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# SMARTPOWER<sup>TM</sup>

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**MX5000**  
**MX2500**  
**XR1**

## **OPERATOR'S MANUAL**

*Read full instructions before use*

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# GALLAGHER SMARTPOWER ENERGIZERS

## *A revolution in time saving, problem prevention... profit improvement*

Today's high performance farming demands manufacturers provide products and systems that are more capable and reliable, yet at the same time simpler to use. To meet the needs of today's leading farmer Gallagher bring you the SmartPower Energizer — the most technically advanced Power Fence Energizer in the world. The use of "leading edge" technology gives this revolutionary Energizer the capability to not only improve animal control but to ensure your fence system is more convenient and efficient to manage.

## *What a SmartPower Energizer offers you*

- The convenience of being able to turn the Energizer ON or OFF anywhere the fence is powered (**Remote Control**)
- Maximum Output Voltage, especially under heavy fence loads (**Adaptive Control**)
- The ability to know how hard the Energizer is working (**Stored Energy**)
- Simple and efficient fence maintenance (**Stored Energy & Fence Voltage**)
- Secure animal control (**Output, Fence & Earth Voltage Alarms**)

## **EQUIPMENT**

Your full SmartPower package includes

- SmartPower Energizer MX2500 or MX5000
- SmartPower XRI Remote Control with pouch
- SmartPower Operators Manual
- "Help Guide" Wall Chart and "Demonstration" Video
- Gallagher Power Fence Manual
- Privileged membership to the "Gallagher Users Group"

SmartPower MX2500 has 24 Joules of Stored Energy (@ 220-240V) and powers 80 km (50 miles) of multi-wire fence.

SmartPower MX5000 has up to 41J (@ 220V), 45J (@ 230V), 48J (@ 240V) of Stored Energy and powers 120 km (75 miles) of multi-wire fence.

Note: Distances are a guide only. In dry conditions Energizers have proven to work effectively for more than twice the distance. In high vegetation growth areas, distances may need to be reduced to less than half.

**Use Gallagher Power Fence™ Accessories to gain maximum performance from your SmartPower Energizer.**

For plug/cord replacement and module changes, contact your dealer.

## INSTALLATION INSTRUCTIONS

Install your SmartPower Energizer in a convenient, frequently accessed place. The display and alarms give valuable information that can save time and help prevent costly problems. Mount the Energizer on a wall, under cover, adjacent to a mains power connection, safe from children, mechanical damage and if possible away from heavy electrical equipment (e.g. pumps).

1. Using the template on the "Important Information" sheet, drill 2 x 4mm holes and attach the top of the Energizer to the wall
2. Install the third screw in the central bottom hole
3. **Fence:** Connect the fence live wire to the RED OUTPUT (⚡) Terminal. Use Gallagher Lead Out Cable (G627X) and Joint Clamps (G603) to bring the live wire into a building.
4. **Earth:** Connect the Earth System to the GREEN EARTH (≡) Terminal. Use Gallagher Lead Out Cable (G627X) and Earth Clamps (G626) to make a high quality connection between the earth stakes or earth return wire and Energizer.
5. Plug in the Energizer and switch ON. Allow at least 30 pulses for the Energizer to adapt to the fence system.

From this point on your SmartPower Energizer is very different from conventional Energizers. The first thing to note is that the electronic display will begin cycling through 4 different readings:

- |   |                                   |
|---|-----------------------------------|
| 1. Stored Energy (J symbol)                 | 3. Fence Voltage (no symbol)      |
| 2. Output Voltage (⚡ lightning bolt symbol) | 4. Earth Voltage (≡ earth symbol) |

**Note 1:** Each reading gives you important information about the performance of your fence system (the red back light illuminates the electronic display for easy reading in dark conditions).

**Note 2:** Readings will change as your SmartPower Energizer responds to fence conditions (this is the Energizer monitoring the fence and adapting its power output accordingly).

**Note 3:** If the Earth Alarm sounds, ignore it until the Earth Test is complete.

**Earth Test:** It is very important to have a high quality Earth System. For an all live wire fence system save time by installing at least 9 Earth Stakes before you start.

