



Strainrite[®]
FENCING SYSTEMS

MBX ENERGIZER MANUAL

ELECTRIC FENCE ENERGIZER

MAINS OR BATTERY

POWERFUL YET SAFE*

PLUG N PLAY - EASY SETUP



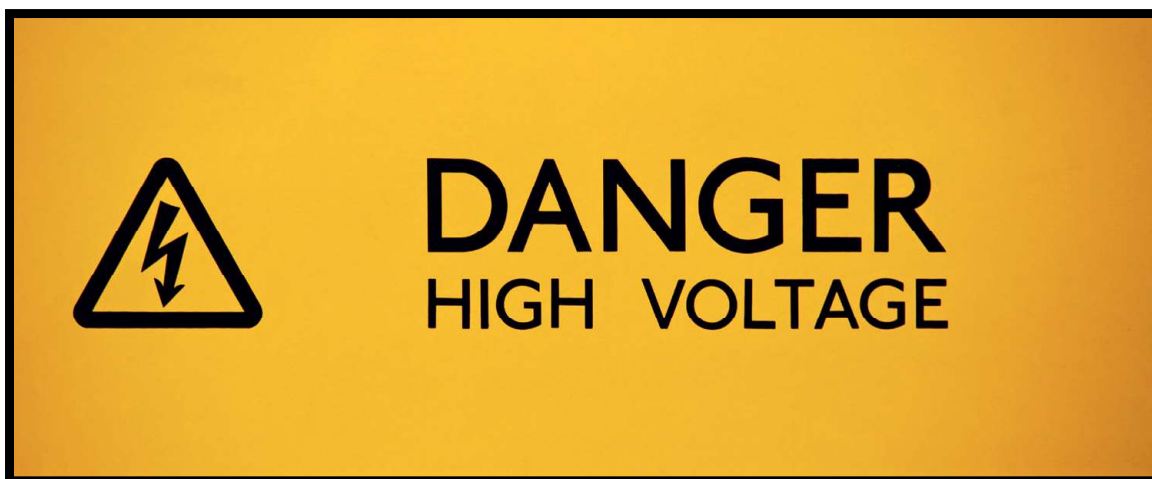
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1 INTRODUCTION

Congratulations on your choice of an MBX Energizer. In choosing to purchase an MBX product you have opted for the highest quality in electric fencing. Please read this manual entirely before installing or operating your new energizer. All MBX products offer a three-year warranty against faulty components and workmanship but excludes environmental extremes (i.e. lightning, flood damage, etc.) or malicious damage to the unit or faulty application. Consumable components (i.e. batteries) are also not covered by the warranty agreement. To ensure your eligibility for the warranty program offered with this device, please retain your proof of purchase. For a warranty description, please see the final page of the manual.



High Voltages exist inside the electric fence energizer and on the fence terminals. The high voltage inside the energizer may take a long time to discharge. Wait at least 10 minutes after turning off before opening the case. Before working on the high voltage wiring of an electric fence, it is recommended that the energizer is disarmed, and a short circuit is placed from the fence live wires to earth. This is a sensible precaution against the energizer being armed by others, while you are working on the fence.

2 IMPORTANT NOTES

2.1 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 should be signed. Warning signs that comply to IEC standards should be prominently displayed on electric fences at distances specified by the country in which they are installed.
4. Electric fences must have an 'earth'. An electric fence ground is one or more pieces of metal (eg. 1.8m Galvanized earth rods) driven into the earth to a depth of at least 1.2m. Additional earth connections may be required at the energizer or along the fence in poor soil conditions.

2.2 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, number and spacing of wires on the fence, type/quality of insulators, resistance of wire, whether the wiring configuration is series or parallel etc. The amount of grass or shrubbery touching the wires also alters the performance. Fence circuit layout is very important. Another factor to consider is acceptable fence voltage, for some stock 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. **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.

2.3 POWER SUPPLY OPTIONS

The MBX electric fence energizers can be powered from a number of power sources.

