Installation Note

Gallagher Medal 501 Energizer

ATTENTION: This equipment contains components that can be damaged by electrostatic discharge. Ensure both you and the equipment are earthed before beginning any servicing.

Contents

Introduction

Thank you for purchasing this Gallagher Medal 501 Energizer.

As a world leader in electric fencing, Gallagher is committed to providing leading products. The Medal 501 Energizer is an example of this commitment, designed to make electric fencing much simpler, more efficient and more reliable for you, our customer.

This Medal 501 Energizer brings a new generation of technology to electric fencing including battery back-up and internal/external battery management. These energizers are ideal for domestic and commercial sites, as they:

- Effectively deter and detect would-be intruders
- Are simple and easy to install and operate
- Provide alarm output for suitable security response
- Provide earth tamper alarms
- Provide gate opening alarms

This booklet is designed to help you operate the system effectively and safely. To gain maximum performance from your Medal 501 Energizer, it is recommended you use Gallagher accessories.

This product can be integrated and/or controlled by other systems. Alarm outputs are configured by the installer.

Please read the following information carefully and refer any queries to your approved installer/dealer.

Carton Contents

Check the carton contains the following items:

- 1 x Gallagher Medal 501 Energizer
- 4 x Mounting screws
- Plug pack and country adaptor plugs

Optional item:

- Gallagher Keypad (Part Number G29401)

Edition 5 | Part Number: 3E0994
October 2015

Cover Icons

Description	Cover Icon
Fence Alarm The Fence Alarm monitors a specific fence section. Whilst Output Voltage may be adequate, voltage out on the fence (particularly in large networks or areas with heavy vegetation) can be inadequate for effective security. The Fence Alarm will operate if the return voltage drops below 3 kV for 3 pulses.	
Earth Alarm A good earth is critical for good performance. The Medal 501 Energizer earth monitoring system will create an alarm if the earth becomes inadequate. If Earth Voltage rises above 0.5 kV the alarm is activated. The Earth Alarm light and internal buzzer will turn on and remain on until the alarm is cleared. The appropriate relays/outputs will also operate.	
Gate Alarm The Gate Alarm can be used to monitor a gate using a security contact type device. If the gate is opened the alarm is activated. The red light will turn on and remain on until the alarm is cleared, while the internal buzzer will operate for 5 minutes. The appropriate relays/outputs will also operate.	
AC Power/Battery Light Green light = energizer is operating from AC power Red light = energizer is operating from battery power Red light flashes = Low battery **Note:** If the red light flashes and the energizer stops ticking, then the energizer is in stop mode.	
ON/OFF Light Green light flashes = Normal operation No light = Off	

Important Safety Information

SAFETY WARNING: Anytime the energizer is on, the deterrent will be present, (i.e. anyone touching the fence or energizer terminals will receive a short, sharp but safe shock).

WARNING: Read all instructions

- Do NOT touch the fence with the head, mouth, neck or torso. Do not climb over, through or under a multi-wire electric fence. Use a gate or a specially designed crossing point.
- Do NOT become entangled in the fence. Avoid electric fence constructions that are likely to lead to the entanglement of animals or persons.
- Electric security fences shall be installed and operated so that they cause no electrical hazard to persons or their surroundings.
- Avoid electric security fence constructions that are likely to lead to the entanglement of persons.
- Gates in electric security fences shall be capable of being opened without the person receiving an electric shock.
- An electric security fence shall not be supplied (energized) from two separate non-synchronised energizers or from independent fence circuits of the same energizer.
- For any two separate electric security fences, each supplied from independently timed energizers, the distance between the wires of the two electric security fences shall be at least 2 m. An electrically non-conductive material, or an isolated metal barrier, can be used between these fences to maintenance a minimum reach distance of 2 m.
- Barbed wire or razor wire shall not be electrified by an energizer.
- Follow the energizer manufacturer's recommendations regarding earthing.
- The distance between electric security fence earth electrode and other earth systems shall be not less than 2 m except when associated with a graded earth mat.

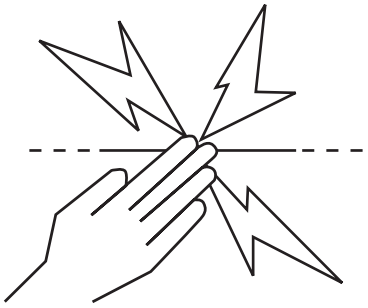
  Note: Where possible the distance between any electric security fence earth electrode and other earth systems should preferably be at least 10 m.
- Exposed conductive parts of the physical barrier shall be effectively earthed.
- Where an electric security fence passes below un-insulated power line conductors, the highest metallic part shall be effectively earthed for a distance of not less than 5 m on either side of the crossing point.
- Connecting leads that are run inside buildings shall be effectively insulated from the earth structural parts of the building. This may be achieved using insulated high voltage cable.

