



# Safe and Effective Electric Animal Controllers: Fencers, Cow Trainers, & Crowd Gates

## Why Fencers, Trainers, and Crowd Gates?

Whether as fences, cow trainers, or crowd gates, electric devices are frequently used as a relatively easy to install, low cost, effective method of controlling animal movement and behavior. These devices work by giving animals a short sharp shock that usually produces a desire to avoid future contact with the source.

If installed correctly, these devices can be beneficial to both animals and their owners. Besides saving labor and preventing animal escape, electric trainers can be beneficial in improving sanitation and reducing animal health risks. However, improperly installed or improperly grounded fencers, trainers, or crowd gates are a common source of grass fires and animal discomfort or distress. Nervous behavior, production losses, and increased health problems can develop from the inappropriate installation or use of fencers, trainers, and crowd gates.

Wisconsin's Department of Agriculture, Trade and Consumer Protection (DATCP) and the Public Service Commission (PSC), in cooperation with the University of Wisconsin-Extension, offers the following guidelines on electric animal controller installation and upkeep, so you can keep your farm running safely and efficiently.

## How electric animal controllers work (fencers, trainers, & crowd gates)

An electric fence, cow trainer, or crowd gate consists of a power unit, grounding system, and shock delivery system. The power unit works by placing repetitive pulses of electric power onto the shock delivery system wires. The average shock pulse lasts only 0.0003 of a second and reaches 2,000 to 7,000 volts at its peak. The strength of the shock depends on the capabilities of the power unit and how easily a pulse can travel the full length of the shock delivery system (system resistance). The system resistance includes both the wires and the soil return path to the grounding system. The whole system must be well constructed and maintained for the power unit's high energy shock to be transmitted in this short time.

The strength of the shock is determined by:

1. *The voltage of the shock at the point of contact (often called the guard voltage).* It is important to realize that guard voltage only determines whether or not a shock will be delivered to the animal, and is not a measure of how much shock will be felt.
2. *The power, or energy, of the shock pulse (measured in joules).* If the guard voltage is adequate to deliver a shock, the effectiveness will depend on how much shock is produced. The higher the joule rating the greater the shock pain.
3. *The resistance to the flow of the shock through the system (measured in ohms).* The system resistance is not only the resistance of the wire, but all the components together; for example, the soil resistance of the return path of the shock to the grounding system (100 to 50,000 ohms).

If not properly grounded, the power unit will not operate effectively and could result in a grass fire or animal health and behavior problems.

## Choosing the right-power unit

The power unit is a vital part of your system and a potential source of problems. Both the Wisconsin State Electric Codes (ILHR 16.51) and Department of Natural Resource fire codes (NR30.08) require the power unit meet the Underwriters Laboratory standards (UL69).

Approved units will bear the Underwriters Laboratory seal.



There are currently no standards in effect to assure consumers that the manufacturers and distributors of power units are fairly and equally comparing the electrical attributes of their products to their competitors. It is truly a "Buyer Beware" market. It is important to locate a reputable and knowledgeable dealer willing to work with you in selecting a system and sizing the power unit.

Fencer power unit operating conditions are extremely variable and dependent on many factors, such as fence length, single or multiple wire fence, weather, plant growth, fence insulation, the type of animals being controlled, and the resistance of the soil along the fence and near the grounding system.

Cow trainers and crowd gate power units are easier to size and select because the barn environment does not vary as much from farm to farm. Use a separate power unit with lower voltage for an electric cow trainer and crowd gate. Between 1,500 and 2,500 volts is adequate in most livestock facilities. Using too large a power unit will potentially cause nervous behavior and production problems. **DO NOT USE A FENCER AS A TRAINER.**

Proper installation of any power unit is important. Be sure to get one that has clear and explicit installation and maintenance instructions. Do not use a power unit outdoors that was designed for inside use.

Do not tamper with the power unit. If it needs servicing, return it to the manufacturer or have repairs made by a factory-authorized representative.

### **Establishing a grounding system.**

Once the appropriately sized power unit is installed properly, an effective earth grounding system must be established. Without an earth grounding system, the electric pulse will not complete its circuit, and there won't be a shock. Improper grounding is also a common source of unintended shocks to the cow.

A grounding system separate from your electrical and water system is required. You should also establish separate grounding for your electric fence system, and another one if you have a cow trainer or crowd gate.

Establishing proper grounding is important for a trainer or crowd gate, since it is located in a concrete environment surrounded by many metallic structures.