- a. 12V external battery (not supplied)
- b. 12V external battery with solar panel (not supplied)
- c. 110/240Vac via power pack

2.4 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 undercover.

3 MBX FEATURES AND SPECIFICATIONS

3.1 FEATURES

	MB1.5	MB3	MB4.5
Nominal Energy Output	1.5J	3.0J	4.5J
Power Consumption	0.165A	0.3A	0.49A
Mains powered	✓	✓	✓
Battery powered (battery not included)	✓	✓	✓
Digital control	✓	✓	✓
“Smooth” wave shape	✓	✓	✓
Ant & moisture protection	✓	✓	✓
Lightning protection	✓	✓	✓
Battery protection	✓	✓	✓
Solar capability [^]	✓	✓	✓
Fence OK Indicator	✓	✓	✓
AC Surge protection	✓	✓	✓
Large knobs	✓	✓	✓
Warranty – 3 years	✓	✓	✓
AC Power adapter included	✓	✓	✓
Battery leads included	✓	✓	✓
Easy to mount on wall with 2 screws	✓	✓	✓
Approved to Australian Safety Standards	✓	✓	✓
UV stable enclosure	✓	✓	✓

3.2 SPECIFICATIONS

Specifications										
Model	Output Voltage ¹	Stored Energy	Power ²	12V drain ³	Solar Panel Size for Minimum Expected Sun Hours Per Day ⁴				Solar Battery ⁵	Peak Output
					3hrs	4hrs	5hrs	>6hrs		
MB1.5	8.2kV	2.1J	12Vdc	165mA	30W	20W	20W	15W	26Ah	1.5J
MB3.0	8.5kV	4.2J	12Vdc	300mA	40W	30W	25W	20W	40Ah	3.0J
MB4.5	8.8kV	6.3J	12Vdc	490mA	85W	60W	40W	40W	65Ah	4.5J

Key

- 1 No load, actual voltage on a short fence can be as high as 10kV.
- 2 The energizer can also be powered with 110v/240Vac by using the external power pack supplied with the energizer.
- 3 Current drain rating is for a 12.5V power source. Current drain will vary with voltage.
- 4 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.
- 5 The recommended battery size will allow the energizer to operate for up to 5 consecutive days of overcast weather.

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

4 MBX MODELS AND FEATURES



On/Off switch



Status indicates fence overload or internal energizer fault (red LED)



Energizer On and OK indicator (green LED)



Model number panel



12 volt battery clips
RED = positive
BLACK = negative

4.1 FENCE CONNECTORS

Full Voltage Operation

1. The Green Earth Terminal (Right) should be connected to suitable electric fence earth spikes.
2. The Red Fence Terminal (Left) should be connected to the live wires of the fence.



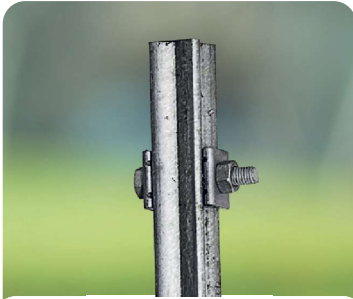
High Power fence connection terminal (To Fence)



Ground/Earth return connection terminal

ELECTRIC FENCE PRODUCT RANGE

Strainrite has everything you need to get your fence operational. from lead out and underground cable, insulators, insulated wire strainers and earth stakes. Visit www.strainrite.co.nz to see the full range or contact us page.



