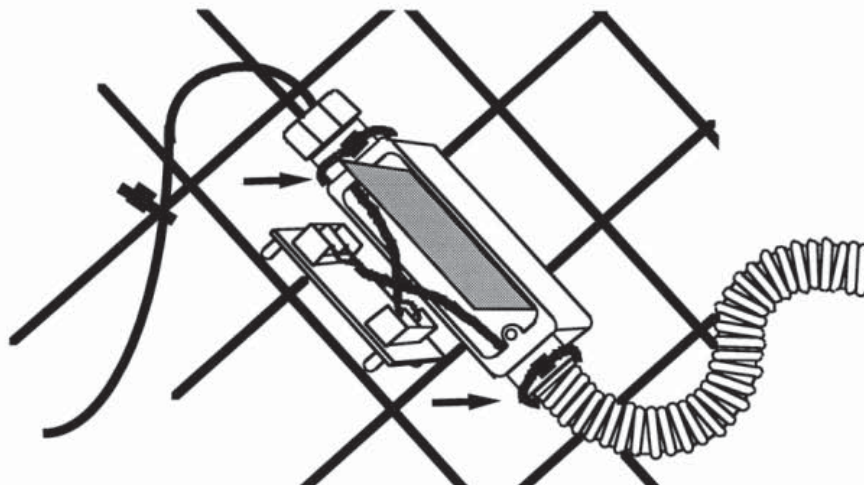
**Figure 27. End-of-Line Termination With 2 Megaohm Resistor**



**Figure 28. EOL Condulet Attached To Fence**



**Figure 29. Condulet Splice Attached To Fence**



**Figure 30. Condulet "G" Attached To Fence**

## Transducer Service Kit (TSK) Installation

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Transducer service kits (TSK) are required for all end of line termination and splicing of standard transducer cable. TSK installation is very important to be sure that moisture does not affect transducer cable operation. When a double run of sensor cable is installed, utilize the end-of-line termination located inside the pre-amp enclosure. A separate TSK is not required.

Each TSK consists of the service kit enclosure, a 1 Megohm, 1% metal film resistor preinstalled on the terminal block, and a cable tie for fastening to the fence fabric. The service kit enclosure is molded of sunlight resistant polymer with a conductive (copper) inner surface to maintain a proper shield around the termination. See Figure 31.

Proper preparation and installation of the transducer cable is essential to provide a water tight seal within the TSK. TSKs must always be installed with the cable entering the bottom. Each cable must have a drip loop so moisture is not allowed to collect near the cable openings. After splicing or termination, each TSK should be filled with Dow Corning 4 electrical insulating compound before sealing. The Dow 4 compound will keep moisture away from the terminations.

The transducer cable shield must be properly stripped and installed to contact the TSK copper shielding saddle on the inside edge of the cable entry. The inner conductor must be trimmed to the proper length to reach the termination screw.

