Z28 SECURITY ENERGIZER

Installation and User Manual

Edition 2.1, 2013

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 43.

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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:

DEMARCATION – The JVA fence around your property shows you mean business.
DEFLECTION – Would-be intruders will be deflected to softer targets.
DETERRENCE – The safe, powerful JVA shock is a strong deterrent to intruders.
DELAY – The physical barrier will delay an intruder, something they do not like.
DETECTION – The JVA's voltage monitor warns you of any tampering with the fence.
DENY – A well-erected electric security fence will deny entry.
DEPENDABLE – 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

2. FEATURES

2.1 Power

- 8 joules peak output energy (4 + 4 Joules = 8 Joules total)
- Mains powered via external transformer (16–18Vac)
- Battery charger with space for internal 7A/H 12V rechargeable back up battery

2.2 Control / Monitoring:

- 3 Control inputs which can be configured to take N.O. or N.C. control contacts.
- 3 12V driven outputs (also referred to as relays), high side switched (common negative)
- 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

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
- Built-in 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	2 × 4 Joules
Pulse Rate	Locked at 0.9 Hz
12v DC Power Consumption	Energizer On – 1005mA average, 1220mA peak Energizer Off – 28mA Not including keypad or Auxiliary power
AC Power Input	16-18Vac 1.5A*
Battery Charger Output	Float voltage 14V, 700mA, short circuit protection, reverse battery protection
Switched Outputs	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	2.5kg

* 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 Energiser reports this fault

- There are no user-serviceable parts in this unit.
- There are potentially lethal high voltages inside the Z Series energizers.
- The high voltage inside the Z Series Energisers 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 energiser be disarmed and an intentional short circuit is placed from the fence live wires to earth. This is a sensible precaution against the energiser being turned on by others or malfunctioning while working on the fence.
- If an electric fence is part of a multiple energiser system and the distance between two separate electric fences, each powered by separate energisers, is less than 2.5 meters, the energisers must be configured to operate in group mode.

4. DESCRIPTION

The Z28 is a dual channel standard (non Bi-Polar) 8 Joule (4 per channel) 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 Z28 Exterior

Figure 1: Z28

4.2 JVA Z28 – High Voltage Terminals

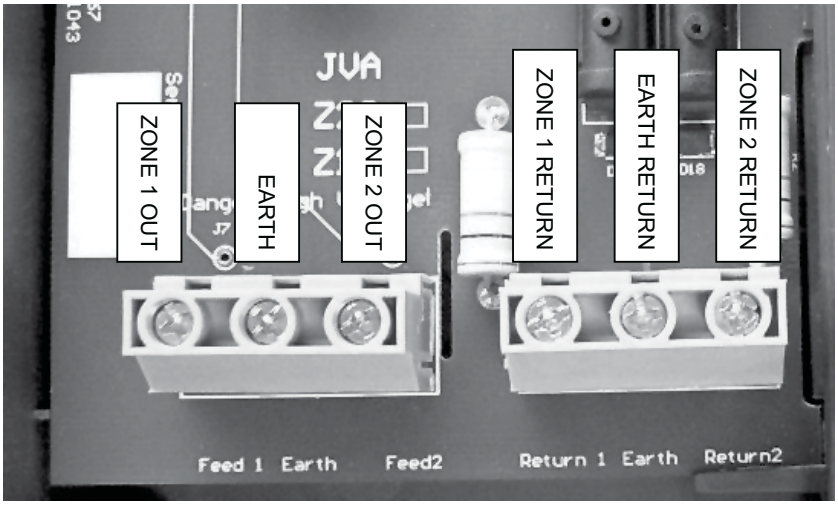


Figure 2: Output Terminals

4.3 LCD Voltage Display

The display on the JVA Z28 shows the voltage at the feed out and return terminals.

Left side = Return zone 1, Right side = Return zone 2.

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

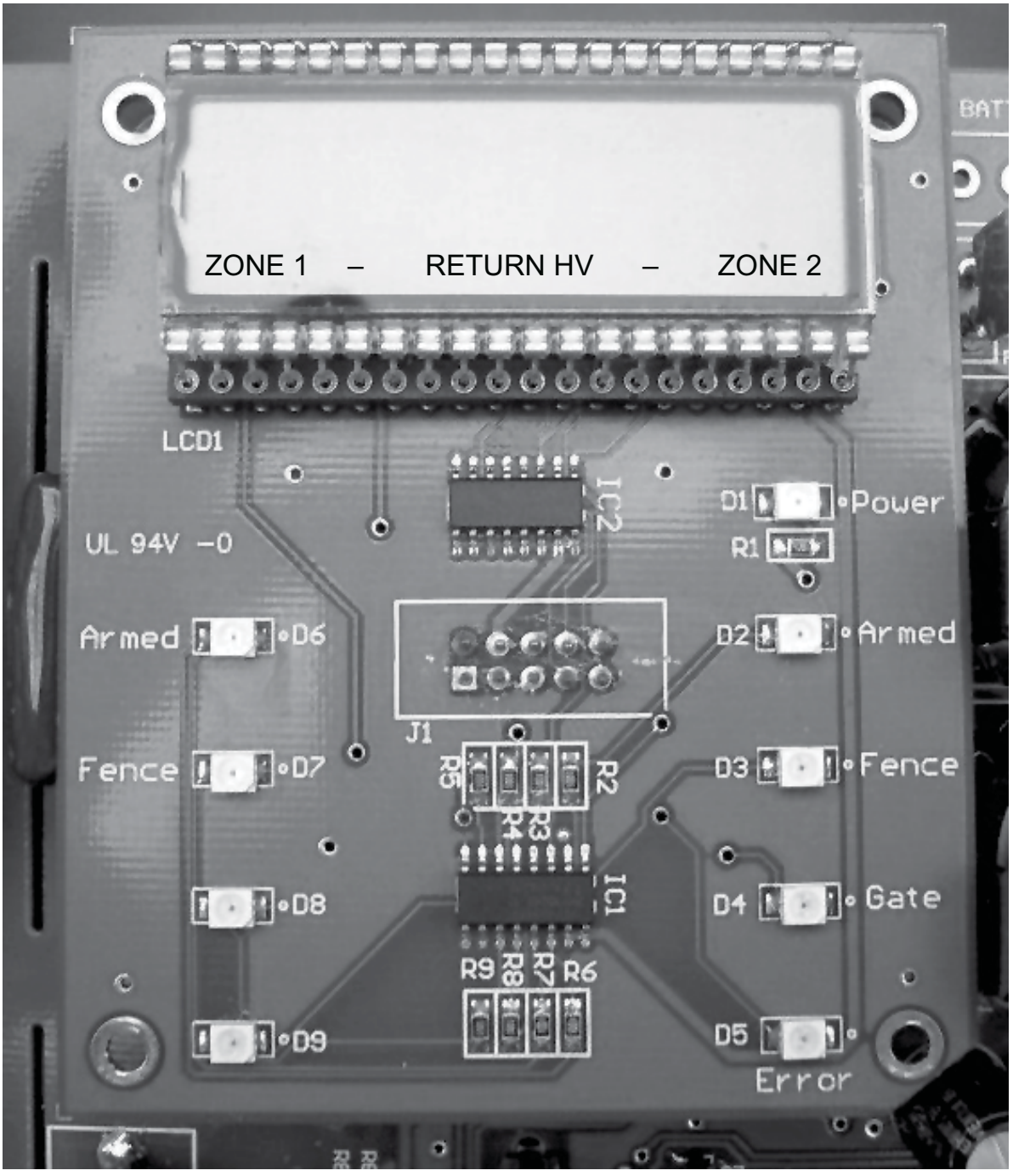


Figure 3: LCD Display and Status LEDs

4.4 Status Lights

Left side Z28

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.

