

**THUNDERBIRD**



**MB Series**  
**Remote Ready Energisers**



**INSTRUCTION MANUAL**  
for models  
**MB550R, MB1050R and MB1750R**

## **WARRANTY THUNDERBIRD**

### **Electric Fence Systems**

Thunderbird warrant all electric fence systems against defective workmanship and faulty materials for 2 years, **plus** a warranty for 6 months against lightning damage, 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 outside the lightning warranty period, insect damage, moisture damage or damage to external wiring.

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**For your records:**

Model No.: .....

Serial No.: .....

Date of Purchase: .....

Place of Purchase: .....

Receipt No.: .....

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 standard AS/NZS 3014:2003.**

## Specifications

Battery Voltage - 11.8 - 16Vdc

Supply Current\*- Standby - 13mA

MB550R- 210 - 400mA (1.4sec pulses, high power)

MB1050R- 350 - 780mA (1.4sec pulses, high power)

MB1750R- 550mA - 1.2A (1.4sec pulses, high power)

Output Voltage - MB550R 7.5kV no load

MB1050R 7.9kV no load

MB1750R 8.1kV no load

Max Output - MB550R - 3.46J at 250 ohms resistive load

MB1050R - 8.02J at 200 ohms resistive load

MB1750R - 13.72J at 142 ohms resistive load

Temperature - -10 - 50 degrees celcius

Humidity - 0 - 90% non condensing

\*Supply current varies with fence load

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## Introduction

Thank you for purchasing this product. Thunderbird has had over 20 years experience in manufacturing electric fence equipment. All Thunderbird energisers are manufactured in Mudgee, NSW, Australia, and we pride ourselves on being 100% Australian owned.

A lot of effort is spent on research and development to constantly improve our products. This energiser is the result of many years experience on improving reliability and service life.

## Warning

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

- Regular inspections of electric fences must be undertaken to ensure continued operational safety and compliance with Australian Standard AS/NZS 60335.2.76:2003 and AS/NZS 3014:2003.

- 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.

- Extended periods of sunlight and excessive heat on the liquid crystal display will cause deterioration over time. This is not covered by warranty.

- **MB1050R and MB1750R** - A power reducer device must be in series with the live wire where young children or infirm persons are likely to contact the fence, such as around house yards.

- Only use the power supply provided by Thunderbird. Damage to the energizer may result otherwise.

## Description

This MB range of energisers are a universally powered electric fence energiser. They can operate from mains, a solar system, or a stand alone battery.

This range of energisers incorporate “intelligent adaptive control” of the output power. This feature allows the energiser to be more efficient in its use of energy from the power source, and yet deliver maximum voltage when the fence becomes heavily loaded. As much as 55% power saving can be achieved by maintaining a well insulated fence that is free from the burden of green grass around the live wires, and with the live wires 200mm or more away from earth wires and ground.

These remote ready electric fence energisers can be turned from standby to on or vice versa from any point along its electric fence by means of an optional 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.

## Instructions for Installation of Electric Fences for Animals

The following information is taken from the Australian Standard AS/NZS 60335.2.76:2003 Amendment 2. Refer to AS/NZS 3014:2003 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 electrode and any other earthing system connected parts - for example, mains power protective earth or telecommunications system 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

Remote control won't work (continued)	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

A number of parameters can also be adjusted on this unit. Output voltage level, 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 30% 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 indicates the condition of the fence as viewed by the energiser. Fence voltage, current, stored joules and earth voltage 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 energiser also includes an alarm output and a siren output should you wish to be alerted if there is a heavy load on the fence. You will also be alerted if there is a problem with earthing if an earth sense wire is connected. The strobe output should NOT be directly connected to a siren, as this will violate noise laws.

## Installation

An electric fence must be constructed properly to achieve reliability, effective energy at the end of long runs, and low maintenance. This is especially true if you intend using a remote control. 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 so much of 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.** 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 optional 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 quality alkaline battery should last for 150-200 transmissions, or up to 12 months, depending on the useage.

Refer to the accompanying helpful hints brochure for a guide on electric fence construction. You may also refer to Thunderbird's website, [www.thunderbird.net.au](http://www.thunderbird.net.au), for further guidance and to see the various types of insulators available. AS/NZS 3014:2003 is the Australian standard for electric fence construction.

**Mounting** - The energiser must be mounted in a vertical position 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, if used, 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. Use underground cable to connect between the live fence wires and the energiser if the energiser is mounted under cover. If earth sensing is

## Trouble Shooting

Problem	Possible Cause	Remedy
No display or functions	Battery Lead is off	Reconnect the battery
	Flat battery	Battery voltage must be above 8V. Charge battery externally or connect a charged battery. See page 5
No voltage on the fence	Live wire shorted to ground	Locate short and remove it
	Arcing insulator	Locate faulty insulator and replace it
Low voltage on the fence	Short on fence	Isolate sections of fence to check on the possible location of the short. Locate short and remove it.
	Poor connection	Make sure joint clamps are used on all joins, and they are firmly tightened.
The remote LED flashes rapidly or the remote operates erratically	Poor earth	Check that all earth connections are tight and that joint clamps are used.
	Battery is low	Replace the battery with a good quality alkaline battery
Remote control won't work	Flat battery in remote	Replace battery

For an earth alarm, pressing ENTER will acknowledge and disable the alarm, but another alarm will occur after 10 pulses if the problem still exists. The reason for this alarm re-triggering is that the fence is not effective if the earth is not connected, whereas a low voltage output can still be effective.