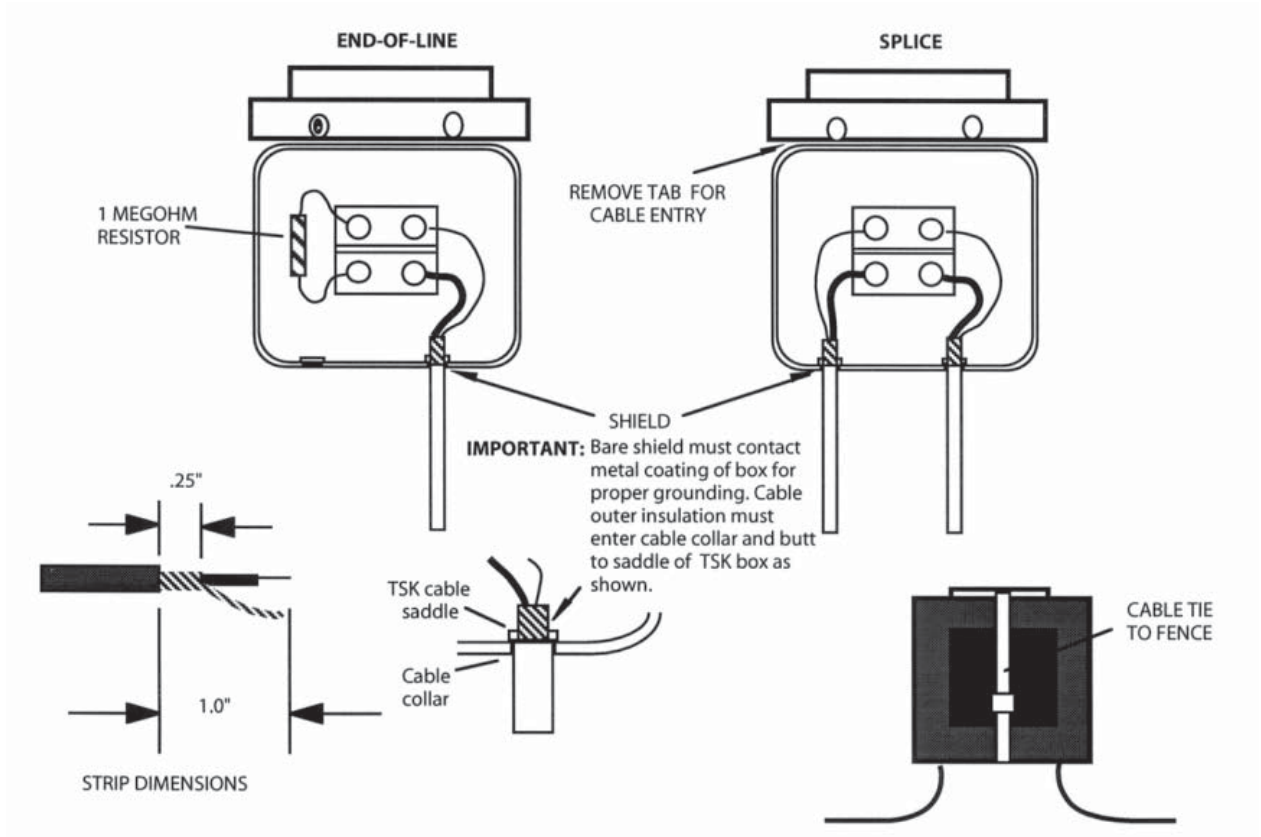
To prepare each end of the transducer cable for TSK termination, proceed as follows:  
(Refer to Figure 32.)

- Step 1: Strip outer insulation 1 inch from the end.
- Step 2: Pull braided shielding back 3/4 inch from center conductor and twist for insertion into terminator receptacle.
- Step 3: Strip center conductor insulation back 1/4 inch from the end and insert into one side of terminator receptacle and tighten lock screw.
- Step 4: Insert twisted shield into terminator receptacle next to center conductor and tighten lock screw.

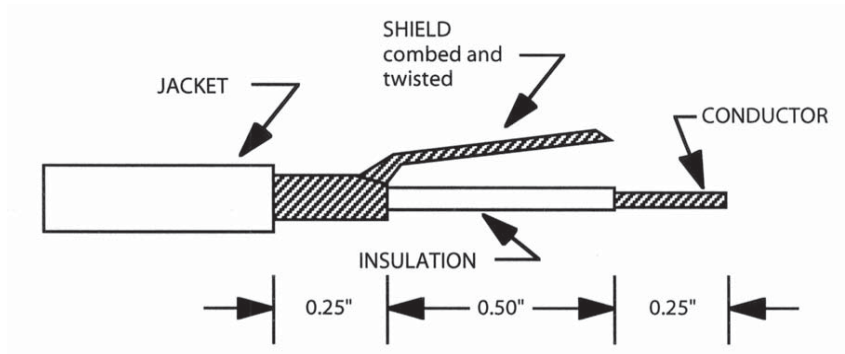
**NOTE:** Prior to installing service kit cover, ensure the transducer outer insulation fits at the inside edge of the cable saddle on the service kit and that the shield contacts the saddle. This is very important to maintain a proper seal. Insulation too far inside the service kit may hinder closing the top cover and too far out may allow moisture to penetrate the enclosure. This may also interrupt the enclosure shield and allow EMI to enter the system.

- Step 5: If splicing two sections of transducer cable, remove the preinstalled 1 Megohm resistor from the terminal block.
- Step 6: Fill the TSK completely with the Dow Corning 4, or other approved, silicone grease.
- Step 7: Install top cover, being sure it seats on all sides, and attach to the fence with a single cable tie.

**CAUTION:** Use only factory supplied or 1% metal film EOL resistors. Carbon and other resistors are not stable and must not be used.



