

Energizers

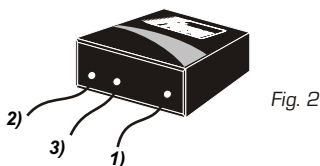


Users Guide

Energizer Installation

An energizer or electric fence system is made up of three components :

Fig. 2



1) Connection to the electric fence (LIVE)

Connect the live wire to electrify in the terminal. (fence ⚡)

2) Connection to the ground (ground ≡)

Connect the ground plugs in the ground terminal. (ground ≡)

Notice all the instructions provided in this manual.

3) Connection to the power source.

a) 12 VDC EQUIPMENTS (models BV100, BV400, BV650, BV1200) DUAL EQUIPMENTS (models DM400, Dm650)

Connect the red peg provided to the battery positive terminal , and the black one to the negative terminal.

CAUTION: In BV100, BV400, BV650 and DM400, DM650 there is a Max./Min. button that must be used during the first three or four days in the Maximum Position, up to the moment the animal gets used to the equipment. Then it can be used in Minimum in order to diminish the battery consumption.

WARNING! Do not connect to other equipments of 220 VAC.

b) 220 VAC EQUIPMENTS (models CA100, CA400, CA650, CA1200)

Connect the plug of 220 VAC in a plug-in modular construction correctly installed, taking into account the neutral and phase polarity according to the rule. Do this once the wire (⚡) live and the ground (≡) have been connected, since the equipment will work immediately.

CAUTION: If the fence line is damaged it should be replaced by the manufacturer or by its supplier, in order to avoid danger:

DO not eliminate the two flat pins plug, take into account the neutral and phase polarity in its installation.

USE A CURRENT BREAKER in its installation, this will protect you from any possible dangerous faults.

Apart from that, install the ground conductor for a better protection of your domiciliary installation.

ENERGIZERS | Principle of Operation

Powered by sources, an equipment sends a pulse of high voltage, great energy and short length to the fence, at regular intervals of approximately a second.

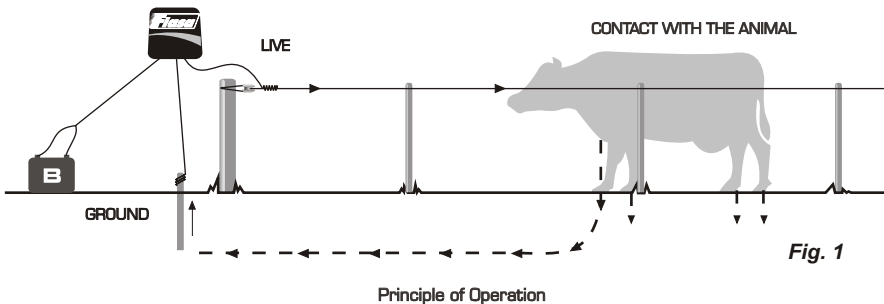
An animal or any other conductor touching this live wire creates a path for the electrical current through its body to the ground and back to the energizer through the ground system, thus completing the circuit and producing what we call "shock". (Fig.1)

If the equipment used fulfils the safety requirements and regulations, this shock is harmless not only for human beings but also for animals. That current flow or shock is instantaneous and whoever receives it goes away from the fence,

immediately.

When there are some green vegetation or any other objects that touch the fence, there is an energy leakage to ground, that according to its amount produces a decrease in the shock voltage and it can eventually repress it.

Provided that this is a psychological barrier, it is essential to keep an effective "shock" along all the fence line, in order to produce a shock, which is sufficiently memorable that animals never forget it. The greater the shock the animal receives, the more lasting the memory will be and the more the fence will be avoided in the future. And consequently the greater the control we will have on them.



c) 110 VAC EQUIPMENTS

Connect the plug of 110 VAC to a plug-in modular construction. Do it once the wire live (⚡) and the ground (—) have been connected.

CAUTION: If the fence line is damaged it must be replaced by its manufacturer or by its supplier in order to avoid danger, since the polarity is essential for your security. DO not eliminate the two flat pins plug, take into account the polarity of the neutral and phase in its installation.

d) SOLAR POWERED ENERGIZERS (models SE200, SE400, SE600 Y SE70Compact)

RECOMMENDED BATTERIES

SE200: It must be 12V 7Ah minimum and do not surpass a battery of 40Ah maximum.

SE400: It must be 12V 12Ah minimum and do not surpass a battery of 55Ah maximum.

SE600 : It must be 12V 18Ah minimum and do not surpass a battery of 100 Ah maximum.

