



ELECTRIC FENCING

DIY MANUAL

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WALL TOP ELECTRIC FENCES

The wall top electric fence is the most practical electric security fence for protecting properties in built up area.

This type of electric fence is well suited to:

- Houses
- Town house complexes
- Factories
- Mini factory complexes

This manual will look into the aspects of wall the fencing only.



SITE INSPECTION

- Wall type and height
- Slope of terrain
- Steps in the wall
- Number of gates Gate opening type
- Driveway surface
- Garden and landscape
- Positioning of Energiser and Monitor
- Access to Energiser and Monitor

SITE INSPECTION (Continued)

Wall type in relation to brackets

The chart below is intended to assist the installer / developer in the selecting the appropriate bracket and fence design.

Bracket Type:

<u>Wall type</u>	<u>Angled</u>	<u>Round Bars</u>
Precast walls	#	#
Single brick wall, plastered	#	
Single brick wall, face brick	#	
Double brick wall, plastered	#	#
Double brickwall, face brick	#	#

Slope of terrain

If the drop between panels exceeds 100mm, then 2 brackets per panel should be used, causing the electrified wires to be parallel with the panel top. When wall tops have very large steps i.e. around 1.5meter and more, the electrified fence should be terminated at the step, and a new section below or above the step, with a loop extended from the one to the other. (See section on loops on page 9&10.)

Gates

Where a property has 2 or more gates with a section of wall between them, power needs to be transferred past the gate to the section beyond. This may be done by either burying the wires under the gate or using the gate wires to transfer the electricity beyond. The latter is done using series gate contacts.

Gate type

Sliding gates require a gate contact to transfer a single line of electricity across where swing gates get their electricity in the form of a loop from the fence and no additional contact are needed.

Driveway surfaces

Although it is easy to bury wires in conduit underground when the surface is grass or red soil, it is often less expensive and quicker to install a setoff series gate contacts to transfer electricity through the electrified wires of the sliding gate to the section of electric fence beyond. It is advisable to bury the wires in the conduit underground to transfer electricity between sets of swing gates.

SITE INSPECTION (Continued)

Garden and landscape

At the initial site inspection, it must be decided who will do the cutting back of trees and shrubs, which should be cut back +200 mm.

Positioning of the energizer

The following is intended as a guide to match the energizer to various installation needs.

Indoors

Inside where access can be obtained without entering a potentially dangerous area.

Possible positions include:

- In a kitchen cupboard
- In the garage if entrance is gained from inside the house
- In an office.

Outdoors

Fitted in a lockable steel cabinet, the energizer is ideal for installations where access to the energizer is restricted. The steel cabinet is suitable for both indoor and outdoor installations, thus ideal for the factories and town house complexes.

Energiser with additional key pad/switch

This allows the energizer to be fitted on the inside of the boundary wall or garage with the small compact monitor inside the house.

CONTENTS OF KIT

100	Ferrules
100	Nail plugs 6x40
50	Nylon tension spring
12	Electric fence warning signs
12	Lugs for stays
12	Rubber clamps for stays
100	Nail in anchors 6x40
5	Kg Braided wire aluminium wire 1.6 mm
1	50M HT Cable
1	Siren
1	Strobe
1	Series gate contact
1	Lightning diverter kit

NB

Just add

Energiser – DTS Megashock 5

Electric fence poles – 5L or 6L (normal spacing 1 every 3M)

Earth spikes – (normal spacing 1 every 30M)

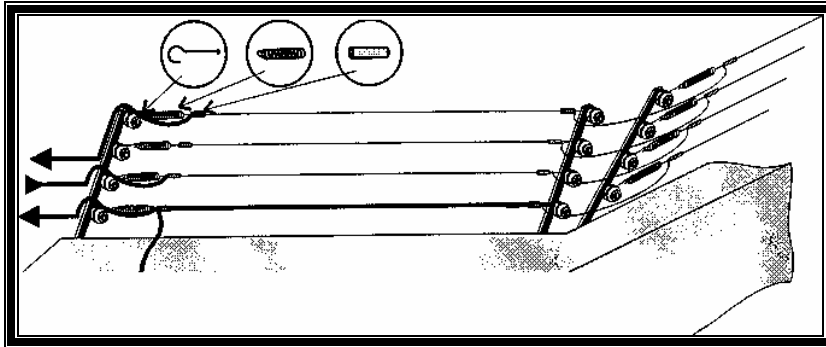
Stays – (2 x each gate and corner and where necessary)

Suggested energisers to use - 4J for household

- 8J for Plots and Factories

- 12J for Small Farms

CONSTRUCTION OF THE FENCE



Although the electric fence installation is simply attaching the brackets and wire, a few aspects should be considered, namely:

- Never strain wires round a corner
- Always use stays
- Stay lugs provide a neat and quick installation
- Don't weld stays - use stay clamps and screws
- Gate opening type
- Driveway surface
- Positioning of energiser and monitor
- Access to energiser and monitor

Installation of components:

Brackets:

Angled brackets can be fitted to the side of a wall and also on the top surface of a double brick wall.