**2M
EARTH STAKES**



**LIGHTNING
DIVERTER**



**UNDERGROUND
CABLE**



**JOULE SHIELD
INSULATORS**



**DURASHIELD
WIRE STRAINERS**



**CUT OUT
SWITCHES**



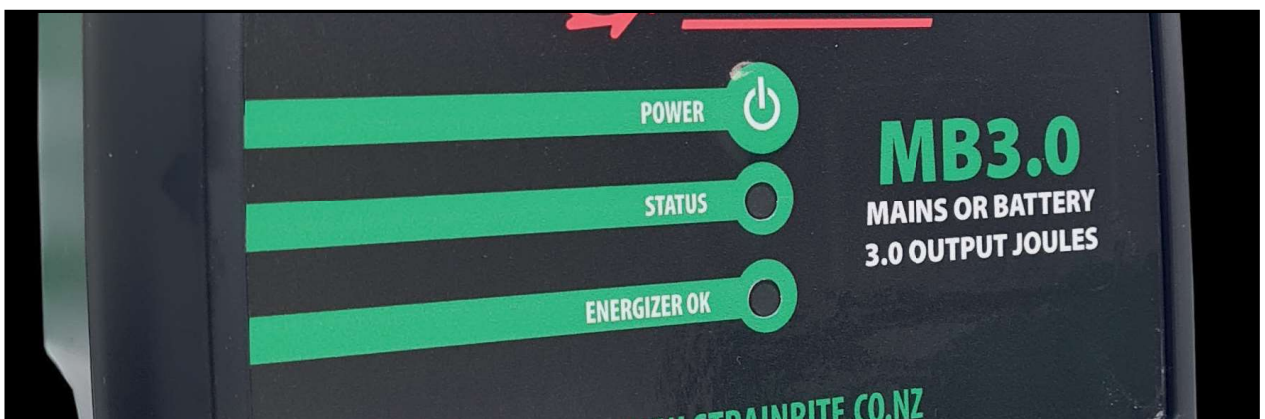
**SCAN THE QR FOR PRODUCT INFO & MORE
WWW.STRAINRITE.CO.NZ**

NOTES

4.2 POWER BUTTON

- 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.

4.3 ENERGIZER LED DISPLAY



Status red LED:

- Flashes slowly (once per pulse) when there is a heavy fence load. This means the fence may have a fault. This will not harm the energizer, but your electric fence may not be effective. See Troubleshooting Energizer Problems below.
- Two Flashes shows the battery is low. You should change or recharge the battery. See Troubleshooting Energizer Problems below.
- More than two flashes shows an error code (this is rare). Some errors can cause the energizer to shut down. See Troubleshooting Energizer Problems below.

Energizer OK green LED:

- Flashes with each pulse to show the unit is on and operating correctly.

5 INSTALLATION

5.1 MOUNTING THE ENERGIZER

If possible keep the energizer in a cool and dry environment (either indoors or at least well covered) to maximise reliability. When mounting it there are a number of 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 at 5.5cm centres, 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.

5.2 CONNECTING THE FENCE (STANDARD)

The electric fence requires a dedicated ground/earth system. Drive at least three earth spikes into the ground to a depth of at least 1.2m. Attach a wire from the Green Ground (Earth) Terminal on the front of the energizer to the earth spikes 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.

5.3 CONNECTING TO POWER

1. **Battery Power Source:** Attach the energizer to the battery and 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 Power Source: Attach the energizer to the supplied power pack. Plug the power pack into the mains power outlet and turn on the switch at the wall.

The mains power pack MUST be kept indoors!

2. **Turn the energizer ON** by pushing the Power button once.

6 OPERATION

6.1 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 live wires, or fence tape, of the fence to make them “live” or “hot” wires. Live wires must be insulated (e.g. with insulators) from earth or any other conductive material touching earth (e.g. fence posts).

The green connection 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 earth return wires to the earth spike and back up to the energizer earth terminal.

On touching the earth terminal on the energizer or the earth spikes 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 spikes 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.

You should not feel a shock from the earth connection or earth rod. If you do, the ‘earth’ is probably not sufficient. An electric fence ‘earth’ is some metal in contact with the soil. The more metal in the earth and the higher the moisture content in the soil the better. The larger the energizer and the longer the fence the more ‘earth’ is required.

In very dry conditions, i.e. sandy soil, it is recommended that a dedicated earth wire be added to the fence line which in turn should be connected to the energizer earth and the ground/earth spikes

For best results place the energizer in the middle of long lines of fence. A cartwheel pattern of farm fences with the energizer positioned centrally is more effective than a tree arrangement with the energizer at the base of the trunk with many branches.

