

The primary function of the ALS-1000 Lightning Prevention System is to neutralize the surface charge on and around a tower or structure. This is accomplished by implementing the concept of "ionic emission" in the most efficient and desirable manner.

The following general instructions for installation will provide you with our minimum technical standards for the best operation of the ALS-3000 system.

Each ALS system is composed of three parts:

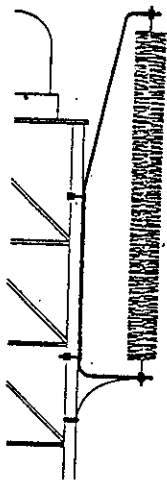
- I. The Dissipation Array (Page 2)
- II. The Vertical Electrical Path (Page 5)
- III. The Collector System (Page 8)

Each part of the system is custom designed for the given application, we will provide a system design for your facility at no cost. Each is equally important to the effectiveness of the system as a whole, if any one part fails, the system will fail. Therefore, any redundancy in the design has its purpose. Review your facilities' ALS system design along with this manual for the best performance of each part.

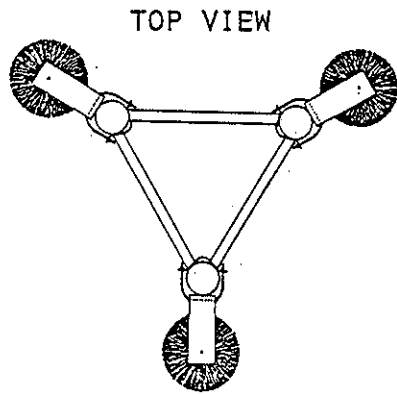
The Dissipation Array

Each ALS-1000 dissipation element is composed of over 14,000 needle type points. Made of high grade stainless steel, the elements will not rust. The element design maximizes the number of points for its length. Additionally, ionic emission from the element occurs in a omni-directional manner. Therefore the element may be mounted at any angle on the tower. For efficiency, we normally recommend each ALS-1000 dissipating element be mounted in a vertical configuration where possible.

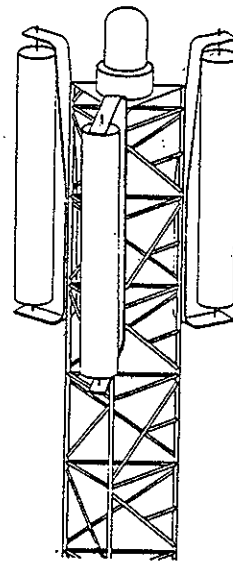
Fig. 1 MOUNTING THE ALS-1000 DISSIPATER ELEMENT.



SIDE VIEW



TOP VIEW

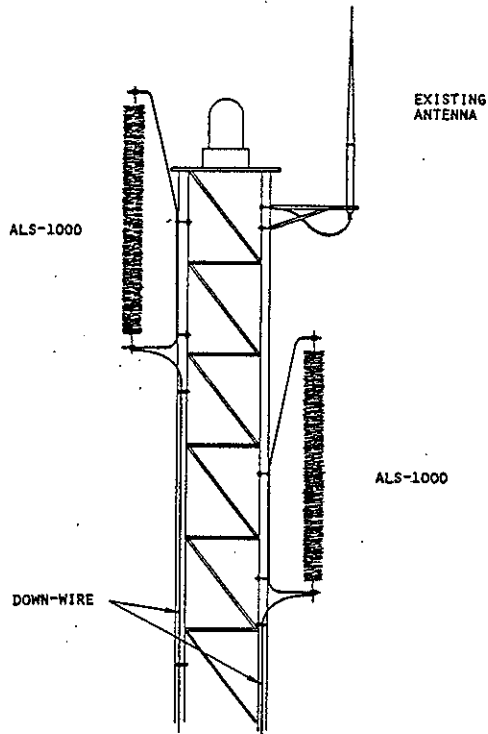


ANGLE VIEW

Install each dissipater element as shown in Fig 1. Some portion of the element should extend above the top of the tower but not enough as to obstruct any small sized beacons. Each element should extend away from the center of the towers' cross section. Each element is supplied with two mounting brackets, they should be position as shown in the Fig 1.

