UNIPOWER

MB *Series*

Remote Controlled Energiser

INSTRUCTION MANUAL

WARRANTY
THUNDERBIRD

Electric Fence Systems

Thunderbird warrant all electric fence systems against defective workmanship and faulty materials for 2 years from the date of purchase. We undertake, at our option, to replace or repair free of charge each product, or part thereof, on condition that it is returned to our factory freight prepaid, and found on examination to be suffering from material or constructional defect. We cannot be held responsible for any repair other than those carried out by us or our authorised agent.

A photocopy of your proof of purchase and a request for warranty must also be returned with the item.

This warranty is void if the product is subject to improper use or handling, incorrect power input voltage, damage through contact with chemicals, flooding, fire, explosion, excessive heat, lightning strikes, insect damage, or damage to external wiring.

Country Electronics Pty Ltd
ABN 38 003 806 040

11 Industrial Avenue
Mudgee NSW 2850
Phone: 02 63723600
Fax: 02 63722597

PO Box 391
Mudgee NSW 2850

Email: enquiries@thunderbird

For your records:

Model No.: .....

Serial No.: .....

Date of Purchase: .....

Place of Purchase: .....

Receipt No.: .....

electrode and any other earthing system connected parts - for example, mains power protective earth or telecommunications sytem earth.
> Electric fence connecting leads located inside buildings must be effectively insulated from the earthed structural parts of the building - use suitable high voltage insulated cable. Important: always ensure metal parts of the building are effectively earthed.
> Electric fence connecting leads located underground must be run in a suitable conduit of insulating material, or high voltage insulated cable be used. Care must be taken that the effects of animal hooves or vehicle wheels sinking into the ground cannot damage the connecting leads.
> Electric fence connecting leads must not be installed in the same conduit as mains supply wiring, communications cables or data cables.
> Crossing with overhead power lines must be avoided wherever possible. If such a crossing cannot be avoided, it must be made underneath the power line and near as possible right angles to it.
> If electric fence connecting leads and wires are installed near an overhead power line, the clearances must not be less than indicated in the table below.

Power Line Voltage - V	Clearances - Metres
Up to 1000V	3
1000V - 33000V	4
Above 33000V	8

> If electric fence connecting leads and wires are installed near an overhead power line, their height above the ground must not exceed 3 metres. This height applies either side of the orthogonal projection of the outermost conductors of the power line on the ground surface, for a distance of:
- 2 metres for power lines operating at a voltage not exceeding 1000V
- 15 metres for power lines operating at a voltage exceeding 1000V

> Electric fences intended for deterring birds from roosting on buildings, no electric fence wire shall be connected to an earth electrode. A warning sign must be fitted to every point where a person or persons may gain access to the conductors.
> Where an electric fence crosses a public pathway, a non-electrified gate must be incorporated into the electric fence at that point, or a crossing by means of stiles must be provided. At any such crossing, the adjacent electrified wires must carry warning signs.
> Any part of an electric fence that is installed along a public road or pathway must 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 must be at least 100mm x 200mm.
> The background colour of both sides of the warning sign is to be yellow.
> The inscription on the sign is to be black and shall be either the symbol shown in figure BB1 of the Standard, or the words “WARNING - ELECTRIC FENCE”.
> The lettering on the sign must be indelible, be on both sides of the sign and in letters not less than 25mm in height.
> Ensure at all times that mains operated ancilliary equipment connected to the electric fence circuit provides a degree of isolation between the fence circuit and the mains supply equivalent to that provided by the fence energiser.
> This energiser must be installed in accordance with the Australian Standard.

Warning

- Regular inspections of electric fences must be undertaken to ensure continued operational safety and compliance with Australian Standard AS/NZS 3350.2.76:2000.

- Persons coming into contact with high voltage pulses may have their normal physiological functions interrupted.

- Young children and infirm persons should not be left unsupervised in the vicinity of an electric fence energiser or fence.

- Read this instruction manual fully before installing or operating the energiser.

