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IO Tech Manufacturing (Pty) Ltd will, at its discretion, either repair or replace a product that proves to be defective.

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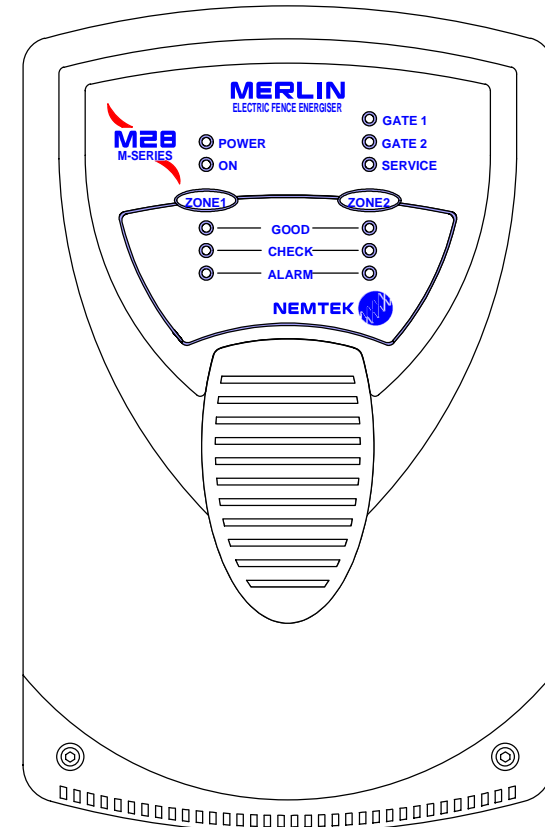
MANUFACTURED IN SOUTH AFRICA

E-NM28
E-NM25



MERLIN II M-SERIES ELECTRIC FENCE ENERGISER

INSTALLATION MANUAL



Installation procedures

Step1: Open the lid by removing the two cap screws. Unplug the battery terminals if connected.

Step2: Unplug the key-switch wires

Step3: Remove the transport screws

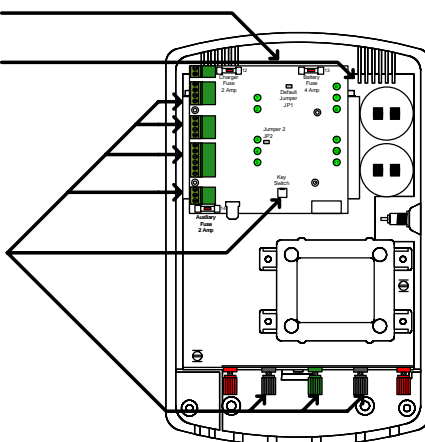
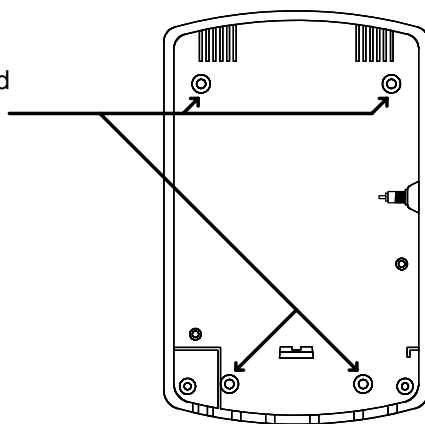
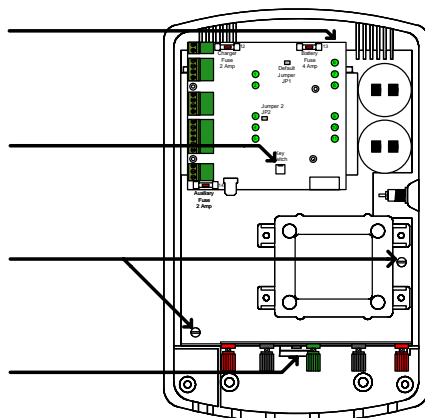
Step4: Unclip with screwdriver and remove energiser chassis

Step5: Drill 4 x 8mm holes for mounting the unit. Four nail in anchors are supplied with the unit. Insert the plastic sleeve of the nail in anchor from the inside of the box and then hammer the screw in with a screw driver and hammer.
NB. Always insert the plastic sleeve on the inside of the box.

