



# **JVA Z-Series Installer Manual for Single Zone Energizers**

Models\*: Z11, Z13, Z14, Z14R, Z18 and Z114

*\*Note: Dual Zone Energizers are covered in a separate manual.*



May 2019



**JVA ELECTRIC FENCE SYSTEMS**



## JVA ELECTRIC FENCE SYSTEMS

*Thank you for choosing our product. The JVA brand is a range of electric fencing products carefully selected from leading manufacturers around the world to meet the needs of perimeter security.*

### THE JVA Z RANGE ENERGIZER CONCEPT

The JVA Range of Energizers has been collaboratively designed and manufactured by an international team with over 30 years of electric fence experience earned in some of the most testing security environments in the world. It aims to provide the very best low-cost, high-voltage security energizers in the world. They are compact, integrated and fully programmable electric fence energizers with built-in alarm units and LCD *out* and *return* voltage display. They also have the option of being controlled from a remote LCD keypad.

*State-of-the-art energizer design IP4 x and ABS plastic*

*Unique LCD display depicting fence out and return voltage*

*Unique LCD keypad option depicting fence and alarm condition*

*Wall-mountable, robust energizer housing with easily detachable PCB chassis for ease of installation and repair*



**2-yr  
WARRANTY**

### TWO-YEAR WARRANTY

All JVA products carry a 2-year warranty against defective components and workmanship. The warranty excludes damage caused by acts of Nature such as lightning or flooding, power supply surges, rough handling, malicious action or incorrect wiring.

**Please retain your invoice as proof of purchase and fill in the warranty form on page 45.**

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# 1. INTRODUCTION

The JVA Z-Series Electric Fence Energizers are designed and manufactured exclusively for JVA by Pakton Technologies of Brisbane, Australia. This manual is an OEM Manual for the Z-Series (Z11, Z13, Z14, Z14R, Z18 and Z114) security electric fence energizers.

Z11 Single Zone, Conventional 1.5 Joule (Output). Z13 Single Zone, Conventional 2.8 Joule (Output).

Z14 Single Zone, Conventional or Bi-Polar 4 Joule (Output). Z14R Z14 with Relays and IR Tamper Circuit.

Z18 Single Zone, Conventional or Bi-Polar 8 Joule (Output), contains Relays and IR Tamper Circuit. Z114 Single Zone, Conventional or Bi-Polar 14 Joule (Output), contains IR Tamper Circuit.

This manual relates to:

PCB versions: 7v42+ for the Z13/Z14/Z14R, 1v10+ for the Z114.

Firmware version: 7.50 or higher (the firmware version is shown on the LCD on reset)

Current Firmware: 8V32.

## Glossary

OEM	– Original equipment manufacturer.
Zone	– A high voltage fence output and return to provide perimeter security.
Control Input	– An input that allows the user to control specific functions of the Energizer.
Relay Output	– A programmable output (provided by a physical relay) to indicate an Energizer/Fence condition, such as Fence Alarm, Low Battery Voltage.
Bi-polar	– A Bi-Polar fence is an all-live wire fence. A Bi-Polar Energizer has the ability to pulse synchronised positive and negative pulses down alternate wires of the same fence line.
Conventional	– A Conventional electric fence is wired in such a way that alternate live and earth wires are on the fence.
Feed Voltage	– (Also Fence Feed) The Voltage connection from the Energizer to the start of the fence zone.
Return Voltage	– (Also Fence Return) The Voltage connection from the end of a fence zone to the monitoring circuit of the Energizer.
On/Armed	– The Energizer is transmitting high (or low) voltage pulses onto the fence. The fence is secure.
Off/Disarmed	– The fence zone is unsecure, but is safe to perform maintenance on.
Positive Voltage	– The Positive fence voltage on a Bi-polar Fence.
Negative Voltage	– The Negative fence voltage on a Bi-Polar Fence.
Low Power mode	– The fence live wires operate at a much lower voltage, typically 500V peak. This ensures detection together with public safety.



## **2. FEATURES**

### **2.1 Power**

#### **2.1.1 Z13**

- 2.8 joules peak output energy
- Mains powered via external transformer (16-18Vac 1A)
- Battery charger with space for an internal 7aH 12V rechargeable back up battery which ensures continued operation of the energizer for up to 12 hours on high power + 14 hours on low power (Max setting on low and high power)

#### **2.1.2 Z14/Z14R**

- 4 joules peak output energy (The Z14R is limited to 2.5 when in Group Mode)
- Mains powered via external transformer (16-18Vac 1A)
- Battery charger with space for an internal 7aH 12V rechargeable back up battery which ensures continued operation of the energizer for up to 10 hours on high power + 14 hours on low power (Max setting on low and high power)

#### **2.1.3 Z18**

- As per Z14 with 8 Joules output
- Mains powered via external transformer (16-18Vac 1.5A)
- Battery charger with space for an internal 7aH 12V rechargeable back up battery which ensures continued operation of the energizer for up to 4.5 hours on high power + 10 hours on low power (Max setting on low and high power)

#### **2.1.4 Z114**

- As per Z14 with 14 Joules output
- Mains powered via external transformer (16-18Vac 1.5A)
- Battery charger with space for an internal 7aH 12V rechargeable back up battery which ensures continued operation of the energizer for up to 4 hours on high power + 10 hours on low power (Max setting on low and high power)

## **2.2 Control/Monitoring**

### **2.2.1 Z11 and Z13**

- Two Control Inputs which can be configured to take NO (Normally Open) or NC (Normally Closed) control contacts
- Two 12V driven Outputs (also referred to as Relays)

- All Relays may be assigned to any alarm function
- LED status lights
- Internal beeper
- AC fail, Low Battery and Bad Battery detection
- Keypad programmable options
- Low power mode – ensures detection together with public safety during the day
- Adjustable energizer power output level
- Will supply power to, and communicate with, up to two keypads

### **2.2.2 Z14**

- Two Control Inputs which can be configured to take NO or NC control contacts
- Two 12V driven Outputs (also referred to as Relays)
- All Relays may be assigned to any alarm function
- LCD voltage display
- LED status lights
- Internal beeper
- AC fail, Low Battery and Bad Battery detection
- Keypad programmable options
- Low power mode – ensures detection together with public safety during the day
- Adjustable energizer power output level
- Will operate with up to 3 keypads

### **2.2.3 Z14R (as per Z14 with additional)**

- Three “Form C” contact Relays with change over contacts
- Infrared tamper beam disables the Energizer if the lid is removed
- Tested to IEC/AS/NZS 60335.2.76, test reports available on request
- A Z14R slave will not fire if not connected to a Master (Er-16 displayed)
- When in group mode a Z14R is limited to 2.5J output

### **2.2.4 Z18**

- As per Z14
- Three “Form C” contact Relays with change over contacts
- Infrared tamper beam disables the Energizer if the lid is removed

### **2.2.5 Z114**

- As per Z14
- Infrared tamper beam disables the Energizer if the lid is removed



## **2.3 Safety**

- Enclosed fence terminals
- Wall mountable, robust enclosure with detachable PCB chassis for ease of installation and repair
- Infrared tamper beam disables the Energizer if the lid is removed (Z14R, Z18 and Z114 only)

## **2.4 Reliability**

- 1 Year Warranty
- Microprocessor controlled
- Pluggable screw terminals
- State of the art, robust, case design IP4x ABS
- Inbuilt lightning protection from both mains and fence sides, external fence lightning protection is still advised in high lightning prone areas
- All Inputs and Outputs are protected against stray fence voltage



## 3. SPECIFICATIONS

### 3.1 Z11 Specifications Table

Specification Name	Specification
Energizer Output Voltage	9.0kV peak no load
Peak Output Energy	1.4 Joules at 500 Ohm
Pulse Rate	Locked at 0.8 Hz
12V DC Power Consumption	Energizer On – 155mA average, 250mA peak Energizer Off – 20mA Not including keypad (add 30mA) or Auxiliary power
AC Power Input	16-18Vac 1A recommended <sup>1</sup>
Battery Charger Output	Float voltage 14V, 300mA, short circuit protection, reverse battery protection
Switched Outputs	12V 2.5A maximum combined load powered Output
Recommended Operating Temperature	-15°C to +50°C
Enclosure	IP4x ABS Plastic
Size	300mm high, 190mm wide, 115mm deep
Weight – packed no battery	1.5 kg

### 3.2 Z13 Specifications Table

Specification Name	Specification
Energizer Output Voltage	9.8kV peak no load
Peak Output Energy	2.8 Joules at 500 Ohm
Pulse Rate	Locked at 0.9 Hz
12V DC Power Consumption	Energizer On – 245mA average, 339mA peak Energizer Off – 18mA Not including keypad or Auxiliary power
AC Power Input	16-18Vac 1A <sup>1</sup>
Battery Charger Output	Float voltage 14V, 300mA, short circuit protection, reverse battery protection
Switched Outputs	12V 2.5A maximum combined load powered Output
Recommended Operating Temperature	-15°C to +50°C
Enclosure	IP4x ABS Plastic
Size	300mm high, 190mm wide, 115mm deep
Weight – packed no battery	1.9 kg

<sup>1</sup> A 24Vdc 1.5A supply can be used in place of the 16Vac. The correct connection is +24V to the right AC pin, GND to the left AC pin. Due to the stored energy in a 24Vdc plug-pack, an AC Fail could occur 5 minutes before the Energizer reports this fault

### 3.3 Z14/Z14R Specification Table

Specification Name	Specification
Energizer Output Voltage	9.0kV peak no load
Peak Output Energy	4 Joules at 500 Ohm, Limited to 2.5J in Group Mode
Pulse Rate	Locked at 0.9 Hz
12V DC Power Consumption	Energizer On – 550mA average, 700mA peak. Energizer Off – 28mA Not including keypad or Auxiliary power
AC Power Input	16-18Vac 1A <sup>2</sup>
Battery Charger Output	Float voltage 14V, 700mA, short circuit protection, reverse battery protection
Switched Outputs	Three 30V 1A "Form C" change-over contacts (Z14R only) Two 12V 2.5A maximum combined load powered Outputs
Recommended Operating Temperature	-15°C to +50°C
Enclosure	IP4x ABS Plastic
Size	300mm high, 190mm wide, 115mm deep
Weight – packed no battery	1.9 kg