SE70 Compact: The battery is internal of 6V4Ah absorbed electrolyte (SE70Compact does not include cables to the source since it possess an internal battery. Connect only fence (⚡) and ground (—). Take into account the position as regards the Sun).

In Solar powered equipments the battery should be correctly filled when it is switched on for the first time.

In order to assure this, connect the equipment to the battery and leave it off during a period of three sunny days, in order to recover the charge that the battery can loose during its storage.

GENERAL CAUTIONS FOR THE INSTALLATION

- ❗ Install preferably under cover and when it is not used keep it in a dry place.
- ❗ On the other hand the solar powered energizers should be installed in an area with no shadows, which is prone to receive the sunlight during the whole day.
- ❗ Keep the battery away from the energizer and if possible do not place them directly on the ground
- ❗ Height is irrelevant in connection to the equipment productivity but it is important in order to free it from possible shadows and animal damage.-
- ❗ **LOCATION:** Face the Solar Panel towards the North (South Hemisphere) with a slope to the horizontal, according to the latitude of the area.

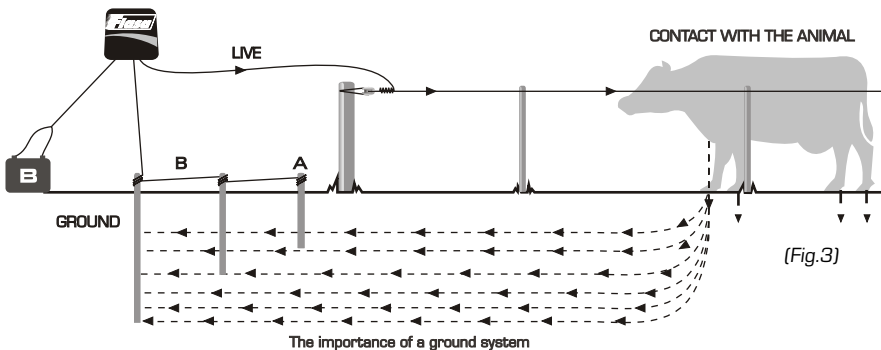
As a general practical rule you should add 10 grades to the latitude of the place where the solar powered equipment is installed, an approximate inclination of about 45° where the latitude is of 35° . In the North Hemisphere the face of the panel will be orientated towards the North following the same rule to calculate the inclination.

How does the grounding system work ?

By touching the wire on the fence the animal receives a current that enters the ground through the animal's feet and then goes back towards the energizer grounding system. Where its greater electron concentration is located in the most moist soils and deepest areas. (Fig.3)

From the figure observation we can conclude some key concepts that are of relevant importance for our knowledge and for the operation of these type of systems.

- a) Soil moist and composition directly affect the energizers' operation, since the ground conductivity is of great importance.
- b) An insufficient ground system (In soils of low mineral content and those which dry out severely, i.e. sandy, pumice or volcanic ash soils) will diminish the "shock" since it diminishes the conductivity. (Dry soils have a very high resistance).
- c) As there will be several shorts the amount of energy from the fence will be less, for that reason it will also loose effectiveness.
- d) It is much more effective to place the equipment in the middle of the wiring rather than in one end.



The more profound, the more conductivity.

- A = Poor ground system , low conductivity = low shock.
- B = Suitable earth depth, high conductivity = good shock.
- A + B** joined, dig at 2m deep minimum = **excellent shock.**

BASIC CONCEPTS

TENSIONING OF WIRES

Electrified wires should be little tensioned in order to obtain a better contact between animal and wire and to extend the accessories life. Making it possible in this way to rise or fall down the wires for vehicle pass or property or transportation access.

SECTION

The greater the wire section or diameter, the greater conductivity and visibility and less electrical resistance. Current distribution is similar to a water installation, where one should begin by using thicker pipes making it possible to reduce its diameter in the ends.

CONNECTIONS

All the electrified wire joints should be tightened with knots that guarantee a good contact. The junction section should also keep the same diameter as the conductor used in the line, avoiding contacts between copper cables and galvanized wires.

GROUNDING SYSTEM

The ground plug or the grounding system of the electrifiers is one of the most important steps of a good installation, its building quality will influence the "shock" effectiveness and the equipment productivity to a great extent.

It is required then:

1) The used pipe to be as profound as possible so as to reach the moist areas permanently.

2) Its diameter to be of 1/2" (wide) minimum in order to increase the contact surface. The greater the pipe section, the greater the "shock".

