

# JVA ELECTRIC FENCE ENERGIZER MB 1.5 - MB 3

#3500 & #3501 - INSTRUCTION MANUAL



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***JVA ELECTRIC FENCE ENERGIZER***  
**MB1.5 • MB3.0 • MB4.5**  
***Installation and User Manual***



October 2019 Edition



***JVA AGRIRANGE ENERGIZERS***

## INTRODUCTION

Congratulations, and welcome to the shocking world of JVA. We thank you for placing your faith in our product range. In doing so you have joined the world-wide body of satisfied JVA users who are benefiting from our products.

The JVA range of energizers is the result of a joint venture between the Australian company, Pakton Technologies and the South African company Ndlovu Fencing (Pty) Ltd. With over 40 years' experience in some of the harshest agricultural and security environments around the globe, JVA Technologies has produced a comprehensive range of agricultural, wildlife and security energizers that meet the needs of these diverse markets. The range extends from small strip grazing energizers to very high-powered units which incorporate Wi-Fi, Auto-Sync™, capable of partitioning long game fences into fifty individual sectors. For full particulars of our energizer ranges and fencing accessories, visit our websites:

[www.jva-fence.com](http://www.jva-fence.com) or [www.jvasecurity.com](http://www.jvasecurity.com)

- ★ MAINS OR BATTERY POWERED  
(See warning on page 4)
- ★ ROBUST
- ★ AUTO-SYNC™
- ★ EASY TO OPERATE
- ★ IEC/SANS 60335.2.76 APPROVED



### **TWO-YEAR WARRANTY**

All JVA products carry a 2-year warranty against defective components and faulty workmanship. The warranty excludes damage caused by acts of Nature such as lightning, fire and flooding, power supply surges, rough handling, malicious action or incorrect wiring. Consumable components (i.e. batteries) are also not covered under the warranty agreement.

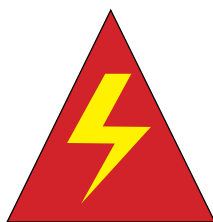


## Table of Contents

1.	<b>IMPORTANT NOTES – PLEASE READ</b> .....	1
1.1	Electric Fences.....	1
1.2	Energizers .....	1
1.3	Power Supply Options .....	1
1.4	Rechargeable Batteries .....	2
2.	<b>JVA MODELS AND FEATURES</b> .....	2
2.1	Features .....	2
2.2	Benefits of Features.....	2
2.3	Specifications .....	3
3.	<b>PARTS OF THE ENERGIZER</b> .....	4
3.1	Fence Connectors .....	5
3.2	Energizer LED Display .....	5
3.3	Power Button .....	5
4.	<b>INSTALLATION</b> .....	6
4.1	Location of the Energizer.....	6
4.2	Mounting the Energizer .....	6
4.3	Connecting the Energizer to the Fence .....	6
4.4	Powering the Energizer .....	6
5.	<b>OPERATION</b> .....	7
5.1	Electric Fences.....	7
5.2	Benefits of Electric Fences .....	7
5.3	All-Live Earth Return System.....	8
5.4	Live-/Earth-Wire Fence Return System .....	8
5.5	Earthing Your Energizer.....	9
5.6	Semi-Permanent and Permanent Fences .....	9
5.7	The Importance of Insulators.....	9
5.8	Maintenance .....	9
6.	<b>COMMON ENERGIZER PROBLEMS</b> .....	10
6.1	Flat Batteries.....	10
6.2	Lightning .....	10
6.3	Moisture and Ants.....	10
6.4	Blown Fuses .....	10
6.5	Errors and Error Codes .....	11

## Table of Contents (continued)

7.	<b>COMMON FENCE PROBLEMS</b> .....	11
7.1	Testing the Earthing System .....	11
7.2	Testing the Fence, Finding Shorts.....	11
8.	<b>INSTRUCTIONS FOR INSTALLATION AND CONNECTION OF ELECTRIC FENCES</b> ...	12
8.1	Definitions.....	12
8.2	General Requirements for Electric Fences .....	12
9.	<b>WARRANTY</b> .....	14
9.1	For Assistance .....	14
9.2	Service or Repairs .....	14
9.3	Contacts .....	14



