



# speedrite™

By **TRU-TEST®**



# FENCE MANUAL



# Manual Contents

Why Electric Fencing	1
Planning	2
Layout and Construction	2
Fence Recommendations	4
Energizer Selection	6
Energizer Installation	9
Earthing	9
Lightning Protection	13
Fence Construction	14
Permanent Fences	14
Branches/Leadout Wires	14
Fence Types	14
Straining Assemblies	17
Wire	19
Fence Connection	20
Flood Gates	21
Gates	21
Temporary Fence Construction	23
Fence Rejuvenation	24
Fault Finding	25
Electric Fencing Terminology	27
Speedrite Fencing Check List	28

# Why Electric Fencing?

An electric fence energizer takes electric energy from a power source and delivers it to a fence as pulses. These pulses are commonly referred to as the "shock" felt by any animal which touches an electrified fence. Unlike conventional fences, an electric fence is a psychological barrier, such that animals learn to respect the fence.

Benefits of electric fencing:

- Low cost - requiring less labour and material than conventional fencing.
- Easy to construct and uses light materials.
- Long life - animals don't lean on fence.
- Economically controls all domestic and feral animals; if animals force their way through electric fences they are usually not hurt.
- Flexibility - wire spacings and fence design can be modified to control a variety of animals.
- Portability - strip grazing and back fencing is easy and fast to build and move.
- Encourages additional subdivision giving increased production.
- Extends the life of existing fences through the attachment of electrified stand-offs.
- Discourages trespassers and predators.
- Provides environmental protection by offering a low cost portable barrier around trees/forest and river banks.

# Planning

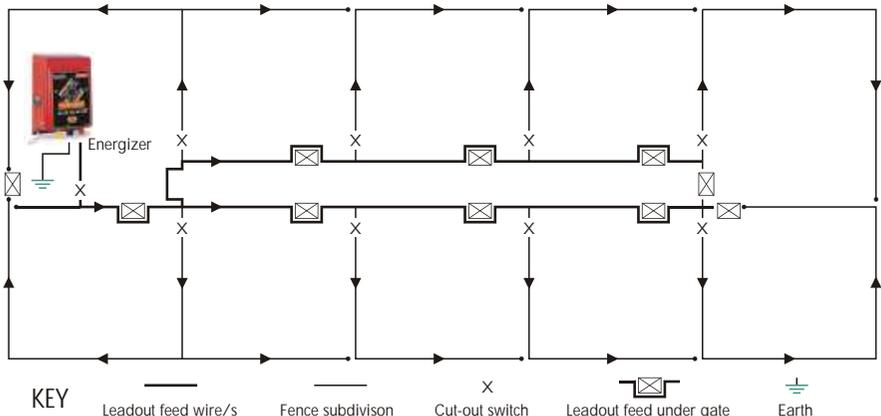
Before starting an electric fencing project, it pays to draw up a plan of what you eventually want to achieve. The overall layout of the electric fence system deserves careful planning, because it will govern the amount of time spent checking and maintaining the fence in the future. Key factors that will influence your fence design are the geography of your farm, the types of animals you wish to control, and the location of your power supply.

Length of fence required to enclose fields of different sizes

AREA GUIDE	<p>1 Acre = .4047 ha 1 Mile = 1.6 km 1 Rod = 5 metres</p>	<p>80 acres (32.375 hectares) Requires 1½ miles (2.4 km) or 480 rods of fence to enclose</p>	
	<p>160 acres (64.75 hectares) Requires 2 miles (3.2 km) or 640 rods of fence to enclose</p>	<p>½ mile (800 metres) or 160 rods</p>	
	<p>40 acres (16.187 hectares) Requires 1 mile (1.6 km) or 320 rods to enclose</p>	<p>¼ mile (400 metres) or 80 rods</p>	<p>¼ mile (400 metres) or 80 rods</p>
	<p>½ mile (800 metres) or 160 rods</p>	<p>20 acres (8.094 hectares) Requires ¾ mile (1.2 km) or 240 rods to enclose</p>	<p>10 acres (4.047 ha) Requires ½ mile (800 m) or 160 rods to enclose</p>

## Layout and Construction

The diagram below illustrates a sample layout for a flat rectangular farm. The same principles can be applied to hill farms or farms of a different shape. A lane, race or roadway down the centre or alongside the area to be subdivided or fenced is usually a good idea so that stock are easily moved and checked, and if necessary, water pipes can be laid down the lanes.



Subdivision fences can be fed from the main fence or leadout wire. To assist with possible fault finding later, these fences should be kept relatively short, each connection should be made at one point only and should be through a cut-out switch (SA064).

### Energizer Location

The best site for an energizer is at the hub of a number of radiating fences. This will minimise the length of (and therefore the voltage loss along) each fence connected to the energizer, resulting in maximum voltage at the end of each fence.

### Size and Shape of Paddocks

Paddocks should be as close to square as possible for better utilisation with more even grazing and less walking by the animals. Long narrow paddocks are over-grazed at the front and under-grazed at the back and tracks are created in from the gateway. The comparatively low cost and ease of construction of electric fencing allows more and better shaped paddocks, lane ways and races.

In hill country it is advisable to fence to the contour so that flat areas, sunny slopes and shady slopes are all separate.

The size of paddocks is not important, what is important however, is the number of paddocks per farm, to allow controlled grazing, easy conservation of hay and silage, and to enable longer rotations during periods of slow growth.

### Number of Paddocks

If you farm sheep intensively, you may want as many as 100 paddocks. This enables the sheep to be moved daily on to a fresh paddock on a three month rotation during slow or zero growth periods. When there are lambs and ewes during spring, two or more flocks can be grazed on a faster rotation.

If you farm dairy cows or beef cattle, 30 to 50 paddocks are usually sufficient, because cattle are easier to strip graze with only one or two wires when longer rotations are necessary during periods of slow growth.

Care should be taken when animals are first experiencing electric fencing, particularly with horses and deer. Ensure that the animals have plenty of room to run.

# Fence Recommendations

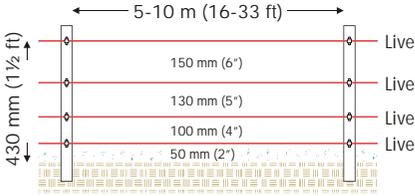
Suggested post and wire spacing for permanent fencing, depending on contour.

Note: Most fence examples below can be All Live or Earth Wire Return System.

