KENCOVE
FARM FENCE SUPPLIES
Fast, Friendly Service and Expert Advice

Kencove EKD16 Dual-Purpose Energizer Installation and User Manual

(Item Code: EKD16WI)

Introduction

Congratulations on your choice of a Kencove Energizer. In choosing to purchase the Kencove brand, you have opted for the highest quality in electric fencing. Please read this manual entirely before installing your new energizer.

This Kencove energizer comes with a 2-year warranty against faulty components, faulty workmanship, and lightning damage. This warranty excludes flood damage, malicious damage to the unit, or faulty application. To ensure your eligibility for this warranty program, *please retain your proof of purchase.*

DANGER! Risk of Shock!

High voltages exist inside the electric fence energizer and on the fence terminals.

Table of Contents

1 Important notes – **PLEASE READ**

1.1 Electric Fences

1. Electric fences are not toys; do not let children play with them.
2. Electric fences should only be installed with regard to the relevant Standards and work place health and safety requirements.
3. Electric fences must have a ground. An electric fence ground is one or more pieces of metal (such as galvanized ground rods) driven into the ground.

1.2 Energizers

1. The energizer places a very short, very high voltage pulse on the fence live wires approximately once every second. The fence is 'safe' in that the pulse is too short to cause electrocution. Please be advised that there is always a risk associated with any device designed to impart an electric shock. Do not allow children or elderly persons to touch the energizer or fence live wires.
2. When energizing a fence, Kencove recommends 1 output joule per mile of fence. So a 16-joule energizer could power 16 miles of fence. The performance of your fence can be affected by the type/quality of insulators and the amount of grass, weeds, or shrubbery touching the fence. Another factor to consider is acceptable fence voltage. For some stock situations this is 2.5Kv (2,500 volts), while others require more.
3. **DANGER!** The Energizer should never be operated with the cover removed as high voltages exist inside the enclosure while operating. High voltage may remain on some internal parts long after the unit has been switched off.

1.3 Power Supply Options

This Kencove Dual-Purpose Energizer can be powered from a range of power sources.

- 12V or 24V external deep-cycle marine battery (not supplied)
- 12V or 24V external deep-cycle marine battery with solar panel (not supplied)
- 240V/110V AC via power pack (supplied)

1.3.1 Important Notes

- Always ensure adequate ventilation is given to the external 12-volt battery. Lead-acid batteries may emit explosive gases while charging!
- Always mount the power supply either indoors or under cover.

1.4 Auto-Sync™

Auto-Sync™ is a new method of synchronizing electric fence energizers patented by Pakton Developments Pty Ltd.

Auto-Sync™ detects when something or someone touches the wires from two different electric fences, and synchronizes the output pulses so that the potentially dangerous condition of receiving more than one pulse per second is avoided.

The magnitude and frequency of the electric fence pulse is restricted by safety standards such as IEC60335.2.76. This limitation is specifically intended to ensure that a shock received from the energizer (and hence the fence) is safe for humans. An important part of the safety requirement is that the person receives no more than one shock per second. When the pulses are one second or more apart, the human body treats them as separate events and the heart is unaffected. Receiving more than one pulse per second can interrupt the natural rhythm of the heart.

An energizer running our patented Auto-Sync™ technology can synchronise with any brand of energizer provided that energizer conforms to international standards regarding pulse timing.

If synchronization cannot be achieved or is lost, the energizer will not shut down. It will continue to operate as though no foreign signal were present on the fence (i.e. its regular pulse frequency and energy output).

2 Kencove EKD16 Features

2.1 Features

- Mains Powered
- Batter Powered
- Digital Control
- “Smooth” Wave Shape
- Power on Demand
- LCD Showing kV and Stored Energy
- Insect and Moisture Protection
- UV-Stable Enclosure
- Overload Indication (Audible and Visible)
- Lightning Protection
- Reverse Battery Protection
- Self-Resetting Fuse
- Solar Capability*
- Low Battery Indication
- Dead Battery Indication
- Over Discharge Battery Protection
- Battery Life Maximization
- Battery Voltage Measurement
- Stored Joules = 24 Joules
- Energy Output = 16 Joules
- Power Consumption at 12.5V DC = 1.6 Amps
- 2-Year Warranty
- Power Adapter Included (24V DC)
- Battery Leads Included
- Audible Alarm
- Auto Recover
- Auto-Sync™
- Bi-Polar Output