Step6: Insert the battery in the chassis below the energiser board with the positive terminal to the top.

Step7: Put the energiser chassis back by inserting the top first and push in the bottom till it locks. Take care that the key-switch wires are clear.

Step8: Connect all the external, key-switch and battery wires. Close the lid by hooking the top of the lid in first and fasten the bottom down. Apply mains to the charger.



Frequently asked questions.

Q: The **fence alarm** goes off and the alarm indicator light does not stop flashing even after I switch the fence off?

A: There is most probably a fault on the fence. Switch the energiser off and disconnect the fence wires at the energiser. Take a short piece of HT wire and bridge the fence-out (Red) and fence-in (Black) terminals. Switch the energiser back on, if the fence indicates GOOD then the energiser is working correctly and the fault is on the fence.

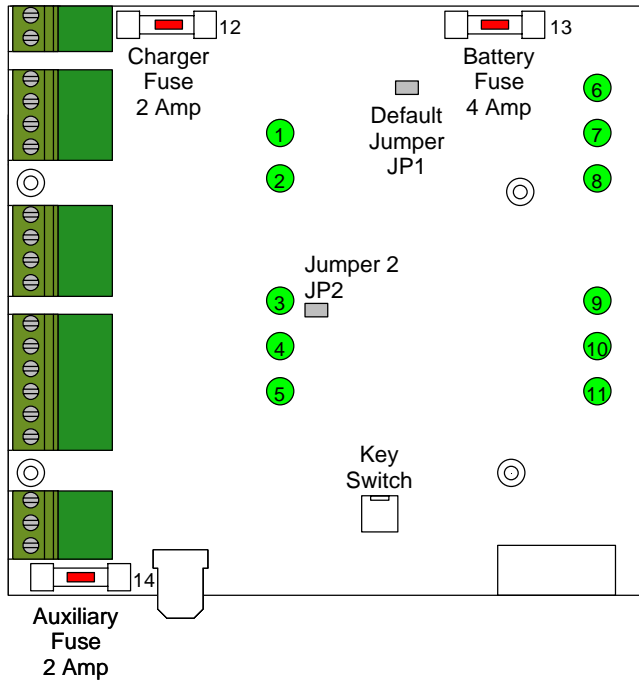
Q: After I opened the lid I **can't switch the energiser back on**?

A: The energiser has a built-in safety switch to avoid electrical shock. If you have to work on the unit while the lid is removed insert jumper 2 (JP2). See page 13

Q: When and for how long will the **siren** sound?