**WARNING**  
**Risk of shock!**

- ▶ High voltages exist inside the electric fence energizer and on the fence terminals.
- ▶ High voltages are also retained for a while after switching off. It is advisable to wait for at least 10 minutes before opening the energizer case.
- ▶ Before working on the high voltage wiring of an electric fence, it is recommended that the energizer be turned off and an intentional short circuit be placed from the fence live wires to earth. This is a precaution against the energizer being turned on while work on the fence is in progress



# 1. IMPORTANT NOTES – PLEASE READ

## 1.1 Electric Fences

1. Electric fences must be installed only in accordance with the relevant Standards and Workplace Health and Safety regulations.
2. Electric fences are designed to deliver a short, safe shock. Do not let children play near them.
3. Electric fences must have warning signs. These must comply with IEC standards and should be prominently displayed on electric fences at distances specified by the country in which they are installed.
4. In order to operate effectively, electric fences must be well earthed. This involves the use of galvanized, \*steel stakes/spikes/rods/electrodes (various terms are in use) driven into the earth at a depth of at least 1.2m. A minimum of 3 earth stakes are recommended at the energizer. Additional earth stakes may be required on higher powered energizers and along the fence in dry soil conditions. The deeper the earth stakes, the better.
  - \* Hot-dipped galvanized steel earth stakes are recommended because the effectiveness of the earthing is reduced by corrosion at the joints. This is caused by the electrolytic effect resulting from a current flowing through unlike metals making contact in a moist environment.

## 1.2 Energizers

1. The energizer places a very short, safe, high voltage pulse on the fence live wires approximately once every second. 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. The maximum length of fence able to be energized depends on many factors, for example the earth resistance, competition from vegetation, number, spacing and configuration of wires – series or parallel, type/quality of insulators, resistance of wire type used, etc. Another factor to consider is acceptable fence voltage: for some livestock situations this is 3kV, others require more or less. Therefore the rated mileage of fence that the energizer will power effectively is a guide only.
3. **WARNING!** 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

- 12V Battery (not supplied)
- 24V Battery (not supplied)
- 12V Battery with Solar panel (not supplied)
- 240Vac (via Power Pack) (13.8V DC Power Pack supplied)

The JVA MB1.5, MB3 and MB4.5 energizers have limited power supply options. For more information please refer to section **2.2**.

**N.B.**

- ▶ **Do not connect directly to mains – use the power supply provided.**
- ▶ When using a battery option, always ensure adequate ventilation is given to the battery. Lead-acid batteries may emit explosive gases while charging!
- ▶ Always mount the power supply either indoors or undercover.

**1.4 Rechargeable Batteries**

If powered from a rechargeable battery, JVA MB energizers are compatible with lead-acid batteries. SLA battery life is shortened considerably if it is:

- a) left in a discharged state or
- b) exposed to very high temperatures.

**WARNING!**

SLA batteries can produce hydrogen. The energizer case is designed to release hydrogen gas to prevent an explosion. Do not take steps to further seal the case. Return the unit for repair if the O-ring seal has become damaged.

**2. JVA MODELS AND FEATURES**

**2.1 Features**

Table 1

Models	Features
MB1.5, MB3.0, MB4.5	<ul style="list-style-type: none"> <li>• Battery protection</li> <li>• Solar capability</li> <li>• Digital control</li> <li>• Smooth wave shape</li> <li>• Fence OK indicator</li> <li>• Ant and moisture protection</li> <li>• Lightning protection</li> <li>• Power on demand</li> </ul>

**2.2 Benefits of Features**

- ▶ The **battery life maximization** works by slowing the frequency of high voltage pulses just before the battery dies to keep the energizer operating for as long as possible without damaging the battery.
- ▶ The **over discharge battery** protection will stop the energizer when the battery is flat and flash the status LED twice each second. This stops too much charge being extracted from the battery and prevents permanent damage. The energizer will restart automatically once the battery voltage returns to a normal level.
- ▶ The **reverse battery protection** protects the energizer from damage should the external battery be connected the wrong way round in error.

