

The Electric Perimeter Security Fence



Let's build a legal security barrier that shocks anybody that touches it, and will trigger an alarm if cut, climbed, shorted, torn down or tampered with. As a bonus, it will also notify us if the voltage falls below a certain threshold.

An electric security fence, or array, can be freestanding, placed atop a wall, or attached to an existing fence. Since most electric security arrays are added to the inside of a chain link fence, that's the example we're going to use, but the principles are the same.

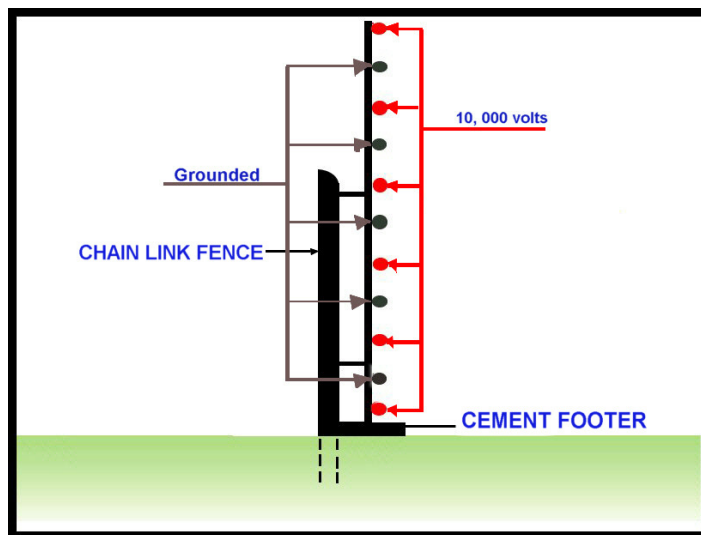


Figure 1 – click on the pictures in this article for larger images.

In Figure 1 we see an array attached to the inside of an existing fence. The wires of the array start a few inches above ground level, and there's a wire every 4 to 6 inches, to a

height of 8 or 10 feet. We run the array all the way up because chain link fences are easily cut with a \$20 bolt cutter.

Alternate wires are grounded to ensure that anything coming over or through the array receives a shock. If the wires remain in contact with each other for more than a few seconds, it will also trigger the alarm. If a hot wire is cut, the alarm sounds.

This also negates throwing a mattress or other insulator over the array because the fence will short out, which triggers the alarm.

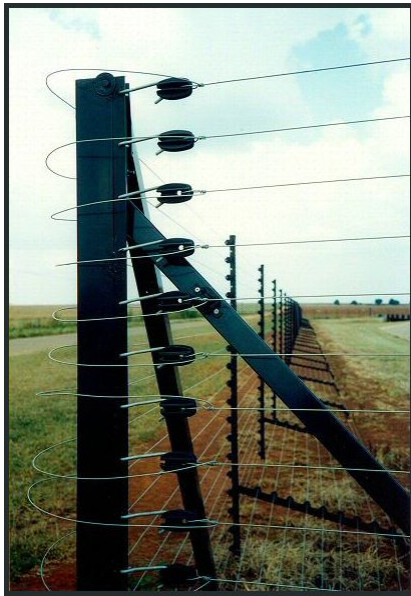


Figure 2 – Animal control arrays are also run horizontally above the ground to prevent digging – [click for enlargement](#)

A optional solid cement footer (see Fig. 1), or some rows of heavy debris along the base of the fence can be used to prevent digging under the fence.

Another way to prevent digging is shown in Figure 2. We run the array horizontally for three feet across the ground to prevent predators and other thieves from digging their way in.

In our experience, we have never had a trespasser attempt to dig under an array. They have always tried to come over it or through it. After the first shock, they leave and don't return.

Another special case is keeping snakes out of utility installations. Our systems are used for this extensively in Texas. [Contact us](#) for snake-proofing and other specialized designs.