**Figure 31. Transducer Service Kit**



**Figure 32. Transducer Cable Preparation**

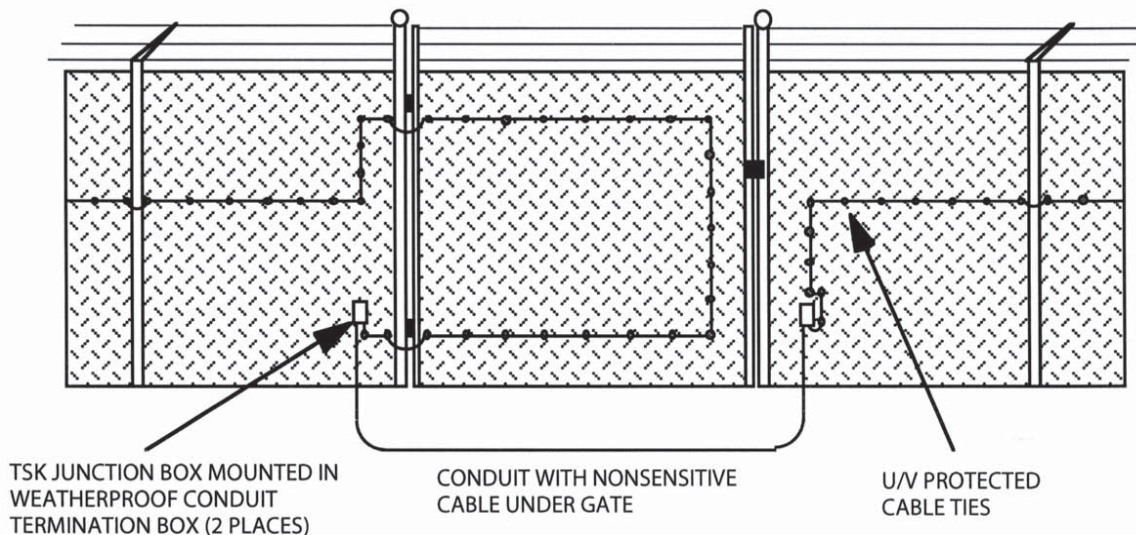
## Gate Installations

Gates, including sally ports, require the same protection as the fence. There are many types of gates, but they are generally swinging or sliding. Additionally, gates can be installed as either single or double gates. Normally, gates are manufactured from the same fabric as the fence so the FPS transducer cable will provide the same level of protection.

Hinged (swinging) gates that are seldom used, such as gates used for maintenance, can usually be protected with transducer cable. High usage hinged gates can be protected in the same way but should probably be assigned their own alarm zone. Sliding gates are best protected using a Telegate. Gate areas may also be protected using a non fence-mounted sensor such as the MPS-4100 microwave system.

### Swing Gate Installation

Transducer cable installation for a hinged gate is shown in Figure 33. This also applies to personnel gates. However, with the personnel type of gate, the conduit can be installed over the top of the gate if space permits. Two weatherproof, electrical junction boxes are mounted on the fence — one on either side of the gate as close as possible to an upright support post. These are interconnected by a 3/4-inch diameter conduit which is buried beneath the ground surface. The conduit depth should be a minimum 18 inches. NOTE: Nonsensitive cable must be used in the conduit connecting the two fence mounted transducer cables. Splice the nonsensitive cable to the transducer cable in each weatherproof junction box. Use a TSK to accomplish the splice [see Transducer Service Kit (TSK) Installation] and fill the TSK with Dow Corning 4 electrical insulating compound before sealing.