6. Turn the Energizer OFF. At least 40 metres along the fence drive a steel stake into the soil (enough to reach moist soil) and connect it to the live wire.
7. Turn the Energizer ON and check the Stored Energy reading. Add steel stakes until Stored Energy reads at least 35 Joules for the MX5000 or 17 Joules for the MX2500 (if the Output Alarm (OA) sounds remove a steel stake).
8. Add Earth Stakes (G619) until you achieve 200-300 or less volts on the Earth reading – for explanation refer to the section on "What does Earth Voltage tell you?" **Construct the Earth System as directed in the Gallagher Power Fence Manual.**
9. Turn the Energizer OFF. Remove the steel stakes from the fence.

**Note 4:** If the Earth Alarm sounds when you remove the steel stakes contact your Gallagher Dealer or National Distributor to change the alarm settings.

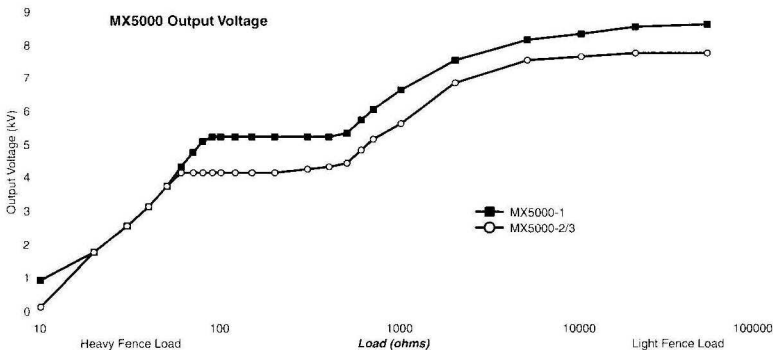
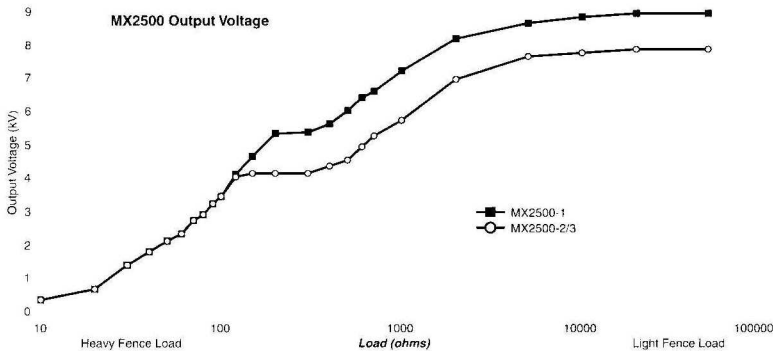
10. **Fence Return:** Remove the link and connect the return wire to the BLUE (⚡) Terminal – for explanation refer to the section on “What does Fence Voltage tell you?” If you DO NOT wish to use this feature, retain the link between the BLUE (⚡) Terminal and the RED OUTPUT (⚡) Terminal. Failure to make this connection will cause the Fence Alarm (FA) to sound.

**Note 5:** Read this Manual and the SmartPower Trouble Shooting Guide (at the back of the Manual) for a complete understanding of the displays and alarms.

## UNDERSTANDING YOUR SMARTPOWER ENERGIZER

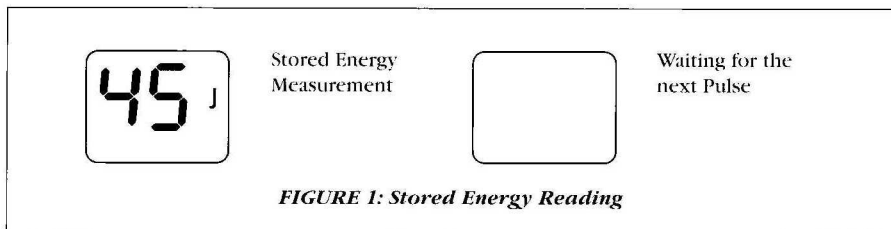
### What is Adaptive Control?