3) The material to be rusting free (galvanized or coppered).

4) To try to cover as much area as possible.

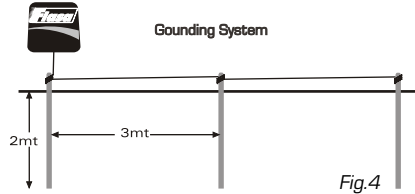
5) The pipes to be interconnected with galvanized wire and without joints or if they are copper bars join them with cables.

According to what was mentioned above the recommended ground plugs are :

A) Windmill pumps, whenever they are not recovered, in local installations or semicentral.

B) Three galvanized pipes or more, of 1/2" (wide), dig at 2 m minimum and interconnected at a distance of 3 m each. (Fig.4).

It is easily proved that the better the grounding system the more effective the "shock", as a good antenna contributes to a



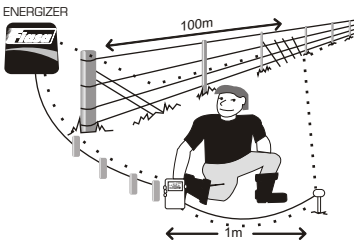
radio reception. The more powerful an energizer is the greater demand of a good grounding system.

Place the energizer in moist areas during the whole year, and during dry periods, moisten the system area. Select a place situated away from other electrical equipments, from telephone posts or of any other building with metal in its construction.

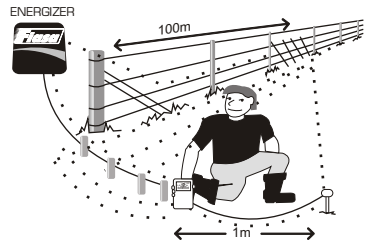
If the ground plug is not correctly or ineffectively built whenever one touches it or measures it will be seen that it does not have voltage. If there is no vegetation in contact with the electric fence system, place a metal stick at a distance of 100m from the equipment.

Producing a short or flow of current through the ground towards the ground system to be proved. If the fact that there is available electricity in the soil, is proved manually or by means of a voltmeter, it is necessary to improve the ground system already existent, because it is insufficient

HOW TO TEST THE GROUND SYSTEM



INADEQUATE earth system : Reading is greater than 200 Volts



ADEQUATE earth system : Reading is 0 - 200Volts

GROUND WIRE RETURN SYSTEM

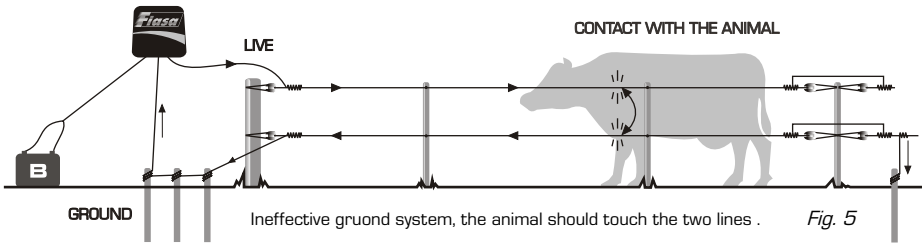
In dry areas, with low rainfall registers there is a severe decrease of the conductivity through ground. A superior surface is formed in the soil, which is insulating to the electric current to flow.

In order to avoid this problem it is necessary to install at least two lines, one should be connected to the live and another

to the ground system. Whenever the animal pressures the fence in order to pass, it should necessarily touch the two wires in order to close the circuit. This system is called Ground Wire Return System, considering that its use is of high security in connection of animal control of any kind. (Fig.5).

The construction should guarantee that any of the two circuits is interrupted and that under no circumstances they contact themselves. Along these fences new ground systems should be installed repeatedly once every 1000m approx., in order to guarantee a Better operation of the system. The ground wire does not require insulation along its entire path, but it requires to be interconnected all along its length, in order to reach the equipment's ground.

When breeding rounding ups are handled, as it is habitual in dry areas, these wires are used more as a replacement of traditional wires than to intensive rotations. For that reason it is advisable to install three lines, where the first and the third are connected to the live and the one in the middle to the Ground. In this way the cow will close the circuit when it takes contact with the first and second line and the calf will do it by touching the second and third.



When wild animals or others' animals which are not used to electrified wire are being controlled, it is always advisable to resort to all live wire systems with the maximum amount of lines as possible depending on the characteristics of the animals to be controlled.

