

NEMTEK
Electric Fencing Products



AGRI 80, 150 and 200 Electric Fence Energizers

Instruction Manual



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Introduction and Disclaimer

INTRODUCTION

Thank you for choosing our product! Nemtek Electric Fence Energizers are designed and manufactured to provide many years of reliable use, if installed and maintained correctly. The guidelines provided in this manual will assist you in basic operation and maintenance.

Currently this energizer is designed and manufactured in South Africa for the South African and international markets. More information on our products and general information are available on our web site at: <http://www.nemtek.com>

Electric fencing can be lethal. Please avoid entanglement/entrapment hazards (See APPENDIX at the end of this manual) and warn the user to avoid head contact with the fence.

DISCLAIMER

Nemtek Holdings (Pty) Ltd or any of its subsidiary companies does not guarantee that the operation of the product will be uninterrupted or totally error free.

Energizer specifications may be altered without prior notification.

The installer is referred to the definitions and general requirements in the Appendix.

The installer must take into consideration the applicable municipal laws concerning the installation of electric fences. General guidelines are available, or refer to the website:

<http://www.nemtek.com>. International standards can be viewed at

<http://www.iec.ch> and South African standards on <http://www.sabs.co.za>

GUARANTEE

The Agri Series of Electric Fence Energizers, manufactured by Nemtek, is guaranteed for a period of two years from date of sale against defects due to faulty workmanship or materials.

Nemtek will, at its discretion, either repair or replace a product that proves to be defective.

Nemtek guarantees that the product, when properly installed and used in line with the specification as determined by Nemtek from time to time, will execute its function of generating a suitable potential. Nemtek does not guarantee that the operation of the product will be uninterrupted and totally error free. Faulty units must be returned to one of the Nemtek Group outlets. The buyer shall pay all shipping and other charges for the return of the product to Nemtek or Nemtek Security Warehouse.

LIMITATION OF GUARANTEE

The guarantee does not apply to defects resulting from acts of God, modifications made by the buyer or any third party, misuse, neglect, abuse, accident and mishandling.

EXCLUSIVE REMEDIES

The remedies provided herein are Nemtek's sole liability and the buyer's sole and exclusive remedies for breach of guarantee. Nemtek shall not be liable for any special, incidental, consequential, direct or indirect damages, whether based on contract, tort, or any other legal theory. The foregoing guarantee is in lieu of any and all other guarantees, whether expressed, implied, or statutory, including but not limited to warranties of merchantability and suitability for a particular purpose.

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Foreword

The Agri 80, 150 and 200 energizers are designed for energizing livestock and game control electric fences and are not suitable for use in a security energizer group.

The Agri 80 is an 8 Joule current limited energizer and the Agri 150 and Agri 200 are respective 15 and 20 Joule energy limited energizers.

The Agri 150 is a time delayed electric fence energizer and when it detects a very low impedance at the output terminals it will limit the energy of its output pulses for a delay time of 15 seconds, but permits the output impulses to rise above the normal maximum allowed value of 5 Joule after the delay time.

Nemtek Connect

Nemtek Agri 80, 150 and 200 energizers can be upgraded for remote connectivity through a smartphone application or internet browser via **Nemtek Connect**. Contact Nemtek for more information on the hardware and software upgrades required.

Warnings and Instructions

Before doing an installation

The instructions in this manual must be fully complied with in every respect.

DANGER: Failure to comply with the instructions could lead to a fatal electric shock.

- Check all local and international regulations for electric fencing regarding the energizer and fence installation, i.e. allowed energy limits, warning signs, distances from power or communication lines etc.
- With the Agri range of energizers only one energizer can be connected to the electric fence.
- The Agri range of energizers are not security energizers but designed for livestock and game control.
- Switch the energizer off before working on the fence.
- Do not open the energizer, there are no removable fuses or serviceable parts inside the energizer. If the energizer is opened while operating it will switch to a low energy mode and a Nemtek representative has to be contacted to reset the energizer. The display will permanently show the warning triangle.
- Responsibility will not be accepted for any accident or damage caused by tampering with and/or any attempted modification of this product.
- Always use materials that are appropriate and are designed for an electric fence installation i.e. insulators, high voltage connecting wires and cables etc.

