ZM20

Advanced
20-Sector Security Electric Fence Controlling and Monitoring System

Installation and User Manual

2nd Edition, 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 48.

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INTRODUCTION

The JVA ZM20 is an advanced security electric fence monitor with the ability to provide the location of a security breach or fault in the monitored electrified fence. The fault location can be reported as being within 1 of up-to 20 pre-programmed sectors or as the fault position as a percentage of the total fence length. This allows for a targeted response by security personnel through manned response or by re-directing of CCTV cameras.

The JVA ZM20 can reduce the cost of traditional multi-zoned security electric fences by providing up-to 20 individually reported sectors from one fence energizer/ monitor combination. This can represent a dramatic saving over installing individual energizers for each zone.

The JVA ZM20 uses digital signal processing to convert power signals into an accurate distance-to-fault measurement as a percentage of the overall fence length.

When coupled with the JVA PC based Perimeter Patrol software, the JVA ZM20 can identify and report the position of a fault which can be visually displayed on a mimic panel and reported or relayed to other security management systems.

The JVA ZM20 is designed to be coupled with an electric fence energizer to power the security electric fence. Unlike standard security electric fence energizers, the JVA ZM20 feeds the fence from both 'ends' which means that if the fence is cut, the voltage is maintained on both sides of the open circuit. It also determines the health of the fence by monitoring the voltage, currents and therefore power flowing through the fence. A change in the power flow can indicate

An electric fence system which meets current safety regulations

that there is a breach/fault somewhere on the fence. At installation time, the JVA ZM20 is 'taught' the location of the sectors by intentionally placing short circuits at the joins between sectors. Passive sector dividers can be used to increase the accuracy of the sector isolation.

By using multiple JVA ZM20's and synchronised energizers, more than one fence loop can be monitored in a single installation allowing for vertical zoning and also providing a degree of redundancy.

The JVA ZM20 has many programmable options which can be adjusted using a JVA Z series keypad. By correctly setting the alarm threshold levels it is possible to determine if a fence has been cut or shorted, though only short circuits can be reported by sector or position.

The JVA ZM20 is fully compatible with JVA Perimeter Patrol for mimic display, logging, email and more.

The JVA ZM20 is designed to meet or exceed the relevant parts of international safety standard IEC60335.2.76 by providing complete galvanic isolation between the fence and low voltage circuits.

The JVA ZM20 is part of the JVA Z series of security products.

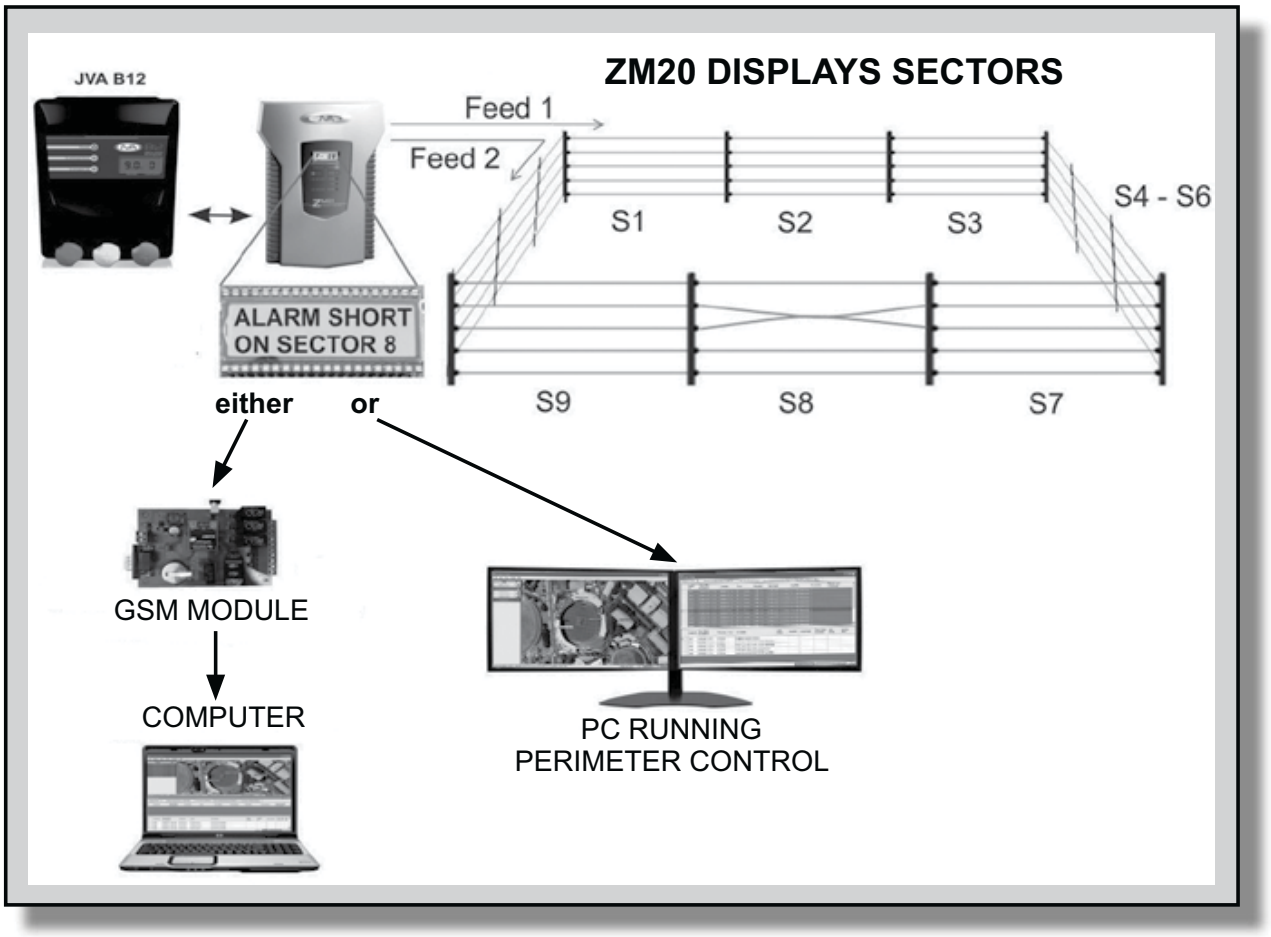
Fictitious example of a 20-sector system for Perimeter Patrol

FEATURES AND BENEFITS

- Can split a single fence zone into up-to 20 sectors for more accurate response.
- Displays which sector is shorted, up-to 20 programmable sectors
- Reports the position of a short on the front panel LCD as a percentage of the total fence length
- Able to be monitored via PC (using Perimeter Patrol software)
- Able to be integrated into third party security management systems at a variety of levels
- Enables the construction of systems from economical Key Switch operation to complex PC controlled applications
- Feeds the fence from both ends to increase deterrent and reduce the effects of a cut wire
- User friendly LCD display
- Built into the wall mountable JVA Z series Energizer Enclosure
- Controlled and programmed via a JVA Keypad with similar codes to the JVA Z Series
- Monitors fence voltage and currents to trigger an alarm if either feed current rises or voltage falls i.e. load increases or reduces suddenly
- Very short sectors can be accurately defined using the Passive Sector Divider
- Run from 16Vac or 12V DC external source
- Built-in battery charger and 7aH back-up battery; connections also available for alternative larger external battery and charger
- Controls 12V DC supply to the coupled energizer
- Siren and Strobe switched 12V DC outputs for stand-alone operation
- 2 Control Inputs and 3 On-Board Relays with many Programmable Functions for low level integration with other systems

CONDITIONS

- The coupled energizer must be compatible with the JVA ZM20. While all JVA energizers are compatible, the JVA MB8 and JVA MB12 are recommended. If low voltage monitoring or multi-zoning is also required then the JVA Z14 or JVA Z18 may be used.
- Energizers with a negative voltage pulse are not suitable
- The JVA ZM20 supports conventional wiring only (not Bi-Polar)
- The coupled energizer output pulse energy must not exceed 18 Joules or be lower than 3 Joules.
- The maximum impedance of the monitored fence loop which can be accurately monitored using the JVA ZM20 is 1000 Ohms
- The JVA ZM20 is not yet supported by the JVA GSM interface or by the PAE212 Web Server at the time of publication of this manual (May 2013)
- The faulted sector is not shown on the LCD Keypad at the time of publication of this manual (May 2013)
- The JVA ZM20 cannot show a faulted sector if the energizer is operating in low power mode.



SPECIFICATIONS

The specifications table below outlines the power consumption of the JVA ZM20 and the acceptable voltage and current ranges for different inputs and outputs.

Specification Name	Specification
Internal battery charger float voltage	14.3Vdc
Internal battery charger charging current	600mA
Power consumption of JVA ZM20 (See Note 1)	100mA at 12.5Vdc
Maximum AC input voltage when internal battery charger is supplying 580mA	19Vac
Maximum DC energizer current from Energizer powered output if using 16Vac supply and internal battery	1.5 Amps
Maximum DC energizer current from Energizer powered output if using external power supply and battery	3 Amps
Maximum voltage on In1, SW2 and Gate inputs (See Note 2)	5Vdc
Maximum power provided to Siren and Strobe outputs (See Note 3)	35 Watts
Maximum Fence Voltage	9.9kV
Maximum Fence Current	80 Amps
Maximum live wire loop impedance	1000 Ohm
Maximum fence load (leakage)	10 Kilo Ohm
Sector accuracy (See Note 4)	100m or 0.1% of total wire length

Note 1: This is the power consumption when none of the powered outputs are active and the keypad is not connected. The rated power consumption may be lower depending on relay configuration and alarm states.

Note 2: The control inputs, In1, SW2 and Gate supply their own power (5 volts, limited to 220µA). If a powered control system is connected to these inputs, the control voltages must not exceed 5 volts.

Note 3: The rated power is the combined output power of both the Siren and Strobe outputs. The voltage which can be expected on this output is the battery voltage. The combined maximum output current of both these outputs is 2.5 Amps. Note that the maximum output power will drop as battery voltage drops.

Note 4: This may not be achieved on all fences.

EQUIPMENT REQUIREMENTS AND OPTIONS

Requirements

- A JVA Energizer (JVA MB8 recommended)
- 12V rechargeable backup battery
- 16Vac power adaptor OR external battery charger
- Security electric fence; standards, insulators, wire etc. wired into sectors.

Some of these items may be included with the JVA ZM20.

Options

- 12V Siren and strobe light
- LCD Keypad. (See Notes 1 and 2 below)
- Sector Dividers. (See page 21, “Using a Sector Divider”.)
- Webserver. (See Note 3. below)
- Windows PC
  - Windows XP or Windows 7
  - PAE 223, USB to keypad bus adaptor
  - or PAE212 TCP/IP adaptor
  - Perimeter Patrol PC application (JVA ZM20 or Pro version)

Notes

1. While the Keypad is not essential for normal operation, it is always required for programming options and sectors during installation.
2. Up to 3 Keypads may be used on a JVA ZM20. Each Keypad must have a unique ID setting.
3. The Webserver allows for remote control using any web enabled device, but requires the site to have a wired LAN internet connection. WiFi may be used but will require a WiFi bridge.

For more information on these options please see www.jva-fence.com.au

Safety Warning

- The installer is reminded that high voltages are retained for a while after disarming the energizer and to wait for at least 10 minutes before opening the case. Should it be necessary to open the JVA ZM20 case ensure that the energizer is disarmed.
- Before working on the high voltage wiring of an electric fence, it is recommended that the energizer is disarmed and a short circuit is placed from the fence live wires to earth. This is a sensible precaution against the energizer being armed while working on the fence.
- The JVA ZM20 contains patent pending technology, contact JVA for more information.

OPERATION

Status LED Lights

The status LED's on the front of the JVA ZM20 allow the user to ascertain quickly the current status of the unit and if any action needs to be taken. Below is a brief description of each LED (top to bottom) and the information it conveys.