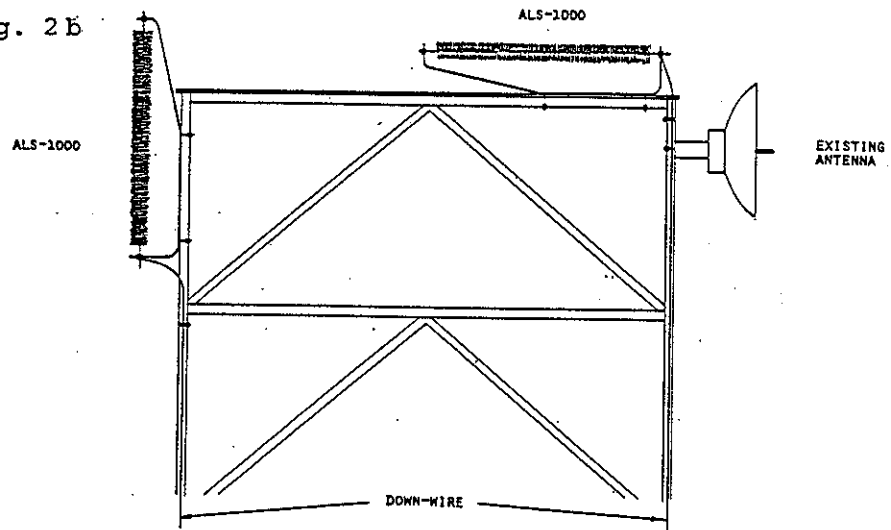
To bond the element to the tower leg select a point about 3" below the bottom of the element. Using a file and sandpaper remove any paint, or scale down to bare metal, forming a band about 2" wide going completely around the tower leg. Wrap the bonding strap attached to the bottom of the element around the bare spot and clamp it tightly to the leg using the stainless steel clamp provided. If #2 down-wire is used, instead of the tower, as the "Vertical Electrical Path", then it should be bonded to the element bonding strap and then mechanically fixed to the tower leg with the steel clamp. Finally, seal the connection with an appropriate sealer then wrap the connection thoroughly with plastic electrical tape.

Fig. 2 a



If existing antennas prohibit the mounting of an ALS-1000 element at the top, then it may be mounted directly below the existing antenna (Fig 2a).

Fig. 2 b

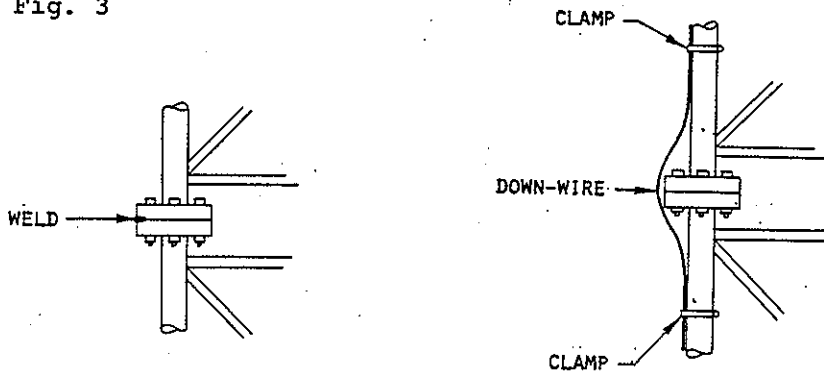


On wide towers where the top is greater than 5 feet wide, the ALS-1000 may be mounted in a horizontal manner, either along the top (Fig 2b) or along the side. The down-wire lead length from the base of the ALS-1000 element to the tower leg should be kept as short as possible.

### The Vertical Electrical Path

The collector system must be provided with a dependable continuous path to deliver the surface charge to each ALS-1000 dissipator element. The continuity of this path is very important to the integrity of the system as a whole.