Product Specifications

	AGRI 80	AGRI 150	AGRI 200
Power Supply	11-15Vdc	11-15Vdc	11-15Vdc
Power Consumption (100% effort)	8.5W	16.5W	23.5W
Max Output Energy	8J	15J	20J
Load @ Max Energy	95Ω	85Ω	70Ω
Max Stored Energy	10J	20J	29J
Maximum Fence Voltage	9.5kV	8kV	9.7kV
Environmental Rating	IP65	IP65	IP65
Fence Wire Length Ideal Condition	80km	150km	200km
Fence Wire Length Average Condition	24km	42km	56km
Guideline PV Panel (location dependent)	80W	160W	240W
Guideline Battery Capacity AGM Pb	100Ah	200Ah	300Ah
Guideline Battery Capacity LiFePo4	50Ah	100Ah	150Ah

Note: All specifications and recommendations based on 1.5 second pulse rate
Maximum Fence wire length is depending on construction and vegetation

Product Identification and Energizer Description

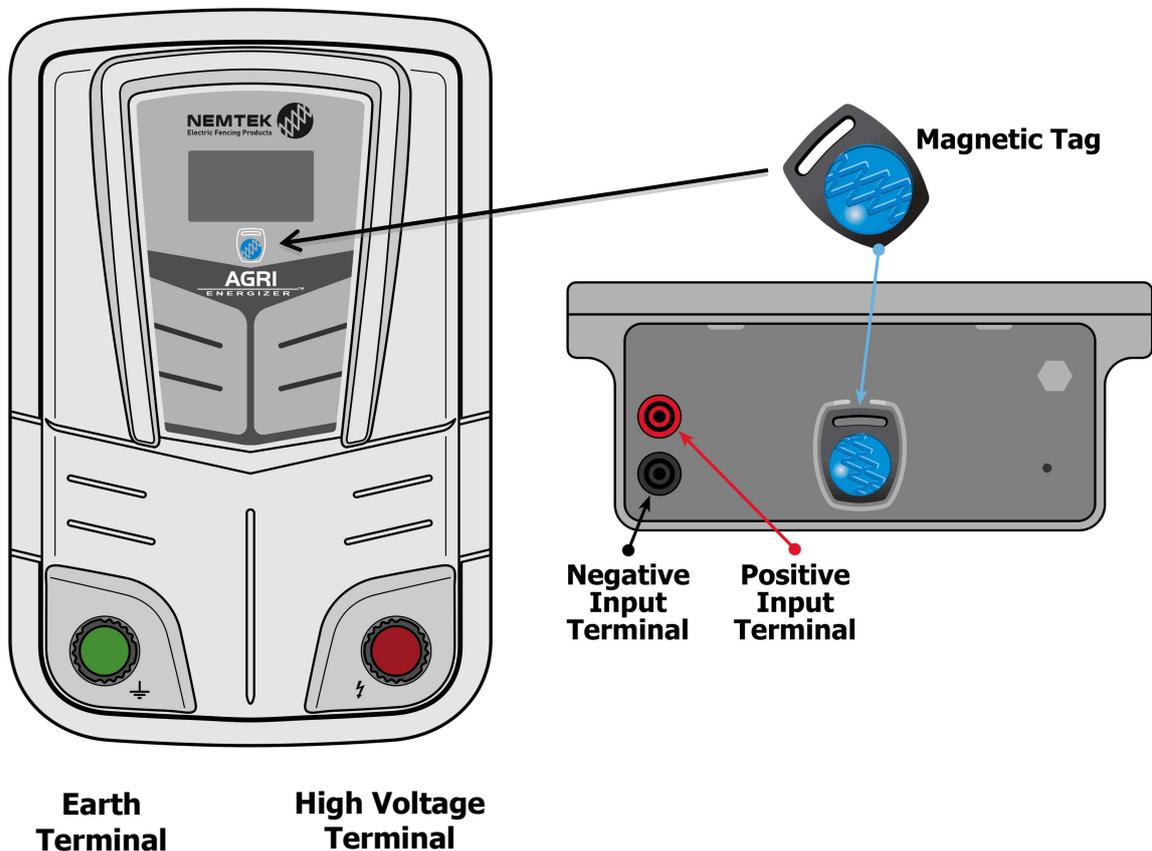
The Agri 80, Agri 150 and Agri 200 can be identified by the label on the front of the energizer or by the label on the side of the energizer. The energizer display will also identify the energizer when it is switched off.