Right side Z28

Power	*On* whenever the energizer has power.
Armed 2	*On* when Zone 2 is armed (pulsing), will flash when in low power mode.
Fence 2	Flashes if the return voltage falls below the Fence Alarm Voltage, stays on when there is a Zone 2 fence alarm.
Gate 2	Flashes Red when the Gate is open, stays Red when there is a Gate 2 alarm.
Status	Flashes an error code for energizer (service) errors. See the table in section 7.2 Status LED Error Codes.

NOTE: Fence and Gate LEDs are latched on (like the strobe) until cleared using the clear alarm memory sequence (*1#) or the Energiser is re-armed.

4.5 Inputs and Outputs

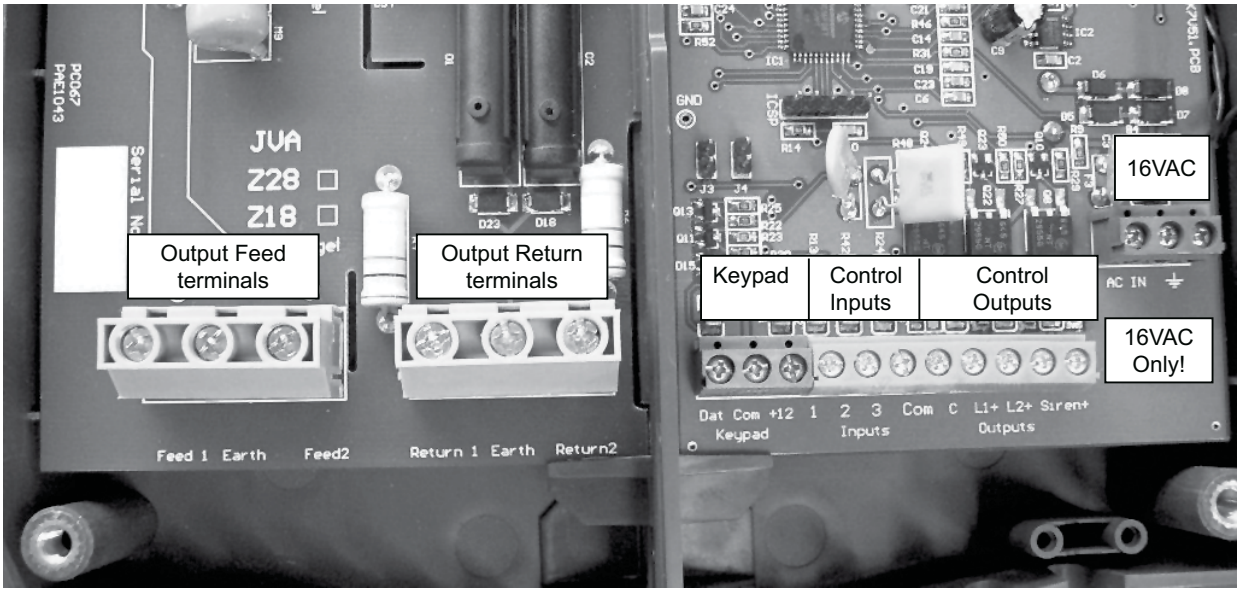


Figure 4: Connection Terminals

4.6 Keypad (Optional)

Up to three keypads can be used to remotely monitor and control the Z28. A keypad is required to set the programmable options. See section 8.5. The keypad will display the fence voltages, alarms and statuses.

Figure 5: LCD Keypad

4.7 Keypad Lights

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

NOTE: There is no panic function currently implemented.

For information on how to control the Z28 via the keypad see section 6.

4.8 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 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.

4.9 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. A minimum distance of 30mm should be kept between High Voltage and Low Voltage cables.

4.10 Lightning Protection

Although the Z28 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.

4.11 Earth Loop Monitoring

The Z28 has two fence earth terminals which when wired into a series looped fence system enable the energizer to monitor the earth circuit. In this configuration, only one earth spike location must be used. 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.

4.12 Noise and Interference

The Z28 contains a microprocessor. Extreme electrical noise can upset microprocessors. 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 Z28 is designed to self-recover from interference, powering off (both AC and battery) should not be necessary.

4.13 Programmable Options

The Z28 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 20. Each parameter has a factory set default.

4.14 Low Power Mode

Z28 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 20 for details on using the keypad to set low voltage mode.

4.15 Control Inputs

4.15.1 Control Inputs

The Z28 has 3 control inputs. These default to:

Input 1 – Arm/Disarm
Input 2 – Gate 1
Input 3 – Gate 2 or low voltage mode input.

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

If the unit is disarmed, the gate input may be set to chime mode. See *Programming Options in Brief* on page 21.

NOTE: If not used, the Gate 1 and Gate 2 inputs must be bridged to the *Com* terminal.

Inputs 2 and 3 can be configured for other functions. See *Programming Options in Detail*, Option 12.

4.15.2 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 section 9, option 14.

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.

4.16 Group Simultaneous Pulse Feature

All JVA Z Range models may be linked to form a group to power multiple zones. See *Group Mode*, page ??.