Fig. 3

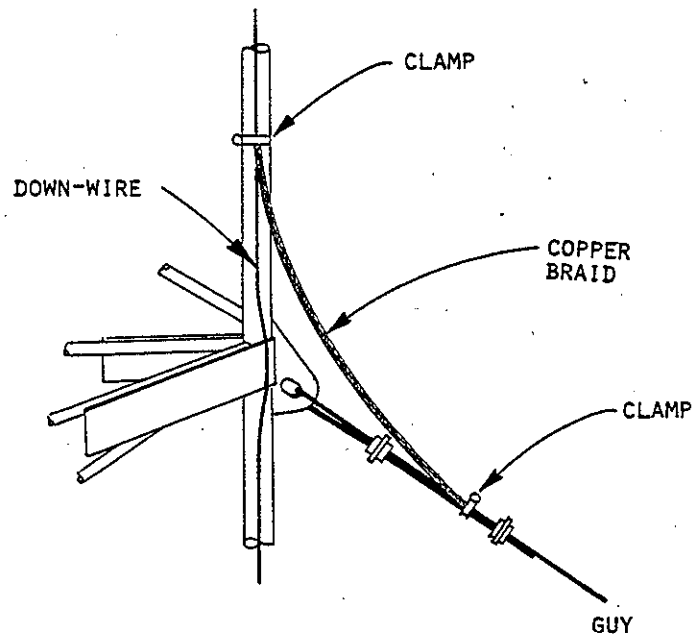


In cases where the tower sections are bonded together with welds the tower itself may be used as this path. If welds are not present, or intended, then a #6 bare copper "down-wire" is run from each dissipater element down the respective tower leg and connected to the collector ring. This is the most popular method.

A continuous smooth radius must be made when installing the copper braid, or locating the down wire, around the section mating flange. Avoid sharp turns or corners.

Non insulated guy wires are incorporated into the overall lightning prevention system. They provide a path for the accumulated charge surrounding the guy anchor point to travel to the tower. It is therefore important that good electrical connections exist at the tower and at the anchor point.

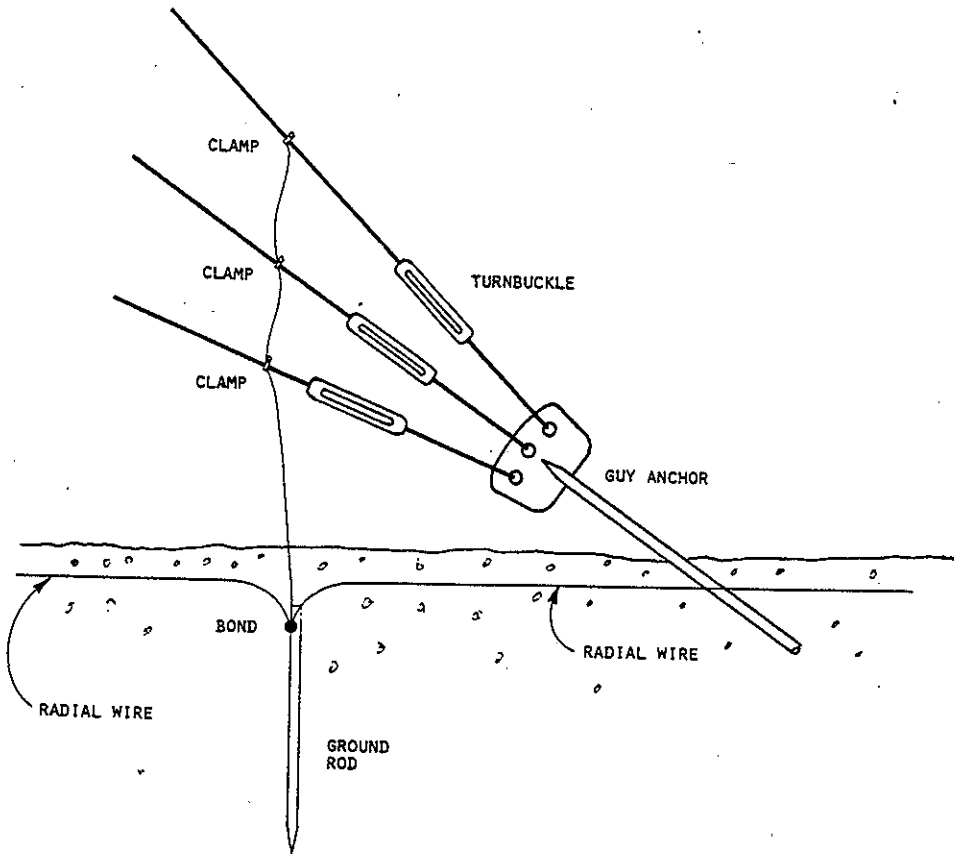
Fig. 4



The guy wires must be bonded to their respective tower leg or the down-wire running up that leg. This is done by clamping one end of a 0.5" wide copper braid strap to the guy wire and the other end to the bare metal of the tower leg or the down-wire. If the tower section is to be used, all paint must be removed around the connection point.

