

# Integrated Solar Energizer

**WARNING: Read all Instructions**

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ENGLISH

## Models covered by this manual

This manual covers various energizer models:

0.15 J model S150 MkII / SXJ MkII / 702S MkII / PS15 MkII / SolarGuard 155

0.5 J model S500 / SXS / 705S

## Key to symbols on the energizer




The energizer should be opened or repaired only by qualified personnel in order to reduce the risk of electric shock.



Read full instructions before use.



This symbol on the product or its packaging indicates that this product must not be disposed of with other waste. Instead, it is your responsibility to dispose of your waste equipment by handing it over to a designated collection point for the recycling of waste electrical and electronic equipment. The separate collection and recycling of your waste equipment at the time of disposal will help conserve natural resources and ensure that it is recycled in a manner that protects human health and the environment. For more information about where you can drop off your waste equipment for recycling, please contact your local city recycling office or the dealer from whom you purchased the product.

 Do not connect to mains-operated equipment including battery chargers.

## Electric fencing and your energizer

Congratulations on the purchase of your energizer. This product has been designed using the latest technology and construction techniques. It has been engineered to give superior performance and many years of service.

It is important to read these instructions carefully and thoroughly. They contain important safety information and will assist you in ensuring that your electric fencing system gives maximum performance and reliability.

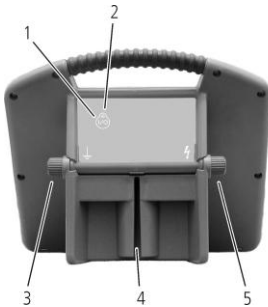
### *Warning!*




- Do not connect to mains-operated or line-operated equipment.
- Switch the energizer off before installation or performing any work on the fence.
- Do not connect simultaneously to a fence and to any other device such as a cattle trainer or a poultry trainer. Otherwise, lightning striking your fence will be conducted to all other devices.
- Read all the safety considerations carefully.
- Check your installation to ensure that it complies with all local safety regulations.

### *Notes:*

- This product has been designed for use with electric animal fences.
- Keep these instructions in a handy location.

## Parts of the energizer



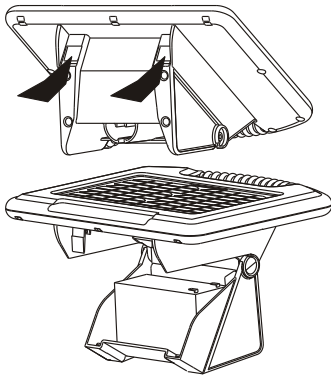
- 1 Power button 
- 2 Pulse indicator light
- 3 Fence earth terminal 
- 4 Post-mounting slot
- 5 Fence output terminal 
- 6 Solar panel
- 7 Battery
- 8 Battery compartment
- 9 Latches

# Installation

## Installing the battery

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- 1 Place the energizer on a flat surface. Open the battery compartment by pressing the latches firmly (see diagram below).
- 2 Insert the battery.
- 3 Connect the positive (red) lead to the positive (+) terminal on the battery.
- 4 Connect the negative (black) lead to the negative (-) terminal on the battery.
- 5 Close the battery compartment.



*Caution!* When connecting the battery, be careful not to short-circuit the supply terminals.

## Positioning the energizer

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Install the energizer:

- adjacent to the electric fence
- preferably in the middle of the electric fence
- where it will receive the most daily sun throughout the season

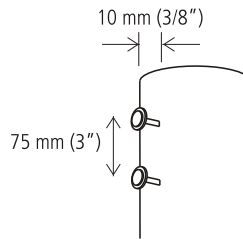
- where a good earth can be obtained
- on firm ground away from flooding and out of reach of animals and children (inside a protective fence, if required).

The solar panel should face north in the southern hemisphere and true south in the northern hemisphere.

## Mounting the energizer



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The energizer can be mounted directly onto a steel Y-post or T-post using the post-mounting slot. To mount onto a wooden post, use the hardware provided. Thread washers onto the nails. Space the nails 75 mm (3") apart (or one nail length). Hammer in the nails, allowing them to protrude by 10 mm (3/8"). Slide the energizer onto the nails with the washers inside the post-mounting slot.

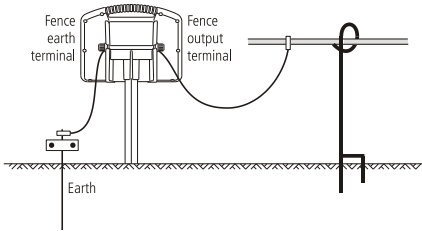


## Connecting to an electric fence

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- 1 Push a 1 m (3'3") earth rod fully into firm ground.
- 2 Connect the black lead from the Fence earth terminal  on the energizer to the earthing system.
- 3 Connect the red lead from the Fence output terminal  on the energizer to the fence. Make sure there is a good contact.

*Caution!* Make sure the connecting leads drop downwards from the energizer to prevent water from collecting at the terminals.