How It Works – a one minute video

Wiring the Array

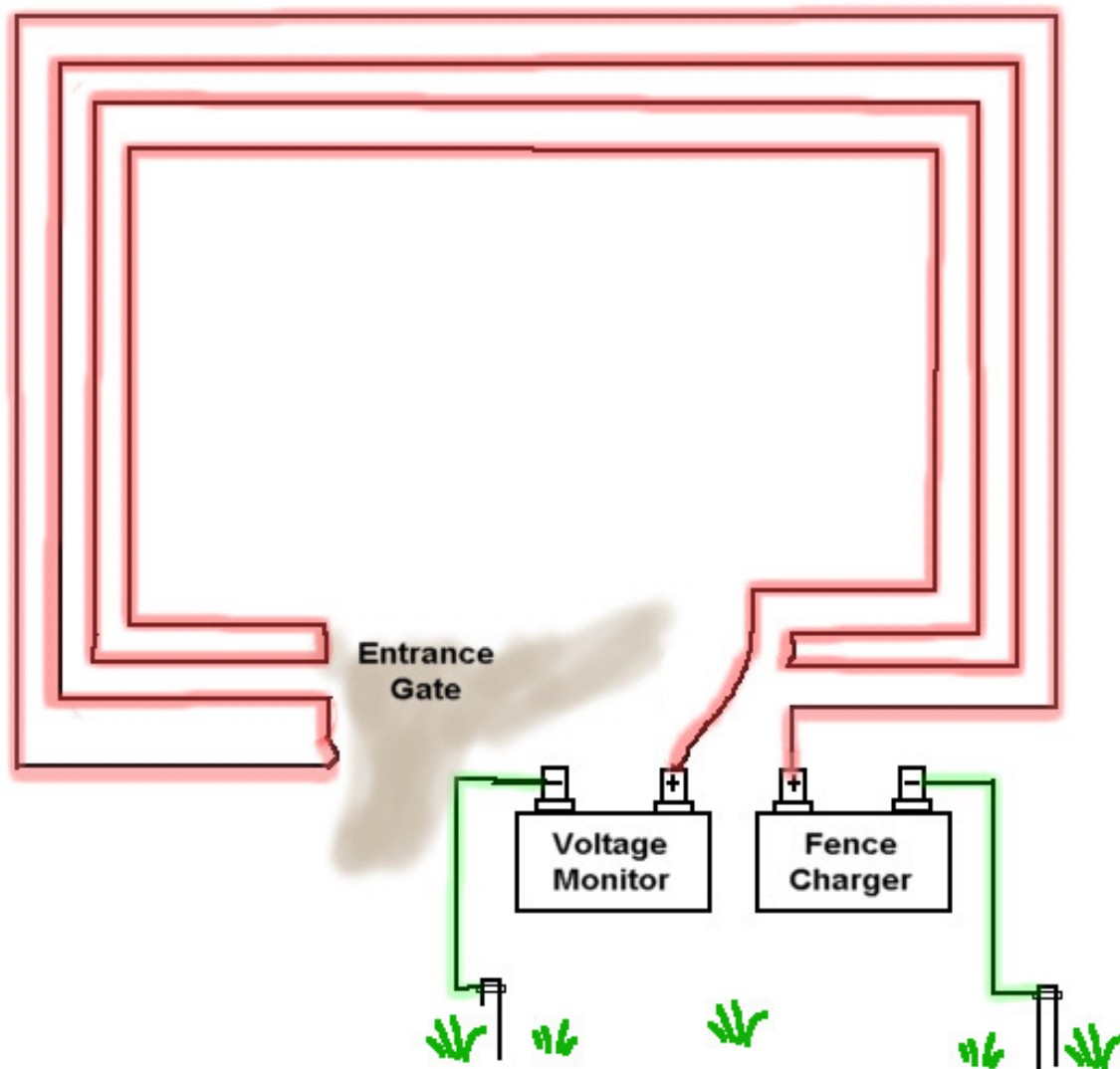


Figure 3

We saw in Figure 1 that alternate rows of the fence carry the high voltage and the alternate wires are grounded. Figure 3 shows just the high voltage wire and how to interconnect them to make one continuous loop. This wiring configuration is the correct way the high voltage wires are to be inter-connected for a security fence.

In a monitored electric security array we need to have continuity in the hot wire. That's how we can constantly monitor the voltage. Figure 3 shows simple example of this.

