Wireless Operation and Installation

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SIGALARM™

Software Version 2.0
Relay Configuration: Custom

Contents

Read this manual in its entirety before attempting installation or operation

1 Overview

1.1 Understanding E-Field Detection

The Sigalarm system is a reliable and finely tuned "radio" designed to receive only one selective and potentially life-threatening source: the detectible e-field present around all high voltage power lines. The strength of the signal (e-field) depends on the lines voltage and the distance from the lines. Simple adjustment of the settings on the Sigalarm unit will provide accurate and repeatable warnings. After the desired setting is made, a visual and audible alarm will occur whenever the "danger zone" is approached.

1.2 Safety Regulations

It is the equipment operator's responsibility to know and follow all OSHA, employer, utility, and equipment manufacturers' instructions, rules, and regulations.

1.3 Safety Warnings

Overhead power lines are a constant danger to anyone working with or near equipment that can come into contact with these high voltage lines. No warning system should be used in place of standard safety rules and precautions. No warning device can absolutely prevent an accident. When properly installed and operated Sigalarm products will provide reliable and repeatable WARNINGS of the presence of voltage.

Not a Distance Measuring Device

Sigalarm products are warning systems and should not be used as distance measuring devices.

2 Installation

2.1 Standard Packing List

Part #	QTY	Description
WCM2.0	1	Control Module
WS2.0	1-16	Sensor(s)
7315-w	1	Parts bag
WPASPC-5P	1	Horn
6111-wrly	1	Relay Cable
6111-spk	1	Speaker Cable
6111-pwr	1	Power Cable

2.2 Installation Precautions

It is highly recommended that Sigalarm products are installed by a certified Sigalarm installer or competent person. Prior to use of Sigalarm products, training should be given to the operator by a certified trainer or competent person. Always test the installation at a safe distance from high voltage power lines. Use extreme care and a spotter while testing this equipment.

2.3 Installation of the Control Module; Sigalarm WCM2.0

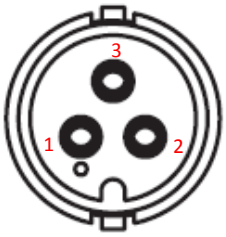
The main component of the Sigalarm system is the control module WPA2.0. It should be mounted in the immediate vicinity of the operator in plain view, without obstructing their view of the work area.

2.4 Connecting the Control Module to a Power Source

Hard Wired: Attach the supplied power cable (6111-pwr) to a 12v to 48v DC power supply. The 6111-pwr cord has a red cable, black cable and, a bare wire. It can be installed one of two ways.

Power

Pin 1&2: Twist red and black together - Positive/Always on 12-48v
Pin 3: Bare wire - Negative/Ground
Connect the power cable to the green socket located on the rear of the control module



Front view of 6111-pwr

Switch Power

Pin 1: Red - Positive/Always on 12-48v
Pin 2: Black - Switched Power
Pin 3: Bare wire -Negative/Ground
Connect the power cable to the green socket located on the rear of the control module

Mobile: Connect the supplied power cable (6111-pwrM) *supplied only by request* to the 12v power port. Switch power is not available with this type of installation.

2.5 Installation of the Sensor(s); Sigalarm WS2.0

The solar sensors are the component of the system that detects voltage.

Verify Pairing:

Before permanently installing the sensor and after power is applied to the main control module verify that the correct quantity of sensors are paired. (Refer to section **3.13 Manage Sensors** for further pairing instruction). Verify the correct serial numbers are listed in the active sensor column.

