Sureguard Pro -Tech 5®

Solar Electric Fence Energiser

AUSTRALIAN MADE®

Portable • Light Weight • Rugged

- 5km • Steel Wire • Poly-Wire • Poly-Braid • Poly-Tape
- Anti-Theft System
- In-Built Surge Protection
- Solar Design Enhanced for Cloud Cover

User Instructions

 www.sureguard.com.au – Revision #8 2024

Electric Fencing Re-envisioned

Sureguard's 5th Generation Solar Electric Fence Energizer.

Features

Latest Solar Panel & Battery Technologies

- Not just for the Australian sun. Pro-Tech 5 has outstanding fence performance even in prolonged cloudy conditions.

Keylock Security Mounting

- Your Pro-Tech 5 has a unique key-locking mechanism that safeguards your investment against theft.

Massive 190 Joule Lightning Surge Protection

- In-built surge protection will help to safeguard your Solar Energiser.

Pure Copper High-Voltage Transformer

- Sureguard's pure copper design eliminating losses typical of other designs.

Use with Various Fencing Materials

- Use Steel Fencing Wire, Polywire, Polytape, Polybraid or Polyrope.

How does an electric fence work?

An electric fence is designed either to contain animals within a designated area or to deter unwanted animals from entering. It operates by delivering high-voltage electrical pulses from the Energiser's "Live" Terminal to the fence wire, electrifying it. This wire is carefully insulated from its supporting posts. The "Earth" Terminal of the Energiser connects to an Earth Electrode that is embedded deep in the ground. This configuration completes an electrical circuit with any animal that comes into contact with the fence, as illustrated on page 4.

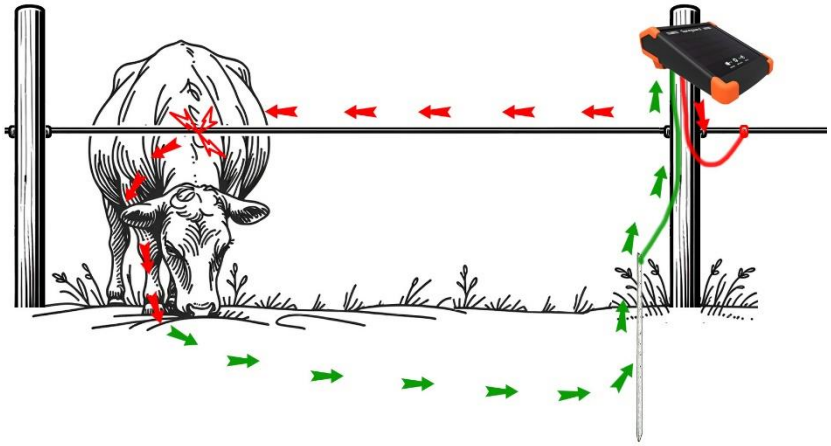
These electrical pulses are brief, lasting only a fraction of a second, and occur at a rate of 30-50 times per minute. When an animal touches the electrified fence wire, its body completes the electrical circuit. This results in a brief yet uncomfortable muscle contraction prompting it to move away from the fence. Due to the distinct sensation, animals quickly learn to avoid the fence.

For optimal results, select a fence design tailored to your circumstances. This can be a single wire, multi-wire, mesh, or a combination of these designs.