## Operation

### Switching on and off (0.15 J model only)

- 1 To switch on, press and hold  until the pulse indicator light gives one long flash.
- 2 To switch off, press and hold  until the pulse indicator light gives five short flashes.

### Switching on and off (0.5 J model only)

- 1 To switch on, press and hold  until the pulse indicator light stays flashing, indicating an output pulse.
- 2 To switch off, press and hold  until the pulse indicator light stops flashing.

### Pulse indicator light

The pulse indicator light flashes once for each output pulse.

## Battery protection mode

An intelligent battery management feature puts the energizer into Battery protection mode when battery charge falls below a 'safe operating level'. When in Battery protection mode, the energizer is still on, but it will not deliver a pulse to the electric fence.

The energizer will resume delivering pulses when the solar panel has charged the battery so that it is above the 'safe operating level'.

Alternatively, the battery can be disconnected, recharged with a battery charger, then returned to the battery compartment and reconnected.

### Run time extension (0.15 J model only)

The output pulse speed varies according to the battery charge level:

Battery charge level	Typical pulse rate
Normal	A pulse every 1.5 seconds
Low	A pulse every 3 seconds

### Run time extension (0.5 J model only)

To maximise the duration before the energizer automatically switches off, the energizer progressively decreases the pulse speed and output energy. The operating mode is determined by a combination of:

- the current battery voltage
- the sunlight available to charge the battery, and
- long term averages of each to determine seasonal effects.

# Battery information

## Battery charging

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The solar panel can fully charge a flat battery in two weeks, provided the energizer is switched off and there is adequate sunlight. The battery can also be charged using a 12 V battery charger suitable for charging rechargeable, lead-acid batteries. This should have an output voltage of 13.8 V and output current not exceeding 1 A.

When fully charged, the battery should be able to power the energizer for over three weeks (0.15 J model) or two weeks (0.5 J model) with no sunlight.

*Warning!* The battery must be disconnected and removed from the energizer before connecting it to a battery charger.

## Replacing the battery

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If a replacement battery is required, use a 12 V, 7 Ah, rechargeable lead-acid battery (suitable for all models). Do not use a non-rechargeable battery.

Do not dispose of the battery in a land-fill or in a fire.

In the event of a spill or leakage from a lead-acid battery:

- Contain small spills with dry sand, earth and vermiculite. Do not use combustible materials. If possible, carefully neutralise spilled acid with soda ash, sodium bicarbonate, lime, etc.
- Wear acid-resistant clothing, boots, gloves and a face shield.

- Do not let acid get into the sewerage system.
- Neutralised acid must be managed in accordance with approved local, state and federal requirements. Consult your state environmental agency and/or federal EPA.

## Removing and inserting the battery

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To remove and insert the battery:

- 1 Open the battery compartment. See step 1 of the procedure *Installing the battery* on page 3.
- 2 Disconnect the red and black leads connecting the battery to the energizer.
- 3 Lift out the battery.
- 4 Install the recharged or replacement battery. See steps 2-5 of the procedure *Installing the battery* on page 3.

*Caution!* When connecting the battery, be careful not to short-circuit the supply terminals.

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## Energizer maintenance

Clean the solar panel regularly with a soft cloth using glass cleaner or a mild solution of detergent and water. This will ensure the solar panel functions efficiently.

When transporting the energizer, protect the solar panel to prevent the glass surface from being damaged.

# Energizer storage

If the energizer is stored for an extended period, the battery may discharge and become damaged.

The energizer should be stored inside, next to a window, where sunlight can shine on the energizer each day.

If the energizer cannot be stored in a sunny position, it should be kept in a cool place. The battery should be fully charged and disconnected from the energizer. The battery should be recharged manually every six months using a suitable 12 V battery charger.

# Building a permanent electric fence

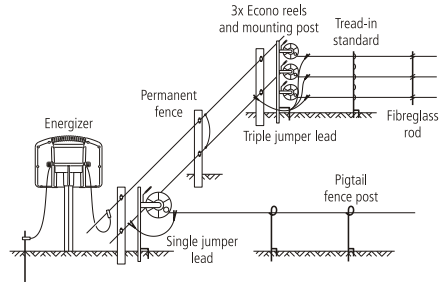
For information about building a permanent electric fence, refer to the Tru-Test Group website [www.tru-test.com](http://www.tru-test.com).

# Temporary electric fencing

Tru-Test Group offers a range of products that allow the farmer to construct a temporary electric fence. A temporary fence that can be quickly erected and easily moved allows the farmer to:

- Make smaller paddocks (fields)
- Keep herds of animals separated
- Ration feed

An example of a temporary fence is shown below.



# Safety considerations

## Definition of special terms

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*Energizer* – An appliance that is intended to periodically deliver voltage impulses to a fence connected to it.

*Fence* – A barrier for animals or for the purpose of security, comprising one or more conductors such as metal wires, rods or rails.

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

*Fence circuit* – All conductive parts or components within an energizer that are connected or are intended to be connected, galvanically, to the output terminals.

*Earth electrode* – 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 arrangements.

*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 security fence*— A fence used for security purposes which comprises an electric fence and a physical barrier electrically isolated from the electric fence.