Placement and Installation:

The almost unlimited types sizes and configurations of equipment on which Sigalarm products can be used make it impossible to cover every potential installation configuration in the manual. However, the following explanation should help you understand general sensor placement considerations. Place a single sensor at the highest point of the equipment with the best line of sight. Where equipment has varying points that can be higher at any given time multiple sensors should be installed at each of those points. Sensors cannot be obstructed by metal at any time. The sensors have an adjustable protection zone, set by the operator on the main control module. Always install sensors with protection zones overlapping. Please refer to the following suggested installation diagrams for examples. Wireless Sigalarm systems are not appropriate for all types of equipment or every jobsite. When in doubt consult a Sigalarm technician

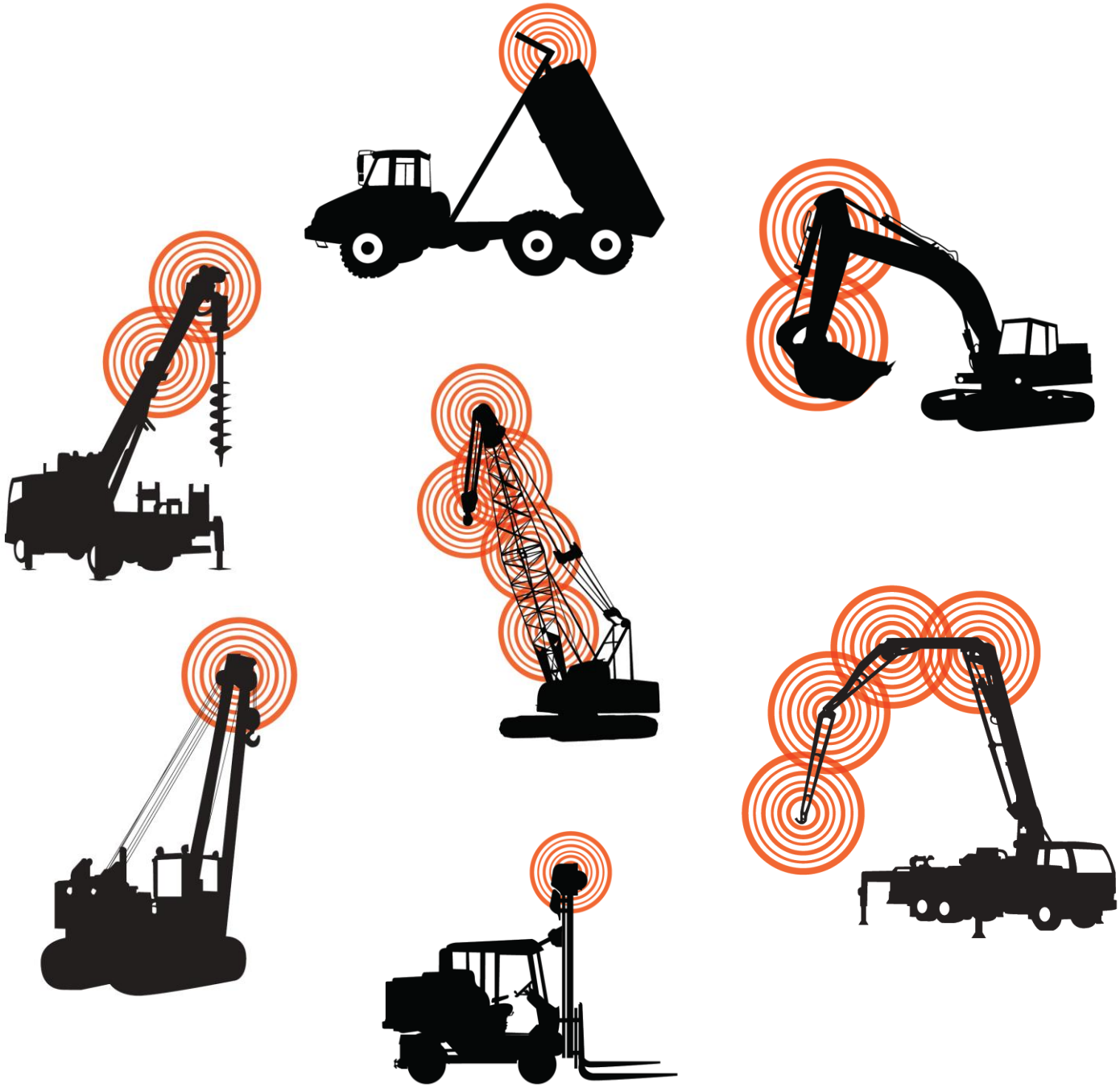
Not for All Types of Equipment

Wireless Sigalarm systems are not appropriate for all types of equipment or every jobsite. When in doubt consult a Sigalarm technician.