Your SmartPower Energizer operates with Adaptive Control. Adaptive Control is a patented technology which increases Stored Energy as fence load increases (maybe due to grass growing on to the fence). A minimum 5.4kV Output Voltage in New Zealand, Australia, South Africa (4.2kV in Europe due to different Electrical Standards) is maintained, until the Energizer is over loaded. This ensures maximum shock is always delivered, maintaining effective animal control.



## What does Stored Energy tell you?

Stored Energy is the first reading – identified by the “J” symbol. Stored Energy is the amount of energy (Joules) available for each pulse. When your fence is in good condition the Energizer uses only a small volume of energy per pulse – minimum Stored Energy for both SmartPower MX5000 and MX2500 is 13 Joules in New Zealand, Australia and South Africa – 7 Joules in Europe. As your fence becomes more heavily loaded Adaptive Control delivers more energy in each pulse – SmartPower MX5000 up to a maximum of 48 Joules and SmartPower MX2500 a maximum 24 Joules. Figure 1 illustrates the Stored Energy reading.

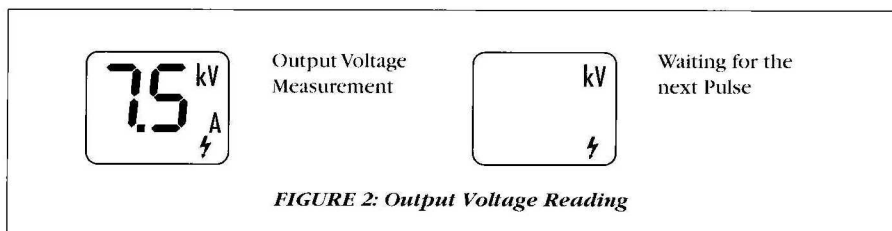


Stored Energy is therefore a measure of fence condition. If, for example, a SmartPower MX5000 is showing a Stored Energy reading of 30 Joules (or a SmartPower MX2500 is showing 16 Joules) your Energizer is well loaded but plenty of capacity remains to cope with a greater loading. However, if the MX5000 increases to 40 Joules or greater (equally the MX2500 increases to 20 Joules or greater) then the fence is in poor condition and close to overloading your Energizer's capacity. Fence maintenance is required.

If additional fence is connected, the level of Stored Energy will indicate whether the Energizer is able to cope with the extra load or you need to upgrade to a larger Energizer.

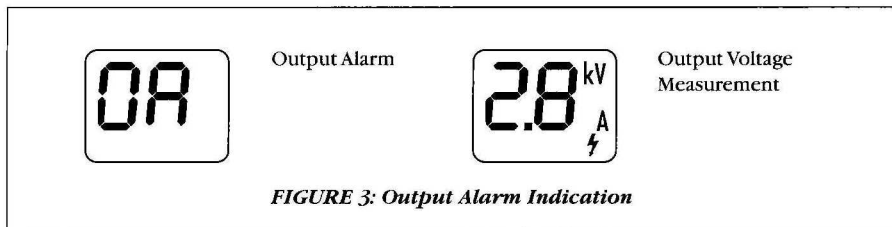
## What does Output Voltage tell you?

Output Voltage is the second reading – identified by the **lightning bolt symbol** (⚡). Output Voltage is the voltage leaving your Energizer. Under heavy fence load Output Voltage will normally be higher than Fence Voltage. Figure 2 illustrates the Output Voltage reading, in kilovolts (kV).




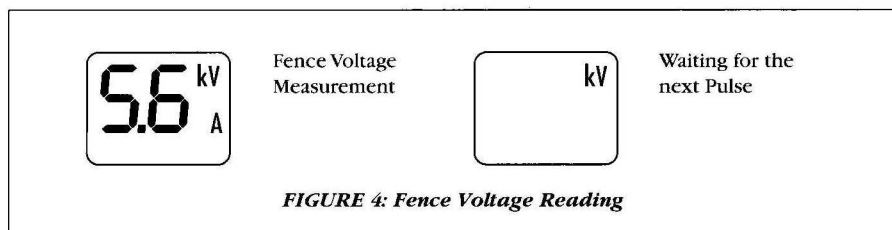
Your SmartPower Energizer features a low Output voltage Alarm (OA). If Output Voltage drops below 3kV (factory default setting) and the Energizer is unable to re-establish 3kV, even at maximum Stored Energy, then the Output Alarm is activated. The Output Alarm can be either turned OFF or set at 2kV, 3kV or 4kV – consult your Gallagher Dealer or National Distributor if you wish to change the default setting. The symbol ‘A’ is displayed (Figure 2) when the Output Alarm is set.