## Posts only

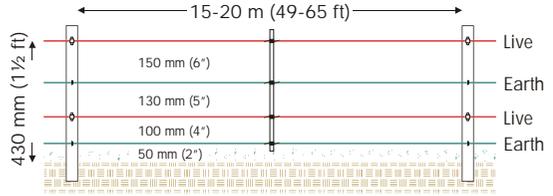
4 Wire Feral

5-10 m spacing, posts only



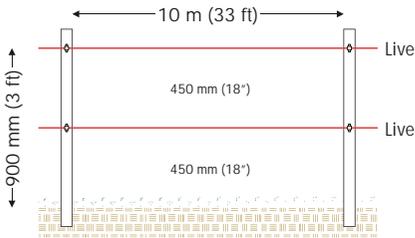
## Posts with droppers

15-20 m spacing with droppers

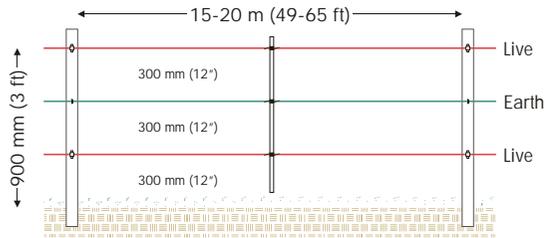


## Cattle and Horses

10-15 m spacing, posts only

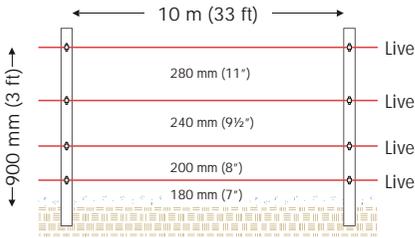


## 15-20 m spacing with droppers

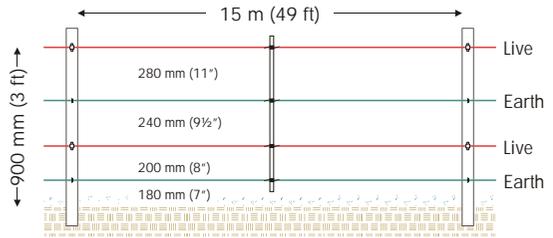


## Sheep, Cattle and Horses

10 m spacing, posts only

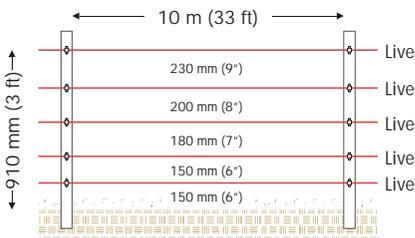


## 15 m spacing with droppers

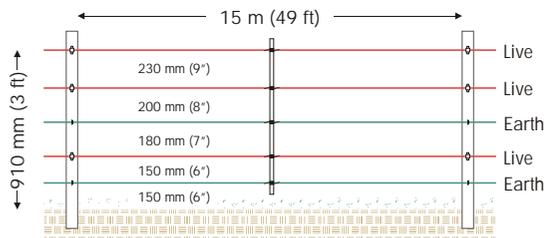


## Goat, Sheep, Cattle and Horses

10 m spacing, posts only

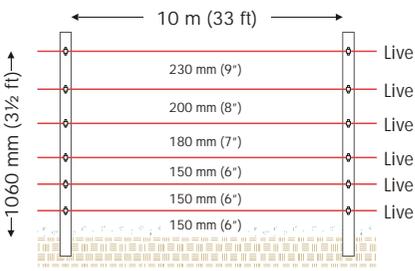


## 15 m spacing with droppers

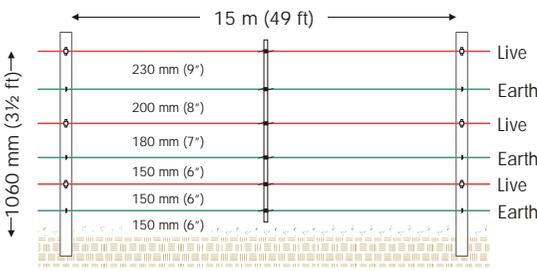


## 6 Wire Boundary or Subdivision

10 m spacing, posts only

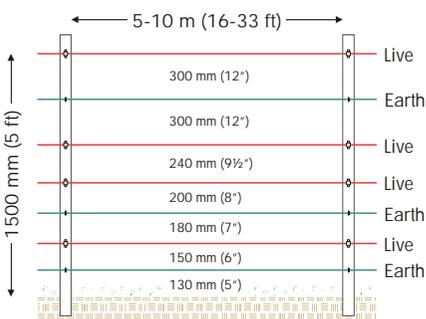


15 m spacing with droppers



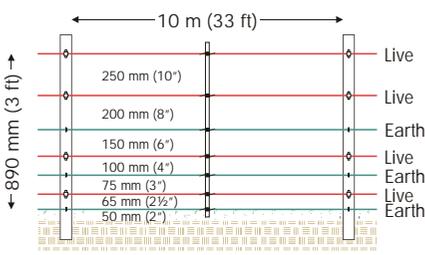
## 7 Wire Boundary

5-10 m max, posts only



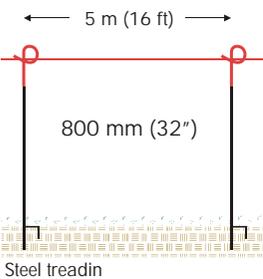
## 7 Wire Feral

10 m spacing with droppers

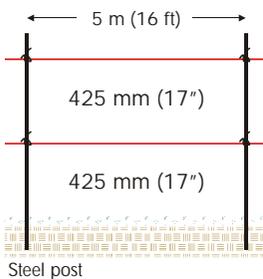


## Suggested Wire and Post Spacing for Temporary Fencing:

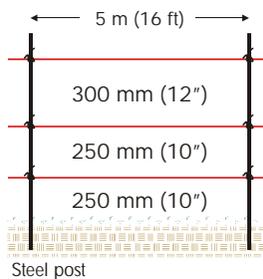
Dairy Cattle



Cattle



Sheep



1 km = 0.62 miles  
1 mile = 1.6 km

1 m = 3 foot, 3 inches  
1 foot = 305 mm

100 mm = 4 inches  
1 inch = 25.4 mm

## Energizer Selection

### The Right Energizer For You

Before deciding which energizer is required you will need to take the following points into consideration. Note that it is essential to compare different energizers on the same basis. Some energizers refer to stored energy, which is the energy stored inside the energizer, and which does not necessarily relate to energy delivered to the fence. Others refer to output energy, which is the energy delivered by the energizer, and is a more relevant measure for energizer performance comparisons.

#### Power Source

**Mains** - Mains powered energizers are the most cost efficient and effective means of powering fence wire.

**Battery** - Battery powered energizers range from low powered energizers for temporary fencing to high powered solar/battery models for multi-wire permanent systems.

Operating time from a battery, or "battery life", is directly related to the battery's capacity and the output energy of the energizer.

**Solar** - Solar powered kits consist of an energizer and solar panel(s). The solar panel(s) will complement the particular energizer to adequately charge the battery, which in turn powers the energizer even in periods of little or no sun. These kits are ideal for isolated areas and long fence lines where no mains power is available.

#### Usage

Determine if the energizer will be used for permanent fencing or temporary (strip grazing) fencing.

#### Output Energy

As an approximate guide, 1 joule of output energy will power 10 kilometres (6.25 miles) of single fence wire. The length of fence an energizer can electrify effectively will vary considerably depending on the type of fence, number of wires, climatic conditions, vegetation etc. Speedrite has an electric fence energizer to suit every application and does not recommend the use of very high power energizers to overcome faulty insulation and fence erection. In some circumstances the installation of two or more energizers on a farm is preferable to connecting all fence lines to one energizer. Two or more energizers give the farmer more options and a degree of flexibility with farm management.

#### Caution:

In no circumstances should more than one energizer be connected to the same fence.

#### Speedrite Energizers

Speedrite energizers are designed to comply with international standards and carry a full 24 month warranty. Please read installation and safety instructions before installing your energizer.