At the guy anchor, a short length of the collector radial wire is wrapped (3 times) and clamped around each guy. This piece is then extended and connected to the buried radial wires which extend from the anchor ground rod. A smooth downward path for this radial wire should be maintained. All connections at the ground rod must be bonded, not clamped. Note that the connections are made on the tower side of the turnbuckle.

Fig.5



The Collector System

As the surface charge builds up in the area of the tower or structure, the LPS collector system gathers the charge for transfer to the dissipation array(s). The collector system consists of the collector ring, #10 (or larger) copper radial wires, and anchor ground rods.

The collector ring is made of #00 copper wire and surrounds the tower as shown in Fig. 6.

The vertical down-wires are connected to the collector ring. Each in the same direction. The ground radial wires are also connected to the collector ring and extended as shown. All connections are to be bonded (Cadwelded, brazed, or silver soldered). A smooth curve is to be provided for each connecting wire to the collector ring, 90 degree or sharp bend connections are to be avoided. All components of the collector system should be buried at least 6" below the surface.

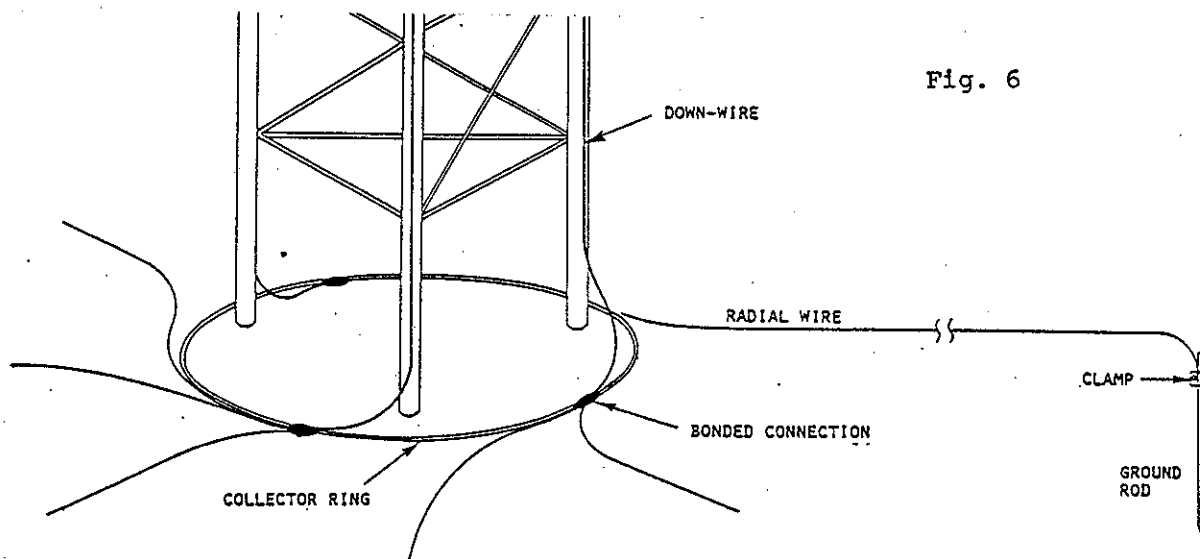
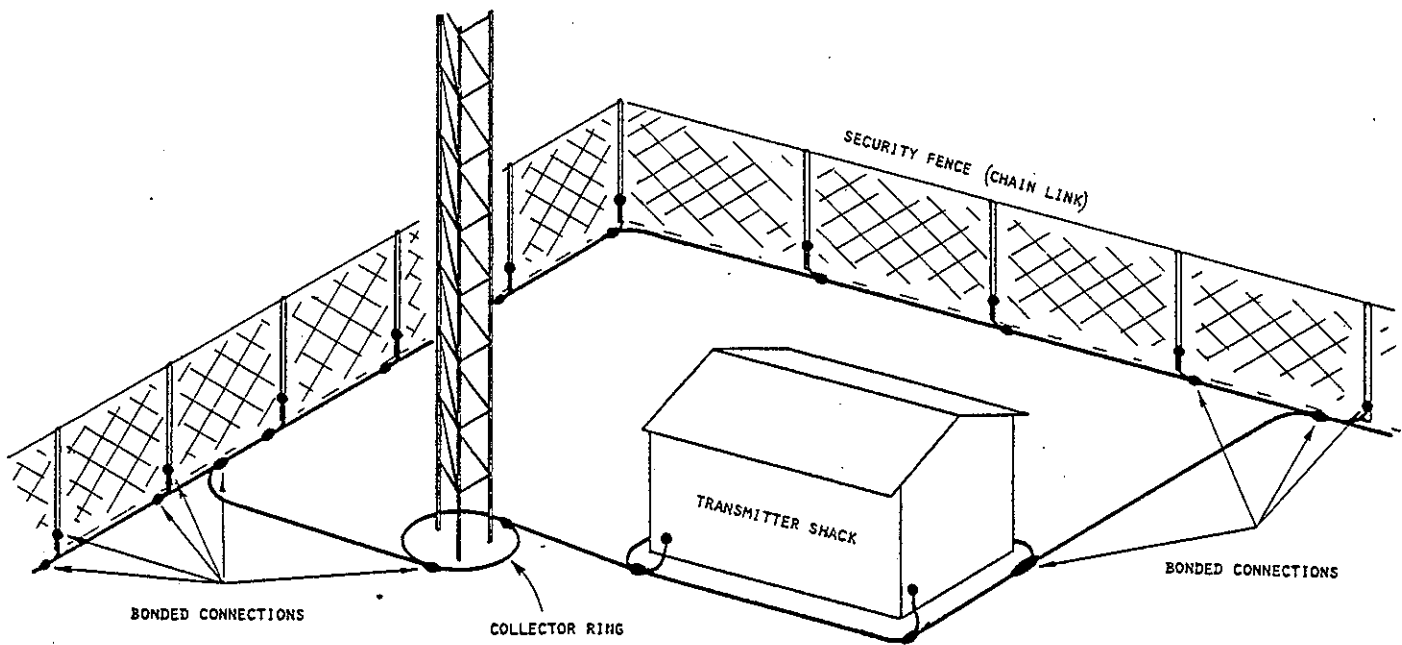