The connections for the DC supply, battery or power supply are located at the bottom of the energizer. The red terminal is the positive input terminal and the black terminal is the negative input terminal.

The Fence terminals are on the front of the energizer with the green earth terminal on the left and the red high voltage output terminal on the right, which normally connects via the lightning diverter to the fence.

A removable magnetic tag, located at the bottom of the energizer, can be used for toggling the energizer On/Off by swiping it over the Nemtek tag symbol on the fascia, a single beep will be heard from the buzzer inside the energizer.

It can also be used for toggling the energizer into Low/High energy mode by holding it for three seconds over the Nemtek tag symbol on the fascia, a double beep will be heard when it toggles.



Mounting the Energizer

Do not remove the lid

STEP 1: The energizer cardboard box packaging has a drilling template printed on the bottom. Use this template and drill 4 x 8mm holes in the wall for mounting the unit. Four nail-in anchors are supplied with the unit. Insert the plastic sleeve of the nail in anchor into the wall then hammer the screw in with a screwdriver and hammer. Leave a gap slightly more than the thickness of the casing between screw heads and wall. Position the casing so that the screws go through the slots provided then drop it into position. If necessary, tighten the top 2 screws slightly more to secure the casing. The bottom two screws will slot into the casing for stability.

STEP 2:

Connect the Earth terminal of the energizer to 3 or more Earth spikes.

STEP 3:

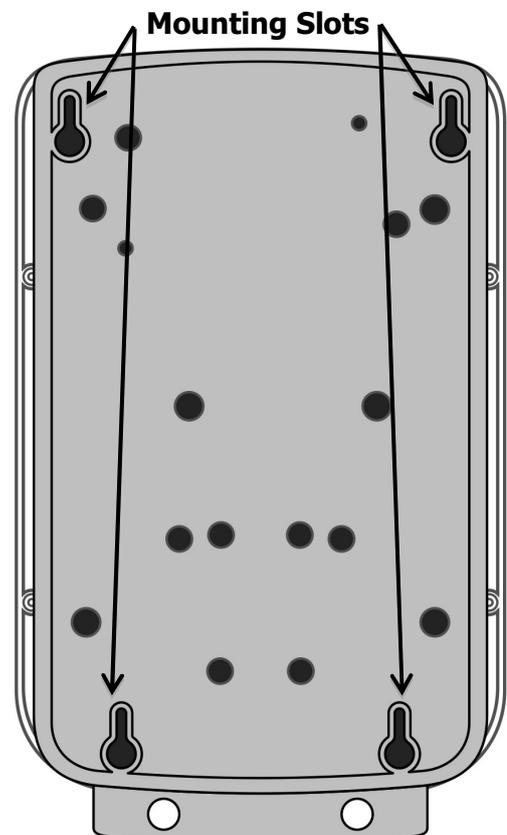
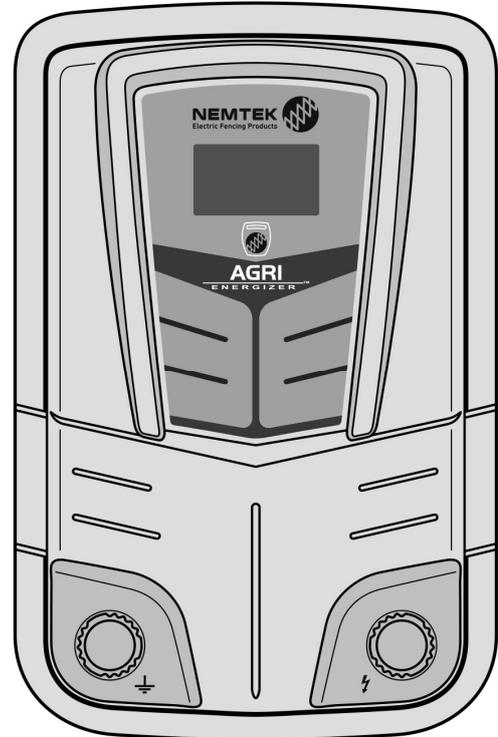
Connect the HV output terminal to the lightning diverter/Fence.

STEP 4:

Connect the DC terminals to the power supply unit or to a battery. Red terminal is positive and black terminal is negative.