## The Speedrite Panther range of mains energizers



- Panther 500**  
(Not available in some countries)
- 0.5 J max output energy
  - 220-240 V (SE130)
  - 110-120 V (SE128)



- Panther MB3000**  
(Not available in some countries)
- 3.0 J max output energy
  - 220-240 V AC / 12 V DC (SE127)
  - 110-120 V AC / 12 V DC (SE124)



- Panther 1000**  
(Not available in some countries)
- 1.0 J max output energy
  - 220-240 V (SE131)
  - 110-120 V (SE129)



- Panther 5800**
- 5.3 J max output energy
  - 230-240 V (SE005)
  - 110-120 V (SE064)



- Panther 1200**
- 1.15 J max output energy
  - 220-240 V (SE009)
  - 110-120 V (SE068)



- Panther 9800**
- 9.4 J max output energy
  - 230-240 V (SE003)
  - 110-120 V (SE062)



- Panther 2400**
- 2.3 J max output energy
  - 220-240 V (SE007)
  - 110-120 V (SE066)



- Panther 12000**
- 12 J max output energy
  - 230-240 V (SE123)



- Panther 3200**
- 3.2 J max output energy
  - 220-240 V (SE125)
  - 110-120 V (SE132)



- Panther 20000**
- 20 J max output energy
  - 230-240 V (SE120)



- Panther 25000**
- 25 J max output energy
  - 230-240 V (SE118)

## The Speedrite Viper range of battery energizers



Viper AN45 (SE114)

- 0.04 J max output energy
- 4x 1.5 V alkaline batteries or 12 V external



Viper 1500 (SE119)

- 1.5 J max output energy
- 1x 60-100 Ahr storage battery (12 V DC)
- Optional Solar Kit



Viper AN90 (SE117)

- 0.12 J max output energy
- 4x 1.5 V alkaline batteries or 12 V external
- Optional Solar Kit



Viper 3000 (SE126)

- 3.0 J max output energy
- 1x 80-100 Ahr storage battery (12 V DC)
- Optional Solar Kit



Viper 1000 (SE116)

- 1.0 J max output energy
- 1x 60-100 Ahr storage battery (12 V DC)
- Optional Solar Kit



Viper 5000 (SE103)

- 5.0 J max output energy
- 1x 100-120 Ahr storage battery
- Optional Solar Kit (12/24/36 V)



Viper 9000 (SE101)

- 9.0 J max output energy
- 2x 100-120 Ahr storage batteries
- Optional Solar Kit (12/24/36 V)

# Energizer Installation

## Mains Powered

Mains powered energizers should be installed indoors or protected from the weather, about 2 m (6 ft) above floor level, out of reach of children and near a power point. Install energizers in accordance with the instructions provided with every Speedrite Panther energizer.

## Battery Powered

Battery powered energizers can be installed either indoors or outdoors and where possible should be mounted out of reach of children and livestock. Install energizers in accordance with the instructions provided with every Speedrite Viper energizer.

Battery energizers which run off internal dry cell batteries (eg. Viper AN90 and Viper AN45) can be attached directly to the fence wire.

## Solar Panel Installation

Install the energizer on the underside of the Speedrite Solar Panel. Solar panels should be erected out of reach of children and animals. If possible position the solar panel and energizer in the middle of your fence system, with the panel facing the midday sun, and adjust its angle for maximum sun during winter. In the northern hemisphere the panel should face south and in the southern hemisphere the panel should face north. Full instructions are provided with the Speedrite Solar Kit. Note that in Australia and NZ the Viper AN90 solar energizer comes complete with battery and durable heavy-duty stand.

## Safety

Double insulated underground/leadout cable (SC005) is recommended for increased durability and protection. Output and earth wires should be kept well clear of power lines or water pipes around the home, and away from flammable materials. Energizer earth rods must be a minimum of 10 m (33 ft) from mains power and other earth rods. Care must be taken to read the safety instructions supplied with every energizer.

## Earthing

Earthing is the most important component of any electric fence system.

### Earthing

For an electric fence to be effective, the electrons travelling from the energizer and along the wires must be able to complete their circuit, through the ground and back to the earth terminal on the energizer. Electrons go to ground either through an animal making contact with the fence, and/or through "leakage" or "shorting" from conductive objects (ie long grass) making contact with the wires. Consequently an adequate earthing system is essential to then capture the electrons in the soil. This is usually done in the form of earth rods, the quantity of which is directly related to the number of electrons that need to travel in the soil. Larger energizers exerting more power, or longer fence lines being subject proportionally to more leakage, will require substantially more earthing.

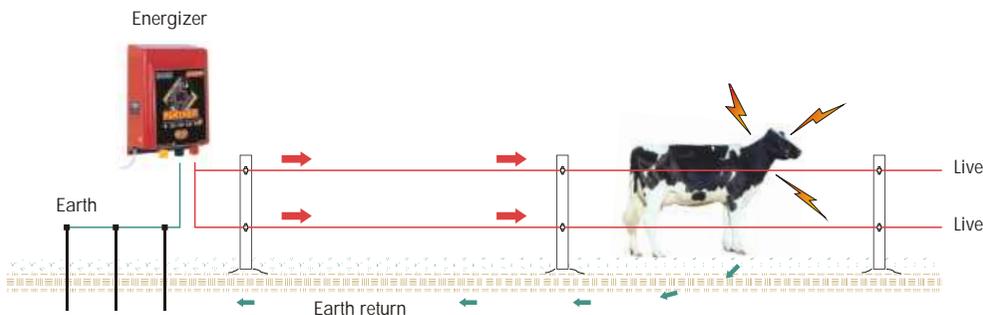
Certain soil types and dry soil are not good conductors, requiring the electrons to spread out and travel over a wide area, usually towards moist mineral soils.

Care must be taken to install the earthing system in a site that is damp all year round, or for drier conditions, install more earth rods or adopt one of the other earthing systems recommended for dry areas (Earth Wire Return/Bentonite). Refer to Bentonite Salt Earth System at the bottom of this page.

It is also important to remember that an earth system installed in winter, which is adequate for winter conditions, may not be suitable for summer and could explain a dramatic loss in power over those summer months.

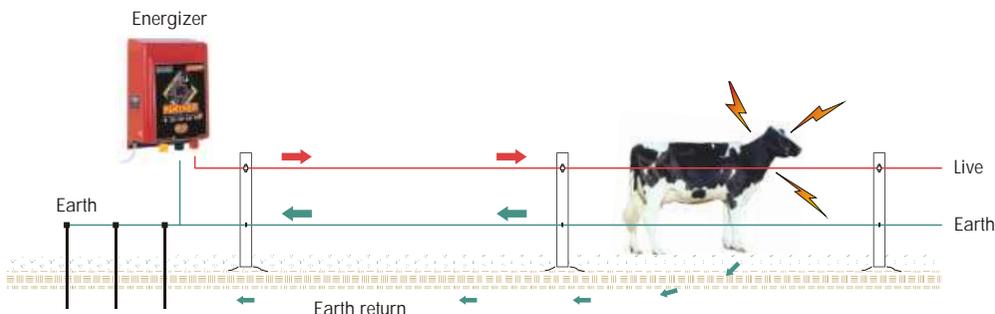
### All Live System

This system is recommended where there is good soil conductivity. The fence is made live with the earth completing the circuit, thus when the animal touches the fence it gets a full shock.



### Earth Wire Return System

This system is recommended where there is little or no soil conductivity (eg dry soils). Alternate wires are made live and earth so that the animal gets a full shock when touching both. The energizer is connected to both the earth and live fence wires, and using an earth system as described earlier. In long fence lines you should put a galvanized earth rod every kilometre (0.6 miles) along the fence and connect the earth wires to it.

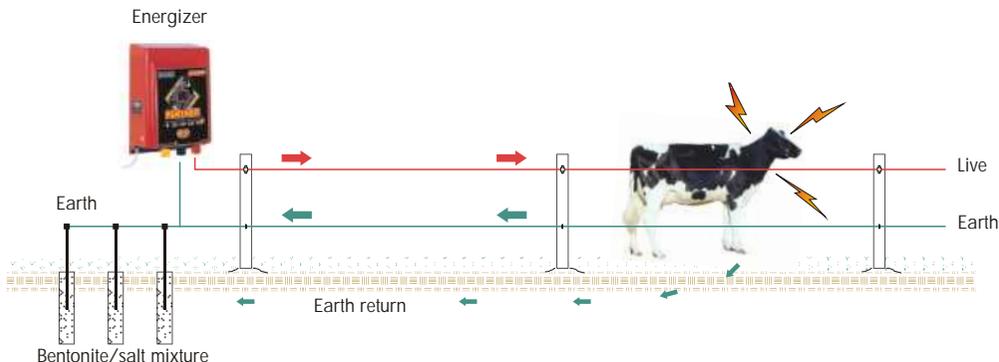


### Bentonite Salt Earth System (Use Speedrite Super Earth Kit - SA066)

This system is highly recommended for both dry and extremely dry soil conditions, as the salt is an excellent conductor and attracts moisture, which the bentonite retains. Fill each hole with the bentonite/salt mixture provided in the Speedrite Super Earth Kit (SA066). Push the stainless steel rod provided down the centre of the hole.