ELECTRICAL UNITS AND TERMINOLOGY

The electrical shock perceived by the animals depends directly on (JOULE) energy available in the wire the moment the animal touches the wire.

The effect the animal receives, is that of a strong muscular contraction. If we double the Joules (available energy) with a stronger energizer, we will obtain the same muscular contraction, with twice the electrified wire or supporting much more loses in the fence.

A Joule is the energy required in order to produce a Watt during a second.

LOW IMPEDANCE

As a general rule any setting that poses a mains of electrical current should install a 220 V electrifier, what will make him install a central installation. Since the electrical consumption of these is little, it is recommended to install the most powerful equipment among the possibilities given.

If you wish keep under control others' animals, cattle together with wild animals apart from the ones you possess you should resort to dual equipments, i.e. those That work indistinctly powered by 12 and

220 V. These "Dual Equipment" are recommended, since they solve the problems originated by shorts, in order to control animals that are not used to the electrified wire.

If there is not a network system of electrical current or if you do not want to begin with central installations, the alternative are the 12 V battery energizers. These equipment's consumption is relevant and it is directly related to its power, what should be taken into account because of the difficultness of the battery change. Affortunately the Solar Powered Panels have solved this problem avoiding the constant recharge of the accumulators and lengthening their life span of since they do not submit them to quick recharge and by means of holding them always at optimum levels of charge. What should be remembered is the fact that in high power electrifiers or those of low impedance the shorts or loses DO NOT produce a greater battery consumption, but a lower shock.

When the charge is low, it produces the pulses to take a distance from each other, not altering its power, but the amount of

shocks per minute.

Once the new concept of energy of the shock has been defined and the different power sources, we will also know which are the facts to take into account :

-The sphere of influence, i.e. the distance that will exist from the energizer grounding system to the last point in the line, in a straight line.

-The surface of the whole area and not only the surface to be electrified, since in mixed farming it is necessary to cover the whole surface and to reach up to the last corner.

-Finally, it is necessary to know that each meter of wire added to the system will produce a resistance that will diminish the shock voltage.

As a practical rule, we can define the energizer's type and size from the total surface of the country or of the area to be electrified including the farming surface, whenever the plotting is not too intensive. For that reason the Joule equivalencies for the present naming for particular surfaces would be :

- Joules (30 km) = up to 250 hectares 1,5
- Joules (60 km) = up to 400 hectares
- Joules (100 km) = up to 900 hectares
- Joules (200 km) = up to 1400 hectares
- + 20Joules (400 km) = up to 1200 hectares

This is a general equivalence and it refers to an installation of only one electrified line at a height of 70 cm the moist pampas. Starting from the point that the 30 km naming is similar to an outlet energy of 1 Joule, as we will see in the electric fence comparative chart. It aims at helping with the electrifier selection taking into account that if the shepherding is done in a more intensive way and more plots are added, the shock voltage will progressively diminish for these reasons and not due to problems in the equipment.

Generally every system of electrified fences already installed works correctly. As time goes by, from the good results obtained, the subdivisions levels goes up and at the same time the materials age, losing sometimes their effectiveness as insulators, producing the originally effective installations to lose that quality in a few years.

The reason for that is that the equipment

became smaller, making it necessary to add up another or set a more powerful one. From this experience we can conclude that we do not have to select the "just" , but to think in the future evolution.

There is also an economic reason whenever one takes the decision of buying an electrifier, the more powerful the equipment, the greater available energy (joules) it will posses. This will reduce the labor costs of maintenance (to keep the installation clean, in good conditions) and the attention over the loses will be less.

HEIGHT OF THE WIRES

It is necessary to mention that the smaller the animals, the more contact between the lines (i.e. the less distance between the lines) and less the distance between sticks and posts. When mixed rounding ups of bovine and ovine stock are controlled, the wires placed near the ground are closer in order to stop the sheep and the distance between the ones which will control the bovine stock will be wider.

LIGHTING DIVERTER

Known as lighting diverter this accessory protects and diminishes the storm risks, due to the dangerous shocks that can blow panels or equipments, when a ray falls in an electrical/electric fence system, it searches the quickest and easiest way of reaching the nearer earth.

