

# ELECTRIC FENCE ENERGIZERS

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The effectiveness of any electric fence, whether it's a one wire fence subdividing a pasture or a 9 wire fence protecting stock from predators, depends on the ability of the fence to deliver an unpleasant shock to animals that touch it. The ability of a fence to deliver that shock depends on three things:

1. **The energizer**
2. **Grounding**
3. **The fence design**

This article describes important energizer features that influence fence performance.

## WHAT YOU NEED TO KNOW ABOUT ENERGIZERS

After reading this article you will be able to:

1. **Describe factors that determine the effectiveness of an energizer.**
2. **Select an energizer that fits your needs.**

## RELEASING PULSES

An energizer (also called a charger or controller) regulates the flow of electricity in an electric fence. It stores electrons in a "capacitor" and then releases them in a "pulse." After each pulse the capacitor stores up electrons for the next pulse. (If you touch an electric fence between pulses you will not get shocked.)

## ENOUGH IS ENOUGH

Your fence, regardless of the animal being controlled, does not need more than 5000 volts. Commonly the best energizers will deliver 4500 to 7000 volts. Energizers are available that produce even higher voltage. In fact one cheap charger blew my voltmeter off the scale (it reads up to 10,000 volts) and knocked me on my #%\$(@&! Avoid these cheap high impedance "weed chopper" type chargers.

# EFFECTIVE POWER

We can measure the voltage in an electric fence with a voltmeter, but the voltage rating of an energizer tells you next to nothing about the effective power of the energizer. The "joule" rating is the critical statistic. Joules measure the total amount of energy released per pulse. Double the joules and you'll double the shock.

Most U.S. made energizers have very low joule ratings. Generally DC energizers are below 0.08 joules and AC chargers are below 0.2 joules. Several models of New Zealand style energizers (Gallagher, Pel, Speedrite, Halman, etc... ) have much higher ratings (over 10.0).

## HOW MANY JOULES DO YOU NEED?

The number of joules needed depends on the length of the fence, the number of electrified wires and severity of conditions. As a general rule you'll need an energizer with a rating of 1 joule for every 6 miles of *wire* you want to electrify. For example, if you install 12 miles of electrified wire (**4 miles of fence with 3 hot wires**) your energizer should have a rating of at least 2 joules (12 miles @ 6 miles per joule = 2 joules).

MINIMUM RECOMMENDED JOULE RATING	MILES OF ELECTRIFIED WIRE
1	6
2	12
3	18
4	24

Under severe conditions (wire passing through heavy vegetation) higher joule ratings may be required.

## PULSES

Energizers differ in the size and duration of the pulses of electrons they send into the fence line. A good energizer has an intense pulse lasting for 0.0003 seconds. These short pulses eliminate the risk of fire (the pulse is so short that no heat builds up in the wire). Poorer quality energizers have pulse lengths of 0.003 to 0.3 seconds. This longer "on" time may allow sparks to arc and heat to build up. This can cause fires. This will also shorten the life of polywire. (These long pulses will cause polywire to melt where it comes in contact with grass.)

## HIGH IMPEDANCE VS. LOW IMPEDANCE

Impedance means leakage. Generally speaking, high voltage energizers with long pulses are high impedance energizers. The current leaks readily. Low impedance energizers resist leakage.

# POWER SOURCE

If mainline power is available and dependable, 110 or 220 volt AC (plug it in the wall socket) energizers are usually most practical for permanent fences. Will they raise your electricity bill? Well, depending on the size of the unit, they typically draw 2 to 25 watts a day. The operational cost of an energizer drawing 17 watts a day would be about \$1.50/month (assuming an electrical rate of \$0.12/kilowatt hour).

AC chargers have several advantages over DC (battery powered) energizers:

- **They require no battery maintenance**
- **They usually have higher joule ratings**
- **They are generally placed in or close to buildings (reducing the risk of vandalism)**

Where mainline power is unavailable or unreliable, battery powered energizers are a practical alternative. Some portable DC energizers can be powered by dry cell batteries. For example, I have a small energizer I use for short (<1/2 mile) temporary fences that is powered by 6 "D" dry cell batteries. The batteries need to be replaced about every 3 or 4 weeks. Beware - manufacturer estimates of battery life are usually optimistic. My energizer claims the batteries will last "up to 6 weeks."

For longer or permanent fences, or for short temporary fences passing through tall wet grass (high leakage), larger energizers powered by 12 volt rechargeable wet cell batteries should be used. Deep cycle batteries are the batteries of choice. They can be completely discharged and recharged repeatedly. Conventional car batteries can be used but they are not designed to be totally discharged. They will only recharge up to about 60 to 75% of their original capacity.

## SIX TIPS FOR BUYING AN ENERGIZER

1. **Check the joule rating.** Don't pay attention to manufacturer claims as to energizer capacity in terms of volts, amps, or watts. Manufacturer claims of miles of fence a charger will power are meaningless. Remember: you double the shock by doubling the joules.
2. **Buy an energizer with the capacity to do the job.** Remember the Joule Rule: 1 joule/6 miles of electrified wire.
3. **Check the cost per joule.** One way to compare the value of energizers is to calculate the cost per joule. Generally speaking, the lower the cost per joule the better the value.
4. **Buy a low impedance energizer** with pulses of 0.0003 seconds or less.
5. **Look for solid state circuitry with modular service boards.** It makes repair much faster and simpler.
6. **Check the guarantee.** They vary in length and items covered. Some cover lightning damage.

## ENERGIZER DON'TS

1. **Don't buy on price alone.** I guarantee the energizer with the cheapest price will turn out to be the most expensive.
2. **Don't skimp on the joule rating.** Buying more joule capacity than currently needed will give you the flexibility to charge fences built in the future without having to buy an additional unit.
3. **Don't forget to ground the system.** Even the largest energizer in the world is useless without effective grounding.

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