- **Battery life maximization** works by slowing the frequency of high-voltage pulses just before the battery dies to keep the energizer going for as long as possible without damaging the battery.
- **The over discharge battery protection** will stop the energizer when the battery is too low and flash the status LED twice each second. If too much charge is pulled from the battery, it will be permanently damaged and never hold the same amount of charge again. The energizer will automatically restart once the battery voltage returns to a normal level.
- **The reverse battery protection** protects the energizer from damage in the event you are having a bad day and connect the external battery the wrong way around.
- The MB series of energizers **seals the electronics inside a durable, UV-stable case** to protect from insects, moisture, and dust to maximize reliability.
- **Overload indication** warns you if your fence is heavily loaded by flashing a warning LED and alerting you with a short audible beep.
- This energizer utilizes the latest **digital microcontroller** technology to extend battery life, provide useful feedback on the energizer status, and increase reliability and performance.

- The **audible alarm** will sound in the event of a serious error for 30 seconds and then shut down for 7 minutes before sounding again.
- The **Auto Recover** feature will attempt to recover the energizer from severe errors which cause the energizer to stop working. This automatic recovery process will occur at 7 minute intervals.
- Our patented **Auto-Sync™** technology to help keep your fences safe.
- **Power on demand** automatically increases the power to heavy fence loads.

*To use with a solar panel, an external 12-volt, sealed, lead-acid, deep-cycle marine battery, solar panel and solar charge controller are required (not supplied with this kit).

2.2 Specifications

Model	Energizer Output Voltage*	Power Input Range	12V Drain**	Solar Panel Size for Minimum Expected Sun Hours/Day***				Solar Battery ****	Peak Stored Energy	Peak Output Energy
				4hrs	5hrs	6hrs	7hrs			
EKD16	8.2kV	12 to 24Vdc	1.6A	220W	180W	150W	120W	260Ah	24J	16J

*No load, actual voltage on a short fence can be as high as 10kV (10,000 volts)

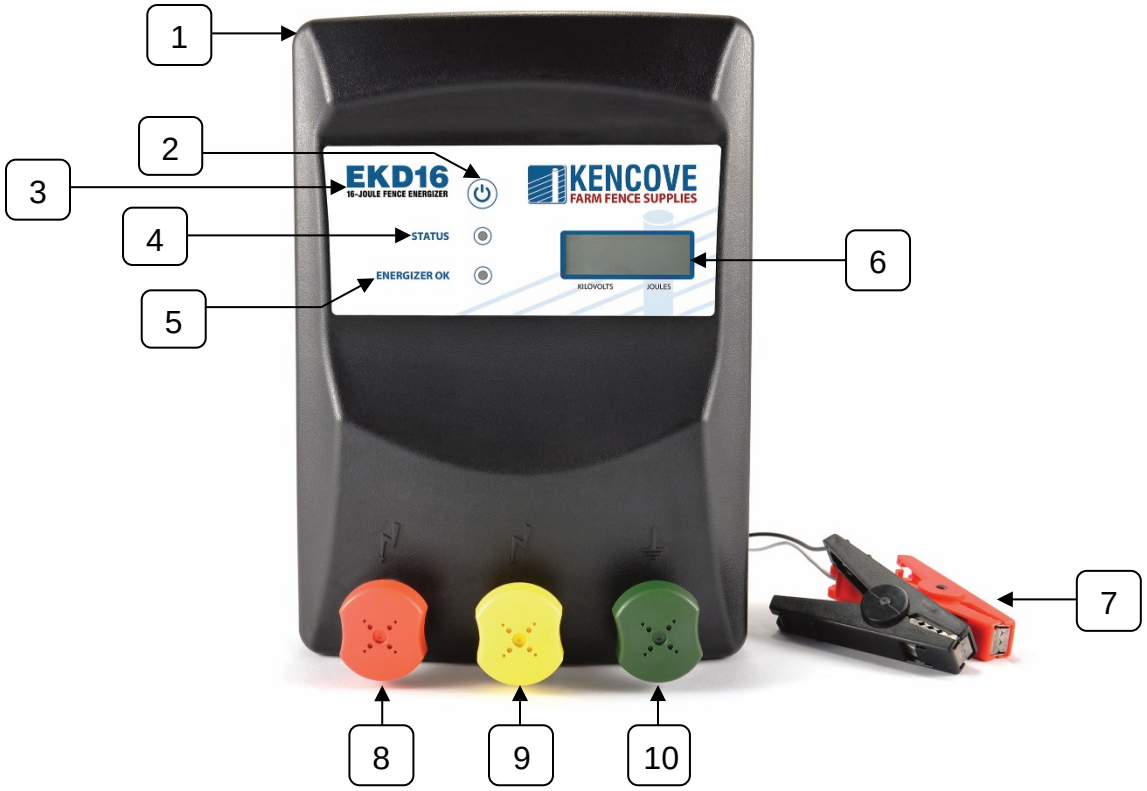
**Current drain rating is for a 12.5V power source. Current drain will vary with voltage.