Note: Energizer to be mounted vertically against a flat surface, in a well-ventilated area.

Avoid prolonged exposure to direct sunlight.



Installation Instructions

- Install the energizer in a dry environment and out of direct sunlight.
- The energizer must be installed in a location that is not accessible to children.
- If the energizer is installed inside a cabinet ensure that there is adequate ventilation.
- Install an external lightning diverter together with the energizer.
- If vented rechargeable batteries are used to supply the energizer ensure that they are placed in a well-ventilated area.
- Non-rechargeable batteries should not be used in the supply circuit if the energizer is powered by a mains supply unit.
- In South Africa the installation and erection of an electric fence is to be done according to the latest edition of SANS 10222-3. Follow the relevant rules and specifications if installing in other countries.

Fence Wiring

HOW AN ELECTRIC FENCE WORKS

In order for a fence to shock an animal an electrical circuit needs to be completed. The energizer sends a high-voltage pulse through the fence live wires. The energizer needs to be earthed.

When the animal touches the live wire, the pulse will flow from the live fence wires to the animal, then into the earth, and back to the energizer, completing the circuit. The completion of the circuit delivers a safe yet memorable, sudden and quick shock to the animal.

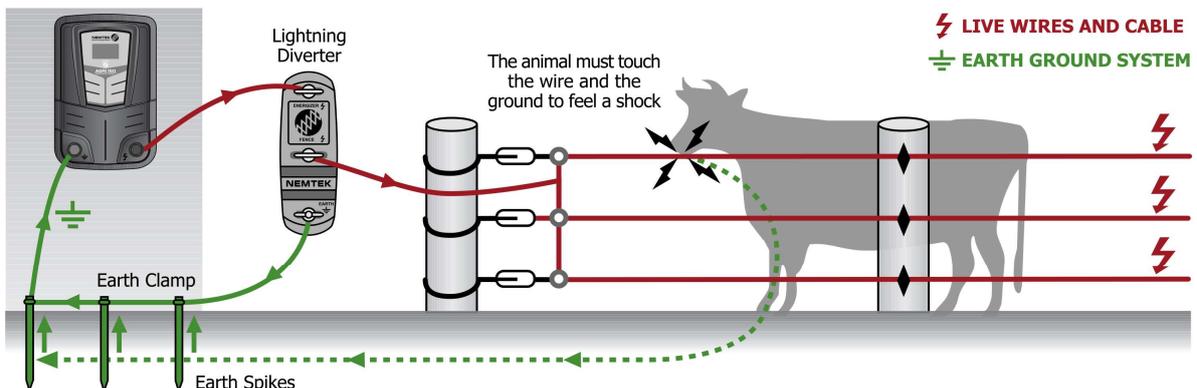
The shock creates an unpleasant memory that animals generally recall. Different animals may require different levels of voltage to create the appropriate shock depending on the thickness of their coats or hides. Sheep, goats and wild animals generally require higher voltage levels compared to horses, pigs and cows.

EARTHING THE FENCE

The earthing component of the fence is very important. Without adequate earthing, the electrical circuit from the energizer will not be completed when the animal touches the fence and the animal will receive an ineffective shock. The pulse needs to flow from the animal through the soil or other earthing system back to the energizer. Generally, when there is good soil moisture you require less additional earthing components on your fence. Earthing conditions can vary depending on the season and the type of soil.

TYPICAL FENCE WITH GOOD EARTHING

If your earthing conditions are good all year round, you will only need live wires on your fence (no earth wires). and a few earth spikes in the vicinity of the energizer.