- ▶ The MB series of energizers has the **electronics enclosed inside a durable UV stable case** to protect against ants, moisture and dust and so maximize reliability.
- ▶ The **overload indication** warns if the fence is heavily loaded by flashing a warning LED and alerting with a short audible beep.
- ▶ The MB series 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.
- ▶ Power on demand automatically increases the power to heavy fence loads.
- ▶ To use the MB Range with a solar panel, an external 12 volt sealed lead-acid battery, solar panel and solar regulator are required.

## 2.3 Specifications

Table 2

Model	Specifications									
	*a Energizer output voltage	Stored Energy	Power	*d 12V drain	*c Solar Panel Size for Minimum Expected Sun Hours Per Day				*c Solar Battery	Peak Output
					3hrs	4hrs	5hrs	>6hrs		
MB1.5	8.2kV	2.1J	*b 12Vdc	165mA	30W	20W	20W	15W	26Ah	1.5J
MB3	8.5kV	4.2J	*b 12Vdc	300mA	40W	30W	25W	20W	40Ah	3.0J
MB4.5	8.8kV	6.3J	*b 12Vdc	490mA	85W	60W	40W	40W	65Ah	4.5J

### KEY

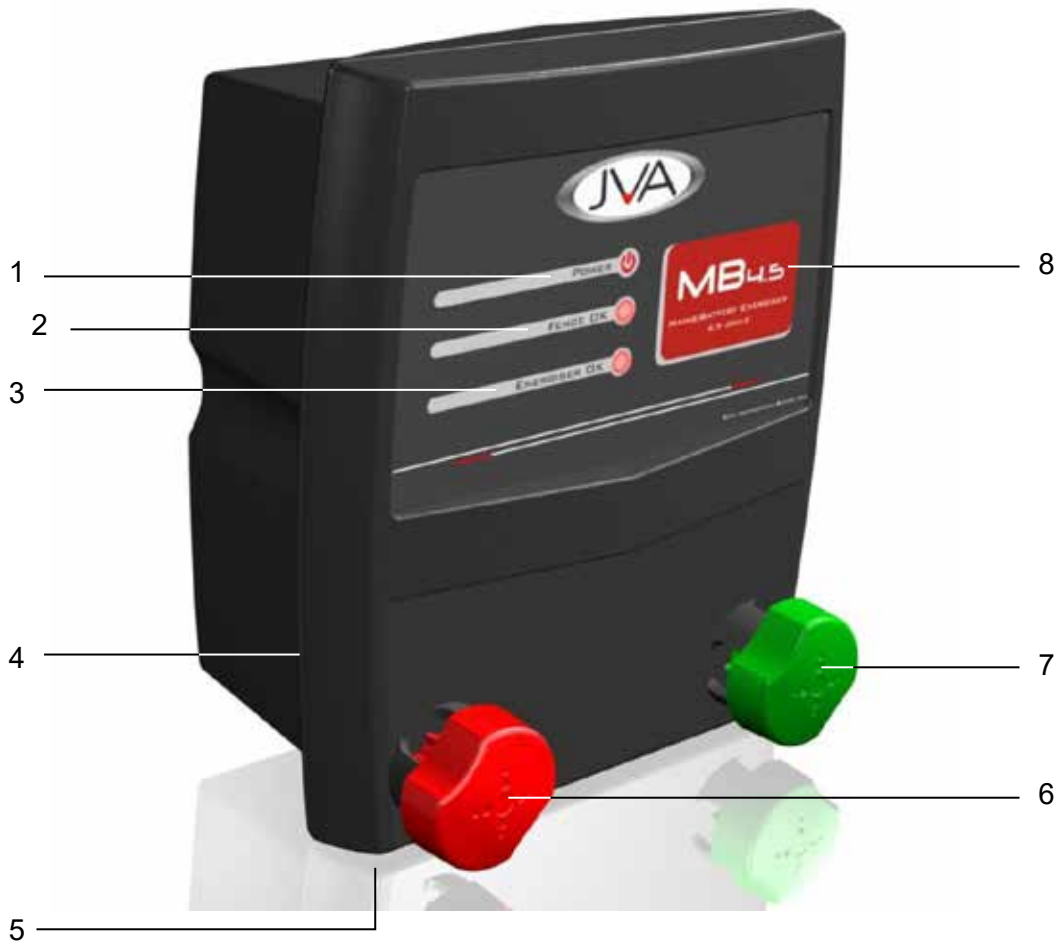
- \*a No load, actual voltage on a short fence can be as high as 10kV
- \*b The energizer can also be powered from 240Vac by using the external power pack supplied with the energizer.
- \*c Minimum recommended sizes for 5 consecutive days of overcast weather.
- \*d Current drain rating is for a 12V power source. Current drain will vary with voltage.