Single Wire Fence

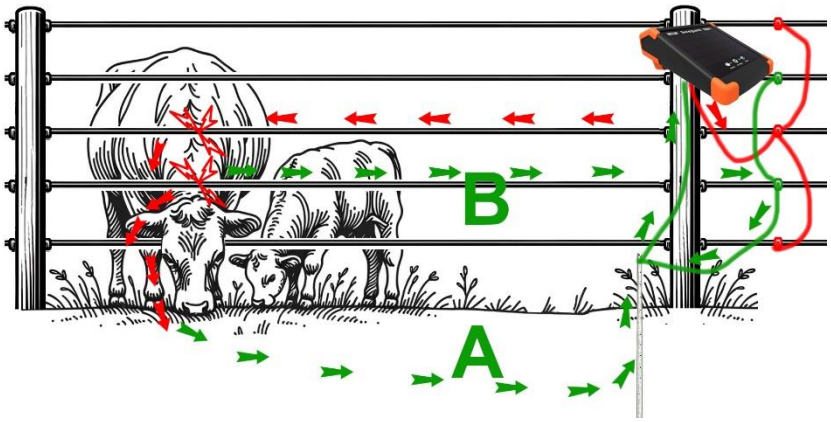
This is a straightforward fence design consisting of a single electrified wire (page 4). When an animal contacts this "Live" Wire, the electrical pulse travels through the animal's body, down its legs, and into the ground. From there, the pulse moves through the moisture in the sub-soil layer (usually about 1m or 3ft deep) and returns to the Energiser's Earth Terminal via the "Earth Electrode". In this setup, the animal's body acts as a conduit between the Live and Earth Terminals

of the Energiser. While simple, a drawback is that the strength of the electrical pulse weakens as it travels further through the soil to the Earth Electrode.



Multi-Wire Fence

As an alternative, there's the multi-wire fence which includes one or more Earth Wires. These Earth Wires can be connected through metal support posts, ensuring consistent grounding. They also allow adding more Earth Electrodes along the fence, boosting its effectiveness.



This type of fence may consist of 3, 5, 7, or even more wires, with alternate connections to the Live or Earth Terminals. It's ideal for fencing that spans more than 1km (or 3000ft) or in regions with specific conditions like low soil moisture, sandy terrains, shallow topsoil, or droughts. It's also a preferred choice for managing hard-to-contain animals, pest control, or enclosures housing animals of various sizes.

The multi-wire fence offers two return paths for the electrical pulse to the Energiser:

A/ Via the Live Wire, through the sub-soil moisture, back to the Energiser. Its efficacy is contingent on the soil's moisture content and the distance from the animal to the nearest Earth Electrode.

B/ Directly through the animal, between its contact points with the Live and Earth Wires. This design offers the highest deterrence due to its minimal electrical resistance, ensuring a strong electrical pulse.

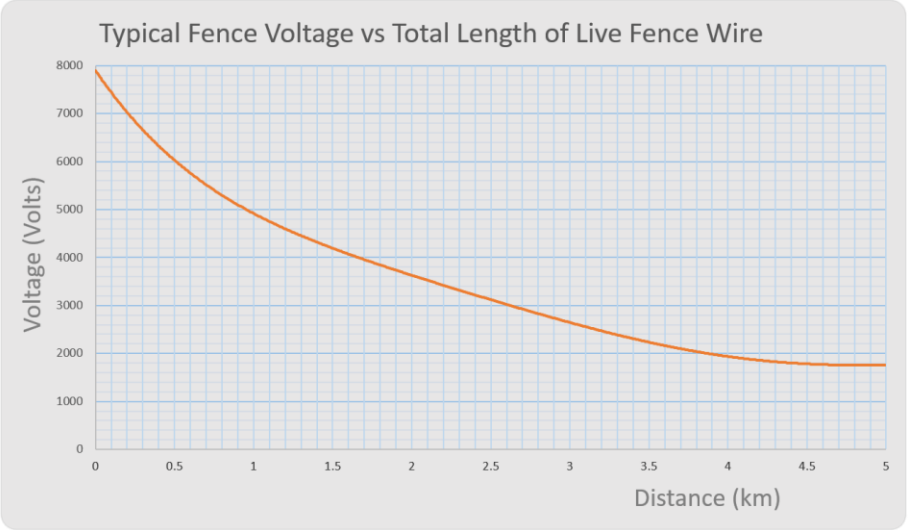
Mesh Fence

For controlling pests like foxes and wild dogs, a grounded high-tensile mesh fence topped with one or two Live Wires provides an excellent barrier. The mesh prevents these animals from squeezing through or under, while the Live Wires deter them from climbing.