### 3.4 Z18 Specification Table

Specification Name	Specification
Energizer Output Voltage	8.5kV peak no load
Peak Output Energy	8 Joules
Pulse Rate	Locked at 0.9 Hz
12V DC Power Consumption	Energizer On – 870mA average, 1220mA peak. Energizer Off – 28mA Not including keypad or Auxiliary power
AC Power Input	16-18Vac 1.5A <sup>2</sup>
Battery Charger Output	Float voltage 14V, 700mA, short circuit protection, reverse battery protection
Switched Outputs	Three 30V 1A "Form C" change-over contacts Three 12V 2.5A maximum combined load powered output
Recommended Operating Temperature	-15°C to +50°C
Enclosure	IP4x ABS Plastic
Size	300mm high, 190mm wide, 115mm deep
Weight – packed no battery	2.5 kg

<sup>2</sup>A 24Vdc 1.5A supply can be used in place of the 16Vac. The correct connection is +24V to the right AC pin, GND to the left AC pin. Due to the stored energy in a 24Vdc plug-pack, an AC Fail could occur 5 minutes before the Energizer reports this fault

### 3.5 Z114 Specification Table

Specification Name	Specification
Energizer Output Voltage	9.5kV peak no load
Peak Output Energy	14 Joules
Pulse Rate	Locked at 0.75 Hz
12V DC Power Consumption	Energizer On – 1450mA average, 2660mA peak. Energizer Off – 27mA Not including keypad or Auxiliary power
AC Power Input	16-18Vac 1.5A <sup>3</sup>
Battery Charger Output	Float voltage 14V, 1A, short circuit protection, reverse battery protection
Switched Outputs	Two 12V 2.5A maximum combined load powered output
Recommended Operating Temperature	-15°C to +50°C
Enclosure	IP4x ABS Plastic
Size	303mm (H) x 223mm (W) x 115mm (D)
Weight – packed no battery	3.1 kg

### 3.6 Notes for all Z-Series Energizers

When the battery voltage drops below 6.5V the energizer will stop functioning but will continue to draw some current (approximately 10mA).

- There are potentially lethal high voltages inside the Z-Series Energizers.
- The high voltage inside the Z-Series Energizers may take a long time to discharge. Wait at least 10 minutes after turning off before opening the case.
- Before working on the high voltage wiring of an electric fence, it is recommended that the energizer be disarmed and an intentional short circuit is placed from the fence live wires to earth. This is a sensible precaution against the energizer being turned on by others or malfunctioning while working on the fence.
- If an electric fence is part of a multiple energizer system and the distance between two separate electric fences, each powered by separate energizers, is less than 2.5 meters, the energizers must be configured to operate in group mode.



<sup>3</sup> A 24Vdc 1.5A supply can be used in place of the 16Vac. The correct connection is +24V to the right AC pin, GND to the left AC pin. Due to the stored energy in a 24Vdc plug-pack, an AC Fail could occur 5 minutes before the Energizer reports this fault

## 4. DESCRIPTION

### 4.1 Z-Series Exterior

#### 4.1.1 Z14/Z14R Exterior



Z14 exterior

#### 4.1.2 Z18 Exterior



Z18 exterior

#### 4.1.3 Z114 Exterior



Z114 exterior

#### 4.1.4 Z11 Exterior

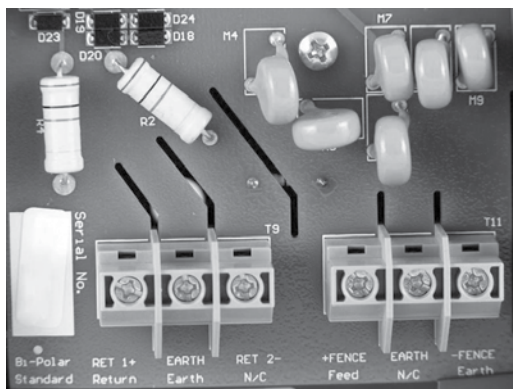


Z11 exterior

## 4.2 High Voltage Terminals

NOTE: The high voltage feed and return terminals on the Z28 are the opposite way around to the Z13/Z14/Z14R/Z18/Z114, as can be seen in the following two sub sections. On the single channel units the feeds are on the right and the returns are on the left. On the Z28 the feeds are on the left and the returns are on the right.

### 4.2.1 Z13/Z14/Z14R/ Z18 High Voltage Terminals



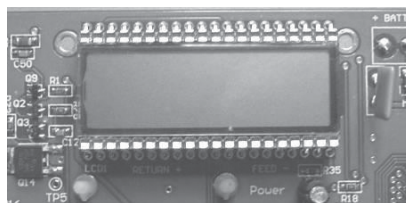
*Z14/Z14R High Voltage terminals*

## 4.3 LCD Voltage Display

### 4.3.1 Z1X LCD Voltage Display

The display on the JVA Z13/Z14/Z18 shows the voltage at the fence and return terminals. The left is the return and the right is the feed voltage. Arrows at the top of the display indicate that the energizer is in conventional mode.

The Stored Joules will be displayed every approximately 4–5 seconds. The reading will vary depending on the load on the fence. Stored Joules displayed is the current stored joules to generate the output voltage requested in Option 1 (Voltage Setting). If the fence is in good condition, this value will be low. As more load comes onto the fence, the amount of joules will increase to meet the requested voltage.



*Z1X LCD*

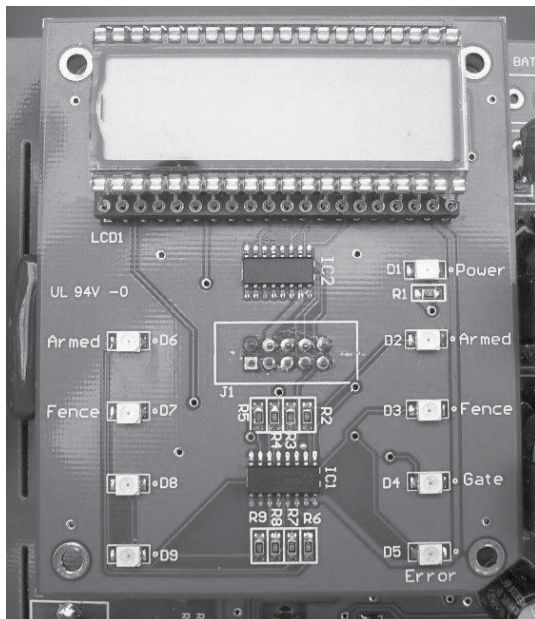
When configured for Bi-Polar operation the left side is the positive Return Voltage and the right is the negative Return Voltage.

The LCD also shows the programming option and current setting when in programming mode. This allows the programming options settings to be checked easily.

## 4.3.2 Z114 LCD Voltage Display

The display on the JVA Z114 shows the voltage at the Fence Feed and Fence Return terminals.

The LCD also shows the programming option and current setting when in programming mode. This allows the programming options settings to be checked easily.



*Z114 LCD Display and Status LEDs*

## 4.4 Status LED Lights

### 4.4.1 Z13/Z14/Z14R/Z18 Status LED Lights

- |        |  |
|--------|--|
| Power  | – On whenever the Energizer has power.   |
| Armed  | – On when the Energizer is armed (pulsing), will flash when in low power mode.   |
| Fence  | – Flashes Green (PCB's 7v45+) when the Energizer is on and the voltage is good, flashes Red if the voltage falls below the Fence Alarm Voltage, stays Red when there is a fence alarm (either Zone). |
| Gate   | – Flashes Red when the Gate is open, stays Red when there is a gate alarm.   |
| Status | – Flashes an error code for energizer (service) errors. See the table in section 7.5 Status LED Error Codes.   |

#### **4.4.2 Z114 Status LED Lights**

- |         |   |   |
|---------|---|---|
| Armed 1 | – | On when Zone 1 of the Energizer is armed (pulsing), will flash when in low power mode.                          |
| Fence 1 | – | Flashes if the return voltage falls below the Fence Alarm Voltage, stays on when there is a Zone 1 fence alarm. |
| Gate 1  | – | Flashes Red when the Gate is open, stays Red when there is a Gate 1 alarm.                                      |
| Power   | – | On whenever the Energizer has power.  |

From code version 7.77 onward, Fence and Gate LEDs are latched on (like the strobe) until cleared using the clear alarm memory sequence (\*1#) or the Energizer is re-armed.

### **4.5 4-Line LCD Keypad (PTE0240)**

#### **Introduction**

The JVA 4-Line LCD Keypad is an integral component in the JVA Security Electric Fence product range. Providing a centralised interface between the Customer and their Perimeter Security Solution; it displays the current condition of each security device connected and can draw attention to adverse fence conditions. The keypad is used to control individual fence Energizers, Monitors or the entire site. The Customer has access to all of these features via a Menu Driven system or by entering key sequences. Security Installers also use the keypad to configure the JVA Security devices to the customer's needs.

#### **Features and Benefits**

The PTE0240 LCD keypad is a second generation Z-Series Keypad

- Menu driven interface
- 4-line Backlit LCD display
- Quick arm / disarm keys
- 500-entry Event-Log
- Battery-Backed Real Time Clock
- Control, monitor and program any Z-Series device
- Displays arm/disarmed status and any trouble or alarm
- Shows fence voltages for Z-Series electric fence energizers and monitors
- Programmable zone names
- Key area glows red on alarm
- Event Log stores Date and Time of Alarm or Trouble

## Limitations

1. The Menu-driven programming requires 8v20 or higher firmware in Energizers.
2. As the firmware is upgraded from time to time, an older keypad may not be compatible with the latest Z-Series devices. The firmware version can be seen by pressing \*9#.

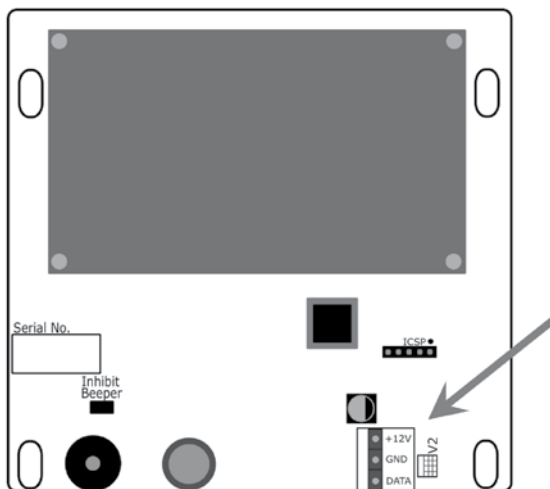
## Opening the Keypad

Push the 4 side tabs in to release the cover from the base. This can be done one side at a time. Once the cover has been removed from the base plastic, the keypad hardware will slide up to release it from the base.