In line with our policy of continual improvement, specifications are subject to change without notice.



### 3. PARTS OF THE ENERGIZER

#### MB1.5, MB3.0, MB4.5



1. On/Off switch (not on MB1.5 and MB3)
2. Fence OK indicator (red LED)
3. Energizer On and OK indicator (green LED)
4. Rubber O-ring seal between front and back case pieces
5. Power cable extends from base of case
6. Fence connection terminal
7. Earth connection terminal
8. Model number

**WARNING:** Do not connect the energizer directly to mains. Use the 12VDC power supply provided.

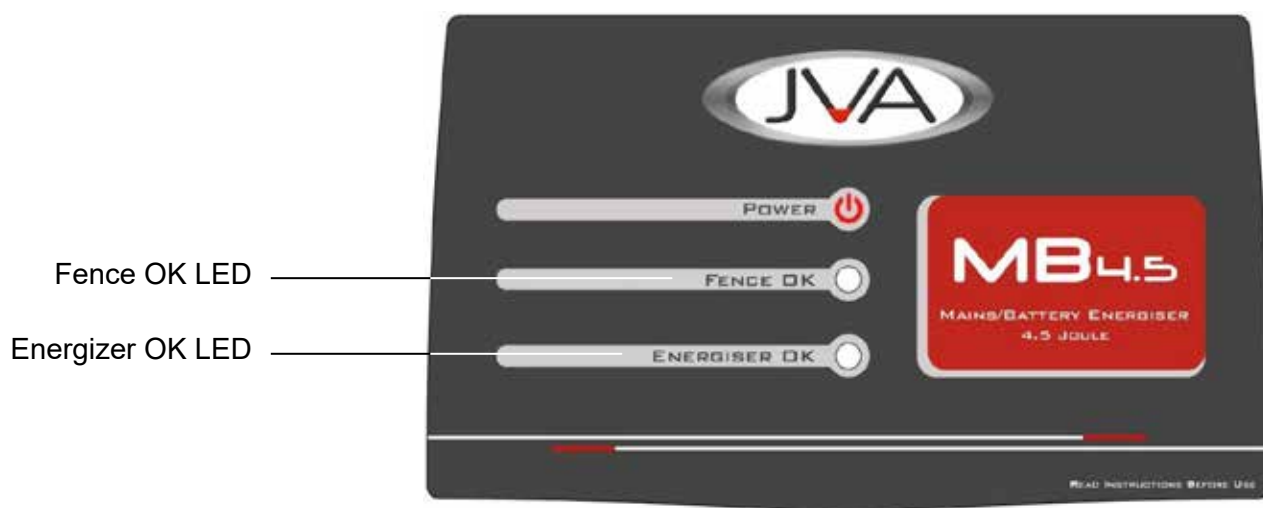
### 3.1 Fence Connectors



- Fence terminal** – should be connected to the live wires of the fence.
- Earth terminal** – should be connected to a suitable electric fence earth stake.

### 3.2 Energizer LED Display

This feature is included in all units.

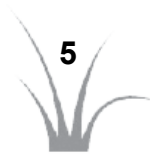


- Fence OK** red LED – Flashes if fence voltage is good. If it goes off there is a problem on the fence.
- Energizer OK** green LED – Flashes with each pulse to show the unit is on and operating correctly.

### 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 Location of the Energizer

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

### 4.1 Mounting the Energizer

There are a number of mounting options.