Fig. 6

At most tower sites there are usually buildings or parking areas and fences, these should be incorporated into the collector system.

Whenever possible bury a #4 bare copper wire around the perimeter of any buildings etc. that lie within the collector system. Be sure to bond this wire to any existing ground systems at several points. A similar wire should be buried along the base of any metallic fences and bonded to the fence at regular intervals. These wires should then be bonded to the collector ring.

Fig. 7



MOUNTING THE DISSIPATOR ON THE TOWER LEG

For round member tower legs attach 2 tower mounting brackets to each dissipator element. Locate the two 7/16" dia. holes on the element frame, using these holes, attach the brackets using the 3/8" x 1 1/4" bolts and locking nuts. The length of the bracket should lie parallel to the element frame. Mount the element to the tower leg with 4 mounting strap clamps (2 per bracket). Be sure all hardware has been firmly tightened.

For elements that are to be mounted on angle members use 2 malleable iron beam clamps for each element. Bolt the beam clamps to the element mounting frame using the 3/8-16 x 1" bolt, flat washer and split lock washer provided in the mounting kit. Use the threaded hole opposite the clamping screw on the beam clamp. The opening of the beam clamps should face the same way on each element. Mount the element to the tower member and tighten the beam clamp clamping screw then tighten the clamping screw lock nut firmly against the beam clamp body. Be sure to all hardware is firmly tightened.

Attach the #2 lug to the bottom of the to the element with the 1/4-20 x 5/8" bolt, flat washers, split lock washer provided. Clamp the down wire firmly into the wire lug attached to the bottom of the element. It is recommended that this connection be brazed or silver soldered.