Sentinel

Installation Manual

May 2011

Manual Part Number: WG-(TBD)

(Ver.)

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OVERVIEW

Sentinel Overview

Sentinel represents the most advanced Asset Protection System on the market today. Sentinel is the perfect fit for applications requiring protection of critical assets, be they items for retail, research, or other property. Additional applications include protection of individuals in assisted living establishments, infants in hospitals, incarcerated people, etc.

A Sentinel system is comprised of Field RAD, EAS RAD (include one control unit and one or more EAS antennas), POS RAD, Sentinel tags and other optional accessories (such as Indoor Alarm Device). The quantities of each will vary depending on the number of items to be protected, size of the area to be protected, the number exits and the number of controlling stations (e.g. registers). This description assumes a retail establishment with a rectangular sized area, one egress point and a single register. Sentinel tags are available in a variety of physical styles, all designed to protect specific type items such as apparel, fishing equipment, firearms, tools, electronics, people, etc.

Field RAD

EAS RAD Control Unit with RX Antenna

EAS RAD TX Antenna

Lanyard Tag

Handheld Remote

POS RAD

SPECIFICATIONS

RAD Detection Performance (Master, Auxiliary and EAS)		
	Europe	**USA**
RAD Field Distance	Up to 20 m	Up to 65 ft
RAD Cone Angle	120º	120º

Electromechanical Specifications		
	Europe	**USA**
Field/EAS RAD Dimensions	155x155x60mm	6"x6"2.4"
POS RAD Dimensions	200x120x47mm	7.9"x4.7"x1.9"
Field/EAS RAD Weights	0.343 Kg	0.76 lb
EAS RAD Weight	0.388 Kg	0.86 lb
POS RAD Weight	0.678 Kg	1.5 lb
RAD Power Input	24vac 50/60Hz <2W	
Keep in consistence with AC24v wiring order when powering all field RAD		

Product Codes		
	USA	Europe
Field RAD	WG APS RAD	WG APS RADE
EAS RAD	WG APS RAD-EAS	WG APS RADE-EAS
POS RAD	WG APS RAD-POS	WG APS RADE-POS
Handheld Remote	WG APS RC2	WG APS RC2
Sentinel Pebble Tag	Tag APS Pebble BS	Tag APSE Pebble BS
Sentinel Lanyard Tag	Tag APS Lyrd BS	Tag APSE Lyrd BS
Sentinel Pencil Tag	Tag APS Pencil BS	Tag APSE Pencil BS
Sentinel Cicada Tag	Tag APS Cicada BS	Tag APSE Cicada BS

RAD & TAG DESCRIPTIONS

Field RAD
Field RADs are the readers installed in the room over the area to be protected. It radiates the area outward with an approximate 120⁰ cone with strength adjustment range of up to 20 meters (65 feet). And it can be mounted on ceilings to cover an area below its conical beam or on walls to point to a direction and cover a conical space as well. Area Field is dependent on the height of the ceiling and signal strength. It periodically radiates the area with an RF coded signal and when the tags detect the signal they will keep their alarms silent. This type of RADs synchronize with 24vac power source for optimum operation. So all the field RADs must powered from one 24vac power source.

EAS RAD
RF protection signals are radiated in a conical fashion and therefore can easily extend past the exit. This means that someone removing an item from the protected zone could possibly be well out of the protected area before an alarm is emitted. This module is placed at the exit and radiates an RF signal of same frequency as Field RADs. Its function is to radiate its area, effectively jamming the protection zone at the exit and in turn causing tags present in that area to alarm. The EAS RAD includes an output relay port to set off an audible or visual alarm.

EAS RAD consists of one control unit box with RX antenna integrated and one or more TX antennas. The control unit and the antennas are supposed to be placed at the exit and radiates an RF signal outward to the exit exterior area.

POS RAD
The POS RAD is integrated with magnet detacher and located at the register counter.The POS RAD communicates directly with the tag, arming or disarming it. The magnetic detacher is simply a device for physically unlocking the tag to remove it from the protected article.
POS RAD can also connect to PC software and database by USB port, and fulfill same functions as mentioned above as well as more sophisticate data mining functions.