**Figure 33. Hinged Gate Installation**

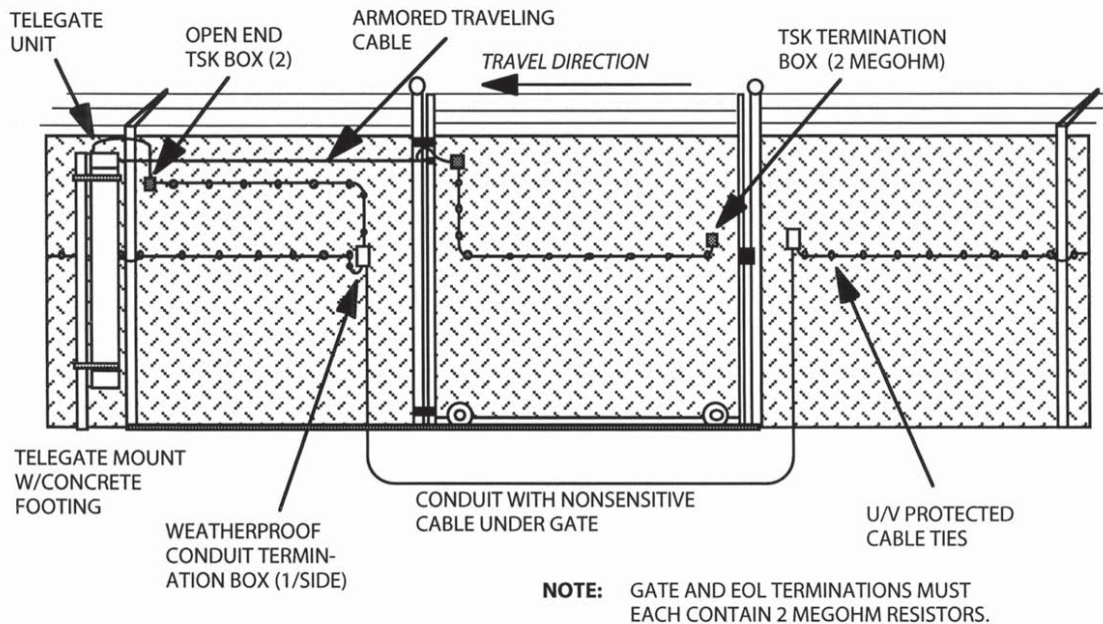
As the transducer cable approaches the gate, it is tied to the fence fabric, turned and run up vertically approximately one foot, then turned horizontally and tied to the upright gate support post near, but not on, the upper hinge. Route the transducer cable across the gate support post and gate post using a strain relief, such as Panduit 1/8" T12F-0, or similar, spiral wrap material and fasten to the gate fabric as shown. The spiral wrap will prevent abrasion and excessive movement in the wind. Route the transducer cable in a large loop around the gate and return to the fence near the lower hinge point as shown. Utilize another strain relief to pass back across the hinge area to the fence fabric. Route the transducer cable on the fence to the weatherproof junction box making sure to provide the transducer cable drip loop shown and entering the junction box from the bottom (the drip loop and coming into the bottom will prevent moisture buildup in the junction box). A gland type cable fitting is recommended at the entrance to the junction box. Using a TSK, splice the transducer cable to the nonsensitive cable in the junction box. Route the nonsensitive cable in the conduit to the junction box on the other side of the gate. Splice here again to the transducer cable using a TSK and continue the transducer cable down the fence as shown. If a double swinging gate is encountered, the transducer cable should be routed and attached to the second half of the gate as explained for the first half.

### Gate Bypass Unit

A gate bypass unit (GBPU) is sometimes used to temporarily disconnect the transducer cable installed on a swinging gate. If a GBPU installation is required, please refer to the Gate Bypass Unit Installation Instructions furnished with the GBPU.

### Telegate Installation

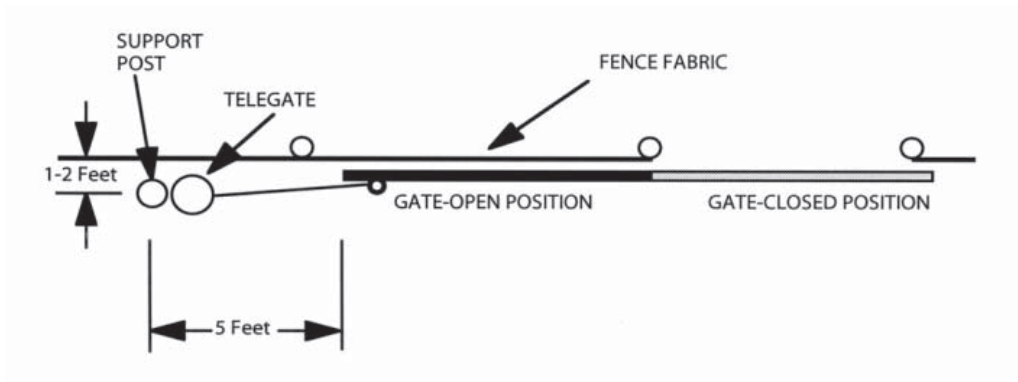
Each Telegate requires installation of a support post. See Figure 34. The support post must be located correctly to ensure proper Telegate operation. The support post and Telegate must be positioned to extend and retract the armored nonsensitive cable as the gate is opened and closed.



