G.M. Advanced Fencing & Security Technologies Ltd

V-ALERT Perimeter Security Intrusion Detection System

INSTALLATION MANUAL

V-ALERT

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V-Alert Perimeter Security System

1. INTRODUCTION

1.1. GM's latest technological development is the V-Alert Vibration Detection System. This system detects intrusion attempts caused by cutting or climbing the fencing barrier, breaking through walls or movement or vibrations on any other barrier or object on which it is installed.

2.2. This installation manual describes the V-Alert System, its technology and the recommended methods of installation of the system.

2. SYSTEM ADVANTAGES

2.1. The Major Advantages of GM's V-Alert Intrusion Detection System are:

2.1.1. No moving parts – parts will not wear out.
2.1.2. Higher detection resolution – detection to the level of each individual sensor.
2.1.3. Easier installation procedure.
2.1.4. The ability to suit a wide range of applications due to the systems technological capabilities.
2.1.5. Each sensor is programmable using the V-AlertComm Setting Manager Application

3. SYSTEM DESCRIPTION

3.1. V-Alert Sensors and Cable (Part No. VAF3)

3.1.1. The system consists of 2 pairs of twisted pair cable connecting V-Alert sensors spaced 3 m apart.
3.1.2. One pair of twisted pair cable carries power to each sensor whilst the other pair of twisted pair cable carries data from each sensor to the zone processing card.
3.1.3. The V-Alert sensor line is typically 150 m in length, consisting of 50 sensors.
3.1.4. The V-Alert sensors are typically supplied with 4 meters of cable between each sensor to allow for flexibility in the position of installation on the existing fence.
3.1.5. The V-Alert sensors are supplied in sensor lines consisting of 10 sensors with a connection box used to connect adjacent 10 sensor lines.
3.1.6. V-Alert sensor spacing for wall applications may vary between 5 to 15 meters depending on the type of wall installation.
3.1.7. The V-Alert sensors are connected to the existing fence on site approximately 120–170 cm above the ground level, depending on the nature and height of the existing fence barrier.
3.1.8. The V-Alert technology enables the installation on almost any fencing barrier without having to upgrade the existing fencing barrier.
3.1.9. Typical fencing barriers on which the V-Alert system can be installed include: Chain Link fencing, welded mesh fencing, other metal fabric fences, walls and window bars.
3.1.10. The unique V-Alert Technology enables the installation on Barbed Wire fencing wires as well as on Electric Security Fencing wires.
3.1.11. The system can also be installed on walls where it will detect any attempt at breaking through the wall.

3.1.12. The system will detect an alarm as a result of CUTTING or CLIMBING of the fence structure.
3.1.13. The V-Alert System is designed in such a way so that an intrusion attempt will be detected to an alarm detection resolution of 3 m or to the level of each individual sensor.

3.2. Zone Processor Card (Part No. VAPC) and Cabinet (Part No.VAC)

3.2.1. The V-Alert Zone Processing Card is installed in an outdoor cabinet containing the V-Alert Zone Processor Card next to or in close proximity to the perimeter fence.
3.2.2. The V-Alert Zone Processing Card can be used to connect 2 V-Alert sensor cable lines, each line consisting of 50 sensors, or 150 m of sensor cable. The cabinets are therefore typically installed every 300 meters.
3.2.3. The outdoor cabinet will contain a power supply unit and 12V battery to ensure that the system continues to operate in the event of a power supply failure. The size of the battery is to be determined depending on the amount of back-up time required.
3.2.4. The V-Alert Zone Processor Card is designed to work with the DUAL COMM Communication Card (see explanation below) for the transmission of the alarm indications to the Central Control Panel/Receiver.
3.2.5. Alternately the V-Alert Relay Card (Part No. VAR) has 5 relays for every sensor line. 4 Relays are used for groups of sensors and the remaining relay is used to provide a CUT in the sensor line. This is explained in more detail in the Cabinet Manual.
3.2.6. 110/220 V Mains Electricity points must be provided for electricity supply to each outdoor cabinet. If it is not possible to supply 110/220V power supply to the cabinets then other methods of electricity supply can be considered.
3.2.7. The cabinets can be heated if the winter weather temperatures are very low.
3.2.8. The parameters of each individual sensor are programmed using GM's V-AlertComm Setting Manager Application
3.2.9. The sensor parameters are programmed by connecting the software application to the USB port on the V-Alert Processing Card in order to set the parameters of the sensor lines connected to the Processing Card.
3.2.10. The V-AlertComm Setting Manager Application is provided free of charge to the installer.
3.2.11. The V-AlertComm Setting Manager Manual is supplied separate to the V-Alert Installation Manual.