Indoor Alarm Device
This device can receive the tag alarm signal and provide LED indication upon different alarms types：Exit EAS Alarm or Tag Exceptional Alarm (such as metal shielding, tag cable cut or false alarms caused by environmental interference).

Sentinel Tag
Sentinel tags can be made in a variety of shapes and sizes, be they shell, lanyard, golf, firearm, etc, depending on the application. Regardless, each tag includes microprocessor electronics to detect signals emitted by the various reader types and react accordingly. Optionally the tag can also include EAS technology for compatibility with standard EAS systems.

Protection zone signals are received by the tags to keep them silent. Should the tag be prevented from receiving the signal (such as from a foil bag or other blocking device), it will automatically self-alarm. If the tag is opened without first disarming, it will self-alarm. Likewise any tampering or cable cutting will cause the tag to self-alarm, even if within the protection zone.

As the tag enters the exit threshold it will lose the protection zone signal because of the jamming properties of the EAS RAD. At that moment the tag will self alarm. Alarming tags will also transmit a specially coded RF signal that will be picked up by the EAS RAD which will in turn cause an alert signal out of the RAD to an audible/visual alarm, alerting store personnel that a tag has been detected at the exit. If the person returns back into the protected zone the tag will stop alarming.

Summary
Sentinel is a very powerful system that blends into the retail décor and does not obstruct the entrances. Protection zone shaping means that items can be placed quite near the entrance without setting off false

alarms. Sentinel tags will self-alarm when tampered with, and also when removed from the protection zone. Bringing the article back into the protection zone quiets the tag without having to take it back to the register for quieting. Sentinel will tie into external alarms, be they audible and/or visual, to alert store personnel that a tag has been detected at the exit. Sentinel is perfect for a wide variety of applications where assets need protection. Wherever smart protection is needed, Sentinel is the answer.

GENERAL RECOMMENDED RAD ARRANGEMENT

Recognizing that each installation may easily differ in size and shape, RAD placement will vary to accommodate the differences.

General Tips

1. Optimum RAD height mounting should be kept to 3-5 meters (10-16 feet).
2. In central ceiling of area, a field RAD should be installed in a central location.
3. Then some field RADs should be installed in corner or side-wall locations and tilted at 45º towards the center of the protected area.
4. Minimum of three fields RADs is recommended to mount at room corners for optimum Field.
5. EAS RAD **(both Control Unit and TX Antenna set)** should be mounted on the outside of the exit and tilted 45º towards the outside to avoid radiating into the protected area.
6. Each field RAD will be assigned a synchronization ID (1 to 9). Multiple RADs may share the same ID but they must not be physically installed at adjacent locations.
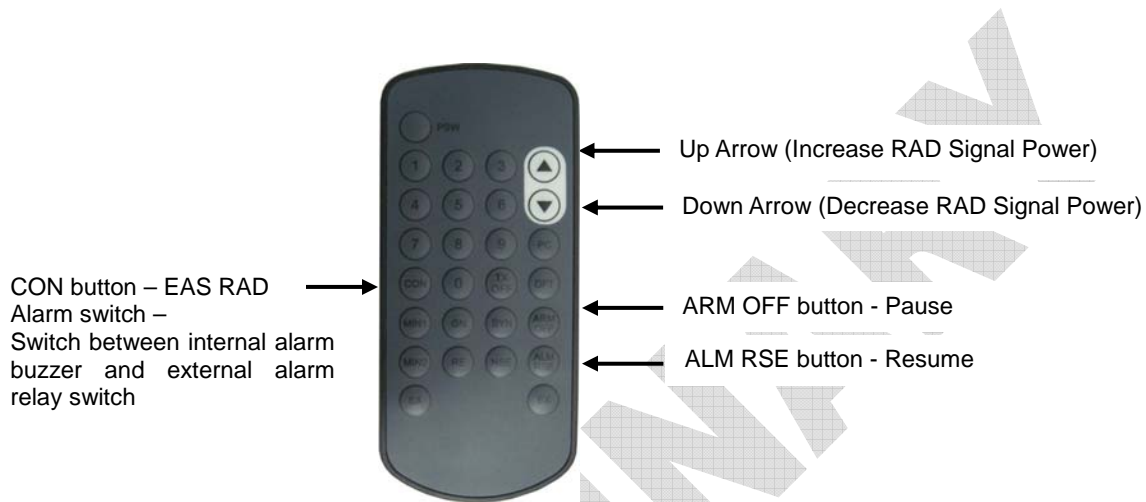
Notice: how to assign a synchronization ID to field RADs, please find reference in the RAD's DIP Switch Configuration Session in last page.