Power – On whenever the unit has power.
Armed – On when the unit is armed (pulsing)
Fence – On when there is a fence alarm (either channel)
Gate – On when there is a gate alarm
Status – Flashes an error code for service errors. The LCD may also show an error message.

Status LED Number of Flashes	Interpretation	Corrective \Action
1	Not used	
2	16Vac Mains fail	Restore mains power
3	Low battery, bad battery	Charge or replace battery
4	PCB service fault	Return to repair/service centre **Note**: A JVA Slave energizer will show this error if disconnected from the Master

LCD Display

The Alpha numeric LCD display shows the status of the JVA ZM20 at all times.

While the unit is armed, pressing # on the keypad will toggle the display between status and readings mode.

JVA ZM20 Screen Examples

Armed All clear	JVA ZM20 Disarmed

While armed, the LCD display will cycle the following information every energizer pulse.

Fence 7.8 kV Ground 0.1 kV	Feed1 2.0A Feed2 2.0A	Battery 13.2V AC on

Pressing # on the keypad will freeze the current information displayed on the LCD screen for approximately 10 pulses. Pressing the # key again will cycle the display to the next information screen.

This screen shows the fence loop balance.

Sector 10 of 20 Balance 49.90%

When an alarm occurs the screen will detail the type of alarm and the sector if applicable.

ALARM – Short Sector 3	ALARM Fence Cut	Armed All clear
ALARM Gate	ALARM Ground 1.0kV	ALARM Energizer Fail

Alarm Multi-sector

Various problem conditions can also be displayed, such as AC fail or low battery.

Battery 11.5V AC Fail

When the JVA ZM20 is disarmed after any alarm, the last alarm will be displayed until cleared.

Disarmed Alarm Sect 18

The display also shows the programmable options and values when in programming mode.

1 – Alarm V 4.5 kV

Control Options

The JVA ZM20 may be controlled i.e. armed and disarmed using a:

- Key Switch or Remote Switch connected to the control input (IN1)
- Remote Control Radio Receiver connected to IN1
- JVA Z Series Keypad
- JVA Webserver
- Windows PC running JVA Perimeter Patrol (JVA ZM20 or Pro versions)
- Low Level Interface (wired to control inputs and relay outputs) from a third part security alarm panel or Physical Security Information System (PSIM)
- High Level Interface.

Note: More than 1 method may be used in the one installation.

Control Arbitration

If an installation contains two ways to control the JVA ZM20/Energizer, then the most recent control signal will determine the Armed/Disarmed state. For example if the JVA ZM20 is armed via the keypad and then disarmed at the control input (IN1) it will disarm.

Energizers that contain more than one control input (for example an Armed/Disarmed input and a Gate input) will use all of the input values when either input changes. For example, an energizer is disarmed using IN1 and then armed using the keypad. If the Gate input changes, the energizer will disarm as the IN1 setting is still set to *Disarmed*.

The higher level control methods such as the Webserver or PC control software may override the Control Input and Keypad's methods, depending on the options used. If it is necessary to make sure that the fence is disarmed, e.g. for maintenance, using the key switch or keypad alone may not guarantee that the fence will remain disarmed.

Control Inputs

The JVA ZM20 may have a single Key Switch mounted on the right hand side of the cabinet which may be used to arm and disarm the security electric fence to which it is connected. This switch is useful for the simplest implementations where no keypad or PC control program is used. It may be disabled by the installer, by removing the lead from socket J2 on the board.

When switched on via the Key Switch (or a switch connected to IN1) the JVA ZM20 will power up the energizer to which it is coupled and begin monitoring the fence.

The screen will change to display the *Armed* status and any faults or alarms. If there is a fence fault the JVA ZM20 will go into an alarm condition, the internal beeper will sound (if it has not been inhibited) and any siren and strobe connected to the JVA ZM20 will be triggered.

The sector in which the fault has occurred will be displayed if the JVA ZM20 has been correctly calibrated.

Switching the Key Switch off will disarm the JVA ZM20, although it will continue to display the last alarm and sector.

Keypad Control

The JVA ZM20 uses the same keypad as the JVA Z Series energizers and is controlled using similar keypad codes.

The Keypad with Version 2 or higher software will display the Fence voltage and Ground voltage and the fence currents. Keypads with older software do not show currents and sectors. The keypad can be upgraded by your nearest JVA dealer.

Alarms and problem conditions will also be displayed.

The Keypad has two LED lights:

Power *On* with Mains power;
Off with Mains fail; flashes on low battery
Armed *On* when the energizer is armed (pulsing); flashes when in low power mode.

All other indications are given via messages on the screen.

Whenever the keypad displays: *ALARM ZONE:* - Press # to see the sector affected:

Zone 1 On when there is a Fence Fault
Zone 2 On when there is a Ground Fault
Zone 3 On when the Gate Input is in an alarm condition

Other messages include:

- *FAULTED ZONE*
- *SYSTEM TROUBLE*

Pressing the [#] key will reveal more information, such as the name of the zone (e.g. *North Fence*) or the actual system trouble, for example *AC Fail*.

Note: There is no panic function currently implemented (June 2012).

Arming/Disarming the Fence Using the Keypad

Enter 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 USER PIN and press #.

Note: If there is an alarm sounding the USER PIN will need to be entered twice: once to silence the alarm and once more to disarm.

When an Alarm Occurs

An Alarm will occur if there is a fault on the fence caused by a short or an open circuit (cut) while the system is armed. The siren will sound and the strobe light will come on. The Internal Beeper and the Keypad may also sound, depending on how your system is configured.

There are 7 ways the JVA ZM20 will detect a fence fault (See the Programmable Options Table on page 31):

1) The energizer fails to fire at all (Energizer Fail)
2) Fence voltage falls (Low Voltage – see Option 1)
3) Fence currents rise (Fence Short – Option 2)
4) Fence currents rise and then the position moves (Fence Multi-Sector Short)
5) The ground voltage rises (Ground alarm – Option 3)
6) Fence current balance is disturbed without a short (Fence Cut – Option 4)
7) Fence currents rise or fall but do not trigger a Short or Cut (Anti-Bridging – Option 17)

Of these the Fence Short is the primary alarm and the one which enables the sector to be detected. Some of these methods can be disabled, see the programming options.

The Siren and Keypad Beeper will sound and any relays assigned to this Fence Alarm will turn on. If the energizer is connected to a building alarm system for monitoring, an alarm signal may be sent to the Alarm Company monitoring the alarm system.

An alarm will also sound if Control Input 2 is assigned to the Gate function and the Gate Input is opened for longer than the Gate Delay Time.

After the siren has cycled on and off according to the times and numbers set according to the options table (See Programmable Options Table on page 31), 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 is removed, the siren will stop after the end of the current On time (Siren On Time).

If the siren is silenced (by entering USER 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 pre-set Off time. If the alarm condition is not present the energizer is instantly rearmed, irrespective of the Auto-Rearm setting.

To Silence the Alarm

If there is no Keypad attached, simply disarm the JVA ZM20 using the Key Switch.

Using a Keypad, enter USER PIN and press #. This will silence the alarm but not disarm the system; the armed light will still be on. The system will be ready for the next alarm.

Note: This silence function will not operate if the JVA ZM20 is part of a JVA Z series in group mode.

The last alarmed Sector will still be displayed on the front panel LED and the Keypad.

The Siren and Strobe are ready to respond again if triggered.

To Disarm

If there is no Keypad attached simply disarm the JVA ZM20 using the Key Switch.

Using a Keypad, disarm the system by entering USER PIN and press #.

The Fence or Gate light on the JVA ZM20 will remain on to show the Alarm memory. This can be cleared by entering the Clear Alarm Memory command *1#. The Alarm Memory will also be cleared when the JVA ZM20 next Arms.

To Clear Alarm Memory

After an alarm occurs pressing *1#, will clear the alarm memory. If the problem still exists the unit will alarm again.

Changing the USER PIN

Enter the current 4 digit USER PIN and press *0#. This enters User Programming Mode.
Enter new user PIN (must be 4 digits) and then #.
Press *# to exit User Programming Mode.
Make sure that the new USER PIN works by using it to arm the energizer.
The default USER PIN is 1234.
For example, the following Keypad sequence will change the USER PIN to 8015 from the default PIN:
1 2 3 4 * 0 # 8 0 1 5 # * #

Standby Battery

Should there be a loss of mains power, the Power Light on the Keypad will go off. The Status LED on the JVA ZM20 front panel will flash twice and the Keypad will show *Trouble – AC Fail.*

If the loss of power is prolonged, the battery may become discharged and become ineffective. The Power Light on the keypad will start to flash indicating that the battery charge is low. The status LED on the JVA ZM20 front panel will flash three times and the Keypad will show *Trouble – Low Battery*.

If the standby battery requires replacement, the Status LED on the Energizer will flash 3 times even after the mains power has been restored.

Internal Beeper/Keypad Beeper

Depending on the Chime Mode setting, the Internal Beeper and Keypad Beeper will sound when there is a fence alarm, a gate alarm, a general alarm or a door chime. On flat battery the Keypad will always beep 4 times before the energizer automatically enters Low Power mode to preserve the battery. On AC Fail it will not beep.

Note: The Internal Beeper also beeps at power up.

All Keypad Codes

Function	Key Sequence
Arm/Disarm	[USER PIN][#]
Silence an alarm (Single Zone system only)	[USER PIN][#]
Start programming mode in the JVA Z series energizer	[INSTALLER PIN][*] [0] [#]
Start programming mode for the keypad	[INSTALLER PIN][*] [0] [1] [#]
Exit any programming mode	[*] [#]
Change a USER PIN	[USER PIN][*][0][#][New PIN]#
Change the INSTALLER PIN	[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 JVA 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 JVA 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][#]
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 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] [#]
Analyse Group	[*][6][8][#]
Reset and display firmware version number	[USER PIN][*][6][8][#]
Reset and return to factory defaults	[INSTALLER PIN][*] [6] [8] [#]
Siren test	[*] [6] [3] [#]
Battery test	[*] [6] [4] [#]
Show Balance	[*] [6] [5] [#]
Clear Alarm memory	[*] [1] [#]

INSTALLATION

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

Installation Steps

1. Read the entire JVA ZM20 and the relevant energizers manuals.
2. Design and build the fence. This is beyond the scope of this manual. Users are advised to consult their distributor for assistance if required.
3. Decide where the Energizer, JVA ZM20 and Keypad are to be mounted. If on an external wall they should be housed within an equipment box and not in direct sunlight.
4. Remove the lid of the JVA ZM20 using a 5mm Hex Key.
5. Remove the JVA ZM20 PCB chassis from the housing by removing the two screws at the top corners.
6. Mount the housing by using 4 screws through the rear of the box. The box must be mounted on a wall in such a way that all of the 4 holes in the rear of the case are against the mounting surface.
7. Replace the PCB chassis.
8. If using a keypad, remove the rear housing of the keypad and fix it onto the wall.
9. Wire the low voltage cables to the PCB terminals.
10. Wire the high voltage cable to the PCB terminals.
11. Set the Jumpers as required.
12. Seal the cable entry area with neutral cure silicon sealant RTV.
13. Fit the battery leads to the battery. The Status LED should be blinking twice to show mains fail.
14. The energizer is designed not to start when first powered up irrespective of the state of the Control Inputs.
15. Replace the front cover (lid).
16. Turn AC power on.
17. Type *68# (if keypad used.)
18. Arm the JVA ZM20 and Switch on the energizer. The LCD display will now show the fence voltage.
19. Find and remove any faults on the fence.
20. Balance the JVA ZM20.
21. Program the sector split positions.
22. Test that a short in any sector puts the JVA ZM20 into alarm and shows the correct Sector.

Note:

1. If using a JVA MB series energizer with the JVA ZM20, turn the energizer on using the front panel On/Off tact switch immediately after arming the JVA ZM20. As the JVA ZM20 controls 12V DC power to the MB energizer, it cannot be switched on before the JVA ZM20. Since JVA MB series energizers remember their last state on power fail, they will power on again when next the JVA ZM20 applies 12V DC power. You will not need to use the MB On/Off switch again.