**Figure 34. Telegate Installation**



The recommended position of the support post for each Telegate is approximately 5 feet from the end of the sliding gate when opened to the maximum position, and not less than 1 foot or more than 2 feet from the centerline of the fence posts on the gate side of the fence. See Figure 46. A 4-inch support post is recommended. The post material should be the same as the fence posts. The support post height must be sufficient that the support post is as tall as the fence and a minimum of 10 feet above ground level. A minimum of one foot space is required between the Telegate bottom and the ground to allow for drainage. The support post footing should be 24 inches deep minimum.



**Figure 35. Telegate Support Post Location**

Unless the Telegate is exactly at the end of an FPS zone or its own FPS zone, a conduit must be run under the gate opening to continue the zone wiring as shown in Figure 34. This conduit should terminate on each fence section using weatherproof electrical bell boxes and TSKs as shown. It is recommended that the support posts, conduit and gates be installed before the Telegate is unpacked and installed.

Each Telegate is shipped completely assembled and is packed in a wooden crate. The Telegate has a 65-pound weight secured in the middle of the PVC tube enclosure. The weight is held in place for shipping between a cable to the bottom cap and the armored cable and pulleys. Unpacking and preparation for installation involves removing the Telegate from the crate, removing the bottom cap, uncoiling the armored cable and lowering the weight to the bottom of the tube. Uncrate and set up each Telegate as follows:

**CAUTION:** Once a Telegate is unpacked and the weight and pulley systems are released, the Telegate should remain upright with pull on the traveling cable so the cable is not allowed to fall off the pulleys and become tangled. Unpacking the Telegate at the installation location is recommended.

- Step 1 Lay the crate on its side with the top side up. Remove the top of the crate.
- Step 2 Carefully remove the Telegate assembly from the crate.
- Step 3 Remove the cable retaining bolt located in the center of the bottom cap. Removal of this bolt releases the cable that is holding the 65 pound weight in place.

- Step 4 Remove the bottom cap by first removing the three 1/4-inch screws. Remove the cap by gently tapping the lip.
- Step 5 Remove the cable tie and tape and uncoil the traveling cable at the top of the Telegate tube. Be careful because when you uncoil the cable the weight can fall to the bottom of the Telegate tube. Hold the cable and gently lower the weight to the bottom of the tube.
- Step 6 With the weight at the bottom of the tube, remove the screw and cable attached to the bottom of the weight.
- Step 7 Gently pull on the cable to verify that the weight is moving freely in the tube.
- Step 8 Replace the bottom cap using the three 1/4-inch screws. You may wish to store the shipping bolts and cable in the cap in case you ever have to remove and ship the Telegate.
- Step 9 The Telegate is ready for installation.

Attach the Telegate to the support post using the two stainless steel bands provided. See Figure 34. Locate each band approximately as shown. Aim the cable outlet located at the top of the Telegate so the traveling cable will pay out straight to the gate. Each band must be tight enough to hold the Telegate in place but not distort the Telegate enclosure.

Open the gate to the maximum opening and attach the Telegate traveling cable to the gate using the insulated shackle furnished. The shackle should connect to an eyebolt or other similar device attached to the gate at or near a point that keeps the cable pull horizontal as shown. Leave a minimum 1 foot pigtail for terminating the armored cable to the transducer cable being installed on the gate.

Before making any further connections, operate the gate from full open to full closed making sure that the Telegate armored cable is extended and retracted correctly. Make required mechanical adjustments before Telegate electrical connections.

Two short sections of nonsensitive cable are furnished with each Telegate to make connections. Terminate the nonsensitive cable running from the top of the Telegate to a TSK mounted on the fence as shown in Figure 34. Route nonsensitive cable from the TSK to the bell box as shown. Fill all TSKs with Dow Corning 4 silicone grease, or equivalent, before sealing.

Terminate the traveling cable to the transducer cable being installed on the gate using a TSK located approximately as shown. Install the transducer cable on the gate in the same manner as the fence. Terminate the other end of the gate mounted transducer cable with another TSK. To maintain supervision of all transducer cable in the zone, the TSK at the end of the gate mounted transducer cable must contain a 2 Megohm resistor, and the TSK at the end of the FPS zone must also be a 2 Megohm resistor to maintain the net 1 Megohm supervision of each FPS zone.