- Connecting leads that are run underground shall be run in conduit of insulating material or else insulated high voltage cable shall be used. Care must be taken to avoid damage to the connecting leads due to the effects of vehicle wheels sinking into the ground.
- Connecting leads shall not be installed in the same conduit as the mains supply wiring, communication cables or data cables.
- Connecting leads and electric security fence wires shall not cross above overhead power or communication lines.
- Crossings with overhead power lines shall be avoided wherever possible. If such a crossing cannot be avoided it shall be made underneath the power line and as nearly as possible at right angles to it.
- If connecting leads, and electric security fence wires are installed near an overhead power line, the minimum clearances from power lines for electric animal fences, shall not be less than those shown in the table below:

Power line Voltage V	**Clearance M**
Less than or equal to 1000	3
Greater than 1000 and less than or equal to 33000	4
Greater than 33000	8

- If connecting leads and electric security fence wires are installed near an overhead power line, their height above the ground shall not exceed 3 m.
- 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 m for power lines operating at a nominal voltage not exceeding 1000V;
  - 15 m for power lines operating at a nominal voltage exceeding 1000V.
- A spacing of 2.5 m shall be maintained between un-insulated electric security fence conductors or un-insulated connecting leads supplied from separate energizers. The spacing may be less where conductors or connecting un-insulated connecting leads supplied from separate energizers. The spacing may be less where conductor or connecting leads are covered by insulating sleeving, or consist of insulated cables, rated to at least 10 kV.
- This requirement need not apply where the separately energized conductors are separated by a physical barrier that does not have any openings greater than 50 mm.
- A vertical separation of not less than 2 m shall be maintained between pulsed conductors fed from separate energizers.
- Electric security fences shall be identified be prominently placed warning signs.
- The warning signs shall be legible from the secure area and the public access area.
- Each side of the electric security fence shall have at least one warning sign.

- Warning signs shall be placed:
  - At each gate;
  - At each access point;
  - At intervals not exceeding 10 m;
  - Adjacent to each sign relating to chemical hazards for the information of the emergency services.
- Any part of an electric security fence that is installed along a public road or pathway shall 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 shall be at least 100 mm x 200 mm.
- The background colour of both sides of the warning sign shall be yellow. The inscription on the sign shall be black and shall be either:
  - The substance of "TAKE CARE – ELECTRIC SECURITY FENCE", or
  - The symbol shown below;



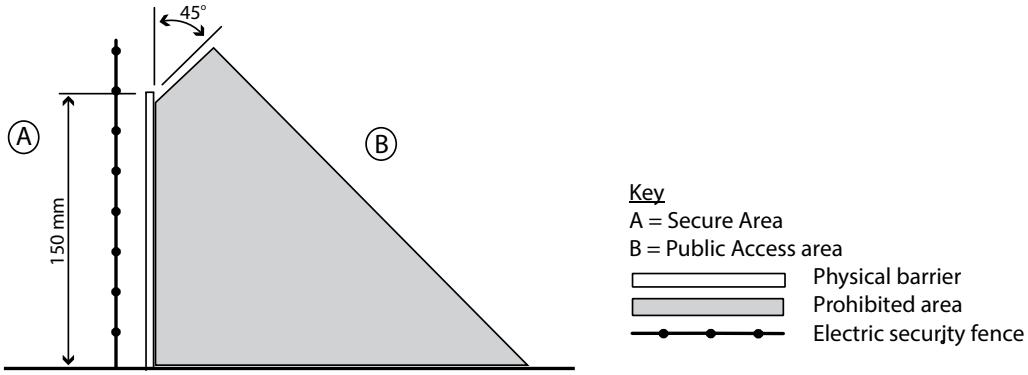
- The inscription shall be indelible, inscribed on both sides of the warning sign and have a height of at least 25 mm.
- Ensure that all Mains-operated ancillary equipment connected to the electric security fence circuit provides a degree of isolation between the fence circuit and the supply mains equivalent to that provided by the energizer.