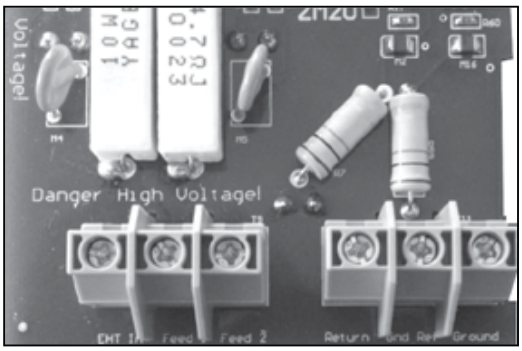
Jumper Configuration

The JVA ZM20 is equipped with three jumpers, two of which (J3 and J4) operate in an identical fashion to those on the JVA Z14. The third jumper, J5 will suppress the beeper on the JVA ZM20 when fitted.

These are located in the top left corner of the PCB.

Jumper	Function	Purpose
J3	Inhibit Mains fail error.	J3 is fitted to inhibit Mains fail errors if the intention is to operate the ZM20 on DC only (as in solar power systems).
J4	Factory default jumper Off to return Programmable Options to factory defaults on power up.	If the ZM20 needs to be defaulted to factory settings, remove all power (AC and battery) and remove the J4 jumper. Reapply the mains and the battery power. Reapply the J4 jumper and the JVA ZM20 unit will be reset to default settings.
J5	Inhibit Internal Beeper	Fitted to inhibit the internal beeper, irrespective of any option setting.
J6	Energizer Power Selection	If the ZM20 has a 16Vac supply plus internal battery fitted and the energizer is a JVA MB8, set J6 to the 24V setting. If using an external battery set J6 to the 12V setting.

High Voltage Terminals



Description of high voltage terminals (Left to Right)

EHT In	Connect the high voltage output of the energizer to this terminal only.
Feed 1	Connect the one end (feed) of the fence loop to this terminal.
Feed 2	Connect the other end (return) of the fence to this terminal. The live wires form a complete loop from *Feed 1* to *Feed 2*. The fence voltage is measured from this terminal.
Return	This terminal is connected internally to *Feed 2*. It is not normally used.
Ground Ref	Reference ground connection. Please refer to diagrams *Earth Loop Monitoring*, *Earth Stake Monitoring* and *No Earth Monitoring* (pages 18 and 19) for information on how to configure this input.
Ground	Main fence earth. Please refer to diagrams *Earth Loop Monitoring*, *Earth Stake Monitoring* and *No Earth Monitoring* for information on how to configure this input.

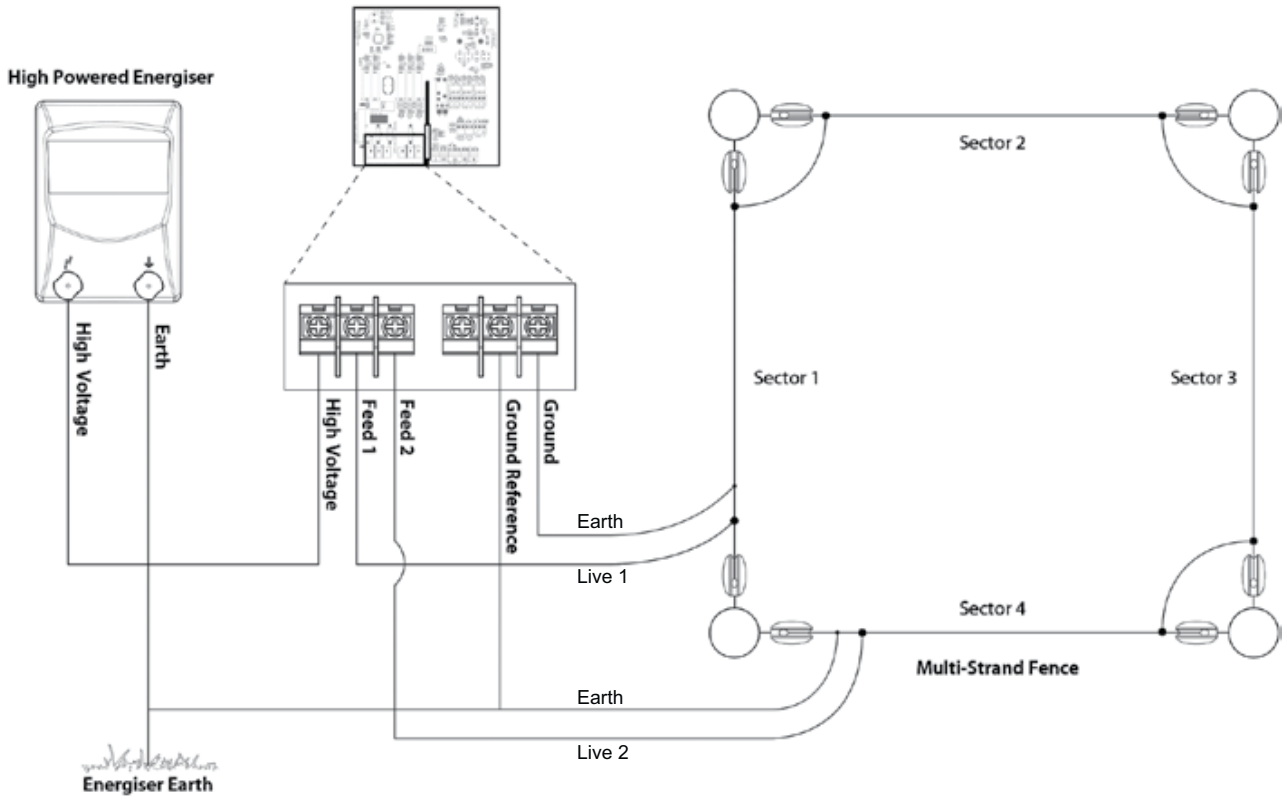
Fence Wiring Diagrams

There are a number of ways the fence wires can be connected to a JVA ZM20. The following diagrams will outline different ways the ground circuit can be configured and what the benefits of each are.

Earth Loop Monitoring

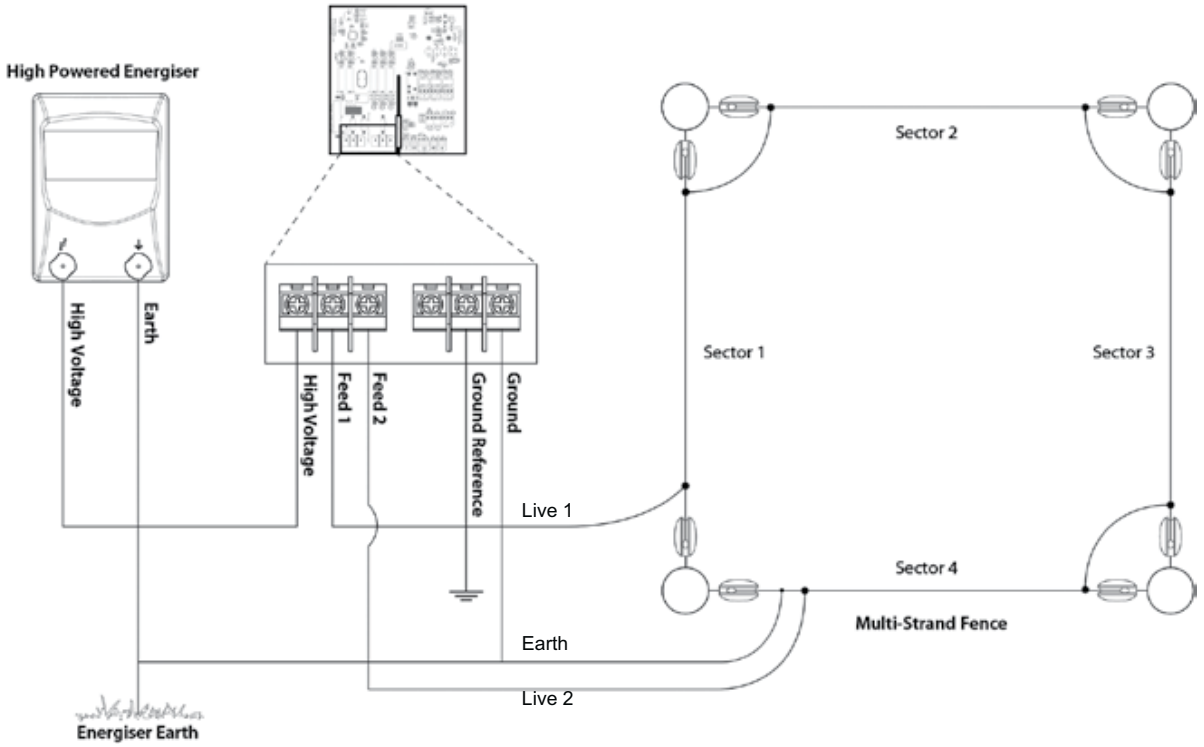
The setup pictured below will detect if the ground wire has been cut. Connect the Ground Reference input to the Energizer Earth, and the Ground input to the other end of the Earth Fence Loop.

If the Fence Ground Loop is cut, induction will raise the measured ground voltage and trigger an alarm.



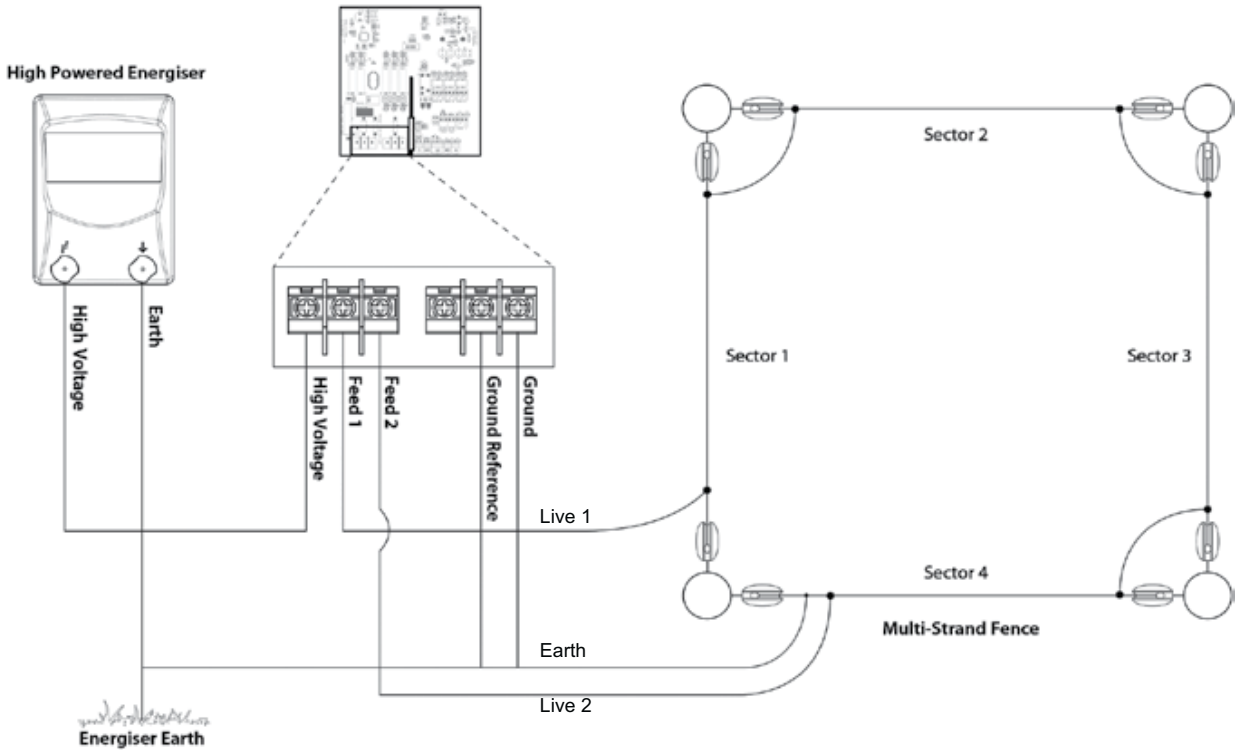
Earth Stake Monitoring

This setup will check how well the energizer is earthed. Connect the Ground Reference input of the JVA ZM20 to the mains earth, or the cabinet earth.