*Physical barrier*— A barrier not less than 1.5 m (5') high intended to prevent inadvertent contact with the pulsed conductors of the electric fence. Physical barriers are typically constructed from vertical sheeting, rigid vertical bars, rigid mesh, rods or chainwire mesh.

## Requirements for electric animal fences

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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.

**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.

This energizer 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 energizer by a person responsible for their safety.

Children should be supervised to ensure that they do not play with the energizer.

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

An electric animal fence shall not be supplied from two separate 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 2.5 m (8'). 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.

A non-electrified fence incorporating barbed wire or razor wire may be used to support one or more offset 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 (6") from the vertical plane of the non-electrified wires. The barbed wire and razor wire shall be earthed at regular intervals.

Follow our recommendations regarding earthing.

A distance of at least 10 m (33') 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.

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 vehicle 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 the table below.

*Minimum clearances from power lines for electric animal fences*

Power line voltage	Clearance
≤1000 V	3 m (10')
>1000 V to ≤33,000 V	4 m (13')
>33,000 V	8 m (27')

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 (10'). 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 (6'6") for power lines operating at a nominal voltage not exceeding 1000 V.
- 15 m (50') for power lines operating at a nominal voltage exceeding 1000 V.

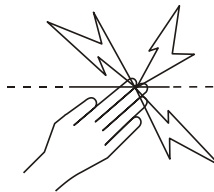
Electric animal fences intended for deterring birds, household pet containment or training animals such as cows need only be supplied from low output energizers to obtain satisfactory and safe performance.

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.

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 100x200 mm (4x8").
- 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:



or the substance of "CAUTION: Electric fence".

- The inscription shall be indelible, inscribed on both sides of the warning sign and have a height of at least 25 mm (1").

Ensure that all mains-operated, ancillary equipment connected to the electric animal 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.

## Servicing

This energizer contains no user serviceable parts. It must be returned to a service agent appointed by Tru-Test Group for repair.

## Troubleshooting

Problem	Action
The Pulse indicator light is flashing, but the electric shock delivered by the fence is weak.	<p>Check that all connections in the fence and earth system are firm and secure. If necessary, clean away any corrosion.</p> <p>Check that the earth rod is pushed firmly into firm ground.</p> <p>Check for faults in the fence-line caused by trees or vegetation. If necessary, remove obstructions and mend the fence.</p> <p>Check that the energizer is adequate for the length of the fence. If necessary, reduce the length of the fence or reduce the number of fence wires. Alternatively, divide the fence-line into smaller zones, with each zone powered by a separate energizer.</p>
The Pulse indicator light is not flashing.	<p>Check that the energizer is switched on.</p> <p>If there has been insufficient sunlight to charge the battery, the energizer may be in Battery protection mode. Charge the battery by placing the energizer in full sunlight with the solar panel facing true north in the southern hemisphere and true south in the northern hemisphere and .</p> <p>Ensure the battery is connected correctly with the positive (red) lead to the positive (+) terminal on the battery and the negative (black) lead to the negative (-) terminal on the battery.</p> <p>Try charging the battery manually using a suitable battery charger. See <i>Battery charging</i> on page 5.</p> <p>Replace the battery with a new battery. Before installing a new battery, charge it fully using a suitable battery charger.</p> <p>If the pulse indicator light is still not flashing, return the energizer to a service agent appointed by Tru-Test Group for repair.</p>

The battery needs frequent replacement.	Check that the solar panel is clean and is not damaged. See <i>Energizer maintenance</i> on page 5.  Make sure the energizer is positioned to receive maximum sunlight. If necessary, remove any objects or vegetation that might be casting a shadow on the energizer. See <i>Positioning the energizer</i> on page 3, or for more detailed information on solar installations, refer to the Tru-Test Group website <a href="http://www.tru-test.com">www.tru-test.com</a> .
(0.15 J model only) After the energizer is switched on, the pulse indicator light gives three long flashes (2 seconds) then the energizer appears to be off.	The energizer is in Battery protection mode because there has been insufficient sunlight to charge the battery. Charge the battery by placing the energizer in full sunlight with the solar panel facing true north in the southern hemisphere and true south in the northern hemisphere.
The pulse speed is irregular. The Pulse indicator light flashes quickly several times and then there is a pause.	There may be a problem with the energizer. Return the energizer to a service agent appointed by Tru-Test Group for repair.

## Product specifications

	0.15 J model	0.5 J model
Power source	12 V, 7 Ah, rechargeable lead-acid battery (all models)	
Average current consumption	<20 mA	15-50 mA
Maximum output		
Voltage	up to 10 kV	up to 9.6 kV
Energy	up to 0.15 J at 2000 $\Omega$	up to 0.52 J at 600 $\Omega$
Typical output at 500 $\Omega$		
Voltage	up to 2.6 kV	up to 4.8 kV
Energy	up to 0.13 J	up to 0.51 J
Stored energy	0.21 J	0.64 J

Unless otherwise stated, values are typical and normal production tolerances of  $\pm 10\%$  should be allowed for