Sample Sensor Placement

The following images are intended as a visual aid only. They are in no way real life representations actual or implied. You must not rely on the information in this diagram as an alternative to advice from an appropriately qualified technician. If you have questions about any installation matter you should consult an appropriately qualified professional.

Placement Suggestions

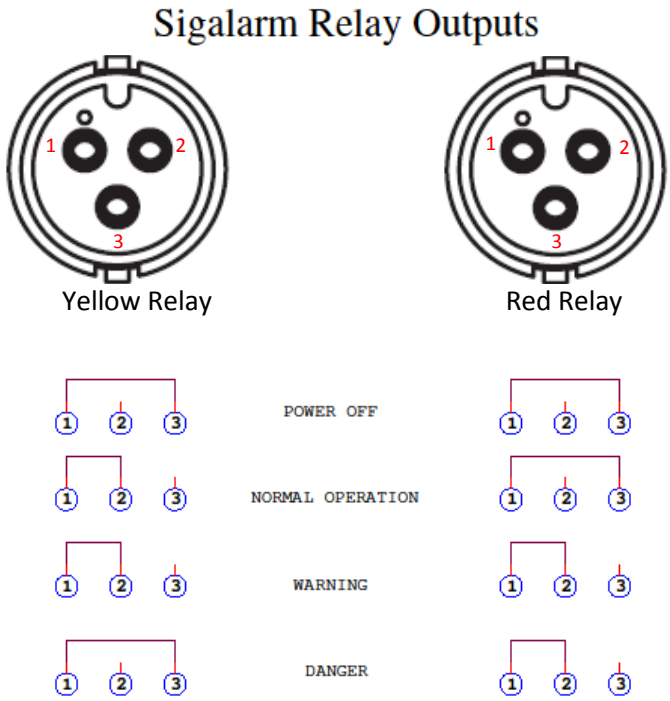


2.6 Installation of the Speaker; WPASPC-5P

An exterior weather proof speaker is provided with each system to warn persons outside the equipment of danger. Place the speaker where it can easily be heard by ground crew, but will not be damaged during equipment operation. Remove the plug from the speaker by cutting it to expose the blunt wire. Connect the blunt speaker wires to the supplied speaker cable (6111-spk) as follows: red to red, and white to white. Connect the speaker cable to the blue socket located on the rear of the control module.

2.7 Relay Options

The Sigalarm system is equipped with multiple relay configurations. These outputs are for up to a maximum of 50Vdc/75Vac only. One 6111-wrly cable comes standard with the Sigalarm system; allowing the installer to utilize the relay options. Addition cables are available upon request.



State	Def. of State	Port								
		1-2	1-3	1-2	1-3		1-2	1-3	1-2	1-3
Normal	Sensor status below set point									
< Set point	Less than setpoint/warning									
> Set point	At or above set point/danger									
Power Failure	No communication possible									

Relay Installation Example

Auto shut down: To stop hydraulics moving when a danger state occurs connect the supplied relay cable (6111-wrly) to a relay socket on the rear of the control module. The blunt end of the (6111-wrly) cable should be wired to the equipment's hydraulics so the circuit is interrupted and hydraulic movement is stopped.

** Auto shut down in never recommend for equipment moving a load**

2.8 Testing the Installation

Verify your installation is correct and, complete the operation set up prior to operating equipment near power lines.