Specifications

Battery Voltage - 12Vdc nominal
Battery Current - Off - <1mA
Standby - 60mA
5J 180 - 480mA
10J 380 - 880mA
15J 380mA - 1.2A
Output Voltage - 9.5kV no load
Max Output - MB500 - 3.8J at 250 ohms resistive load
MB1000 - 7.0J at 250 ohms resistive load
MB1500 - 10.9J at 180 ohms resistive load

Description

The Unipower is a universally powered electric fence energiser. It can operate from mains using a battery, a solar system, or a stand alone battery.

The Unipower electric fence energiser can be turned from standby to on or vice versa from any point along its electric fence by means of a remote control. This is a valuable time and fuel saving feature when additions, repairs or access is required on the fence system. The remote control is capable of operating even when there is a heavy load on the fence.

The energiser is essentially a battery powered energiser, but can maintain charge on the battery that it’s using from mains power. The Australian Standard calls this a class “D” energiser. The Unipower will maintain the charge on a battery if the accompanying power supply is connected.

A number of parameters can also be adjusted on the Unipower. Output voltage (hence power), the pulse period, and alarm voltage can all be set. The current drain on the battery is able to be varied from rated current to around 40% of the rated current by changing the output power and pulse period. This is especially useful on solar systems if there is a long period of cloudy weather.

A 16 character x 2 line display also indicates the condition of the fence as viewed by the energiser. Fence voltage, current, stored joules and earth condition are displayed while the unit is running.

Warning beeps are given when the unit is about to turn on. This is a safety feature that, for example, warns someone near the energiser that it's about to turn on from a remote command.

The Unipower also includes an alarm output should you wish to have a strobe to alert you to a heavy load on the fence. It should NOT be directly connected to a siren, as this will violate noise laws.

Installation

For the energiser and remote control to work correctly, the fence must be constructed properly. The following should be particularly noted:

- **Do not use rusty wire**. A good galvanised coating is required to make a reliable connection between the fence wires.

-**Avoid using polywire or polytape on extended runs.** Hot tape and polywire may be used for runs of up to 400m in any one direction. Super polywire and polytape may be used for runs up to 1500m in any one direction. The resistance of these products makes them ineffective for greater distances. Use galvanised wire for long runs.

- **All wire joins must be made with joint clamps**. Twisted wire joins are subject to a zinc oxide insulation barrier building up between the wires, especially after it has been wet. This isn't a concern for the high voltage pulse, but it can stop the low voltage communication from the remote control. A properly tightened joint clamp fuses the 2 galvanised wires together.

- **Good earthing is essential**. Use 3 earth stakes near the energiser and 1 every kilometre along the fence. The stakes must be galvanised. **Do not use copper stakes or normal tar covered steel posts**.

Remote earth clip not connected	Clip the earth lead to a good earth. The remote requires both fence and earth connections
Energiser is turned off	Energiser must be in standby or pulsing to receive the remote
The section of fence is isolated	Turn on any isolator between the remote and the energiser
Poor fence connection	Ensure joint clamps are used on all joins
Poor earth connection	Ensure all earth connections are made with joint clamps and that they are tight

Instructions for Installation of Electric Fences for Animals

The following information is taken from the AustralianStandard AS/NZS 3350.2.76:1998 Amendment 2. Refer to this or a later standard for the full details on electric fencing.

> Electric fences must be installed and operated so that they do not cause an electrical hazard to persons, animals or their surroundings.
> Construction of electric fences that is likely to lead to entanglement of animals or persons is to be avoided.
> An electric fence must not be supplied from two separate energisers or from independent fence circuits of the same energiser.
> For any two separate electric fences that are supplied from separate independently timed energisers, the distance between the two wires must be at least two (2) metres. If this gap is to be closer, it must be effected by means of an electrically non-conductive (insulating) material and/or an isolated metal barrier.
> Barbed wire or razor wire must not be electrified by an energiser.
> A non-electrified fence incorporating barbed or razor wire may be used to support one or more offset electrified wires on an electric fence. The supporting devices for the electrified wires must be constructed so as to ensure that these wires are positioned at a minimum distance of 150mm from the vertical plane of the non-electrified wires. The barbed or razor wire must be earthed at regular intervals in accordance with Country Electronics earthing recommendations. (See helpful hints brochure)
> A distance of at least 10 metres must be maintained between the energiser's earth

The Unipower is also constantly monitoring itself in case a problem occurs internally. Should it detect a problem, the cause will be shown on the display. The unit should be returned to Thunderbird for repair if any unusal error is displayed.