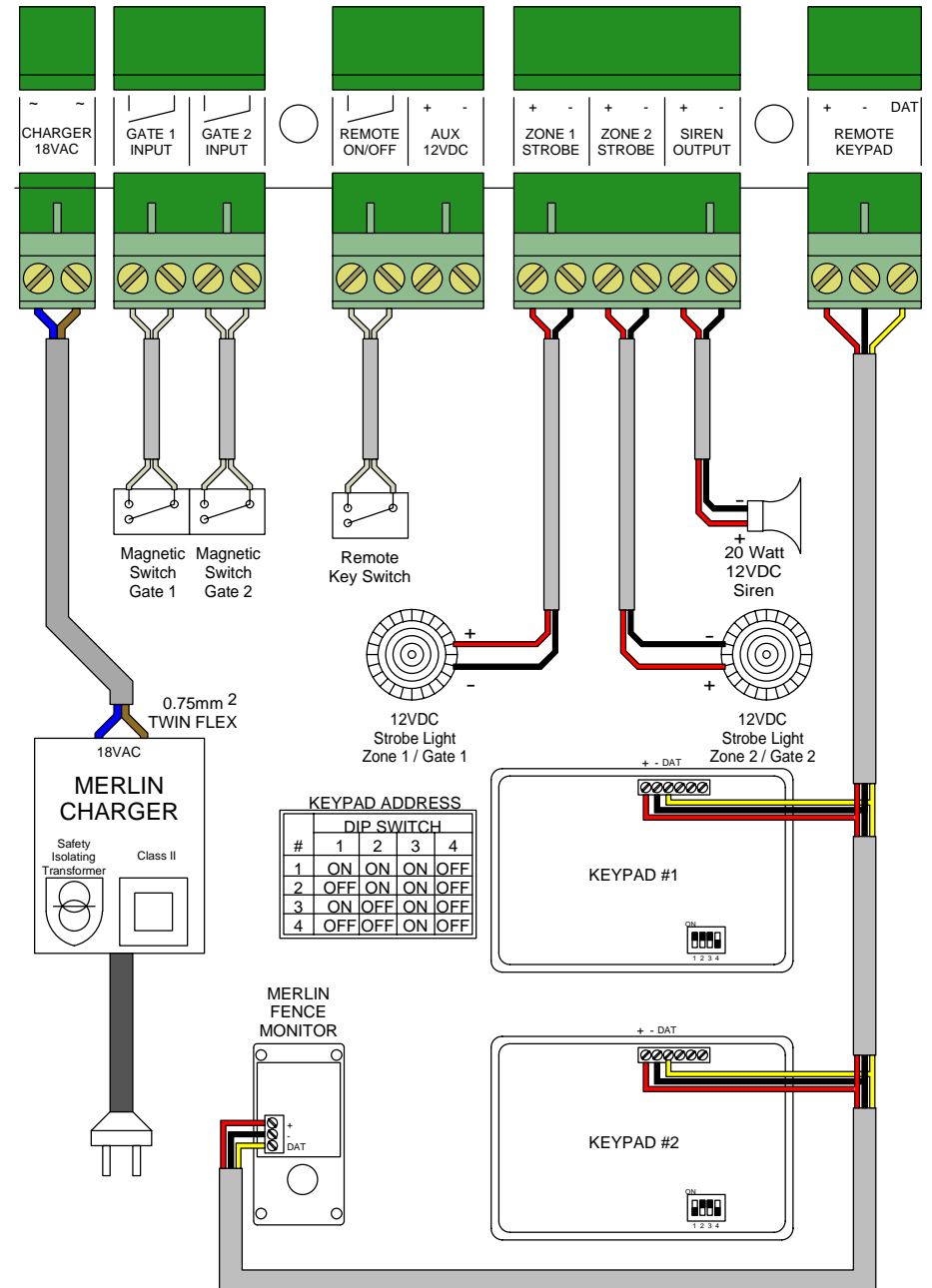
A: The siren will be activated by one of the following conditions: Fence Alarm, Gate Alarm, Service Alarm or by holding the Panic button (on the keypad) in for 3 seconds. For a permanent fault like a broken fence wire, the siren will sound for 4 minutes (*Siren-on Time*) or until the user resets the energiser by switching it off and on again. If the energiser is not reset then it will sound the alarm again after 5 minutes (*Siren-off Time*). This siren on-off cycle will repeat itself 4 times (*Number Of Times The Siren Sounds*) after which the siren will not sound unless the fault, broken wire is repaired. For a more intermittent fault like arcing on the fence the siren will sound for 4 minutes followed by a silent period of 5 minutes. The siren is now ready to repeat the 4 minutes on and 5 minutes off cycle as soon as the next fault condition (arcing) occurs. This on-off cycle will repeat 4 times after which the siren will then be silent for 1 hour (*Siren Auto Rearm Time*). Any faults during the 1 hour will restart this time-out period. At the end of the 1 hour fault free period the siren will rearm automatically and will sound on the next fault condition. The installer can change all the above alarm settings through the keypad. See the following Installer Programming Options: *Siren-On Time*, *Siren-Off Time*, *Number Of Times The Siren Sounds* and *Siren Auto Rearm Time*.