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

The display may show "Heavy Fence Load" to indicate that there is a problem with the fence. This may be caused by a short some distance from the energiser or a lot of thick green grass growing up around the lives wires.

The displayed warning will overwrite some of the normal displayed data. You may see the overwritten data by pressing ENTER. The normal display will be shown for 10 pulses, and the show the warning again if it is still existing.

The energiser 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 unusual error is displayed.

One such internal problem is a high temperature warning. This may occur on a hot day if the sun is shining onto the energiser and there is inadequate ventilation. The energiser will reduce its output and slow down the pulses until it has cooled sufficiently and then will resume normal operation.

required, connect the earth stake used for sensing to the "EARTH SENSE" terminal. Make sure all terminals are screwed tightly onto the wires.

**Strobe and Siren Connection** - There is a 6.5mm stereo socket available on the bottom of the enclosure. This is for connecting a strobe and/or siren 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 or siren!** The energiser powers the strobe and siren outputs itself from the 12V source. The siren output will only operate for 5 minutes unless the energiser is manually reset. A maximum of 1 amp may be drawn to power both the strobe and siren.

**Power Supply** - A socket is provided on the bottom of the energiser for connecting the provided mains power supply or a 12V battery. A battery lead with clips and a fitted plug is provided to connect to a 12V battery.

**Keep the battery lead as short as possible if you are using a 12V battery.** Long battery leads can have a significant voltage drop, which reduces the voltage reaching the energiser, and can affect its performance.

A situation may arise where the battery might go completely flat if the energiser is operating on a stand alone battery. 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 before using it on the energiser.

### **Battery and Solar Panel Selection**

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

- MB550R - 100 amp hour deep cycle or solar rated
- MB1050R - 200 amp hour deep cycle or solar rated
- MB1750R - 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 lead-acid

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:

MB550R - 40W solar panel  
MB1050R - 80W solar panel  
MB1750R - 120W solar panel

These panels require a solar regulator. The output of the regulator 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. For example, the solar panel should be angled at approximately 45 degrees during the winter for areas around central Victoria.

## Communication

The communication between a remote and the energiser is based on time. If the energiser is pulsing, the remote control will only transmit immediately after a pulse. If the energiser is in standby or is off, the remote will only transmit if the button has been held on for more than 2.5 seconds.

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

Hold the remote button down for a minimum of 2.5 seconds, or until a click is heard. The reason for the delay 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.

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 the distance between the energiser and the short. The pulse rate of the MB1750R may slow down briefly 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 energiser 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 siren outputs, and display the reason for the alarm on the screen. The siren output will be disabled after 5 minutes, and will not become active again until the energiser has been manually reset and another alarm occurs.

For a fence alarm, pressing ENTER will acknowledge and disable the alarm. If the condition still exists after 24 hours, the alarm will occur again.



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 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 energiser 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, the siren will sound for 5 minutes (if fitted), and the strobe will start flashing (if fitted).

## Monitoring Fence Condition

The energiser 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.

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 2.5m. 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 2.5m 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. From this you can ascertain whether the energiser is working.

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 energiser, but each remote must have the same code. Contact Thunderbird or 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 energiser remembers the mode it was in if the battery goes flat. If it was operating, for example, and a blackout occurred, the energiser will start operating when the battery charges again. It also remembers the user settings, and implements these when powering up.

In standby mode, the energiser is constantly listening for a remote command to turn on. If either a keypad or remote command is received to start pulsing, the energiser will give 3 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 voltage, output voltage and current. These last 3 are displayed along with the stored joules. 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.

The fence condition is constantly monitored. If the output voltage falls below a selected alarm voltage for more than 10 consecutive pulses, a low fence alarm will be displayed, the internal buzzer will beep continuously, and the strobe and siren outputs will be activated. This alarm can be reset and will not occur again within 24 hours of being reset.

If the earth voltage rises above 1kV for more than 10 consecutive pulses, a warning will be displayed. If the earth voltage rises above 3kV for more than 10 consecutive pulses, an alarm will be displayed, the internal buzzer will beep continuously, and the strobe and siren outputs will be activated. The earth voltage will only rise above 3kV if the earth lead has become detached from the earth stake or the energiser. This alarm can be reset, but will occur again after 10 pulses if the problem is not fixed.

A heavy fence load warning will also be displayed if the fence current is higher than a preset level. This warning won't trigger an alarm, but is a reminder that something is wrong with the fence.

## Setting the Output Level

There are 3 output levels that can be set on the Unipower. They are high, medium and low. The LEVEL need only be changed to a level lower than high if animals such as horses are being contained, or if the battery consumption needs to be minimised.

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 energiser 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 1.3 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 energiser returns to normal after 10 seconds.