  Note: Ancillary equipment that complies with the requirements relating to isolation between the fence circuit and the supply mains in clauses 14, 16 and 29 of the standard for the electric fence energizer is considered to provide an adequate level of isolation.
- Mains supply wiring shall not be installed in the same conduit as signalling leads associated with the electric security fence installation.
- Protection from the weather shall be provided for the ancillary equipment unless this equipment is certified by the manufacturer as being suitable for use, and is of a type with a minimum degree of protection IPX4.
- An electric security fence should be installed so that, under normal conditions of operation, persons are protected against contact with pulsed conductors.

  Note 1: This requirement is primarily intended to establish that a desirable level of safety is present or is being maintained in the physical barrier.

  Note 2: When selecting the type of physical barrier, the likely presence of young children should be a factor in considering the size of openings.

- The electric security fence should be separated from the public area by a 1.5 m high physical barrier.
- Pulsed conductors shall not be installed within the shaded zone shown in the following diagram:



- Where a physical barrier is installed as per previous diagram, the distance between the pulsed conductors and the physical barrier is determined by the greatest dimension of the openings in the physical barrier:

Size of opening (greatest dimension)	Distance between barrier & conductors
Less than or equal to 50 mm	100 to 200 mm or greater than 1000 mm
Greater than 50 mm	Greater than 1000 mm

- Electric fence conductors should not be mounted on a support used for any overhead power line.
- The conductors of an electric security fence should not be energized unless all authorized persons, within or entering the secure area, have been informed of its location. Where there is a risk of persons being injured by a secondary cause, appropriate additional safety precautions should be taken.

  Note: An example of a secondary cause is where a person may be expected to fall from a surface if contact is made with pulsed conductors.
- Do not use non-rechargeable batteries.
- Lead-acid batteries must be placed in a well-ventilated area during charging.
- Do not place combustible materials near the fence or energizer connections. In times of extreme fire risk, disconnect energizer.
- The appliance is not intended for use by young children or infirm persons without supervision.
- Regularly inspect the supply cord and energizer for any damage. If found to be damaged in any way, immediately cease use of the energizer and return it to a Gallagher Authorised Service Centre for repair in order to avoid a hazard.
- Refer servicing to a Gallagher Authorised Service Centre.
- Check your local council for specific regulations.

SAFETY WARNING: Risk of electric shock. Do not connect the energizer simultaneously to a fence and to any other device. Otherwise, lightning striking your fence will be conducted to all other devices.

This energizer complies with international safety regulations and is manufactured to international standards.

Gallagher reserves the right to make changes without notice to any product specification to improve reliability, function or design.

Save these instructions

Power Source

The Medal 501 Energizer can be powered by its internal battery or by an AC power supply.

Power	Description
Battery	12 V 7 Ahr rechargeable battery - mounted internally
AC Power	110 V or 220 - 240 V input power

Notes:

- The required battery can be purchased from your local distributor.
- If using AC power, choose the appropriate country adaptor provided with the plug pack provided.

Battery Use

IMPORTANT: Only use a battery which is suited to back-up or for cyclic applications. The recommended type is a 12 V deep cycle lead acid rechargeable battery. For improved battery life, keep the battery fully charged and protect it from temperature extremes.

Note: When AC power is present the energizer is automatically recharging the battery (up to 0.5 A). Test the battery every 6 months.

Contact your Gallagher Security dealer for further information.

Battery operation

When operating on battery only, the energizer pulse rate will slow to 2.5 seconds to conserve power.

Low battery

When the battery voltage is low, the energizer will indicate this by beeping every 15 seconds.

Battery protection (stop mode)

The energizer automatically protects the battery from deep discharge by disconnecting the battery when it is flat. Deep discharge may cause permanent damage to your battery. When this occurs the energizer will stop and the HV alarm will operate. The battery will be automatically reconnected when the Medal 501 Energizer internal charger increases the battery voltage to an acceptable level.

Battery disposal/safety information

- Leaking batteries should be removed. Avoid contact with any leaked material.
- Contact your local battery agent for advice and assistance in the safe disposal of your battery.

Battery life

A standard 12 volt 7 ampere-hour battery will last for 24 hours. This period can be extended with additional external batteries by 3.42 hours per ampere-hour.

Battery Type	Average Battery Life
Internal 7 Ahr	24 hours*
Internal 7 Ahr + External 7 Ahr	48 hours*
Internal 7 Ahr + External 55 Ahr	212 hours (8 days)*

* Battery life is based on fence output operation only, **without** any additional auxiliary DC devices.