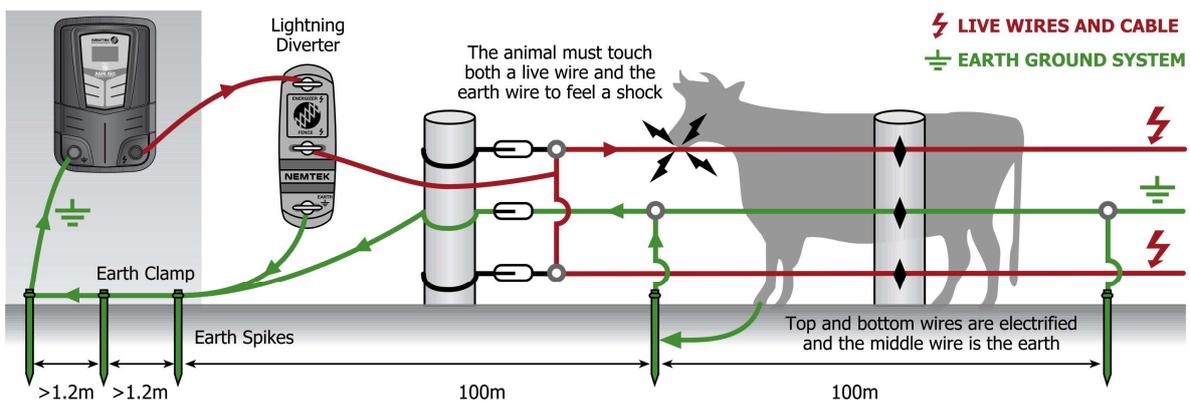
Fence Wiring

TIPS FOR BETTER EARTHING

- Place your earth spikes in damp areas where possible.
- Earth spikes must be placed in the vicinity of the energizer. There should be at least three earth spikes, placed a minimum of two meters apart.
- The earth spike connectors (at the top of the earth spike) should always be visible for maintenance and ease of connection.
- Additional earth spikes can be connected to the earth wires of the electric fence. (Ensure that the earth wires are connected to the earth input of the energizer)
- Earth spikes must be at least 10 meters away from electrical earth systems, e.g. house mains, telephone and power lines.

TYPICAL FENCE WITH INADEQUATE EARTHING

If you have inadequate earthing due to poor soil conditions or seasonal changes in the soil moisture levels, you will require additional earthing. You will need one or more earth wires along your fence in addition to your live wires. Earth spikes will also need to be placed along the fence. By introducing these additional earthing components, you counteract any bad soil conditions to ensure that the electrical circuit back to the energizer can be completed so that the animal receives an adequate shock.



LIGHTNING AND SURGE PROTECTION

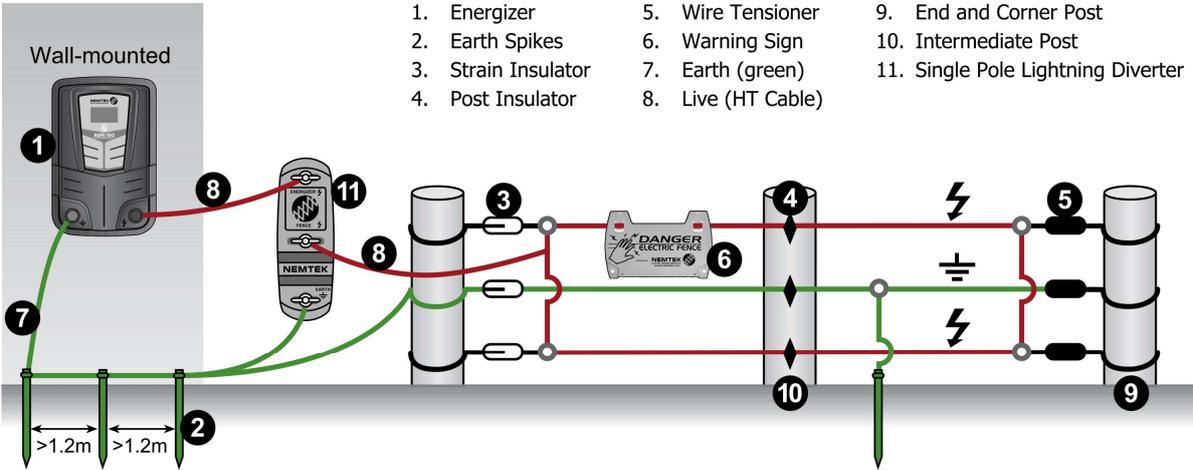
The lightning inhibitor and diverter can be used to reduce the likelihood of a power surge coming through the fence wires to the energizer as a result of lightning. It offers a two-pronged approach. First it inhibits the lightning surge from damaging the energizer, and second it diverts any lightning surge away from the energizer into the ground through the earth spikes. It can be mounted onto a flat or round surface.