Stays:

Stay should be fitted using the M4 bolt and nut sets provided, to the end brackets of each straight strain length.

With the lug fitted to the bottom of the stay, press the stay firmly against the top surface of the wall until the lug bends parallel to the wall top. Drill and knock in a nail in anchor. The stay can be fitted to the top or the side of the wall. There is no need for welding and painting when using this method of stay fixing the stay with lug may be fitted to the side of a panel of a precast wall.

Avoid securing stays to tops of sliding gates, as their presence will restrict the maximum opening of the gate.



CONSTRUCTION OF THE FENCE (Continued)

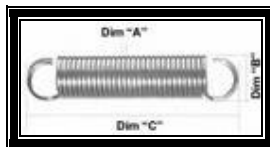
Spring hooks and springs:

Clip a spring hook to each bobbin of only one of the end brackets of each strain length. It is practical to keep the springs and spring hooks always on the same side of the strain length, i.e. either always on the left or always on the right.



Tension springs:

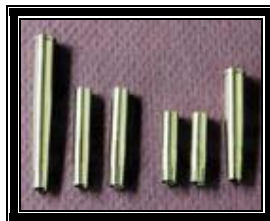
Tension springs keep the fence taut and looking good. When two wires are shorted out, and released again, the tension springs returns the wire to its normal state



Ferrules

The use of ferrules makes good reliable electrical connections. Should the ferrule be crimped at one end only, when securing a wire around an end of the line bobbin, the open end of the ferrule can be used to secure the HT cable from the energiser.

Don't rely on the ferrule to hold tension. Rather bend the end of the wire around the ferrule, allowing this bend to bear the load of the tension. Bending the end ensures tension while crimping the ferrules is left till the end of the job after checking loops and earth connections.



CONSTRUCTION OF THE FENCE (Continued)

Gate contacts.

The gate contact is designed to transfer electricity from the fence to the gate.

Wire

Stainless steel wire is shining and is aesthetically pleasant. It should not be used for long fences or freestanding fences, as its resistance is high. The electric fence acceptable length should be determined with the help of the energiser manufacturer.

Stranded wire is a set of steel wire strands, twisted and galvanized, and better suited to the longer fences since it has a lower resistance than stainless steel wire.

HT Cable

Flexible HT cable is easy to work with, makes a neat installation, but should be placed in conduit when routed underground. The ferrule used for connecting the flexible HT cable must be crimped tightly to prevent oxidation of the copper. The HT cable transfers the high voltage to the start of the electric fence and returns the closed loop to the energiser for monitoring.

Remember that cables and electrified wire should not run parallel to overhead power cables or alongside the coaxial cables. When routing the HT keep away from the telephone lines, TV aerials, intercoms and electric wires to avoid possible induction.

Earth spikes

The earth spike should be planted near the energiser and be connected to the earth wire of the electric fence and also to the energiser. A good rule of thumb is to plant one earth spike at the start of the electric fence (nearest the energiser) and one per 100m of perimeter length.