Earth Electrode

You must install a proper Earth Electrode. Use ONLY GALVANISED steel, pipe or fence posts (star pickets). DO NOT use bitumen-covered posts or rusty metal because these will reduce the intensity of the pulse to the animal. **You want the Earth Electrode to have as much conductive surface area in contact with sub-soil moisture as possible**. Typically, you should drive the Earth Electrode 1.5m into the ground. **Don't overlook this point!** Then at distances of about every 500~1000m along the multi-wire fence, add more Earth Electrodes and connect these to the Earth Wires of the fence.
For more design information & worthwhile tips, visit our website at:
Electric Fence Design: www.sureguard.com.au/page/electric-fence-design
Tips and videos: www.sureguard.com.au/page/video-pro-tech-5

Specifications



- **Maximum Distance Rating:** 5km or 3 miles.
- **Weight:** 0.93kg (33oz)
- **Dimensions:** 195mm Wide. 100mm High. 220mm Deep. (4.95" x 3.95" x 8.65").
- **Output Impedance:** Excellent (Low).
- **Pulse Energy:** 0.2 Joules (stored energy).
- **Pulse Voltage:** 8000 Volts (typical).
- **Surge Protection:** Varistor technology 190 Joules.
- **Battery Life:** About 5 to 8 years under typical operating conditions. [Wiki: Battery Technology LiFePO4](#).

Solar Powered Fence Energiser

1. Shock-Resistant Rubber Corners
2. Anti-Theft Key-Lock System
3. Screw Mounting Option for Timber Posts & Fences
4. Anti-Theft Locking Bolt Attaches to Steel Star Post
5. Quality Push-Button Output Terminals including Leads & Clips
6. Mounting Post Location (Optional Accessory)
7. Simple, Easy to use ON / OFF Power Switch
8. Rubber Hand Grips
9. High Power Solar Panel with Long Life Battery
10. **Control Panel:** Touch Switch & LED Control Indicators:
    * In-built Fence Voltage Tester
    * In-built ON / OFF Automatic Timer
    * Smart Fault Alarm with ON/OFF Option

Mounting Location

The Energiser is solar-powered and requires a suitable location for reliable operation.
1/ It must have an uninterrupted view of the sky from east to west.
2/ No shadows over the Solar Panel between at least 10am to 2pm.
3/ The Energiser must also point towards the equator; in Australia, that means northward.
TIP: Stand behind the Energiser with the Terminals in view. Confirm you are looking northwards. (NOTE: In the northern hemisphere, the equator is southward.)

The Solar Panel will charge quickly in full direct sunlight. In cloudy conditions, the sun's intensity is lower, and the charge time is longer, but the Solar Panel still collects power from the full view of the overcast sky.
IMPORTANT: The Solar Panel only charges while the Energiser is switched ON.

Mounting Options

The Energiser has several mounting options – see Key #3, #4 & #6 illustrated on page 5.

Steel Post Anti-Theft Mounting

Refer to Key #4. We recommend you mount the Energiser on top of a steel post or "star picket" used for electric fencing. The Energiser's internal mounting bolt locks the Energiser to the post and is easily attached or removed using the supplied Key.

Locking Procedure:
1/ Remove the rubber sealing plug and insert the supplied Key.
2/ Align the mounting bolt (see Key #4 on page 5) with the top hole in the post.
3/ Rotate the Key anticlockwise to retract the mounting bolt.

4/ Push the Energiser onto the post. Jiggle until you hear the bolt click into the hole.
5/ Rotate the Key clockwise to lock.
6/ Make sure the Energiser cannot come off. Then remove and store the Key
7/ Put the rubber sealing plug back into the keyhole as an insect & weather seal.

IMPORTANT: The top of the steel post must not be mangled or damaged as it might damage the mounting point.