Board Layout

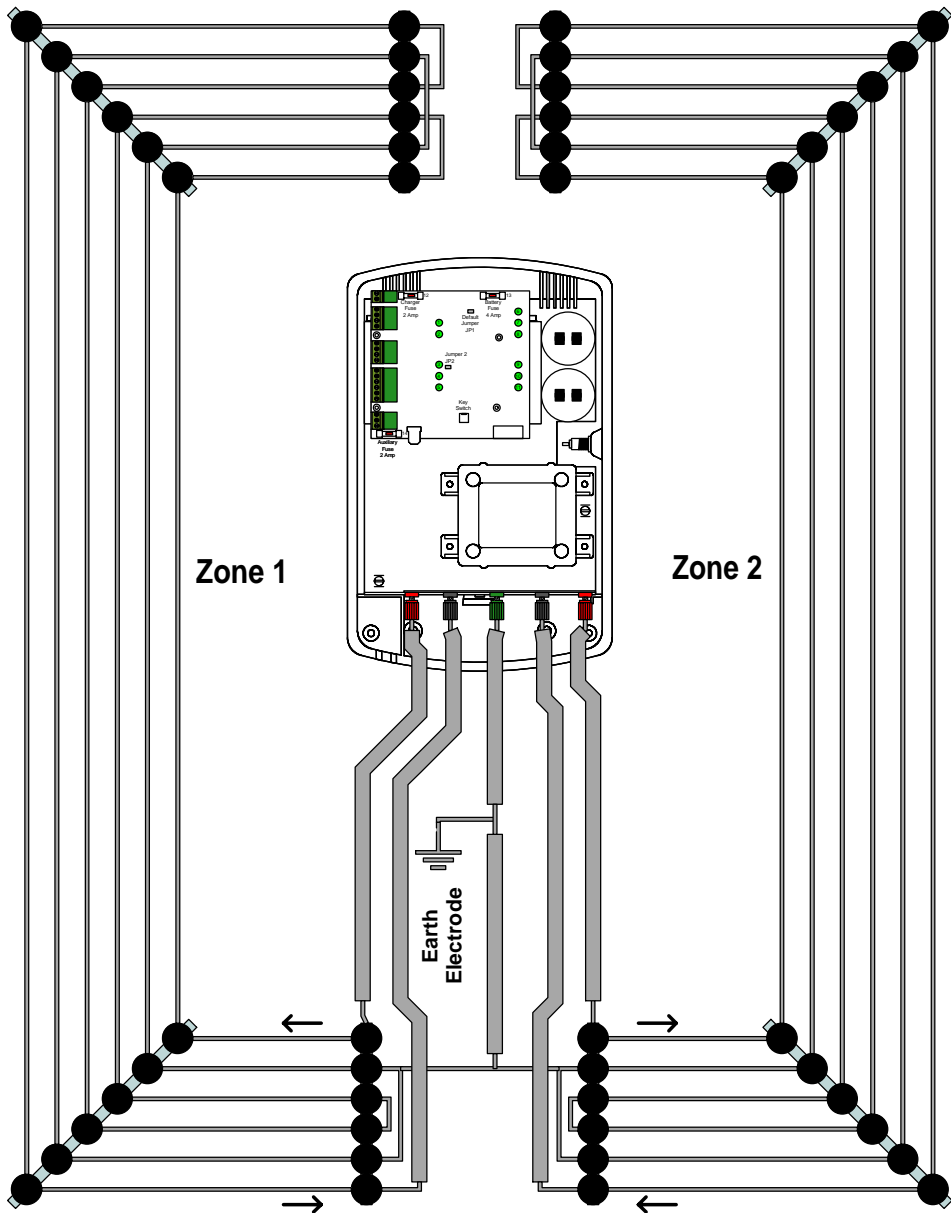


1. Disconnect the mains and battery terminals before replacing any fuses.
2. The Auxiliary fuse powers the Siren, Strobe lights and keypads.
3. For normal operation make sure jumper 1 (JP1) is inserted and jumper 2 (JP2) is removed.
4. Lights 12, 13 and 14 are located underneath the fuses. Take care not to damage these lights (LED's) when replacing the fuses.