Connections

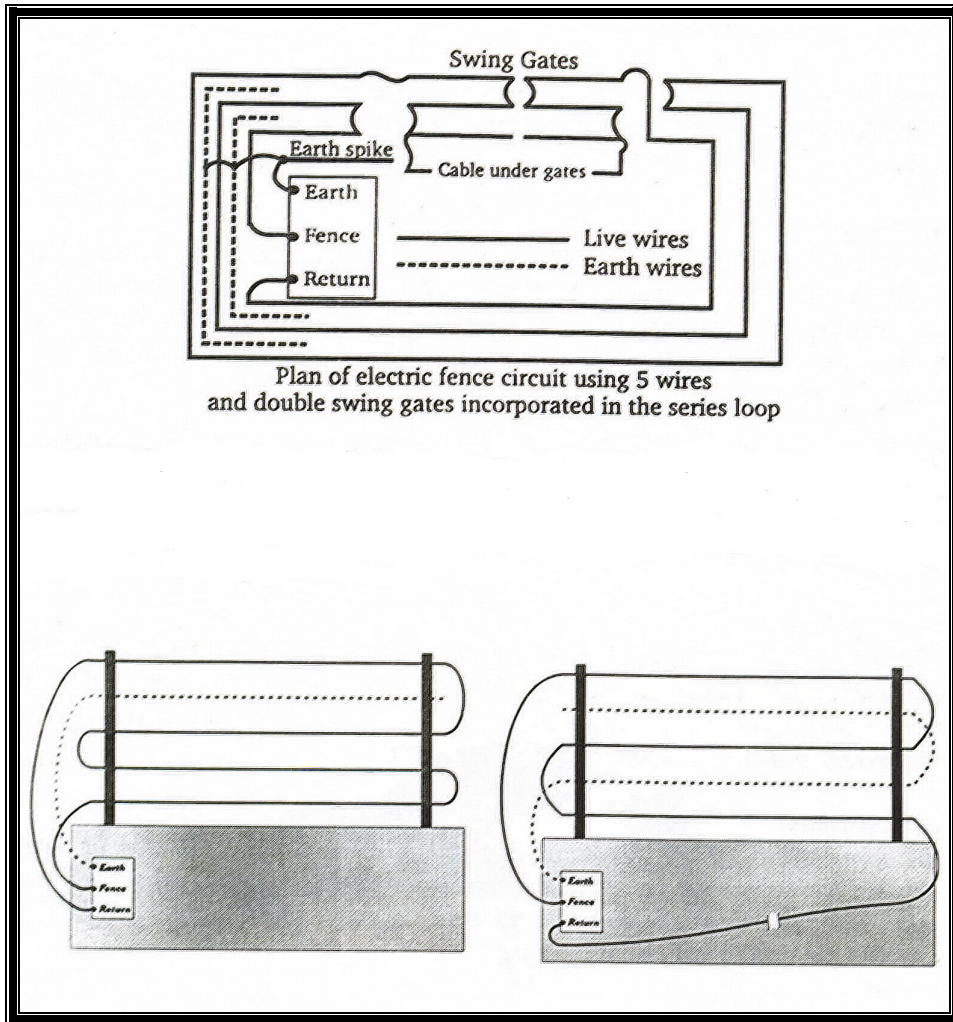
All connections should be securely fixed by using either ferrules or line clamps. Never make an electrical connection by twisting wires together. This weak link contributes to low voltage and an extra sensitive electric fence, which can result in unnecessary alarms.

Looping:

The electric fence should be designed to operate as a live closed loop, being theoretically one wire with two ends only. When this is the case, the alarm should be activated every time a live wire is cut, breaking the closed loop.

The precise looping will depend on the design of the electric fence, considering factors like whether the start and return points of the entire loop is to be on the same bracket, or if the wire or a closed loop is to go under a gate to another section beyond.

CONSTRUCTION OF THE FENCE (Continued):



HT Cable Connections:

The chosen position of the energiser will determine the ideal location where the HT cable will be connected to the electric fence. The HT cable need not always be connected to the start of an electric fence, and can be connected somewhere along a section. One bracket is supplied with insulators next to each other to commence fence.

EARTHING

Improper earth causes most electric fence problems.

Only when there is a good connection between the intruder and the earth terminal of the energiser and also from the intruder to the live wire will the electric fence produce the rated shock.

When the electric fence earthing is adequate, the earthing of the person to the energiser earth terminal is done through the ground.

Higher power energisers require more earth spikes than the smaller ones.

It is recommended that earth spikes be 1, 5 meters long and galvanized or copper coated. They should be positioned not further than 100 meters apart.

The earthing of the electric fence has several functions, including:

- to lead away induction from the fence
- to increase the effectiveness of the shock given
- to create a short when in contact with a live wire, by draining the power to earth
- completing the circuit between live and earth through the intruder

FAULT FINDING

When a live wire is shorted to an earth wire, or when a live wire is cut or broken, the monitor will activate the output devices like siren, warning flash light or contacts for outside response. Switch off the monitor and with the energiser still on; inspect the electric fence, whilst also listening for arcing on the fence (a ticking sound).

Open circuit:

Look along the electric fence for a break or cut in the wire. Look also for a live wire loop broken or removed.

Short circuit:

Inspect the fence for wires touching each other, causing shorts. These should be separated, whilst also inspecting the tension springs for over stretching caused by the short.

Look for something against the wire. This could be a branch or twig, or a piece of wire placed there by an intruder or your stay pole.

An insect can also cause a short between a live wire and a bracket, causing electricity to be conducted through it.

Another fault could be a live wire removed from its place of rest on the bobbin and neatly positioned between the bobbin and the bracket.

Low Voltage:

Low voltage can be caused by a magnetic field induced into the earth wire, most likely caused by too shallow earth spikes, insufficient earthing or a break in the earth wire between the earth strand of the electric fence and the earth spike.

