JVA

Z18 Mk2 SECURITY ENERGIZER

Installation and User Manual

Edition 2.1, 2013

JVA ELECTRIC FENCE SYSTEMS

JVA Z Energizer Range Concept

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 42.

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1. INTRODUCTION

Welcome to the world of JVA monitored electric security fences. The proliferation of non-lethal, monitored, electric security fences in our towns and cities is indicative of the confidence the public has in this form of perimeter security. The reason for this popularity is simple – monitored electric security fences are effective, economical, simple to install, and they offer more D's of security than any other perimeter system:

D<small>EMARCATION</small> – The JVA fence around your property shows you mean business.
D<small>EFLECTION</small> – Would-be intruders will be deflected to softer targets.
D<small>ETERRENCE</small> – The safe, powerful JVA shock is a strong deterrent to intruders.
D<small>ELAY</small> – The physical barrier will delay an intruder, something they do not like.
D<small>ETECTION</small> – The JVA's voltage monitor warns you of any tampering with the fence.
D<small>ENY</small> – A well-erected electric security fence will deny entry.
D<small>EPENDABLE</small> – 60 seconds a minute, 60 minutes an hour, 24 hours a day, 365 days a year, your JVA electric security fence is monitored by an alert, sober, electronic watchman.

Every second, the JVA Z energizer discharges a very short-duration, safe, high-voltage pulse down the fence live wire. The JVA Z energizer then monitors the voltage at the end of this live wire, thereby checking that the voltage is being maintained along the entire fence line. In the event of a voltage drop caused by either shorting, cutting or poor maintenance, the monitor will trigger an alarm, thus alerting you.

Manufactured to meet the most stringent international safety standards, the JVA Z energizer is in a class of its own when it comes to features and benefits at an affordable price.

An electric fence system which meets current safety regulations

Features

2. FEATURES

2.1 Power

- 8 joules peak output energy
- Mains powered via external transformer (16–18Vac)
- Battery charger with space for internal 7A/H 12V rechargeable back up battery

2.2 Control / Monitoring:

- 2 Control inputs which can be configured to take N.O. or N.C. control contacts
- 2 12V driven outputs (also referred to as relays)
- 3 extra relays with change-over contacts
- 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
- Tamper/safety function
- Will operate with up to 3 keypads

2.3 Safety

- Designed to pass IEC60335.2.76 and EMC standards (reports available on request)
- Enclosed fence terminals
- Wall mountable, robust enclosure with detachable PCB chassis for ease of installation and repair
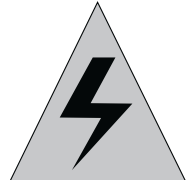
2.4 Reliability

- 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 protected against stray fence voltage

3. SPECIFICATIONS

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	16Vac 2A
Battery Charger Output	Float voltage 14v, 700mA, short circuit protection Reverse battery protection
Outputs	3 × 12V 2.5A maximum combined load 3 × 30V 1A changeover relay contacts
Enclosure	IP4x ABS plastic
Size	300mm high, 190mm wide, 115mm deep
Weight – packed, no battery	2.5kg
Recommended operating temperature	From -15°C to +50°C

- There are no user-serviceable parts in this unit.
- The installer is reminded that high voltages are retained for a while after switching off, and to wait for at least 10 minutes before opening the case.
- Before working on the high voltage wiring of an electric fence, it is recommended that the energizer be turned off and an intentional short circuit be placed from the fence live wires to earth. This is a sensible precaution against the energizer being turned on by others or malfunctioning while work on the fence is in progress.
- This appliance is not intended for use by persons with reduced physical, sensory or mental capabilities, or lack of experience and knowledge, unless they have been given supervision or instruction concerning use of the appliance by a person responsible for their safety.
- Children should be supervised to ensure that they do not play with the appliance.
- 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.

WARNING

Specifications

Description

4. DESCRIPTION

The Z18 is a single channel, conventional or bi-polar 8 Joule (Output) security energizer.

This manual relates to:

● PCB versions: 7.51 and higher
● Firmware versions: 7.50 or higher (the firmware version is shown on the LCD on reset)

4.1 JVA Z18 Exterior

Figure 1: Z18 Exterior

4.2 JVA Z18 – High Voltage Terminals

| Standard | Return | Earth | N/C | Feed | N/C | Earth |
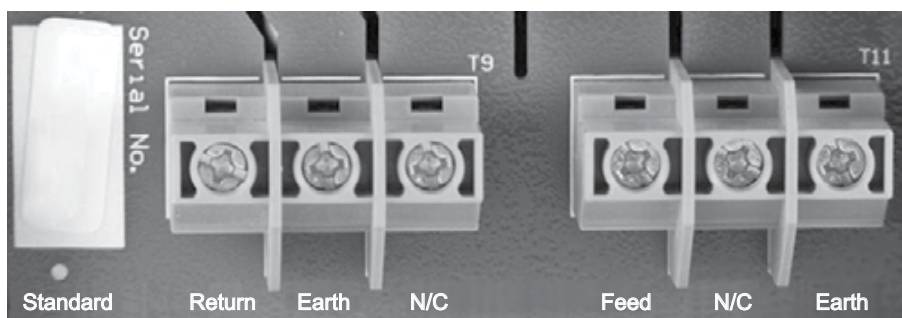
Figure 2a: High Voltage (Fence) Terminals in Conventional Mode

| BiPolar | RET 1+ | EARTH | RET 2- | +FENCE | EARTH | -FENCE |
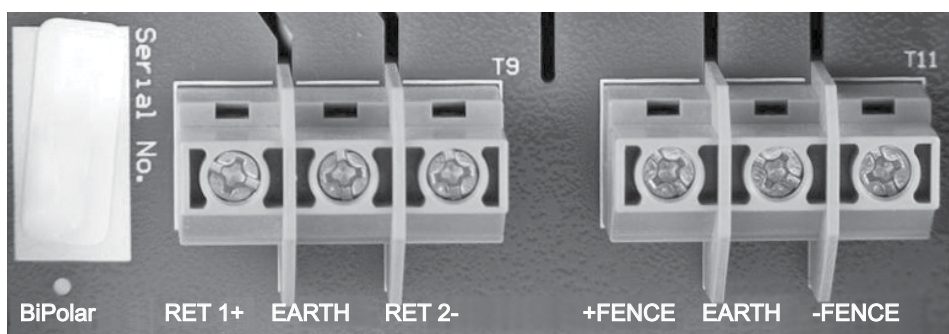
Figure 2b: High Voltage (Fence) Terminals in Bi-polar Mode

4.3 LCD Voltage Display

The display on the JVA Z18 shows the voltage at the *Feed Out* and *Return* terminals.

Left side = *Return*, Right side = *Feed*.

When configured for Bi-polar operation, the left side is the positive return voltage and the right side 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.

Figure 3: LCD Display and Status LEDs

4.4 Status LED Lights

(See Figure 3.)

Power	–	On whenever the energizer has power.
Armed	–	On when the energizer is armed (pulsing); will flash when in low power mode.
Fence	–	The fence status light flashes green when the energizer is armed and the voltage is good; flashes red if the voltage falls below the Fence Alarm Voltage; stays red when there is a fence alarm condition.
Gate	–	Flashes Red when the *Gate* input is open, stays Red when there is a gate alarm.
Status	–	Flashes an error code for energizer (service) errors. See the table in Section 7.3

Fence and gate LEDs are latched on (like the strobe) until cleared, using the clear alarm memory sequence (*1#), or until the energizer is rearmed.

4.5 Keypad (Optional)

Up to 3 keypads can be used to remotely monitor and control the Z18. The keypad is also used to set the programmable options. See section 8.5.

To provide feedback to the user the LCD keypad utilizes two LEDs and a LCD display. A description of each LED's function and the messages that may appear on the LCD display can be found in the table below. (Section 4.6)

The fence *Out* and *Return* voltages are displayed when the Z18 is armed.

Figure 4: LCD Keypad

4.6 Keypad Lights

Power	*On* with AC power, flashes on low battery.
Arm	*On* when the energizer is armed (pulsing), flashes when in low power mode.

NOTE: There is no panic function.

For information on how to control the Z18 via the keypad see section 6.

NOTE: By pressing the House key ⌂⊠ the display will toggle between any alarm conditions, trouble conditions and voltage conditions.

4.7 Internal Beeper/Keypad Beeper

Depending on the *chime* setting, the internal beeper and keypad beeper will sound when there is a fence alarm, a gate alarm or a general alarm or a door chime. On flat battery the keypad will always beep 4 times before the energizer automatically enters low voltage mode to preserve the battery. On AC Fail it will not beep.

NOTE: The internal beeper also beeps at power-up.

4.8 Cabling

High voltage cabling (fence lead out 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. <u>A minimum distance of 30mm should be kept between high voltage and low voltage cables</u>.

4.9 Lightning Protection

Although the Z18 contains internal lightning protection elements, external lightning protection elements such as additional external lightning kits available from your local dealer, are recommended as they would help to reduce lightning damage even further.

4.10 Earth Loop Monitoring

The Z18 has two fence earth terminals which when wired into an insulated series looped fence system enable the energizer to monitor the earth circuit. If this is not required the installer can loop the two earth terminals at the energizer and then connect the earth spikes to one of the parallel earth terminals.

Description

Description

4.11 Noise and Interference

The Z18 contains a microprocessor. Extreme electrical noise can upset micro-processors. The most likely cause of such noise is the high voltage output from the unit 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 Z18 is designed to self-recover from interference, powering off (both AC and battery) should not be necessary.

4.12 Programmable Options

The Z18 has many programmable options. These are also known as *setup parameters*. To alter these options a keypad must be used. The options are explained in *Programming Options in Brief on* page 21. Each parameter has a factory set default.

4.13 Low Power Mode

Z18 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 500V peak. See *Programming Options in Brief on* page 21 for details on using the keypad to set low voltage mode.

4.14 Control Inputs

The Z18 has 2 control inputs. These default to:

Input 1 – Arm/Disarm
Input 2 – *Gate* Switch or High/Low power control

The gate input may be wired to a gate switch to trigger an alarm when a gate is opened.

Gate Input
The Gate 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 *Programming Options in Brief* on page 21.

NOTE: If *Gate* Input feature is not used, the *Gate* Input must be looped.

If the unit is disarmed, the gate input may be set to Chime mode.

High/Low Power Control

When the *Gate* Input is configured to control High/Low Power mode, the *Gate* 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.

4.15 Group Simultaneous Pulse Feature

In some installations it may be preferable to provide the ability to link multiple units into a group. When linked, the individual Z14s, Z18s and Z28s become a group. As many as fifteen energizers can be grouped. Individual units in 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.

Description

5. INSTALLATION

JVA recommends installation 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 JVA Z18 is to be mounted. If on an external wall it should be housed within an equipment box and definitely not in direct sunlight or where it could get wet.
4.	Mount the unit by hanging the housing on the two nail-in anchors provided. If necessary, two extra mounting holes can be used at the bottom of the housing.
5.	If using a keypad, remove the rear housing of the keypad and fix it to the wall.
6.	Wire the low voltage cables to the PCB terminals (right side)*. (See page 17)
7.	Wire the high voltage cable to the PCB terminals*. (See page 6) If earth monitoring is not going to be used on the fence, connect a bridge wire from earth out to earth return.
8.	Fit the battery leads to the battery. The *Status* LED should blink twice to show mains fail.
9.	Mount the 220 – 16V transformer and connect the 16V side to the Z18 16V input terminals. (AC is not polarity sensitive.) Do not connect a live or neutral to the earth terminal.
10.	The unit is designed not to start when first powered up irrespective of the state of the inputs.
11.	Replace the front cover.
12.	Turn AC power on. The *Status* LED should stop blinking.
13.	Enter the keypad initialisation code *68#.
14.	Arm and disarm the energizer via the keyswitch or keypad, if fitted.
15.	Arm the unit. The LCD display will now show the fence voltage.
16.	Check to ensure that a short anywhere on the fence triggers the alarm.
17.	Ensure that the user understands how to change the user code (PIN) and is in possession of this Installer/User Manual and the installer's contact details.