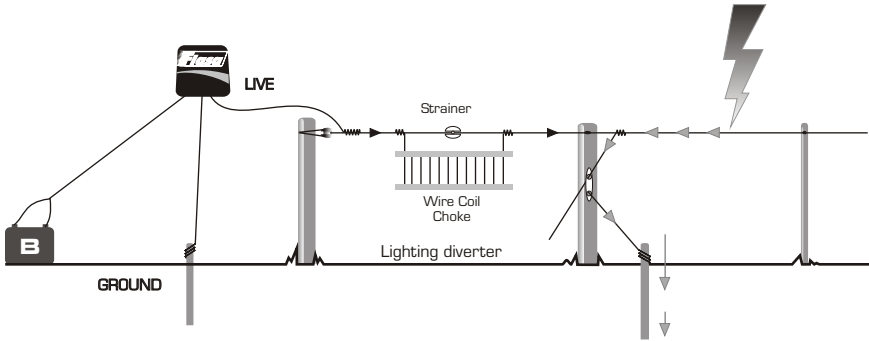
These lighting diverters , change the ray direction to ground before they damage the equipment. Anyway, during stormy days it is recommended to completely disconnect the equipment.

SOLAR POWER EQUIPMENTS

The Solar panels work as battery charge holders, lengthening their life of operation, since they are not subordinated to recurrent shocks, guarantying a perfect operation of the electrifier even after several cloudy days.

The size or the charge capacity of the panel is directly related with the daily consumption of the energizer and this with its power outlet, considering that they work during 24 hours a day at a constant rhythm of 55-66 pulses per minute.

The more Joules the equipment generate, the more the charge capacity of the panel,



its cell amount and as a consequence its size.

The more powerful the energizer, the more the accumulation capacity or the battery size should be.

FAULT FINDING

To trace a fault it is necessary to learn how the shock voltage behaves in an electrical wire installation.

We can say that in a correct installation the voltage is uniform, or the same everywhere, what indicates that any short or loss, produces its fall in the whole equipment. This means that the reading in the energizer's terminals is, except little variations, the same in any other place of the circuit, what makes it easier and allows a quick fault finding.

It is then, the moment in which a correct sectioning acquires vital importance, since the whole finding method is based on measuring by section elimination. When proved with the voltmeter in the energizer's terminals that there is a low or insufficient shock, it is necessary to go round the countryside to find out the problem that originates the lost. The first elimination testing is done when the nearer wire division to the equipment is reached. At this moment we will probably detect which is the problem source.

From that moment on, following the same methodology we will be gradually eliminating the sections in order to quickly solve the short that affected us. It is clear then, that if the voltage notoriously rises at the moment of eliminating a section, the fault is situated in the eliminated section.

In a good installation and with the energizer properly shaped a voltage rise

can occur at the end of the line. A fall as we leave the equipment can indicate accumulation of losses, bad connections or a sphere of action or equipment range superseded. The fact that no notorious fault is detected in the installation when there is low voltage can indicate the resistance produced by the amount of electrified wire, due to bad moist conditions in the soil or to little losses accumulation in the line.

As during the day different reading can be observed, all the measuring as paths to detect the faults should be done in normal moist conditions, i.e. when the dew has disappeared and the reading is much more confinable. Only as we come closer to the loss we can detect a progressive and relative voltage fall.

COMMON/ORDINARY FAULTS

In order to help in the previous paragraph comprehension, it is useful remembering that the most habitual faults that we find in the countryside are:

- a) Poor Grounding System
- b) Bad connection of the energizer to the wire
- c) Loose junctions
- d) Not recommended insulators (Hosepipes, black rubber band, wood, bones, etc.)
- e) Neutral wire crossings that run down to earth.
- f) Broken insulators in rods or metal posts.
- g) Excessive vegetation touching the wires
- i) Accidental shorts (loose hanging wires, fallen branches, skipped corner insulators, etc.)
- j) Rust accumulation

In order to prevent an excessive accumulation of little losses, which would derive in an important short, it is necessary to revise the line periodically, by means of a preventive maintenance and using good quality materials.

A practical and lasting method for the control of weeds growing under the wires is to use total weedkillers that prevent the permanent cutting and control of grass that produce losses.

TRAINING STOCK

As the electric fence is a psychological barrier of poor visibility, the animals need to be previously trained or taught to know and respect these kind of systems. When a property sharing enters a countryside it should be enclosed in a specially designed plot (paddock). To fulfil this goal, with several electrified wires where with food and water they will be getting in contact with the electricity and they will learn to respect them.

This passing through "an educational period", will be memorized by the animals that even in short occasions or power failures, they will continue well controlled for several days.

This training effect makes it possible that the stock eat under the electrical systems without touching the wire.

Adapting the wiring it was possible to see in New Zealand and Australia, power fences to control deer in captivity, kangaroos and complete zoos with wild animals that respect the system due to the training received or to the power of the shock perceived.