## Installation

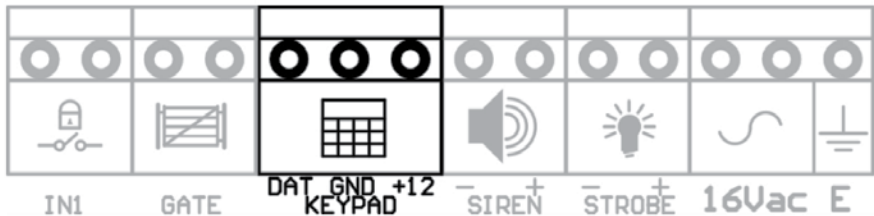
The Keypad only requires three wire connections to JVA Energizers or Monitors. This is the +12V, GND and DATA connections on the back of the Keypad circuit board.







When connecting a Group of Energizers together, the +12V wire is only required between the Keypad and Energizer. The other Energizers are connected together using the GND and DAT terminals only.



Keypad terminals on a JVA Single Zone Energizer

Keypad Operation

Note: Z-Series Energizers/Monitors have the following Default PINs  
User PIN: 1234  
Installer PIN: 012345

Discovering Energizers

Function	Key 1	Key 2	Key 3	Key 4
Discover Devices connected to the Keypad	*	6	8	#




Description



The Keypad needs to discover all of the Energizers/Monitors connected to the Keypad for it to work properly. This is best achieved after each Energizer/Monitor has been configured and wired together in a group. The display will show "Analysing" followed by the device type connected at each zone.

NOTE: All Energizers/Monitors need to be Disarmed before starting the Discovery process.

### Arming/Disarming the Site Using the Keypad

To Arm the site, press the Lock button. It will ask for your PIN. Enter the USER PIN and press #	
To Disarm the site, press the Un-Lock button. It will ask for your PIN. Enter the USER PIN and press #	
To Silence a Siren on an Energizer/Monitor press the Menu Button. It will ask for your PIN. Enter the USER PIN and press # Press the # key on the Menu item "Silence Siren" A short-cut for this is to just enter 1470# directly.	

### Keypad Status Display

In normal operation the keypad shows a Summary Page followed by the status of each device connected to the Keypad.

Summary page:

```
JVA Security
13:17 01/11/2015
Disarmed
All OK
```

The Installer's Details (Dealer Message)  
24hr Clock and Date

If the site is Armed/Part Armed or Disarmed  
If the site is in Alarm/Trouble or All OK

Z14 page:

```
ZONE 1
Feed:8.6kV Ret:7.5kV
Alarm: Fence
```

The Name of the Zone (Zone Label)  
The Energizer Voltages  
Alarms/Troubles are displayed here

The keypad will automatically scroll the display through all relevant information on each connected Energizer/Monitor. Each screen is shown for about 5 seconds. To pause this, press # and the auto scrolling will stop for 20 seconds.

Pressing the # key again will advance the display one step.

The keypad will automatically display a new Zone Alarm or Trouble and it will remain on this page for 3 minutes. Pressing # again will advance the screen. If the Keypad beeper is sounding, any key press will silence it.

## Keypad Menu

The Keypad Menu system can be accessed by pressing the **Menu** key.  
Key in either the **USER PIN** or **INSTALLER PIN** followed by the **Enter** key to proceed.

To access the Menu items below **Exit Menu** the Installer PIN is required.



## Main Menu

Menu	Function (when # key is pressed)												
Mute Siren	Mutes Energizer or Monitor Sirens currently sounding												
Clear Alarms	Sends the Clear Alarm Memory command to the Energizers/ Monitors. This will clear "Latched Fence Alarms" if the problem has been cleared.												
Show Event Log	Displays the Event Log. Use <b>Up/Down</b> keys to scan through events. The # key will exit the Log												
Arm Low Power	Arm the Site in Low Power Mode												
Arm High Power	Arm the Site in High Power Mode												
Test Menu	See <i>Test Menu</i>												
Keypad options	See Test Menu <table border="1"> <thead> <tr> <th>Menu</th><th>Function (when Enter key is pressed)</th></tr> </thead> <tbody> <tr> <td>Analyse group</td><td>Discovers the Energizers connected to the Keypad</td></tr> <tr> <td>Siren Test</td><td>Turns on the Energizer/Monitor Siren Outputs for 2 seconds</td></tr> <tr> <td>Battery Test</td><td>Triggers the Battery Test in connected Energizers/Monitors. See the LCD display of the Energizer for the results.</td></tr> <tr> <td>Show Model</td><td>Displays the Keypad Version</td></tr> <tr> <td>Reset Energizers</td><td>Forces the Energizers to reset</td></tr> </tbody> </table> Keypad Options	Menu	Function (when Enter key is pressed)	Analyse group	Discovers the Energizers connected to the Keypad	Siren Test	Turns on the Energizer/Monitor Siren Outputs for 2 seconds	Battery Test	Triggers the Battery Test in connected Energizers/Monitors. See the LCD display of the Energizer for the results.	Show Model	Displays the Keypad Version	Reset Energizers	Forces the Energizers to reset
Menu	Function (when Enter key is pressed)												
Analyse group	Discovers the Energizers connected to the Keypad												
Siren Test	Turns on the Energizer/Monitor Siren Outputs for 2 seconds												
Battery Test	Triggers the Battery Test in connected Energizers/Monitors. See the LCD display of the Energizer for the results.												
Show Model	Displays the Keypad Version												
Reset Energizers	Forces the Energizers to reset												
Set Clock	Displays the current clock for editing. See <i>Event Log</i> . The Event log contains information about Alarms, Troubles and Arm/ Disarm commands. Each event is displayed on a separate page. Press the <b>Up</b> or <b>Down</b> key to change pages. Press # to exit the Log. The most recent entry is displayed when the log is first opened. Setting the Clock												



Menu	Function (when # key is pressed)
Show Shortcuts	Displays commonly used Key Sequences for reference
Remember User PIN / Forget User PIN	This will 'save' the USER PIN entered. From now on, the Quick Arm/Disarm buttons will not require a PIN to operate. Pressing Menu button immediately enter the Menu system as well. Delete the 'saved' USER PIN
Exit Menu	Exits the Keypad Menu
Program Device	
Program Sectors	
Clear Log	Requires Installer PIN to access. Clears the Event Log
Program this Keypad	<p>Requires Installer PIN to access. See <b>Program Device: Requirements for Menu Driven Programming</b></p> <p>For this system to work effectively, all connected Energizers/Monitors need to be Mk2 protocol compliant. This version is usually found in the Black Plastic box, rather than a Silver Plastic box.</p> <p><b>Procedure</b> The Keypad takes around 10 seconds to enter Menu Driven Programming mode. Once entered, the list of connected devices will be listed. Use the Up/Down arrow to choose the device to be configured. Press # and the Keypad will Load the configuration from the Energizer. Use the Up/Down arrows to move around the options and the Left/Right arrows to change the selected value.</p> <p>Options with &gt;&gt; displayed have a SubMenu that is accessed by pressing the Right Arrow. Use the Up/Down arrows to select the new options and Left/Right to change the selected value. To exit this SubMenu, press the Up arrow till the cursor is at the &lt;&lt; line. Now press the Left Arrow.</p> <p>Press # at any time to Save the new configuration to the Device. Press * at any time to Discard the configuration.</p> <p><b>Exiting Device Programming</b> Press the Menu at any time to completely exit Device Programming.</p> <p><b>Program Sectors</b> Program this Keypad</p>
Default Keypad	Returns the keypad to Factory Defaults

## Event Log

The Event log contains information about Alarms, Troubles and Arm/Disarm commands. Each event is displayed on a separate page. Press the Up or Down key to change pages. Press # to exit the Log. The most recent entry is displayed when the log is first opened.

```
Log Entry: 37
14:35 13/02/15
Zone 1
Fence Alarm
```

## Setting the Clock

The clock is formatted to 24 hour time followed by the Day/Month/Year.

Use the number keys to set the new value for the current cursor location. Each number pressed will move the cursor to the right. If the keypad detects an error, the cursor will return to the first location and the original date time will be displayed again.

```
Set Time and Date
hh:mm dd/mm/yy
14:35 13/02/15
--:-- --/--/--
```

The entire Time and Date needs to be entered before the new value is saved. Pressing the Enter Key at any time during the process will cancel the update.

## Test Menu

Menu	Function (when Enter key is pressed)
Analyse Group	Discovers the Energizers connected to the Keypad
Siren Test	Turns on the Energizer/Monitor Siren Outputs for 2 seconds
Battery Test	Triggers the Battery Test in connected Energizers/Monitors. See the LCD display of the Energizer for the results
Show Model	Displays the Keypad Version
Reset Energizers	Forces the Energizers to reset

## Keypad Options

Menu	Function (when Enter key is pressed)
Press Beeps	Turns ON/OFF the key press beeps
Chime Sounds	Turns ON/OFF the Gate Chime Sounds
Error Sounds	Turns ON/OFF the Error Sounds when entering a PIN for Energizer control
Alarm Sounds	Turns ON/OFF the Keypad Beeper sounding for a new Alarm/Trouble
Backlight	Cycles through the Backlight options (ON / Timeout / OFF)



## Program Device

### Requirements for Menu Driven Programming

For this system to work effectively, all connected Energizers/Monitors need to be Mk2 protocol compliant. This version is usually found in the Black Plastic box, rather than a Silver Plastic box.

### Procedure

The Keypad takes around 10 seconds to enter Menu Driven Programming mode. Once entered, the list of connected devices will be listed.

Use the Up/Down arrow to choose the device to be configured. Press # and the Keypad will Load the configuration from the Energizer.

```
Select Device...
ID: 1-Z25
ID: 2-Not Connected
ID: 3-Z18
```

Use the Up/Down arrows to move around the options and the Left/Right arrows to change the selected value.

```
High Power      8.5
Low Power       1.1.
Fence 1 Alarm   4.0
Fence 2 Alarm   4.0
```

Options with >> displayed have a SubMenu that is accessed by pressing the Right Arrow. Use the Up/Down arrows to select the new options and Left/Right to change the selected value.

```
Unused
Group ID        1
Input 1         >>.
Input 2         >>
```

To exit this SubMenu, press the Up arrow till the cursor is at the << line. Now press the Left Arrow.

```
<< Input 1      .
Trigger         N/Open
Function        Arm All
```

Press # at any time to Save the new configuration to the Device.

Press \* at any time to Discard the configuration.

### Exiting Device Programming

Press the Menu at any time to completely exit Device Programming.