No Earth Monitoring

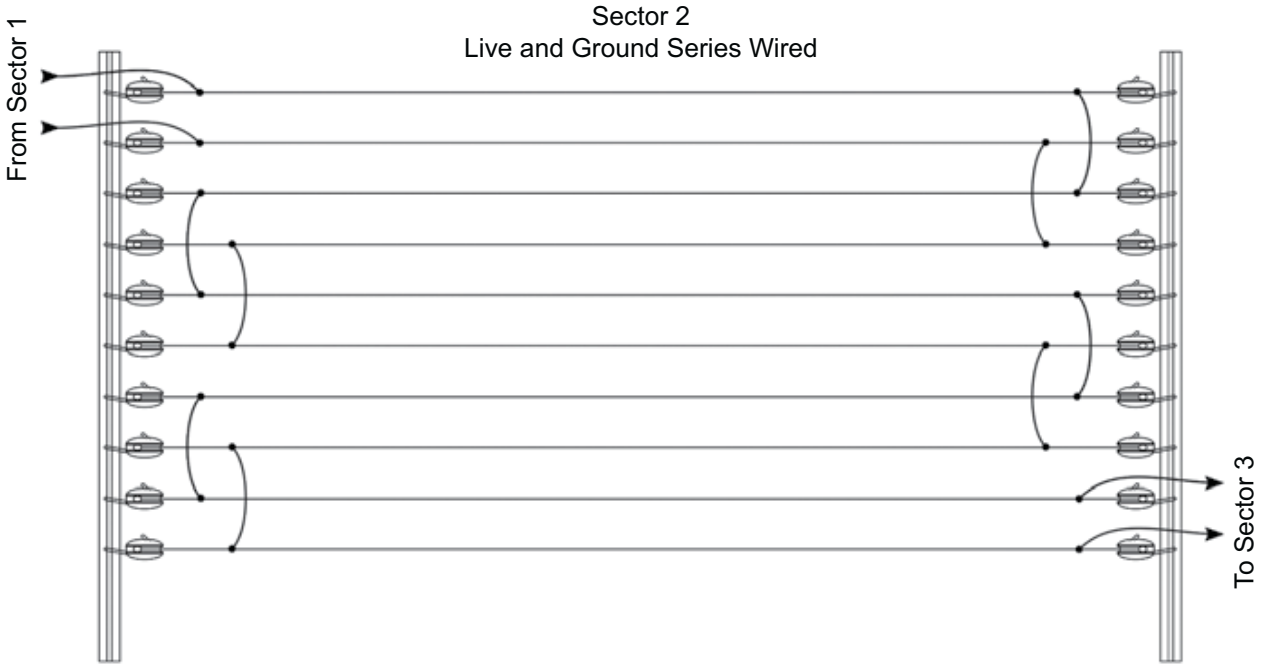
This setup will monitor only the fence return voltages and fence current. Bridge the *Ground Reference* and *Ground* inputs to each other with a short piece of wire.

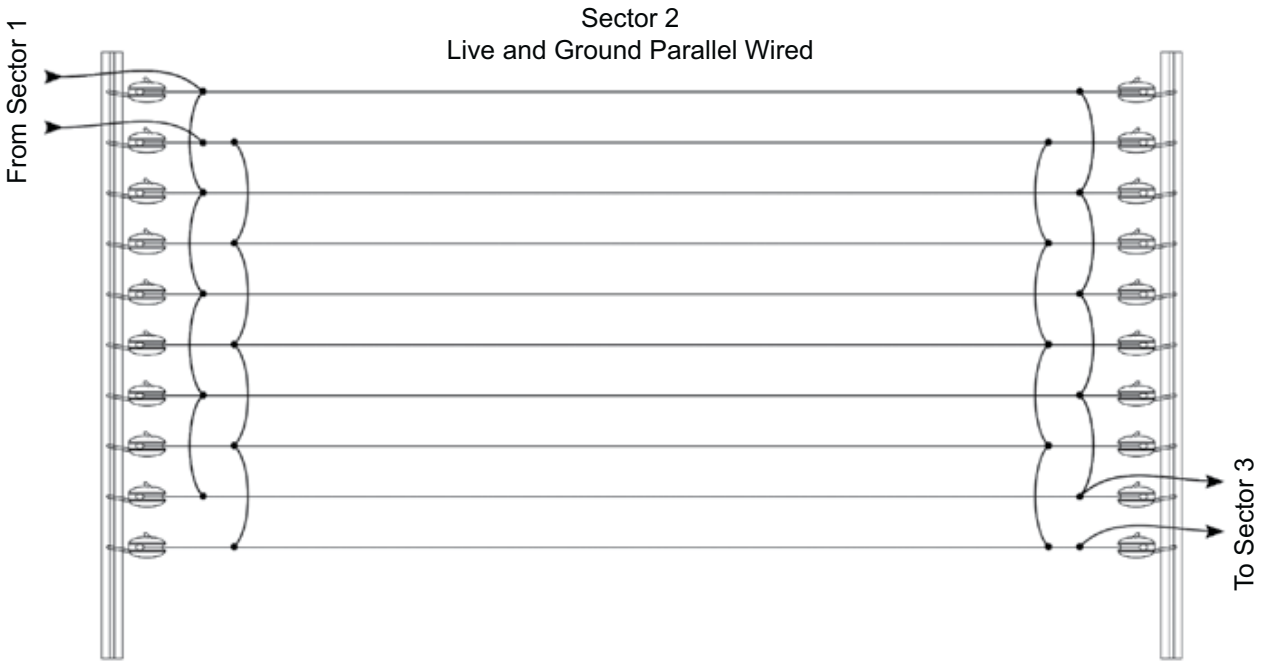


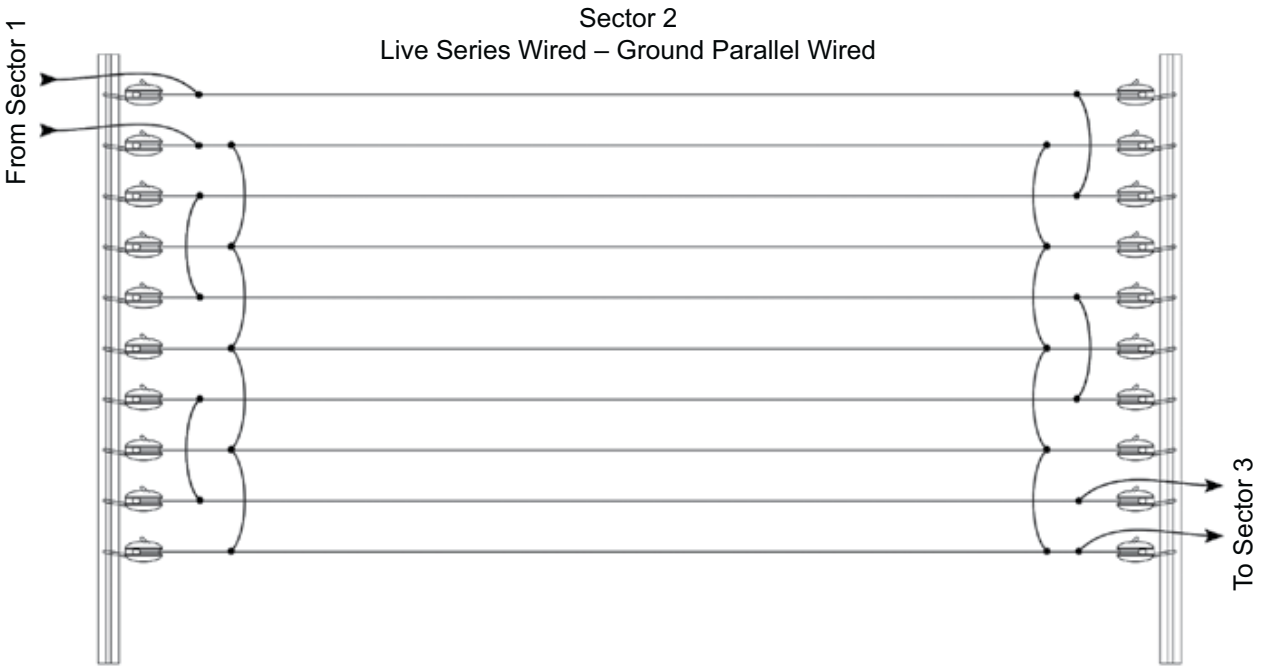
Fence Sector Wiring

Although series live wiring is recommended, on very long fences parallel wiring may be used. Parallel wiring can result in a fault not being reported if a live wire is cut. If parallel wiring is used, the live wires should be connected in parallel at **both** ends of the sector.

Ground wires may also be series or parallel. Series ground wiring is useful only if you are using ground loop monitoring. Parallel ground wires should also be connected in parallel at **both** ends of the sector.