- Apply power to the unit and verify the LCD screen turns on and the unit goes into a maximum status. If no sensors are bonded “no data” will appear.
- Select the reset button and verify the control module reverts from max to the last displayed set point. The set point auto saves every 10 seconds.
- Verify the correct quantities of sensors installed are showing in the home screen/ detail view, as well as the active sensor column of the manage sensors screen
- Using the decrease icon or - button lower the set point to initiate a **warning** status. Verify that the external and internal speakers alarm. Also check that visual warnings on the control module are functioning.
- If relay options are being utilized verify they functioning properly.
- Using the decrease icon or the - button, lower the set point further to initiate a **danger** status.
- Verify that the external and internal speakers alarm. Also check that visual warnings on the control module are functioning.
- If relay options are being utilized verify they functioning properly.
- Depress the override icon and adjust the setpoint back to the desired level.

3 Menu Display Identification

3.1 Home Screen / Detail View

The home screen or detail view provides the central point of access for all the systems range of applications. It consists of the following sections:

- Tool bar
- Sensor dashboard
- Set point display
- Sensor status gauge
- Work zone indicator
- Touch screen button icons

You can drag the page to the left or right for alternate page views.

3.2 Tool Bar

Item	Top Tool Bar	Function
12	GPS	Indicates if the Sigalarm system is receiving GPS service
13	GSM	Indicates GSM signal strength; Optional
14	Compass	Indicates direction
15	AZ/EI	Indicates position
1	Menu	This icon opens the actions screen

3.3 Sensor Dashboard

Item	Sensor Dashboard	Function
11	Sensor name	Displays paired sensors
16	Sensor reading	This is a numerical representation relative to the voltage detected
17	Alert status	Indicate the status of the sensor in relation set point
	Battery life	Indicates battery status for each sensor

3.4 Set Point Display

Item	Sensor Dashboard	Function
2	Set Point	The adjustable numerical value at which the operator gets a danger status. Set point values range from 5-120

Set Point Distance Correlation

The higher the numerical value of the set point the closer you can get to a power line

Example: A set Point of 90 will allow an operator to get closer to a power line than a set point of 20

3.5 Sensor Status Gage

Item	Status Gage	Function
3	Status Gage	This gage is a visual representation of sensors readings in relation to the set point

3.6 Work Zone Indicator (Coming Soon)

Item	Work Zone Indicator	Function
4	Status Gage	As the operator increases or decreases the set point, the bar at the bottom of the screen will show a representation of the relative work zone change

3.7 Touch Screen Icons

Item	Tool Bar	Function
5	Override	The override icon can be selected in a danger state. This will put the unit in a warning state for 15 second count down to allow the operator to move away from danger *This is especially important when the auto shutdown feature is utilized*
6	Decrease	Decreases the set point
7	One touch	Matches the set point to the current highest sensor reading plus five
8	Increase	Increases the set point
9	Reset	After power is applied reverts unit to last set point

3.8 Buttons and Knobs

Item	Button/knobs	Function
8a	+	Increase set point
6a	-	Decrease set point
10	Enter	N/A
9a	Reset	After power is applied reverts unit to last set point
16	Volume	Adjust the volume of the speaker
17	Brightness	Adjust the brightness of the screen
18	Fuse	Fuse port

3.9 Actions Screen Overview

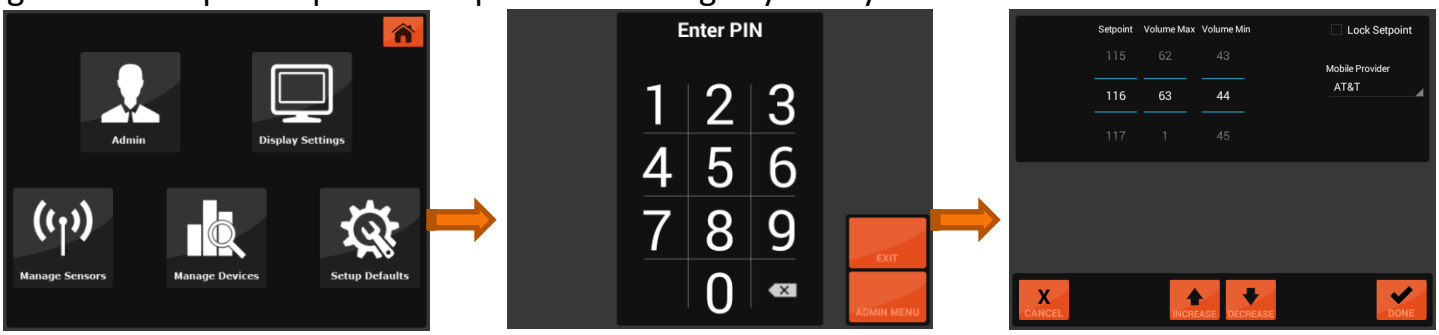
The actions screen provides the point of access for all the following pages:

- Admin
- Display settings
- Setup defaults
- Manage sensors
- Manage device

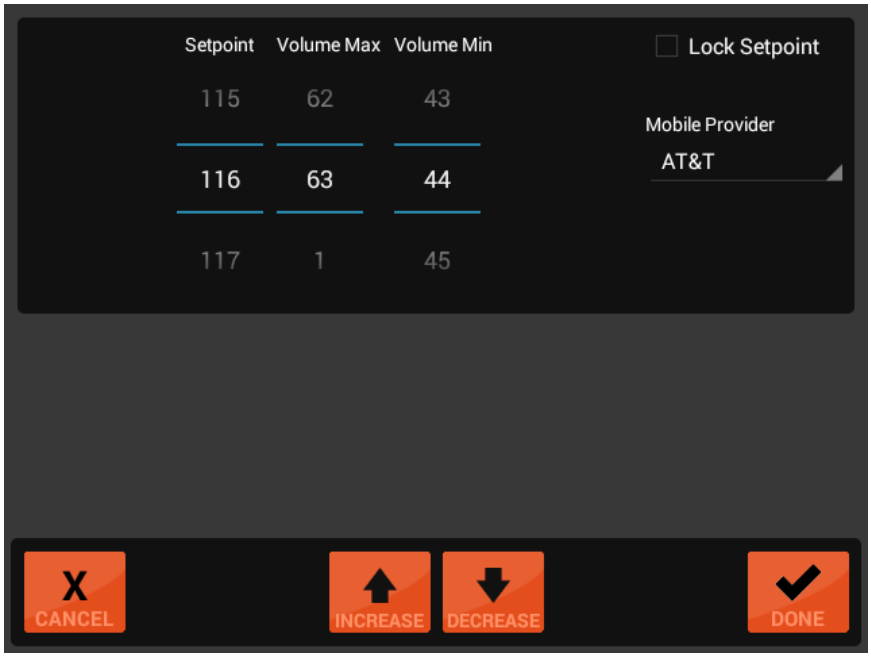
3.10. Admin

Item	Action Screen	
1	Admin Icon	Enter password, adjust setpoint max (optional), volume min and max (optional), lock set point (optional)

Any adjustment that can be made from the admin screen should be completed while equipment is a safe distance from power lines and in a stationary position. As an added layer of protection access to these adjustments are password protected. Passwords should only be given to competent persons capable of making key safety decisions.



Admin Screen Features



Set Point: Maximum set point parameters can be set to limit the operator's ability to increase the set point from the home screen. For example: if the admin selects 55 as the maximum set point, the operator can only increase the set point to 55 or less. This also limits the one touch feature to 55 or less.

Volume Max: The volume maximum can be set to limit the operator's ability to increase the volume of the external speaker. For example: vehicles working in residential neighborhoods may require a softer alarm. This setting should never bet set low enough that ground personnel cannot hear the external speaker. This feature should always be set to the highest tolerable maximum.

Volume Min: The volume minimum can be set to limit the operator's ability to decrease the volume. A setting of 1 means the operator can adjust the volume of the external speaker all the way down to silent. This is NEVER recommended. It is imperative that ground personnel can hear the external speaker.