## Program this Keypad

This menu allows the Zone names, and Dealer/Service messages to be altered. It also contains the Keypad Address.

The menu order is:

- SERVICE MESSAGE
- DEALER MESSAGE
- ZONE NAMES (1 – 16)
- BAUD RATE
- KEYPAD ADDRESS

The Dealer Message, Service Message and each of the 16 Zone Labels can be changed using a Multi- Touch Entry System

- The Dealer Message is displayed on the Summary page
- The Service Message is displayed on the Summary page during AC failure, communication failure, or low battery
- Zone Labels are displayed at the top of each Device Page.

The keypad will also exit the programming mode if you do not press any key in five minutes.

## Key values (Multi-Touch Entry)



“See Below” – The Zero key has the following characters:

space 0 . ! @ # \$ % ^ & \* ( ) - +

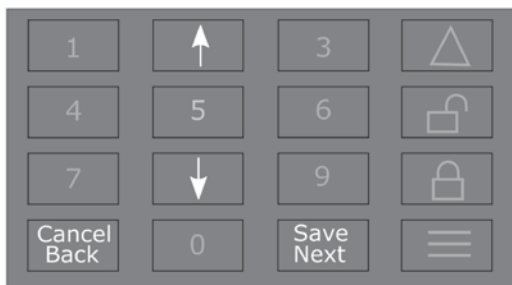
The Multi-Touch entry system is based on the system older mobile phones used for text entry. Pressing a key more than once will change the character based on the values assigned to that number. When the correct letter is displayed, either press a different Key or Pause for 2 seconds before pressing the same Key.

For example: To enter the letter **R**, you would press Key 7 three times.

To enter **JVA**, you would press 58882

To enter **ACE**, you would press 2 (pause for 2 seconds) 22233

## Changing the Keypad Number options (Arrow Keys)



The Keypad BAUD and Keypad ID options can be changed using the Up/Down Arrow Keys. Press # when the correct value has been selected. Pressing the \* key will discard any changes and the display will show the previous option.

## Group Connection

### Using more than one Keypad

Function	Key 1	Key 2	Key 3	Key 4	Key 5	Key 6	Key 7	Key 8
Re-analyse the keypad group	USER PIN				*	6	8	#

Up to three keypads may be used to remotely monitor and control Z-Series devices.

To operate correctly, each keypad must be configured to use a unique **keypad address**. This is achieved by connecting one keypad (at a time) to the master Z-Series device and updating the **keypad address**. Once all keypads have a different address, all can be connected to the system. A recommendation is that one keypad is kept at **address 1**.

If the security system is to use a PC based interface such as Perimeter Patrol, **keypad address 2** should not be used by a keypad. The PC software uses this address to control the Z-Series devices. Once all Keypads are connected, enter the **Re-analyse the keypad group** command listed above.

## Notes

Things to remember when configuring/using the keypad.

- Zone 1 must be connected to the group. If it is not connected, the other Z-Series devices in the group will not send their data to the keypad generating Coms Fail alarms on the keypad.
- If the keypad is unresponsive, this is likely due to the Z-Series device looking for other keypads in the group. Be patient. Wait a few seconds and try again.
- A slave Z-Series device disconnected from the Group will only talk to a keypad if it has a **keypad address** of 1 or 8.



## Summary of Keypad Key Sequences

Default INSTALLER PIN 012345  
Default USER PIN 1234

1. To change the Installer PIN, the Energizer needs to be in Energizer Programming Mode first. ("Start Programming the Z-Series energizer" function)

Energizer Function	Key 1	Key 2	Key 3	Key 4	Key 5	Key 6	Key 7	Key 8	Key 9	Key 10	Key 11	Key 12
Arm/Disarm					#							
Silence the Energizer Siren	1	4	7	0	#							
Start Programming the Z-Series energizer												
Start Programming the Keypad							*	0	#			
Exit Programming (any mode)	*	#					*	0	1	#		
Change a User PIN, 4 Digits					*	0						
Change the Installer PIN, 6 Digits <b>NOTE1</b>	0	0										#
Arm All Zones (Multi-zone groups)					*	1	0	#				
Arm Specific Zone (up to Zone 15)					*	1		Zone Number	#			
Disarm All Zones					*	2	0	#				
Disarm Specific Zone (up to Zone 15)					*	2		Zone Number	#			
Switch All Zones to low power mode					*	4	1	#				
Switch Specific Zone to low power mode					*	4	1	Zone Number	#			
Switch All Zones to high power mode					*	4	2	#				
Switch Specific Zone to high power mode					*	4	2	Zone Number	#			
Arm Gate circuits only					*	4	#					
Bypass Siren (All Zones)					*	5	2	#				
Bypass Specific Zone Siren					*	5	2	Zone Number	#			
Re-enable Siren (All Zones)					*	5	1	#				
Re-enable Specific Zone Siren					*	5	1	Zone Number	#			
Bypass Gate Alarm (All Zones)					*	5	4	#				
Bypass Specific Gate Alarm					*	5	4	Zone Number	#			
Re-enable Gate Alarm (All Zones)					*	5	3	#				
Re-enable Specific Gate Alarm					*	5	3	Zone Number	#			

Description

# Description

Energizer Function	Key 1	Key 2	Key 3	Key 4	Key 5	Key 6	Key 7	Key 8	Key 9	Key 10	Key 11	Key 12
Arm in Agricultural Mode (No Alarms)		USER PIN			*	9	Zone Number		#			
Reset and Display firmware version number		USER PIN			*	6	8	#				
Reset and return to factory defaults		INSTALLER PIN					*	6	8	#		

Energizer Function	Key 1	Key 2	Key 3	Key 4
Clear Alarm memory	*	1	#	
Display the Group ID of the Energizer	*	2	6	#
Siren test	*	6	3	#
Battery test	*	6	4	#
Display the Stored Joules	*	6	7	#
Re-analyse the group	*	6	8	#
Panic – The Energizer/Monitor will react depending on its Panic settings		△ #		

Keypad Specific Function	Key 1	Key 2	Key 3	Key 4
Change the Keypad Messages to English	*	3	1	#
Change the Keypad Messages to Spanish	*	3	2	#
Keypad Audible Feedback On/Off	*	5	1	#
Keypad Chimes On/Off	*	5	3	#
Keypad Error Tones On/Off	*	5	4	#
Local Keypad Alarms On/Off	*	5	5	#
Backlight mode On/Timeout/Off	*	8	#	
Display Keypad Model	*	9	#	

## **4.6 Internal Beeper/Keypad Beeper**

Depending on the Chime Mode setting, the internal beeper and keypad beeper will sound when there is a fence alarm, a gate alarm, a general alarm or a door chime. On flat battery the keypad will always beep 4 times before the energizer automatically enters low power mode to preserve the battery. On AC Fail it will beep.

Note: The Internal beeper also beeps at Power up, see 7.9 Start up events.

## **4.7 Cabling**

High Voltage Cabling (Fence Feed and Returns) should be run using suitably rated cable. Double insulated electric fence “underground” cable is suitable. High Voltage Cables must never be run within the same conduit as Low Voltage Cables. A minimum distance of 30mm should be kept between High Voltage and Low Voltage Cables.

To maintain the IPx4 rating of the enclosure and to ensure moisture does not enter the enclosure via the cable entry area a silicon sealant (neutral cure) must be used to seal all the cable passages.

## **4.8 Lightning Protection**

Although the Z-Series of security energizers contain internal lightning protection elements, external lightning protection elements are recommended as they would help to reduce lightning damage even further. Additional external lightning kits are available from your local dealer.

## **4.9 Monitor Earth**

The Z-Series of security energizers have two fence earth terminals, in most installations these may be joined and only one wire used to connect to the earth. Directions on how to wire for earth loop monitoring are in section 5.2 Example Fence Wiring Diagrams.

## **4.10 Noise and Interference**

The Z-Series of security energizers contain a microprocessor. Extreme electrical noise can upset microprocessors. The most likely cause of such noise is the high voltage output from the Energizer itself. In the event of erratic behaviour, check that the high voltage wiring is firmly connected to the terminals and that no sparking is seen. The Z-Series Energizers are designed to self-recover from interference, powering off (both AC and battery) should not be necessary.



## 4.11 Programmable Options

The Z-Series of security energizers have many programmable options. These are also known as Setup Parameters. To alter these options a keypad must be used. Please refer to Section 4.5 Programming options in detail. Each parameter has a factory set default.

## 4.12 Low Power Mode

The Z-Series of security energizers can be switched into Low Power mode. Low Power mode may be used in situations where the fence is not required to be a deterrent but is still required to actively detect intrusion. In Low Power mode the fence live wires operate at a much lower voltage, typically 900V peak. See 9.6 Programming options in detail for details on using the keypad to set low power mode.

## 4.13 Control Inputs

### 4.13.1 Z11/Z13/Z14/Z14R/Z18/Z114 Control Inputs

There are two Control Inputs available, these default to:

Input 1 – On/Off (Arm/Disarm)

Input 2 – Gate Input or High/Low Power Control (Z14R Default)

### 4.13.2 Control Input Functions

#### *On/Off (Arm/Disarm)*

When configured as an On/Off Input, the Control Input Arms or Disarms the Fence Zone. On/Arm will make the Fence Live (High Voltage on the Fence), while Off/Disarm will make the fence Safe (No fence voltage)

#### *Gate Input*

When configured as a Gate Input, the Control Input may be wired to a gate switch to trigger an alarm when the gate is opened for longer than the Gate Entry/Exit Delay time (Option 13). The timer will reset to zero when the gate closes.

If the Energizer is disarmed, the Gate Input may be set to Chime Mode. See Keypad programming – Section 4.5.

#### *High/Low Power Control*

When configured to control High/Low Power mode, the Control Input is able to change the Energizer Output (While Armed) to either High Power or Low Power modes. It is also used to determine what Power Mode to start in when the Energizer is Armed using a Control Input.

## 4.14 Groups

The Z-Series energizers may be linked to form a “group” to power multiple zones. See Appendix B.