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

### 4.2 Connecting the Energizer to the Fence

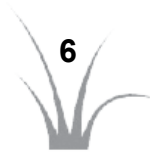
- The electric fence requires a dedicated ground/earth system. Drive at least three galvanized earth stakes into the ground to a depth of at least 1.2m. Attach a wire from the green Earth Terminal connector on the front of the energizer to the earth stake.
- Connect a wire from the red Fence Terminal connector the front of the energizer to the live wire of the fence.

### 4.3 Powering the Energizer

**Mains Power Source** (MB1.5, MB3.0 and MB4.5): Plug the power adapter (MB1.5, MB3.0 and MB4.5) supplied with the energizer, into an AC power source and the energizer.

Turn the energizer ON by pressing the On/Off switch.

**Battery Power Source** (1.5, MB3): Attach the battery, red to positive and black to negative battery terminals. For battery choice see specification Table 2 on page 3. Turn the energizer ON by pressing the On/Off switch.



## 5. OPERATION

### 5.1 Electric Fences

Electric fence energizers work by discharging a short, safe, high voltage pulse onto the fence wires. The animal will not be harmed by a pulse, but it will remember to 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 fence wire or electric fence tape to make them live or 'hot' wires. Live wires must be insulated from earth or any conductive material touching the ground, e.g. fence posts).

The green Terminal connector on the energizer is the earth (or ground) terminal. Electric fences need earthing 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 or the earth return wires to the earth stake and back up to the energizer earth terminal thereby completing the circuit. (See Fig 1 below)

On touching the earth terminal on the energizer or the earth stakes in the ground, no shock should be felt. If a shock is felt on either of the above, it is an indication that the earthing is insufficient. To overcome this problem, extra earth stakes need to be added to the system. The better the quality of the earthing system, the more effective and efficient the electric fence system will be.

The more earth stakes in the ground and the higher the moisture content in the soil, the better the system will function. The higher powered (higher joule rating) the energizer and the longer the fence, the more earthing is required.

In very dry conditions and sandy soils, it is recommended that a dedicated earth wire be added to the fence line. This in turn should be connected to the energizer earth and the ground/earth stakes. (See Fig 2)

For best results locate the energizer as centrally as possible in a fencing layout.

The fence and the earth voltages can be measured using an electric fence digital voltmeter, or a digital electric fence directional fault finder, such as the JVA Electric Fence Digital Directional Fault Finder.