Step 1: Prepare for Installation

1. Select a suitable place to install the energizer, according to the following requirements:
   - The energizer should be on a wall, under cover and out of reach of children (preferably inside).
   - There should be no risk of the energizer incurring fire or mechanical damage and if possible should be located away from heavy electrical equipment, (e.g. pumps, radio transmitters or other items that may cause electrical interference).
   - The energizer should be in a frequently accessed location. The cover display provides valuable information that can save time and help prevent costly problems.
2. Remove product from the packaging.
3. Drill 4 x 4 mm (5/32") holes in the wall, using the product as a template.
4. If using more than 3 undergate* cables or cables larger than an undergate cable, you will need to snap off extra knockouts from the HV cable entry point (see diagram below).

   * Undergate refers to the Gallagher G902XX or G281XX double insulated HV cable.

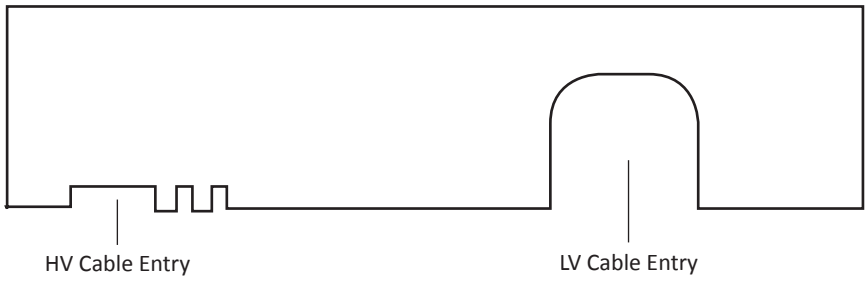


Figure 1: Base of Medal 501 Energizer

5. Mount the energizer on the wall using the screws provided.

Step 2: Connect the LV Cables

Note: For additional information refer to the topic "Medal 501 Energizer Connections" later in this note.

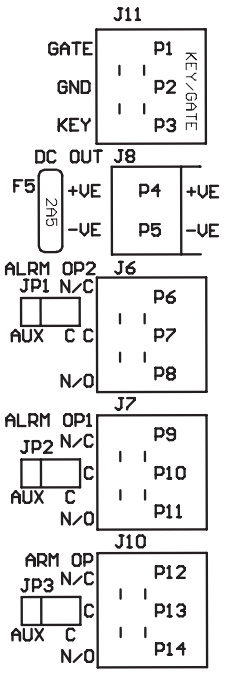
1. Insert the AC power plug pack cable through the low voltage (LV) cable entry tunnel, using the retaining clips to hold the cable alongside the battery area.
2. Connect to the plug pack connector.
3. Insert the remaining LV external wiring through the LV tunnel, using the retaining clips to hold the cable and connect to the appropriate LV connection.

Step 3: Set the Connections and Switches

Set the connections and switches on the energizer, according to your requirements.

LV terminal connections

Pin	Description
P1	Gate Switch IN (Closed = OK), always active
P2	Gate Switch/External Arm GND
P3	External Arm IN (external arm switch)
P4	Auxiliary DC out/in positive 12 V DC nominal (0.5 A maximum)
P5	Auxiliary DC out/in negative
P6	Relay 1 Normally Closed
P7	Relay 1 Common
P8	Relay 1 Normally Open*
P9	Relay 2 Normally Closed
P10	Relay 2 Common
P11	Relay 2 Normally Open*
P12	Armed Indication Normally Closed
P13	Armed Indication Common
P14	Armed Indication Normally Open*



* All relays have a 2 A fuse that will reset 30 seconds after the load is removed.

Notes:

- The Pin numbers can be found under the connectors.
- When using a powered relay Common (refer to Figure 3 on page 14), the total current consumption of all relays and any external battery connections is 0.5 A.

Alarm Relay Setting

Switch No.	Orientation	Relay 1	Relay 2
1	ON (Up) OFF (Down)	Relay 1 Any alarm Relay 1 Gate alarm	Relay 2 Any alarm Relay 2 Fence and/or Earth alarm
2	ON (Up) OFF (Down)	Relay 1 Timed at 5 minutes Relay 1 Other function - switch 3	
3	ON (Up) OFF (Down)	Relay 1 Mimic Relay 1 Latched	
4	ON (Up) OFF (Down)		Relay 2 Mimic Relay 2 Latched

Note: The default setting for all the switches is OFF, (i.e. down). DIP switches are numbered from the left. For changes to DIP switch settings to take affect, the energizer must be turned off.