4. TYPICAL SYSTEM CONFIGURATION

4.1. DUAL COMM Communication System

4.1.1. The alarm indications from the V-Alert Sensor line will be integrated with GM’s DUAL COMM Communication system.
4.1.2. The DUAL COMM system operates as a wireless and/or hardwired communication system.

4.1.3. The DUAL COMM communication system consists of a communication card that transmits via wireless or hardwired communication to the DUAL COMM Control Panel/Receiver.
4.1.4. The DUAL COMM Communication Card will be installed inside the outdoor cabinets that hold the V-Alert zone-processing card.
4.1.5. For customers not wishing to use the DUAL COMM System, it is possible to use the V-Alert Relay Card referred to above.
4.1.6. The operation of the DUAL COMM Communication System is explained in-depth in a separate operation and instruction manual. (See DUAL COMM Manual)

4.2. SecurCOMM Central Control System Software

4.1.1. The DUAL COMM Communication system supplied can be integrated with a computer-controlled system that will consist of GM's SecurCOMM Central Control System Software.
4.1.2. This software will centralize all the alarm signals from the perimeter security fence (V-Alert System and other systems such as the Electric Security Fence), show the site in the form of a synoptic map, and maintain and store an events log of all the events occurring in the site.

5. V-ALERT PRINCIPLE OF OPERATION

5.1. The V-Alert sensor consists of a small printed circuit board containing electronic components that is encased in an epoxy weatherproof housing. Electronic components in the sensor detect movement on the fence and convert these movements into electronic signals.
5.2. There are no moving parts in the sensor that are a common source of false alarms in other vibration detection systems. The sensor PCB consists of solid state electronics.
5.3. Each individual sensor processes data resulting from movements on the fence line and transmits this data to the Zone Processor Card.
5.4. Each individual sensor has its own ID.
5.5. The continuous data flow from individual sensors is processed by the sensor itself and in turn analysed by the Zone Processor Card.
5.6. The Zone Processor Card continuously compares the data from each individual sensor in order to detect whether the movement on the fence line is an intrusion attempt or not.
5.7. Advanced algorithm technology enables the system to detect a REAL intrusion attempt that is usually caused by climbing or cutting of the fence or fence wires.
5.8. The system is monitoring changes in the data flow from each individual sensor resulting in an alarm detection resolution of 3m or an alarm detection resolution to each individual sensor.
5.9. An example of the operation of the system in operation can be described as follows:

Strong wind on the sensor line causes an entire group of sensors to move. Each individual sensor will detect movement, and the electronic signals or data will flow from each individual sensor to the zone-processing card. If all the data received by sensors in that group of sensors show similar changes, then no alarm will be activated. The Zone Processor Card will only alarm when an individual sensor or

number of sensors transmits data that is different to data received by the larger group of sensors at that given moment. The system adapts to the constantly changing conditions on the fence.