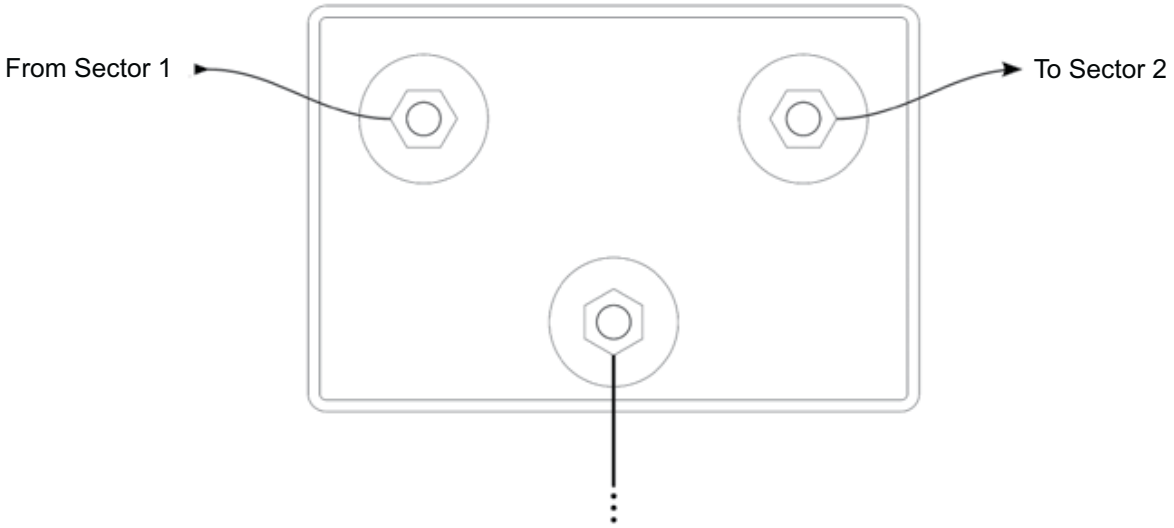




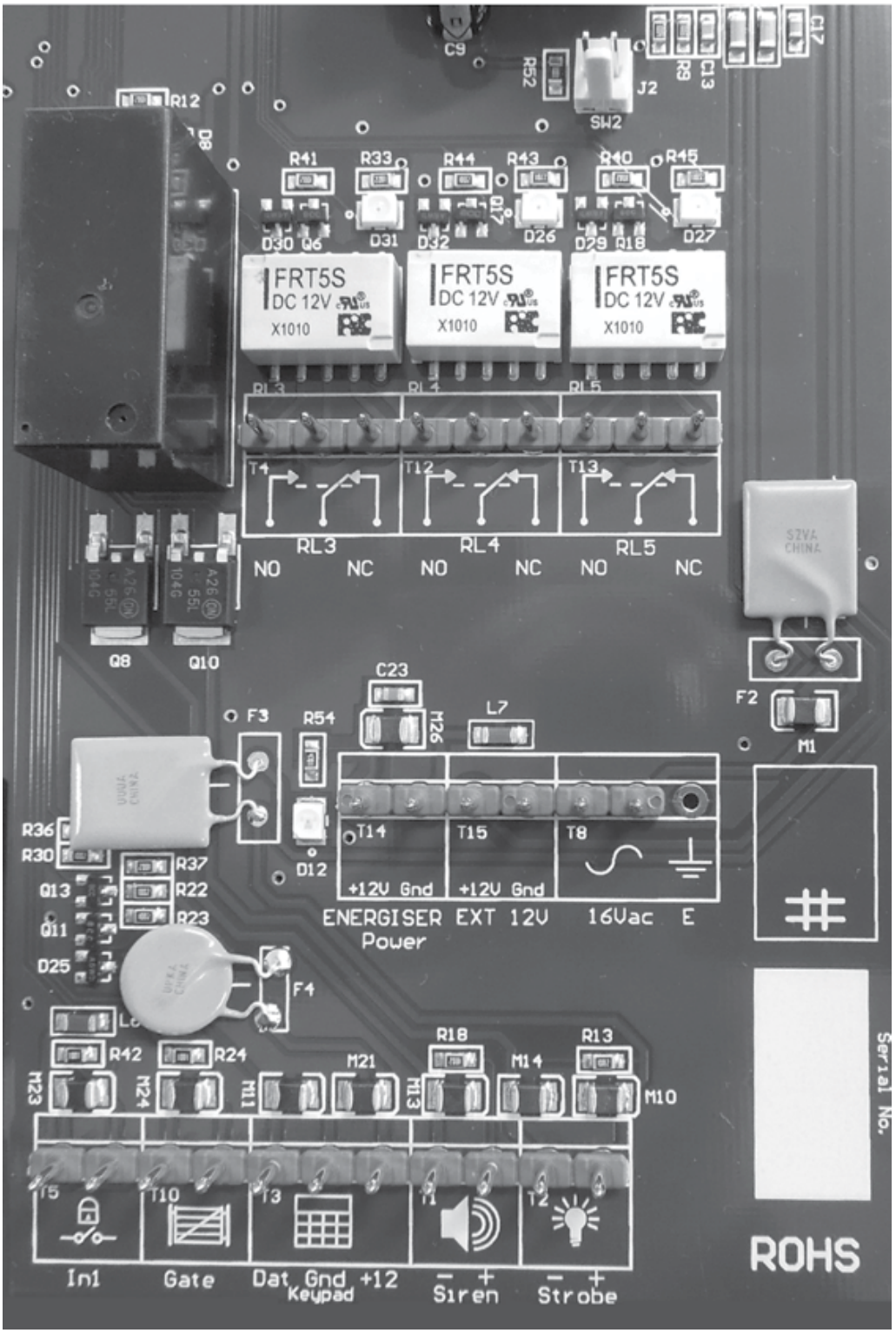
Using a Sector Divider (Splitter)

In order to maintain the highest level of sector reporting accuracy, Sector Dividers may be wired between sectors on the fence. This is required when one or more of the sectors is very short in length and is also recommended between sectors which differ in construction, for example between wall top and free standing sectors.

Note: When programming the sector splits into the JVA ZM20, place the short to ground on the mid (normally unused) terminal of the Sector Divider. This means that the sector split is recorded at the theoretical midpoint inside the divider and any real fence short will always be outside.



Low Voltage Terminals



Label	Type	Description
SW2	2 Way	Also connected to IN1 and functions exactly the same way as IN1. Typically this input is used if a Key Switch is fitted to the case.
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.
Gate	2 Way	Energizer control input defaults to low power, normally open, but may also be assigned to Gate Input. When the unit is armed and the gate is opened, it will trigger the gate alarm.
Keypad	3 Way	Supplies power and data line for an External Keypad. The +12V source on these terminals is protected with 1A Self Resetting Fuse.
Siren	2 Way	Switched 12 volt output. Low side switched. 35W max (including Strobe). A buffer relay should be used when connecting these outputs to an alarm panel.
Strobe	2 Way	Switched 12 volt output. Low side switched. 35W max (including siren). A buffer relay should be used when connecting these outputs to an alarm panel.
Energizer Power	2 Way	Controlled 12V output to a DC energizer. Enabled when the JVA ZM20 is armed. Power is drawn from the JVA ZM20 battery and 16Vac power supply, or from the EXT 12V input.
EXT 12V	2 Way	Feed 12V power into this input as an alternative to the 16Vac. Used for DC energizers which exceed the supply rating of the on-board rectifier.
AC IN	3 Way	16Vac Power Input. Fused via F3 3A Self Resetting Fuse. The Earth Terminal may be required to be connected to mains earth in some countries: consult the local wiring guidelines.
Relay 3	3 Way	May be set to any of 16 alarm conditions.
Relay 4	3 Way	May be set to any of 16 alarm conditions.
Relay 5	3 Way	May be set to any of 16 alarm conditions.
Batt	Leads	12V dc or battery connection via F1 (3 Amp Self Resetting Fuse). Connect Red Lead to battery positive (+) terminal. (not pictured above)

Low Voltage Wiring Diagrams

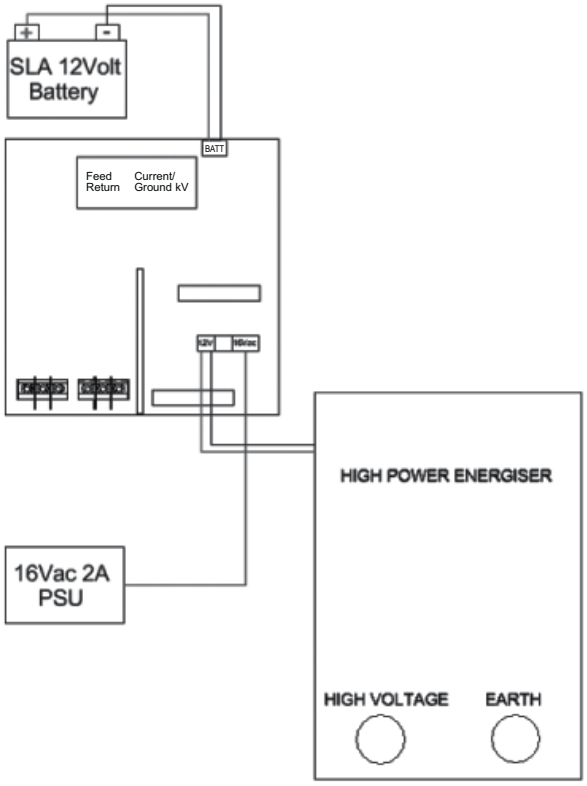
Wiring for recommended 12V DC energizers
A 16Vac 2Amp power supply is used to run the built-in rectifier and battery charger for the internal 7ah 12V rechargeable battery.

The JVA ZM20 and 12V DC energizer are run from the battery if AC power fails.

This option is suitable for JVA MB4.5, MB8 or equivalent energizers.

The DC voltage supplied to the energizer may be unregulated or regulated. For JVA energizers select “24V unregulated” using J6, as this will improve the battery charging current capacity and reduce heat in the JVA ZM20.

AC power will be monitored and an AC Fail Alarm can be provided.



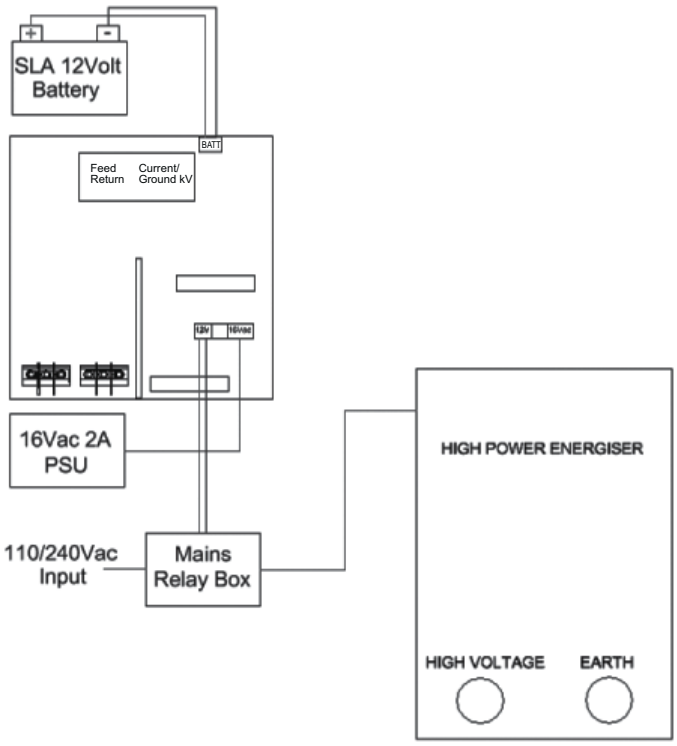
For higher powered DC energizers utilise the external 12 volt power supply input. (See below.)

Mains Energizer Power Wiring
The JVA ZM20 can be coupled to a Mains Powered Energizer.

The JVA ZM20 is used to control an External Relay Box designed to switch a Mains Powered Energizer On or Off.

Warning: DO NOT use relay 3, 4 or 5 on the JVA ZM20 PCB to switch mains voltage.

Mains power must be wired only by licensed electricians.

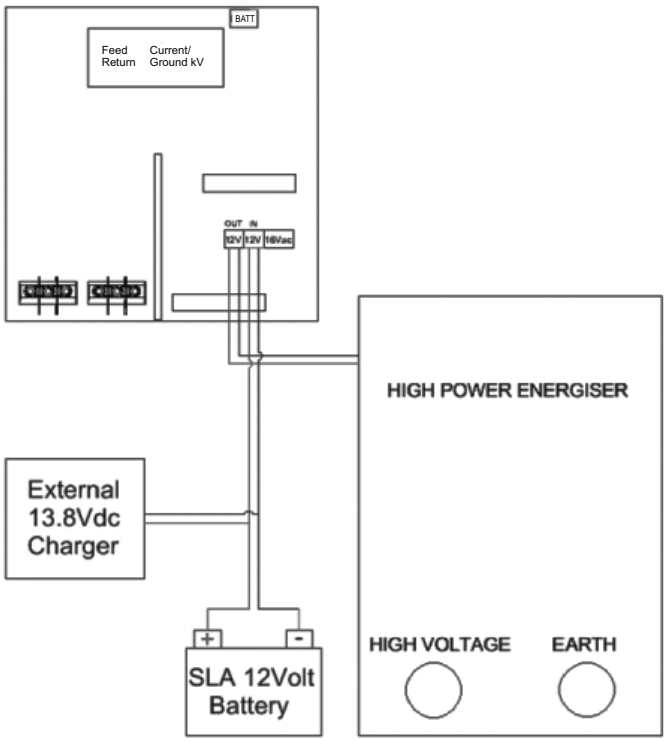


External Battery and Charger Wiring for 12V DC Energizers

An external 12V DC source may be used to power both the JVA ZM20 and the coupled DC energizer via the external 12V power input. The energizer 12V supply is still controlled by the JVA ZM20. This is the recommended circuit if using a JVA MB12 as the energizer.

Ac Fail should be inhibited by fitting J3.

Note: There is no fuse protection on the JVA ZM20 for this wiring. A fuse or circuit breaker should be used in the battery circuit.



Combining the JVA ZM20 with a JVA Z Series Energizer

A JVA ZM20 can be combined with a JVA Z Series Energizer to power the fence. The added advantage of this is that the fence can be turned to low power during the day and still be monitored. It also means that a Webserver device or PC running Perimeter Patrol can control and monitor the energizer as well as the JVA ZM20.