When the Output Alarm is activated the alarm sounds for 10 minutes. The display will flash between "OA" and Output Voltage (Figure 3) until the fence condition is corrected and Output Voltage returns above the minimum setting. **An Output Voltage under 3kV indicates your fence system is heavily loaded and at risk of being inadequate for effective animal control. Urgent fence maintenance is required. Always aim to maintain voltage well above the Output Alarm setting.**



## What does Fence Voltage tell you?

A special feature of your SmartPower Energizer is its ability to monitor a specific section of fence. This offers the advantage that, whilst Output Voltage may be adequate, voltage out on the fence (particularly in the case of large networks or areas with heavy vegetation) can be inadequate for effective animal control. Fence Voltage is the third reading – identified by no symbol on the display. To monitor Fence Voltage you need to return a wire from the section of fence you wish monitored (e.g. the front paddock or field) and connect it to the BLUE  terminal. Figure 4 illustrates the Fence Voltage reading.



Your SmartPower Energizer also features a Fence voltage Alarm (FA). If Fence Voltage drops below 3kV (factory default setting) and the Energizer, after 30 pulses is unable to re-establish 3kV then the Fence Alarm is activated. The Fence Alarm can be either turned OFF, set on Property Protection (refer "Property Protection Option"), or set at 3kV or 4kV – consult your Gallagher Dealer or National Distributor if you wish to change the default setting. The symbol 'A' is displayed (Figure 4) when the Fence Alarm is set.

When the Fence Alarm is activated the alarm sounds for 10 minutes. The display will flash between "FA" and Fence Voltage (Figure 5) until the fence condition is corrected and Fence Voltage returns above the minimum setting. **A Fence Voltage under 3kV is at high risk of being inadequate for effective animal control. Fence maintenance is required.**



Fence Alarm

Fence Voltage  
Measurement**FIGURE 5: Fence Alarm Indication**

**Note:** If you DO NOT wish to monitor Fence Voltage, retain the link between the BLUE (⚡) Terminal and the RED OUTPUT (⚡) Terminal.

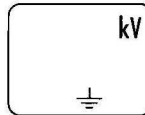
## Property Protection Option

Fence Voltage can either monitor fence load (as described above) or detect a sudden, sustained drop in fence voltage – the Property Protection Option. This option is available for simple property protection measures, e.g. around a building or valuable piece of machinery. Under this option the “Fence Alarm” will activate if Fence Voltage drops below 2.0kV for 3 or more consecutive pulses. For example, if a fence is dropped on the ground, a vehicle driven over it and the fence returned to its previous state, the Energizer will alarm, alerting you of the breach. Alarms and displays are as described in the “Fence Voltage” section above, except that the display will continue to alert you of the breach. Return the display to normal operation by, firstly, correcting the cause (e.g. standing the fence up again) and then turning the Energizer OFF and ON at the mains. Consult your Gallagher Dealer or National Distributor if you wish to change the default setting to the “Property Protection Option”.

**Note:** This SmartPower Energizer offers the ability to monitor only a single fence system. If you wish to install a comprehensive security system consult Gallagher Security or your National Distributor.

## What does Earth Voltage tell you?

Earth Voltage is the fourth reading – identified by the earth symbol (⏏). Figure 6 illustrates the Earth Voltage reading in kilovolts (kV).