Fence Wiring

PERMANENT ELECTRIC FENCE

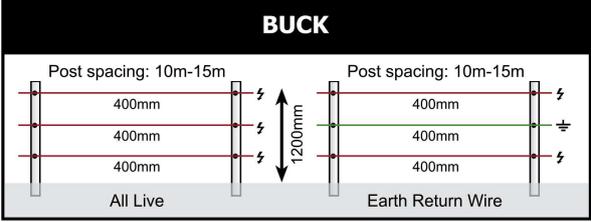
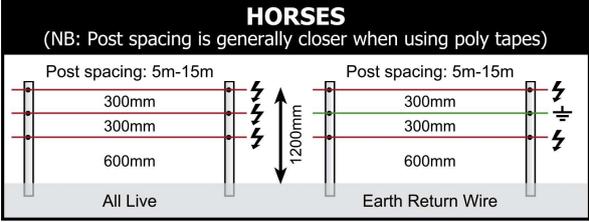
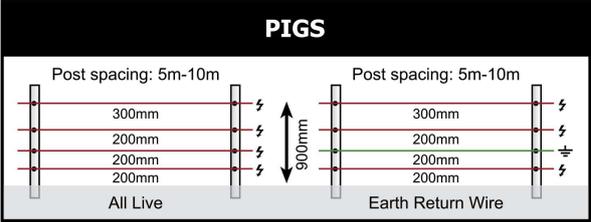
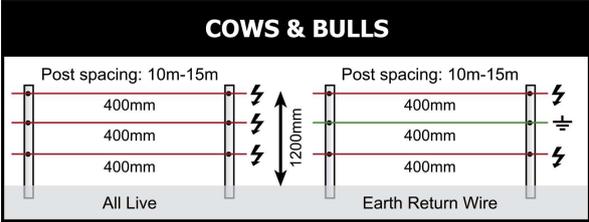
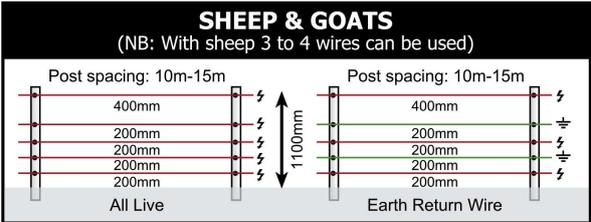
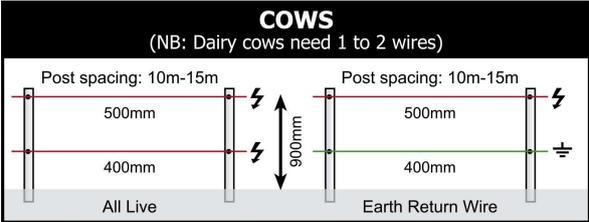
A permanent fence for game animals or livestock will require higher tensile strengths, be more robust, have a longer life span and use more durable insulators and equipment.

Animals tend to run into the fence before seeing it and they could damage the fence, especially in the dark.



- 1. Energizer
- 2. Earth Spikes
- 3. Strain Insulator
- 4. Post Insulator
- 5. Wire Tensioner
- 6. Warning Sign
- 7. Earth (green)
- 8. Live (HT Cable)
- 9. End and Corner Post
- 10. Intermediate Post
- 11. Single Pole Lightning Diverter

LIVESTOCK POST AND WIRE SPACING



Energizer Operation

When the energizer is connected to a suitable DC supply (11-15Vdc) the LCD backlight colour will indicate the state of the energizer.

Blue: The energizer is switched off

Green: The energizer is switched on and operating within acceptable limits

Amber: The energizer is switched on but operating outside acceptable limits

Red: The energizer could be on or off depending on service/alarm conditions

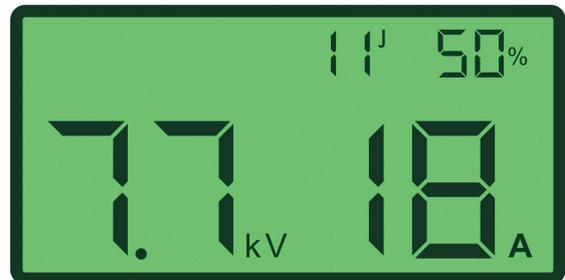
Blue: The energizer is off and the display will show the energizer model in large characters.