**CAUTION:** Use only factory supplied or 1% metal film EOL resistors. Carbon and other resistors are not stable and must not be used.

### Transducer Cable Connections

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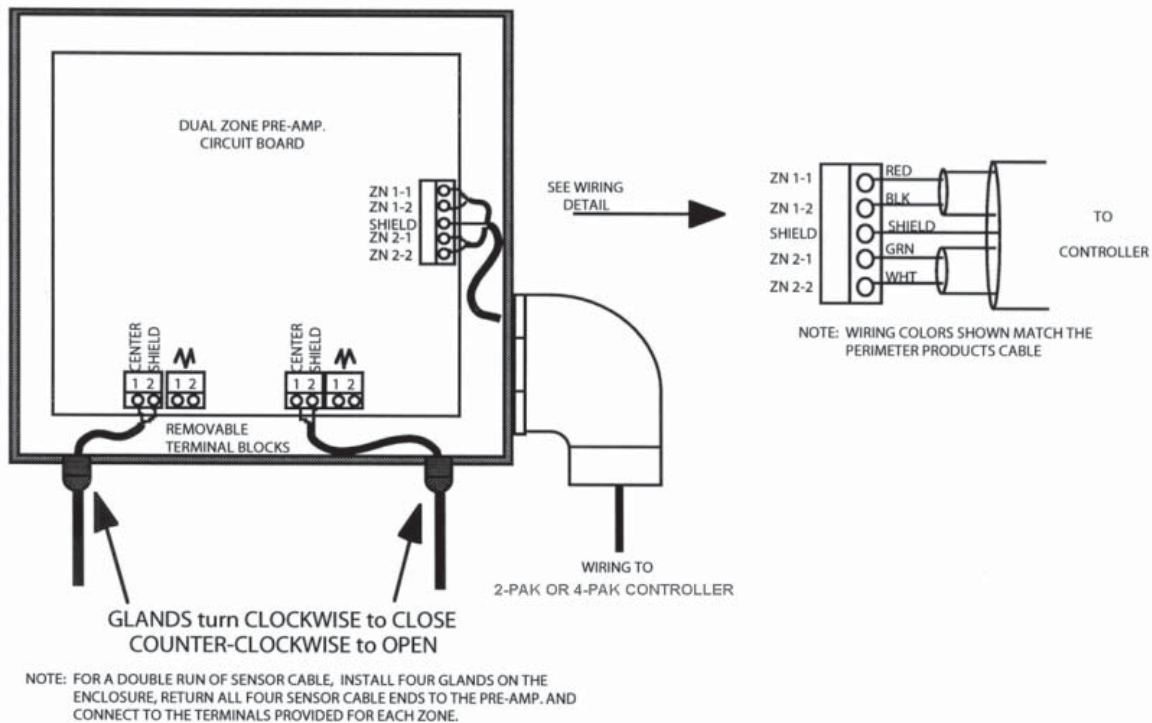
The pre-amp transducer cable connections are very important to the operation of the sensor system. Before proceeding with transducer cable terminations, the transducer cable should be completely installed and terminated in the zone and the transducer cable extended through the conduit and/or the pre-amp cable glands into the pre-amp enclosure. To connect the transducer cable to the pre-amp, proceed as follows:

- Step 1: Strip outer insulation of the transducer cable 1 inch from the end.
- Step 2: Open the entry gland by rotating the outer shell one full turn counter clockwise.
- Step 3: Pull transducer cable through to the inside of the processor enclosure.
- Step 4: Pull braided shielding back 3/4 inch from outer conductor and twist.
- Step 5: Strip center conductor insulation back 1/4 inch from the end.
- Step 6. Attach the center conductor and the braid to the screw terminal located on the lower edge of the pre-amp board as shown in Figure 48. Be sure to separate shield and center conductor at terminal block to avoid noise in audio. If you are installing a double run sensor cable, attach the other end of the sensor cable to the 1 meg ohm terminations as shown in Figure 36.
- Step 7 Allow enough transducer cable inside the pre-amp enclosure to permit future service.
- Step 8: Close the entry gland by rotating clockwise the outer shell until the cable is held snugly. **DO NOT OVER TIGHTEN!**

### Interconnect Wiring

Each dual zone pre-amp requires a wiring connection to the 2 Pak or 4-Pak Controller, which provides power and signal connections for the two alarm zones. The wiring consists of a dedicated 2-pair, individually shielded, 24-gauge low capacitance cable with drain wire and high density polyethylene jacket, Magal-Senstar Part No. 2-Pak Interconnect. Use only the approved cable to connect each dual zone pre-amp to the Controller. Other cables may not provide adequate performance.