Low Voltage Wiring Diagram



High Voltage Wiring Diagram



IMPORTANT: Keep all these wires away from the low voltage wires

Fault Finding

General fault conditions:

Condition	Power	On	Service	Siren	Comment
Normal	On	On	Off	Off	Normal no fault
Power Fail	Off	On	Off	Off	Check if charger is plugged in
Battery Low	Flash	On	Off	Off	Check charger and fuses
Battery Flat	Flash	Flash	Flash	On	Check charger and fuses
Low Voltage	On	Flash	Off	Off	Fence in low voltage mode
Service			Flash	On	Service fault see next table

Service fault conditions:

There are 6 possible conditions that can cause a service alarm. To determine the cause of the service alarm open the lid of the energiser box while the service light is flashing. Make sure that jumper 2 (JP2) is NOT inserted. The following lights will indicate the cause of the service condition:

Condition	Light (Page14)	Comments
Energiser Faulty	Alarm (5)	Send in for repair
Battery Flat	Power (1)	Check charger and fuses
¹ Battery Faulty	Battery Fuse (13)	Check battery fuse or replace battery
Memory Faulty	Check (4)	Default to factory settings or send in for repair
Keypad Faulty	On (2)	Check keypad wires and address or send keypad and energiser in for service. See programming function 19.
² Charger Faulty	Charger Fuse (12)	Check charger fuse and charger voltage at energiser. (16VDC or 18VAC)
Aux Fuse Faulty	Aux Fuse (14)	Check auxiliary fuse, keypad, siren and strobe light wires.

¹ To reset a service alarm caused by a battery fault you have to do a manual battery test (*6#) or load the factory defaults. If you do a manual battery test it will only reset the service condition after the battery test (5 minutes).

² A faulty charger will not immediately cause a service alarm but it will cause the battery to run down and that will cause a Battery Flat service alarm.

Programming Notes

1. To load **factory default** programming options: Unplug the charger from the mains, disconnect one battery terminal and remove Default Jumper JP1. Reconnect the battery terminal and apply mains to the charger. After the energiser has switched on replace the Default Jumper.
2. After changing the **Fence Alarm Voltage** setting make sure that a short and open circuit fault can still activate the alarm.
3. The **Fence Voltage** setting is measured with no load on the energiser. It is possible that the output voltage is lower or higher than indicated in the table if a fence is connected to the energiser.
4. If you set the **Battery Alarm Voltage** to option 0 then the battery will drop out (disconnect itself) before any low voltage indicator will come on. The battery drops out at 9.5 Volts.
5. If you use the **Gate2** input to switch between high and low fence voltage (Option 13). Then High Voltage = Closed and Low Voltage = Open contact. When in this mode you will not be able to change the fence high / low voltage mode from the keypad.

Installation Notes

1. Keep the high and low voltage **wiring** separate.
2. Use only 0.75mm² or thicker cable between the **charger** and energiser. The charger voltage at the energiser, while it's pulsing must not drop below 16 VAC or 18 VDC.
3. The wire between the **remote key switch** and the energiser can be up to a 100m and the switch contact must be closed for the energiser to be on.
4. The **auxiliary 12VDC** can be used to power a remote receiver but the power consumption must not exceed 0.1 Amps.
5. The **siren** and **strobe light** together must not draw more than 1.75Amps.
6. To connect a **radio alarm transmitter** or **alarm panel** to the energiser use an isolation relay between the strobe light output and the panel. Never use the energiser battery to power a radio alarm transmitter or alarm panel.
7. The wire between the **magnetic gate switch** and the energiser can be up to a 100m but must not run in parallel with the fence wires. The gate switch must be open circuit if the gate is open.
8. The **remote keypad cable** must not exceed a 100m in total. Avoid running this cable in parallel with any fence (high voltage) wires.
9. Make sure the **keypad address** dipswitch is set correctly according to the table in the low voltage wiring diagram. You can connect a total of 4 keypads and or fence monitors to one energiser. Remove the power to the keypad before changing the dipswitch settings.
10. Use **high voltage insulation wire** between the fence and energiser, including the earth wire. Never run these wires in the same conduit or through the same hole as the low voltage wires.
11. Always use ferrules or line clamps to connect two **high voltage wires** together. Avoid using different types of material for connections like copper on steel.
12. The **fence** must be **earthed** properly with at least one earth electrode as close as possible to the energiser. A good rule of thumb is an earth electrode for each 100m of fencing. The distance between the fence earth electrode and other earth systems shall be not less than 10 m.
13. When **replacing the lid** of the energiser hook the top in first while holding it an angle and then push it closed at the bottom. Fasten the lid down with the two cap screws.
14. If the **indicator lights** (LED'S), that protrude into the lid are not straight then the lid will not close properly or will damage the indicator lights. Bend the indicator lights straight very gently.
15. Always **test** the **fence** alarm for a short and open-circuit after installation at the furthest point on the fence.