5. INSTALLATION

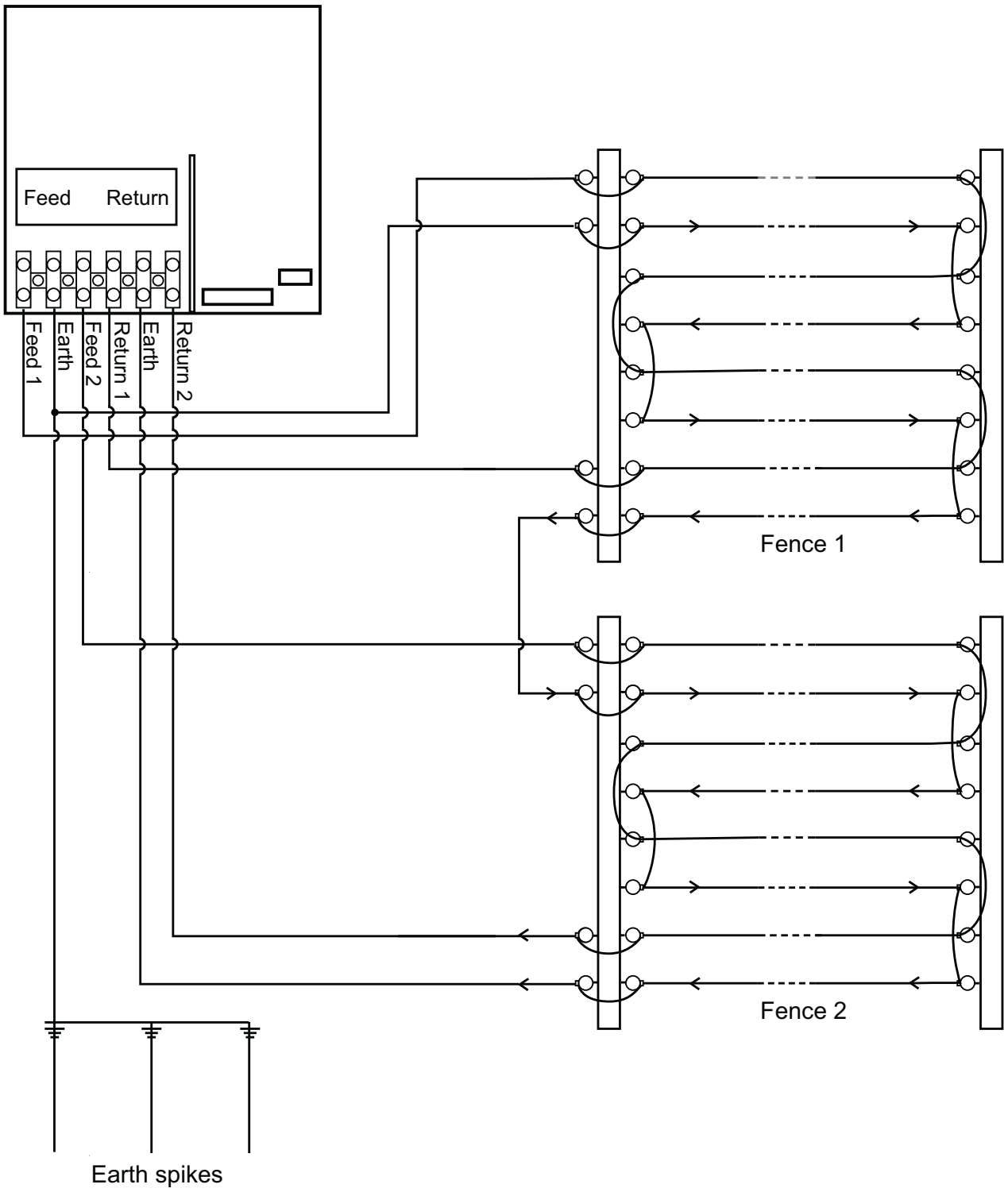
JVA recommends installation by qualified technicians.

5.1 Installation Steps

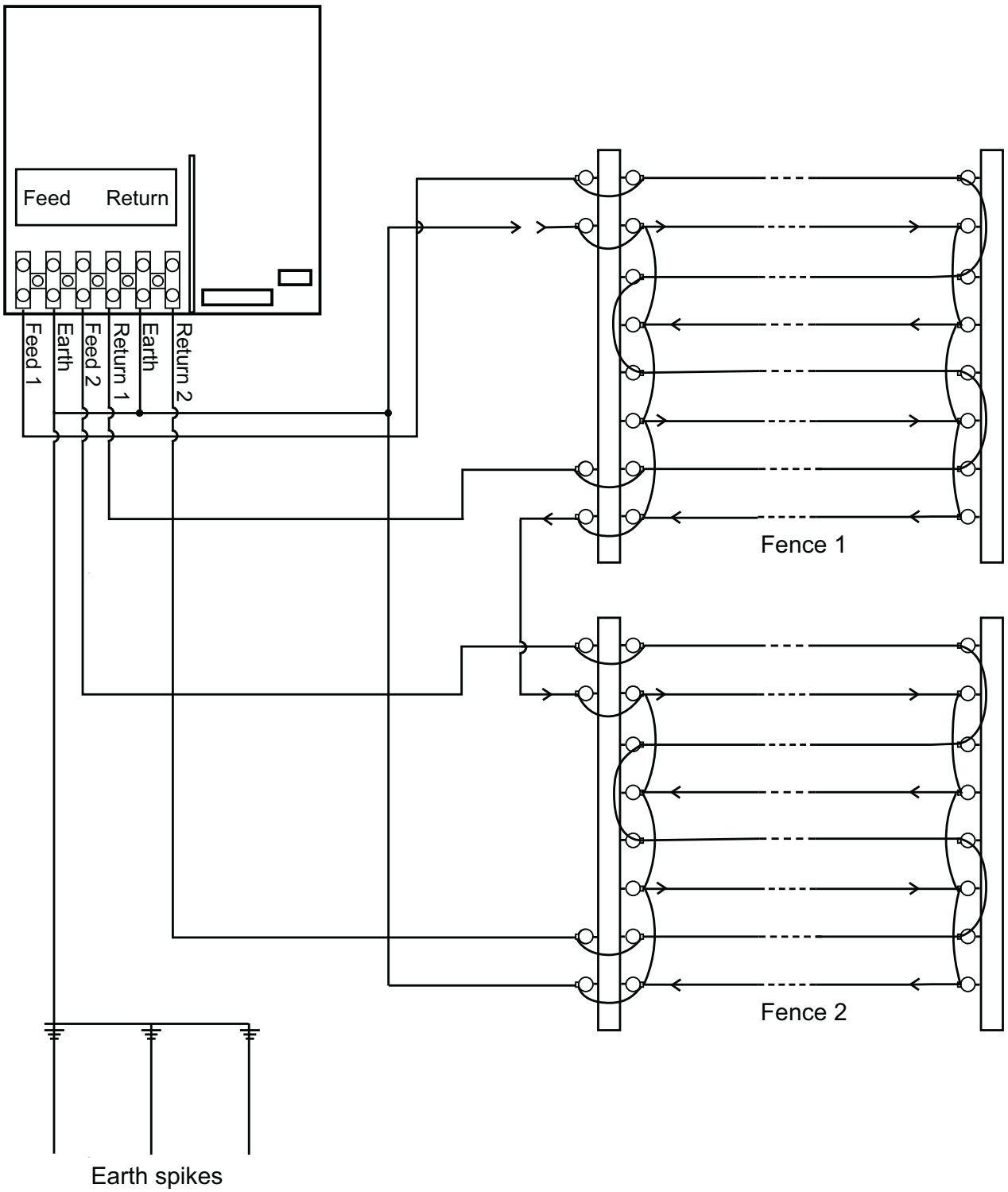
1.	Read the entire manual first!
2.	Design and build the fence. (Beyond the scope of this manual.)
3.	Decide where the JVA Z28 is to be mounted. If on an external wall it should be housed within a waterproof equipment box and definitely not in direct sunlight.
4.	Mount the unit by hanging the housing 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 8)
7.	Wire the high voltage cable to the PCB terminals*. (See page 8) 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 Z28 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.
13.	Arm and disarm the energizer via the keyswitch or keypad, if fitted. The *Status* LED should stop blinking.
14.	If using a keypad, type *68#. The keypad will analyse the zones.
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.	On handing the system over to the owner/user, explain how to change the user PIN. Leave a User Manual with the user.

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

5.2 Example Fence Wiring Diagrams



JVA Z28 Energizer Fence Wiring, Including Earth Monitoring



JVA Z28 Energizer Fence Wiring, without Earth Monitoring

6. OPERATION

6.1 Arm/Disarm Control

The unit can be controlled by the keyswitch, 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. 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; default is 1 2 3 4) 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, zone 1 or zone 2 LEDs 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 control input 2, if it has been programmed accordingly.