Connect the wiring at each dual zone pre-amp as shown in Figure 36. This connector is removable, making it easier to connect the wiring. Keep wires short and make sure the shield drain wires do not touch the box.



**Figure 36. Pre-amp Cable Connections**

## Controller Setup

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The 2-Pak and 4-Pak Controllers can be configured for two basic modes of operation: Active Operator Control or Automatic Acknowledge/Reset. The operating mode is set by way of jumpers on the controller board, and two face labels are provided corresponding to the operating modes. The settings and operation characteristics for the two modes are defined as follows:

**Active Operator Control Mode:** Use label with "ACCESS ON/OFF" designations

**Jumper Settings:** JP1 - A position; JP2 - shunt installed; JP3 - A position; JP4 - A position

### Alarm Sequence -

Red alarm LED flashes, green LED extinguished, alert tone and respective alarm relay activated

-- Operator pushes ACK/Reset button for respective zone

Red alarm LED goes on steady, alert tone deactivated

--Operator pushes ACK/Reset button again

Red alarm LED extinguished, green LED on, relay deactivated

### Tamper Sequence -

Red tamper LED flashes, green LED extinguished, alert tone and tamper relay activated

-- Operator pushes ACK/Reset button for respective zone

Red tamper LED goes on steady, alert tone deactivated

--Operator pushes ACK/Reset button again

Red tamper LED extinguished, green LED on, relay deactivated

### Alarm Sequence -

-- Operator pushes ACCESS button for respective zone

Yellow access LED lights, no alarms will be indicated in this zone

--Operator pushes ACCESS button again

Yellow access LED extinguished, zone is active

**Automatic Acknowledge/Reset Mode:** Use label with Auto "ACK ON/OFF" designation

**Jumper Settings:** JP1 - A position; JP2 - shunt installed; JP3 - no shunt installed; JP4 - B position

-- Operator initiates automatic reset by pushing AUTO ACK button

### Alarm and Tamper Sequence -

Respective red LED flashes, green LED extinguished, alert tone and respective relay activated.

After approximately 3 seconds, red LED extinguished, green LED on, tone and relay deactivate.

--Operator deactivates automatic reset by pushing AUTO ACK button again

**Alarm and Tamper Sequence -** Same as Active Operator Control Mode

## Common Controller Functions

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### Zone Test-

-- Operator pushes then releases TEST button

Test button cycles power to the Pre-Amp initiating self-test

On successful test, Controller will indicate Tamper and Alarm for both zones

Operator can listen to test pulses by activating audio

**Audio-**

- Operator pushes respective AUDIO ON/OFF button to activate
- Green LED of respective zone flashes when audio is activated
- Operator can listen to mechanical activity on the fence
- Loudness is adjusted with AUDIO VOLUME control
- Operator pushes AUDIO ON/OFF button to deactivate audio

**AC Indicator -**

Green AC LED is illuminated when AC power is present

**Sensitivity Adjustment -**

Sensitivity is controlled by Gain and Count settings

**Gain Setting -**

Defines the impulse level resulting in an alarm event  
Set by DIP switch for each zone (see figure) in binary sequence  
Switch 1 = 1; Switch 2 = 2; Switch 3 = 4; Switch 4 = 8  
Settings are additive; Switch 1 ON and Switch 2 ON = Gain of 3  
Typical Gain setting is 3 or 4.

The higher the Gain the more sensitive the zone

**Count Setting -**

Defines the number of alarm events for an alarm indication  
Set by DIP switch for each zone just as the Gain setting  
Typical count setting is 3 or 4.