Screw Mounting

Refer to Key #3 on page 5. Insert a single M4 screw (4mm thread with a head no more than 9mm) into timber, steel or plastic fencing or posts. Hang the Energiser using the screw mounting (illustrated on the right).

Plastic Mounting Post

Refer to Key #6 on page 5. A plastic Mounting Post is available as an optional accessory. Assemble its three parts. Remove the protective rubber bung and push the post into the base of the Energiser. Push the other end of the post into the soil or screw it onto an existing fence using two 25mm Saddle Clamps (clamps and post not included).

Connecting Energiser to Fence

Included with your Energiser are quality Silicone High-voltage Cables with rust-resistant alligator clips and 15mm pre-cut insulation on the end. For each Cable, remove the pre-cut 15mm of insulation with a twisting motion, so the copper wires become twisted together. Then fold the copper wires back over themselves by 5mm. (As illustrated with the red wire). With the Energiser switched OFF, push the Red Terminal button to open the metal jaw and insert the copper wire, so it is touching the Terminal's metal contacts. Release the button. Ensure its securely held. Now, repeat the same process for the Green Cable.

Attach the Red Alligator Clip to the Live fence wire and Green Alligator Clip to the Earth Electrode and/or Earth Wires. Switch ON to energise the fence.

For steel fencing wire and Polywire, simply attach the Red Alligator Clip as shown below. You cannot do this for Polytape. The Alligator Clip won't correctly energise all the wires, and you may create sparks. The correct method is to:

1/ cut the Polytape,
2/ tie the two ends together in a secure knot,
3/ pull ALL the wires free from each end,
4/ twist all the wires together,
5/ connect the Red Alligator Clip to these twisted wires. You can also use this method to reliably join two pieces of Polytape or Polywire together anywhere along the fence.

Switch Energiser ON

Use the ON/OFF Switch on the underside of the Energiser to toggle ON or OFF. ("I" is ON, "0" is OFF)

The energiser is supplied ready-to-go. When you switch the Energiser ON, you will see two LED lights on the Solar Panel. The POWER LED relates to the charge in the battery. The FENCE LED relates to the measured fence voltage. Each LED can light Green, Red or Blue. Refer to the table below for what the colours mean. Two green lights mean you are good to go!

NOTE: Critical issues will cause the LED to **flash** RED & Alarm **Buzzer** to sound. Read Advanced User Features if you want to customise the Buzzer.

What the LED Colours Mean:

POWER LED	**GREEN**	Normal operation. The internal battery has plenty of power.
	GREEN FLASHING	If both the Power & Fence LED are flashing green, then contact Sureguard for assistance.
	RED	The internal battery is low. Check Solar Panel is clean and set up correctly.
	RED FLASHING	Critically low battery. **Rectify immediately!** (Troubleshooting page 11).
	BLUE	Displayed while using the advanced optional Settings Switch (page 10).
	NOT LIT	The Energiser is switched OFF or the battery is too depleted. Switch ON to commence charging. The Power LED flashes RED momentarily every few seconds while charging. The Energiser will resume operating automatically.
FENCE LED	**GREEN**	The fence voltage is good.
	RED	The fence voltage is low. Check the condition of the fence.
	RED FLASHING	The fence voltage is very low. **Rectify immediately!** The Energiser will be pulsing more slowly in this condition. (Troubleshooting page 11).
	BLUE	You have selected the ON/OFF Timer. The fence is currently inactive. (Refer to page 10, Function #3 and #4).
	BLUE FLASHING	It displays when you switch the Energiser ON. It is analysing the fence voltage, but the readout is not available yet.
	NOT LIT	See above.

Advanced User Features

The cog icon on the Solar Panel is a Touch Switch that works from moisture in your finger. When you switch the Energiser ON, the Touch Switch is active for the first 45 seconds. During this time, you can customise the operation of the Energiser. Your settings will be stored even if the power is switched OFF.

NOTE: If the cog area is wet, dry it before using the Touch Switch.