*NB *Keep high voltage and low voltage cables at least 100mm apart.*
Do not run high and low voltage cables in the same conduit.

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 metres, the energizers must be configured to operate in Group Mode.

5.2 Example Fence Wiring Diagrams

Return   Feed

Return
Earth
Feed
Earth

Conventional Fence

Energizer Earth
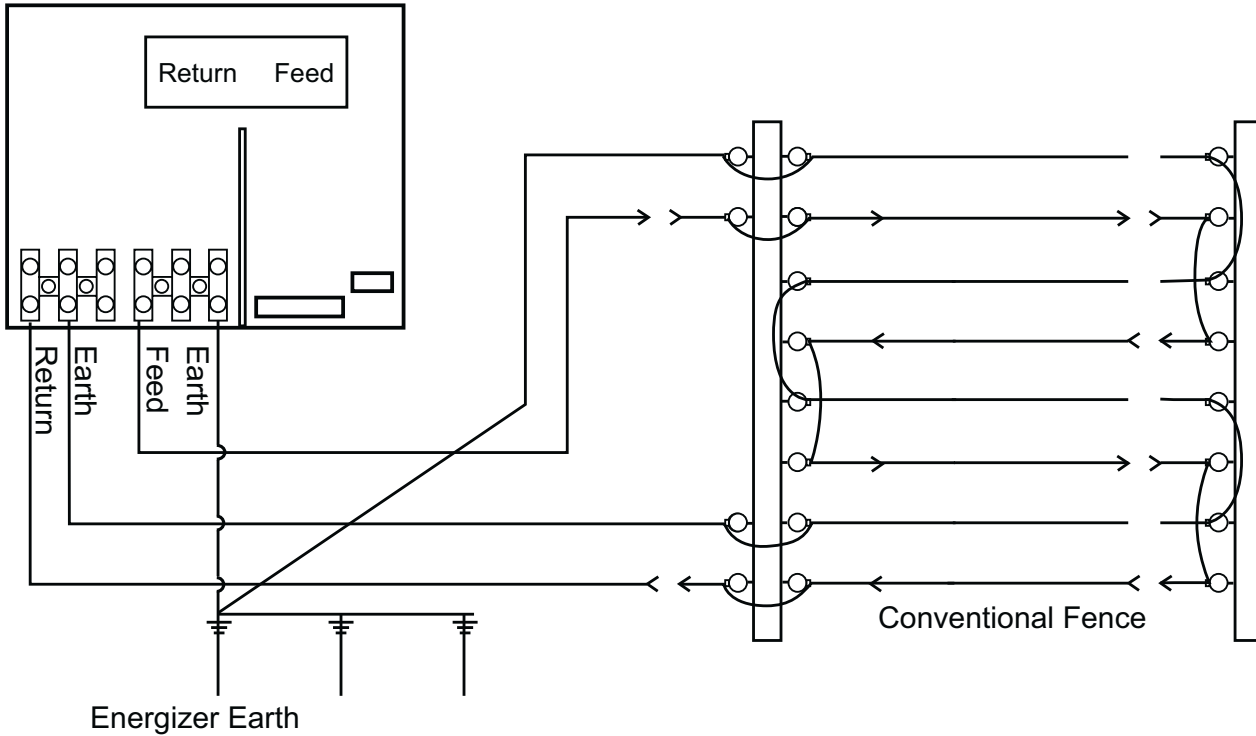
Example Fence Wiring Diagram, Conventional – Live & Earth, including earth monitoring

Positive   Negative

Return 1
Earth Return
Return 2
Fence+
Earth Out
Fence-

Negative Feed

Positive Feed

Negative Return

Positive Return

Bi-polar Fence

Energizer Earth

Example Fence Wiring Diagram, Bi-polar – All Live

Installation
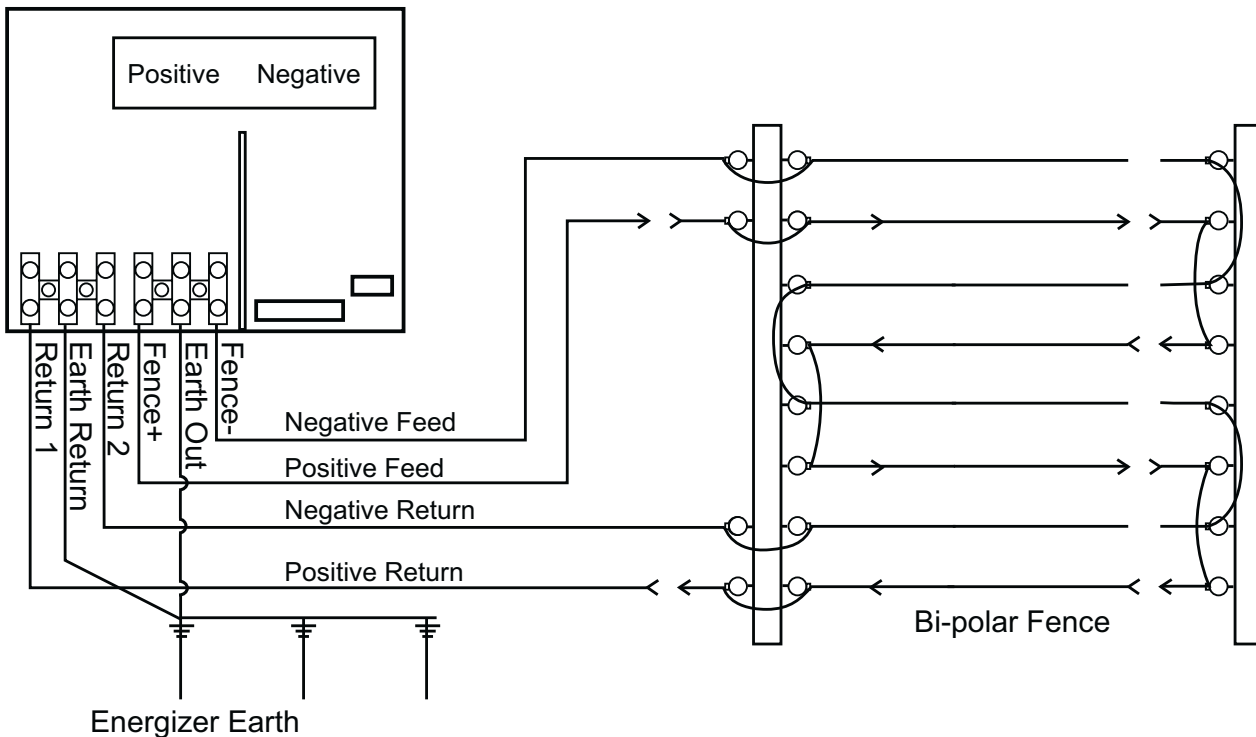
6. OPERATION

6.1 Arm/Disarm Control

The unit can be controlled by the keyswitch, control input 1 (IN1) 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. So if the unit is armed via the keypad and then disarmed at the control input it will disarm.

6.2 Arming the Fence Using the Keypad

- Enter your **USER PIN** number (four digits long) and push the **#** key.
- Make sure the red ARM light comes on.
- The keypad will beep twice to confirm that the system is armed.
- The fence will power up and if all is well (no faults) the system will be ready to deter and detect.
- If there is a fault on the fence and it cannot achieve full voltage, *Fence* LED will flash.
- To disarm the system, enter your **USER PIN** and press **#**. This will also clear any fault lights and zone lights which may have been on.

6.3 Turning to Low Power Mode

To switch to Low Power mode, enter your **USER PIN** and press ***41#**. In Low Power mode the fence will still be powered and any breach will be detected, but the voltage will be much lower than normal operation. The ARM light will flash in Low Power mode.

Enter your **USER PIN** and press ***42#** to switch back to Full Power mode.

Alternatively, the unit can be switched to Low Power mode using the gate switch input, if it has been programmed accordingly.

6.4 When an Alarm Occurs

If the system is armed and the fence is tampered with, the FENCE light will flash on the energizer and then remain on. Relays assigned to alarms 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 the gate input is opened and the entry/exit delay time has elapsed.

Operation

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 Siren *On* Time).

If the siren is muted by (entering **USER PIN #**) then the siren will enter the next 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.

6.5 To Silence the Alarm

- Enter your **USER PIN** and press **#.** This will silence the alarm <u>but not disarm</u> the system; the armed light will still be on. The system will be ready for the next alarm.
- The keypad text display will show the respective zone alarm.
- The siren and strobe are ready to respond again if triggered.
- To disarm the system enter your **USER PIN** and press **#** again. The Zone light will remain visible until the Clear Alarm memory command is entered (*1#).
- Alternatively, disarming using the key switch 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 6.9 *Keypad Control in Brief*.

6.6 Changing the USER PIN Number

- Enter the old 4-digit **USER PIN** and press ***0#.** This enters User Programming mode.
- Enter your new **USER PIN** (must be 4 digits) and then #.
- Press ***#** to exit User Programming mode.
- Make sure your new **USER PIN** works by using it to arm the energizer.
- The default **USER PIN** is 1 2 3 4.

6.7 Standby Battery

Should there be a loss of mains power, the *Power Light* on the keypad will go off. Output power will be reduced to conserve battery power. If the loss of power is prolonged, the battery may discharge power and become ineffective. The *Power Light* will start to flash indicating a battery low power problem. If the standby battery requires replacement, the *Power Light* will flash and the *Status Light* will flash three times.

6.8 Status Light

If the energizer develops an internal fault, the *Status Light* will flash a code. See section 7.3 (page 18).

Operation

6.9 Keypad Control in Brief

The default USER PIN is 1 2 3 4.

Function	Key Sequence
Arm/Disarm	[User PIN][#]
Silence an Alarm (Single zone system only)	[User PIN][#]
Start programming the Z series energizer	[Installer PIN][*] [0] [#]
Start programming the Keypad	[Installer PIN][*] [0] [1] [#]
Exit Programming (any mode)	[*] [#]
Change a User PIN	[User PIN][*]0[#][New PIN]#
Change the Installer PIN – in programming mode only	[0] [0] [New Installer PIN][#]
Arm All Zones (Multi-zone groups)	[User PIN][*][1][0][#]
Arm Zone 1 (Master)	[User PIN][*][1][1][#]
Arm Zone 2 (On Z28 or slave in group)	[User PIN][*][1][2][#]
Disarm All Zones	[User PIN][*][2][0][#]
Disarm Zone 1 or Master	[User PIN][*][2][1][#]
Disarm Zone 2 (On Z28 or slave in group)	[User PIN][*][2][2][#]
Switch to low power mode (all zones)	[User PIN][*][4][1][#]
Switch to high power mode (all zones)	[User PIN][*][4][2][#]
Keypad Audible Feedback Toggle	[*] [5] [1] [#]
Keypad Alarm Beeper (Chime) On/Off	[*] [5] [3] [#]
Keypad Error Tones Toggle On/Off	[*] [5] [4] [#]
Backlight Toggle On/Off	[*] [8] [#]
Display Keypad Model	[*] [9] [#]
Reset and display firmware version number	[User PIN][*][6][8][#]
Reset and return to factory defaults	[Installer PIN][*] [6] [8] [#]
Power Boost	[*] [9] [9] [#]
Siren Test	[*] [6] [3] [#]
Battery Test (while disarmed only)	[*] [6] [4] [#]
Clear alarm memory	[*] [1] [#]

6.10 Solar Powering the Unit

If there is no mains power on the site, the Z18 can be powered as follows: A 56 Amp/hour battery charged by a 120 watt solar panel. This is a guideline. A bigger panel may be required in some cases. If operating from an externally charged battery, fit Jumper J3.