Installer Programming Options

Enter Programming mode □ □ □ □ □ □ * 0

Before any of the installer options can be changed the unit must be in programming mode. To do so enter the 6 digit installer PIN followed by the * 0 # keys.

- The keypad will beep twice if the PIN was correct. The unit is now in programming mode.
- If no key is pressed for one minute, the system will automatically exit the programming mode.
- The default Installer PIN is: **0 1 2 3 4 5**

Exit Programming mode *

When finished it is important to exit the programming mode. While in programming mode you will be unable to access any user functions from the keypad.

Installer PIN 0 0 □ □ □ □ □ □

The default installer PIN can be changed by pressing the '0' key twice followed by the new PIN and the # key.

- The new PIN must be 6 digits long.
- If you can't remember the PIN, default the unit and use 0 1 2 3 4 5 as the PIN.

Siren-On Time 0 1 □

The time that the siren will be on for can be changed by pressing the '0' key followed by the '1' key. Select the desired time from the table and press the corresponding number from 0 to 9 followed by the # key. The keypad will beep twice to indicate that the new setting was accepted.

Example: To change the Siren-On Time to 3 minutes enter the following. **0 1 4 #**

The default Siren-On Time is 4 minutes.

0	10 Sec
1	30 Sec
2	1 Min
3	2 Min
4	3 Min
5	4 Min
6	5 Min
7	6 Min
8	7 Min
9	8 Min

Siren-Off Time 0 2 □

The time period for the siren to be silent after the Siren-On Time has elapsed can be changed by pressing the '0' key followed by the '2' key. Select the desired time from the table and press the corresponding number from 0 to 9 followed by the # key. The keypad will beep twice to indicate that the new setting was accepted.

Example: To change the Siren-Off Time to 30 minutes enter the following. **0 2 5 #**

The default Siren-Off Time is 5 minutes.

0	0 Min
1	1 Min
2	5 Min
3	10 Min
4	15 Min
5	30 Min
6	1 Hour
7	3 Hours
8	6 Hours
9	12 Hours

Installer Programming Options

Battery Test Duration 1 8 □

The duration of the battery test can be changed by pressing the '1' key followed by the '8' key. Select the desired time period from the table and press the corresponding number from 0 to 9 followed by the # key. The keypad will beep twice to indicate that the new setting was accepted.

Example: To change the Battery Test Duration to 30 minutes enter the following. **1 8 5 #**

The default Battery Test Duration is 5 minutes.

0	1 Min
1	2 Min
2	5 Min
3	10 Min
4	15 Min
5	30 Min
6	45 Min
7	60 Min
8	90 Min
9	120 Min

Keypad Detect Switch 1 9 □

The keypad detect switch can be changed by pressing the '1' key followed by the '9' key. Select the desired state from the table and press the corresponding number from 0 or 1 followed by the # key. The keypad will beep twice to indicate that the new setting was accepted.

0	Keypad Detect = OFF
1	Keypad Detect = ON

Example: To switch the Keypad Detect Switch on, enter the following. **1 9 1 #**

The default Keypad Detect Switch is option 0. The energiser will not give a service alarm if there is no keypad(s) connected.

Siren Auto Rearm Time 2 0 □

The time period for the siren to automatically rearm it self, if no alarm condition is present, can be changed by pressing the '2' key followed by the '0' key. Select the desired time from the table and press the corresponding number from 0 to 9 followed by the # key. The keypad will beep twice to indicate that the new setting was accepted.

Example: To change the Siren Auto Rearm Time to 5 minutes enter the following. **2 0 2 #**

The default Siren Auto Rearm Time is 1 hour.