Lock Set Point: The lock set point feature can be selected to leave the operator with no ability to increase or decrease the set point.

3.11 Display Settings

Item	Action Screen	
2	Display Icon	Adjust brightness

3.12 Setup Defaults

Item	Action Screen	
3	Set Up Icon	Language preference, default English

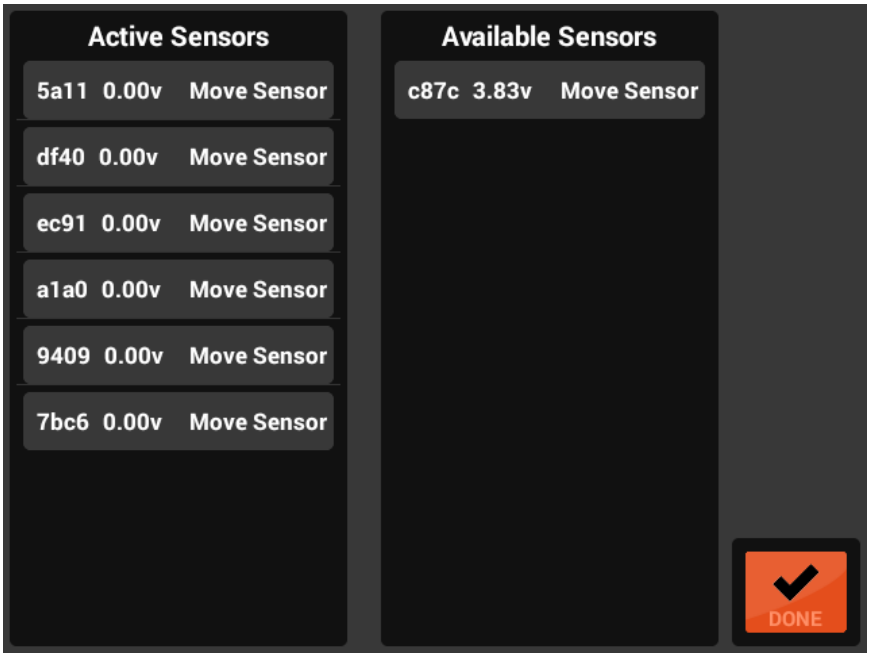
3.13 Manage Sensors

Item	Action Screen	
4	Manage sensor Icon	Add or remove sensors

Manage Sensors Features:

Active Sensors: Displayed sensors in this column are paired to the control module. These same sensors will appear in the homes screen/Detail view. The installation technician should always verify the serial number and quantity of sensors installed on the equipment are identical to the listed sensors in this column. Sensors can be removed simply by selecting the icon.

Available sensors: Displayed sensors in this column are within range of the control module but not paired to the control module.



3.14 Manage Devices

Item	Action Screen	
5	Manage Devices Icon	Synch key fob (optional)

4 Getting Started

4.1 Initial Control Module Set Up

Before the equipment is operated near power lines the following control module set up must be completed.

A. Admin

- **I.** Establish new custom password

B. Display settings

- **I.** Adjust brightness
- **II.** Adjust volume
- **III.** Select default page layout preference

C. Setup Defaults

- **I.** Select Language preferences

D. Manage sensors

- **I.** Add or remove sensors as necessary
- **II.** Verify pairing

E. Manage Devices

- **I.** Verify optional key fob status

5 Operation

5.1 Warnings

The operator must fully understand how the Sigalarm system functions, and its limitations before use. It is dangerous to operate any equipment directly beneath or above high voltage power lines. Never approach any power line closer than the minimum safe distance set by OSHA. If multiple lines are present the Sigalarm system should be set to the lowest voltage line and, an additional spotter may be required.

5.2 Operating Procedure

Powering up: When power is first applied the control module will search for sensors. No data will appear while connectivity is in progress (approx. 2 seconds). Once sensors are connected the control module will go into a maximum setting. If any power lines are in the vicinity the alarms will sound. The operator must select the reset button to revert the system to the displayed last set point.