The higher the Count the less sensitive the zone

**Relay Configuration -**

There are 3 relay contacts for each pair of zones (see figure)  
Alarm zone 1; Alarm zone 2; Combined Tamper for both zones  
Set jumper for normally open or normally closed operation

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**Controller Installation**

**Mounting -**

**2-PAK Controller**

Can be mounted to wall or counter top  
open housing for connections and mounting by removing 4 phillips head screws

**4-PAK Controller**

Can be mounted to wall or standard 19" equipment rack  
Remove back box for rack mounting, or for access to terminals by removing 4 screws

**Power Connections -**

16.5 VAC, class 2, plug-in transformer is provided  
Connect AC power leads to AC terminals on Controller board

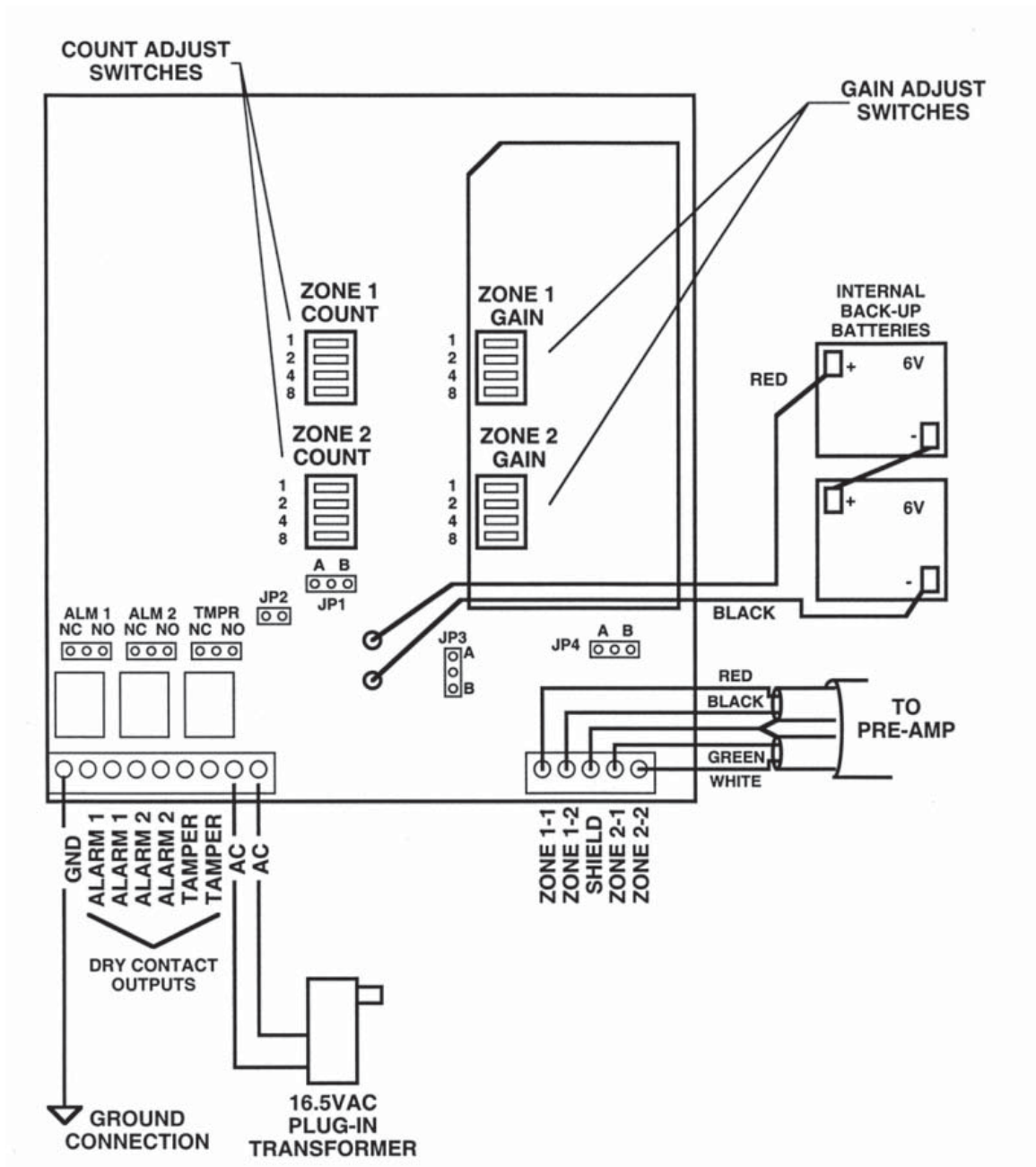


Figure 37. Connection and Jumper Locations