6.4 When an Alarm Occurs

If the system is armed and the fence is tampered with, the corresponding *Zone 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 input 2 is assigned to the “gate input” function and the gate input is opened and the 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.

6.5 To Silence the Alarm

- Enter your **USER PIN** and press **#**. This will silence the alarm but not disarm the system; the *Armed Light* will still be on. If *Auto-Rearm* is set, the system will be ready for the next alarm. Note that the following functions have an effect on alarm timing: Siren On time, Siren Off time, Siren Cycles, Auto Re-arm time).
- 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 **USER PIN** and press **#** again. The zone light will remain lit until the Clear Alarm Memory command (*1#) is entered.
- Alternatively, disarming using the key switch will reset the alarm.

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 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. 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 *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 7.2 (page 19).

7. LCD KEYPAD OPERATION

7.1 Arming/Disarming the Fence Using the Keypad

Enter your USER PIN (Personal Identification Number: four digits long) and push the # key. Make sure the red ARM light comes on and the keypad beeps 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.

To disarm the system enter your USER PIN and press #.

NOTE: If there is an alarm sounding you will need to enter your PIN twice, once to silence the alarm and once more to disarm.

7.2 Keypad Status Display

In normal operation the keypad shows a continuous summary of the system status. For example if the system is disarmed the keypad will display “Ready to Arm”.

If the system is armed then the keypad will display the voltages for each zone in the system.

Since there can be many things to display the keypad automatically “scrolls” through all relevant detail. Each screen is show for about 2 seconds. If you wish to hold the display at a particular point simple press the [#] key. The auto scrolling will stop for about 20 seconds.

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

If a new trouble (AC fail, low battery etc) or alarm occurs, the keypad screen will jump to the relevant zone, the keypad will beep (unless toggled off) and auto scrolling will cease for about 3 minutes.

7.3 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 display after the [#] key is pressed during alarm memory or faults.

The programmable Service Message is displayed during AC failure, communication failure, or low battery.

7.3.1 Keys used for changing messages:

[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

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.

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 you move to the next message using [5] instead of the [#] key you will lose any changes you made!

To change the keypad address, scroll through the messages until the keypad displays: "Keypad address __" then change the value by pressing [2] (up) or [8] (down). Validate by pressing [#].

The message order is:

- SERVICE MESSAGE (Displayed under "SYSTEM TROUBLE")
- DEALER MESSAGE (Displayed under the standby message: "READY TO ARM")
- ZONE NAMES
- BAUD RATE (should be left at 2400)
- KEYPAD ADDRESS (should be left at 1)

7.3.2 To Exit Keypad Programming

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

NOTE: The keypad will also exit the programming mode if you do not press any key within a five minute period.

To return the Keypad to default settings press the emergency button  during power up. This feature was added in keypad firmware version 1.2.

7.3.3 Connecting Multiple Keypads to a system

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

To operate correctly, each keypad must be configured to use a unique KEYPAD 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 energiser using the keypad (configured to ADDRESS 1), by pressing [USER PIN]*68#. Alternately 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 unauthorised keypads being added to the system once it is running.

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.

7.3.4 Notes Regarding Keypad Configuration

Zone 1 (the master) must be connected to the group. If it is not connected the other energisers in the group will not send status packets to the keypad. The status packets contain voltage and alarm information which the keypad displays. If Zone 1 is not connected, the keypad will report a communications failure with all the zones.

A Slave Energiser disconnected from the Group will only talk to a Keypad if it has a KEYPAD ADDRESS of 1. When adding/removing an energiser to/from the group, be sure to re-analyse the group using the key sequence *68#. Zone 1 (the master) must be connected to the group for this operation to work.

When re-analysing a group ensure all energisers are disarmed. If they are not this function will not work properly.

NOTE: If the group ID has recently been changed you may need to reset ([PIN]*68#) before the new ID’s will be properly reported to the keypad.

7.5 Summary of LCD Keypad Functions

Function	Key Sequence
Arm/Disarm	[USER PIN][#]
Silence an alarm (Single zone system only)	[USER PIN][#] Note 1
Start Programming the Z series energiser	[Installer PIN][*] [0] [#]
Start Programming the Keypad	[Installer PIN][*] [0] [1] [#]
Exit Programming (any mode)	[*] [#]
Change a USER PIN, 4 Digits	[USER PIN][*]0[#][New PIN]#
Change the Installer PIN, 5 Digits	[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 x, where x is any zone number up to 15	[USER PIN][*][1][x][#]
Disarm All Zones	[USER PIN][*][2][0][#]
Disarm Zone 1 or Master	[USER PIN][*][2][1][#]
Disarm Zone x, where x is any zone number up to 15	[USER PIN][*][2][x][#]
Switch to low power mode (all zones)	[USER PIN][*][4][1][#]
Switch to high power mode (all zones)	[USER PIN][*][4][2][#]
Arm Gate circuits only	[USER PIN][*][4][#]
To change the Keypad Messages to English	[*][3][1][#]
To change the Keypad Messages to Spanish	[*][3][2][#] (not well supported yet)
Keypad Audible Feedback On/Off	[*] [5] [1] [#]
Keypad alarm beeper (Chime) On/Off	[*] [5] [3] [#]
Keypad Error Tones On/Off	[*] [5] [4] [#]
Backlight mode On/On with keys/Off	[*] [8] [#]
Display Keypad Model	[*] [9] [#]
Re-analyse the group	[*][6][8][#]
Reset and Display firmware version number	[USER PIN][*][6][8][#] Note 3
Reset and return to factory defaults	[Installer PIN][*] [6] [8] [#]
Power Boost	[*] [9] [9] [#]
Siren test	[*] [6] [3] [#]
Battery test	[*] [6] [4] [#]
Clear Alarm memory	[*] [1] [#]