5.3 Adjusting the Set Point

The operator must decide what set point is appropriate for each and every jobsite. To adjust the set point, position the equipment at the desired location where the operator would like an alarm state. Then depress the “one touch” button. This will change the set point to the greatest numerical sensor reading +5 at that position. When adjusting the set point, always position the equipment far enough away from the power line to give the operator time to react. The Sigalarm system should be set to give a warning at least 20 feet from the nearest power line. Set point adjustments can also be made utilizing the increase or decrease buttons. Use a spotter to help you determine a safe distance while adjusting the setpoint.

Alert status: Below Set Point

A below set point status occurs when all of the sensors have a reading numerically lower than the displayed set point. This means the means the equipment is in the defined work zone.

Alert status: Warning Status

A warning status occurs when one or more sensors are within 80% of the set point. This mean the equipment is getting closer to but has not yet reached the danger zone.

Alert status: Danger Status

A danger status occurs when one of the sensor readings match the set point. This means the equipment has crossed into the danger zone. No set point adjustments can be made during a danger status.

Alert status: No Data

A no data status occurs when the sensor is not transmitting data to the control module for more than two seconds. This means there is no protection zone around the “down” sensor and the equipment is no longer detecting voltage. Do not operate equipment with a no data status.

5.4 Remote Control Operation (Coming Soon)

Some units are equipped with remote control capabilities those units can be operated as follows: The control module will automatically go into max when power is applied. The operator can depress the reset button from the remote key fob. If a danger status occurs the operator can depress the override button on the remote key fob. The control module will then display an override countdown. The override countdown keeps the unit in a warning state for 15 seconds to allow the operator to pull away from the line.

5.5 System Reset

The reset button and icon returns the unit to the last set point. The reset must be selected once every time power is applied to the control module. The displayed set point will auto save every 10 seconds.

5.6 Override Feature

If a danger status occurs the operator can depress the override icon. The control module will then display an override countdown. The override countdown keeps the unit in a warning state for 15 seconds. If the auto shutdown feature has been utilized this will allow the operator to pull away from the line.

Use extreme caution when utilizing the override feature

6 Data Management

6.1 Data logger

All control modules record events up to 2 gigs of storage

6.2 Downloading Data (Coming soon)

Download data using the data port on the rear of the control module and the supplied data cable.

6.3 Data Dashboard (Coming Soon)

7 Specifications

7.1 Dimensions

Control Module	W 7.5	D 3.0	H 5.25
Sensor	W 4.5	D 2.5	H 1.5
External Speaker	W 5	D 5	H 5
Cables		30 Ft	

7.2 Material

Control Module	ABS plastic enclosure
Sensor Enclosure	Built with ABS plastic, IP 65 rating, Nema 4x
External Speaker	ABS with stainless steel hardware
Cables	18 AWG stranded tinned copper conductors with PVC insulation, water blocking tape, foil shield and PVC jacket

7.3 Power Supply requirements

12-48 Volt

7.4 E-field Detection

Electric Field 60 Hz or overseas 50Hz

7.5 Range of Effectiveness

Voltage Detection - Between 10 to 200 feet depending on voltage
Zigbee Communication – 27 meters (Between Sensors and Control module)

7.6 Sensor Battery

Each sensor is equipped with a lithium polymer battery that should last approximately 660 hours with no sunlight. Variables such as extreme heat or cold will affect estimated battery life. The solar panels will continually charge this battery for years. Completely dead batteries will take approximately 24 hours to charge (at approximately 100 milliamps per hour). If the battery is allowed to run down to 3.0 volts or less the sensor will enter self-preservation mode and shut down. The sensor will resume operations at 3.2 volts and, is considered fully charged at 3.75 volts.

7.7 Control Module Screen

5.7” Full color TFT display, capacitive touch, High Brightness 900 Nits,
640 x 480 res.

7.8 Temperature

-10° c to +70°c

We’re in the Business of Saving Lives