7. TECHNICAL INFORMATION

7.1 Inputs and Outputs
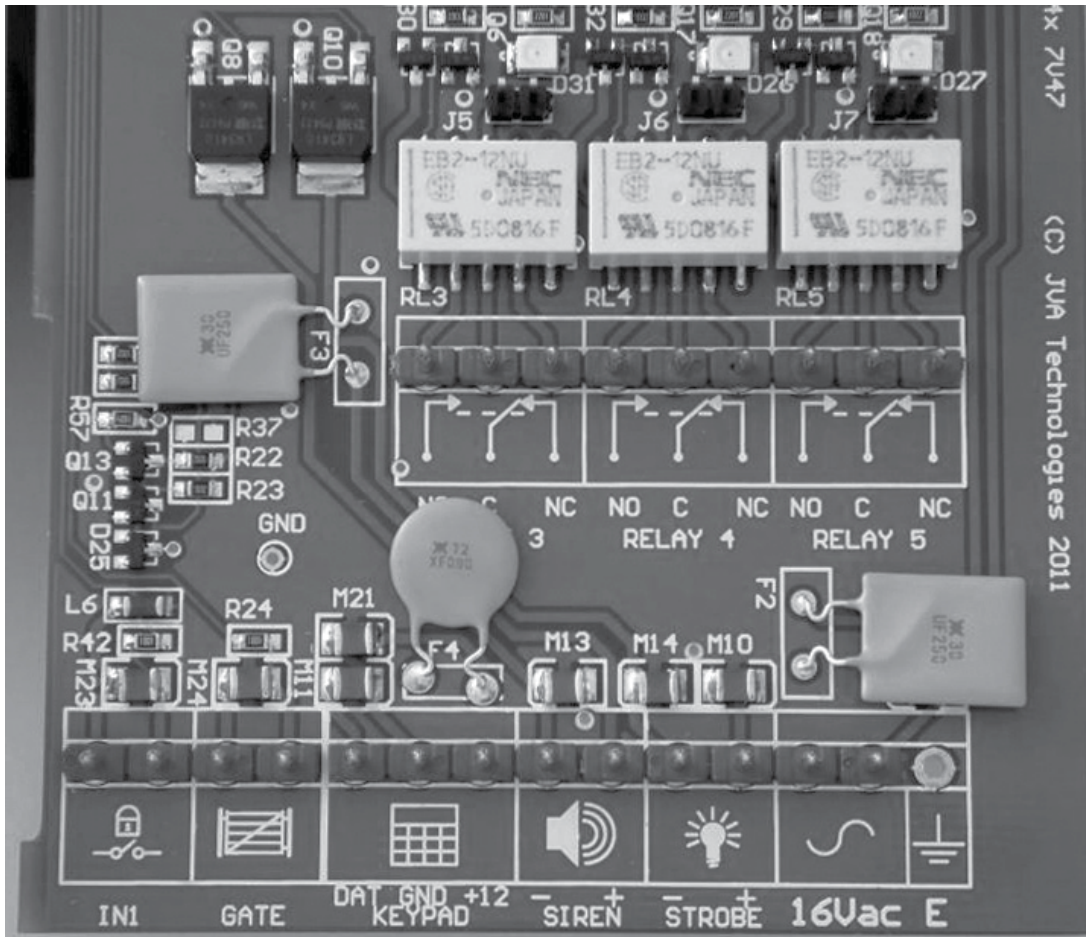
Low voltage connector layout – Note the 3 relay outputs

Please refer to the Low Voltage diagram above.

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. **NOTE**: This input is wired in parallel with the SW2 keyswitch input.
Gate	2 Way	Energizer Control Input 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.

Low Voltage Terminals

Technical Information

Label	Type	Description
Siren (Relay 1)	2 Way	Switched 12 volt output. **Low side switched.** 30W max (including strobe). A buffer relay 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 should be used when connecting this output to an alarm panel. 2.5A Fused*
16Vac	2 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 J7 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.

NOTE: To reset the fuse, remove power for a few seconds and then reapply power.

7.2 Power Options

The unit has 2 sources of power, 16VAC and 12VDC (battery).
NOTE: Use only rechargeable batteries. Always ensure adequate ventilation is available for the housing if it contains a battery. Lead acid batteries may emit explosive gases while charging! Always make sure that a battery is connected to the energizer before applying AC. The energizer cannot operate without a battery.

7.3 Status Codes

Status LED Number of Flashes	Interpretation	Corrective Action
1	Tamper detected	Fit the lid
2	16 VAC Mains fail	Restore mains power. Can be bypassed by fitting J3
3	Low battery, bad battery	Charge or replace battery
4	PCB service fault	Default the unit (See 7.4 (J4) below)

Status Codes

If an error occurs, the relay assigned to general alarm will go into alarm state. Minor errors will self clear if the error condition is removed. If the mains power fails, it 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 fence alarms will be activated.

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

7.4 Jumpers

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

Jumper	Function	Purpose
J3	Inhibit Mains fail error. OR Tamper disable	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
J4	Factory default jumper Off to return program-mable options to factory defaults upon 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 battery power first, then 16 VAC power. Reapply the J4 jumper and the unit will be reset to default settings. If the *Status* LED flashes four times, return the unit to the nearest JVA service centre.

Jumpers

Jumper J3 also disables the new infrared Tamper/Safety feature, if it has been enabled by programming sequence 168#.

The new Tamper/Safety circuit serves two functions. It protects service personnel from receiving a shock by disarming the energizer when the lid is removed. It also sounds an alarm when the lid is removed while the energizer is armed. 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, and the Tamper function must have been enabled by the programming sequence 168#.

Technical Information

8. INSTALLATION PROGRAMMING OPTIONS

The unit has a non-volatile memory in which programming options (setup parameters) are held. These are factory pre-set but can be field programmed using a keypad.

8.1 Programming Mode

To enter Programming mode, enter the 6-digit INSTALLER PIN followed by ***0#** keys. The keypad will beep twice to indicate that the command was accepted. If the INSTALLER PIN was incorrect, the keypad will beep 3 times. The LCD will now show the first programming option and its current setting.

Pressing the # key will cycle through all the options on the LCD.

NOTE: Not all numbers are used. The default INSTALLER PIN is 0 1 2 3 4 5.

8.2 To Exit Programming Mode

After programming, press *** #** to exit. If left unattended, the unit will *time out* and *auto exit* Programming mode after approximately 5 minutes.

8.3 Changing the INSTALLER PIN

The INSTALLER PIN may only be changed while in Programming mode.

To enter a new INSTALLER PIN, press **00** followed by the new 6-digit INSTALLER PIN, then the **#** key.

If you cannot remember your INSTALLER or USER PIN, return the unit's memory to default. To do this, remove power (AC off and disconnect the battery), open the energizer, remove jumper J4 and reconnect the battery for about 10 seconds.

Re-fit J4.

This will return all options to the factory set defaults.

8.4 Changing an Option

Most of the options have possible values in the range of 0 to 9.

To change any options, the unit must be in Programming mode. Check the option number (see table below) and then the table of values for that option. Then press the option number followed by the required value. When the programming is completed, exit from Programming mode. (See 8.2 above.)

For example, to change the power level to maximum press **019#**, the keypad will beep twice to indicate that the command was successful. The LCD will immediately show the updated value.

8.5 Programming Options in Brief

Option	Function	Description
01	Power Level	Sets the output power levels
02	Low Power level	Sets the output power levels used in Low Power mode
03	Fence Alarm Voltage	Sets the voltage threshold below which the fence alarm will occur
04	Not used in Z18	
05	Low Power Alarm Level	Sets the voltage threshold below which the fence alarm will occur in Low Power mode
06	Missed Pulse Count	Sets the number of pulses which may be missed before the alarm is activated
07	Battery Alarm Voltage	Sets the battery voltage threshold below which the general alarm will activate
08	Siren *On* Time	Sets the time that the siren (and keypad beeper) will stay on after an alarm
09	Siren *Off* Time	The amount of time the siren will be off after the *On* time has expired
10	Siren Cycles	The number of times the siren will sound for the *On* time function above. After this many cycles the siren will automatically mute
11	Input Inversion	Normally open or normally closed
12	Gate Input Function	Gate Switch mode or Low Power Switch mode
13	Gate Exit Delay	Time from gate switch opening to alarm
14	Chime Mode	Allows the keypad and internal beeper function to be altered
15	Fence Mode	Bi-Polar or Conventional mode
16	Binary Options	Miscellaneous options
17	Anti-Bridging	If the voltage rises OR falls quickly by more than this setting as a percentage of the average fence voltage the alarm will occur
18 – 19	Not used in Z18	
20	*Auto-Rearm* Time	Sets the time which must elapse after an alarm has timed out (completed the siren cycles) before the unit will automatically re-arm, ready for the next alarm event.
21	Relay 1	Used to assign an alarm function to output L1 – *Siren*
22	Relay 2	Used to assign an alarm function to output L2 – *Strobe*
23	Relay 3	Used to assign an alarm function to *RELAY 3*
24	Relay 4	Used to assign an alarm function to *RELAY 4*
25	Relay 5	Used to assign an alarm function to *RELAY 5*
26	Group ID	Allows the energizer to be set as a Master or Slave in a synchronised group.

Programming Options

Installation Programming Options

8.6 Programming Options in Detail

Note: The bold panel in each table indicates the default value.

8.6.1 Power Level (01x#)

The power level option allows the shocking power of the fence to be adjusted. For example: To change the power level to *maximum*, enter the following:

0 1 9 # or **0 1 0 9 #**.

The keypad will beep twice to indicate that the new setting has been accepted.

The normal fence voltage depends on the amount of fence wire, the losses and the power level.

This setting affects the average power drain and therefore backup battery time.

Kilovolt settings refer to a 1000 Ohm load, actual fence voltages will depend on the type and length of fence.

Value (x)	Voltage Conventional Mode	Voltage Bi-Polar Mode
0	5.0kV	2.5kV
1	5.5kV	2.8kV
2	6.0kV	3.0kV
3	6.5kV	3.3kV
4	7.0kV	3.5kV
5	7.5kV	3.8kV
6	8.0kV	4.0kV
7	8.5kV	4.3kV
8	**9.0kV**	**4.5kV**
9	9.5kV	4.5kV

Power Level (01x#)

8.6.2 Low Power Level (02x#)

Same as above, but for Low Power mode.

Value (x)	% of High Power
0	0.5%
1	1.0%
2	1.5%
3	2.0%
4	2.5%
5	3.0%
6	**3.5%**
7	4.0%
8	4.5%
9	5.0%

Low Power Level (02x#)

8.6.3 Fence Alarm Voltage (03x#)

This option sets the voltage threshold below which the fence alarm will occur. The default Fence Alarm Voltage is 4 kV.