***Recommended solar panel sizes based on the number of sun hours/day a region receives. To find the minimum number of sun hours/day your region receives contact your local meteorological authorities. As the sun hours received in winter are far less than that of summer, it is possible to employ a smaller solar panel if the energizer is only to be used in summer.

****The recommended battery size will allow the energizer to operate for up to 4 days on the battery alone.

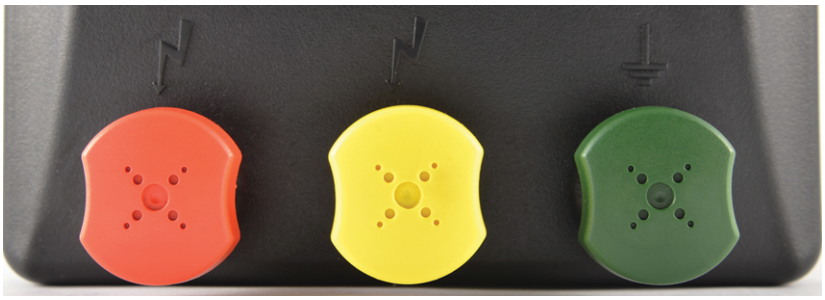
Due to our policy of continual improvement, specifications are subject to change without notice.

3 Parts of the Energizer



1. Rubber O-Ring Seal – between front and back case pieces
2. ON/OFF Switch
3. Model Number Panel
4. Status – indicates fence overload or internal energizer error (red LED)
5. Energizer On and OK Indicator (green LED)
6. LCD – Liquid Crystal Display
7. 12-Volt Battery Clips (black = negative, red = positive)
8. High Power Fence Connection Terminal
9. Low Power Fence Connection Terminal
10. Ground Return Connection Terminal

3.1 Fence Connectors



Full Voltage Operation (Standard)

1. The *Green Ground Terminal* (Right) should be connected to suitable electric fence ground rods. Kencove recommends 3 feet of ground rod per joule of energizer.
2. The *Red Fence Terminal* (Left) should be connected to the live wires of the fence.

Low Voltage Operation (Standard)

1. The *Green Ground Terminal* (Right) should be connected to suitable electric fence ground rods.
2. The *Yellow Fence Terminal* (Center) should be connected to the live wires of the fence.

Bi-Polar Operation

1. The *Green Ground Terminal* should be connected to one of the live wires on the fence (this will become negative relative to ground).
2. The *Yellow Fence Terminal* (Center) should be connected to suitable electric fence ground rods.
3. The *Red Fence Terminal* should be connected to the other live wire on the fence (this will become positive relative to ground).

3.2 Energizer LED and LCD Display

This feature is included on all units.

Status red LED – This LED has multiple functions. These are listed below.

- Flashes slowly (once per pulse) when the load exceeds an acceptable level indicating that the fence probably has a fault. Operating in the overloaded condition for extended periods of time will NOT harm the energizer. See *Common Energizer Problems* below.
- Flashes twice in quick succession (2 flashes per pulse) to indicate the battery is low. Arrange to change or recharge the battery. See *Common Energizer Problems* below.
- Flashes multiple times when an error code is displayed if an internal error causes the energizer to shut down. See *Common Energizer Problems* below.

Energizer OK green LED – Flashes with each pulse to show the unit is on and operating correctly.

Kilovolts display – Shows the voltage on the output terminals of the energizer. The higher the voltage the more effective the fence will be.

Joules display – This new feature allows you to see how much energy the energizer is storing for each fence pulse. On smaller fences, the voltage will be high but the energy may be low. On larger fences, as the voltage starts to drop, the energizer will ramp up how much energy it is storing between high voltage pulses to try and maintain a good fence voltage.