Connect the Super Earth Kits in sequence and attach to the energizer and earth fence wire to complete the earth return. Stainless steel earth rods are used to avoid salt corrosion.

In drought conditions it may be necessary to water the earthing system. Full installation instructions are included with the product.



### Earth Rods

Drive Speedrite earth rods (SA067/Australia AA770) into the ground at your selected damp site. The distance between earth rods should be no less than 3 m (10 ft). Ensure that the number of earth rods is appropriate for your energizer size (refer table below).

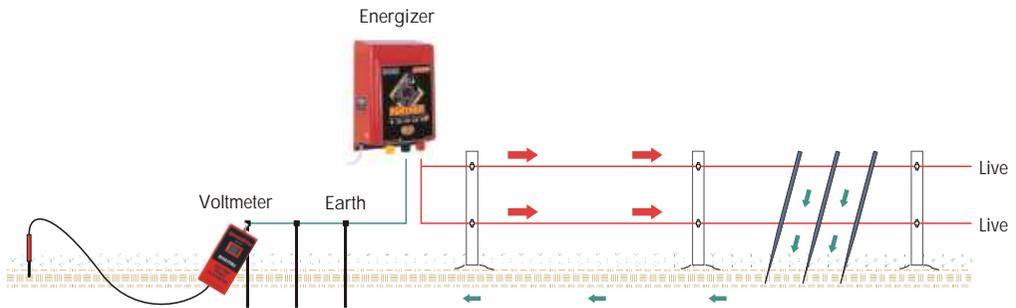
Energizer model	Minimum number of 2 m (6 ft) earth rods required
<b>Mains Powered</b>	
Panther 25000	5
Panther 20000	4
Panther 12000	3
Panther 9800	3
Panther 5800	2
Panther 3200	2
Panther MB3000	2
Panther 2400	2
Panther 1200	1
Panther 1000	1
Panther 500	1
<b>Battery Powered</b>	
Viper 9000	3
Viper 5000	2
Viper 3000	2
Viper 1500	1
Viper 1000	1
Viper AN90	1
Viper AN45	1

Join the earth rods with Speedrite earth clamps (SA052) and 2.5 mm (12 gauge) Speedrite insulated cable (SC005). Alternatively galvanized pipes and galvanized steel posts can be used for earth systems. For maximum earthing effectiveness in dry conditions, Speedrite Super Earth Kits (SA066) (bentonite system) should be used. Spacing between each Super Earth Kit should be no less than 10 m (33 ft). Earth energizers at least 10 m (33 ft) from all electrical and other earth systems or buildings, to avoid energizer interaction between energizer earths and potential AC supply earths. Depth of earth rods is essential, and where possible, one deep earth rod will provide a more effective earth than a number of short rods. In situations where an earth cannot be set up in close proximity to the energizer, you may be able to use an existing fence line to connect to a remote earth system.

### Testing Your Earth

1. Turn the energizer off.
2. At least 100 m (330 ft) away from the energizer, heavily short circuit the fence by laying several steel rods or lengths of pipe against the fence.
3. Turn the energizer back on.
4. Using a Speedrite Digital Voltmeter (ST010), first check that the fence voltage is below 2 kV, then check your earth system. Insert the voltmeter's earth probe into the ground at the full extent of the lead, and hold the hook against the last earth rod.
5. The tester should not read more than 0.3 kV. Anything higher than this indicates better earthing is required. Either add more earth rods or find a better ground area to drive your existing earth rods into.

Note: Earthing energizers installed in dairies. Earth at least 20 m (65 ft) away from dairy using double insulated wire to avoid touching the dairy building or equipment.



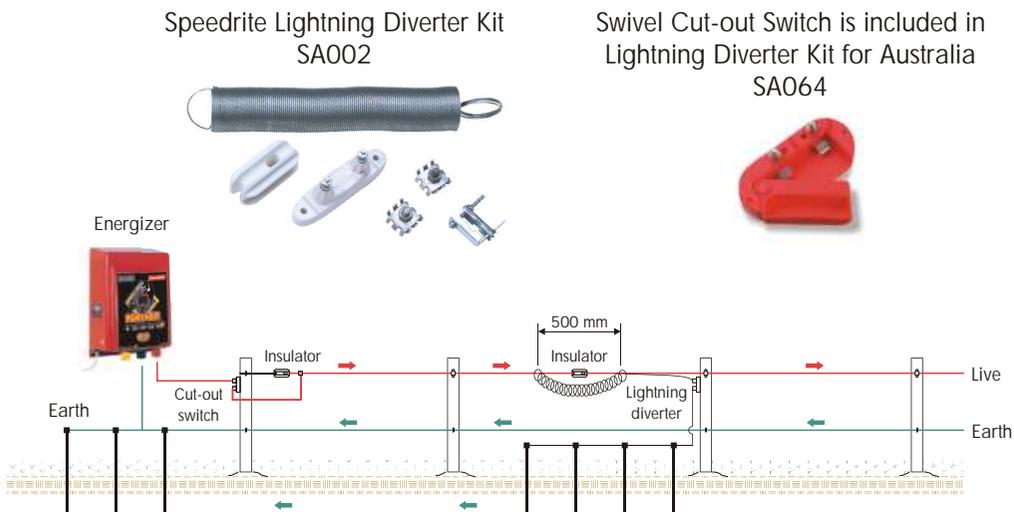
Many farmers are reducing the effectiveness of electrified fencing by failing to earth their systems adequately. Common causes of inadequate shock are:

- Badly joined wires
- Poor connections to earth rods
- Earth rods too close together
- Earth rods not long enough
- Insufficient depth of earth rods
- Insufficient number of earth rods
- Electrolysis through joining mixed metals, eg. copper wire to galvanised rods.

Note: Good depth is important to good earthing.

## Lightning Protection

Lightning will always find the quickest and easiest way to earth. By installing a Speedrite lightning diverter (SA002) with an effective earth you can minimise the likelihood of energizer damage. The earthing system for the lightning diverter should be a minimum of 20 m (65 ft) from the energizer earth. Damage can also be minimised by unplugging the energizer and disconnecting it from the fence line and earth before electrical storms. There is no lightning protection device which will give you 100% protection, especially if the fence or energizer has a direct strike. In areas subject to severe lightning storms a voltage spike protector plug at the wall socket is recommended. This will reduce damage to your energizer through energy surges from your power source.



Note: It is important that the earth system for the lightning diverter is more substantial than the earth system of the energizer. For example, if the energizer earth system uses three rods, the lightning diverter system should use four rods.