Value (x)	Voltage Conventional Mode	Voltage Bi-Polar Mode
0	1.5kV	1.5kV
1	2.0kV	1.8kV
2	2.5kV	2.1kV
3	3.0kV	2.4kV
4	3.5kV	2.7kV
5	**4.0kV**	**3.0kV**
6	4.5kV	3.3kV
7	5.0kV	3.6kV
8	5.5kV	3.9kV
9	6.0kV	4.2kV

Fence Alarm Voltage (03x#)

8.6.4 Low Power Alarm Level (05x#)

This option sets the voltage threshold below which the fence alarm will occur. The default Fence Alarm Voltage is 500 Volts.

Value (x)	Voltage
0	300 Volts
1	**500 Volts**
2	700 Volts
3	900 Volts
4	1100 Volts

Low Power Alarm Level (05x#)

8.6.5 Missed Pulse Count (06x#)

This option enables the pulse count to be varied from the default (3). This is the number of bad or missing pulses that are counted before the alarm occurs.

NOTE: The lower this option is set, the more likely you are to get false alarms.

Value (x)	Missed Pulses
0	1
1	1
2	2
3	**3**
4	4
5	5
6	6
7	7
8	8
9	9

Missed Pulse Count (06x#)

8.6.6 Battery Alarm Voltage (07x#)

This option sets the battery voltage threshold below which the alarm will activate. The default Battery Alarm Voltage is 10.0 Volts and the unit will drop to low power at 9.0 Volts (after beeping 4 times).

If the unit enters Low Power mode due to a flat battery, the unit will automatically return to high voltage, without warning, when the mains voltage comes back on and the battery voltage rises.

Keypad Number	Alarm	Reduce Power
0	9.0 V	8.0 V
1	9.5 V	8.5 V
2	**10.0 V**	**9.0 V**
3	10.5 V	9.5 V
4	11.0 V	10.0 V
5	11.5 V	10.5 V
6	12.0 V	11.0 V
7	12.5 V	11.5 V
8	13.0 V	12.0 V
9	13.5 V	12.5 V

Battery Alarm Voltage (07x#)

Installation Programming Options

8.6.7 Siren *On* Time (08x#)

This option sets the duration of time that the siren will remain on after a fence alarm occurs. After this time the siren will turn off for the *Off* time indicated in Table 8.6.9. The siren will sound again if the alarm is still present after this *Off* time has passed. The default is 3 minutes.

This may be the subject of local regulations to stop an alarm causing undue disturbance to neighbours, etc.

NOTE: The siren *On* time will be cut short if the battery falls below the low battery level.

Value	Time	7.95 Firmware
0	10 Seconds	
1	30 Seconds	
2	1 Minute	
3	2 Minutes	
4	**3 Minutes**	
5	4 Minutes	
6	5 Minutes	
7	6 Minutes	20 Minutes
8	7 Minutes	45 Minutes
9	8 Minutes	130 Minutes

Siren On *time (08x#)*

8.6.8 Siren *Off* time (09x#)

This option sets the amount of time the siren will be off for after the *on* time above has expired. If an alarm is still present after this *Off* time, the siren will sound again.

Value	Time
0	10 Seconds
1	1 Minute
2	2 Minute
3	5 Minutes
4	**10 Minutes**
5	20 Minutes
6	30 Minutes
7	40 Minutes
8	50 Minutes
9	60 Minutes

Siren Off *time (09x#)*

8.6.9 Siren Cycles (10x#)

This option sets the maximum number of times the siren will sound for the *On* time if the alarm continues. This may be limited by local regulations to stop an alarm causing undue disturbance to neighbours, etc.

NOTE: This is the maximum number of cycles for 1 continuous alarm, intermittent alarm events could cause more than this number of siren soundings.

Value	Cycles
0	0
1	1
2	2
3	**3**
4	4
5	5
6	6
7	7
8	8
9	9

Siren Cycles (10x#)

8.6.10 Input Type (11x#)

The Z18 inputs can be inverted. Unless the input is used for a Gate switch, in which case it is always N.C.

Value	Function
0	**Normally Open (N.O.)**
1	Normally Closed (N.C.)

Input Inversion (11x#)

8.6.11 Input Function (12x#)

This option is used to set the function for the Input *Gate*. If set to 0, the gate alarm will trigger if the gate is opened for longer than the Gate Entry/Exit Delay. If set to 1, the energizer will go into Low Power mode if this Input is closed.

By default, the input is set to *Gate*.

Value	Function
0	**Gate**
1	Low Power

Input Function (12x#)

8.6.13 Chime Mode (14x#)

This option allows the energizer's internal, and keypad, beeper to be used as a door chime for the gate switch. When set to *None*, the keypad beeper is used to indicate correct keypad operation only. When set to *Door Chime*, the beepers will sound when the gate switch opens, even if the energizer is disarmed.

If set to *Siren*, the beepers mimic the siren function. *Gate Beeps plus Siren* will give 2 beeps on Gate Open and 4 beeps on Gate Close, plus a continuous beep for an alarm. The beeps are from the keypad only, not from the internal beeper.

NOTE: *Gate* must be selected in option 12.

Value	Function
0	None
1	Door Chime
2	**Siren**
3	Fence Alarm
4	Gate Beeps plus Siren

Chime mode (14x#)

8.6.12 Gate Entry/Exit Delay (13x#)

This option sets the time between the gate switch opening and the siren sounding.

Value	Time
0	0 Seconds (immediate)
1	30 Seconds
2	**1 Minute**
3	2 Minutes
4	3 Minutes
5	4 Minutes
6	5 Minutes
7	6 Minutes
8	7 Minutes
9	8 Minutes

Gate Entry/Exit Delay (13x#)

8.6.14 Fence Mode (15x#)

This option sets Bi-Polar or Conventional modes.

Value	Function
0	Bi-polar
1	**Conventional**

Fence Mode (15x#)

8.6.15 Binary Options (16x#)

Each option in this table can be turned on by adding the corresponding value.

For option+ 1 set 16 to 01, for + 1 and +2 set 16 to 03.

+1: Enable cross coupled alarm, not used on Z series Energizers.

+2: Maximum power at all times. Note turning this option on may remove IEC standards compliance.

Value	Time
0	**None**
+1	Cross couple alarm
+2	Max Power
+4	2.5 Joules Limit
+8	IR Tamper enabled
+16	Stop slave on comms fail
+32	Do not send Alarm memory

Binary options (16x#)

+4: Limits outputs to 2.5 Joules per Zone on a Z28. Also limits a Z14 to 2.5J per zone in group mode.

+8: Enables the IR tamper detection under the lid. J3 changes function to inhibit tamper.

+16: Stop slaves on E-16 if the communications from the group master is lost.

+32: Stops the energizer sending Alarm Memory to a PC, relay PCB or keypad. Set this to restore "unlatched" mode on a PAE201 relay PCB.

8.6.16 Anti-Bridging Threshold (17x#)

Anti-bridging has been designed to detect a section of fence being bypassed, and removed, by an intruder bridging the adjacent fence sections together.

Setting this option to a value greater than 0 (default is 0 = off) will enable Anti-bridging, however this feature will not operate in low power mode!

While Armed, a Fence Alarm will trigger if the Fence Voltage rises OR falls quickly by more than the threshold. A slow change to the voltage will not trigger a Fence Alarm until the Voltage is less than the Fence Alarm Voltage (03x#).

The Anti-bridging Threshold is a percentage value of the current Fence Voltage.

For example, setting option 17 to 10 (1710#) will set a 10% Anti-bridging Threshold. At this level a fence (return) voltage normally reading 7.5kV will trigger a Fence Alarm if the voltage quickly rises to over 8.3kV or falls to less than 6.7kV.

NOTE: In order for this alarm to operate, Power Level (Option 1) must be set higher than the normal fence running voltage, otherwise if the load is released (fence bridged) voltage control will limit the voltage rise and the anti-bridging alarm will not activate. For the above example, Option 1 must be set to 7 or greater to allow the unloaded fence to rise to 8.3kV or higher, thus triggering the alarm.

8.6.17 *Auto Re-arm* Time (20x#)

This option sets the time which must elapse before another alarm will sound after the first alarm has timed out (gone completely through its cycles).

If an event occurs (such as a low fence voltage) which triggers the siren, any other events which would otherwise trigger the siren (such as a gate alarm) will be ignored while the siren is sounding and until after the *Auto Re-arm* time has passed.

A setting of 9 will disable *Auto Re-arm*.

Value	Time
0	**0 Seconds (Immediate)**
1	30 Seconds
2	1 Minute
3	2 Minutes
4	3 Minutes
5	4 Minutes
6	5 Minutes
7	6 Minutes
8	7 Minutes
9	Disabled – Do not auto rearm

Auto Re-arm Time Values (20x#)

If this time is set to less than the Siren Off Time, the energizer may re-arm in the *Off* time and the number of Siren Cycles will be reduced.

8.6.18 Relay Functions

All relays can be set to any of the available functions (user assignable).

Relay 1 is (**21x#**)
Relay 2 is (**22x#**) etc.
The modes are explained in the table alongside.

The defaults for the Z18 Mk2:

Relay 1 Siren
Relay 2 Strobe
Relay 3 Fence
Relay 4 Armed
Relay 5 General.

NOTES:

1. The siren and strobe switched 12V outputs can be used to drive external buffer relays.

2. Group relay functions are only operable on the group master.

Value (x)	Mode
0	**Fence 1**
1	Fence 1 or Off
2	Armed 1
3	Fence 2
4	Fence 2 or Off
5	Armed 2
6	Fence Bi-polar
7	General
8	Siren
9	Strobe
10	AC Fail
11	Low/Bad Battery
12	Tamper
13	Strobe 2
14	Gate
15	Siren caused by Gate
16	Armed in Low Power Mode
17	Group Armed – Note 2
18	Group General

Relay Functions

8.6.19 Relay Function Details
Some additional modes have been added to the relay functions as per table.

Function	Logic for alarm state (opposite of normal state)
Zone x	Zone x is on AND the fence voltage has fallen below the programmed fence alarm voltage for more pulses than the missed count setting. Not latched.
Zone x alarm or off	Zone x is *Disarmed* OR the fence voltage has fallen below the programmed fence alarm voltage for more pulses than the missed count setting. Not Latched.
Fence Bipolar	Energiser is Armed (Pulsing) AND the Fence Return Voltages on either Bi-polar return line has fallen below the Fence Alarm Voltage for more pulses than the Missed Pulse Count. Not latched.
Armed x	Zone x is *Armed*.
General	AC fail OR *Low Battery* OR *Internal Error* OR *Gate Alarm*. Latched for internal errors only.
Siren	*Fence Alarm* Or *Gate Alarm*. Will time out after the siren time out time. This function is latched.
Strobe x	As per siren but does not time out, will remain on until unit is disarmed. This function is latched. Also indicates gate alarm.
AC Fail	Alarm on *AC Fail.*
Battery	Alarm on low or bad battery.
Tamper	Alarm when the lid is up and J3 is not fitted.
Group wide x	Group relay functions are the collected status of the whole group of Z energisers. Group Armed for example is set only if all energisers in the group are armed.

Relay Functions

8.6.20 Group Mode (26x#)

A group must have only one master. The other units in the group are slaves. Group voltage display units require each slave to have a different number. Since the keypad bus is common among the group one keypad can be used to program all units for all options except this one. The procedure is:

Connect the keypad to each unit in turn, before linking all units into a group. Set this option: one unit as master the other as slaves.

NOTE: In some markets group mode may not be available.

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

Group Mode (26x#)

For details on group wiring and operation see page 30 Figure 5.

1. Make sure the key switch is turned off and *IN1* is not looped.
2. Connect the battery.
3. Connect the keypad.
4. On the keypad, enter [Installer's code] [*] [0] [#], then [26]. (Default Installer Code: 0 1 2 3 4 5.)
5. Enter the required value (e.g. [1] for master) then [#].
6. Enter [*] [#] to exit programming.
7. Connect the group using the keypad bus as per Figure 7.