6. INSTALLATION

6.1. SITE PLANNING and SITE SURVEY – TYPICAL QUESTIONS

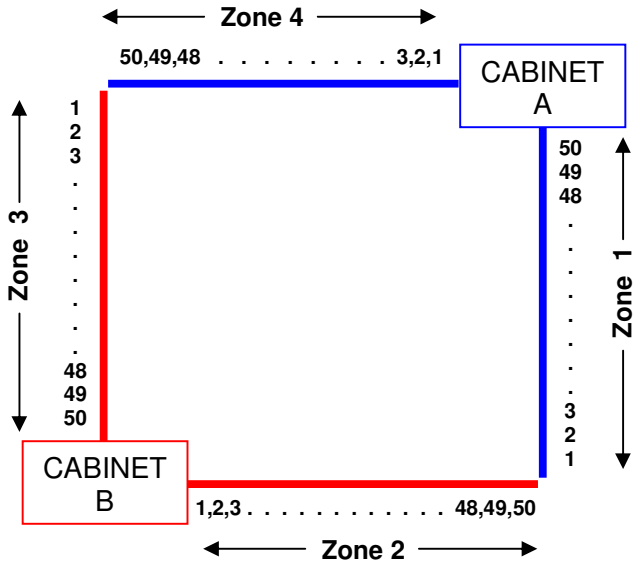
6.1.1. Examine the type of fence or wall on which the sensor line is to be installed.
6.1.2. Record the following:
- Fence Height
- Distance between fence posts
- Type of fence – chain link, welded mesh, metal bars, palisade, wires etc
- General condition and description of the fence taking into account outriggers, barbed wires on the top of the fence, concertina coil on the top of the fence, any other elements installed on the fence fabric such as signs or loose elements installed on the fence.
- Photograph the fence if possible

6.1.3. Look for the optimal position to install the sensor line on the fence or wall.
6.1.4. Look for the optimal installation position of the electronic cabinet taking into account the zone configuration, position of gates and security personnel and source of 220/110 volts or alternative energy source.
6.1.5. Look for or identify the optimal position of central control room or place in which the alarm indications are to be received. Typically each site will have a pre-designated control or guard room.
6.1.6. Decide what type of communication is to be used – wired or wireless communication.
6.1.7. More detailed explanation of the site planning considerations can be provided by GM's technicians in the framework of project installation training or training seminars held on site, at the distributor or at GM's Israel offices.

6.2. ZONE CONFIGURATION

6.2.1. It is essential to plan the zone configuration logically. The objective is to make the reaction to the times of the security personnel quick and effective. The security personnel should be able to react immediately to an alarm so has to be able to go directly to the place or position of the intrusion attempt.
6.2.2. The diagram below shows a typical way of configuring the zones and numbering of the sensor line.
6.2.3. The site should be divided up into zones – each zone will consist of up to 50 sensors. In the diagram below the site has been divided into Zones 1,2,3 and 4.
6.2.4. Numbers 1,2,3……49,50 represent the number of sensors in each Zone.
6.2.5. Typically one should assign the sensor number 1 at the start of the Zone 1,2,3 and 4 as seen in the diagram below.
6.2.6. It should be decided to configure the zones either clockwise or anti-clockwise and to continue to use the same direction for that specific project or installation.
6.2.7. The sensor number 1 to 50 should always be in the same direction for all the zones. This enables the security personnel to go to the exact sensor or place of

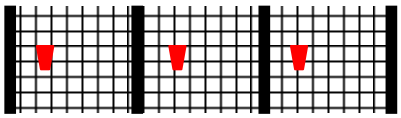
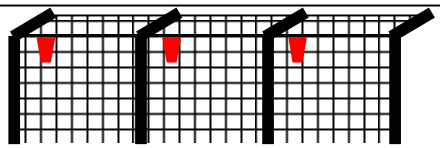
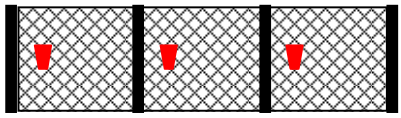
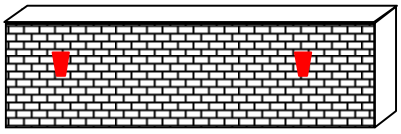
the intrusion attempt. As an example, sensor number 35 will be in the same relative position within each of zones 1,2,3 and 4.



6.3. PLACE OF ATTACHMENT OF THE SENSOR LINE

6.3.1. It is essential that the sensor's are installed in the optimal position on the fence, wall or barrier, so as to ensure that the V-Alert System will operate at its maximum performance level. The table below shows the typical and recommended places on the barrier where the sensors should be attached.

6.3.2. Please take into account that although there are many types of standard fences such as chain link, welded mesh fencing etc, each fence or barrier should be examined independently in order to ensure that the sensor is installed in the optimal position on the fence or barrier. If the installer is unsure of the optimal attachment position GM's technical support should be contacted.