External Inputs/Outputs

External arm switch input (turns the energizer on and off)
Armed Indication output (relay is closed when the energizer is armed)
Gate Switch Input (triggers the gate alarm if the gate is opened)

Step 4: Connect the Gate Switch (if required)

Note: Gate switch, bypass switch and gate magnetic contact are not included.

1. Connect the gate switch and bypass switch, as shown below.

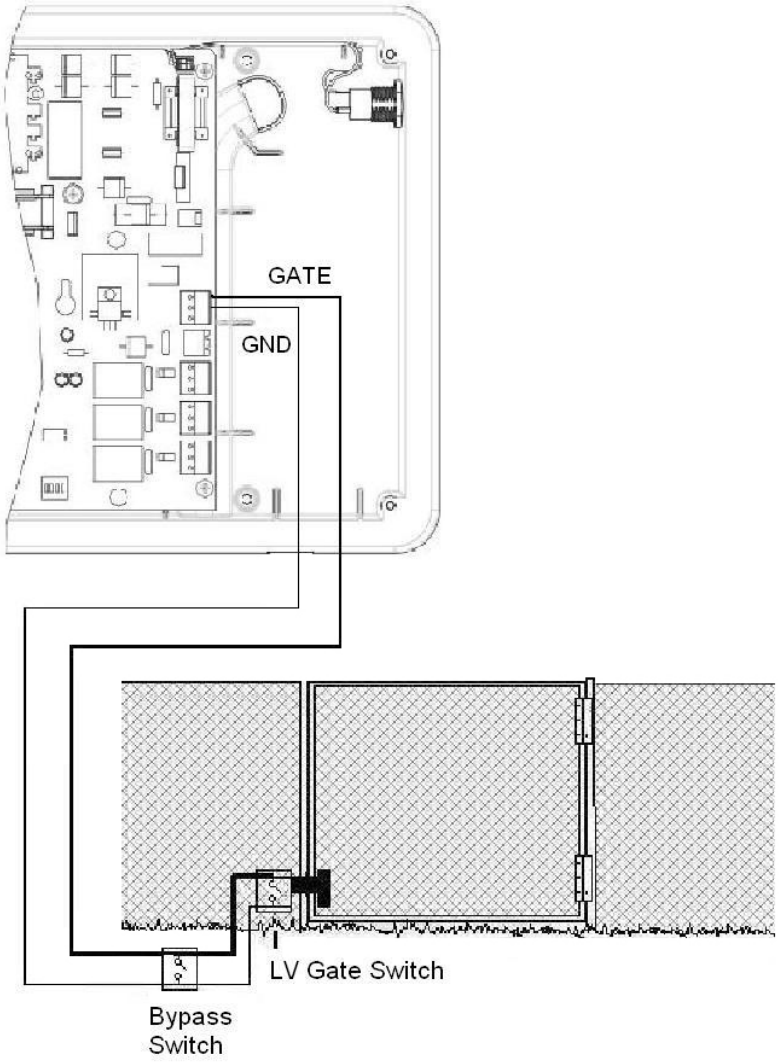


Figure 2: Connect the gate and bypass switch

2. Refer to the LV terminal connections table (page 11) and connect to Pin 1 and Pin 2.

   Note: Before connecting the LV cables to the appropriate pins, ensure the LV cables are routed through the LV entry channel and clipped in alongside the channel.

Step 5: Connect the External Siren and/or Light (if required)

Low current - STROBE (with Aux. DC supply)

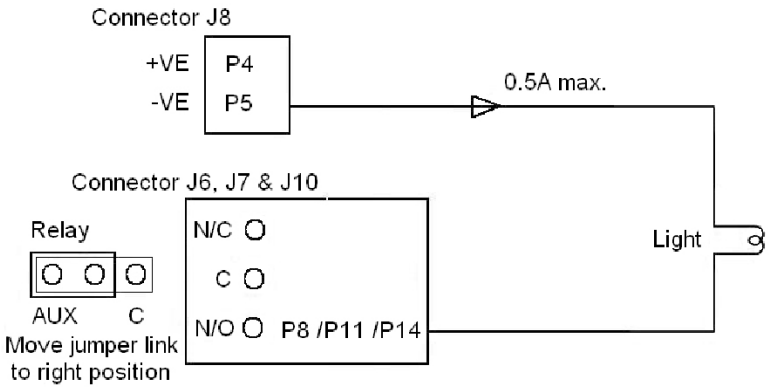


Figure 3: Connecting strobe/light

Notes:

- The light is not included.
- If the light fails to operate correctly, then the auxiliary DC current limit may have been reached. Reconfigure the wiring to operate directly from the battery as shown in Figure 4.