Low voltage is also caused by a defective energiser. Must be tested by removing the fence live and fence return (closed fence long) from the energiser and replacing them with a short loop of approximately 100mm long length of wire. If the volts reading is above 6500 volts it can be assumed that the energiser is alright and the fault will be found on the fence.

The HT cables should be tested next. Remove the temporary loop from the energiser and replace the fence supply HT cable, remove both supply and return from the fence. Observe the volts reading at the fence end of the supply HT cable. If this reading is acceptable, join the fence supply and fence return HT cable (still removed from the fence) and observe the volts reading at the energiser end of the return HT cable (still removed). If the volts reading have dropped, check the HT cables for damage and replace. Remember that the HT cables must not be joined, even in conduit, as the insulation is insufficient.

FAULT FINDING (Continued):

If a lightning arrester is fitted, it should be tested by removing its live supply lead. The lightning arrester should be replaced if the volts reading returns to normal when it is disconnected from the fence.

No monitor display:

If the energiser has a bar graph display, execute the energiser and HT cable tests discussed in the previous section for low voltage and observe the bar graph. If the bar graph reads correct, the fence should be carefully inspected. If there is no response on the bar graph, and no reading from the fence, check the battery and the 220V supply.

False Alarms:

If it is certain that the fence has no faults and that the earthing is adequate, the sensitivity can be adjusted. NB: This should be done only as a fine tuning, when it is established that there is absolutely no fault on the fence, and must not be used as a short cut to minimize false alarms.

Ticking sounds:

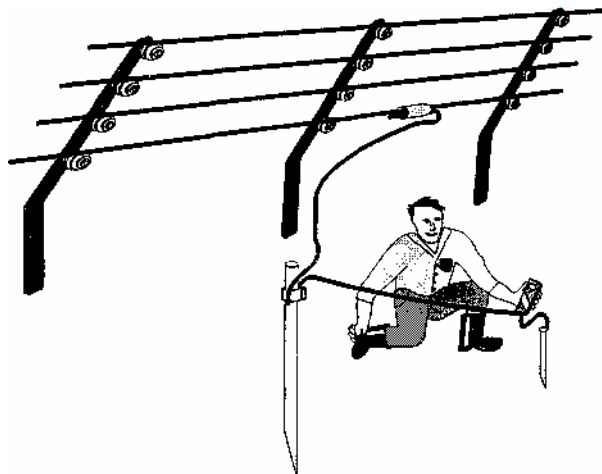
The only sound that should be heard is a ticking sound at the energiser. There should be no ticking sounds along the fence. Any ticking there indicates a short or arcing to earth, and should be corrected.

Interference:

Interference on the television, alarm system or the telephone usually results from the HT cable running parallel and/ or too close to the cables of these devices.

Earthing:

With the energiser on, observe the volts reading with one terminal of the voltmeter connected to the earth wire on the fence. Should the reading exceed 600 volts, look for inadequate earthing or a loose connection between an earth wire and an earth spike. A volt reading can be taken between an earth spike and a large nail pushed in the ground. If a reading occurs, the earthing is poor and should be corrected or increased.



THE ELECTRIC FENCE & THE LAW

These are a few condensed highlights from the government gazette.

- An electric fence earth must be separate from and at least 2 meters away from a municipal earth.
- No member of the public may inadvertently come in contact with an electric fence along a municipal boundary.
- An electric fence must not run parallel to overhead power lines.
- Warning signs must be displayed conspicuously not more than 30 meters apart, with at least one on every panel and one on every gate.
- The energiser shall not put out a voltage exceeding 10'000 Volts.
- A free standing fence must be at least 1 meter from an existing fence.



The above are just a few of the common causes of fence faults.

Manufacturers warranty.

- **All goods manufactured by DTS Security carry a 24 month factory warranty from date of invoice.**
- **Batteries & remote controls carry a 12 month warranty.**
- **All goods are warranted to be free from faulty components and manufacture.**
- **Faulty goods will be repaired or replaced at the sole discretion of DTS Security Products, free of charge.**
- **This warranty is subject to the goods being returned to the premises of DTS Security Products.**
- **This warranty excludes lightening damage, insect damage and damage caused by faulty installation.**
- **In the event of the goods being supplied by dealer, merchant, agent or duly appointed installer of DTS Security Products, the claim must be directed to that supplier.**
- **The carriage of goods is for the customer's account.**
- **This warranty is only valid if the correct installation and application of goods, as laid out in the applicable documentation accompanying said goods, is adhered to.**
- **All warranty claims must be accompanied by the original invoice.**
- **The liability of DTS Security Products and / or their distributors is limited as herein set out DTS Security Products and / or their distributors will not be liable for consequential or incident damages howsoever arising.**