Power Supply Voltage display – When the energizer is turned off, it will display the power supply voltage. This is useful for quickly checking what the battery voltage is.

3.3 Power Button

The power button turns the energizer on or off and silences the beeper.

- If the energizer is off, push the power button to turn it on.
- If the beeper is giving an audible warning, push the power button to silence the beeper for 10 minutes.
- If the energizer is on, push the power button to turn it off.

4 Installation

4.1 Mounting the energizer

If possible, keep the energizer in a cool and dry environment (either indoors or at least well covered) to maximize reliability. There are a number of mounting options. To deter any water ingress, keep the energizer upright when located outdoors.

- Wall Mount: the energizer may be mounted from two 12 gauge screws, OR
- Lay or stand the energizer on a shelf, OR
- Thread wire or string through the keyholes to hang the energizer, OR
- Hang the energizer from a single nail or hook.

4.2 Connecting to the Fence (Standard)

The electric fence requires a dedicated ground/earth system. Drive at least three ground rods (minimum length 3') into the ground. Attach a wire from the Green Ground (Earth) Terminal on the front of the energizer to the ground rods in the ground.

For full power connect a wire from the Red Fence Terminal on the front of the energizer to the live wire of the fence. For half power connect a wire from the Yellow Fence Terminal on the front of the energizer to the live wire of the fence.

4.3 Connecting to the Fence (Bi-Polar)

The electric fence requires a dedicated ground/earth system. Drive at least three ground rods (minimum length 3') into the ground. Attach a wire from the Yellow (Half Power) Terminal on the front of the energizer to the ground rods in the ground.

Connect the Red Fence Terminal to one of the bi-polar live fence wires, and the Green Ground Terminal to the other bi-polar live fence wire.

4.4 Connecting to Power

1. **Battery**: Connect the red clip to the positive battery terminal and the black clip to the negative battery terminal. For battery choice see the specification table.

   Mains: Attach the energizer to the supplied power pack. The mains power pack MUST be kept indoors!

   Solar: It is recommended that a solar charge controller is used in conjunction with a solar panel and a rechargeable battery. Please refer to instructions provided with the solar regulator for information regarding its setup. Once the solar charge controller, solar panel, and rechargeable battery have been configured, connect the energizer to the battery as described above.
2. Turn the energizer ON by pushing the power button once

4.5 Connecting to Wi-Fi

The Kencove EKD16 Energizer is able to connect to the internet and be remotely controlled and monitored – all from a smart phone. Using the Wi-Fi Energizer Controller app, you can:

- Remotely turn the energizer on or off
- See the fence voltage and joules
- See the battery or power supply voltage and be notified of a low battery condition
- Set a custom voltage threshold and receive a notification if the fence voltage falls below that level
- Monitor any number of compatible energizers in any number of locations
- Allow other people to monitor your energizer

The only requirement is that the energizer is within range of a WiFi network with internet access. This can be a home or business WiFi network, or a cellular hotspot providing WiFi access to a cellular network.

Simply download the “Wi-Fi Energizer Controller” Android or iPhone app from the Google Play Store or App Store. You can search the app store for “Wi-Fi Energizer Controller” or scan the QR codes below.

After you have successfully downloaded the app, refer to this online setup guide for instructions on setting up your energizer. You can follow the link below or scan the QR code.

kencove.com/wifienergizer/setup

5 Operation

5.1 Electric Fences

Electric fence energizers work by discharging a short, high voltage pulse onto the fence wires. Although the voltage is very high (up to 10,000 volts) the pulse is too short to cause electrocution. The result is a short, sharp, safe but effective shock that an animal will remember, and so the animal will avoid contact with the energized fence in future.

The high voltage is discharged from the red positive fence terminal of the energizer and this is connected to the live wires, or fence tape, of the fence to make them “live” or “hot” wires. Live wires must be insulated (with insulators) from ground or any other conductive material touching the ground (such as fence posts).

The green connection on the energizer is the ground terminal. Electric fences need grounding to complete the circuit. When an animal touches the live wire of the fence, a current will flow from the live wire, through the animal, back through the ground return wires to the ground rod and back up to the energizer ground terminal.

An electric fence ground is some metal in contact with the soil. The more metal in the ground and the higher the moisture content in the soil, the better the ground connection. The larger the energizer and the longer the fence, the more ground is required.