How to Enter the Advanced Features Mode

1. Switch the Energiser OFF. Wait 10 seconds. Switch ON.
2. Wait until the FENCE LED stops flashing BLUE.
3. Touch the cog icon for about 1-second until both LED lights glow BLUE.
   TIP: Touch lightly, don't press hard. If your finger is small, use your thumb.
4. As soon as both LEDs glow BLUE, remove your finger off the cog.
5. Wait until both BLUE LEDs go OFF.
6. Momentarily tap the cog icon the number of times required to match the function you want to enter (as per the list below). **TIP:** You'll find the Touch Switch responds better when you press and release, moving your finger at least 2cm away from the cog.

- **Touch once (Function #1):**
  Reset all functions to factory default and performs the following hardware tests:
  1/ LED's light in sequence RED-GREEN-BLUE.
  2/ Alarm Buzzer sounds.
  3/ Solar panel, in sunlight, is linked to the POWER LED. It will flicker BLUE to verify power is going into the battery. **NOTE:** If the battery is fully charged, the POWER LED will not flicker BLUE. So, it is best to test **first thing in the morning** after running all night so the battery will accept charge.
  4/ Energiser reboots automatically after 20 seconds.
- **Touch twice (Function #2):**
  Timer is switched OFF. Energiser will operate **24-hours a day**. (Factory default setting).
- **Touch 3 times (Function #3):**
  Timer is switched into **Night Mode.** The Energiser will power the fence at night, starting about 15-minutes after sunset. During the day, the Energiser is in standby mode. The FENCE LED will glow BLUE. The Solar Panel will continue to charge the battery. **NOTE**: The Alarm Buzzer may sound if a fault occurs at night. This behaviour can be customised by Function #5. To locate the fault, do a factory reset (Function #1), then check the points under "Rectifying Fence Faults.

- **Touch 4 times (Function #4):**
  Timer is switched onto **Day Mode** & will only operate during the day, starting about 15 minutes after sunrise. At night the Energiser is in standby mode, and the FENCE LED glows BLUE. **NOTE**: The Alarm Buzzer may be customised by Function #5, or #6.
- **Touch 5 times:**
  Switch the **Alarm Buzzer OFF**. It will not sound if a status error occurs.
  Touch 6 times:
  Switch the **Alarm Buzzer ON** and make it active only during daylight hours. (Factory default setting).
- **Touch 7 times:**
  Switch the **Alarm Buzzer ON** and active day or night (when operating in 24-hour mode).
- **Touch 8 times:**
  Report the **current fence voltage** in kilovolts (0.5 to 9.9kV). The fence voltage is helpful for fence diagnostics. Count the number of flashes of POWER LED; this is the first digit. Count the number of flashes of the FENCE LED; this is the second digit.
  The normal voltage range is 2kV to over 8kV
  NOTE: If necessary, select Function #2 to put the Energiser into 24-hour Mode.
- **Touch 9 times:**
  Like Function #8, this reports the **lowest fence voltage** since midnight. (Useful for diagnostics).
- **Touch 10 times:**
  Like Function #8, this reports the **highest fence voltage** since midnight.
- **More than 10:**
  Does nothing. Beeps an error.

Rectifying Power Faults

POWER LED Continuously RED:

The internal battery needs more charge. The Energiser will automatically lower its power consumption to continue operation. It will pulsate less frequently. Check the following:

1. Clean the Solar Panel with water; remove bird droppings and dust.
2. Confirm your solar setup is as described in “Mounting Location”.
3. Confirm the panel is facing toward the equator (not east or west), not experiencing shadowing and can see as much of the sky in all directions as possible.
4. A temporary low power condition may occur during dark cloudy conditions.

POWER LED Flashing RED:

1. In addition to the above points, select Function #1 to test the hardware and Solar Panel.
2. If your solar location is not ideal, consider setting the Energiser to run in either Night-Mode or Day-Mode (if acceptable).