- The DC supply voltage to the energizer is displayed in the top right corner



Green: The energizer is on and the LCD displays shows the following:

- In large characters the output fence voltage in kilovolts (kV) measured between the Earth and HV terminal
 - In large characters the output current measured in Ampere (A) going into the fence
 - In small characters the stored energy inside the energizer measured in Joules (J)
 - In small characters the percentage (%) effort that the energizer is working at to achieve the indicated fence voltage
- If the input supply voltage drops below the set level the green display will go yellow/green
 - If the input supply voltage drops below the very low voltage setting the green display will go yellow



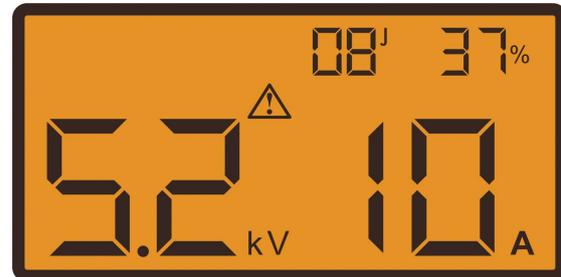
Energizer Operation

Amber: The display will go amber when the energizer is on but it is taking action to keep the energizer operating correctly. The display will show the same parameters as on the green display.

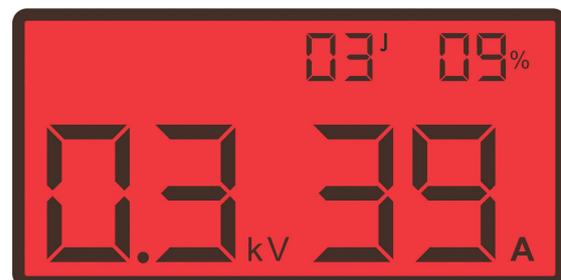
- When the energizer effort is either below or above set levels the display will go amber
- If the energizer internal temperature is high the energizer will start operating in a reduced energy mode to prevent over heating and the display will go amber and will show a thermometer symbol

Red: The display will go red and the energizer will switch off when the input supply voltage drops too low for the energizer to operate. The display will show the word "bAtt" and in small characters the supply voltage.

- If a service condition is detected the energizer will switch off and the display will go red, it will also show a picture of a spanner
- When a heavy fence load has dropped the output voltage at the HT terminals below the set low fence voltage alarm level, the energizer will keep on operating but the display will go red and show the same parameters as shown on the green display
- If the internal temperature of the energizer goes over a set level the



- If a sudden decrease in fence load is detected excess energy will be diverted from the fence and the display will go amber and will show a triangle with an exclamation mark



energizer will drop its output to a very low energy level, the display will go red and show the symbol for a thermometer

- When the fence condition changes to an extent that potentially there could be an animal/human stuck in the fence, the energizer will alarm and the display will go red and show the warning triangle. The energizer will still operate but the time between impulses will be longer

Installation Notes

- Keep the wires to the fence separate from mains and communication wiring.
- Do not try and modify the energizer. Any unauthorized modifications will null and void the warranty and possibly render the unit illegal.
- Use HT (high voltage) wire between the fence and energizer, including the earth wire. Never run these wires in the same conduit or through the same hole as the low voltage wiring.
- Always use ferrules or line clamps to connect two high voltage wires together. Avoid using dissimilar materials for connections like copper on steel.
- The fence must be earthed properly with three earth spikes close to the energizer. The distance between the fence earth spikes and any other earth systems shall be not less than 10m for an agricultural fence installation. (Typically, a rural property installation.)
- Always test the fence after installation for correct short and open-circuit alarming at various points along the fence.
- Refer to the applicable laws concerning the installation of electric fences in your area.

Basic definitions

- **Electric Fence:**

A barrier which includes one or more electric conductors, insulated from earth, to which electric pulses are applied by an energizer.

- **Connecting Lead:**

An electric conductor, used to connect the energizer to the electric fence or the earth electrode.

- **Electric Animal Fence:**

An electric fence used to contain animals within or exclude animals from a particular area.

- **Public Access Area:**

Any area where persons are protected from inadvertent contact with pulsed conductors by a physical barrier.

- **Pulsed Conductors:**

Conductors which are subjected to high voltage pulses by the energizer.

- **Earth Spike:**

Metal structure that is driven into the ground near an energizer and connected electrically to the fence earth terminal of the energizer, and that is independent of other earthing arrangement.