7. The POS RAD may be installed anywhere within the protected area but not near the EAS RAD.
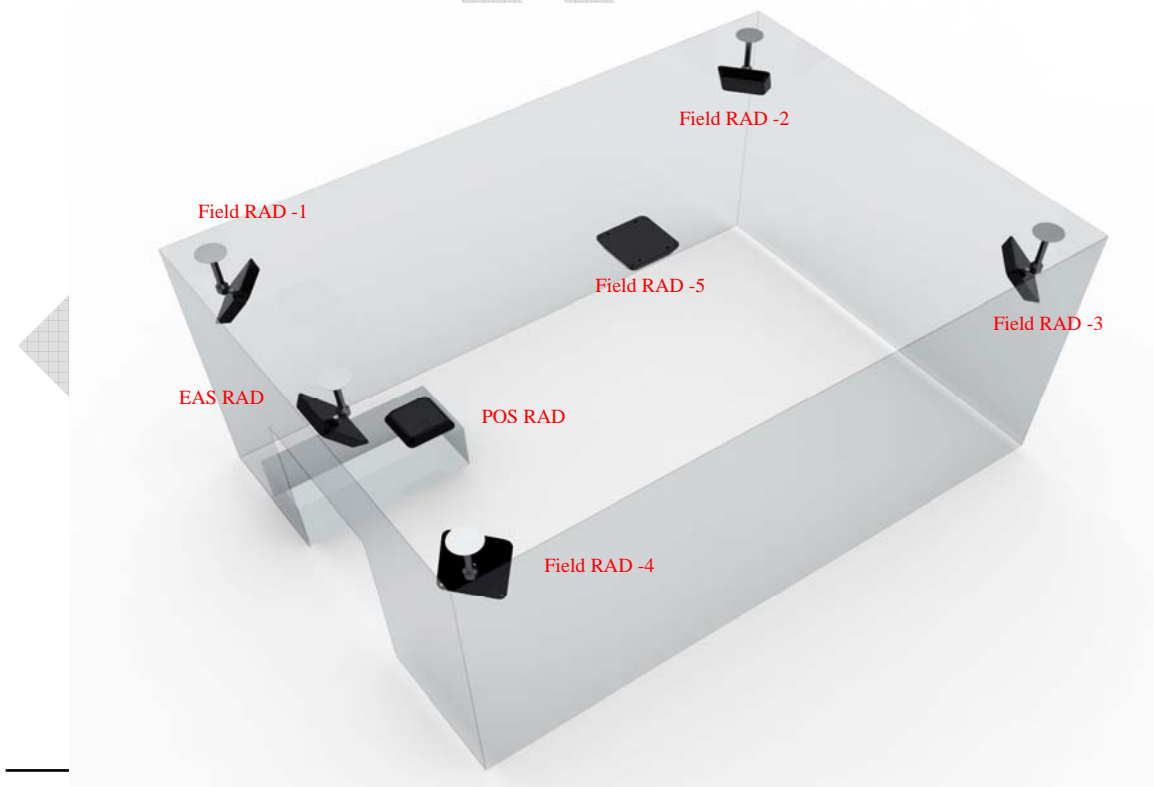
TUNING & USER INSTRUCTION

Handheld Remote Buttons

Up Arrow (Increase RAD Signal Power)

Down Arrow (Decrease RAD Signal Power)

CON button – EAS RAD
Alarm switch –
Switch between internal alarm
buzzer and external alarm
relay switch

ARM OFF button - Pause

ALM RSE button - Resume

Field RAD and EAS RAD Tuning

1. Power Up all field RADs
    Apply power to all field RADs. The LEDs will begin to flash, either at regular rate of 1 flash/second or
    fast rate of 3 flashes/second, indicating the RADs are in operational status
    Notice: 1 flash/second means RAD is synced with other RADs, and 5 flashes/second indicating the
    RAD is out of sync.