8. TECHNICAL INFORMATION

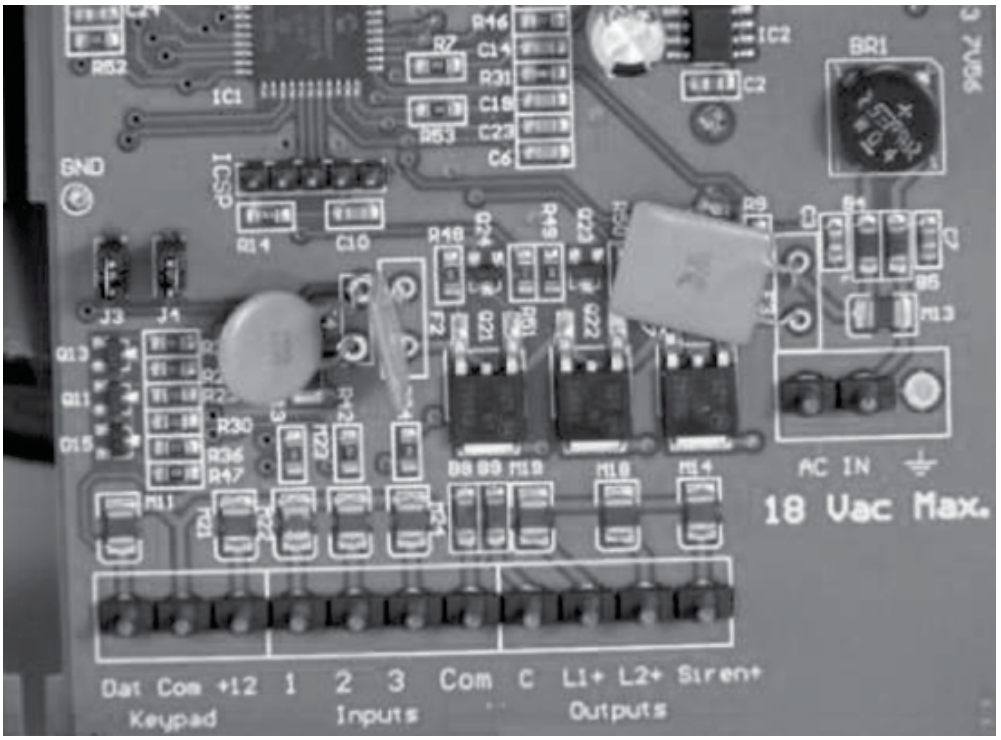


Figure 6: Low Voltage Terminals

Label	Type	Description
Keypad	3 Way	Supplies power and data line for an external keypad. The +12 source on these terminals is protected with a 1A self-resetting fuse.
Inputs	4 Way	Energizer control inputs (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. See section 4.
Outputs	4 Way	Siren and Strobe or other programmable outputs. See section 4 and 8 (Programming Options).
AC IN	3 Way	16Vac power input. Fused via F3 3A self-resetting fuse.
Batt	Leads	12V dc or battery connection via F1 (3 Amp self-resetting fuse.

Low Voltage Terminals

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

8.1 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 16 VAC.

8.2 Status Codes

Status LED Number of Flashes	Interpretation	Corrective Action
1	Not used	
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	Return to repair/service centre

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 PCB fault will disarm the energizer. If an error disarms the energizer, the general and fence alarms will activate.

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.

8.3 Jumpers

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

Jumper	Function	Purpose
J3	DC only jumper	Fit J3 to inhibit mains fail errors, if the intention is to operate the unit on DC only (as in Solar Power systems)
J4	Factory default jumper Off to return programmable 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.

Jumpers

8.4 Multiple Keypads

All Z series energisers have support for up to two keypads provided the Energisers firmware version is 7v66 and above. If more than one keypad is desired one of the keypads must have an ID of 2, the other keypad 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. 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.

9.1 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 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.

9.2 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.

9.3 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. Do not forget to re-fit J4.

This will return all options to the factory set defaults.

9.4 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 9.2 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.

9.5 Programming Options in Brief

See page 26 for more detail.

Option	Function	Description
01	Power Level	Sets the output power levels and voltage limit
02	Low Power level	Sets the output power levels used in Low Power mode
03	Fence Alarm Voltage Zone 1	Sets the voltage threshold below which the fence alarm will occur (Zone 1)
04	Fence Alarm Voltage Zone 2	Sets the voltage threshold below which the fence alarm will occur (Zone 2)
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 for 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	Allows the energizer Control Inputs to be changed from *normally open* to *normally closed*.
12	Input 2 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
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	Binary Options 2	Miscellaneous options
20	Auto Re-arm 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
22	Relay 2	Used to assign an alarm function to output L2
23	Relay 3	Used to assign an alarm function to Siren or output 3
24	Relay 4	Used to assign an alarm function to output 4
25	Relay 5	Used to assign an alarm function to output 5
26	Group ID	Allows the energizer to be set as a Master or slave in a synchronised group. Not available in all markets.

9.6 Programming Options in Detail

9.6.1 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.

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

Value (x)	Voltage
0	5.0kV
1	5.5kV
2	6.0kV
3	6.5kV
4	7.0kV
5	7.5kV
6	8.0kV
7	8.5kV
8	**9.0kV**
9	9.5kV

Power Level (01x#)

9.6.2 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#)

9.6.3 Fence Alarm Voltage Zone 1 (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
0	1.5kV
1	2.0kV
2	2.5kV
3	3.0kV
4	3.5kV
5	**4.0kV**
6	4.5kV
7	5.0kV
8	5.5kV
9	6.0kV

Fence Alarm Voltage Zone 1 (03x#)

9.6.4 Fence Alarm Voltage Zone 2 (04x#)

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

Value (x)	Voltage
0	1.5kV
1	2.0kV
2	2.5kV
3	3.0kV
4	3.5kV
5	**4.0kV**
6	4.5kV
7	5.0kV
8	5.5kV
9	6.0kV

Fence Alarm Voltage Zone 2 (04x#)

9.6.5 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#)

9.6.6 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#)

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#)

9.6.7 Battery Alarm Voltage (07x#)

This option sets the battery voltage threshold below which the alarm will activate. The default Battery Alarm Voltage is 11.0 Volts and the unit will drop to low power at 10.0 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.

9.6.8 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.

Firmware version 7.95 changes options:

Value	Time
7	20 Minutes
8	45 Minutes
9	130 Minutes

7.95 firmware

Value	Time
0	10 Seconds
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

Siren On *time (08x#)*

9.6.9 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#)*

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#)

9.6.10 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.

9.6.11 Input Type (11x#)

The Z28 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#)

9.6.12 Input 2 and 3 Functions (12x#)

For the Z28, this option is used to set the function of Input 2 and 3.

If set to 0, Input 2 is Gate 1 and Input 3 is Gate 2.

If set to 1, Input 2 is Gate 1, Input 3 controls Low Power Mode for both zones.

If set to 2, Input 2 controls On/Off for Zone 2, Input 3 is Gate 2.

If set to 3, Input 2 controls on/off for Zone 2, Input 3 controls low power for both zones.

If set to 4, Input 2 is Gate 1, Input 3 controls low power for zone 2 only.

Value	Function
0	**In 2 Gate 1** **In 3 Gate 2**
1	In 2 Gate 1 In 3 Low Power
2	In 2 On/Off Zone 2 In 3 Gate 2
3	In 2 On/Off Zone 2 In 3 Low Power
4	In 2 Gate 1 In 3 Low Power Z2

Input 2 and 3 Functions (12x#)

For the Z28, the default setting is 0 (Gate1/Gate2).

If Input 2 is set to control On/Off for Zone 2 then Input 1 controls on off for Zone 1. Otherwise Input 1 controls both zones.

NOTES: Values 2 and 3 added in version 7.67. Value 4 added in version 7.86.

9.6.13 Gate Entry/Exit Delay (13x#)

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

The gate switch must remain open for longer than the Gate Entry/Exit Delay before the Gate Alarm is triggered. If the switch closes within this time, the Gate timer is reset to the Gate Entry/Exit Delay value.

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#)

9.6.14 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. Note "Gate" must be selected in Input 2 Function (Option 12).

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

Chime Mode (14x#)

If set to *Siren*, the beepers mimic the siren function.

Gate Beeps plus Siren will give 2 beeps on Gate open and 4 on close, plus continuous for an alarm.

Beeps are on Keypad only, not internal beeper.

9.6.15 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 Energisers.

+2: Maximum power at all times. Note turning this option on may remove IEC standards compliance. Added in code version 7.80.