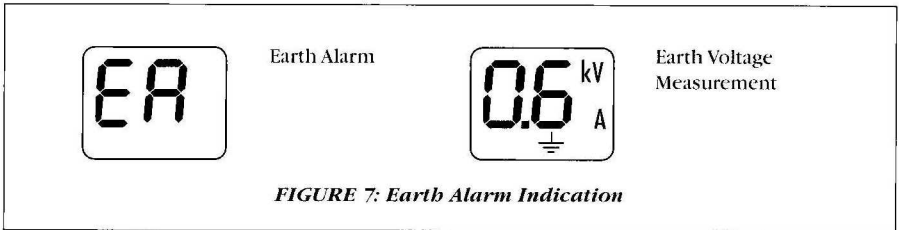
Earth Voltage  
MeasurementWaiting for  
next Pulse**FIGURE 6: Earth Voltage Reading**

Your SmartPower Energizer features an Earth voltage Alarm (EA). If Earth Voltage is above 500 volts (factory default setting) the Earth Alarm is activated. The Earth Alarm can be either turned OFF or set at 300, 500 or 700 volts – consult your Gallagher Dealer or National Distributor if you wish to change the default setting. The symbol ‘A’ is displayed (Figure 6) when the Earth Alarm is set.



Earth Voltage indicates the quality of your Earth – the lower the voltage the better the animal control (refer Gallagher Power Fence™ Manual for “Earthing System” instructions). SmartPower makes installation of your Earth very simple. For example, an Earth reading of 0.6kV (as per Figure 7) would activate the Earth Alarm – being greater than the default setting of 0.5kV. Just keep adding Earth Stakes until you achieve a reading of ideally 0.2kV. In some situations, 0.2kV may be difficult to achieve.

When the Earth Alarm is activated the alarm sounds for 10 minutes. The display will flash between “EA” and Earth Voltage (Figure 7) until the quality of Earth is improved.



**Note:** Only test your Earth System under a heavy fence load – refer “Installation Instructions”. If your Earth is good under a heavy fence load (high Joule reading) but the Earth Alarm sounds under a light fence load (low Joule reading) contact your Gallagher Dealer or National Distributor to either set the Earth Alarm to 700 volts or turn it OFF.

## YOUR SMARTPOWER XR1 REMOTE CONTROL

Your SmartPower XR1 Remote Control is a hand held device which switches the Energizer ON or OFF anywhere the fence is powered.

### How to Use Your Remote

1. Either push the earth stake into the ground (All Live Fence System) or place the earth stake on the earth wire (Fence Wire Return System). For reliable performance it is IMPORTANT to achieve a good earth.
2. Place the brass terminal on the live fence wire.
3. The Remote will indicate Energizer pulses (Normal Operation) by regular, short flashes (0.3 of a second) of the LED.
4. Push the button to switch the Energizer ON or OFF

Your Remote LED gives a long flash (0.8 of a second) to indicate the signal has been transmitted. Your Energizer will switch between Normal Operation (ON) and Standby Mode (OFF). Repeat the process and your Energizer will switch between Standby Mode and Normal Operation.

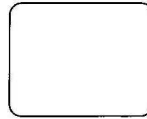
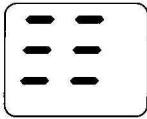
**Attention:** Damage can be caused if you , a) use the Remote on a fence not powered by a SmartPower Energizer or, b) reverse the connection by placing the earth stake on the live fence wire and the brass terminal on the earth.

## Low Battery

A flat battery is indicated by the LED giving 5 quick flashes, either when the button is pushed or the Remote receives a fence pulse.

## Energizer Standby Mode

Your SmartPower Energizer indicates it is going into or out of Standby Mode by the alarm sounding 5 times. Whilst in the Standby Mode the alarm sounds every 8 seconds and the display flashes between the two displays shown in Figure 8.



**FIGURE 8: Standby Mode Indication**

## SMARTPOWER PERFORMANCE

### Energizer Performance


If your fence is heavily loaded (indicated by low fence voltage), yet the Energizer is not adapting up to full Stored Energy, it could be your **leadout** is inadequate for the power of this Energizer. We recommend you use at least one highly conductive Aluminium Coated Wire (G617), or the equivalent 3 x 2.5 High Tensile Galvanised Wires, in the main leadout to your fence system. We recommend you use high performance Double Insulated Cable (G627X) to connect the Leadouts and Earth System to the Energizer.