## 5. INSTALLATION

**It is recommended that all installations are performed by qualified technicians.**

### 5.1 Installation Steps

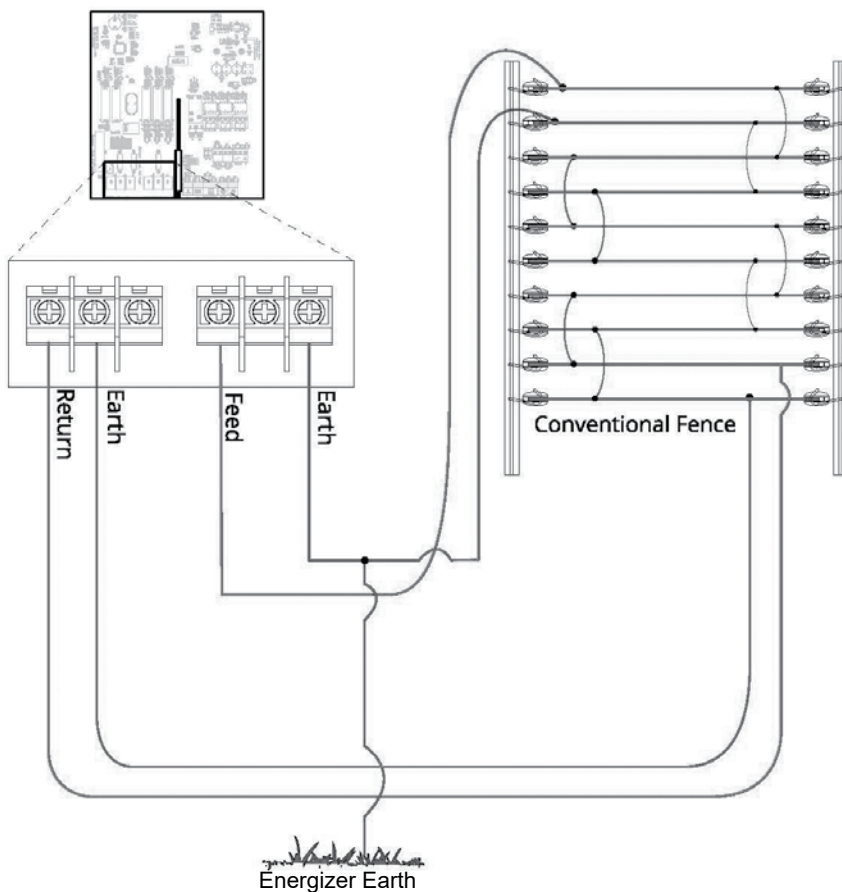
1. Read the entire manual first!
2. Design and build the fence. (Beyond the scope of this manual.) Ask your distributor for help if required.
3. Decide where the Z-Series security energizer is to be mounted. If on an external wall it should be housed within an equipment box and definitely not in direct sunlight.
4. Remove the Z-Series energizer PCB chassis from the housing by removing the two screws.
5. Mount the housing by using 4 screws through the rear of the box. The box must be mounted to a wall in such a way that all of the 4 holes in the rear of the case are against the mounting surface. No hole is to be left open as otherwise it may be possible to poke a metal object into the case and receive a shock.
6. Replace the PCB chassis.
7. If using a keypad, remove the rear housing of the keypad and fix it to the wall.
8. Wire the low voltage cables to the PCB terminals.
9. Wire the high voltage cable to the PCB terminals.
10. Seal the cable entry area with neutral cure silicon sealant RTV.
11. Fit the battery leads to the battery. The Error LED should be blinking twice to show mains fail.
12. The Energizer is designed not to start when first powered up irrespective of the state of the Control Inputs.
13. Replace the front cover.
14. Turn AC power on.
15. Arm and disarm the Energizer via the Control Input or keypad if fitted. The Error LED should stop blinking.
16. Arm the Energizer. The LCD display will now show the fence voltage.
17. Check to ensure that a short anywhere on the fence triggers the alarm.

#### **IMPORTANT NOTE:**

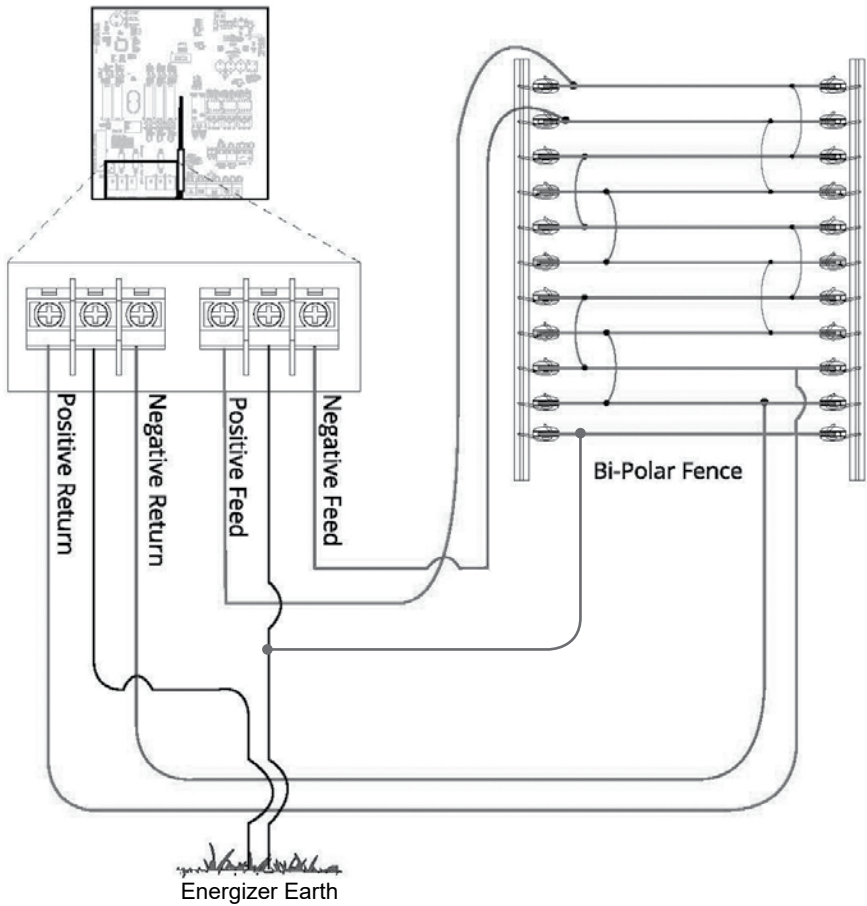
If an electric fence is part of a multiple energizer system and the distance between two separate electric fences, each powered by separate energizers, is less than 2.5 meters, the energizers must be configured to operate in Group Mode.

## 5.2 Example Fence Wiring Diagrams

### 5.2.1 Z13/Z14/Z14R/Z18 Energizer Fence Wiring



*Z1X Energizer configured for conventional fence operation*



*Z1X Energizer configured for bi-polar operation*



## **6. OPERATION**

### **6.1 Arm/Disarm Control**

The Z-Series of security energizers can be armed or disarmed by the Control Input 1 or via a keypad. The keypad also allows instant audiovisual indication of the state of the energizer and therefore the fence it is powering.

If there are two ways to control the energizer both connected at once, i.e. keypad and Control Inputs, then the last change will determine the result. I.e. if the Energizer is armed via the keypad and then disarmed at the Control Input it will disarm. On Energizers with more than one Control Input (for example if an Input is configured for high/low power mode control) a change on any one of the Control Inputs will cause the energizer to use all the Control Inputs, instead of the last keypad command.

If in doubt ask your installer.

### **6.2 When an Alarm Occurs**

When the system is armed, if the Fence Return voltage falls below the Fence Alarm Voltage for more than 3 (default) pulses, the corresponding Zone light will flash and then remain on. The siren and keypad beeper will sound and any relays assigned to this fence alarm will turn on. If the energizer is connected to a building alarm system for monitoring, an alarm signal may be sent to the alarm company monitoring the alarm system.

An alarm will also sound if Control Input 2 is assigned to the "gate" function and the gate input is opened and the Gate entry/exit delay time has elapsed.

After the siren has cycled on and off according to the times and numbers set in options, the siren will stop sounding. The on and off timing is able to be set in the options. The Strobe will remain on. After a further delay (Auto Rearm Time) the siren will again respond to the next alarm condition with a new set of on / off cycles.

If the alarm condition (low fence voltage or gate input) is removed, the siren will stop after the end of the current "on" time (Siren On Time).

If the siren is muted by (entering **PIN#**) then the siren will enter the next "off" cycle (Siren Off Time). If the alarm condition is still present (voltage is low) the siren will sound again after the preset "off" time. If the alarm condition is not present the Energizer is instantly rearmed, irrespective of the auto-rearm setting. The last feature was added in version 7.77.



## 6.3 To Silence the Alarm

Enter your **PIN** and press **#**. This will silence the alarm but not disarm the system; the armed light will still be on. The system will be ready for the next alarm.

The Zone lights on the keypad will flash to show where the breach occurred. The siren and strobe are ready to respond again if triggered.

To disarm the system enter your **PIN** and press **#** again. The Zone light will remain lit until the Clear Alarm memory command is entered (**\*1#**). For firmware versions earlier than 7.77 disarming the system will also clear the Zone light.

Alternatively, disarming using the key switch on the Z14 and Z18 will reset the alarm.

When a Z-Series security energizer is a member of a group and goes into alarm, it can be silenced by disarming and rearming that Energizer using the Disarm/Arm Zone commands. See Keypad Programming – page 21.

## 6.4 Standby Battery

Should there be a loss of mains power, the Power light on the keypad will go off. If the loss of power is prolonged, the battery may become discharged and become ineffective. The Power light on the keypad will start to flash indicating that the battery charge is low.

If the standby battery requires replacement, the Status LED on the Energizer will flash 3 times.

## 6.5 Error (Service) Light

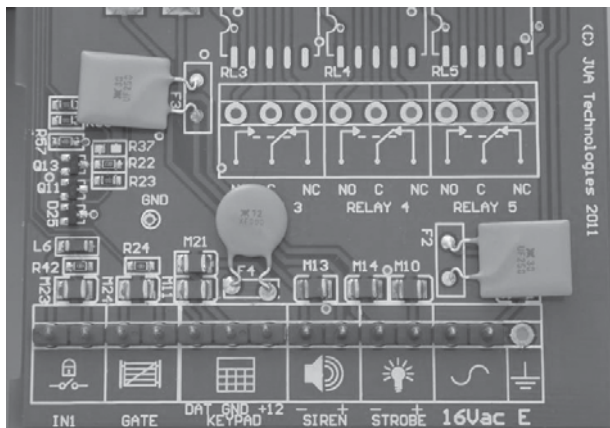
If the Energizer develops an internal fault, the Service light on the keypad will come on. Refer to Section 7.5.

## 7. TECHNICAL INFORMATION

### 7.1 Low Voltage Terminals

The low voltage terminals have over voltage protection to protect the circuit board from excessively high voltages such as power surges or incorrect installation.