# Fence Construction

## Permanent Fences

### Branches/Leadout Wires

Reduce the risk of voltage drop between the energizer and the fence line by correctly installing leadout wires. Leadouts can be run either overhead or underground. Consider the following options in order of preference:

- Use a well constructed 4-5 wire electric fence as a leadout.
- Use electric fence curlon stand-offs (SI001) to attach leadouts to a conventional fence and 3.15 mm (10 gauge) wire if practical.
- Use 2.5 mm (12 gauge) high tensile wire with curlon stand-offs spaced at 10-15 m (10-15 yards) at a height of 800 mm (2 ft 6 in) or less depending on vegetation. (Leadout wires close to the ground increase the risk of voltage drop due to leakage through vegetation.)
- Electrify the top two wires of an existing fence ensuring battens and posts are insulated.
- Attach fibreglass outriggers or insulated droppers to existing fence posts to carry leadout wire overhead. If the earth return wire (see earthing) is also being carried care must be taken to keep these well away from each other.
- Branches off an electric wire should be tailed off as close as possible to the energizer. Keep stray wires well away from leadouts or indeed the entire fence line. Where leadout wires are likely to come in contact with another object use Speedrite Insulators or Heavy Duty Insultube (SA034).
- The longer a leadout wire the greater its resistance. Resistance of the wire is one of the biggest obstacles to overcome. Larger diameter wires have less resistance and therefore allow better current flow.
- The table below shows the DC resistance in ohms of a single galvanised steel fence wire over 1 km (0.6 miles). The lower the resistance the better.

Wire Diameter	Wire Resistance
4.0 mm (8 gauge)	14 ohms/km
3.15 mm (10 gauge)	22 ohms/km
2.5 mm (12 gauge)	35 ohms/km
1.6 mm (16 gauge)	90 ohms/km

- Two wires of a given diameter, connected in parallel, will have half the resistance of a single wire and can therefore be better than a single larger diameter wire.

### Fence Types

#### Wood Post - Treated Timber and Fibreglass

Used with a fibreglass system and fitted with quality high density polyethylene insulators, tanalised posts will provide a more rigid and visual barrier while not detracting from the insulation and psychological properties of an electric fence system (see example next page). In softer ground they can be driven straight into the ground, or in hard tight soils a spike can be used to form a hole before the post is inserted.

Speedrite Wood Post Insulators and Accessories include:



Wood Post (Claw) Insulator  
SI0291



Wood Post (Pinlock) Insulator  
SI027



End Strain Insulators  
SI018 / SI031



Wood Post Supershed  
Staple On Insulator  
SI041

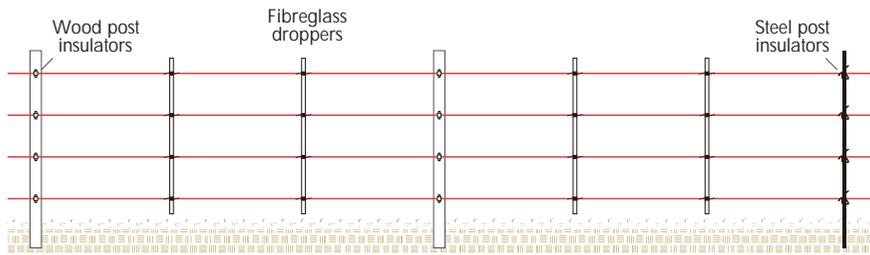


Heavy Duty Line Tap (Joining Clamp)  
SA052



Cut-Out Switch  
SA064

Wood Post / Steel Post Fencing



## Steel Post

Ideal for fences where their strength and rigidity provide a more visual and physical barrier. Most suited to broken hill country terrain. A combination of steel posts, heavy duty Speedrite insulators and fibreglass droppers provides an effective fence (see example on previous page).

## Speedrite Steel Post Insulators and Accessories



Steel 'Y' Post Insulator  
SIO25



RP12



Rod Post Insulators

RP14



Steel 'T' Post Insulator  
TP9



Steel 'T' Post Insulator  
SIO35

## Fibreglass

Proven worldwide as a lightweight, high strength, no maintenance material in many applications, and widely accepted for electric fencing. The perfect insulation qualities of fibreglass, ease of handling in even the most rugged conditions and speed of erection make it a particularly effective low cost fence material, reducing the need for heavy timber posts and insulators.

## System Components



Post Clips  
(clips firmly to post but allows  
wire to move freely)  
10 mm SF031  
12 mm SF0154



Fibreglass Posts  
Silicone bonded  
High quality fibreglass  
Various lengths & diameters available

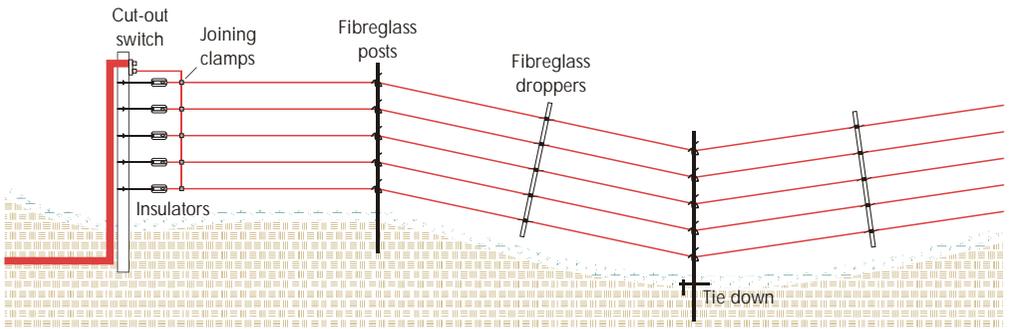
## Dropper Clips

A dropper clip locks wire firmly to a fibreglass dropper. It is for use between posts to maintain wire spacing and to provide a more visual barrier. Droppers should be fixed to the fence when wires are at the desired strain. Dropper clips slide to any point on the rod by simply bending back the wire clips, which releases the pressure. Slip one wing return over fence wire, and lever the other end under the wire with a screwdriver or large nail.

### Dropper Clip Connection



## Fibreglass Fencing



## Straining Assemblies

Strainers are the foundations of a fence line. A wood post, 2.1 m (7 ft) x 150 mm (6") diameter is most suitable for an electric fence end strainer.

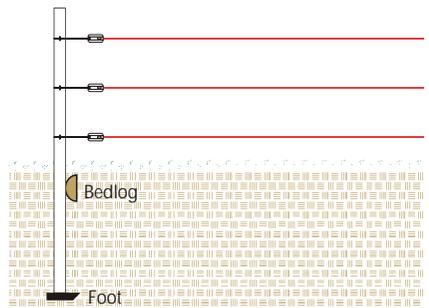
There are several ways of installing a strainer assembly, the most important thing to remember is that it must be able to withstand the wire strain applied to it.

### Bedlog

Suitable for firm soil, low tension strainer.

A bedlog (breastplate), horizontal or angle stay will be required to eliminate any movement of the fence strainer and keep the fence wires taut.

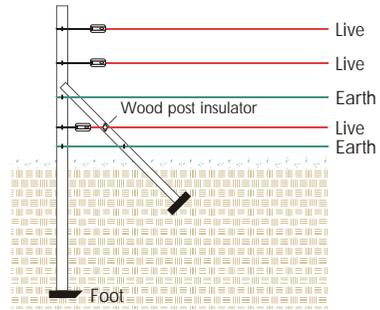
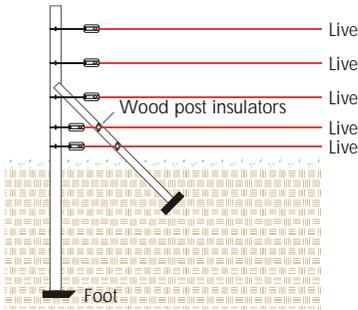
A foot installed at the base of the strainer, and wired up the post, will eliminate any rotation of the post when the wire is strained.



## Angle Stay

Suitable for field gate, high tension strainer.

After firmly setting the footed strainer in the ground, dig in the stay block just below ground level, at a distance to ensure the angle stay will be held snugly in position. The stay can be levered into position with a spade.