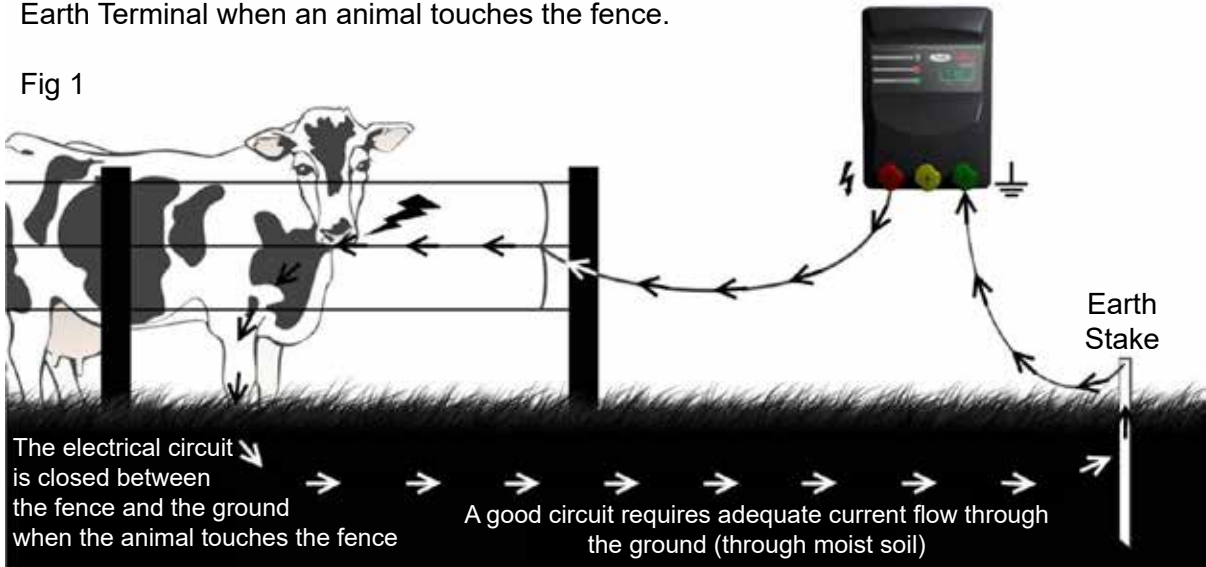
### 5.2 Benefits of Electric Fences

- ▶ An electric fence offers a psychological barrier as well as a physical barrier.
- ▶ The risk of injury to livestock is lower than with 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 variety of designs to suit needs
  - they are quick and easy to erect
- ▶ They improve pasture and grazing control
- ▶ They can improve existing fence life as a result of less physical pressure on the fence
- ▶ They are easy to set up compared with traditional fences.

### 5.3 All-Live Wire, Earth Return System

The Earth Return (also called Ground Return) configuration is the most common method of configuration for electric fences, particularly smaller fence applications like strip grazing. The fence live wire(s) are electrified and rely on the soil to complete the circuit back to the energizer Earth Terminal when an animal touches the fence.

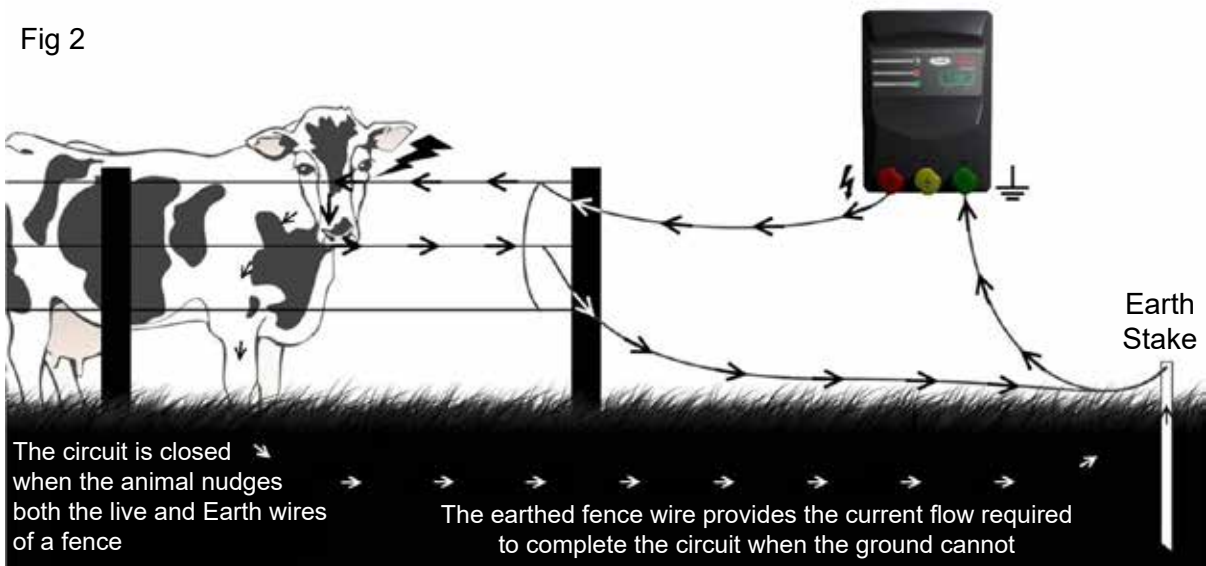
Fig 1



### 5.4 Live-/Earth-Wire Fence Return System

The live-/earth-wire fence return configuration for electric fences is used where the soil is too dry to complete the circuit adequately, or the animals are likely to try to force their way through between the fence wires. In this system earth 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 earth wire simultaneously.

Fig 2



## 5.5 Earthing Your Energizer

The best way to earth an energizer is to use a minimum of 1.2 metre galvanized earth stakes. If the earth stake is too rusty it will not work properly. The best place to locate the earth stake is somewhere close to where the fence commences and if possible where the ground is damp such as a garden bed, a water course, or the overflow from a rain water tank. (South African regulations require a minimum of 3 earth stakes to be located close to the energizer.) Do not connect the earth of the energizer to a metal shed, metal pipes or utility earthing system as this could lead to shock from tap, showers etc.