+4: Limits outputs to 2.5 Joules per Zone on a Z28. Added in code version 7.84. Also limits a Z14 to 2.5J per zone in group mode. Added 7.86.

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

Binary Options (16x#)

+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 energiser sending Alarm Memory to a PC, relay PCB or keypad. Set this to restore "unlatched" mode on a PAE201 relay PCB.

9.6.16 Anti-bridging threshold (17x#)

Anti-bridging has been designed to detect a section of fence being bypassed, and removed from circuit, by an intruder bridging the feed to returns together and then cutting the live wires. 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.

NOTES:

1. 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 would not activate. For the above example, Option 1 must be set to 7 or greater to allow the un-loaded fence to rise to 8.3kV or higher, thus triggering the Alarm.
2. A minimum of 5% was added in code version 7.92.

9.6.17 Binary Options 2 (18x#)

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

For option+ 1 set 18 to 01, for + 1 and +2 set to 03.

+1: Enable Siren Acknowledge. The siren will chirp once for armed and twice for disarmed.

+2: Enables a home alarm style entry/exit delay for the gate input. See also option 13.

Value	Function
0	None
+1	Siren codes
+2	Gate delay type
+4	4800 baud
+8	9600 baud
+16	
+32	

Binary Options 2 (18x#)

+4:Sets the keypad bus baud rate to 4800 (default is 2400), all units in a group, PC and Keypad must be set to the same baud rate. The change will not take effect until after a reset.

+8:Sets the keypad bus baud rate to 9600 (default is 2400)

NOTE: +2, +4 and +8 were added in code version 7v92.

9.6.18 Fence Entry/Exit Delay (19x#)

Setting the Fence Entry/Exit Delay to a value between 1 and 9 will alter the function of Zone 1 in a Z28. This Zone will now operate as an Entry/Exit delay circuit. It should only be wired to the Site Entry/Exit Gate and the Zone must short to Ground, or become Open Circuit, when the gate opens.

Value	Time
0	0 Disabled
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

Fence Entry/Exit Delay (19x#)

This Zone acts as an Exit Route immediately after the Zone is Armed. This means that a Fence Alarm will not trigger due to the Gate being opened during the Exit Time. However, if the Gate remains open when the Exit Time elapses the Fence Alarm will trigger.

After this Exit Time has elapsed, this Zone will act as an Entry Route. This allows a User to enter the Site through this Gate without a Fence Alarm occurring immediately. The User has the Entry Time to disarming this Zone, before a Fence Alarm occurs.

NOTE: This function was added in firmware version 7.92

9.6.19 *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.

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 (20x#)

9.6.20 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 below.

The defaults for the Z28:

Relay 1 Strobe 1
Relay 2 Strobe 2
Relay 3 Siren.

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

Relay Functions

NOTES:

1. These defaults were different in pre 7V64 firmware.
2. The siren and strobe switched 12V outputs can be used to drive external buffer relays.
3. Group relay functions are only operable on the group master.

9.6.21 Relay Function Details

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 disarm	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.
Armed x	Zone x is Armed (pulsing).
General	AC fail OR Low battery OR internal error OR Gate alarm. Latched for internal errors only.
Siren	Fence alarm 1 OR fence alarm 2 Or a 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 which gate input has caused an alarm.
AC Fail	Alarm on *AC Fail*
Battery	Alarm on low or bad battery
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.

9.6.22 Group Mode (26x#)

A group must have only 1 master. The other Energisers in the group are slaves. Since the keypad bus is common among the group, one keypad can be used to program all Energisers for all Options except Group Mode (for obvious reasons).

If there is no Master, each Slave will electrify the fence (pulses) when Armed. However, the simultaneous pulse feature will NOT be operating.

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

NOTE 1: Do not interconnect the energisers via the keypad bus until after they are programmed.

Value	Mode
0	No Group
1	Master
2	Slave 1
3	Slave 2
4	Slave 3
5	Slave 4
6	Slave 5
7	Slave 6
etc.	etc.
15	Slave 14

Group Mode (26x#)

NOTE 2: If more than one keypad is used, they will need different addresses.

NOTE 3: If Perimeter Patrol is used, any keypad in the system should not have address 2, (see 7.3 ??? Changing the Keypad Messages and Address).

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

1. Make sure the key switch is turned off and *Input1* is not connected to the *Com* terminal.
2. Connect the battery.
3. Connect the keypad.
4. On the keypad, enter [Installer's code] [*] [0] [#], then [26].
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 (15 zones total). If more zones are required, PAE 212 LAN boards can be used.

In Group Mode, only one keypad can be used.

NOTE: In some markets Group Mode may not be available.

For details on group wiring and operation Figure 7.

Group linking via the Keypad "bus"

The keypad terminals on all Energisers in the group are linked, see Figure 17. Since only one Energiser needs to power the keypad, 3 wires are linked from one Energiser (preferably the Master) to the keypad (optional) and 2 wires to every other Energiser in the group. Do not connect the + lines between Energisers 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 energisers in the group. If energisers are not disarmed Step 10 may not work correctly.
2. Program the keypad address using one of the energisers.
3. Program each energiser 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 Energisers in the group are connected
8. Wait 5 minutes for all the Energisers 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 energisers 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 energisers are connected.
11. Arm the group using keypad [1] [2] [3] [4] [*] [1] [0] [#] or Perimeter Patrol, make sure all Energisers 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).
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 energiser firmware 7v83 and keypad firmware 1v09, Z28’s should have an ‘empty’ ID between each Energiser. This means if the Z28 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 Energiser (that is disconnected from the Group) must have a KEYPAD ADDRESS set to 1 or 8. Otherwise the Energiser will not respond to commands.