NOTE: At this time groups are limited to a master and 14 slaves. Only one keypad can be used in Group Mode. If more slaves are required, use can be made of LAN network interface cards (PAE212).

Installation Programming Options

8.7 Diagram of Group Wiring

Z Series Energizer

Z Series Energizer

Keypad

LAN cable

PAE212

LAN cable

Master

Slave 1

Z Series Energizer

Z Series Energizer
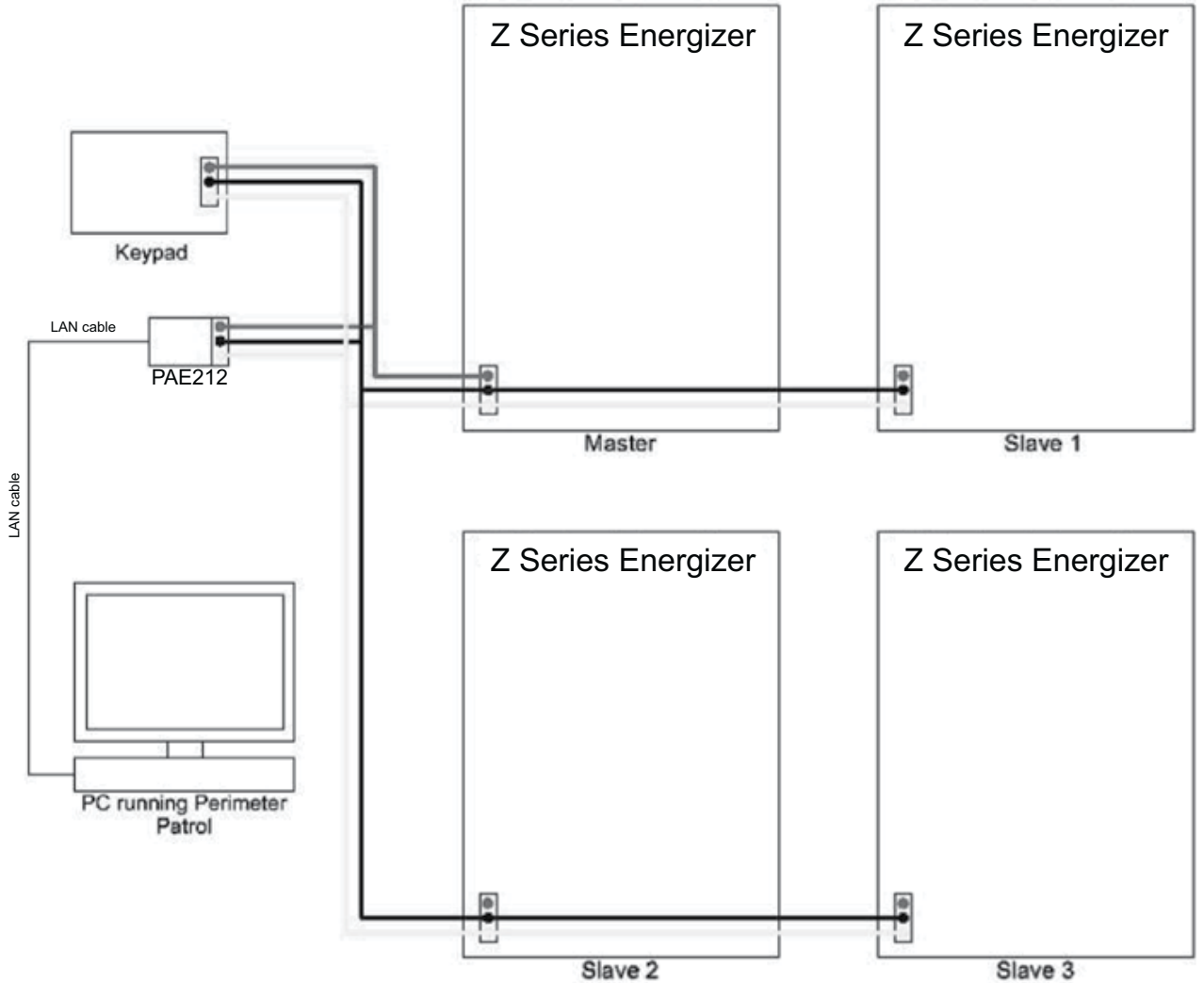
PC running Perimeter Patrol

Slave 2

Slave 3

Figure 5: Example of Group Mode Linking

9. ALPHA PLUS LCD KEYPAD FEATURES

All JVA Z series energizers, including the Z18 Mk2, now have support for up to three keypads. If more than one keypad is desired, one of the keypads must have an ID of 2. The other keypads can have an ID number from 1 to 8 but excluding ID 2. If only one keypad is desired, any ID number from 1 to 8 can be used.

9.1 Using the Alpha Plus LCD Keypad

The LCD keypad has two LED's: *Power* and *Arm*. They act as follows:

Power: *On* with Mains power, flashes on low battery.
Arm: On when the energizer is armed (pulsing);
        flashes when in *Low Power* mode.

All other indication is given via messages on the screen.

Whenever the keypad displays:

    ALARM ZONE
    FAULTED ZONE
or SYSTEM TROUBLE

pressing the [#] key will reveal more information, such as the name of the zone or the actual system trouble, e.g. *AC Fail*.

9.2 Changing the Keypad Messages and Address

The messages and each of the 15 zone labels can be changed.

● The *Dealer Message* displays when the system is on standby.
● *Zone Labels* displays after the [#] key is pressed during alarm memory or faults.
● The programmable *Service Message* is displayed during AC failure, fuse failure, communication failure, or low battery.

[1]	[2] Character up	[3] not used	Emergency not used
[4] ← Cursor left	[5] Next Message	[6] → Cursor right	Fire not used
[7]	[8] Character down	[9]	Panic not used
[*]	[0] Last Message	[#] Enter/Exit	Bypass not used

Keys Used For Changing Messages

Alpha Plus LCD Keypad Features

- To activate the *Keypad Programming Mode*, enter the [**Installer's Code**] [*] [0][1] [#]. Information may be entered into the keypad in the form of letters (upper and lower case), numbers (0–9), and 22 special symbols. All characters are displayed in the order: upper and lower case letters, numbers, and special symbols. The [Space] character precedes the letter A.
  NOTE: *The default Installer Code is 0 1 2 3 4 5.*

- To enter a Label, use the [2] key to scroll through the characters until you reach the desired character. If you scroll past the desired character, the [8] key may be used to scroll backwards. NOTE: *The space character is before the A character (When A is displayed, press [8] to get a space).*

- When the desired character is displayed, press the [6] key to move the cursor to the next character position. The [4] key moves the cursor to the left.

- When all characters have been entered, press the [#] key to enter the message and move to the next message position.

- Use the [0] key to move backward through the messages.
  NOTE: *If one moves to the next message using [5] instead of the [#] key, any changes made will be lost.*

The message order is:

- *Service Message* (Displayed under *System Trouble*)
- *Dealer Message* (Displayed under the standby message: *Ready to Arm*)
- *Soft Zone Identifiers* (A, B, and C) not used
- *Zone Identifiers*
- *Keypad Address*

  Up to three keypads may be used to remotely monitor and control the Z series security energizers.

  To operate correctly, each keypad must be configured to use a unique Keypad Address, see section 9.2 *Changing the Keypad Messages and Address*. This is best achieved by connecting one keypad, at a time, to the Master Energizer 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. The energizer now needs to be introduced to all of these keypads. This is achieved by resetting the energizer using the keypad (configured to Address 1), by pressing *68#. The power can also be removed to reset the energizer. After a reset, the energizer will determine what keypads are connected, and only these Addresses will be used in the future. This prevents un-authorised keypads being added to the system once it is running.

NOTE: Keypad Addresses

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 energizers. This also limits the number of keypads on the system to 2.

LCD keypads should NOT be set to Address 8 as Address 8 uses a different protocol specific to the LED keypad.

Energizers with firmware Version 7v84 or lower can only connect to two keypads. One of these must be configured to Keypad Address 2 to operate. The use of Perimeter Patrol further reduces the usable keypads to 1.

9.3 To Exit Keypad Programming

When you have finished programming, press [*] [#].

9.4 Other Keypad Functions

- ● To turn the backlight on or off. [*][8][#]
- ● To turn the audible feedback on or off. [*][5][1][#]

Alpha Plus LCD Keypad Features

10. SECTOR SETUP TESTS AND ADJUSTMENT

With a single sector system there are three considerations for the electric fence monitor voltage level:

1. The monitor <u>should</u> trigger the alarm if one of the live wires is shorted to ground.

2. The monitor <u>should</u> trigger the alarm if one of the live wires is cut.

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

10.1 Basic Fence Tests

1. Energise 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 there must be 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 they are not, a larger energizer may be required.

10.2 Fault Condition Tests

1. To simulate a break, disconnect a joint 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 live return wires. If so, reduce the induced voltage by placing a 3000 Ohm, 10 Watt resistor between the live return and earth return terminals (or from +ve to -ve in a Bi-Polar system) at the monitor.

3. Reconnect the live wires.

4. Place a short on the fence live wires.

5. Check that the monitor goes into alarm.

6. Remove the short.

11. SOME STANDARD REQUIREMENTS FOR ELECTRIC SECURITY FENCES

The JVA range of energizers has been extensively tested and certified in accordance with international standards. JVA does not take responsibility for the erection standards of the fence. It is the responsibility of the erector to consult and comply with the Standards and Codes of Practice for the installation and erection of electric security fences. For the user's convenience, we include some Standard Requirements here but the installer also needs to consult standards such as SABS 1063, 0142, SABS IEC 60335-2-76.

11.1 Definitions

Physical Barrier
A barrier of not less than 1.5m in height and intended to prevent inadvertent contact of persons with the conductors of the electric fence.

NOTE: Physical barriers are typically constructed from vertical sheeting, rigid vertical bars, rigid mesh or rods of chain wire mesh.

Public Access Area
Any area where persons are protected from inadvertent contact with pulsed conductors by a physical barrier (see above).

Pulsed Conductors
Conductors that are subjected to high voltage pulses by the energizer.

Secure Area
An area where a person is not separated by a physical barrier (see above) from pulsed conductors (see above) below 1.5m.

11.2 Installation, Operation and Maintenance

11.2.1 Electric security fences and their ancillary equipment shall be installed, operated and maintained in a way that minimises danger to persons, and reduces the risk of persons receiving an electric shock unless they attempt to penetrate the physical barrier, or are unauthorised to be in the secure area.

11.2.2 A space of 2.5m shall be maintained between uninsulated electric fence conductors or uninsulated connecting leads that are supplied from different energizers. This space can be less where the conductors or the connecting leads are covered by insulating sleeving, or consist of insulated cables that are rated to at least 10kV.

11.2.3 The requirement in 10.2.2 does not apply in cases where the separately energised conductors are separated by a physical barrier that has no openings greater than 50mm.

11.2.4 A vertical separation of not less than 2m shall be maintained between pulsed conductors fed from different energizers.

11.2.5 Mains supply wiring shall not be installed in the same conduit as signalling leads associated with the electric security fence installation, but shall be installed in accordance with the requirements given in SABS 0142.
* NB. *(Fence HT leads must under no circumstances be routed in the same conduit as any other wiring.)*

11.3 Warning Signs

NOTE: Regulation warning signs are available from all JVA Electric Fence centres and all JVA certified dealers.