All Live System

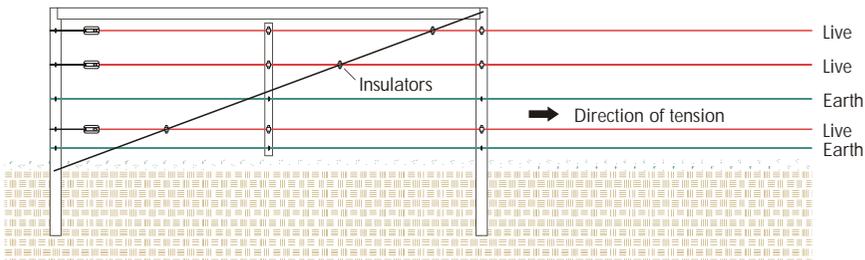
Earth Wire Return System

## Horizontal Stay

Suitable for field gate, high tension strainer.

Very simple to erect and most suitable as a high tension strainer, excellent in areas where the soil gets very wet or where heavy frost occurs.

Note: Feral fencing requires high strains, therefore it is recommended that a suitable stay is installed. eg. a horizontal stay.



## Tensioning and Straining

Electric fencing is a psychological rather than a physical barrier, therefore there is no need to excessively tension wire. There is also no need for heavy end strain assemblies, thus reducing the overall cost of construction.

The recommended strain on electrified wires is 900 Newtons (90 kg, 200 lbs), compared to 1500 Newtons (150 kg, 340 lbs) for conventional fences. Tension can be measured on each wire with a tension meter. Greater tension may be required for the control of feral animals.

Speedrite Tensioning and Strainer Accessories include:



Black Insulated Wire Strainer  
SA018



White Insulated Wire Strainer  
SA014



Porcelain Wire Strainer  
SA012



Permanent Wire Strainer  
SA010



In-line Wire Strainer  
SA016



Black End Strain Insulator  
SIO31



White End Strain Insulator  
SIO18

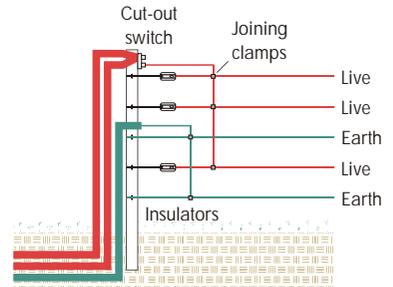


Porcelain End Strain Insulator  
SIO23

## Wire

For most fences it is preferable to use hi-tensile wire instead of soft wire because its non-stretch qualities prevent it from sagging and causing shorts.

2.5 mm (12 gauge) hi-tensile wire is suggested for use with permanent fencing as thinner gauges have greater resistance and so are less effective. For longer leadout lines with energizers that exceed 10 joules output, use two live wires coupled in parallel or a larger diameter (4.0 mm, 8 gauge) wire.



## Wire Joints

Incorrectly joined wires can significantly reduce electric fencing performance.

Below are the recommended wire joints for a good electrical contact.



## Barbed Wire

Barbed Wire is not to be used with electric fencing for the following reasons:

- Electric fencing is the deterrent not sharp barbs
- Barbs may prevent a person or animal moving away from electric shock
- Barbs can create a short circuit by getting tangled with other fence lines
- Barbs can cause damage to pelts and serious bruising to animals

## Fence Connection

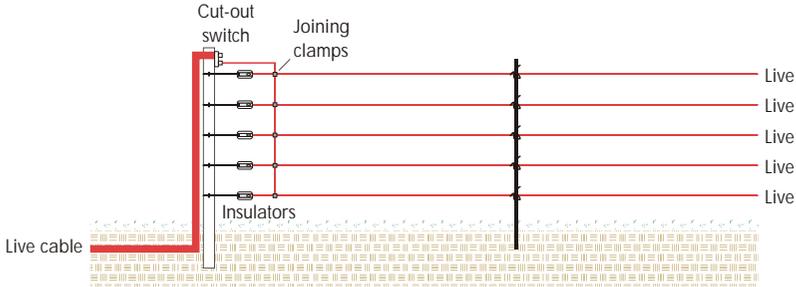
On an Earth Wire Return System, interconnect all the earth wires and all the live wires with underground cable (SC005) and joining clamps (SA052) at each end of the strain. This will greatly reduce the overall wire resistance.



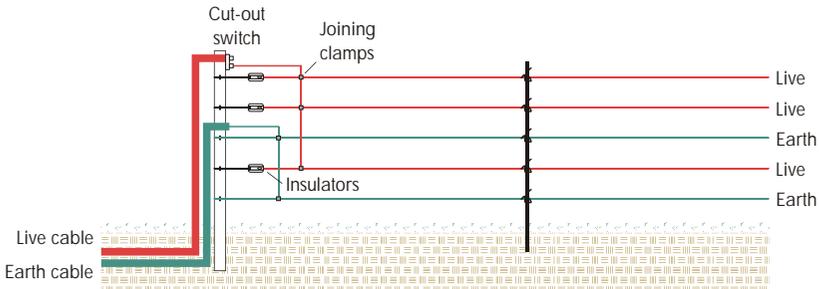
## All Live System

Joining Clamp  
SA052

Underground Cable  
SC005



## Earth Wire Return System



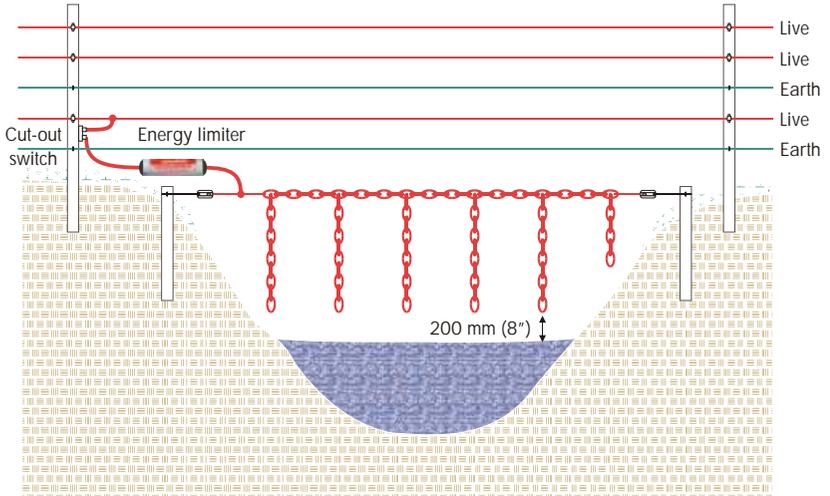
## Flood Gates

The use of an Energy Limiter (SA038) in both flood gates and vegetation leakage problem areas will avoid the entire fence from being shorted out. A single strand of 3 mm (1/8") galvanized chain is strained between 2 insulated points above the highest flood level. From this other lengths of chain are hung at 150-300 mm (6"-12") intervals keeping ends approximately 200 mm (8") above average summer water level. The energy limiter is connected between the fence and the floodgate and limits the amount of power on the flood gate during a flood so that the remainder of the fence continues to have high voltage. Placement of a cut-out switch is recommended where there is a likelihood that water levels will remain high for an extended period of time.