You should not feel a shock from the ground connection or ground rod. If you do, the ground is probably not sufficient. To overcome this problem, extra ground rods need to be added to the system. The better the quality of the grounding system, the more effective and efficient the electric fence system will be.

In very dry conditions such as sandy soil, it is recommended that a dedicated ground wire be added to the fence line, which, in turn, should be connected to the energizer ground and the ground rods.

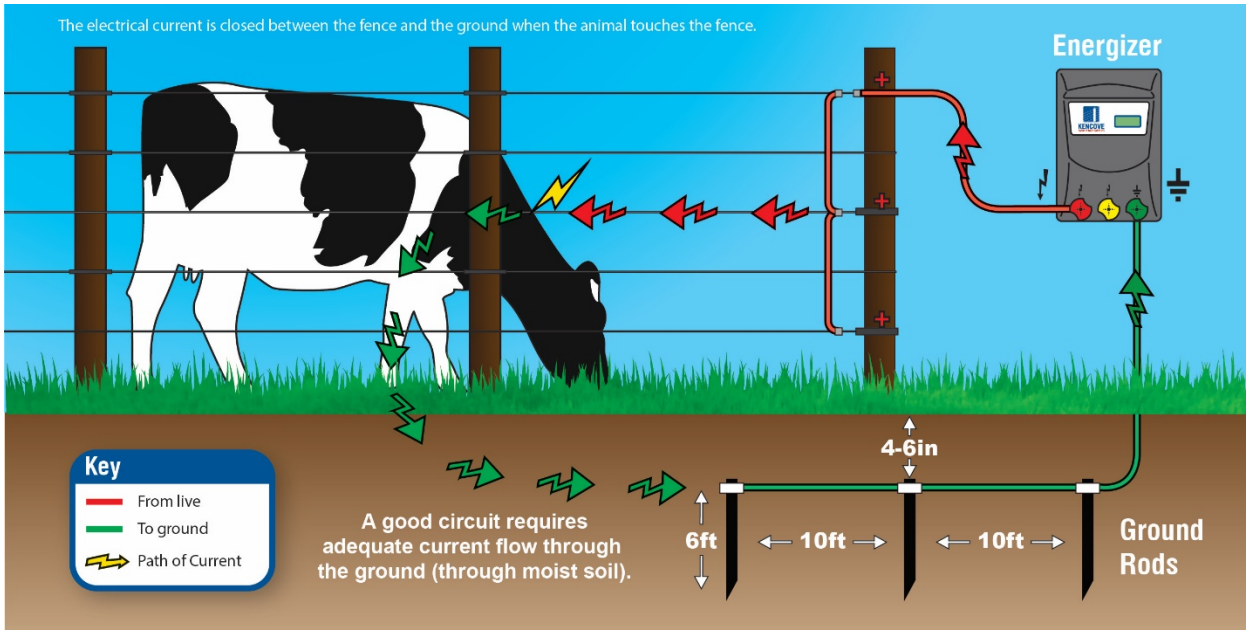
The fence and the ground voltages can be measured using an electric fence digital voltmeter or digital electric fence directional fault finder.

5.2 Benefits of Electric Fences

- An electric fence offers a psychological barrier as well as a physical barrier.
- The risk of injury to livestock is lower than that of barbed wire fences.
- Electric fences cost less to install and maintain than conventional fencing. Users enjoy low maintenance costs because their stock stays off the fence.
- Their use is versatile.
    - They can be permanent or portable systems,
    - They can be arranged in a variety of designs to suit different needs and environments
    - They are quick and easy to erect
- They improve pasture and grazing control.