High current - SIREN or STROBE (without Aux. DC supply)

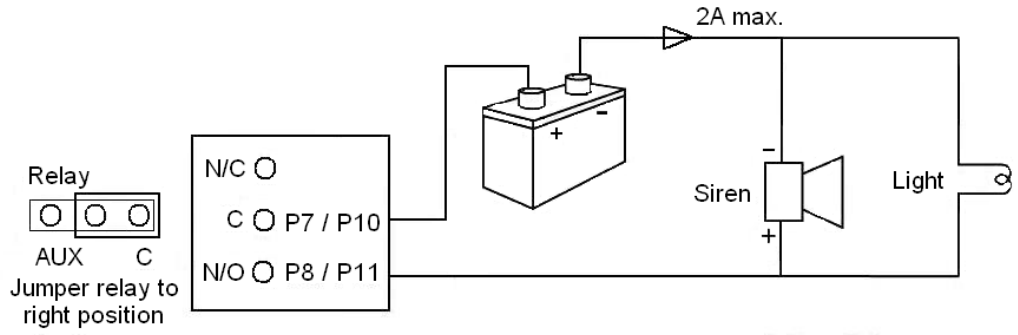


Figure 4: Alternative connection for high current alarm strobe/light and siren

Notes:

- The siren and light are not included.
- If you trip the auto fuse, you need to unplug the load and wait 30 seconds. The auto fuse will then reset.
- If the current draw is higher than 0.5 A, then this configuration is only suitable for intermittent operation, (i.e. alarm type indicators).

Step 6: Connect the Internal Battery

Note: Ensure the energizer is disconnected from the AC supply when installing or removing the battery.

1. Connect the battery leads inside the compartment to the battery: red lead to the positive (+) terminal of battery, black lead to the negative (-) terminal of battery.
2. Position the battery inside the compartment.
3. Plug the battery leads in when all the fence connections have been completed.

SAFETY WARNING: Anytime the energizer is on, the deterrent will be present, (i.e. anyone touching the fence or energizer terminals will receive a short, sharp but safe shock).

Step 7: Connect to the Fence

Connect the HV wires

1. Use Gallagher Underground Cable. Strip 25 mm (1") of sheathing off the end of each wire, and insert the HV wires into the HV cable entry of the compartment and pull through.
2. Connect the HV wires to the terminal block.
3. The terminal block has two screws per input/output. Screw down both screws.
4. Configure the fence, so the pulse passes from the energizer output terminal (marked FENCE) to the fence, through the configured wire and returns to the detection connection terminal (marked RETURN). Between these configured pulse wires there should be ground/earth wires.
5. Connect the energizer's FENCE terminal to the fence using the lead-out cable provided.
6. Attach the other end of the cable to the fence using a joint clamp.
7. Repeat for the fence RETURN terminal.

Connect to earth (ground) system

1. Attach the cable to the earth system by removing 10 cm (4") of insulation from the cable at each Gallagher Earth Stake and then clamp the exposed wire to each stake using a Gallagher Earth Clamp.
2. Tighten the clamp. Also connect the Earth to the physical fence (if metallic) and the Earth wiring on the fence.