Trouble Shooting

Problem	Possible Cause	Remedy
No display or functions	Battery Lead off	Reconnect battery
	Flat battery	Battery voltage must be above 8V. Charge battery externally or connect a charged battery. See page 4
No voltage on the fence	Live wire shorted to ground	Locate short and remove it
Low voltage on the fence	Arcing insulator	Locate faulty insulator and replace it
	Poor connection	Make sure joint clamps are used on all joins, and they are firmly tightened.
	Poor earth	Check that all earth connections are tight and that joint clamps are used.
The remote LED flashes rapidly or the remote operates eratically	Battery is low	Replace the battery with a good quality alkaline battery
Remote control won't work	Flat battery in remote	Replace battery

See the accompanying helpful hints brochure.

- **A minimum of one earth return wire is required**. The communication between the remote control and the energiser will likely fail if you rely on dry ground as a return path.

- **A separate earth stake** is required if you want earth sensing. This stake should be a minimum of 5m from the main fence earth.

- **Only use alkaline 9V batteries in the remote**. When transmitting, the remote draws a large amount of current for a very brief period from the battery. This current surge can cause the output voltage of a carbon zinc battery to drop dramatically because of its internal resistance, which the processor senses as a flat battery. A good alkaline battery should last for 150-200 transmissions, or up to 12 months, depending on the useage.

The energiser must be mounted under cover, such as in a shed, if the mains power supply is used. Use underground cable to connect the energiser to the fence and to the earth stakes. If using a solar system or stand alone battery in the field, make sure that the energiser is mounted vertically so that the connections are at the bottom of the energiser. This will prevent rain or dew from entering the case. DO NOT leave the energiser laying on the ground.

The remote control should be stowed in a safe place away from moisture and rough treatment.

Fence Connections - Connect the fence live wire to the "FENCE" terminal, and the earth stakes and earth return wire to the "EARTH" terminal. If earth sensing is required, connect the earth stake used for sensing to the "EARTH SENSE" terminal.

Strobe Connection - There is a 6.5mm socket available on the bottom of the enclosure. This is for connecting a strobe as an external alarm indication. The strobe supplied by Thunderbird has a plug suited to this socket. **DO NOT apply an external 12V to the strobe!** The Unipower powers the strobe itself.

Mains Power Supply - A socket is also provided on the bottom of the Unipower. This is for connecting the provided mains power supply. The Unipower will not operate on this power supply alone. **A battery must**

be connected for it to operate. DO NOT use any other type of power supply. Damage to the energiser may occur if a power supply of a different rating is used.

Battery - The attached battery clips must be connected to an external battery. A 12V 7AH battery is provided which will suffice if the mains power adaptor is used, but a larger battery will be necessary if using solar power or a stand alone battery.

A situation may arise where the battery might go completely flat if the Unipower is operating on a stand alone battery, or there has been an extended blackout and the battery can't be charged. In this situation the energiser may fail to operate if the battery voltage is less than 8V. If this is the case, charge the battery with a separate battery charger. The Unipower will attempt to charge the battery if it's 8V or higher. **You must press the ON button to restart the Unipower if the battery has fallen below 8V**. For immediate operation, connect a charged battery.

Battery and Solar Panel Selection

For solar use or stand alone battery use, the minimum recommended sizes are:

MB500 - 100 amp hour deep cycle or solar rated
MB1000 - 200 amp hour deep cycle or solar rated
MB1500 - 280 amp hour deep cycle or solar rated

These battery sizes will give a maximum of approximately 10 days running time without any charge. It is not recommended to run a lead acid battery completely flat however. Repeatedly discharging a battery by more than 40-50% will severely shorten its life.