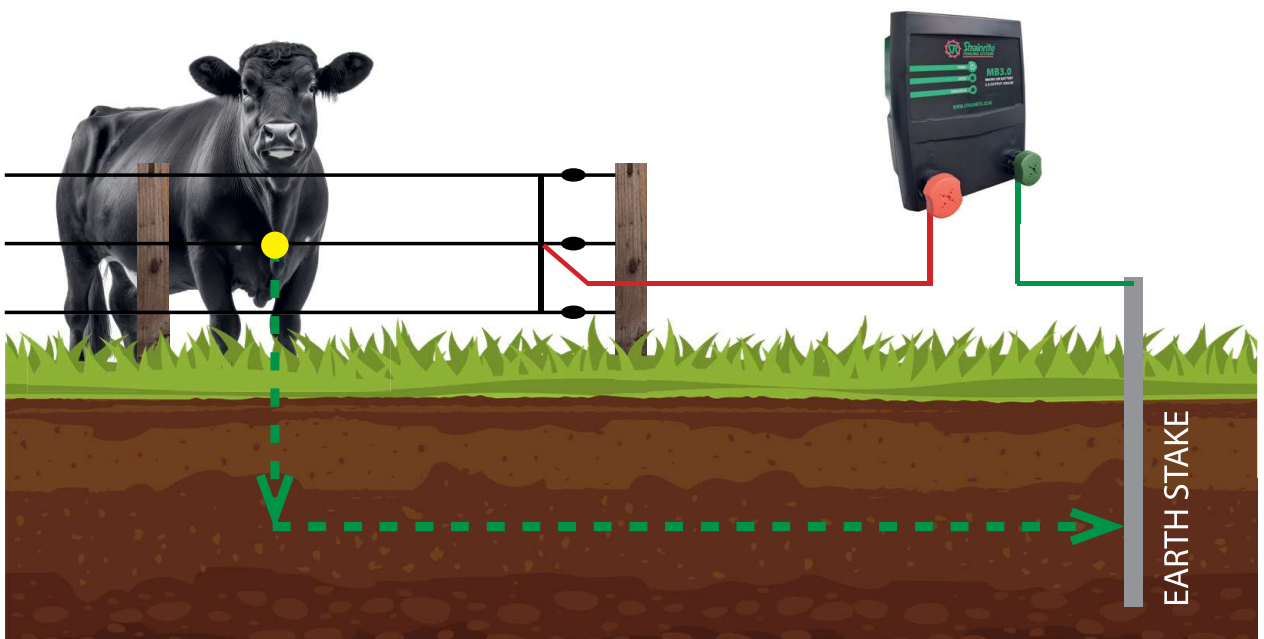
The fence and the earth voltages can be measured using an electric fence digital voltmeter or digital electric fence directional fault finder (the Electric Fence Fault Finder).

6.2 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 due to less physical pressure.
- Easy to set up compared to a traditional fence.

6.3 ELECTRIC FENCES

The Earth Return (also called 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 Earth terminal when an animal touches the fence.