11.3.1 Electric security fences shall be identified by prominently placed warning signs that shall be legible from the secure area and from the public area.

11.3.2 Each side of the electric security fence will have at least one warning sign.

11.3.3 A warning sign shall be placed:
   a. at each gate
   b. at each access point
   c. at intervals not exceeding 10m
   d. adjacent to each sign with regard to chemical hazards, for emergency services information.
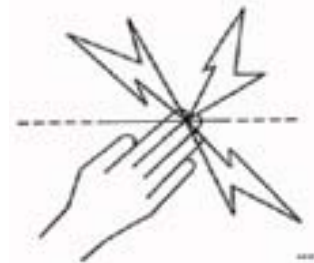
11.4 Gates

Gates in electric security fences shall be capable of being opened without the person who is operating the gate receiving a shock.

11.5 Earthing

11.5.1 Where an electric security fence passes below bare power line conductors, the highest metallic element shall be effectively earthed for a distance of not less than 5m on either side of the crossing point.

11.5.2 The distance between any electric fence earth electrode and other earth systems shall be not less than 10m, except when the earth system is associated with a graded earth mat. The earth electrode shall comply with SASS 10611. Amendment 1, Deco 2000 1.

11.5.3 All exposed conductive parts of the physical barrier shall be effectively earthed.

Some Standard Requirements

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11.6 Protection

11.6.1 All ancillary equipment connected to the fence circuit shall be designed to provide a degree of isolation between a fence circuit and the supply mains equivalent to that specified for the energizer.

11.6.2 Protection from weather shall be provided for the ancillary equipment unless the equipment is certified by the manufacturer as being suitable for use outdoors, and is of a type with a minimum degree of protection IPX4 (protected against splashing water).

Power line voltage	Minimum clearance
<1 000	3m
>1 000 and <33 000	4m
>33 000	5m

Fence to Powerline Minimum Clearance

Some Standard Requirements

Figure 6
Typical constructions where the electric security fence is exposed to the public.
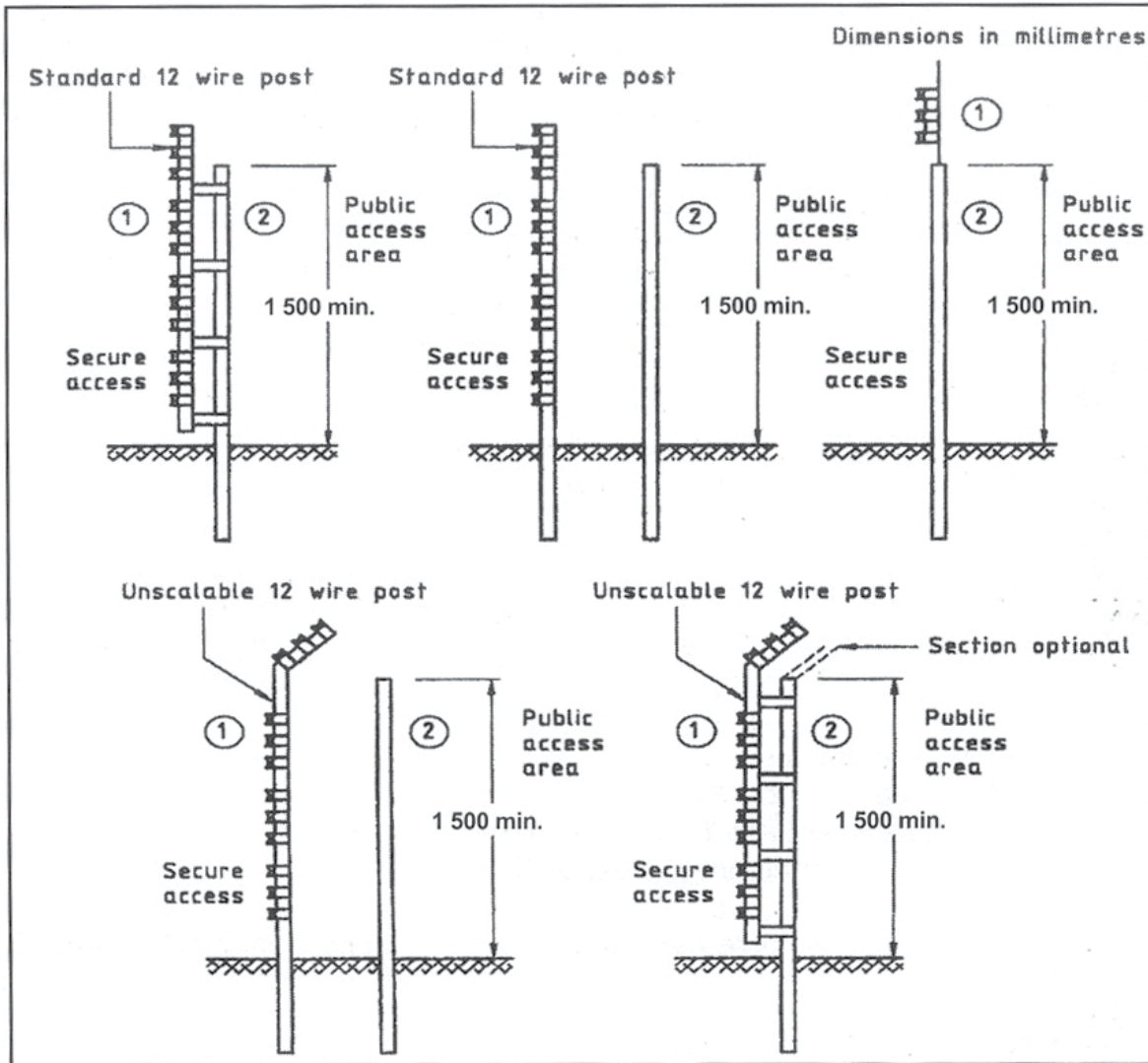
Some Standard Requirements

Figure 7
Typical fence constructions where the electric security fence is installed in windows and skylights.
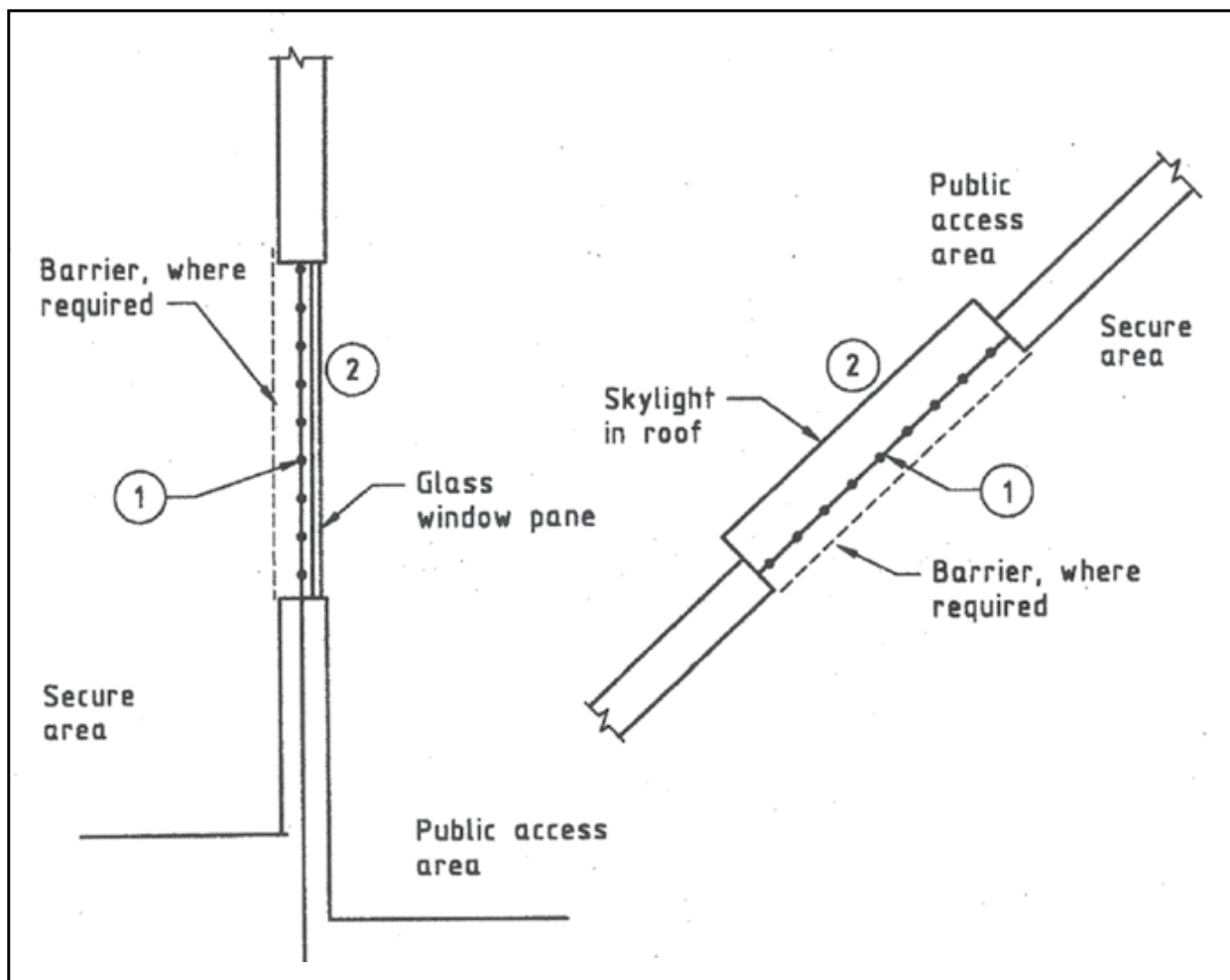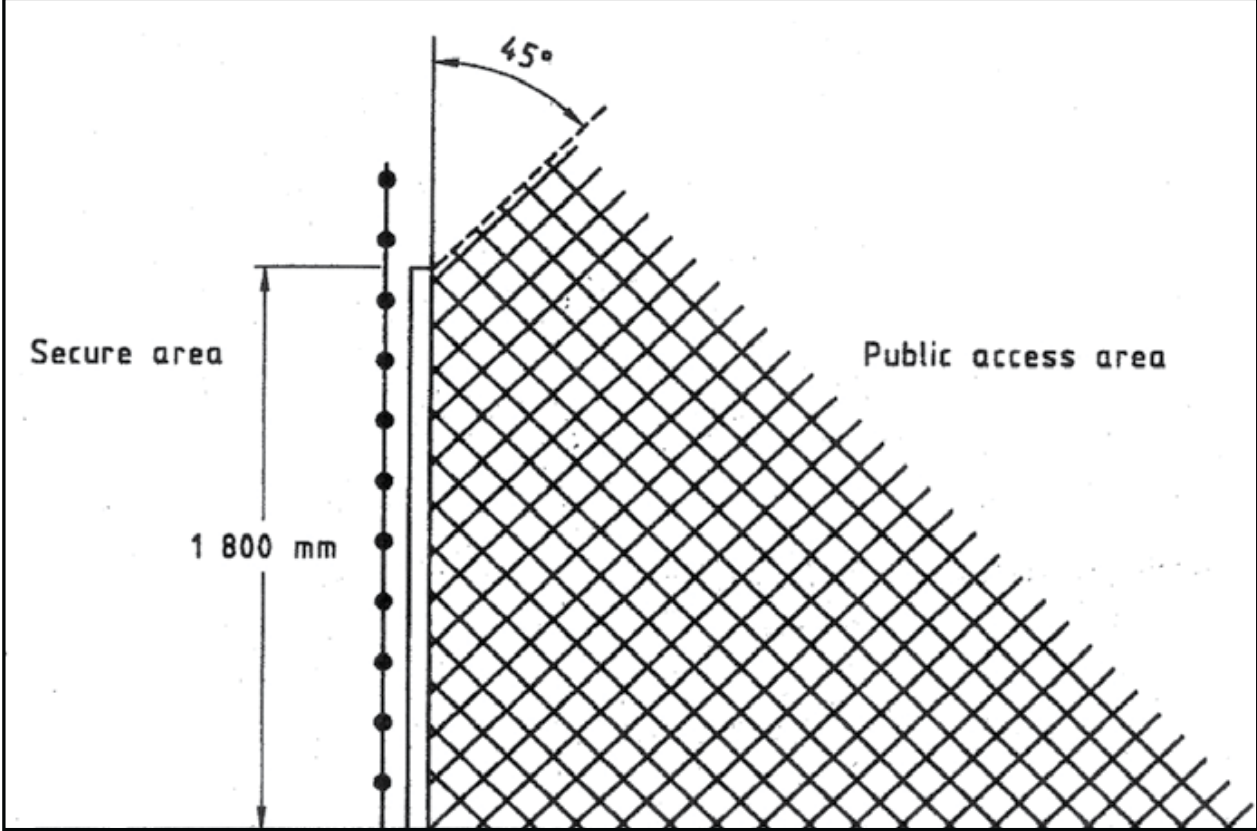
Key: ① Electric security fence   ② Physical barrier

Figure 8
Prohibited zone for pulsed conductors.