## Flood Gate



Energy Limiter (SA038)

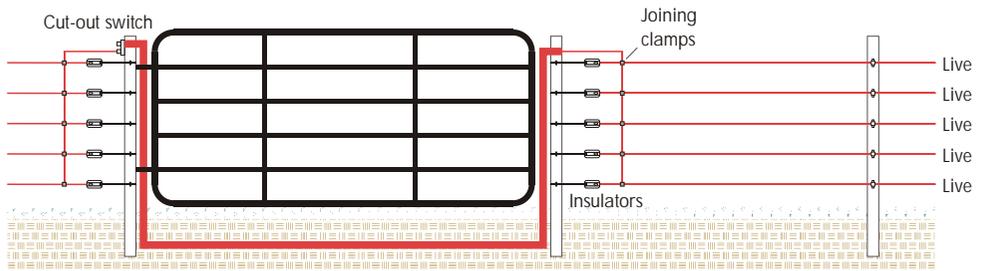


## Gates

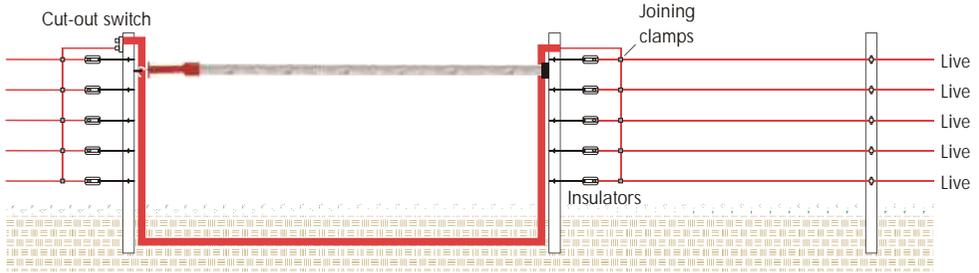
When by-passing gateways proper protection of live wires is essential. The wire should be encased in a high density polythene pipe, buried at least 300 mm (12") deep. Turn the ends of the pipe down, well above ground level, to keep water out. If ordinary wire is used, moisture can develop and corrode the wire. Therefore we recommend that underground cable (SC005) be threaded through the pipe. Double insulated, high quality underground cable is essential to the performance of the entire fence system.

Insulation on low quality thin cable can perish underground or have insufficient insulation at high voltages, which can cause a drop in fence voltage or a complete short circuit.

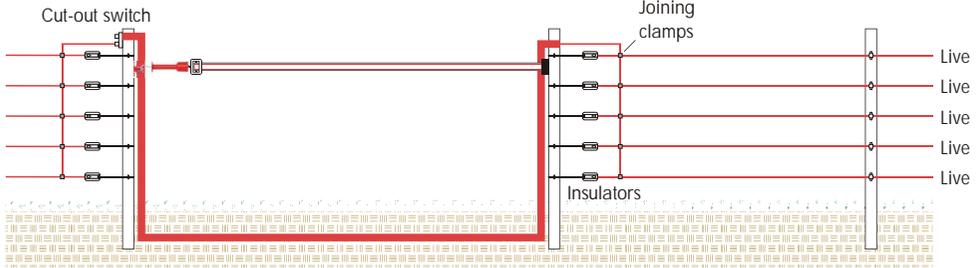
## Conventional Gate



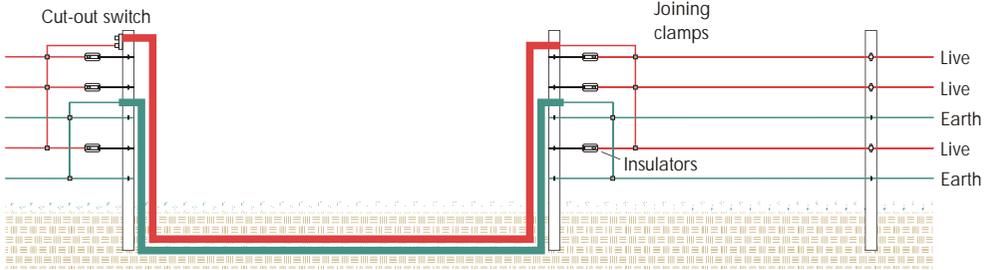
## Spring Gate



## Tape Gate



## Earth Wire Return System



## Speedrite Gate Accessories include:



Spring Gate  
SA044



Tape Gate Kit  
SA039



Gate Break  
SA042



Compression Gate Break  
SA042C



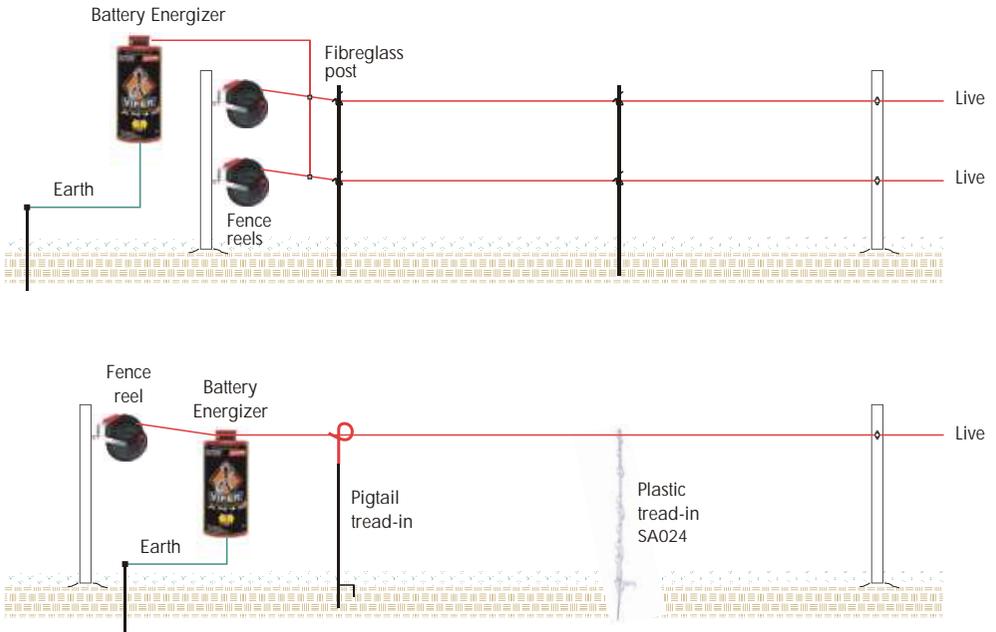
Underground Cable  
SC001  
SC003  
SC005  
SC007

# Temporary Fence Construction

Temporary fencing gives you the versatility to strip graze, make temporary paddocks or pens and to protect trees and gardens from damage by stock and feral animals.

Strip grazing for controlled rotational grazing is an excellent method of achieving maximum pasture utilisation. For best early re-growth of pasture, back fencing of the areas already grazed is recommended, refer to page 5 for recommended wire spacings. Generally the fence is moved daily. The distance it is moved is based upon the number of animals being grazed and the quality and quantity of pasture available. It will be necessary with this type of grazing to provide a portable water supply for livestock that can be moved with each break.