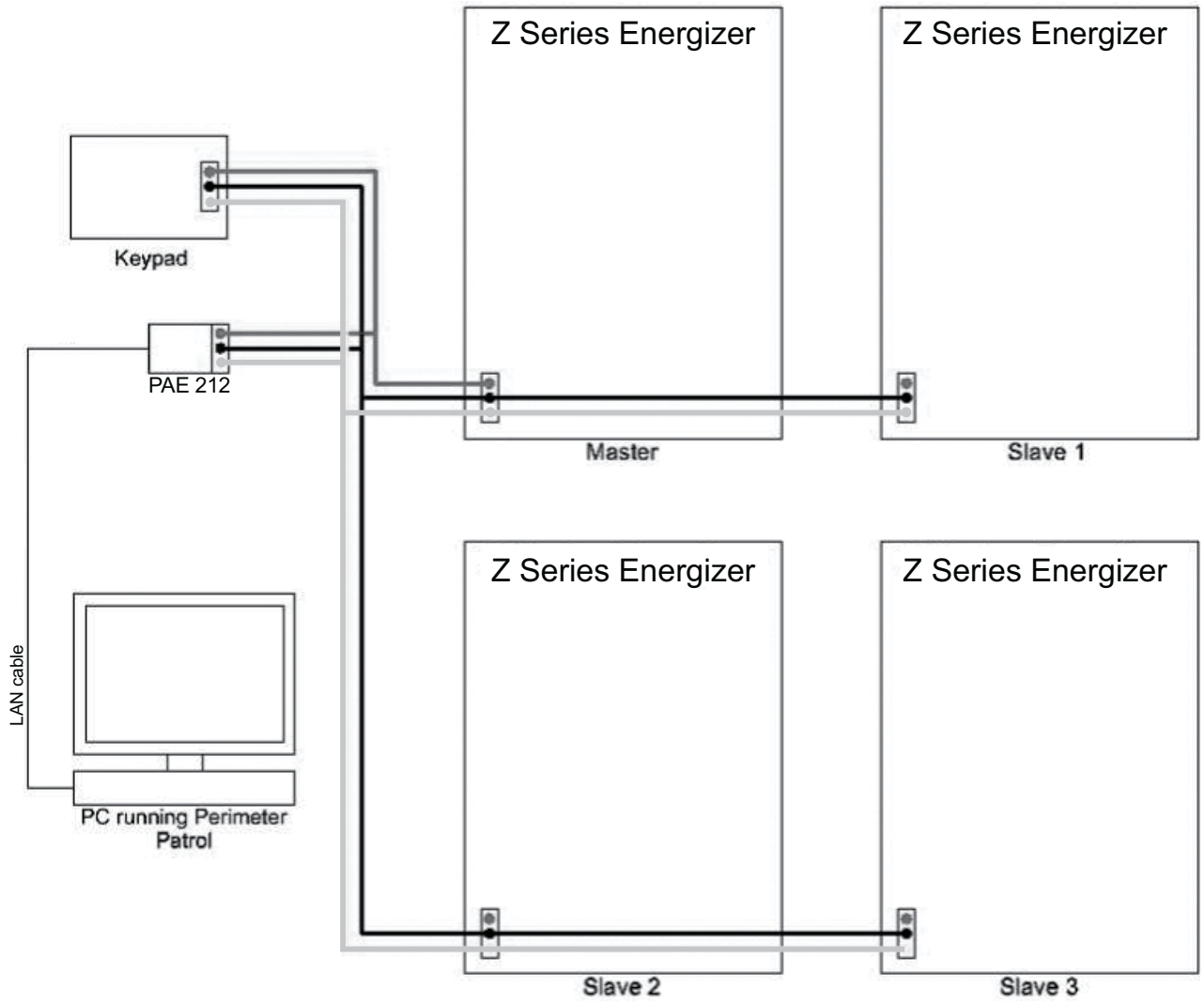


Figure 7: Group Mode Linking

Group Installation notes

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

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 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.

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.
4. Check the electric fence earth. (See electric fence manuals.) One method is to make an intentional short from live wire to earthed metal. 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.
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) 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 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.
7. Do Steps 4 – 6 for both zones.

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.

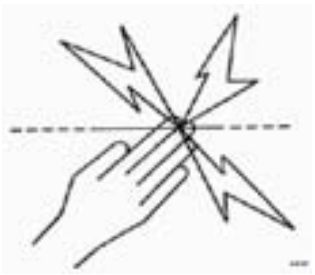
11.2.2 A space of 2.5m shall be maintained between uninsulated electric fence conductors or uninsulated connecting leads that are supplied from different energizers. This space can be less where the conductors or the connecting leads are covered by insulating sleeving, or consist of insulated cables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

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

Figure 1
Typical constructions where the electric security fence is exposed to the public.

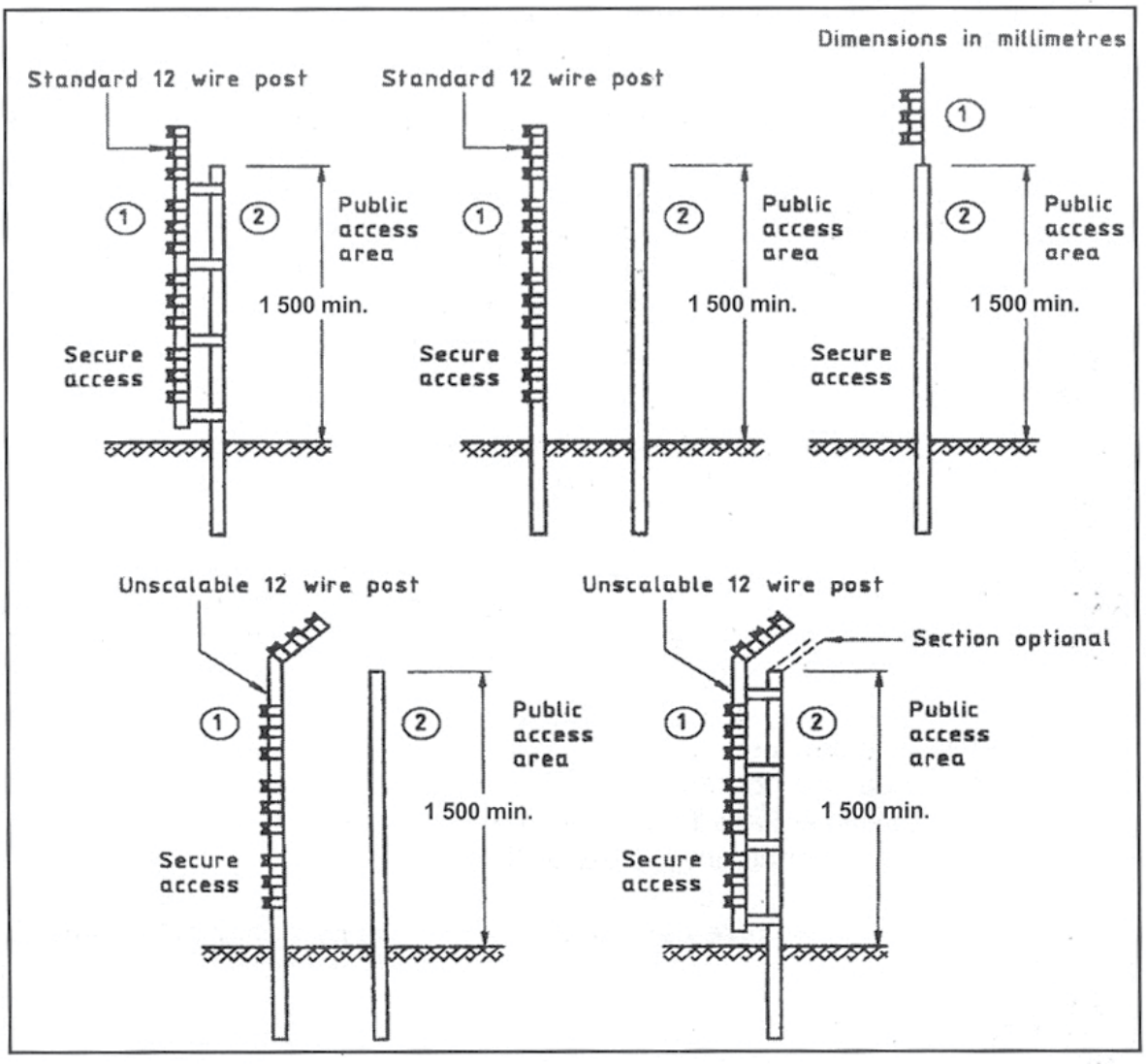


Figure 2
Typical fence constructions where the electric security fence is installed in windows and skylights.