#### 7.1.1 Z13/Z14/Z114 Low Voltage Terminals

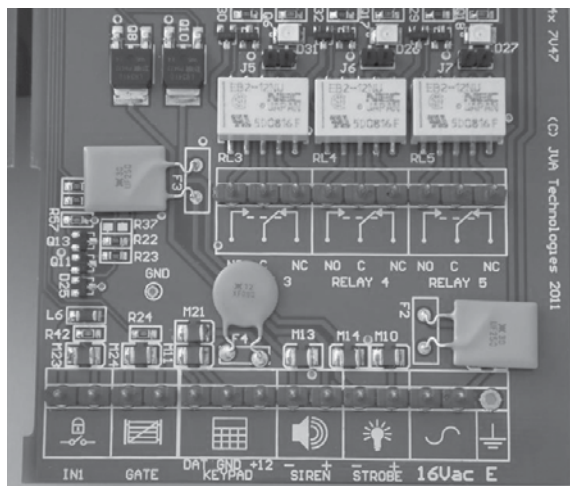


*Z13/Z14/Z114 Low Voltage Terminals*

#### Z14 Low Voltage Terminal Descriptions

Label	Type	Description
IN1	2 Way	Energizer Control Input (dry contact). Defaults to normally open. Can be used for a remote switch or a radio receiver. The receiver may be powered from the keypad +12V terminal. <b>NOTE:</b> This input is wired in parallel with the SW2 input.
Gate	2 Way	Energizer Control Input (dry contact). Defaults to normally open, Low Power Mode. It may also be assigned as a gate input. When the Energizer is armed and the gate is opened, it will trigger the gate alarm. Alternatively, the gate input can be used for low power mode remote arming and disarming.
Keypad	3 Way	Supplies power and data line for an external keypad. The +12 source on these terminals is protected with 1A self resetting fuse.
Strobe (Relay 1)	2 Way	Switched 12 volt output. Low side switched. 30W max (including siren). A buffer relay such as the PAE234 should be used when connecting these outputs to an alarm panel.
Siren (Relay 2)	2 Way	Switched 12 volt output. Low side switched. 30W max (including siren). A buffer relay such as the PAE234 should be used when connecting these outputs to an alarm panel. On the Z14 this defaults to a Siren output.
16Vac	3 Way	16Vac power input. Fused via F3 2A self resetting fuse.
Batt	Leads	12V dc or battery connection via F1 (3 Amp self resetting fuse). Connect Red lead to battery positive (+) terminal.

## 7.1.2 Z14R/Z18 Low Voltage Terminals



Z14R/Z18 Low Voltage Terminals

### Z14R/Z18 Low Voltage Terminal Descriptions

Label	Type	Description
IN1	2 Way	Energizer control input (dry contact). Defaults to normally open. Can be used for a remote switch or a radio receiver. The receiver may be powered from the keypad +12V terminal. <b>NOTE:</b> This input is wired in parallel with the SW2 input.
Gate	2 Way	Energizer Control Input, Z14R defaults Low Power control, Z18 defaults to Gate Input. Alternatively, the gate input can be used for low power mode remote arming and disarming.
Keypad	3 Way	Supplies power and data line for an external keypad. The +12 source on these terminals is protected with 1A self resetting fuse.
Siren (Relay 1)	2 Way	Switched 12 volt output. Low side switched. 30W max (including strobe). A buffer relay such as the PAE234 should be used when connecting this output to an alarm panel. 2.5A Fused*
Strobe (Relay 2)	2 Way	Switched 12 volt output. Low side switched. 30W max (including siren). A buffer relay such as the PAE234 should be used when connecting this output to an alarm panel. 2.5A Fused*
16Vac	3 Way	16Vac power input. Fused via F3 3A self resetting fuse.
Relay 3	3 Way	Defaults to General alarm. But may be set to any of 13 alarm conditions. Fit LINK J5 to connect +12V to the Common of this Relay. 2.5A Fused*
Relay 4	3 Way	Defaults to AC Fail alarm. But may be set to any of 13 alarm conditions. Fit LINK J6 to connect +12V to the Common of this Relay. 2.5A Fused*
Relay 5	3 Way	Defaults to Low/Bad Battery alarm. But may be set to any of 13 alarm conditions. Fit LINK J6 to connect +12V to the Common of this Relay. 2.5A Fused*
Batt	Leads	12V dc or battery connection via F1 (3 Amp self resetting fuse). Connect Red lead to battery positive (+) terminal.

\* – All of the Relays (1 – 5) use the same 2.5A fuse.

## 7.2 Power Options

The Z-Series of security energizers have 2 sources of power, 16Vac and 12VDC (Battery). The energizers cannot operate without a battery. Under no circumstances should a Z-Series security energizer rely on the keypad bus for power.

## 7.3 Battery Information

Use only 12V sealed lead acid rechargeable batteries.

**Always ensure adequate ventilation is provided for any enclosure that has a rechargeable battery. Some lead acid batteries may emit explosive gases while charging!**

To replace a battery: Turn the Energizer off. Disconnect the external power source (16Vac). Open the cover. Disconnect the old battery and remove. Connect a new battery making sure to observe the polarity, red lead to positive (+) terminal.

Ensure you dispose of old battery properly; they should not end up in land fill. Check with your local council or lead acid battery disposal procedures or call your local recycling centre.

The battery should be removed from the Energizer before the appliance is scrapped.

## 7.4 LEDs

For information about the Status LEDs please refer to section 4.4 Status LED Lights.

## 7.5 Status LED Error Codes

*Status LED Error Codes*

Error LED Number of Flashes	Interpretation	Corrective Action
1	Tamper detected	Fit LID or Fit the link to J3
2	16Vac Mains fail	Restore mains power
3	Low battery, bad battery	Charge or replace battery
4	PCB service fault	Return to repair/service centre Note: A Z14R slave will show this if disconnected from the Master

If an error occurs, an Output assigned to General Alarm will go into alarm state. Minor errors will self-clear if the error condition is removed.

Mains fail will not disarm the energizer, nor will low battery. However, without mains power, the battery will eventually be depleted and the energizer will attempt to maintain operation by entering low power mode after 4 warning beeps. If the battery charge

continues to fall, the energizer will eventually stop. Once mains power has been restored and the battery has recovered, the energizer will re-arm itself automatically after 4 warning beeps.

A tamper or a PCB fault will disarm the Energizer. If an error disarms the Energizer, the General Alarm and Fence Alarm will be activated.

If an error has momentarily caused the Energizer to stop pulsing, this can be corrected by disarming and rearming the Energizer. Should the error recur return the Energizer for service.

## 7.6 Jumpers

The Energizer has two special purpose jumpers (links). These are listed in the table below.

*Special Purpose Jumpers (links)*

Jumper	Function	Purpose
J3	Inhibit Mains fail error. OR Tamper disable (Z14R/ Z18/Z114)	J3 is fitted to inhibit Mains fail errors if the intention is to operate the energizer on DC only (as in solar power systems). Disables the Infrared Tamper feature on the Z14R/Z18/Z114.
J4	Factory default jumper Off to return programmable options to factory defaults on power up.	If the energizer needs to be defaulted to factory settings, remove all power (AC and battery) and remove the J4 jumper. Reapply the mains and the battery power. Reapply the J4 jumper and the Energizer will be reset to default settings.

## 7.7 Start-up Events

When a Z1X series security energizer is powered up (either from a battery or 16Vac) it will run through a set sequence of events to allow the technician to easily ascertain what the energizers model number, customer number and firmware version is.

When the energizer is powered up the following events can be observed for approximately 2 seconds.

- All LED's (those on the main circuit board and on the LCD display) will be lit.
- The Beeper will sound.
- Relays will click on and off (an audible clicking can be heard)
- The Battery symbol will appear on the LCD display
- The LCD display will test the LCD segments and then display the energizers model number, customer number and the firmware version which is running.



## **7.8 Multiple Keypads**

All Z-Series energizers have support for up to three keypads provided the Energizers firmware version is 7v66 and above. If more than one keypad is desired the second and subsequent keypads will need to have ID's set to 4 to 7. The first keypad can be left at the default ID 1. ID 2 and 3 should not be used. ID 2 is reserved for a PC running Perimeter Patrol.

## **7.9 Tamper Circuit (Z14R, Z18 and Z114)**

The tamper circuit serves two functions. It protects service personnel from receiving a shock by disarming the energizer when the lid is removed. It also sounds alarm if the lid is removed while the energizer is running. The tamper alarm can be inhibited by shorting the J3 pins together. It should be noted that in order for this function to work the inside of the Energizer lid needs to have a small piece of reflective material above the IR tamper circuit. Note that Programming Option 16 must have the +8 option set to enable the Tamper circuit.

## **8. SECTOR SETUP TESTS AND ADJUSTMENT**

### **8.1 Introduction**

With a Single Zone system there are three considerations for the electric fence monitor voltage level:

1. The monitor should trigger the alarm if one of the live wires is shorted to ground.
2. The monitor should trigger the alarm if one of the live wires is cut.
3. The monitor should not trigger the alarm when dew forms on the insulators, it rains, grass touches the wires, or spider webs, dust, etc. settles on the wires.

Should this happen, the alarm threshold should be decreased.

Use common sense and turn the Energizer off when making changes to the fence, then turn the Energizer back on to check the effects.

### **8.2 Basic Fence Tests**

1. Energize the newly completed fence.
2. Use an Electric Fence Power Probe to find any construction faults.
3. Check that there is voltage on all live wires (continuity) and that there are no shorts from live to earth, or between live circuits (Bi-Polar).
4. Check the electric fence earth. (See electric fence manuals.) One method is to make an intentional short from live wire to earthed metal (not +ve to -ve if using Bi-Polar). The voltage at the earthed point should be less than a few hundred volts; the voltage on the earth stake with respect to any nearby earthed metal should be less than a few hundred volts.
5. Record the start and end of fence live wire voltages.  
Note: Bi-Polar systems should have approximately equal voltages with respect to earth.
6. Record the live wire currents going out from the energizer to the fence.

At this point you must have a reasonable voltage on all parts of the fence. To be an effective barrier, the Power Probe (or voltmeter) readings between wires (live to earth or +ve to -ve for Bi-Polar) must be greater than 5.0kV. If it is not then you may require a larger energizer.