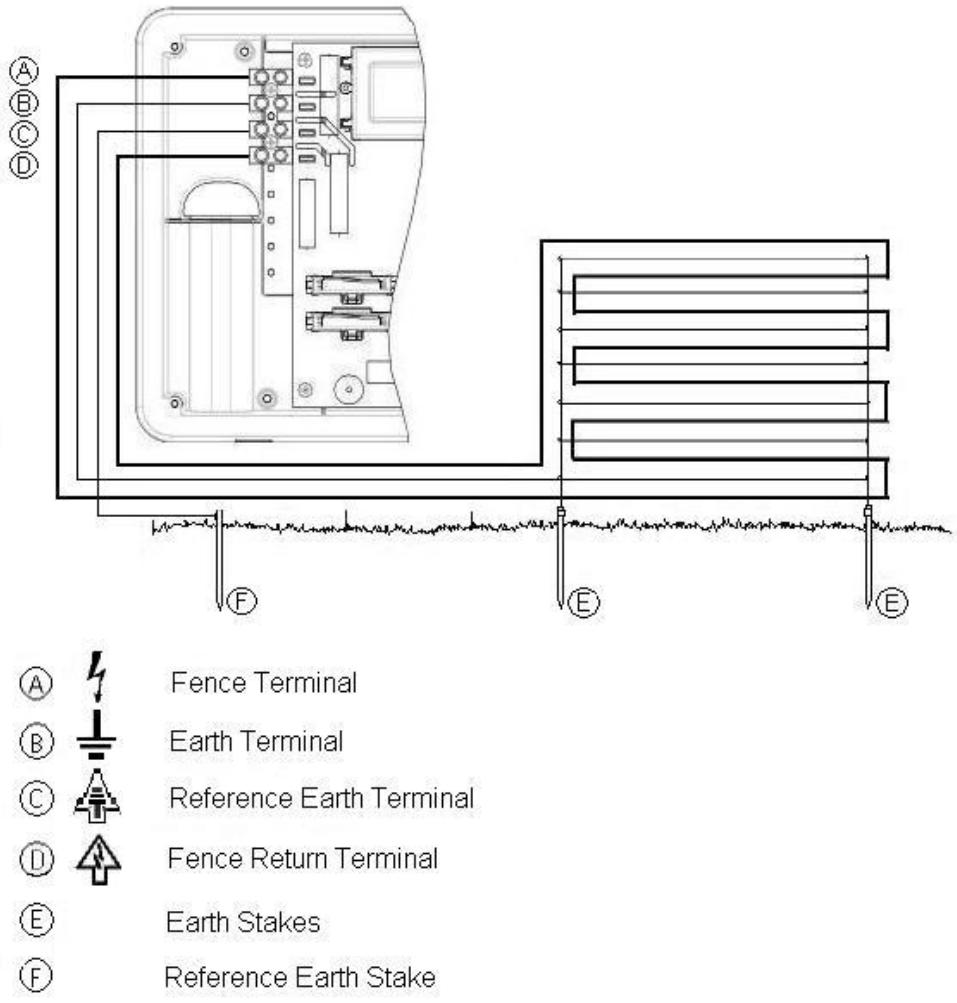


Figure 5: Connect the fence

Note: You may choose to connect earth stakes, however they are not necessary for a wall-top fence.

Earth Reference

An additional earth stake is required to allow correct measurement of the Earth Voltage. Install a single Gallagher stake at least 60 cm (2 ft) long, at least 5 m (16 ft) from the energizer earth system and at least 10 m (33 ft) from any power supply earth peg, underground telephone or power cable. Using Gallagher Underground Cable connect the Reference Earth Stake to the **Ref Earth** terminal on the energizer.

IMPORTANT: If the Earth Reference is not connected, the Earth Alarm will operate.

Note: If the earth reference feature is not being used, then a link is required between the earth and earth reference terminals.

Step 8: Test the Fence

IMPORTANT: Refit the cover before testing the fence, as stray light entering the unit will interfere with sensor calibration, which may result in false alarms.

1. Plug the energizer plug pack into a power outlet and switch ON.
2. Test the fence by creating a connection between the pulse and earth wires. An alarm will occur within 4 seconds of this connection.

   Note: This is a temporary connection and can be created by hanging a bent piece of wire between the pulse and ground wires. During this process the fence should NOT be touched, as it will provide a short, sharp but safe shock.
3. Reset the energizer by turning off the energizer.
4. Remove the piece of wire.
5. Turn the energizer back on and ensure the light is flashing in time with the pulse.

SAFETY WARNING: Anytime the energizer is on, the deterrent will be present, (i.e. anyone touching the fence or energizer terminals will receive a short, sharp but safe shock).

Step 9: Mount the Cover

Replace the cover on your energizer, if it has been removed after testing.
The energizer is now operational.

Troubleshooting

Display	Causes	Solution
Fence Alarm	Breach in fence system. Heavily loaded fence system.	Check for break in fence circuit. Check for shorts on the fence. Remove excess vegetation from fence.
Earth Alarm	Inadequate earth system, or Earth wire cut/disconnected.	Check all connections.
Earth Alarm when first turned on after 3 pulses	Earth Reference is not connected.	Install and/or check all connections to the Reference Earth.
Battery light flashing on with Fence Alarm	AC not present. Very low battery voltage in Stop mode.	Reconnect AC to charge the battery. Check battery condition.