Do not ground the electric animal controllers to water pipes, stanchions, electrical panels or panel grounds, or any other metallic structure inside the livestock area.

Installation instructions for your power unit should give you guidance on the number of ground rods and placement required to allow the best performance from your unit. Periodically check the condition of the grounding system to make sure all wires are making good contact.

## **Shock Delivery System**

The system delivering the shock should:

1. Use and maintain good clean insulators at all contacts with other surfaces not of the shock system. Do not allow any other wires or metal to touch the charged wires.
2. Be wired and maintained with good clean wires or conductive fibers. (Resistance not more than 0.5 ohm per yard.) Do not use barbed wire.
3. Be kept clear of combustible materials around the system.

Because the maximum insulation rating of electric wire used in buildings is only 600 volts, such wire does not have adequate insulation to withstand the high voltage of the power unit. If 600 volt wire is used, the electric shock wires running through buildings can cause problems. Use wire or wire insulators rated for the voltages delivered by your power unit. Always look for cases where an insulation breakdown may be causing voltage to jump from an insulated electric wire to metal equipment inside your barn.

Make sure that electric fence wires and cow trainers do not run parallel with large metal equipment, because they may induce voltage into the metal. If parallel runs cannot be avoided, then limit them to 10 feet or less.

By following these suggestions, your electric fence, cow trainer, and crowd gate systems should run efficiently and safely. If you feel your system may be causing an electric problem, contact your utility, electrician, or county extension agent to help you pinpoint its source. After working with these people, if you still need help, Wisconsin's Rural Electric Power Services Program (REPS) may be of assistance.

You can contact PSC or DATCP for a stray voltage assessment application by writing:

REPS Program - Public Service Commission  
P.O. Box 7854  
Madison, WI 53707-7854

or

REPS Program  
Wisconsin Dept. of Agriculture, Trade & Consumer Protection  
P.O. 8911  
Madison, WI 53708-8911

Or you can call:

Wisconsin Dept. of Agriculture, Trade & Consumer Protection  
Farmer's Assistance hotline  
1-800-942-2474



## Suggestions for installing and maintaining cow trainers and crowd gates

Trainers must be installed carefully so they don't influence the milk pipeline, waterlines, or other conducting surfaces in the animal contact area. It is important to limit the voltage, or contain it, so it doesn't affect these structures. Refer to Figure 2 to see how to install a typical cow trainer system.

When you install the trainer, be sure to follow the manufacturer's instructions closely and do the following:

1. Keep trainer and related wires as far away as possible from the milk pipeline, water lines, or other conducting surfaces.
2. Establish good grounding. Grounding is important since the trainer is located in a concrete and animal area. Ground the trainer's power unit [A] to its own grounding system. [B] DO NOT ground the trainer to other ground systems, electrical panels or grounds, water pipes, stanchions, or any metallic structures inside the livestock area.
3. Two or more ground rods [C] may be required to get good grounding. Place 8-foot rods a minimum of 12 feet apart for a grounding system. [D] If you use shorter ground rods, space them 1½ times the length of the rod apart. Try to keep the ground rods at least 25 feet from buildings and underground water pipes, power cables, or telephone lines.[E]
4. Connect the ground leads to the ground rods with a listed ground rod connector. [F] The ground lead should be a #8 or larger copper-stranded conductor insulated for 600 volts.[G]
5. Use 10,000-volt, insulated wire [H] to connect the power unit's "hot" lead terminal to the bare trainer wire. [I] Do not connect the "hot" lead terminal to anything not associated with the trainer power unit.
6. Use the correct size terminal lugs, such as a #8 brass lug for a #10 stud. [J]
7. Protect the 10,000-volt, insulated lead wires going through walls with PVC pipe, or rubber or plastic tubing. [K]
8. The trainer wire [L] supports [M] should be insulators rated for the voltage used.
9. The trainer hangers [N] should be adjusted so that they are about 3 inches above the cow's shoulders. Lower the trainers until they are effective in training the cows to drop their manure in the gutter (this may be as close as 1½ inches in some cases). It is essential that the trainer be fastened securely to eliminate the possibility of the unit sliding down onto the cow's back.
10. Plug the power unit into a three-prong, 120V receptacle [O] wired in accordance with the State Electric Code. A surge suppression receptacle or single plug surge suppressor [P] is suggested.
11. Be sure to inspect your electric cow trainer system at least every six months, to ensure proper operation.

Figure 2