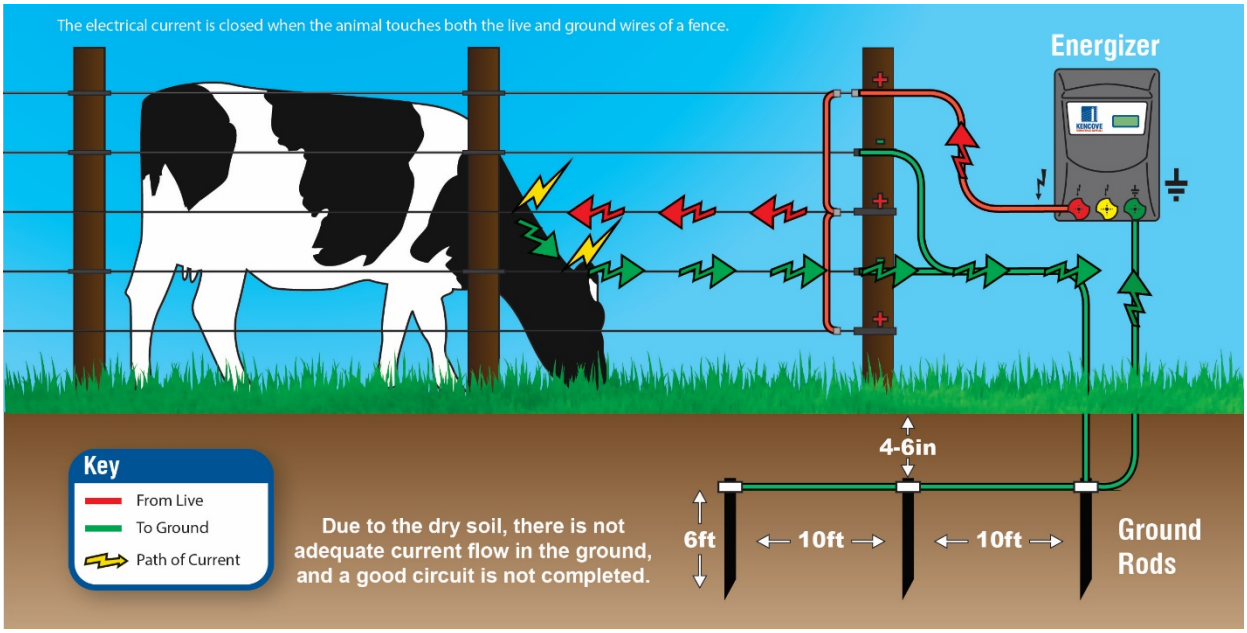
5.3 Ground Return System

The Ground Return configuration is the most common method for electric fences, particularly smaller fence applications like “strip grazing”, due to its lower cost and ease of setting up. The fence live wire(s) are electrified and rely on the dirt to complete the circuit back to the energizer ground terminal when an animal touches the fence.



5.4 Fence Return System

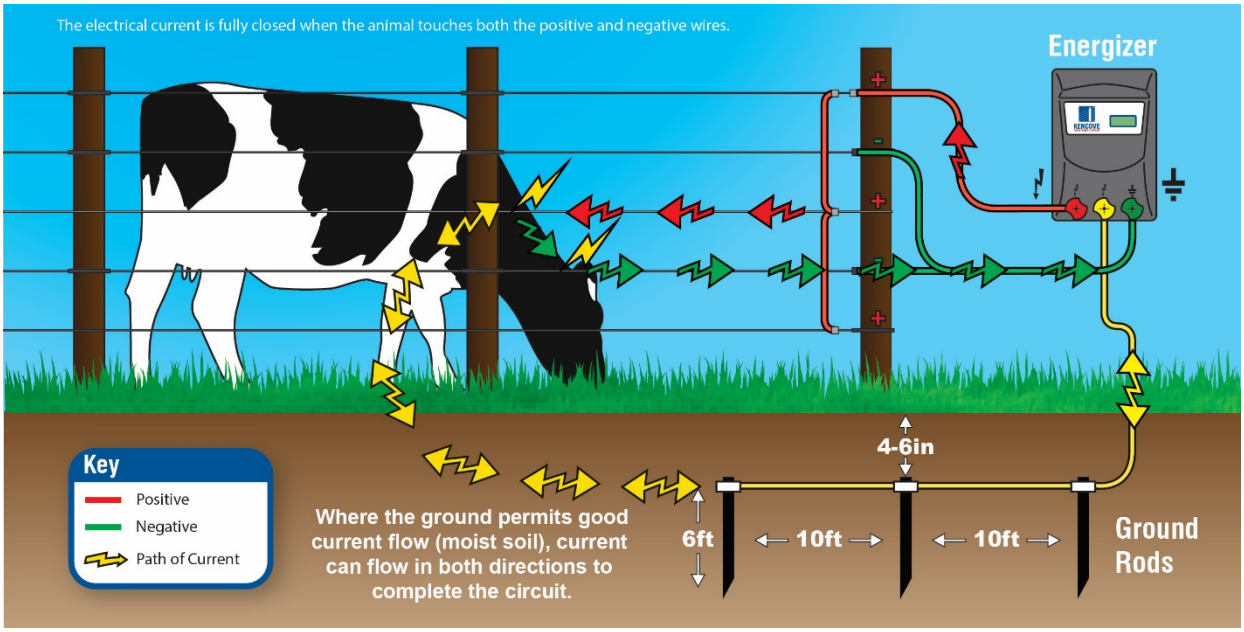
The Fence Return configuration for electric fences is used where the soil could be too dry to complete the circuit, or the animals are likely to try to force their way through between the fence wires. In this system, the ground wire(s) are also run along the fence with the live wire(s) to provide a low resistance path for the current to return to the energizer. In this system, if the soil is moist enough, it will also function as a return path for the current when the animal touches the live wire, but if the soil is not moist or has poor conductance, this system will keep your fence effective provided the animal touches both a live and the ground wire simultaneously.