Note: The JVA ZM20 cannot determine the fault sector or distance while the energizer is in low power mode.

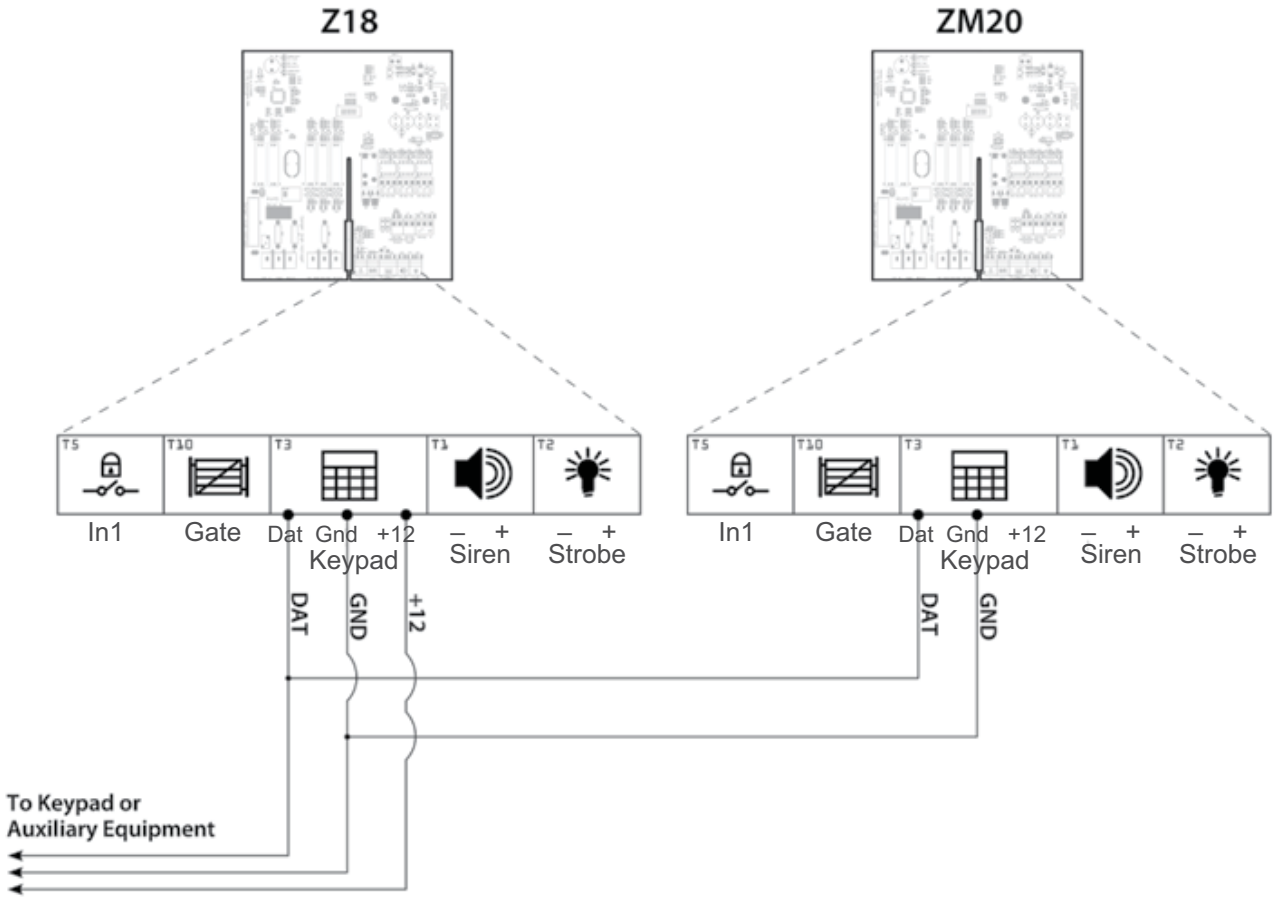
If the JVA ZM20 is to be used with a JVA Z14 or JVA Z18 the JVA ZM20 should not be configured to control the 12V DC power to the energizer. The energizer and JVA ZM20 should instead be configured in Group Mode and controlled using a Z Series LCD Keypad. The JVA Z energizer should always be the master, not a JVA ZM20.

If the JVA ZM20 is armed but the energizer is not, the JVA ZM20 will report an Energizer Fail alarm.

Up to 7 pairs of JVA Z energizers and JVA ZM20s can be connected into a group via the Keypad Bus and this can be extended to over 100 by using PAE212 TCP/IP adaptors.

The Z18 should be configured for maximum power unless doing so causes arcing on the fence.

Low Voltage Wiring



Group Mode configurations

MB8 with a Keypad

- Set the Group ID of the ZM20 to Master (2601#), or leave it in Stand-Alone Mode (2600#)

A ZM20 by itself does not require the Group ID to be configured as it is factory set to Stand-Alone mode.

Z18 with a Keypad

- Set the Group ID of the Z18 to Master (2601#)
- Set the Group ID of the ZM20 to Slave 1 (2602#)

The Group ID of the ZM20 must be 1 value higher than the Group ID of the Z-Series Energizer driving it.

Two Z18s with a Keypad

- Set the Group ID of the first Z18 to Master (2601#)
- Set the Group ID of the first ZM20 to Slave 1 (2602#)
- Set the Group ID of the second Z18 to Slave 3 (2604#)
- Set the Group ID of the first ZM20 to Slave 4 (2605#)

A ZM20 requires the use of 2 Group ID values. This is the reason there is a 'Group ID gap' between the first ZM20 and the second Z18.

Two Z18s connected to Perimeter Patrol through a PAE223 (USB Interface)

- Set the Group ID of the first Z18 to Master (2601#)
- Set the Group ID of the first ZM20 to Slave 1 (2602#)
- Set the Group ID of the second Z18 to Slave 3 (2604#)
- Set the Group ID of the first ZM20 to Slave 4 (2605#)

A ZM20 requires the use of 2 Group ID values. This is the reason there is a 'Group ID gap' between the first ZM20 and the second Z18.

MB8/MB12 connected to Perimeter Patrol through a PAE212 (TCP Interface)

- Set the Group ID of the first ZM20 to Slave 1 (2602#)
- Set the Group ID of the first ZM20 to Slave 3 (2604#)

The PAE212 is the Master device (2601#) in the Group. Therefore all other connected devices must be set Slaves.

The MB8/MB12 is not connected to the Keypad Bus; therefore it does not require a Group ID value. This also means that the Energizer pulses are not synchronised.

Note: MB8s will Auto-synchronise when they are cross coupled due to a fence fault. However a 2.5 metre isolation gap is still required between these fences when complying with International Electric Fence Standards.

A ZM20 requires the use of 2 Group ID values. This is the reason there is a 'Group ID gap' between the first ZM20 and the second Z18.

PROGRAMMING OPTIONS

Like the JVA Z series of Security Energizers, the JVA ZM20 has Non-volatile Memory in which programming options (or setup parameters) can be stored. These are factory pre-set (defaults), but can be programmed using a keypad.

Enter 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 on the JVA ZM20 will now show the first programming option and its current setting.

Pressing the # key will cycle through all the options on the LCD. Not all numbers are used. (See the Options Table below. Also see a table of All Keypad Codes in the Operations section of this manual.)

The default INSTALLER PIN is 012345

To Exit Programming Mode

To exit programming mode, press *#. If left unattended the JVA ZM20 will time out and auto exit after approximately 5 minutes.

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 the INSTALLER or USER PIN cannot be remembered, return the JVA ZM20 memory to default. To do this, remove power (AC off and disconnect the battery), open the JVA ZM20, 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.

Changing an Option

The options have possible values in the range of 0 to 99. Some are limited to lower maximum values.

To change an option value, first check the option number (See table below) and then the table of values for that option. On the Keypad, press the option number followed by the required value.

For example, to change Option 1 to the maximum press 0199#. The keypad will beep twice to indicate that the command was successful. The Energizer LCD will immediately show the updated value.

As the keypad bus is common to a group of Z-Series Energizers and ZM20s, one keypad could be used to program all connected units at the same time. A Group containing Z-Series Energizers and ZM20s MUST NOT get programmed this way as the ZM20 contains different Option values to the Z-Series Energizers. Each ZM20 or Energizer will need to be isolated from the Group Wiring and programmed individually.

Programmable Options Table

Option	Function	Default	Description
01	Fence Voltage Alarm Level	40 (4.0kV)	Sets the voltage below which the Fence Alarm will occur. If either feed voltage falls below this level for more than the Missed Pulse Count a fence alarm (Sector 1) will occur.
02	Feed Current Alarm Level	20A	Sets the threshold to alarm on current from either feed terminal to the fence. If either feed current (*Feed 1* or *Feed 2*) rises above this level for more than the Missed Pulse Count a fence alarm (Sector 1) will occur.
03	Ground Voltage Alarm Level	10 (1.0kV)	Sets the voltage above which the Fence Alarm will occur. If the Ground Voltage rises above this level for more than the Missed Pulse Count a Ground Alarm (Sector 2) will occur. When this alarm is triggered, the JVA ZM20 will display the Sector Number of the fault.
04	Fence Cut Alarm	0	Sets the percentage balance change either side of 50% at which the Fence Cut alarm will occur.
05	Not used	0	
06	Missed Pulse Count	3	Sets the number of pulses which may be missed before the alarm is activated.
07	Battery Alarm Voltage	2 (10V)	Sets the Battery Voltage Threshold below which the general alarm will activate.
08	Siren On Time	4 (3 Mins)	Sets the time that the Siren (and Keypad Beeper) will stay on after an alarm.
09	Siren Off Time	4 (10 Min)	The amount of time the Siren will be off for after the Siren On Time has expired.
10	Siren Cycles	3	The number of times the Siren will sound for the time set in Siren On Time above. After this many cycles the siren will automatically mute.
11	Input Type	0 (N/O)	Allows the Control Inputs to be changed from normally open to normally closed.
12	Input 2 Function	0	Gate Switch
13	Gate Delay	2 (1 Min)	Gate Switch Open Time till alarm sounds.
14	Chime Mode	2 (Siren)	Allows the Keypad and Internal Beeper Function to be altered
15	Not used	0	
16	Binary Options	0	Miscellaneous options
17	Anti-Bridging	0 (Off)	Sets the % threshold for the alarm on a sudden rise or fall of fence current.
18	Sectors	0 (Off)	Sectors 0-20 (0 means none)
19	Not used	0	
20	Auto Rearm Time	0	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	8	Used to assign an alarm function to Relay 1 (Siren Output)
22	Relay 2	9	Used to assign an alarm function to Relay 2 (Strobe Output)
23	Relay 3	0	Used to assign an alarm function to Relay 3
24	Relay 4	2	Used to assign an alarm function to Relay 4
25	Relay 5	7	Used to assign an alarm function to Relay 5
26	Group ID	0	If used as part of a group, this sets the device ID

Programming Options in Detail

Fence Voltage Alarm Level (01xx#)

This option sets the voltage below which the fence alarm will occur. If the fence voltage measured at *Feed 2* (and *Return*) EHT terminals, falls below this level for more than the *Missed Pulse Count* a fence alarm (*Sector 1*) will occur. The value is set directly, not via a table.

For example, to set a threshold of 5.0kV enter: 0 1 5 0 #.

Value (x)	Alarm Level
Minimum	
0	0.0 kV
Default	
40	**9.9 kV**
Maximum	
99	9.9 kV

Do not enter the decimal! The default level is 4.0kv (40), maximum is 99.

It is not strictly necessary to use the voltage alarm level on a JVA ZM20 as it is primarily a current monitor. Setting this option to 0 effectively turns off fence voltage monitoring.

Warning: Setting this level to a higher than normal running voltage of the fence will result in continuous fence alarms.