    After verify all field RADs working at power up, then installer must pause all RADs and tune RAD one
    by one. To Pause RAD, the operation procedures are: point remote control to one RAD and keep a
    distance at 5 meters or below, press ARM OFF button on remote control. If RAD stops flashing LED
    and keep LED on then it indicates the RAD is paused.
    After doing above procedures to all the field RADs, then reactivate one RAD.
    To reactivate reader, the operation procedures are: point remote control to one RAD that is paused
    within 5 meters distance, press ALM RSE button on remote control. If RAD starts to flash LED again
    then it indicates RAD is restored to work.

2. Tune Field RADs

    The method to tune the field RAD is by observation of an armed tag's alarming status by touring all
    the nearby RADs to make sure the tuned RAD's radiation coverage can cover all the nearby RADs.

    If tag alarms at some corner, it means the RAD under tuning has a low radiation field and can not
    cover this corner. Operator can increase the radiation level of the RAD to cover this dead corner.
    The procedures to tune up radiation are: point remote control to one RAD that is paused within 5
    meters distance, press arrow UP button on remote control. If at the same location, alarming tag stops

alarming, then it means RAD has increased its radiation and field range to cover the location where tag located.

Vise versa, if tag doesn't alarm even tester bring tag two more meters away from the protected area boundary, then it means the RAD has too big of field and coverage is too big. Operator can decrease the RAD's radiation and field range.

The procedures to tune down radiation are: point remote control to one RAD that is paused within 5 meters distance, press arrow DOWN button on remote control. If at the boundary location, tag starts alarming, then it means RAD has decreased its radiation and field range back to boundary.

Repeat this process until all field RADs have been properly tuned, at which time the overall field RAD tuning process is complete.

3. Synchronization for Field RADs
    All Field RAD must be powered by same 24vac power source – this make sure all Field RADs receive a common power phase signal to sync with each other.
    Synchronization is determined to be proper when the LED on each Field RAD is flashing at a once per second rate. If the flashing is too fast, e.g. 5 flashes per second, this signifies the Field RAD doesn't detect the qualified synchronization signal from 24vac power. The situations may be listed as below
    1. the 24vac power source is not 50Hz or 60Hz power system. - Field RAD only recognize 50Hz or 60Hz frequency of 24vac power.
    2. the 24vac power source is impure – excessive interference from 24vac power may make field RAD unable to sync with the 24vac power phase.
    3. If field RAD is mistakenly powered by DC power, the RAD also will be unable to sync.
    .

4. Tune EAS RAD
    Point the Remote to the EAS RAD and press the Resume button to activate it. Move the tag towards the exit to determine where EAS RAD Field takes over and causes the tag to self-alarm. There is no rule on defining the boundaries of the EAS RAD Field area but generally it should depend on how close to the exit tagged articles will be placed. But it would be advisable that tags should alarm within close proximity to the exit so that sales personnel are alerted quickly enough for timely response.

Tag and POS RAD Operation

Once the Sentinel system has been set up and tuned, the only remaining function is to attach Sentinel tags to the articles and arming them. This section describes the steps in controlling the tags and other features to assist in maintain control over the protected area. The Mode Switch selects between arming and disarming a Sentinel tag as indicated by the left and right indicators. The Magnetic Detacher is used to unlock the tag for removal from the protected article after disarming.

1. Power Up
    The POS RAD is powered by 24vac power same as Field RAD or by any PC USB port (5V 500mA). There is a switch on POS RAD which is default set as POS RAD Mode switch button.

    One press this button each time will switch the POS to next Mode. There are altogether three modes (see the mode table below.)