Suggested strip grazing installations are as below:



Speedrite Strip Grazing Accessories include:



Poliwire

Politape

Ultratape

Ultrawire

Ultrabraid



Strip Grazing Reels  
 Jumbo 400 m (1320 ft) SR001  
 Maxi 200 m (660 ft) SR003  
 Mini 100 m (330 ft) SR005



Geared Reel  
 SR020



Compression  
 Gate Break  
 SA042C



Gate Break  
 SA042



Tape Gate Kit  
 SA039

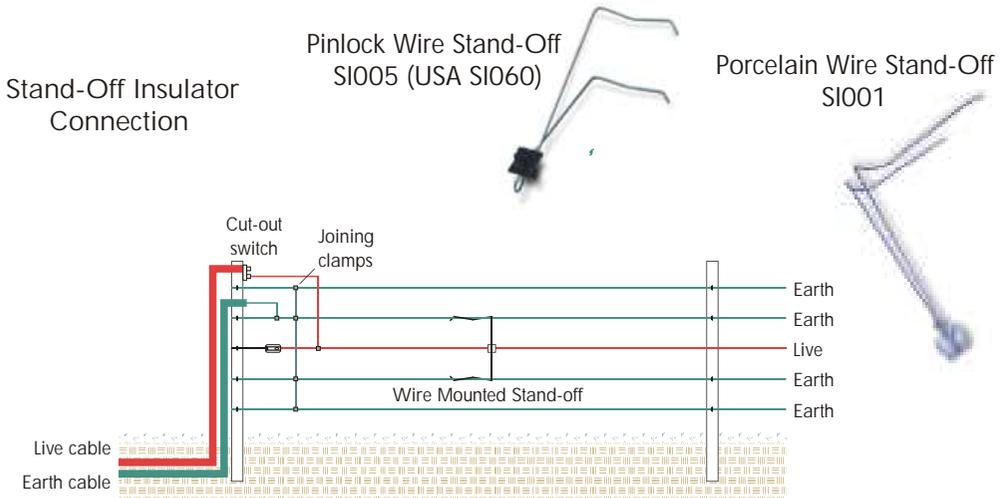


Plastic Tread-in  
 SA024

## Fence Rejuvenation

Old non-electrified fences requiring total replacement can be rejuvenated to last many more years through the use of stand-off insulators and a live wire on either one or both sides of the existing fence.

Restore the old fence wires by either removing some of the worst wires or by tightening them sufficiently so they do not short out the live offset wire. The existing fence wires should be interconnected and used as an earth return. The life of new standard fences can also be extended through the use of stand-offs to reduce stock pressure.



# Fault Finding

There are a number of reasons for reduced voltage on the fence line including:

- Vegetation growth
- Broken wires
- Corrosion
- Poor earthing
- Bad connections
- Poor insulation
- Increasing the length of the fence

## Testing Your Fence

All sections of the fence should be electrified from one point only. Isolating sections of fenceline using cut-out switches (SA064) greatly aids fault finding. The correct procedure when the fence is found to be lacking in voltage is first to check the energizer and earth, and then proceed to the first cut-out, which should be at the end of the leadout wires. The voltage should, of course, go up to normal as you disconnect the rest of the fence. Then move along the fence line, disconnecting each further section of fence until the fault is found.

## Tools Required

A Speedrite Digital Voltmeter (ST010) or a Speedrite Lite Tester (ST020) is useful for pinpointing faults.



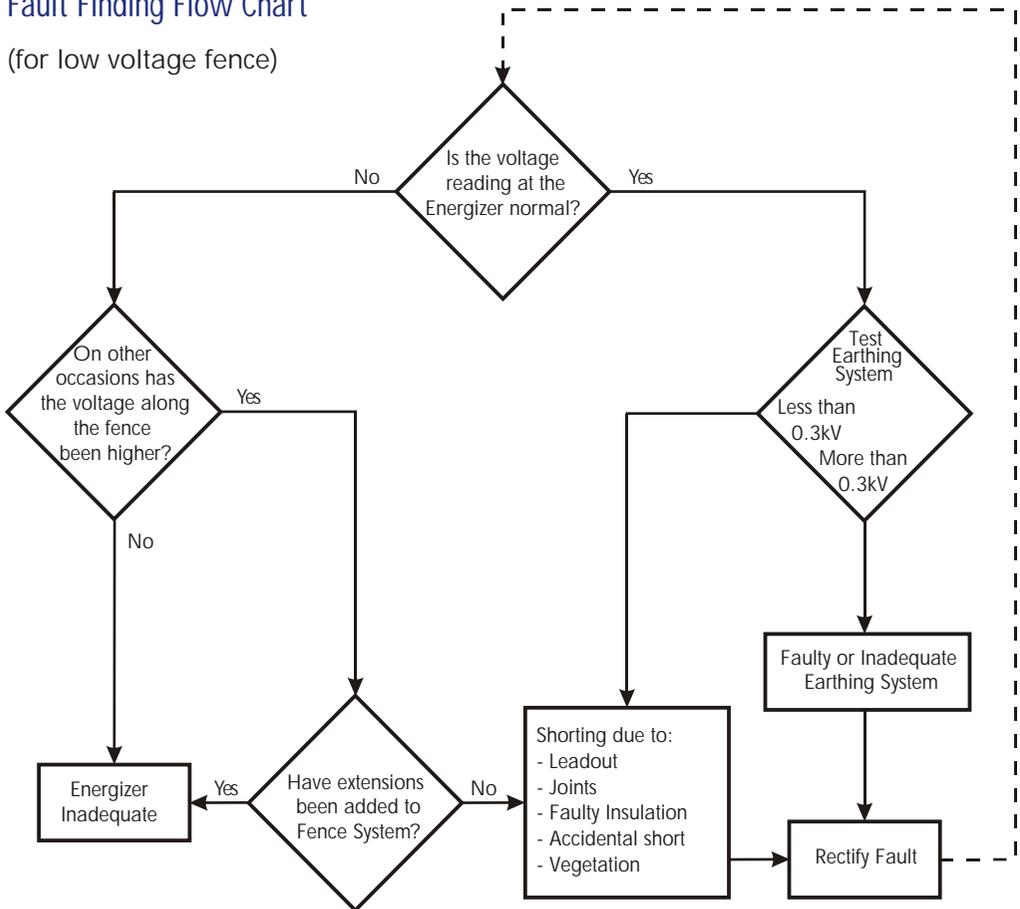
Digital Voltmeter  
ST010



Lite Tester  
ST020

# Fault Finding Flow Chart

(for low voltage fence)



## Radio Interference

In areas of poor reception, radio interference in the form of loud clicks can cause understandable irritation.

To reduce (or eliminate) the problem look for faults in the following areas:

- Radio and power supply. Ensure all connections, aerial and earthing are correct and/or adequate.
- Energizer earth. This must be well isolated from power supply earths and should not be in contact with any metal objects above ground.
- Leadout wires. Avoid having these running parallel with telephone or mains reticulation lines.
- Fences. Arcing across partial shorts, poor joints, or cut-out switches near the radio reception point is a common source of interference.
- A portable radio tuned off-station forms a convenient mobile test instrument for locating arcing points.

# Electric Fencing Terminology

- AC alternating current, Mains Power Supply 110 - 120 V or 220 - 240 V.
- DC direct current, Battery Power Supply (eg 12 V battery input).
- Current the duration and magnitude of current causes the shock on the electric fence. Increasing the voltage increases current, while increasing resistance decreases current.
- Amp unit of current.
- Ohm unit of resistance.
- Volt unit of electrical pressure causing current to flow.
- Joule unit of energy - one joule is one watt of power for one second.
- Watt unit of power - one watt is one joule per second.
- Short a large energy loss from the fence line such as live wire lying on the ground.
- Leakage small energy losses from the fence such as those caused by vegetation growing over the fence.
- Pulse a brief electrical current given by an energizer, approx 0.0003 seconds per pulse.
- Stored Energy  
energy accumulated in the storage capacitor(s) in between output pulses.
- Output Energy  
the effective energy delivered by the energizer, which depends on the following factors: stored energy, the efficiency of the output circuit, and the fence load.
- Capacitors  
used to store energy in the energizer, the amount of stored energy is proportional to the size of the capacitor(s).
- Resistance and Load Losses  
loss of power and voltage on a fence can be caused by (i) resistance due to excessive fence length, inadequate wire gauge and/or connections, and (ii) the load due to vegetation, shorts and/or poor insulation.
- Earth the rod(s) in the ground connected to the earth terminal on the energizer.
- Live Wire the current-carrying wire connected to the energizer fence output terminal.