## 5.6 Semi-Permanent and Permanent Fences

The quickest and easiest way to set up a permanent fence is to use steel posts, but timber and fiberglass posts can also be used. Make sure that the wires are tight enough to eliminate sagging. 2.5mm galvanized fence wire is recommended as poly tape or rope will degrade and break over time. Warning signs need to be fitted as per the requirements outlined in the, General Requirements for Electric Fences section of this manual.

## 5.7 The Importance of Insulators

If the live wire is not well insulated the fence load will be much higher. This means that, for any given length of fence, the voltage will be lower. Pieces of wood and garden hose are not good insulators! For reliable results standard insulators designed for this purpose are recommended.

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

UV stable poly 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.

## 5.8 Maintenance

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

1. Check the fence voltage using an electric fence voltmeter. The JVA 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. The judicious use of weed killer may be used if so wished to deter any growth.
3. Check that nothing has fallen against the fence and that the wires are not broken or have been unclipped from insulators.
4. Check the condition of the earthing system for corrosion and loose joints.
5. Check that lightning diverters are all still operational.
6. Check and tighten any loose line clamps along the fence.
7. Check the energizer battery. 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:

- Flat batteries
- Lightning
- Moisture and ants
- Blown fuses

The intelligent JVA Series of energizers will self-diagnose and report their status. (See *Errors and Error Codes*) on the LED and LCD displays.

### 6.1 Flat Batteries

The JVA series energizers, to run effectively, require a battery that is in good condition. 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 not receiving the expected life from a battery consider having it checked by an electrician.

### 6.2 Lightning

The JVA range of energizers is covered with a two-year warranty that excludes lightning. Surge protection components inside the energizer are fitted to reduce the risk of damage by lightning. However, nature is capable of performing more extremely than can be tested for in the laboratory; to ensure the wellbeing of your JVA investment for the long term, it is recommended that a Lightning Protection Kit is installed to prevent lightning damage and possible costly repairs.

### 6.3 Moisture and Ants

Moisture and ants should not be a significant problem for the JVA range of energizers as they are protected in a weatherproof case. However, where possible, keep the energizer protected from the weather.

### 6.4 Blown Fuses

The fuse used is a self-resetting type. Disconnect the power for a minute and then reapply the power. If the unit still does not power up, return it to a service centre.



## 6.5 Errors and Error Codes

The JVA 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.

Table 3

Error Code #	Red LED Flashes	LCD Display	Meaning
2	2	Battery symbol "Lo b"	Flat Battery: the energizer will recover and re-start when the battery is recharged.
6	6	"Er 06"	High battery: the energizer will re- start when the battery voltage is returned to the correct range

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.

Should the error continue to re-occur, please return the unit to a qualified service centre for repair. There are no user-serviceable parts inside the energizer. All internal fuses will automatically reset themselves.

## 7. COMMON FENCE PROBLEMS

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

- Inadequate earthing/grounding
- Shorts on the fence

For tips on fence construction please refer to an Electric Fencing Manual.

### 7.1 Testing the Earthing/Grounding System

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

Short the end of your fence to earth by hammering a metal stake into the soil and connecting this to the live fence wire. Using an electric fence voltmeter or a JVA Electric Fence Fault Finder, (Do not use a standard multimeter.) check the voltage is at the earth terminal of the energizer. In general it should be 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 JVA Electric Fence Fault Finder is even better. An effective fence will have more than 2 kV (2000 volts).



## 8. INSTRUCTIONS FOR THE INSTALLATION AND CONNECTION OF ELECTRIC FENCES

Instructions for installation and connection of electric fences vary from country to country. Most are based on the International Electrical Commission (IEC) AS60335.2.76 specifications.