    User can also configure the POS RAD into dedicated modes, please find reference at Appendix: **RAD's DIP Switch Configuration.**
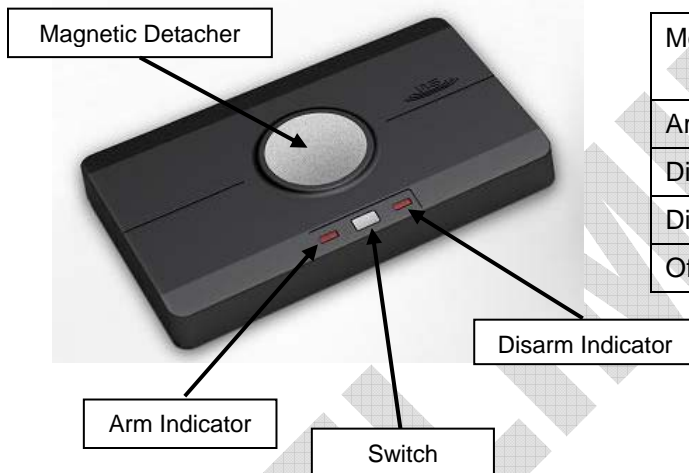
Mode	Arm Indicator Blue LED	Disarm Indicator Red LED
Arm Mode	On	Off
Disarm Mode	Off	On
Disalarm Mode	On	On
Off Work	Off	Off

Magnetic Detacher

Disarm Indicator

Arm Indicator

Switch

2. Tag Arming
    Set the Mode Switch in the position so the Arm Indicator is lit. Then place the tag on the surface of the RAD. A single beep will signify the tag has been armed. The tag will also flash approximately once per second to indicate it is in the armed condition.
    Notice: If armed tags without movement over one minute, tag circuit will automatically turn off RF function to save power, the LED on tag will stop flashing too. But it doesn't mean tag is off work. Tag will reactivate itself when movement of tag is detected.

3. Tag Disarming
    Set the Mode Switch in the position so that both the Disarm and Arm Indicators are lit. Then place the tag on the surface of the RAD. A single beep will signify the tag has been disarmed. The tag may now be opened without self-alarming. In this condition the tag may be removed from the protection zone without alarming. In this stage the tag will not respond to any commands except the Arm command from the POS RAD.

4. EAS Alarm
    If the tag enters the field of the EAS RAD, the tag will self-alarm and emit its own coded-signal to the EAS RAD that is typically connected to an external alarm or other device.
    Notice: by remote control CON button, user can switch EAS RAD alarming between internal alarm buzzer and external alarm relay to external alarm device.
    During this alarm condition the tag LED will flash at a fast rate. At normal armed status, tag will flash one time per second. Returning the tag back to the Field area will cause the tag to stop self-alarming.

5. Anti-Tamper Alarm
    Tampering with the Sentinel tag will cause it to self-alarm. Tampering includes opening without first disarming, prying it open, or in the case of lanyard tags cutting the lanyard. During this alarm condition the tag LED will flash at a 3/sec rate.

    When the tag's tamper alarm goes off, it will also trigger the EAS RAD if within its range. The tag alarm may be silenced with the POS RAD.
    Notice: POS RAD must be set to Disalarm mode to stop the alarming status of tag. See above POS RAD mode setup and LED indicator chart.

6. Tag LED Blink Timing Modes
a. Armed status, armed tags will go to sleep without movement over one minute

1s

LED blink timing Mode 1
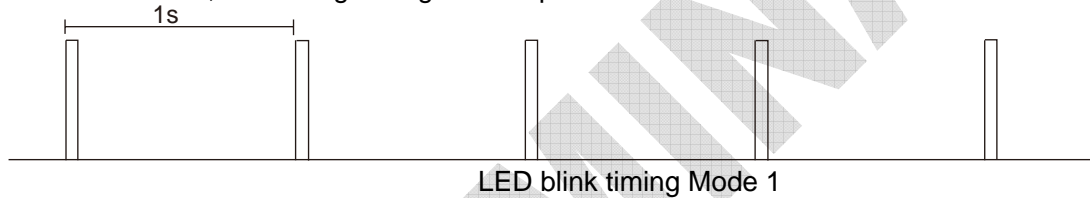
b. Ever alarmed but return to armed status. This status will keep for 1 minute after the latest alarm.

1s

LED blink timing Mode 2

c. Tags alarming status.