General requirements for electric fences

Electric fences and their ancillary equipment shall be installed and operated and maintained in a manner that minimizes danger to persons, animals or environment,

Electric fence constructions which are likely to lead to the entanglement of animals or persons shall be avoided, as entrapment can be lethal.

An electric fence shall not be supplied from two different energizers or from independent fence circuits of the same energizer.

For any two different electric fences, each supplied from a different energizer with independent timing, the distance between the wires of the two electric fences shall be at least 2.5m. If this gap is to be closed, this shall be affected by means of a physical barrier of high voltage electrically non-conductive material or an earthed conducting material such that the two separate electric animal fences cannot be contacted at the same time.

A spacing of 2.5m shall be maintained between non-insulated connecting leads supplied from separate energizers. This spacing may be less where insulated cables are used or sleeving rated at 10kV.

Barbed wire or razor wire shall not be electrified by an energizer or placed physically close to an electric fence as these circumstances can create a lethal entanglement/entrapment hazard.

A non-electrified fence incorporating barbed wire or razor wire may be used to support one or more off-set electrified wires of an electric animal fence. The supporting devices for the electrified wires shall be constructed so as to ensure that these wires are positioned at a maximum distance of 150mm from the vertical plane of the non-electrified wires. The barbed wire and razor wire shall be earthed at regular intervals.

A distance of at least 10m shall be maintained between the energizer earth electrode and any other earthing system connected parts such as the power supply system protective earth or the telecommunication system earth.

Any part of an electric fence which is installed along a public road or pathway shall be identified at frequent intervals by prominently placed warning signs securely fastened to the fence posts or firmly clamped to the fence wires. The size of the warning signs shall be at least 100mm x 200mm. The background colour of both sides of the warning plate shall be yellow. The inscription on the plate shall be in black.

Appendix B

The warning sign shall typically appear as depicted in the figure below or have the substance of "CAUTION: Electric fence". The inscription shall be indelible, inscribed on both sides of the warning plate and have a height of at least 25mm.

The warning sign should be legible from the secure area and the public access area.



Where an electric animal fence crosses a public pathway, a non-electrified gate shall be incorporated in the electric animal fence at that point or a crossing by means of stiles shall be provided. At any such crossing, the adjacent electrified wires shall carry warning signs.

Warning signs shall be placed adjacent to each sign related to chemical hazards for the information of emergency services

Gates in electric animal fences shall be capable of being opened without the person receiving an electric shock.

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.

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 shall be taken to avoid damage to the connecting leads due to external factors.

Connecting leads shall not be installed in the same conduit as the mains supply wiring, communication cables or data cables.

Connecting leads and electric fence wires shall not cross above overhead power or communication lines.

Mains supply wiring shall not be installed in the same conduit as signaling leads associated with the electric security fence installation.

Appendix B

Where an electric animal fence passes below bare power line conductors, the highest metallic element shall be effectively earthed for a distance of not less than 5m on either side of the crossing point.

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.

If connecting leads and electric fence wires are installed near an overhead power line, the clearances shall not be less than those shown in the table below.

<u>Power Line Voltage</u>	<u>Clearance</u>
Equal or less than 1kV	3 meter
Greater than 1kV, but equal or less than 33kV	4 meter
Greater than 33kV	8 meter

If connecting leads and electric fence wires are installed near an overhead power line, their height above the ground shall not exceed 3m.

If connecting leads and electric 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:

- 2m for power lines operating at a nominal voltage not exceeding 1kV
- 15m for power lines operating at a nominal voltage exceeding 1kV

Ensure that all ancillary equipment connected to the electric security fence circuit provides a degree of isolation between the fence circuit and the supply mains equivalent to that provided by the energizer. Protection from the weather shall be provided for the ancillary equipment unless this equipment is certified by the manufacturer as being suitable for use outdoors, and is of a type with a minimum degree of protection IPX4.

IEC Safety Information

- There are no user serviceable parts inside the energizer.
- This appliance is not intended for use by persons (including children) with reduced physical, sensory or mental capabilities, or lack of experience and knowledge, unless they have been given supervision or instruction concerning use of the appliance by a person responsible for their safety.
- Electric fencing can be lethal. Avoid head contact with the fence.
Ask the installer to explain the options of current limiting resistors, the programmable output energy levels as well as the low-voltage operation of the energizer.

Document Revision History

Rev 1.0, 1 September 2023

First release