0	0 Min
1	1 Min
2	5 Min
3	10 Min
4	15 Min
5	30 Min
6	1 Hour
7	3 Hours
8	6 Hours
9	12 Hours

Installer Programming Options

Low Power Fence Alarm Voltage

1 5 □ #

The low power fence alarm threshold voltage can be changed by pressing the '1' key followed by the '5' key. Select the desired voltage from the table and press the corresponding number from 0 to 4 followed by the # key. The keypad will beep twice to indicate that the new setting was accepted.

0	500 Volts
1	700 Volts
2	900 Volts
3	1200 Volts
4	1500 Volts

Example: To change the Low Power Fence Alarm Voltage to 900 Volts enter the following. **1 5 2 #**

The default Fence Alarm Voltage is 700 Volts.

Battery Alarm Voltage

1 6 □ #

The battery low and alarm threshold voltages can be changed by pressing the '1' key followed by the '6' key. Select the desired voltage from the table and press the corresponding number from 0 to 9 followed by the # key. The keypad will beep twice to indicate that the new setting was accepted.

	Low	Alarm
0	9.0 V	8.0 V
1	9.5 V	8.0 V
2	10.0 V	9.0 V
3	10.5 V	10.0 V
4	11.0 V	10.0 V
5	11.5 V	10.0 V
6	12.0 V	11.0 V
7	12.5 V	11.0 V
8	13.0 V	11.0 V
9	13.5 V	11.0 V

Example: To change the Battery Alarm Voltage to Low = 10.0 Volts and Alarm = 9.0 Volts enter the following. **1 6 2 #**

The default Battery Alarm Voltage is Low = 11.0 Volts and Alarm = 10.0 Volts

Battery Test Interval

1 7 □ #

The frequency at which the unit test the battery can be changed by pressing the '1' key followed by the '7' key. Select the desired time period from the table and press the corresponding number from 0 to 9 followed by the # key. The keypad will beep twice to indicate that the new setting was accepted.

0	12 Hours
1	1 Day
2	2 Days
3	5 Days
4	7 Days
5	14 Days
6	30 Days
7	60 Days
8	90 Days
9	Never

Example: To change the Battery Test Interval to every 7 days enter the following. **1 7 4 #**

The default Battery Test Interval is 1 day.

Installer Programming Options

Number Of Times The Siren Sounds

0 3 □ #

The number of times the siren will sound after an alarm is activated can be changed by pressing the '0' key followed by the '3' key. Select the desired number of times from the table and press the corresponding number from 0 to 9 followed by the # key. The keypad will beep twice to indicate that the new setting was accepted.

0	Continuous
1	1 Time
2	2 Times
3	3 Times
4	4 Times
5	5 Times
6	10 Times
7	20 Times
8	30 Times
9	40 Times

Example: To change the Number Of Times The Siren Sounds to 10 times enter the following. **0 3 6 #**

The default Number Of Times The Siren Sounds is 4 times.

Gate 1 Delay Time

0 4 □ #

The time delay for gate 1 to stay open before the alarm is triggered can be changed by pressing the '0' key followed by the '4' key. Select the desired time delay from the table and press the corresponding number from 0 to 9 followed by the # key. The keypad will beep twice to indicate that the new setting was accepted.

0	15 Sec
1	30 Sec
2	60 Sec
3	90 Sec
4	2 Min
5	3 Min
6	4 Min
7	5 Min
8	10 Min
9	15 Min

Example: To change the Gate 1 Delay Time to 60 seconds enter the following. **0 4 2 #**

The default Gate 1 Delay Time is 4 minutes.

Fence Voltage

0 5 □ #

The open circuit fence voltage can be changed by pressing the '0' key followed by the '5' key. Select the desired voltage from the table and press the corresponding number from 0 to 9 followed by the # key. The keypad will beep twice to indicate that the new setting was accepted.

0	4.5 kV
1	5.0 kV
2	5.5 kV
3	6.0 kV
4	6.5 kV
5	7.0 kV
6	7.25 kV
7	7.5 kV
8	7.75 kV
9	8.0 kV

Example: To change the Fence Voltage to 6 kV enter the following. **0 5 3 #**

The default Fence Voltage is 7 kV.