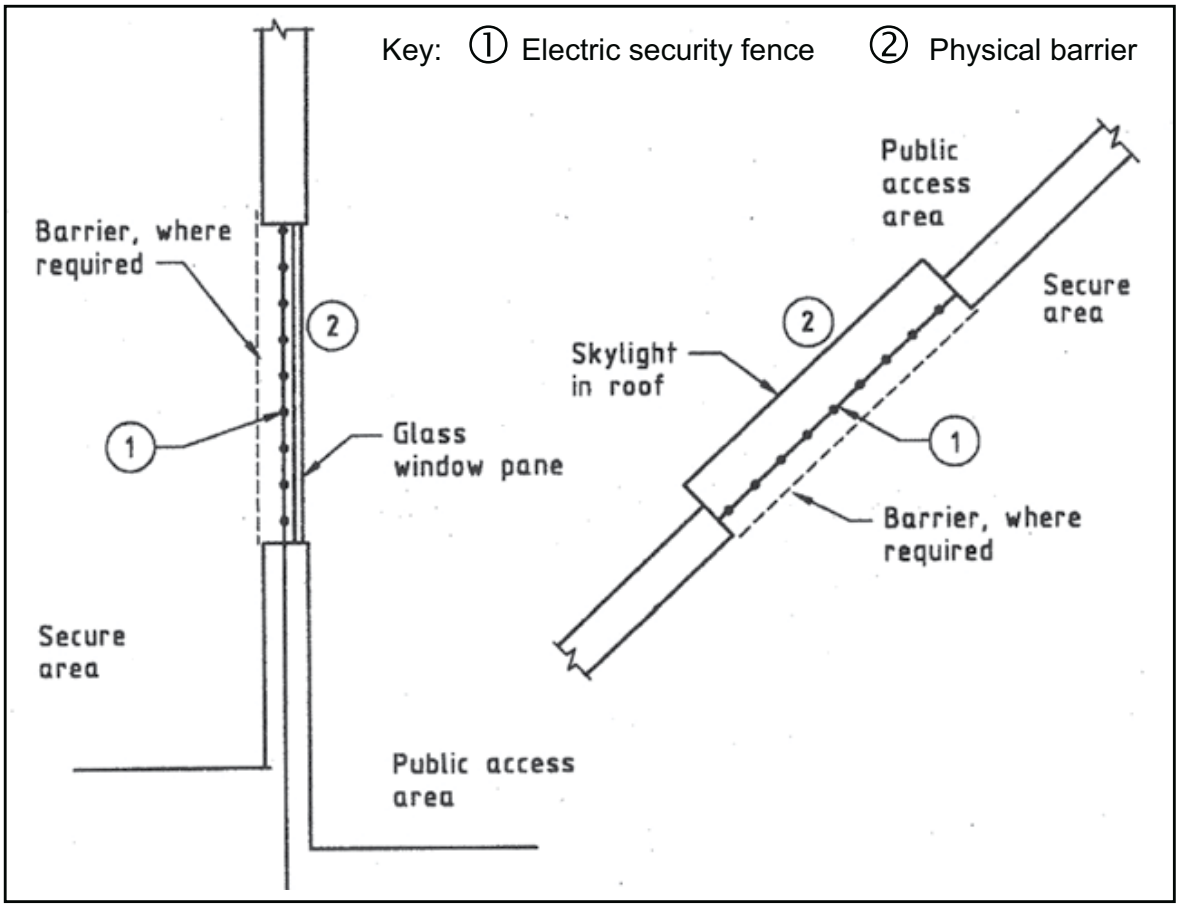
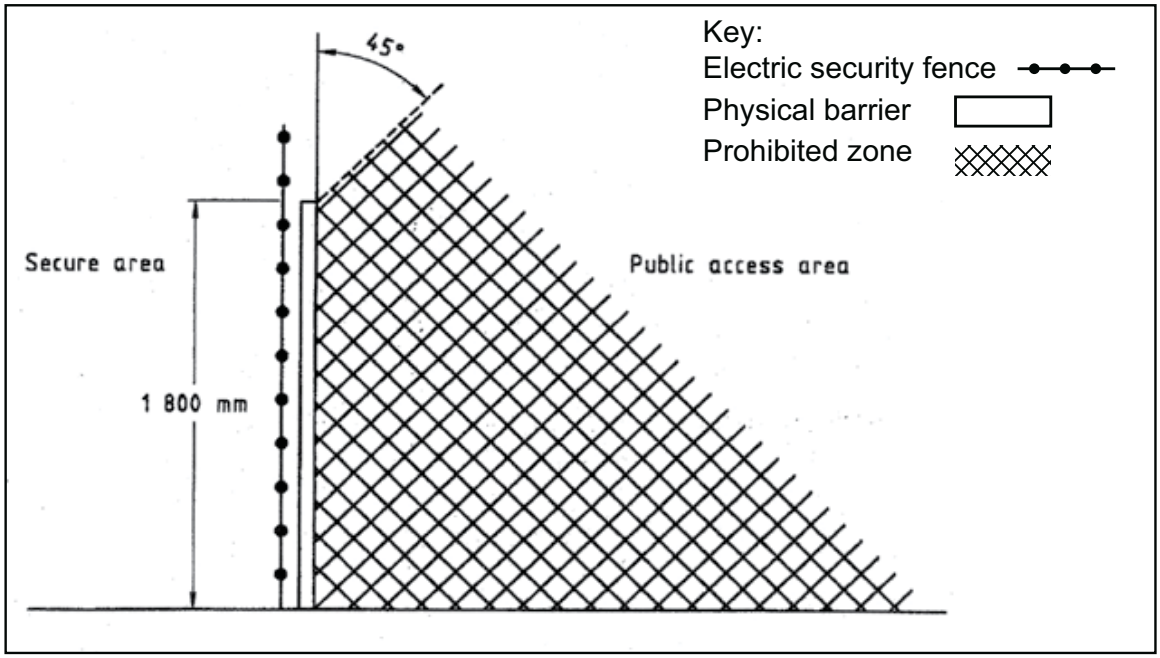


Figure 3
Prohibited zone for pulsed conductors.



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

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.

CUSTOMISED CODES

Customer Pin No. .....

Installer Pin No: .....

INSTALLER DETAILS

Name .....

Phone No. .....

Date Of Installation .....

Z-RANGE

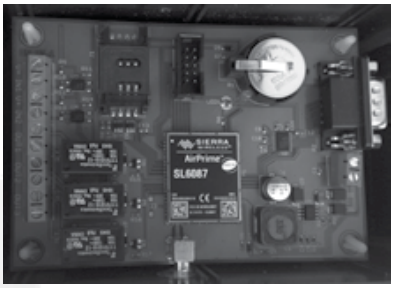
Z14 STANDARD AND BI-POLAR ENERGIZERS

Z18 STANDARD AND BI-POLAR ENERGIZERS

Z28 STANDARD 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

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:


AUSTRALIA


AFRICA


NEW ZEALAND


LATINO AMERICA


CARIBBEAN


SOUTH EAST ASIA


EUROPE


RUSSIA


INDIA


USA


MEXICO


CENTRAL ASIA


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

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
Tel: 041 365 7178

East London
Shop 3, Paphos Park
Devereaux Avenue
Tel: 043 726 6652/60

George
Shop 3, 57 York Road
George
Tel: 044 874 0669