Key: •–•–•– Electric security fence ☐ Physical barrier ⬚⬚⬚ Prohibited zone

12. 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
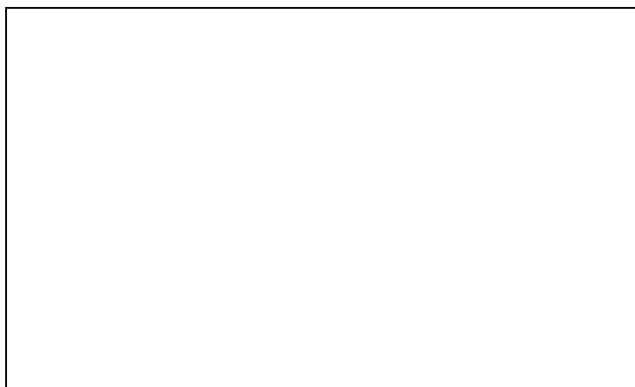
Mail to:

Your local JVA Dealer
SA JVA Service Department P.O. Box 13898, Cascades 3202

Warranty

TEST Africa

The Leader in Safety Testing

Company :	**Ndlovu Fencing (Pty) Ltd t/a JVA Technologies**
Sample :	JVA, Z13 / Z18 / Z28 Fence Energizers
Specification:	SANS 60335-2-76:2006 & IEC 60335-2-76:2002 & A1:2006 SANS 60335-1:2007 & IEC 60335-1:2006
Report Number:	WCT 10/1472
Date of Issue:	2010-12-14

The sample complied with all the requirements of the above- mentioned specification.

NOTES

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CUSTOMISED CODES

Customer Pin No. ....

Installer Pin No: ....

INSTALLER DETAILS

Name ....

Phone No. ....

Date Of Installation ....

ANNOUNCING THE UPGRADE OF THE JVA Z18 TO THE JVA Z18 Mk2

We are delighted to inform you that JVA has produced a new improved version of the JVA Z18 – the JVA Z18 Mk2. This new model has many new features to give customers more security benefits:

- Bi-Polar operation – to enable all-live fences
- 3 relays on board – all programmable to monitor more and various conditions
- Tamper/Safety switch detection – Checks if the lid is removed
- Can also be operated from two keypads
- And more general improvements to the product.

These improvements have occasioned some changes to the Z18 Manual. While the new manuals are being printed to reflect these improved features please be aware of the following when using the Z18 manual to install your new upgraded model.

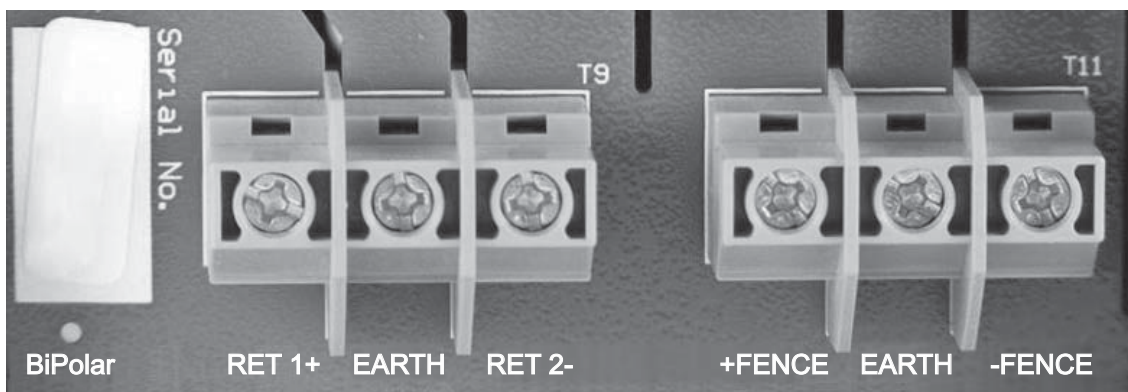**Page 5**   **3. SPECIFICATIONS**

Please note that:

- the 12v DC power consumption is as follows:
  Energiser On – 870mA average, 1220mA peak
- the Battery charger float voltage is now 14v, 700mA
- the recommended operating temperature is from -15°C to +50°C.

Page 6   **4.2 High Voltage Terminals**
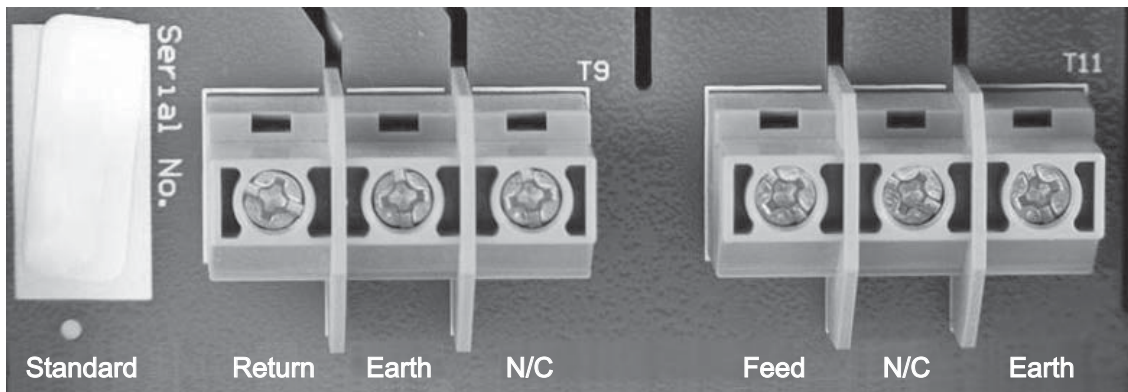
*High Voltage (Fence) Terminals in Conventional Mode*

High Voltage (Fence) Terminals in Bi-polar Mode

Page 8   4.4 Status Lights

- The fence status light flashes green when the energiser is armed and the voltage is good; flashes red if the voltage falls below the *Fence Alarm Voltage*; stays red when there is a fence alarm condition.
- The gate status light flashes red when the gate is open; stays red when there is a gate alarm condition.
- Fence and gate LEDs are latched on (like the strobe) until cleared, using the clear alarm memory sequence (*1#), or until the energiser is rearmed.
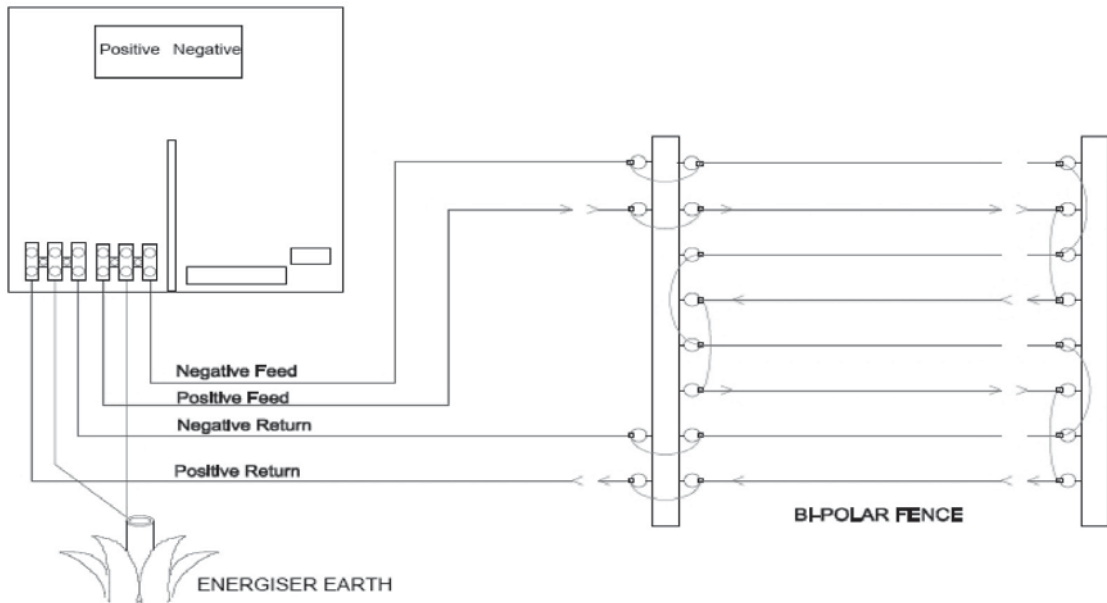
4.5 Inputs and Outputs
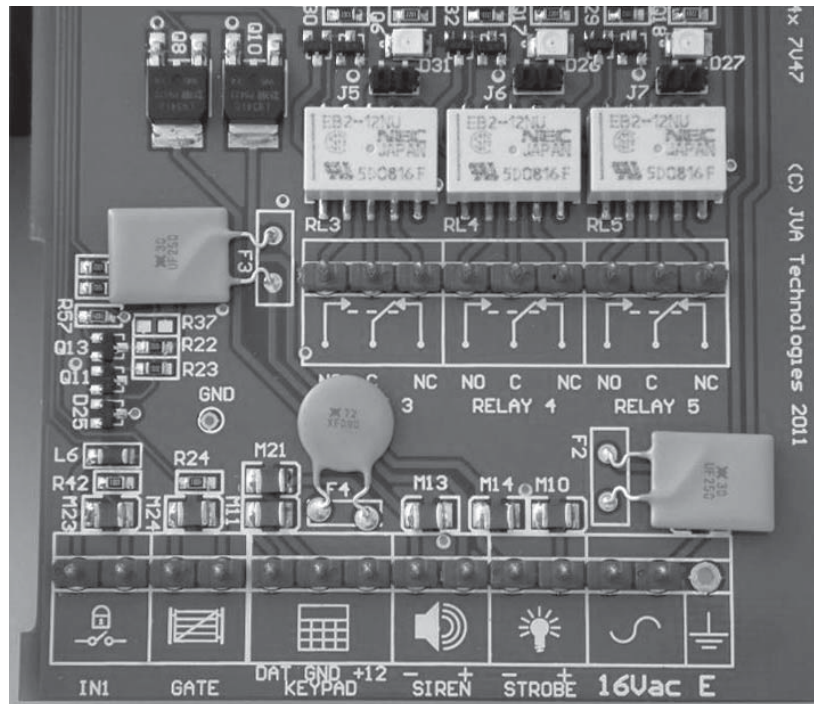
New low voltage connector layout – Note the extra 3 relay outputs