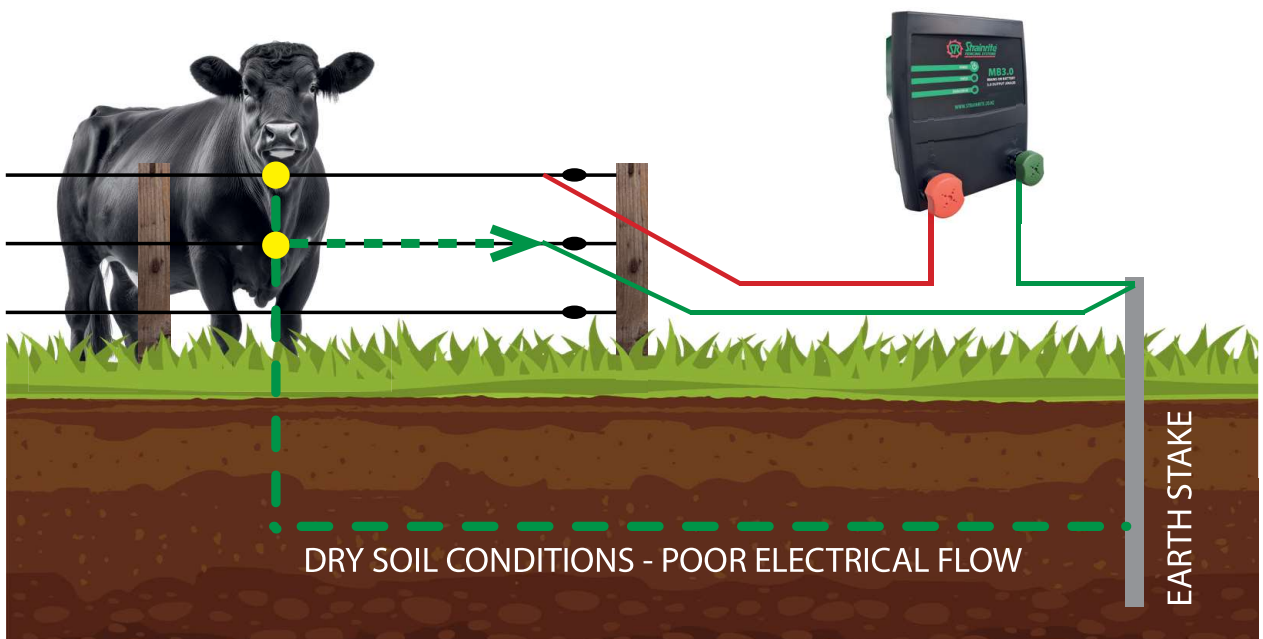


The electrical circuit is closed between the fence and the ground. When the animal touches the fence it completes the electrical circuit back to the earth, providing a shock.

A good earthing system is critical to energizer performance.

6.4 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 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.



The electrical circuit is closed. When the animal nudges both the live wire (Red) and Earth Wire (Green) it completes the electrical circuit, providing a shock.

6.5 EARTHING YOUR ENERGIZER

The best way to earth your energizer is using a 1 meter galvanized earth stakes. If the earth stake is too rusty it may not work properly. The best place to locate the earth stake 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 earth of your energizer to a metal shed or the same earth 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.

6.6 SEMI-PERMANENT AND PERMANENT FENCES

Steel posts are the quickest and easiest way to set up a fence, but timber and fiberglass posts can also be used. Make sure that the wires are tight enough that there is no sagging. 2.5mm galvanized fence wire is recommended as poly tape or rope will degrade and break over time. Safety signs need to be fitted as per the requirements outlined in the “General requirements for electric fences” part of this manual.

6.7 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 earth wire(s) do not need to be insulated, in fact if you are using steel intermediates the more times the earth wire touches a metal post the better it is “earthed”.

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.

6.8 MAINTENANCE

On permanent fences maintaining the fence 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 volt meter. The 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 have been 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.

7 TROUBLESHOOTING ENERGIZER PROBLEMS

The most common problems with electric fence energizers are:

- Moisture and Ants
- Lightning
- Flat batteries

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

7.1 MOISTURE AND ANTS

Moisture and Ants should not be a significant problem for the MBX range of energizers as they come in a weatherproof case. Still, where possible, keep the energizer protected from the weather.

7.2 LIGHTNING

The MBX range of energizers is covered with a three-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 investment for the longer term, it is recommended that a Lightning Protection Kit is installed to prevent lightning damage and possible costly repairs.

7.3 FLAT BATTERIES

The MBX series of energizers require 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 MBX series of energizers indicate 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. Return it to the manufacturer if unsure.

7.4 ERRORS AND ERROR CODES

The MBX energizer may stop and display error codes. The error codes are displayed on the Status (red) LED, where it will flash rapidly a number of times. The number of these flashes corresponds to the Error Code.