5.5 Bi-Polar System

A Bi-Polar fence is a combination of both the ground return system and the fence return system. The benefits are that

1) If either the positive OR negative fence wires are loaded with a fault and have a low voltage, the other wire will not be affected by the fault and still have good voltage on it.
2) A bi-polar fence will interfere with wireless signals (like digital TV) less because the electrical noise generated by the fence will cancel itself out.
3) It is less affected by parasitic elements of the fence, which means it can power longer fences more effectively.



5.6 Grounding Your Energizer

The best way to ground your energizer is by using galvanized ground rods. If the ground rod is too rusty, it may not work properly. The best place to locate the ground rod is somewhere close to where the fence starts and that is kept damp like a garden bed, a water course, or the overflow from a rain water tank. Do not connect the ground of your energizer to a metal shed or the same ground your home electricity system uses. It is also advised not to use any metal water pipes as this could lead to someone receiving a shock from a tap.

5.7 Semi-Permanent and Permanent Fences

Steel posts or step-in posts are the quickest and easiest way to set up a fence, but wood and fibreglass posts can also be used. Make sure that the wires are tight enough that there is no sagging. High-tensile fence wire is recommended as polytape or rope will degrade and break over time. Safety signs are also recommended.

5.8 The Importance of Insulators

If the live wire is not well insulated, the fence load will be much higher. This means for any given length of fence, the voltage will be lower. Pieces of wood and garden hose are not good insulators. Use the ones made for the job and you will get a better result.

In a fence return system, the ground wire(s) do not need to be insulated. In fact, if you are using steel intermediates, the more times the ground wire touches a metal post the better it is grounded.

UV-stable, plastic insulators will last much longer than non-UV-stable plastics. Plastic insulators are not as susceptible to fracture as ceramic insulators, however, ceramic insulators are better in grass fire prone areas as they do not melt.

5.9 Maintenance

Maintaining permanent fences is important, especially during the warmer months when plant growth is at its highest and after any large weather events.

1. Check the fence voltage using an electric fence voltmeter. A Kencove Fault Finder will also detect faults and direct you towards them.
2. Keep vegetation away from the fence. If it touches the fence, it will reduce its performance. Along permanent fence lines you may wish to use a weed killer to deter any growth.
3. Check that nothing has fallen against the fence and that the wires are not broken or unclipped from insulators.

The energizer battery must be checked. If the energizer is flashing a low battery warning, it is time to recharge or replace the battery.

6 Common Energizer Problems

The most common problems with electric fence energizers are:

- Moisture and Insects
- Lightning
- Low or dead batteries

The Kencove EKD16 Energizer will self-diagnose and report the status (See Errors and Error Codes) on the LED and LCD displays.

6.1 Moisture and Insects

Moisture and insects should not be a significant problem for this energizer comes in a weatherproof case. Still, where possible, keep the energizer protected from the weather.

6.2 Lightning

The Kencove EKD16 Energizer is covered by a 2-year warranty that includes lightning damage. Surge protection components inside the energizer are fitted to reduce the risk of damage by lightning. However, it is recommended that lightning protection is installed to prevent lightning damage.

6.3 Low Batteries

This energizer requires a battery that is in good condition to run correctly. The energizer will protect the battery by slowing down and eventually stopping altogether as the battery charge is depleted. For best results, check on the energizer at regular intervals. If you are not getting the expected life from the battery, consider having it checked by an auto electrician.

The Kencove EKD16 energizer indicates a depleted battery by flashing the red Error LED twice (see “Parts of the Energizer” above).

If the battery fails it should be recycled, not sent to land fill. If you are unsure, return it to the manufacturer.