Page 13   5.2 Example fence wiring diagram
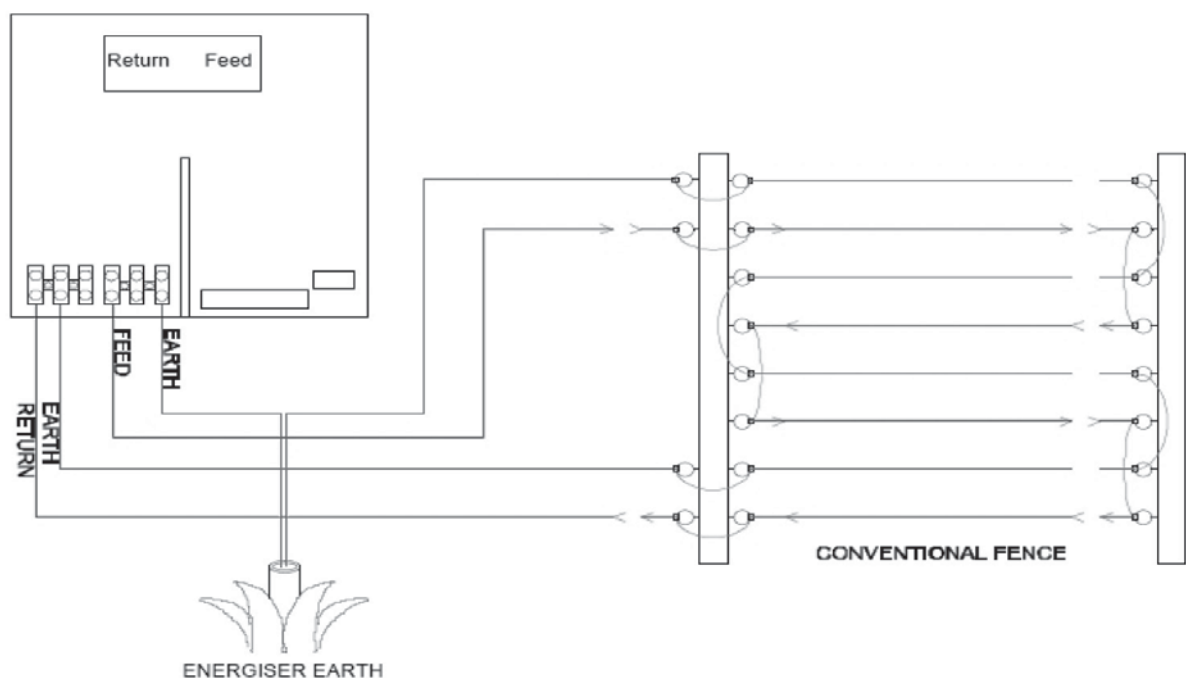
Example Fence Wiring Diagram, Conventional – Live & Earth

Page 13   **5.2 Example fence wiring diagram**

Example Fence Wiring Diagram, Bi-polar – All Live

Page 17   **7. TECHNICAL INFORMATION**

Please refer to the New Low Voltage diagram above (Section 4.5).

Page 18   **7.2 Status Codes**

• Interpretation of Status LED 1 flash is *Tamper detected*. Corrective action is to *Fit the lid*.

7.3 Jumpers

• Jumper J3 also disables the new infrared Tamper/Safety feature, if it has been enabled by programming sequence 168#.

• The new Tamper/Safety circuit serves two functions. It protects service personnel from receiving a shock by disarming the energiser when the lid is removed. It also sounds an alarm when the lid is removed while the energiser is armed. 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 energiser lid needs to have a small piece of reflective material above the IR tamper circuit, and the Tamper function must have been enabled by programming sequece 168#.

Page 21   **8.6.1 Power Level (01x#)**

The Z18 Mk2 has improved programmable voltage control indicated by this new table.

Value (x)	Voltage Conventional Mode	Voltage Bi-Polar Mode
0	5.0kV	2.5kV
1	5.5kV	2.8kV
2	6.0kV	3.0kV
3	6.5kV	3.3kV
4	7.0kV	3.5kV
5	7.5kV	3.8kV
6	**8.0kV**	**4.0kV**
7	8.5kV	4.3kV
8	9.0kV	4.5kV
9	9.5kV	4.5kV

Table 16 – Power Level Values

Page 22   **8.6.7 Battery Alarm Voltage (07x#)**

The new default battery alarm voltage is 10 volts.

Page 24   **8.6.14 Chime Mode (14x#)**

Note the changes to the chime mode functions in the new table. If set to *Siren*, the beepers mimic the siren function. *Gate Beeps plus Siren* will give 2 beeps on Gate Open and 4 beeps on Gate Close, plus a continuous beep for an alarm. The beeps are from the keypad only, not from the internal beeper.

Value	Function
0	None
1	Door Chime
2	**Siren**
3	Fence Alarm
4	Gate Beeps plus Siren

Auto Re-Arm Time (20x#)

This option sets the time which must elapse before another alarm will sound after the first alarm has timed out (gone completely through its cycles).

If an event occurs (such as a low fence voltage) which triggers the siren, any other events which would otherwise trigger the siren (such as a gate alarm) will be ignored while the siren is sounding and until after the *Auto Re-arm* time has passed.

A setting of 9 will disable *Auto Re-arm*.

If this time is set to less than the Siren Off Time, the energiser may re-arm in the *Off* time and the number of Siren Cycles will be reduced.

Setting 0 was changed to immediate in version 7.77.

Value	Time
0	0 Seconds (Immediate)
1	30 Seconds
2	1 Minute
3	2 Minutes
4	**3 Minutes**
5	4 Minutes
6	5 Minutes
7	6 Minutes
8	7 Minutes
9	Disabled – Do not auto rearm

Auto Re-arm Time Values (20x#)
Values for Firmware 7.77 and above

Page 25   **8.6.16 Relay Functions**

Some additional modes have been added to the relay functions as per table.

Defaults for Z18 Mk2:

- Relay 1 – Siren
- Relay 2 – Strobe
- Relay 3 – Fence
- Relay 4 – Armed
- Relay 5 – General

Value (x)	Mode
0	Fence 1
1	Fence 1 or off
2	Armed 1
3	Fence 2
4	Fence 2 or off
5	Armed 2
6	Fence Bi-Polar
7	General
8	Siren
9	Strobe
10	AC Fail
11	Low/Bad Battery
12	Tamper
13	Strobe 2
14	Gate 1 or 2
15	Siren caused by Gate 1 or 2
16	Armed in Low Power Mode

Page 28   **9. KEYPAD FEATURES**

All JVA Z series energisers, including the Z18 Mk2, now have support for up to three keypads. If more than one keypad is desired, one of the keypads **must** have an ID of 2. The other keypads can have an ID number from 1 to 8 but excluding ID 2. If only one keypad is desired, any ID number from 1 to 8 can be used.
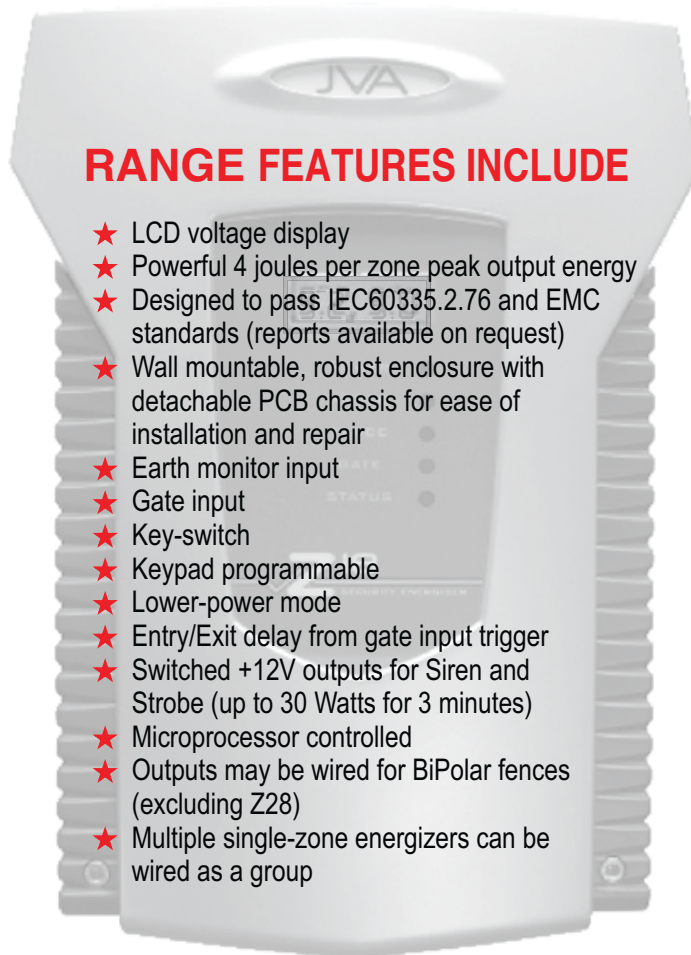
Z-RANGE

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
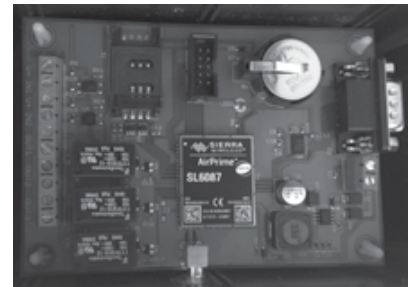
GSM MONITORS AND CONTROLS JVA ENERGIZERS USING A CELL PHONE

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 **AUSTRALIA**

JVA **AFRICA**

JVA **NEW ZEALAND**

JVA **LATINO AMERICA**

JVA **CARIBBEAN**

JVA **SOUTH EAST ASIA**

JVA **EUROPE**

JVA **RUSSIA**

JVA **INDIA**

JVA **USA**

JVA **MEXICO**

JVA **CENTRAL ASIA**

JVA **UNITED KINGDOM**

JVA SA SERVICE CENTRES

East Rand (Jet Park)
Aerostar Business Park
219 Jet Park Road, Jet Park
Tel: 011 397 3507

North Rand (Kya Sand)
174 Bernie Street
Randburg
Tel: 011 708 6442

West Rand (Roodepoort)
602 Ontdekkers Road
Delaréy, Roodepoort
Tel: 011 472 8823

Pretoria
1185 Steve Biko Road
(977 Voortrekker Road)
Wonderboom South
Tel: 012 335 4290

Kimberley
29 Schmidtsdrift Road
Tel: 053 861 5631

Cape Town
Unit 15, Viking Business Park
Viking Way, Epping Industria
Tel: 021 534 5056

Polokwane
19A Suez Street
Nirvana
Tel: 015 292 6273

Nelspruit
D1 Waterfall Park
15 Rapid Street
Riverside Industrial Park
Tel: 013 752 7152

Bloemfontein
36 Kolbe Lane
Tel: 051 448 6695

Pinetown
Unit 1, 7 Suffert Street
Tel: 031 702 6351

Rustenburg
1 Howick Avenue, Shop 7, Waterfall Mall
Tel: 014 537 2884

Durban North
Shop 11, Arcadia Centre
87 Umhlanga Rocks Drive
Tel: 031 563 0274/
      031 563 6478

Pietermaritzburg
51 Winston Road
Tel: 033 342 6727

Port Elizabeth
45 Mangold Street
Newton Park
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Shop 3, 57 York Road
George
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