Feed Current Alarm Level (02xx#)

This option sets the alarm threshold level on current from either feed terminal to the fence. If the feed current rises above this level for more than the Missed Pulse Count a fence alarm (Sector 1) will occur.

The value is set directly, not via a table. For example to set a threshold of 15A enter: 0 2 1 5 #.

Value (x)	Alarm Level
Minimum	
0	0 Amps
Default	
20	**20 Amps**
Maximum	
75	75 Amps

The default level is 20A, the maximum is 75A.

This value must be set below the higher of Feed 1 and 2, shown when a short is placed at the mid point of the fence. The Sector is only shown after a Fence Short alarm occurs.

Ground Voltage Alarm Level (03xx)

This option sets the voltage above which the fence alarm will occur. If a difference in voltage is measured between the *Ground* and *Ground Reference EHT Terminals* of above this level for more than the Missed Pulse Count, a ground alarm (Sector 2) will occur.

The value is set directly, not via a table. For example to set a threshold of 2.0kV enter: 0 3 2 0 #.

Value (x)	Alarm Level
Minimum	
0	0.0 kV
Default	
10	**1.0 kV**
Maximum	
50	5.0 kV

Do not enter the decimal! The default level is 1.0kv (10).

▶▶▶

This can be used to monitor for Ground Stake Voltage or Fence Ground Circuit Voltage depending on the fence wiring.

This setting is irrelevant if the Ground and Ground Reference Terminals are shorted together.

The ground voltage is shown as zone 2 on a keypad.

Fence Cut Alarm Level (04xx#)

Sets the percentage balance change either side of 50% at which the Fence Cut alarm will occur. In normal running, with no faults, the fence currents should be well balanced, i.e. the current Feed 1 and Feed 2 will be close to the same value in Amps. When they are equal the balance value is close to 50%.

Value (x)	Alarm Level
Minimum	
0	Disabled
Default	
0	**Disabled**
Maximum	
50	50%

The Balance can be checked at any time that the fence is on by entering *65# on the keypad.

If the fence is cut the currents will be unbalanced. A setting of 20% means that the Fence Cut alarm will show if the balance moves below 30% or above 70%.

A Fence Short alarm will take precedence over a Cut alarm.

On some fences a fence load device may need to be installed to ensure that this alarm works properly for all fence cuts.

Missed Pulse Count (06xx#)

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 false alarms will occur.

The value is set directly. For example to set a threshold of two bad or missing pulses enter:
0 6 0 2 #.

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

Battery Alarm Voltage (07x#)

This option sets the battery voltage threshold below which the general alarm will activate. The default Battery Alarm Voltage is 10.0 Volts. This alarm can be set to activate one of the relays, and is part of the General Alarm.

Note: The JVA ZM20 will not turn the energizer off when the battery voltage is low. But if the supply voltage falls too low the relay powering the external energizer will eventually drop out.

Value	Alarm
0	9.0 V
1	9.5 V
2	10.0 V
3	10.5 V
4	11.0 V
5	11.5 V
6	12.0 V
7	12.5 V
8	13.0 V
9	13.5 V

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 Siren *Off* Time indicated in the table. 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
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 *Off* Time (09x#)

This option sets the amount of time the siren will be off for after the Siren *On* Time 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 Cycles (10x#)

This option sets the maximum number of times the siren will sound for the Siren *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.

The value is set directly. For example to set two siren cycles enter: 1 0 2 #.

The default is 3, minimum is 1 and the maximum is 9.

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

Input Type (11x#)

The control inputs can be inverted.

Unless an input is used for a Gate Switch, in which case it is always NC.

Value (x)	Input type
0	**N/O Normally open**
1	N/C Normally Closed

Input 2 Function (12x#)

This input cannot be configured to anything other than a Gate input at this time.

Gate Delay (13x#)

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

Chime Mode (14x#)

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

This option allows the JVA ZM20 Internal Beeper and the 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).

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

Gate Beeps plus Siren will give 2 beeps on Gate open and 4 on Gate close, plus continuous beeping for an alarm. Beeps are on the Keypad only, not the internal beeper.

Binary Options (16x#)

Value	Function
0	**None**
+1	Engage DFD
+2	Non Z series energizer

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

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

+1: Enable DFD ™ (Distant Fault Detection). Not implemented on the ZM20 yet.

+2 Set if using a ZM20 in a group where the energizer is not a Z series energizer. This tells the ZM20 that the energizer may not be synchronised.

Anti-Bridging Threshold (17x#)

Value (x)	Threshold
Minimum	
0	Disabled
Default	
0	**Disabled**
Maximum	
90	90%

Anti-bridging has been designed to detect a section of fence being bypassed, and removed by an intruder bridging the adjacent fence sections together. This also detects when the *Feed 1* is connected to *Feed 2* with a short cable by a would-be intruder aiming to disable the fence.

Setting this option to a value greater than 0 (default is 0 = off) will enable Anti-bridging.

While armed, a Fence Alarm will trigger if the total fence current rises OR falls quickly by more than the threshold. A slow change to the current will trigger a fence alarm when the current is more than the Current Alarm Level (02x#)

The Anti-Bridging Threshold is a percentage value of the fence current.

For example, setting option 17 to 50 (1750#) will set a 50% Anti-Bridging Threshold. At this level a fence current normally reading 10 Amps will trigger a fence alarm if the current quickly rises to over 15 Amps or falls to less than 5 Amps.

Measuring fence current to determine if a fence is bridged will work irrespective of the energizer type powering the fence.

Sectors (18x#)

Setting this option from 2-20 engages Sectoring and tells the system how many sectors the fence is divided into.

When a fault occurs (as defined by the total current exceeding the Current Alarm Level set in Option 02), the JVA ZM20 will determine in which sector the short exists.

Each sector division needs to be programmed into the JVA ZM20. The sector programming procedure is outlined below.

Value (x)	Sectors
Minimum	
0	Disabled
Default	
0	**Disabled**
Maximum	
20	20 Sectors

Warning: Setting this option to 0 clears all sector calibration data.

Note: The JVA ZM20 cannot show more than one faulted sector at any one time.

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

Relay Functions

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

Relay 1 is (**21x#**)
Relay 2 is (**22x#**), etc.
Defaults for the JVA ZM20

- Relay 1 – Siren (8)
- Relay 2 – Strobe (9)
- Relay 3 – Fence 1 (0)
- Relay 4 – Armed (2)
- Relay 5 – General (7)

Note:

1. The siren and strobe switched 12V outputs can be used to drive external buffer relays.
2. On the JVA ZM20 *Fence 2* means Ground Voltage Alarm.

Value (x)	Mode
0	Fence Alarm
1	Fence Alarm or Disarmed
2	Armed
3	Ground Alarm
4	Ground Alarm or Disarmed
5	**Not used**
6	Fence or Ground Alarm
7	General
8	Siren
9	Strobe
10	AC Fail
11	Low / Bad Battery
12	**Not used**
13	**Not used**
14	Gate Alarm
15	Siren caused by Gate Alarm

Function	Logic for alarm state (opposite of normal state)
Fence Alarm	The JVA ZM20 is Armed (energizer on) AND any Fence alarm occurs, these include: – The Fence Voltage has fallen below the Fence Voltage Alarm Level (Low Voltage) – The Feed Current has increased above the Feed Current Alarm Level (Short) – Or Anti-Bridging, Energizer fail or Fence Cut alarm. for more Energizer pulses than the *Missed Pulse Count* setting. Not latched.
Fence Alarm or Disarmed	The JVA ZM20 is Disarmed OR any Fence alarm occurs, these include: – The Fence Voltage has fallen below the Fence Voltage Alarm Level (Low Voltage) – The Feed Current has increased above the Feed Current Alarm Level (Short) – Or Anti-Bridging, Energizer fail or Fence Cut alarm. for more Energizer pulses than the *Missed Pulse Count* setting. Not latched.
Armed	The JVA ZM20 is Armed (energizer on)
General	*AC Fail* OR *Tamper* OR *Low Battery* OR *Gate Alarm* OR *Internal Error*. Latched for internal errors only.
Siren	*Fence Alarm* OR *Gate Alarm* OR *Tamper*. This will time out after the Siren Time Out time. This function is latched.
Strobe	As per Siren but does not time out, will remain on until both channels are switched off. This function is latched.
AC Fail	Alarm on AC Fail
Battery	Alarm on low or bad battery
Ground Alarm	The JVA ZM20 is Armed (energizer on) AND the Ground Voltage has risen above the Ground Voltage Alarm Level for more Energizer pulses than the Missed Pulse Count setting. Not latched.

Group Mode (26x#)

The JVA ZM20 cannot be a group master. If JVA ZM20's are included in a group they should be slaved to a JVA Z series energizer.

For example a JVA Z14 could be the master and the JVA ZM20 a slave. This will allow a PC or Keypad to control both devices at once.

In Perimeter Patrol the JVA ZM20 appears as a 2 Zone Energizer showing Feed Voltage for Zone 1 and Ground Voltage for Zone 2.

A group must have only 1 master. The other Energizers/Slaves in the group are slaves. As the keypad bus is common among the group, one keypad could be used to program all Energizers/ ZM20 for all Options. As the JVA ZM20 contains different Option values to the JVA Z-Series Energizers, it MUST not be programmed this way.

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

The correct procedure is:

Connect the keypad to each Energizer/ZM20 in turn, programming each Option as required before linking the Keypad bus into a group.

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

As of code version 1.58+ the ZM20 can now be a group master in limited circumstances.

Groups can now be made up of:

ZM20's (driven by MB8 or similar energizers) or Z series energizers and ZM20's

If the group contains Z series energizers an energizer should be the master.

If one or more ZM20's are connected via a TCP/IP board to a PC then the TCP/IP board will be the master.

If any ZM20 in a group is coupled to a non Z series energizers all slave ZM20's must have Option 16 set to 2.

Since MB8's or similar energizers cannot be synchronised over the keypad bus the normal rules regarding using an isolation barrier between two fences powered by non-synchronised energizers apply.

In Perimeter Patrol the ZM20 appears as a 2 Zone energizer showing Feed voltage for Zone 1 and Ground voltage for Zone 2.

If you are controlling ZM20's in a group using a keypad then the ZM20's should be spaced 2 ID's apart like a Z28.

Keypad Programming

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.

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 IDENTIFIERS*
- *KEYPAD ADDRESS*

Connecting Multiple Keypads to a System

Up to three keypads may be used to remotely monitor and control the JVA Z Series Security Energizers.

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 energizer using the keypad (configured to *ADDRESS 1*), by pressing *[USER PIN]**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 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.

To Exit Keypad Programming

When programming is complete, press [*] [#].

Note: The keypad will also exit the programming mode if no key is pressed 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.

Connecting Multiple Keypads to a system

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. 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 [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 un-authorised 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.

The backlight has three modes which are toggled using the [*][8][#] key sequence. The three modes are:

- Always Off
- Timeout Mode
- Always On

In Timeout Mode the backlight will turn on if a new alarm or trouble condition is received or if a button is pressed, and turn off 20 seconds after the Alarm or Trouble condition is received or 20 seconds after a key has been pressed.

Notes Regarding Keypad Configuration

Zone 1 (the master) must be connected to the group. If it is not connected, the other energizers 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 Energizer disconnected from the Group will talk only to a keypad if it has a keypad address of 1 or 8.

Notes: 1. When adding/removing an energizer 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.

2. When re-analysing a group ensure all energizers are disarmed. If they are not, this function may not work properly.
3. If the group ID has recently been changed, ([PIN]*68#) may need to be re-entered before the new ID's will be properly reported to the keypad.

SECTOR PROGRAMMING METHOD

In order to determine which Sector the fault is in, the system must be programmed with the end position of each sector (the division between each sector, also known as the sector “split”).

Note: Make sure the JVA ZM20 cover is on if there is any chance of sunlight hitting the PCB. Bright light shining on the IR optical couplers will cause errors in the readings.