POWER LED is OFF:

The Energiser has entered a low-power **Sleep Mode** to avoid depleting the battery. This condition might happen if you forgot to switch the Energiser OFF when putting it into

storage. To rectify this, place the Energiser in **FULL sun** and **switch ON**. As it commences charging, the POWER LED should flash briefly every few seconds but will stay in Standby Mode. **IMPORTANT:** Once charging begins, do not switch the Energiser OFF. After a few hours (or the next day if it is cloudy), you should see the Power LED go GREEN and the fence commence working. If the battery still does not come good, replace it.

Rectifying Fence Faults

FENCE LED Continuously RED:

The Energiser is functional, but the output voltage is medium to low. Possible reasons:

1. The total length of Live Wire is more than 5km.
2. Excessive foliage touching the Live Wire is draining power from the fence.
3. Some fence insulators are faulty due to surface dust, dirt, lichen, etc., causing electrical leakage, particularly during wet conditions.
4. Some fence insulators may be cracked and require replacing.
5. The Live Wire is short-circuiting to the ground, perhaps through a metal post or adjacent Earth Wire. Look for the cause.
6. Insulating fence cables are experiencing electrical breakdown due to age or damage.
7. Replace any insulators not purposely designed for high voltage use.
8. If the energiser is more than 5 years old, its storage capacitor may need replacing. Call Sureguard for advice.

FENCE LED Flashing RED:

Perform the following **self-test** of the Energiser:

1. Switch OFF the Energiser.
2. Disconnect both fence wires from the rear Terminals.
3. Switch ON the Energiser. If the Energiser now displays a GREEN FENCE LED, your Energiser is good. The result means you have excessive power loss somewhere on the fence Live Wires. (Read the last section for troubleshooting tips). If the Energiser doesn’t pass this self-test, then call Sureguard for advice.

“Instructions for installation and connection of electric fences”

Excerpts from Australian Standard AS NZS 60335.2.76, Annex BB

Annex BB.1 Requirements for electric animal fences

Electric animal fences and their ancillary equipment shall be installed, operated and maintained in a manner that minimises danger to persons, animals or their surroundings.

Electric animal fence constructions that are likely to lead to the entanglement of animals or persons shall be avoided.

> INSTALLERS/USERS SHOULD NOTE:
>
> WARNING: Avoid contacting electric fence wires especially with the head, neck or torso. Do not climb over, through or under a multi-wire electric fence. Use a gate or a specially designed crossing point.

An **electric animal fence** shall not be supplied from two separate **energisers** or from independent **fence circuits** of the same **Energiser**.

For any two separate **electric animal fences**, each supplied from a separate **Energiser** independently timed, the distance between the wires of the two **electric animal fences** shall be at least 2,5 m. If this gap is to be closed, this shall be affected by means of electrically non-conductive material or an isolated metal barrier.

Barbed wire or razor wire shall not be electrified by an **Energiser**.

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.

Follow the Energiser manufacturer’s recommendations regarding earthing.

A distance of at least 10 m shall be maintained between the **Energiser Earth Electrode** and any other earthing system connected parts such as the power supply system protective Earth or the telecommunication system Earth.

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 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.

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

Connecting leads and **electric animal fence** wires shall not cross above overhead power or communication lines. 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 animal fence** wires are installed near an overhead power line, the clearances shall not be less than those shown in Table BB1.

Table BB1 – Minimum clearances from power lines for electric animal fences

Power line voltage (volts)	Clearance (m)
≤ 1000v	3m
> 1000v and ≤ 33000v	4m
> 33000v	8m

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

Electric animal fences intended for deterring birds, household pet containment or training animals such as cows need only be supplied from low output **energisers** to obtain satisfactory and safe performance.

In **electric animal fences** intended for deterring birds from roosting on buildings, no **electric fence** wire shall be connected to the **Energiser Earth Electrode**. A warning sign shall be fitted to every point where persons may gain ready access to the conductors.

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.