If the energiser is to run continuously using solar power, the minimum recommended sizes of solar panels are as follows:

MB500 - 40W solar panel
MB1000 - 80W solar panel
MB1500 - 120W solar panel

These panels require a solar regulator. The output of the regulator

the distance between the energiser and the short. The pulse rate of the MB1500 may slow down slightly as it increases the output energy to maintain the fence voltage.

Normal 2.5mm galvanised wire has a resistance of about 30 ohms per kilometre. If the short is several kilometres away, the energiser might not notice much of a change in load. For this reason it is wise to regularly inspect and check the voltage on the fence at different locations, especially in the outer areas, to make sure that it's still functional.

The display will also indicate the condition of the fence earth, if a separate earth sensing stake has been installed. The energiser measures the voltage between the ground via the separate earth stake and the earth terminal on the energiser. A bad earth will not allow the animal to receive a decent shock if it touches the fence. Ensure that there are at least 3 earth stakes connected to the earth terminal, as well as existing fencing. The existing fence should also be earthed at regular intervals.

Alarms

The Unipower is capable of sensing fence, battery and internal problems. For a fence alarm, if the output voltage is below the set alarm voltage for more than 10 consecutive pulses, an alarm will occur. This count is reset if even 1 pulse is above the alarm voltage.

When an alarm occurs, the energiser will beep, enable the external alarm, and display the reason for the alarm on the screen.

For a fence alarm, pressing ENTER will acknowledge and disable the alarm. However, this only silences the alarm. If the condition still exists after 24 hours, the alarm will occur again. If the problem is fixed within 24 hours after acknowledging the alarm, and there are 20 consecutive pulses above the alarm voltage, the alarm will be automatically reset.

The display may show "Heavy Fence Load" after the ENTER button has been pressed to indicate that there is still a problem with the fence.

The alarm may be reset by pressing ALARM, then ENTER within 10 seconds. Once the alarm has been reset, it will start checking for problems again.

period. If pulsing was occurring previously, it will resume at the new pulse period.

Note that the remote control will not work while the pulse period is being changed. The energiser will resume normal operation if no buttons have been touched for more than 10 seconds.

Setting Alarm Voltage

The alarm voltage can be changed from 6.0kV to 2.0kV in 0.1kV steps.

To change the alarm voltage, press ALARM. If the energiser was pulsing, the pulsing pauses to minimise the danger of accidentally touching the live wire. The current alarm is shown, and you will also be asked if you want to change it. Press YES to change, and NO to leave it. If neither are pressed, the Unipower returns to normal after 10 seconds.

If YES is pressed, use the up and down arrows (which are also YES and NO) to set the desired alarm voltage. Press ENTER to accept the new voltage. If pulsing was occurring previously, it will resume at the new pulse period.

Note that the remote control will not work while the alarm voltage is being changed. The energiser will resume normal operation if no buttons have been touched for more than 10 seconds.

If the sensed voltage falls below the alarm level for more than 10 pulses, the energiser will start beeping, an alarm will be displayed on the screen, and the strobe will start flashing (if fitted).

Fence Condition

The Unipower display can indicate the condition of the fence. If the fence is OK, the volts should be high (around 6 - 8kV), and the amps should be low (1 - 10A, depending on the length of the fence). You should take note of the displayed values when the fence is in good condition.

If a short or heavy load appears on the fence, the volts will decrease and the amps will increase. How much they change will depend on the severity of the load, the number of kilometres of fence connected, and

should be connected directly to the battery.

The size of the panel may have to be increased for higher latitude locations such as Southern Victoria or Tasmania. Alternatively, the energiser may be operated at reduced power or a slower pulse rate. This is recommended anyway during extended periods of cloud. Ensure that the solar panel is facing the equator, and that it can receive full sun throughout the day. The solar panel should be angled at approximately 10 degrees more than your latitude for maximum effect during the winter period.

Communication

The communication between the remote and the Unipower is based on time. The remote control will only transmit immediately after a pulse if the energiser is on.

Connect the remote to the fence by clipping the earth lead to an earthed wire in the fence, then placing the metal clip on the front of the remote onto the live wire.