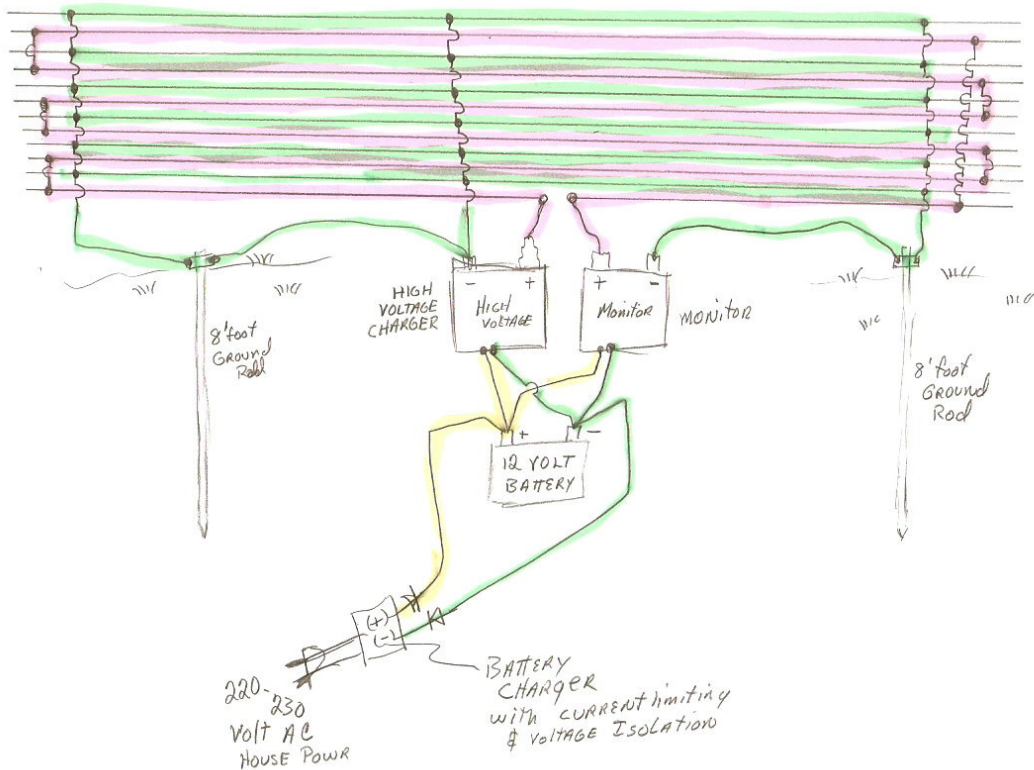


Figure 4 – Security Array Wiring Diagram

Figure 4 shows how this is done on a larger scale.

The grounded (green) wires can be bundled and sent directly to ground – the better the grounding, the better the security system.

Having good earth grounds on the array and components is what ensures that anybody that comes into contact with it gets a good, hard zap. This is what knocks them off the fence.

The hot (pink) wire goes back and forth in an “S” pattern, eventually making its way from the high voltage source – the fence energizer – to the Fence Hawk Plus monitor.

This continuous “S” pattern of the energized hot wire is what makes a monitored security array work, and is the key to monitoring the voltage on the fence. When wired and connected in this fashion, if any “hot” wire is cut or shorted anywhere in the array, the alarm will be produced.

By alternating back and forth using technique, one can construct a fence up to many meters high, as there is actually no limit to the number of folds that one can introduce to the high voltage conductor.