### **8.3 Fault Condition Tests**

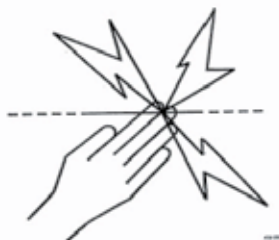
1. To simulate a break, disconnect a joint(s) in the live wires at some convenient point on the fence, making sure that the wires do not short to ground or between +ve and -ve wires.
2. Check that the energizer fence alarm activates. If not check the voltage (using an electric fence voltmeter) at the inputs to the monitor. Set the Fence Alarm Voltage level higher than this voltage. If there is still considerable voltage, you may have induced voltage in the feedback wires. If so, reduce the induced voltage by placing a 4700 ohm resistor across the return to earth terminals (or from +ve to -ve in a Bi-Polar system) at the monitor.
3. Reconnect the live wires (from step 3).
4. Place a short on the fence live wires.
5. Check that the monitor goes into alarm.
6. Remove the short.



## 9. LEGAL AND SAFETY REQUIREMENTS FOR ELECTRIC FENCES

The legal requirements relating to the safety and utilization of electric fences vary from country to country. It is important to know and understand the legal requirements applicable to your country. The standard adopted by most countries is the International Electro-technical Commission standard – IEC 60335-76. The following safety requirements are common to most countries:

- Use only energizers that have been tested and comply with IEC 60335-76 specs.
- Do not electrify barb wire.
- Do not connect two or more energizers to the same fence.
- In the case of an electric security fence, install a 1.5m barrier fence within 100mm – 200mm or at least 1m away from the face of the electric security fences to avoid creating a man-trap and inadvertent contact with the fence.
- Attach warning signs conspicuously to the electric fence lines. Warning signs



*Warning plate symbol*

should have a yellow background with black writing and be a minimum of 100mm × 200mm.

- Earth the fence well. It is recommended that a minimum of three 1.2m long hot dipped, galvanised earth electrodes be inserted at the energizer, and additional stakes every 30m along the fence line in urban areas.
- Insert the earth stakes at least 2m away from any mains earth electrodes.
- Do not attach your earth wires to any electrodes connected to a mains supply.
- Avoid running an electric fence parallel to or under mains power or telephone lines.
- When in doubt check with your local authority.
- For any further information regarding the legalities and safety requirements for electric fencing in your area, contact your local JVA agent or supplier.



## APPENDIX A: Group Simultaneous Pulse Feature

### Group Simultaneous Pulse Feature

In some Industrial Installations it may be preferable to provide the ability to link multiple Energizers into a group. When linked the individual Z-Series Energizers become a “Group”. Members of a group have simultaneous high voltage output pulses and act as if they are one energizer with multiple outputs. This is designed so that no possible combination of individual outputs can be dangerous.<sup>5</sup>

### Group Mode Programming (26x#)

A group **MUST** have only 1 master. The other Energizers in the group are slaves.

For the Z14R Energizers, if there is no Master, a Slave will display Error 4 on the Status LED when Armed and it will not electrify the fence.

For every other Z-Series Energizer, if there is no Master, each Slave will electrify the fence (pulse) when Armed. However, the simultaneous pulse feature will NOT be operating.

**Note 1:** *Do not interconnect the energizers via the keypad bus until after they are programmed.*

**Note 2:** If more than one keypad is used, they will need different addresses (see page 23: *7.3 Changing the Keypad Messages and Address*).

**Note 3:** If Perimeter Patrol is used any keypad in the system should not have address 2. (See Page 19, Program this Keypad.)

Value (x)	Mode
0	No Group
1	Master
2	Slave 1
3	Slave 2
4	Slave 3
5	Slave 4
6	Slave 5
7	Slave 6
8	Slave 7
9	Slave 8
10	Slave 9
11	Slave 10
12	Slave 11
13	Slave 12
14	Slave 13
15	Slave 14

<sup>5</sup> Patent Applied For.

For all Energizers that will be part of a group, the procedure is as follows:

1. Make sure the key switch is turned off and IN1 isn't shorted (**note that the Z14R does not have a key switch**).
2. Connect the battery.
3. On the keypad, enter [Installer's code] [\*] [0] [#].
4. Enter [26] followed by the required value (e.g. [1] for master) then [#].
5. Enter [\*] [#] to exit programming.
6. Connect the group using the keypad bus as per the figure on page 51.

**Note 1:** At this time groups are limited to a master and 14 slaves (15 single zones total).

## Group Linking via the Keypad "Bus"

The keypad terminals on all Energizers in the group are linked. Since only one Energizer needs to power the keypad, 3 wires are linked from one Energizer (preferably the Master) to the keypad (optional) and 2 wires to every other Energizer in the group. Do not connect the + lines between Energizers as this could result in some strange behaviour and possibly damage. Note the connections can be a star or daisy chain or any mixture. It is possible for a PC to be added to the group using a keypad to RS232 adaptor (PAE051).

### We recommend following these steps in the right order:

1. Disarm all energizers in the group. If energizers are not disarmed Step 10 may not work correctly.
2. Program the keypad address using one of the energizers.
3. Program each energizer with its required address (Master address=1, Slave 1 address=2...). Refer to note 4 below.
4. Connect any control/monitoring unit 12V, GND and Data to the Group Master
5. Connect all the slaves Data and GND to the Group Master.
6. Connect the battery and AC power of the Group Master but do not arm.
7. Connect the battery and AC power of each slave Note. Do not arm them until all the Energizers in the group are connected.
8. Wait 5 minutes for all the Energizers to synchronise with the Master.
9. If there are more than one keypad or control unit, make sure they have a different ID then reset the group using keypad code. [user pin] [\*] [6] [8] [#] or Perimeter Patrol "Reset All" this will allow both keypads to be recognised by all energizers in the group.
10. If using a PTE0210 keypad (refer to Appendix I), enter the key sequence [\*][6][8][#] to automatically re-scan the group and check what energizers are connected.
11. Arm the group using keypad [1] [2] [3] [4] [\*] [1] [0] [#] or Perimeter Patrol, make sure all Energizers are activated.

## Notes:

1. Members of a group can be individually switched on and off; even the master can be turned off via input or key switch (note that the Z14R does not have a key switch). For Arming and Disarming INDIVIDUAL Zones, refer to page 21.
2. A slave will generate a General alarm if the keypad bus is broken between it and the group master.
3. After programming the Keypad may be disconnected, it is not required for group operation.
4. As of energizer firmware 7v83 and keypad firmware 1v09, Z28's should have an 'empty' ID between each Energizer. This means if the Z28 and Z25 master ID=1, then the ID of the first slave should be 3, not 2.
5. When connected to Perimeter Patrol, the arm/disarm function of a keypad is disabled. Control of these functions is through the Perimeter Patrol interface.
6. A Keypad that is connected to a Slave Energizer (that is disconnected from the Group) must have a KEYPAD ADDRESS set to 1 or 8. Otherwise the Energizer will not respond to commands.



Group Mode Linking

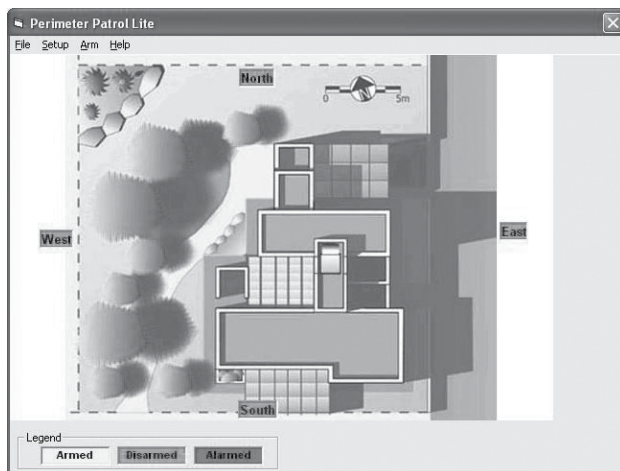
## Group Installation Notes

1. If an Energizer hasn't been programmed as a Master or a Slave, it is set as "Stand alone" by default.
2. All energizers need an appropriate high voltage circuit earth connection.
3. Allow for the heat load of multiple Energizers mounted inside a cabinet, approx. 10W each.
4. Use shielded or twisted pair cable for the group keypad wiring.

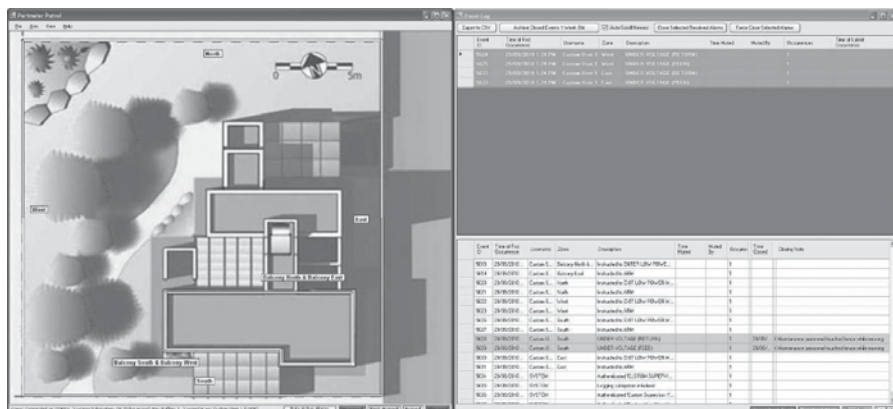
## Perimeter Patrol Software

The JVA Perimeter Patrol software package enables one or more energizers to be monitored and controlled from a PC.

This package can be used for a standalone system where the owner is interested in a visual representation of an electrified enclosure (mimic screen) and the ease of operation that a Windows compatible GUI application can provide.



Perimeter Patrol is sold as commercial software to accompany one or more Z-Series energizers. It offers a number of features, providing functionality that may be required at more critical installations. To obtain a copy of Perimeter Patrol 3.x, please contact your JVA Z-Series distributor.