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 BB1, or the substance of "CAUTION: **Electric fence**".

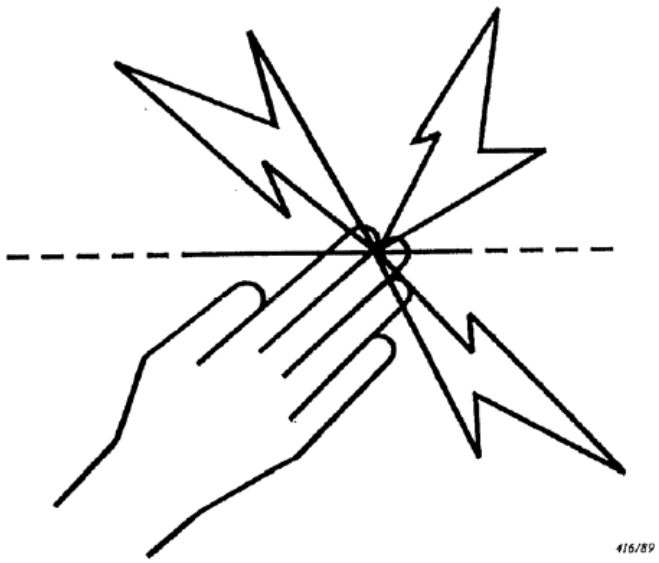
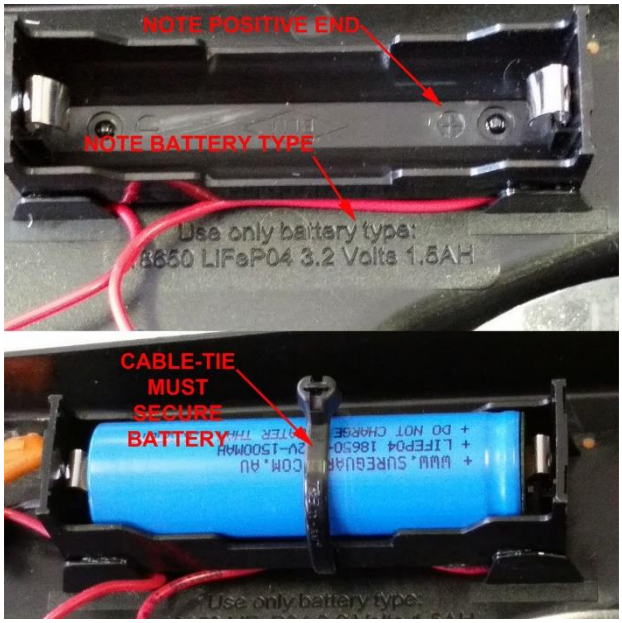


Figure BB1 – Symbol for warning sign

How to Change the Solar Battery

This Energiser uses a particular long-life lithium battery. You may never need to replace or remove it. But if you do, open the case by removing the four case screws. Then ensure that:



1. The replacement battery is type Lithium-Iron-Phosphate (LiFePO4). This battery has a voltage of 3.2 volt. **DO NOT substitute** other battery voltages because they will NOT charge. The original battery has an Amp-Hour rating of 1.8AH, but a larger capacity may be available in future.
2. Identify the positive end of the battery holder. **Insert the positive end of the battery first** then push the negative end down.
3. Do not install damaged batteries.
4. **ALWAYS Cable-Tie** the battery as illustrated. It is a safety requirement.

Maintenance

1. Regularly check and clean the Solar Panel for dust and bird droppings.
2. Use a damp cloth with a little soap every three months to clean the external rubber corners. Cleaning reduces mould from taking hold and damaging the rubber.

Manufacturer's Warranty

Sureguard provides a Manufacturer's Warranty to the original purchaser or gift recipient to cover defects in materials and workmanship for a period of 12 month.

Extend your Warranty to 3 Years!

www.sureguard.com.au/warranty-extended

Full Terms and Conditions at www.sureguard.com.au/terms