At the heart of your SmartPower Energizer is a **microcontroller**. As happens in computers, the microcontroller can be upset ("crash") by spikes in electrical current. If strange characters or symbols appear on the electronic display it is possible the microcontroller has "crashed". Check for loose connections on either the live wire or earth system within 25 metres of the terminals. To correct the display turn the Energizer OFF and ON at the mains. If microcontroller "crashes" occur regularly contact your Gallagher Dealer or National Distributor.

### Remote Control Performance

If the Remote Control fails to switch the Energizer, ensure:

1. The Remote Control earth stake is achieving a good earth. Use damp ground or another good earth, e.g. an iron fence stake.
2. The Energizer Earth is showing a low voltage reading.
3. You are not trying to operate the Remote Control next to a large short on the fence. The Remote is like a small Energizer, the pulses will power through small shorts but have difficulty with large shorts.

4. The wire connections are good. A large Energizer pulse will leap a poor connection but the smaller Remote pulse will have difficulty. Find faulty connections by beginning at the Energizer and progressively work towards where the Remote does not work. A Digital Volt Meter (G503) will assist by identifying a drop in voltage. Use Joint Clamps (G603) to ensure good wire connections.
5. That the Electrical Interference symbol () is not displayed (refer next paragraph) causing the Energizer to ignore Remote Control signals

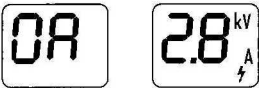
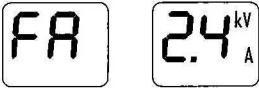


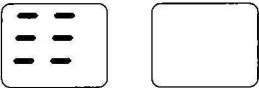
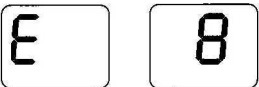
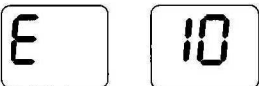
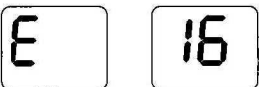
Although unlikely, it is possible for electrical interference on the fence (e.g. caused by military activity or a nearby communications facility) to copy the Remote Control signal. During high electrical interference the Energizer ignores signals on the fence. When this occurs a Remote Control symbol () is displayed on the electronic display. If electrical interference is affecting the operation of your Remote Control contact your Gallagher Dealer or National Distributor for assistance.

**Note: In the very unlikely event that electrical interference exactly reproduces the Remote signal, and unwanted switching occurs, contact your Gallagher Dealer or National Distributor.**

Both your Energizer and Remote are pre-set with an identifying code. In the event that your neighbour has a Remote with the same identifying code – hence your neighbour can unintentionally turn your Energizer OFF and ON – your Gallagher Dealer or National Distributor are able to re-program an alternative code in both the Energizer and Remote.

# SMARTPOWER TROUBLE SHOOTING GUIDE

Your SmartPower Energizer not only has the capability to inform you of what is happening on the fence but also the ability to diagnose its own troubles. Below is a summary of what the alarms and displays mean:

DISPLAY	CAUSES	SOLUTION
 <b>Output Alarm</b>	Heavily Loaded Fence System	Check for shorts on fence. Remove excess vegetation from fence.
 <b>Fence Alarm</b>	Heavily loaded fence section. Breach in fence section.	Check for shorts on fence. Remove excess vegetation Check fence circuit for continuity.
 <b>Earth Alarm</b>	Insufficient Earth System.	Check connections. Add Earth Stakes.
 <b>Electrical Interference</b>	Electrical interference preventing Energizer from receiving clear Remote signal.	Self-corrects when interference reduces.
 <b>Energizer Standby</b>	Remote has switched Energizer to Standby mode.	Use Remote to switch Energizer ON again.
 <b>Energizer Error</b>	Errors E1 to E14 - self diagnostics detect Energizer failure.	Record the error number and contact your Gallagher Dealer.
 <b>Abnormal Operation</b>	Energizer readjusting.	Self Correcting. If not cleared after 3 minutes contact your Gallagher Dealer.
 <b>Installation Error</b>	Energizer installed incorrectly.	Check Output and Earth Terminals are correctly connected.

If the above remedies do not cure the problem contact your Gallagher Dealer or National Distributor.

**Gallagher Power Fence™ Systems**  
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