Installer Programming Options

Low Power Fence Voltage

0 6 □ #

The open circuit low power fence voltage can be changed by pressing the '0' key followed by the '6' key. Select the desired voltage from the table and press the corresponding number from 0 to 9 followed by the # key. The keypad will beep twice to indicate that the new setting was accepted.

Example: To change the Low Power Fence Voltage to 1000 Volts enter the following. **0 6 4 #**

The default Low Power Fence Voltage is 800 Volts.

0	600 Volts
1	700 Volts
2	800 Volts
3	900 Volts
4	1000 Volts
5	1200 Volts
6	1400 Volts
7	1600 Volts
8	1800 Volts
9	2000 Volts

Strobe Light Function

1 0 □ #

The strobe light output can be changed by pressing the '1' key followed by the '0' key. Select the desired function from the table and press the corresponding number from 0 or 1 followed by the # key. The keypad will beep twice to indicate that the new setting was accepted.

Example: To change the Strobe Light Function so that the strobe 1 switches on whenever the fence is on and strobe 2 switches on when the fence is in high voltage mode, enter the following. **1 0 1 #**

The default Strobe Light Function is option 0. Strobe 1 switches on when zone1 or gate1 alarm is activated and Strobe 2 switch on when zone2 or gate2 alarm is activated.

0	Strobe 1 = Zone1 / Gate1 Strobe 2 = Zone2 / Gate2
1	Strobe 1 = Fence ON Strobe 2 = High Voltage

Gate 2 Input Function

1 1 □ #

To change the gate 2 input function press the '1' key followed by the '1' key. Select the desired function from the table and press the corresponding number from 0 or 1 followed by the # key. The keypad will beep twice to indicate that the new setting was accepted.

Example: To change the Gate 2 Input Function so that you use the fence Zone 2 to detect an open or closed gate and not the magnetic switch input, enter the following. **1 1 1 #**

The default Gate 2 Input Function is option 0. The magnetic switch input is used to detect an open or closed gate.

0	Gate 2 = Gate 2 input
1	Gate 2 = Fence Zone 2

Gate 2 Delay Time

1 2 □ #

The time delay for gate 2 to stay open before the alarm is triggered can be changed by pressing the '1' key followed by the '2' key. Select the desired time delay from the table and press the corresponding number from 0 to 9 followed by the # key. The keypad will beep twice to indicate that the new setting was accepted.

Example: To change the Gate 2 Delay Time to 60 seconds enter the following. **1 2 2 #**

The default Gate 2 Delay Time is 4 minutes.

0	15 Sec
1	30 Sec
2	60 Sec
3	90 Sec
4	2 Min
5	3 Min
6	4 Min
7	5 Min
8	10 Min
9	15 Min

Fence Voltage Control

1 3 □ #

To change the fence voltage control press the '1' key followed by the '3' key. Select the desired function from the table and press the corresponding number from 0 or 1 followed by the # key. The keypad will beep twice to indicate that the new setting was accepted.

Example: To change the Fence Voltage Control so that you use the Gate2 magnetic switch input to switch between high and low voltage mode, enter the following. **1 3 0 #**

The default Fence Voltage Control is option 1. To toggle the fence voltage between high to low voltage use the keypad (□ □ □ □ * 3 #)

0	Gate2 Input
1	Keypad

Fence Alarm Voltage

1 4 □ #

The fence alarm threshold voltage can be changed by pressing the '1' key followed by the '4' key. Select the desired voltage from the table and press the corresponding number from 0 to 9 followed by the # key. The keypad will beep twice to indicate that the new setting was accepted.

Example: To change the Fence Alarm Voltage to 2.4 kV enter the following. **1 4 3 #**

The default Fence Alarm Voltage is 3 kV.

0	1.5kV
1	1.8kV
2	2.1kV
3	2.4kV
4	2.7kV
5	3.0kV
6	3.3kV
7	3.6kV
8	3.9kV
9	4.2kV