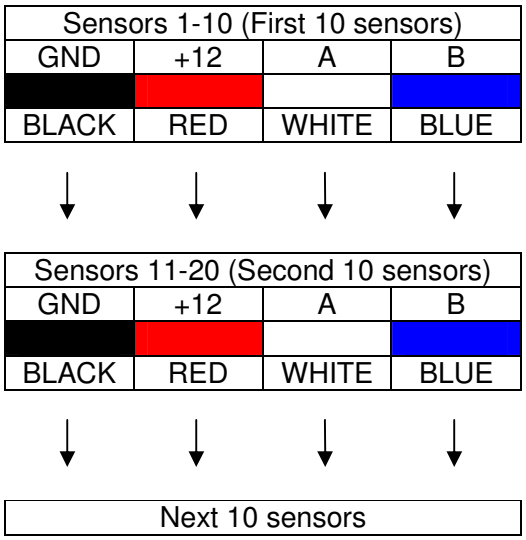
Type of Fence	Typical position of V-Alert Sensor – marked by ▼
Welded Mesh Fence 2.5m	
Welded Mesh Fence with outrigger	
Chain Link Fence 2.5 m	
Wall – Position and distance between sensors depends on the type of wall	

6.4. ATTACHMENT OF THE SENSOR LINE

6.4.1. After having decided where to install the sensor line, the following procedure should be undertaken:

a. Bring the sensor line (consisting of ten sensors or 30 meters of sensor line) to the fence or barrier.
b. Place the sensor line on the ground near the fence.
c. Attach the sensors to the fence using the back plate and screws supplied with the sensor line. PLEASE SEE THE PHOTOGRAPH BELOW SHOWING THE METHOD OF ATTACHMENT OF THE SENSOR.

d. Attach the sensor cable to the fence fabric using cable ties. The cable ties should be used to attach the sensor cable every 20-25 cm. Do not over tighten the fence ties. The cable should have enough slack so that it is not stressed, but tight enough so that it will not move in the wind.
e. As the sensor line is typically supplied with 4 meters of cable between sensors there are many cases in which there will be extra cable remaining after attaching the sensors in their final position. In this case the extra cable should be rolled up and connected securely to the fence fabric.
f. Connect every group of ten sensors to the next group of 10 sensors using the cable connection box supplied with each 10 sensor line. Attaching sensor lines to each other is a simple matter of connecting LIKE wires to each other:



g. The system will be supplied with an end of line resistor installed in a termination connection box. The last sensor in any sensor line is to be attached to this termination box. 2 termination boxes will be supplied for every zone processor card supplied.
h. After attaching the entire sensor line to the fence connect the sensor cable line wires (COLOUR CODE: BLACK – GND – RED-WHITE- BLUE to the zone-processing card as follows:

GND	+12	A	B
BLACK	RED	WHITE	BLUE

i. Having completed the attachment of the V-Alert sensor line to the fence, the installer can proceed to program the V-Alert Sensors using the V-Alert Set-up Application.

6.5. LIGHTNING PROTECTION - IMPORTANT

6.5.1. The V-Alert Sensor and V-Alert 2 Zone Processor Card have lightning protection components on the respective PCB's.

6.5.2. IT IS ESSENTIAL THAT EACH ELECTRONIC CABINET INSTALLED ON SITE BE FITTED WITH PROPER GROUNDING PROTECTION INSTALLED BY AN AUTHORIZED ELECTRICIAN. THE GROUNDING REQUIREMENT WILL DIFFER ACCORDING TO THE CONDITIONS ON SITE. GM WILL NOT TAKE ANY RESPONSIBILITY FOR DAMAGE TO THE V-ALERT ELECTRONIC SYSTEMS CAUSED BY DIRECT LIGHTNING STRIKES ON CABINETS THAT HAVE NOT BEEN CORRECTLY GROUNDED

PLEASE NOTE:

The objective of this manual is to provide initial installation guidelines in the mechanical installation of the V-Alert Intrusion Detection System.

GM recommend on site training, training in the Israel or training in the distributors offices in order to receive complete training in the use of the V-Alert System.