Practical Hints

- Periodically check the energizer. Ensure that the indicator light is flashing with each pulse on the unit.
- Periodically check the fence. Remove any fallen branches, weeds or shrubs because these will cause the fence to short out, become less effective and may cause alarms.

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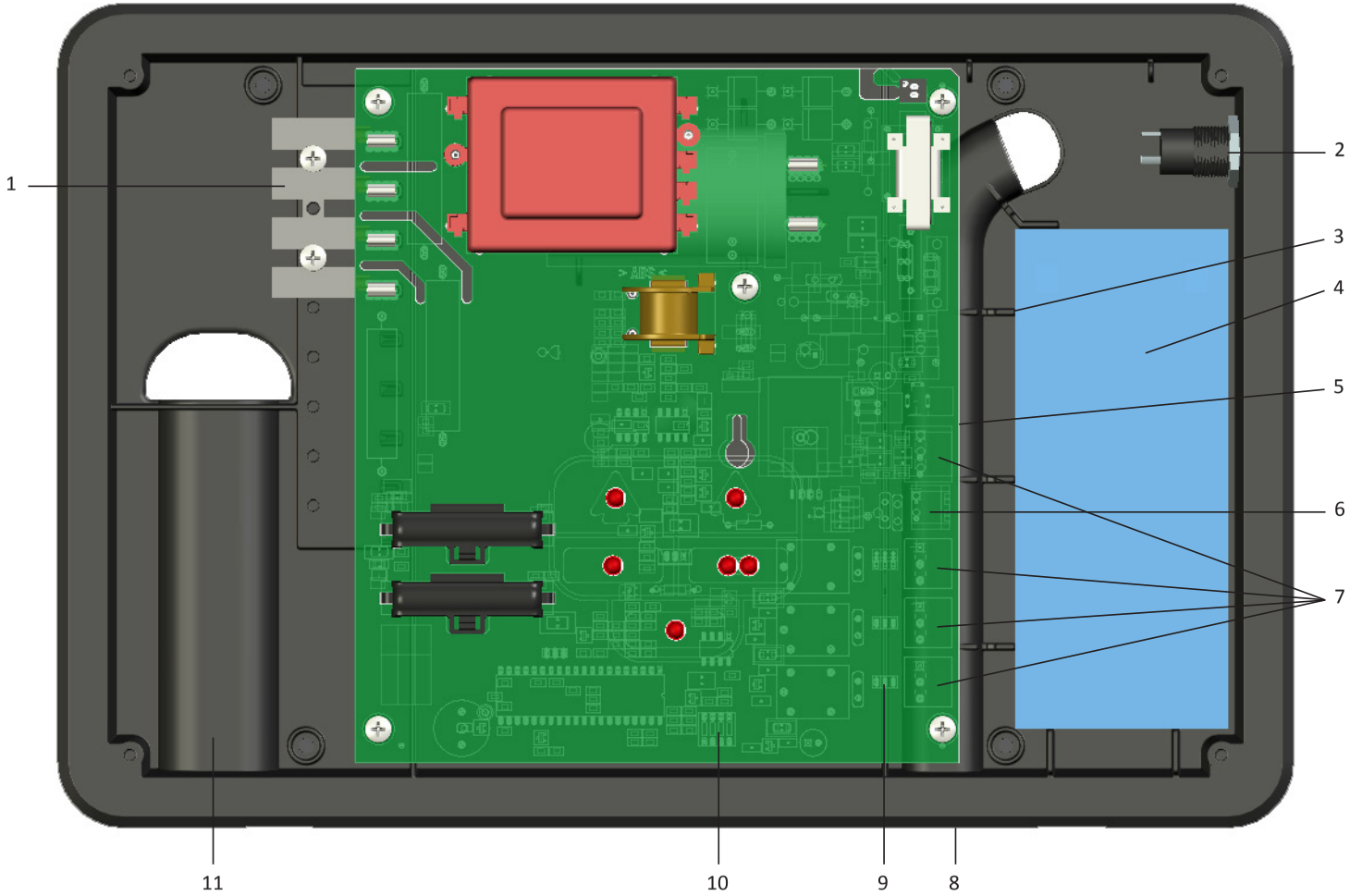
Medal 501 Energizer Connections



1. HV terminal block
2. Key Switch
3. LV cable clips
4. Battery
5. Plug pack
6. Battery connection
7. LV connections
8. LV cable entry
9. Jumpers x 3
10. Switches
11. HV cable entry