Security Zones

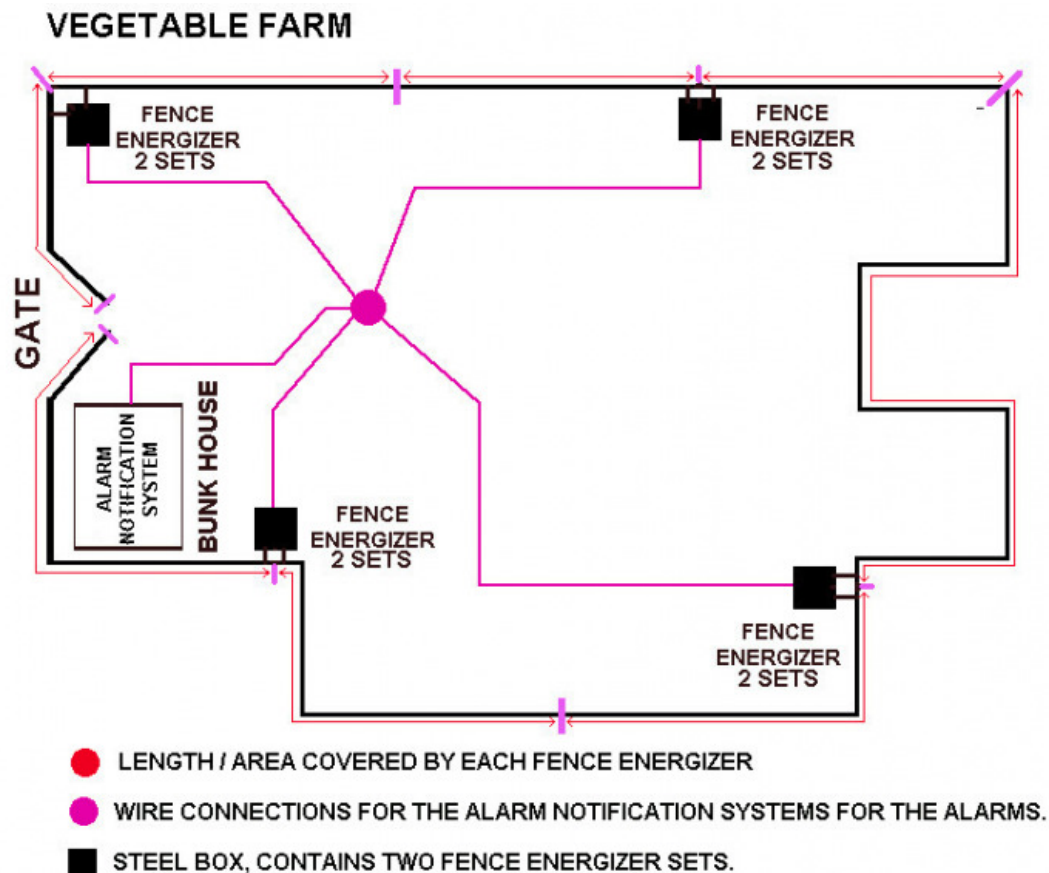


Figure 5 – Eight security zones – example of design and wiring

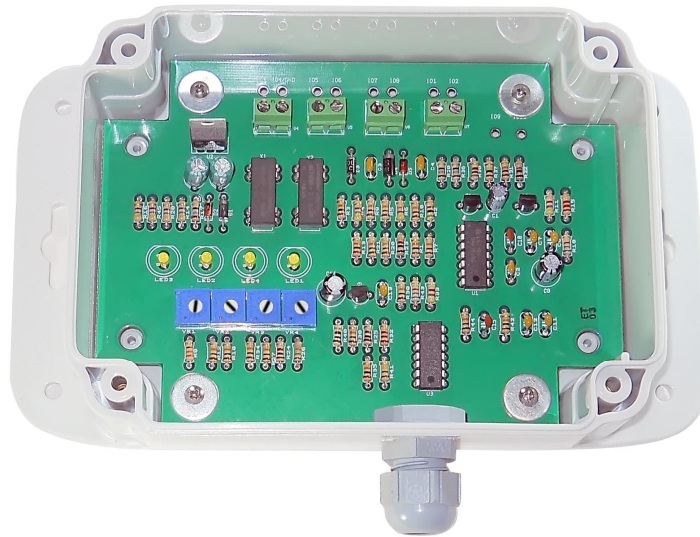
On larger installations it's good security practice to split the secured area into smaller segments or zones. This allows dispatching security directly to the area when an alarm goes off.

It also allows you to automatically turn on lights and cameras for that area, if you are so equipped.

Third, it allows you to turn off individual zones during working hours – a front gate, for example – without turning off the entire system.

In Figure 5 the gates are wired and zoned in such a way that the entire system can remain on when the gates are left open. The array on the gates can be turned on or off independent of the rest of the system.

The Fence Hawk Monitor/Sensor – Made in the USA



Fence Hawk Plus computerized PCB

So we designed an improved monitor and sensor we named the Fence Hawk Plus. The state-of-the-art, computerized, patent-pending circuitry measures the actual voltage on the line. When installed, it's adjusted to the voltage of the array – up to 25,000 volts.

When the voltage falls below a set value and remains that way for a period of time a security alarm is sounded.

When the voltage falls below an adjustable minimum voltage, usually 2,000 volts below the normal fence energizer voltage, a weed alert is generated.

Because the Fence Hawk Plus *measures and counts* the voltage pulses on the fence, and allows for the occasional random or spurious pulse, *it doesn't generate false alarms.*

If the pulse rhythm is interrupted by a nearby lightning strike or a person touching the array, the Fence Hawk Plus is designed to watch carefully, and if the pulse and voltage quickly return to normal, it ignores this.

It only generates an alarm when the fence voltage is lost, or drops below a set level, for a set period of time.

Since installing our first Fence Hawk Plus we've had no false alarms, and we've never had a perimeter violation when the array was activated and armed – because we believe a system that generates false alarms is worse than no security system at all!

An Integrated Security System

The Fence Hawk Plus monitor is designed to connect to any alarm control panel. It connects like a motion or smoke detector.

One pair of wires from the Fence Hawk Plus carries the alarm signal, the other pair signals low voltage – the weed alert.

This gives you a fully integrated alarm system, and allows your existing alarm to call the police, trigger sirens, floodlights, cameras, etc., when the Fence Hawk detects an intrusion.