1) **Clear the Settings**

   The sectoring system defaults to off (option 18 = 0).

   When first setting up a new fence leave sectoring off until you are sure the fence is working correctly and there are no faults. If the sectoring system was previously on, turn it off now to clear the settings by changing option 18 to 0. Exit programming mode.

2) **Check the Fence**

   Check the fence with a JVA Fault Finder. The current from each feed (Feed1 and 2 measured at the fence) should be the same, or very similar. If one is much higher than the other, there may be a fault, in which case do not proceed until all faults have been eliminated.

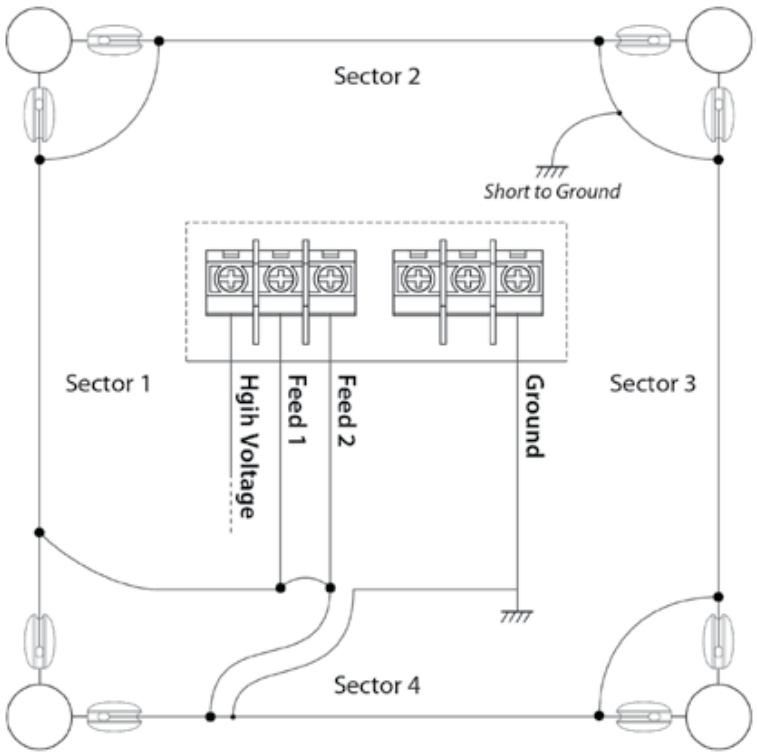
3) **Check that the JVA ZM20 goes into Current Alarm**

   Place a link from Feed 1 to Feed 2 at the JVA ZM20 terminals, leaving the wiring to the fence in place.

   Place a short (using a crocodile clip jumper cable) on the fence at approx-imately the midpoint (end of sector 10 for a 20 sector fence) from live to a ground wire. This represents the hardest fault to detect, as other positions will draw more current.

   Turn the fence (JVA ZM20 and energizer) on.

   Check that the JVA ZM20 goes into alarm. If it does not, reduce the setting of Option 2.



Tips:

a) To ensure the JVA ZM20 goes into current alarm turn voltage alarming off by setting option 1=0 (010#) and turn anti-bridging off, by setting option 17=0 (170#).

b) Since the sector programming means placing intentional shorts on the fence, to stop alarms sounding, remove any connection to a siren and set programming option 14 to 0 to stop the keypad and JVA ZM20 from beeping. Finally set option 6=9 (069#) to provide enough time to read the Fence Current once the system is settled.

c) Set Option 2 to a value less than the minimum Feed Current as displayed on the JVA ZM20 display.

4) **Check the Current Balance**

With the link and fence short still in place from step 3 above, check that the position reading is at 50% of full fence length. Note that you can view the balance by pressing *65# at any time. If the reading is not very close to 50%, you will need to re-balance the current sensors by entering the re-balance keypad sequence [INSTALLER PIN]*10#.

Alarm – Short
at 50.33%

Note: The JVA ZM20 will not re-balance if either current is less than 5A or greater than 75A. If you cannot achieve balance do not proceed. Contact your JVA distributor for help.

Assuming you did achieve balance, disarm the JVA ZM20.

Remove the link from Feed1 to Feed2 at the JVA ZM20 terminals.
Remove the short you placed on the fence from step 3.

5) **Engage Sectoring**

Enter programming mode ([INSTALLER PIN]*0#) and set option 18 to 20 (for 20 sectors, or however many sectors the fence actually has). Exit programming mode.

6) **Record Sector End Points**

Place a short (using a crocodile clip jumper cable) at the very end of sector 1 between live and earth preferably using the fence earth wire nearest the exit point of sector 1. Sector 1 is the sector directly powered from the Feed 1 terminal.

If you are using a Sector Divider place the short from the centre terminal to ground.

When the JVA ZM20 goes into alarm it will display *Sector 1 – Short* and the position (as a percentage of the whole fence length. Make sure the reading is steady. If it is fluctuating wait until it settles.

Enter the code [INSTALLER PIN]*101# to store the position of the end of sector 1 into the JVA ZM20 memory.

Record the position percentage in the table provided on page 47.

Remove the short at the end of Sector 1 and move it to the end of Sector 2. When the JVA ZM20 goes into alarm it will display *Sector 2 – Short*.

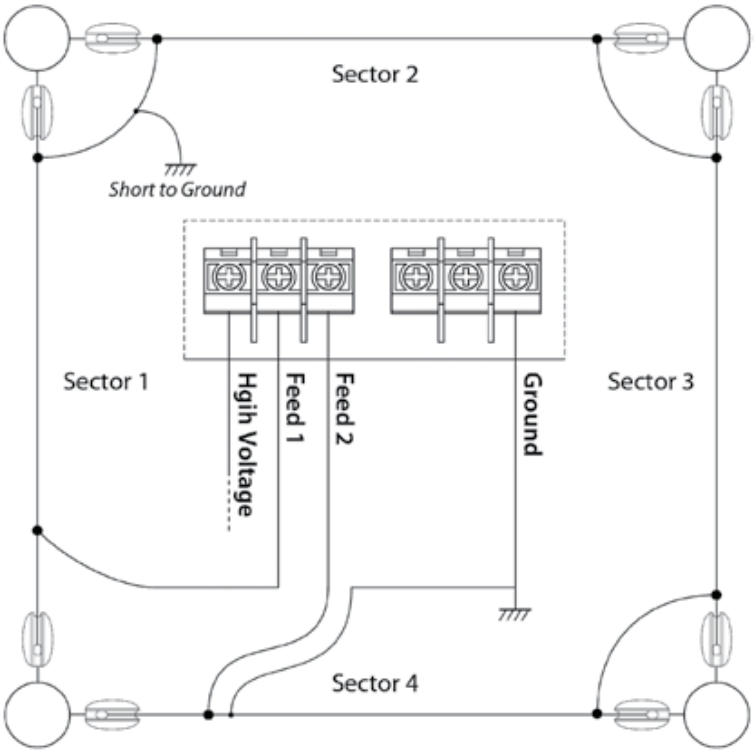
Enter the confirmation code [INSTALLER PIN]*102#.

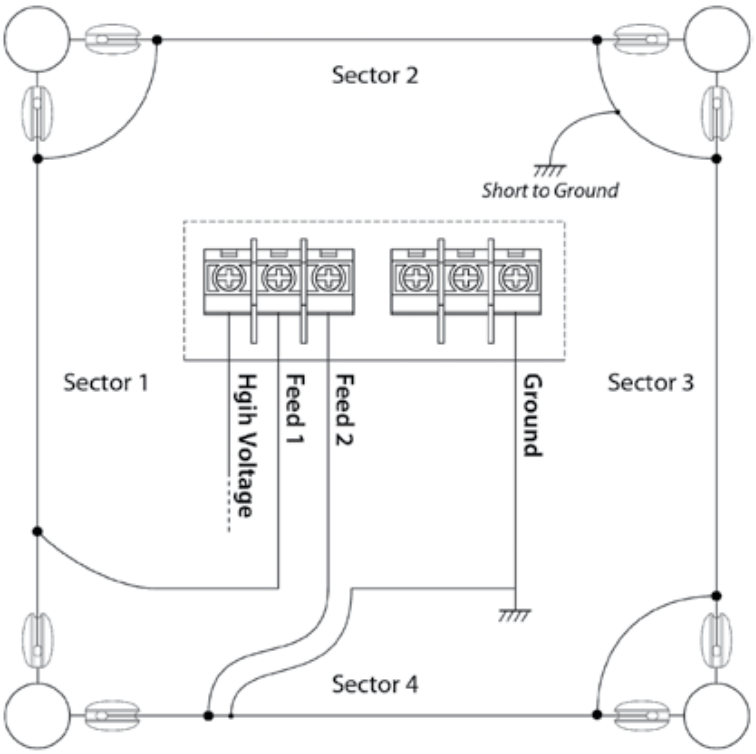
Record the position percentage in the table provided on the following page.

Continue to move the short to each sector end and enter the sector confirmation code as [INSTALLER PIN]*1[Sector Number]#. The sector number is always a two digit value; therefore sector 3 is entered as 03.

Note: The last short will be placed at the end of Sector 19 for a 20 sector fence, not at the end of Sector 20 as this is directly connected to Feed 2.

Sectors MUST be entered in sequence. The JVA ZM20 display will show the expected Sector number when a short is applied.





7) **Confirm the Sector Percentages are Correct**

Check the table of sector end positions (percentages) recorded. If any were missed, you may use *66# (while disarmed) to show them again. Press the # key (slowly) to step through the sectors.

These numbers must be in increasing order! If for example the reading for end of sector 3 is lower than that for sector 2, something is wrong. If the sectors are short and there is no difference between the reading for one sector and the next you may need to fit a passive sector definer between them. There should be approximately 5% difference between each sector.

If a mistake is made, the sector memory may need to be cleared by setting option #18 to 0 and then exiting programming mode. Re-enter programming mode and set option #18 back to the desired number of sectors. Start the process over from step 4).

8) **Check the Sector Positions are Working**

After recording all the sector end points, return to sector 1 and place a short somewhere on Sector 1. Check that the JVA ZM20 reports Sector 1. If you are close to the end of sector 1 the JVA ZM20 may report Sector 1 and 2 (alternating).

9) **Restore the Alarm Settings**

Remember to set and check the voltage alarm setting in Option 1 (if used) and the Anti-bridging setting in option 17.

If you removed siren wiring in step 3 and or inhibited the onboard beeper (J6) or the Keypad Beeper, also restore them to their correct settings and check that they operate.

Note: If after sector programming the fence, it is altered (wires added or removed) or sector dividers are added, the entire sector programming sequence will need to be repeated from step 1.

CUSTOMISED CODES

Customer Pin No. .....

Installer Pin No: .....

INSTALLER DETAILS

Name .....

Phone No. .....

Date Of Installation .....

Site Sector Record

Recording the actual sector split positions will help in fault finding at a later date.

Sector End	Position (% of total fence length)	Feed 1 A	Feed 2 A	kV
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
12				
13				
14				
15				
16				
17				
18				
19				
No Short	(Balance – Use *65#)			

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:
RSA JVA Service Department P.O. Box 13898,
Cascades 3202, Republic of South Africa • support @jva-fence.com

Z-RANGE

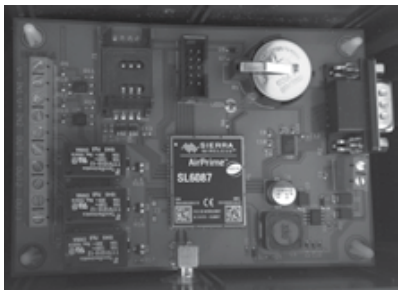
Z14 STANDARD AND BI-POLAR ENERGIZERS

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

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. RSA 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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EUROPE


RUSSIA


INDIA


USA


MEXICO


CENTRAL ASIA


UNITED KINGDOM

JVA RSA 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
Delarey, 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
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