SAFETY REQUIREMENTS

ANNEX BB OF IEC RULE 60335-2-76 STANDARD

1) The electric fence systems should be installed and operated so that they do not produce an electrical risk to human beings, animals or their surroundings. Their construction should avoid the risk of animal or people tangling. No more than one Energizer may electrify any one fence line at any one time.

2) The distance between two independent wiring should more than 2 m.. If this distance has to be less an insulation material or an insulated wiring as a barrier

should be used.

a) Barbed wires should not be used.

b) The Energizer (ground) stakes must be situated at least 10 metres away from any other electrical ground system.

c) Avoid the fence line passing under or running parallel to power lines of high voltage. If unavoidable, the crossing should be done underneath and at right angles to it. Energizers should not burn more than 60 pulses per minute. If it passes under the electrical energy line, the distance to it should be the one indicated in the chart.

d) Avoid the wires running under the telephone wires or parallel to underground telephone cables for any distance.

e) Electric fences bordering public thoroughfares are required to have a warning sign at least 200mm x 100mm in size (every 90 meters).

The background will be yellow at both sides with the lettering in black or with figure symbol. The signs should display the words "WARNING - ELECTRIC FENCE"

The lettering should be indelible, at both sides of the sign and at least 25mm high.

Except for little battery energizers the earth stake must be at least 1 m.

The energizer live wire that must run through the building interior should be effectively insulated from their structures.

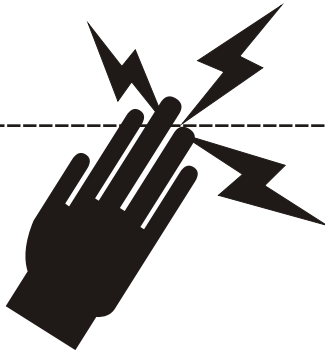
This can be done by using insulated cables of high volatage..

The energizer live wire that should be dig will be placed in pipes made of insulated material and / or with insulated cables of high tension.

Be careful in order to avoid the damage caused by rodents or by farming tools to the dig cables.

The Energizer live wire should not be installed in the same pipe as the electrical domiciliary installation, communications, TV, data, etc.

TAKE CARE - ELECTRIC FENCE



Energy Line voltage	Distance
$\leq 1000V$	3m
$> 1000 \sim \leq 33000$	4m
> 33000	8m

The distance to ground of the energizer live wire should not surpass the 2m, on a the perpendicular energy line projection and being this situated at a distance of :

2m for energy lines of voltage less than 1000 V
15m for energy lines of voltage higher than 1000V

WARRANTY REQUIREMENTS

1-Electric fence energizers are guaranteed against eventual manufacturing failures correctly proved. For that reason during the guarantee period, any part presenting manufacturing failures, proved by our technicians, will be gratuity repaired or replaced by our Official Mechanical Service, against the presentation of this document and its corresponding invoice.

2-To make the guarantee fulfillment effective, the purchaser should present the equipment in our Official Mechanical Center, for guarantee attention. It is situated in Rivadavia and A. Palacios St., in Bragado, province of Buenos Aires. The official communication sent by transport will be received there, being in charge of the purchaser freight and the insurance.

3-Once the guarantee request has been done, Mechanical Service should give a supporting receipt to the client. In that document it will be clearly mentioned the maximum deadline for its fulfillment, with which the client can make the effective complaint.

4-The maximum period for the fulfillment of the effected repairment among the guarantee fulfillment is of 30 days from the effected order date done by the purchaser. Excluding those reopairments, which demand foreign spare parts. In these situations, the guarantee deadline will be added to the original validity term.

5-FIASA accept no responsibility for any accident caused by unqualified personal, done to the equipment while repairing it , being or not within the guarantee period.

NOT INCLUDED IN THE WARRANTY

Faults originated in :

- Incorrect use of the equipment
- Inefficient electrical installations
- Inadequate grounding system
- Incorrect input voltage
- Damage caused by electric energy oscillation
- Natural erosion/running down
- Incorrect stowing, climate influence, etc.
- Rays directly or indirectly affecting it.

NOTE : This warranty will automatically expire if :

- The electric fence energizer was opened by a third party.
- In case of not being connected to the appropriate voltage network indicated on the equipment identification note.
- In case of not being used with a protection current breaker.



Warranty attention : FIASA Rivadavia and A. Palacios St. , area code (6640), Bragado Bs. As. Telephone number : (02342) 439000