6.4 Errors and Error Codes

This energizer may stop and display error codes. The error codes are displayed in two places. The first of these is on the Status (red) LED, where it will flash rapidly a number of times. The number of these flashes corresponds to the Error Code. The second place is on the LCD, where it will display a message.

Error Code #	Red LED Flashes	LCD Display	Meaning
2	2	Battery symbol & “Lo b”	Low Battery: the energizer will recover and restart when the battery is recharged.
3	3	“Er 03”	Charging failure.
4	4	“Er 04”	Fast pulsing.
5	5	“Er 05”	Discharge failure.
6	6	“Er 06”	High battery: the energizer will restart when the battery voltage is supplied.
7	7	“Er 07”	EEPROM write failure.
8	8	“Er 08”	Self-calibration failure – insufficient output.
9	9	“Er 09”	Self-calibration failure – insufficient capacitor charge.
10	10	“Er 10”	Capacitor failure, charged too quickly.
11	11	“Er 11”	Calibration error, voltage reading too low for fence conditions.
21	n/a	“Er 21”	Opto-coupler failure.

For errors 3 and 5, the energizer will try and recover these three errors which are classified as severe errors. This automatic recover process will occur at 7 minute intervals. Error 4 is classified as a fatal error. The energizer will not attempt to automatically restart due to safety concerns. Errors 2 and 6 indicate the battery voltage is either too low or too high. The energizer will restart as soon as the voltage returns to the correct range. All other errors indicate an internal malfunction.

If the error continues to reoccur, please return the unit to a qualified service center for repair. There are no user serviceable parts inside the energizer. All internal fuses will automatically reset themselves. If the energizer case is opened, the warranty will be voided.

7 Common Fence Problems

The most common problem with electric fences is low voltage on the live wires caused by

- Insufficient ground
- Shorts on the fence

For tips on fence construction, please call a Kencove Product Specialist at 1-800-KENCOVE or visit www.kencove.com.

7.1 Testing the Ground

The ground is essential to all electric fence systems. Larger energizers require more earth rods. Additionally, all energizers require a low resistance wired connection from the energizer ground terminal to the ground rod.

Short the end of your fence to ground by hammering a metal rod into the soil and connecting this to the live fence wire. Using an electric fence voltmeter or fault finder, check what the voltage is at the earth terminal of the energizer. In general, you should see a reading less than 300 volts (0.3kV).

7.2 Testing the Fence, Finding Shorts

To test the performance of the fence or find faults on the fence, an electric fence voltmeter is essential and a fault finder is even better. An effective fence will have more than 2.5kV (2,500 volts).

8 Warranty

8.1 For Assistance

This energizer is covered by a 2-year warranty. If you have any questions or need further assistance, please call Kencove Farm Fence Supplies at 1-800-KENCOVE or email sales@kencove.com. For more information on our complete range of electric fencing products, visit www.kencove.com.

8.2 Service or Repairs

Energizers can be damaged by lightning, insects, or even a power surge. If you need a repair or an estimated cost for repair, please read and follow the instructions below:

- Ship the energizer to Kencove Farm Fence, Attn: Repairs, 344 Kendall Rd, Blairsville, PA 15717. **Please include name, address, and telephone number, taped ONTO the energizer.**
- If the cost of the repair is less than half the cost of a new unit, the technician will repair it and call you with the total charges. If the cost of the repair is *more* than half the cost of a new unit, you will be contacted for approval before the repair is completed.
- There is a $30 diagnostic fee for checking the unit. If you decide to have the unit repaired, the $30 fee will be applied to the final repair bill.
- If you decide *not* to have the unit repaired, you will be charged the $30 diagnostic fee.
- If you decide *not* to have the unit repaired, but purchase a new unit from Kencove, you will *not* be charged the $30 diagnostic fee.
- All shipping and applicable taxes will be added to the repair cost.
- Labor cost is $60 for the first hour and $45 per hour thereafter.
- Any energizer repaired and not paid for within 6 months will become the property of Kencove Farm Fence, Inc.
- Energizers can be dropped off at our Blairsville, PA location. A technician is typically available Monday through Thursday during normal business hours. We recommend calling beforehand to ensure a technician is available. Energizer repair questions or concerns can be directed to 1-800-KENCOVE.

Manufactured for Kencove Farm Fence Supplies by Pakton Technologies

User Manual Version 1.1