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### 8.1 Definitions

<b>Connecting lead</b>	an electric conductor, used to connect the <b>energizer</b> to the <b>electric fence</b> or the <b>earth electrode</b> (stake)
<b>Electric animal fence</b>	an <b>electric fence</b> used to contain animals within or exclude animals from a particular area
<b>Electric fence</b>	a barrier which includes one or more electric conductors, insulated from earth, to which electric pulses are applied by an <b>energizer</b>

### 8.2 General Requirements for Electric Fences

- Electric animal fences shall be installed and operated so that they cause no electrical hazard to persons, animals or their surroundings.
- Electric animal fence constructions which are likely to lead to the entanglement of animals or persons shall be avoided.
- An electric animal fence shall not be supplied from two different energizers or from independent fence circuits of the same energizer. For any two separate electric animal fences, each supplied from a separate energizer independently timed, the distance between the wires of the two electric animal fences shall be at least 2 m. If this gap is to be closed, this shall be effected by means of electrically non-conductive material or an isolated metal barrier.
- Barbed wire or razor wire shall not be electrified by an energizer.
- Any part of an electric animal fence that is installed along a public road or pathway shall be identified at frequent intervals by warning signs securely fastened to the fence posts or firmly clamped to the fence wires.
  - The size of the warning sign shall be at least 100 mm × 200 mm.
  - The background colour of both sides of the warning sign shall be yellow. The inscription on the sign shall be black and shall be either:
    - the symbol of Figure 3, or
    - the substance of TAKE CARE – ELECTRIC ANIMAL FENCE
  - The inscription shall be indelible, inscribed on both sides of the warning sign and have a height of at least 25 mm.

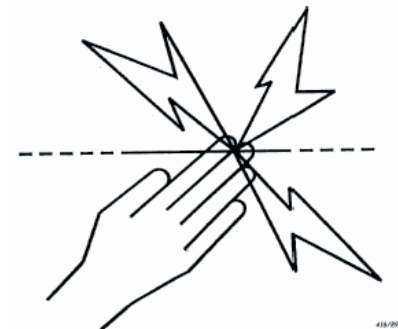


Figure 3 – Warning plate symbol

6. The **energizer earth electrode** shall penetrate the ground to a depth of at least 1.2 m.
7. **Connecting leads** that are run inside buildings shall be effectively insulated from the earthed structural parts of the building. This may be achieved by using insulated high voltage cable.
8. **Connecting leads** that are run underground shall be run in a conduit of insulating material or else insulated high voltage cable shall be used. Care must be taken to avoid damage to the **connecting leads** due to the effects of animal hooves or tractor wheels sinking into the ground.
9. **Connecting leads** shall not be installed in the same conduit as the mains supply wiring, communicating cables or data cables.
10. **Connecting leads** and **electric animal fence wires** shall not cross above overhead power or communication lines.
11. Crossings with overhead power lines shall be avoided wherever possible. If such a crossing cannot be avoided, it shall be made underneath the power line and as nearly as possible at right angles to it.
12. If **connecting leads** and **electric animal fence wires** are installed near an overhead power line, the clearances shall be not less than those shown in table 5 below.

Table 4

Power line voltage V	Clearance m
<=1 000	3
>1 000 <=33 000	4
>33 000	8

*Minimum Clearances from Power Lines*

13. If connecting leads and electric animal fence wires are installed near an overhead power line, their height above the ground shall not exceed 3m. This height applies either side of the orthogonal projection of the outermost conductors of the power line on the ground surface, for a distance of
  - 2 m for power lines operating at a nominal voltage not exceeding 1,000 V
  - 15 m for power lines operating at a nominal voltage exceeding 1,000 V.

## 9. WARRANTY

This material is copyright of the International Electrical Commission (IEC).

### 9.1 For Assistance

If you have any questions or need further assistance, or for more information on our complete range of electric fencing products, please see the JVA website at [www.jva-fence.com](http://www.jva-fence.com).

### 9.2 Service or Repairs

If service is required, package your energizer carefully and return it to the place of purchase or your nearest JVA distributor along with your proof of purchase.

### 9.3 Contacts

[www.jva-fence.com.au](http://www.jva-fence.com.au)

[www.jva.security.co.za](http://www.jva.security.co.za)



[www.jva-fence.com](http://www.jva-fence.com)

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