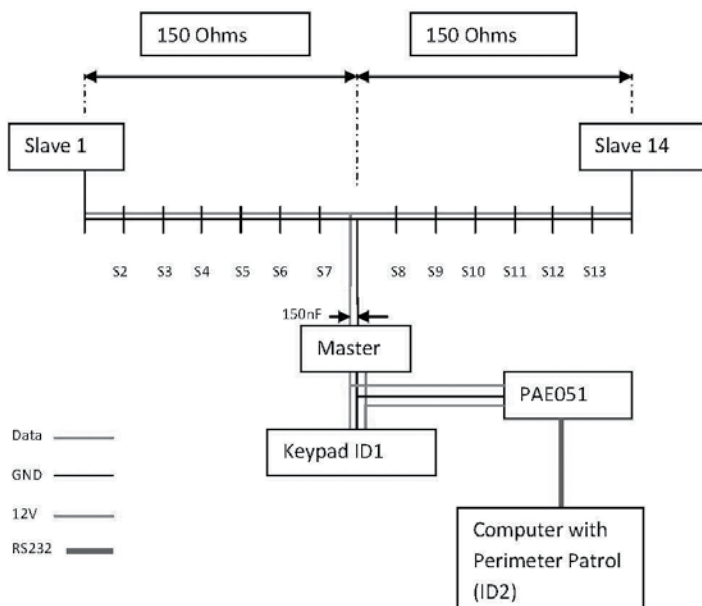


## Group Mode Limitations Using Category 5 Cable:

- For best results, the Master should be connected closest to the control/monitoring unit (Keypad, computer or LCD display). Note that the keypad can only tolerate 4.5 Ohm resistance on the GND wire from the Master to be able to control more than 15 Energizers in the system. When using CAT 5 cable, 2 or more wires can be shorted together to reduce the cable resistance.

Note that CAT 5 DC loop resistance is 0.188 Ohm / meter

- We recommend that the maximum length between a single energizer and a control/monitoring unit should be 1km because of the capacitance between wires with CAT 5 cables. CAT5 cable capacitance is 52pF / Meter.
- Using single CAT 5 wire connections, we recommend that the maximum length of cable for 2 energizer and up to 15 should be 1.5Km, and for 3 or more energizers, the Master should be in the centre of the cable and the energizers should be evenly spaced. For big systems, 2 or more CAT 5 wires can be shorted together to decrease the connection resistance between units. Star or Ring Network configurations can also be used. Note that the maximum capacitance acceptable between Data and GND for a 15 Energizers group is 150nF. For a star or ring network configuration it is worth calculating or measuring the capacitance at the Master point of view to make sure it doesn't exceed this value.
- Example:



## **APPENDIX B: Pulse Synchronization**

### **Introduction**

The synchronization of electric fence energizers powering zones of a multi-zone security electric fence is a safety requirement to prevent anyone (personnel or intruders) from receiving a potentially lethal shock. The danger arises when multiple zones powered by different energizers intersect which is often the case in security installations. While the zones are electrically isolated from each other at the intersection point, it is possible for someone to touch two different zones simultaneously. Doing this means it is possible for someone to receive a shock of greater magnitude or higher frequency than is safe.

This report will explain;

- why synchronization of electric fence energizers operating in a Group Mode is required what the official Australian and New Zealand standard requirements are with regard to the synchronization of energizer pulses
- how the JVA Z-Series of energizers (specifically the Z14) meet the Australian and New Zealand standards

### **About Synchronization**

#### **Why a Synchronized Fence is a Safe Fence**

The aim of synchronizing electric fence pulses is to limit the frequency and magnitude to ensure that these are within safe levels.

By pulsing the energizers in a group at the same time it is only possible to receive a shock once per pulse cycle. If energizers were able to fire a pulse irrespective of when energizers powering neighbouring zones were pulsing it would be possible to receive a shock at a higher frequency than what is considered safe (i.e. you could get shocked by energizer A, and then by energizer B a fraction of a second later).

Synchronizing pulses also means the magnitude of the energy passed to the person touching two zones at the same time is less than the arithmetic sum of the energy output by the two energizers (i.e. if both energizers are each outputting 4 joules of energy, the arithmetic sum would be 8 joules). This means that the energy passed to the person is kept within the safety requirements set out in the South African standards.

Section 5.2 and 5.3 of ASNZS3014 states that:

**5.2 Use of one energizer**

An electric fence shall not be supplied from two separate independently timed energizers or from independently timed fence circuits of the same energizer.

**5.3 Separation between electric fences**

For any two separate electric fences, each supplied from a separate independently timed energizer, the distance between the wires of the two electric fences shall be at least 2.5m. If this gap is to be closed, this shall be effected by means of electrically non-conductive material or an isolated metal barrier.

Section 5.2 clearly states that using two unsynchronised energizers (independently timed) on the one fence is prohibited. The second part of the statement "or from independently timed fence circuits of the same energizer" is referring to energizers like the Z28 which have two completely independent charge and discharge circuits built onto the same circuit board. The two independent circuits must be synchronized. The Z28 meets these criteria.

The first paragraph of section 5.3 discusses how far apart electric fences which are not synchronized need to be. The 2.5 meter gap of electrically non-conductive material (i.e. a brick wall) is a weak point for criminals to exploit. If a synchronized group of energizers is used this gap can be closed and a uniform defensive barrier can be maintained.



## WARRANTY

All JVA products carry a **2-year warranty** against defective components and workmanship. The warranty excludes damage caused by acts of Nature such as lightning or flooding, power supply surges, rough handling, malicious actions or incorrect wiring.

Whilst every effort has been made to check that the information contained is accurate, JVA Technologies Pty Ltd will not be liable to loss or damage resulting from construction, operation or failure of any installation or system. Installation of security electric fences should be made by trained professionals with regard to the relevant local standards and workplace health and safety requirements.

Product model purchased: ..... Serial No: .....

Customer Name: .....

Address: .....

.....

Postal Code: .....

Tel. No: ..... Cell: ..... Landline: .....

email: .....

Date purchased: .....

Invoice No: .....

Dealer Name: .....

### Dealer's Stamp



**Mail to:**

**Your local JVA Dealer**

**SA JVA Service Department P.O. Box 13898, Cascades 3202**

Warranty



[illegible]

## Z-RANGE



**Z14 STANDARD  
AND BI-POLAR  
ENERGIZERS**



**Z18 STANDARD  
AND BI-POLAR  
ENERGIZERS**



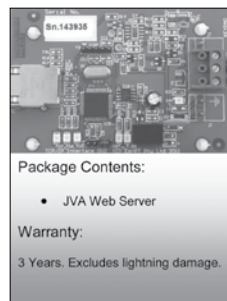
**Z28 STANDARD  
2-ZONE ENERGIZER**

### RANGE FEATURES INCLUDE

- ★ LCD voltage display
- ★ Powerful 4 joules per zone peak output energy
- ★ Designed to pass IEC60335.2.76 and EMC standards (reports available on request)
- ★ Wall mountable, robust enclosure with detachable PCB chassis for ease of installation and repair
- ★ Earth monitor input
- ★ Gate input
- ★ Key-switch
- ★ Keypad programmable
- ★ Lower-power mode
- ★ Entry/Exit delay from gate input trigger
- ★ Switched +12V outputs for Siren and Strobe (up to 30 Watts for 3 minutes)
- ★ Microprocessor controlled
- ★ Outputs may be wired for BiPolar fences (excluding Z28)
- ★ Multiple single-zone energizers can be wired as a group



**GSM MONITORS AND  
CONTROLS JVA ENERGIZERS  
USING A CELL PHONE**



#### Package Contents:

- JVA Web Server

#### Warranty:

3 Years. Excludes lightning damage.

**WEB SERVER MONITORS  
AND CONTROLS  
ENERGIZERS VIA THE  
INTERNET**

**PERIMETER PATROL  
COMPLETE CONTROL  
SYSTEM MONITORING  
EVENT LOGGING**



## Customer Support

**For assistance:** If you have any questions or need further assistance, please call your nearest JVA dealer. SA Tel. No.: 0861 782 349.

**For service or repairs:** If a service or repair is required, please package and label your energizer carefully and return it to your local JVA Service Centre.

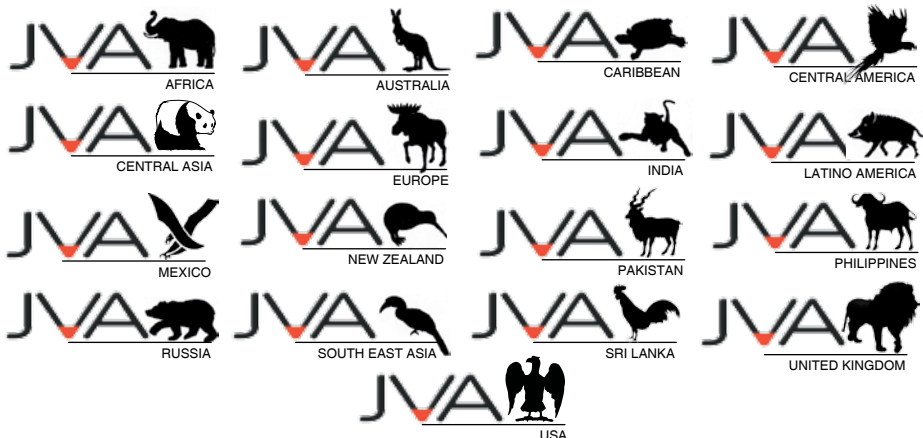
**For warranty repairs:** Include proof of purchase, e.g. invoice.

**Note:** Repair centre details are displayed on the back cover of this manual.



## JVA ELECTRIC FENCE SYSTEMS

JVA products are designed by JVA Technologies,  
Queensland, Australia and distributed to:



### JVA RSA SERVICE CENTRES

#### **Bloemfontein**

36 Kolbe Lane, Oranjesig  
Tel: 051 448 6695

#### **Cape Town**

Unit 15, Viking Business Park  
Park Road (off Viking Way)  
Epping Industria  
Tel: 021 534 5056

#### **Centurion**

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Tel: 012 880 0222

#### **Durban North**

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#### **East London**

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Devereaux Avenue  
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#### **East Rand (Jet Park)**

Aerostar Business Park  
219 Jet Park Road, Jet Park  
Tel: 011 397 3507

#### **George**

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Tel: 044 874 0669/ 044 873 2958

#### **Kimberley**

29 Schmidtsdrift Road  
Rhodesdene  
Tel: 053 861 5631

#### **Klerksdorp**

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#### **Nelspruit**

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Riverside Industrial Park  
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#### **Paarl**

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Der Merwe St., Paarl  
Tel 021 862 0886

#### **Pietermaritzburg**

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Tel: 033 342 6722/27

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Tel: 031 702 6351

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Tel: 015 292 6273

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Tel: 018 297 1488

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South  
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#### **Vanderbijlpark**

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Rabie Street  
Tel: 016 931 0408

#### **Vryheid**

Unit F, 153 President Street  
Cnr. Hlobane Street  
Tel: 034 981 0318

#### **West Rand (Roodepoort)**

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Delaréy  
Roodepoort  
Tel: 011 472 8823