Error Code #	Red LED Flashes	Meaning
2	2	Flat battery: the energizer will recover and re-start when the battery is charged
3	3	Charging failure
4	4	Fast pulsing
5	5	Discharge failure
6	6	High battery: the energizer will re-start when the battery voltage is supplied
7	7	EEPROM write failure
10	10	Capacitor failure, charged too quickly

For errors 3 and 5 the energizer will try and recover these two errors which are classed as severe errors. This automatic recover process will occur at 7 minute intervals. Error 4 is classed 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.

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.

8 COMMON FENCE PROBLEMS

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

- Insufficient 'earth'
- Shorts on the fence

For tips on fence construction please see an Electric Fencing Manual.

8.1 TESTING THE 'EARTH'

The 'earth' 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 earth terminal to the earth rod.

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 volt meter or a Electric Fence Fault Finder (do not use a standard multimeter) 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).

8.2 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 Electric Fence Fault Finder is even better. An effective fence will have more than 2 kV (2000 volts).

9 AUSTRALIAN STANDARDS REQUIREMENTS - AS60335.2.76

Instructions for installation and connection of electric fences in Australia, as required under AS60335.2.76

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9.1 DEFINITIONS

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
Electric fence	a barrier which includes one or more electric conductors, insulated from earth, to which electric pulses are applied by an energizer

9.2 GENERAL REQUIREMENTS FOR ELECTRIC FENCES

1. **Electric animal fences** shall be installed and operated so that they cause no electrical hazard to persons, animals or their surroundings.
2. **Electric animal fence** constructions which are likely to lead to the entanglement of animals or persons shall be avoided.
3. 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 affected by means of electrically non-conductive material or an isolated metal barrier.
4. Barbed wire or razor wire shall not be electrified by an **energizer**.
5. 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.

5.1 The size of the warning sign shall be at least 100 mm x 200 mm.

5.2 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:

- a. the symbol of Figure 1, or
- b. the substance of TAKE CARE – ELECTRIC ANIMAL FENCE.

5.3 The inscription shall be indelible, inscribed on both sides of the warning sign and have a height of at least 25 mm.



Figure 1 - Warning Plate Symbol

6. The **energizer earth electrode** shall penetrate the ground to a depth of at least 1.2m.
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 3.

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

Table 1 - 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.

9.3 PARTICULAR REQUIREMENTS FOR ELECTRIC ANIMAL FENCES IN AUSTRALIA

1. A distance of at least 10 m 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.
2. **Electric animal fences** intended for deterring birds, household pet containment or training animals such as cows need only be supplied from low output **energizers** to obtain satisfactory and safe performance.
3. In **electric animal fences** intended for deterring birds from roosting on buildings, no **electric fence** wire shall be connected to the **energizer earth electrode**. A warning sign shall be fitted to every point where persons may gain ready access to the conductors.
4. 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 minimum distance of 150 mm from the vertical plane of the non-electrified wires. The barbed wire and razor wire shall be earthed at regular intervals.
5. 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.

9.4 PROHIBITED MOUNTING

Electric fence conductors should not be mounted on a support used for any overhead power line.

10 WARRANTY

This product carries a limited warranty against defective components and workmanship. The warranty excludes damage caused by acts of Nature such as lightning or flooding, power supply surges, rough handling, malicious actions or incorrect wiring.

Whilst every effort has been made to check that the information contained in this manual is accurate, Strainrite Fencing Systems will not be liable to loss or damage resulting from construction, operation or failure of any installation or system.

10.1 FOR ASSISTANCE

Product information.

visit www.strainrite.co.nz for more information

Email

visit www.strainrite.co.nz and fill in the contact form.

For more information on our complete range of electric fencing products please see the website: www.strainrite.co.nz

Region	Phone
New Zealand	04 524 9027
Rest of world	+64 4 524 9027

10.2 SERVICE OR REPAIRS

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

11 **NOTES**



Strainrite[®]
FENCING SYSTEMS

ELECTRIC FENCE ENERGIZER

MAINS OR BATTERY

POWERFUL YET SAFE*

PLUG N PLAY - EASY SETUP

SPK00279