Pressing a button on the remote does not immediately cause the remote to transmit. If the energiser is in standby mode, you must hold the remote button down for a minimum of 2.5 seconds before it transmits. The reason is that the remote listens for more than the maximum pulse period time to make sure that the energiser is not already pulsing. If it is, a signal is sent immediately after the pulse.

A signal will also be sent immediately after any induced pulse from a neighbouring electric fence. These induced pulses can cause 2 transmissions from the remote in one pulse period, which can cause problems with communication. Induced pulses are most commonly caused by 2 electric fences powered by different energisers running next to each other for some distance. A solution is to fit a resistive load to the fence near the source of the problem to eliminate these induced pulses.

Note: There is a requirement in the Australian Standards on Electric Fences to keep different systems separated by more than 2m. This is for safety reasons. If the other system belongs to a neighbour, and you both need to have the fence wires closer, you could maybe arrange to power his fence for that distance off your energiser. It won't cost any more to

run your energiser, and it will eliminate both the interference problem and the safety problem. If this is done, don't forget that there still must be 2m separation between the systems in the corners of the paddock.

Briefly pressing and releasing a button on the remote will power the remote, and the pulse LED will flash at every fence pulse while it's connected to the fence.

If the pulse LED on the remote control flashes rapidly, it is indicating that the battery is starting to become flat. Briefly releasing the button and pressing it again will allow a transmission to occur if there is enough power left in the battery.

Each remote is coded to match a specific energiser. This is to prevent someone maliciously turning on or off your energiser. There are over 1000 different combinations, so the chances are slim that 2 systems will have the same code.

Multiple remote controls may be used on the Unipower, but each remote must have the same code. Contact your supplier for more information on matching the remote control codes.

Operation

There are 3 operating modes that the energiser can be in. They are off, for minimum current drain; standby, where there are no pulses but it listens for any remote command; and on for pulsing. The 3 modes can be selected by the keypad, but only standby and on can be selected by the remote.

The Unipower remembers the mode it was in if the battery goes flat. If it was operating, for example, and a blackout occurred, the Unipower will start operating when the battery charges again. It also remembers the user settings, and implements these when powering up.

In standby mode, the Unipower is constantly listening for a remote command to turn on. If either a keypad or remote command is received to start pulsing, the Unipower will give 5 short beeps and then start pulsing. If a remote command is received, it will be displayed briefly.

The energiser listens for a remote signal immediately after a pulse is sent. It also checks battery voltage, earth condition, output voltage and current. These last 3 are displayed. If the battery voltage is low, the energiser will change the output level to low and the pulse period to maximum so as to extend the battery life as much as possible. If the battery voltage becomes too low, the energiser will stop pulsing.

Setting Output Level

There are 3 output levels that can be set on the Unipower. They are high, medium and low.

To see the current level, press LEVEL. If the energiser was pulsing, the pulsing pauses to minimise the danger of accidentally touching the live wire. The current level is shown, and you will also be asked if you want to change it. Press YES to change, and NO to leave it. If neither are pressed, the Unipower returns to normal after 10 seconds.

If YES is pressed, use the up and down arrows (which are also YES and NO) to set the desired level. Press ENTER to accept the new level. If pulsing was occurring previously, pulsing will resume at the new level.

Note that the remote control will not work while the level is being changed. The energiser will resume normal operation if no buttons have been touched for more than 10 seconds.

Setting Pulse Period

The pulse period can be changed from 1.4 seconds to 2.4 seconds in 0.1 second steps. Changing the pulse period to a slower rate reduces current consumption, and so extends the time between charges for a stand alone battery.

To change the pulse period, press RATE. If the energiser was pulsing, the pulsing pauses to minimise the danger of accidentally touching the live wire. The current pulse period is shown, and you will also be asked if you want to change it. Press YES to change, and NO to leave it. If neither are pressed, the Unipower returns to normal after 10 seconds.

If YES is pressed, use the up and down arrows (which are also YES and NO) to set the desired pulse period. Press ENTER to accept the new