1s

LED blink timing Mode 3
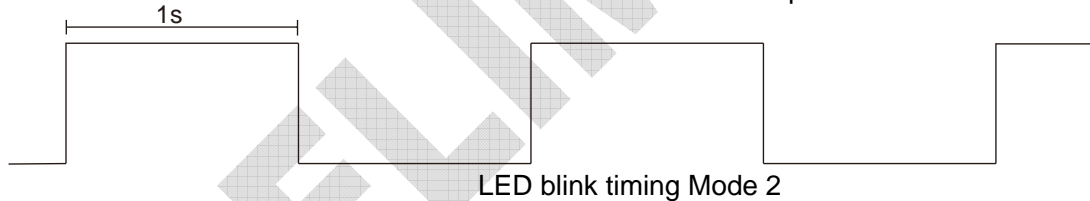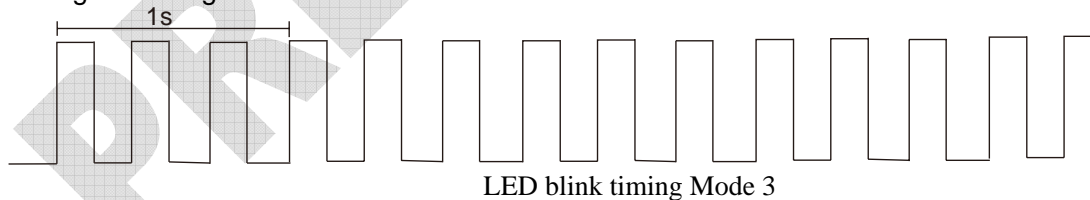
Important Notes

1. **Keep in consistence with AC24v wiring order when powering all fields RAD, and connect all Field RADs to one dedicated power source.**
2. **If using WG SPS-24 unit, don't connect the grounding wire to power supply unit at AC input side.** (refer to **Dual Backup 24vac Powers Connection Diagram** session)
3. **If tag pin is not inserted, POS RAD will not able to arm, disarm and disalarm the tag.**
4. When pointing the Remote at the field RADs the distance between Remote and RAD can be up to 5 meters. But not too close to RAD, the minimum operation range is 5cm.
5. Field RAD, EAS RAD and POS RAD are all internally unique to serve different functions within the Sentinel system and must not be mixed up and replace each other.

RAD's DIP Switch Configuration

On each RAD, there is a DIP switch which can setup the RAD with different configurations.

Each Field RAD can be configured with different synchronization ID from 1 to 9. the settings are illustrated as below.
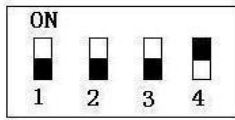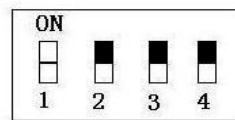
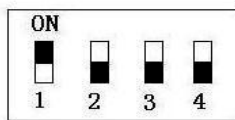Field RAD-1
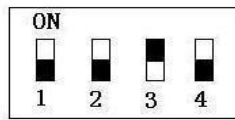
Field RAD-2
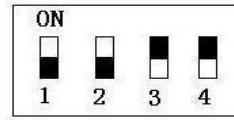
Field RAD-3
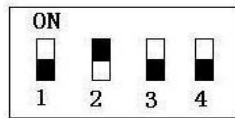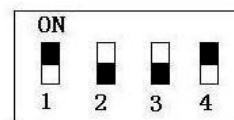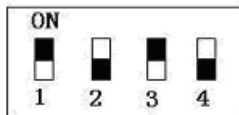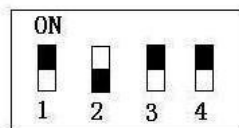
Field RAD-4
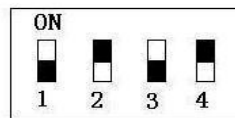
Field RAD-5
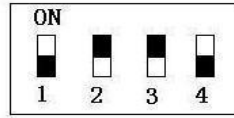
Field RAD-6

Field RAD-7

Field RAD-8

Field RAD-9

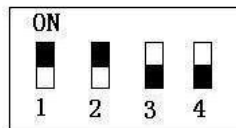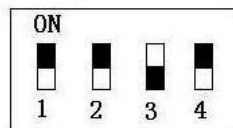EAS RAD has only one setting. Please don't change the DIP.

EAS RAD

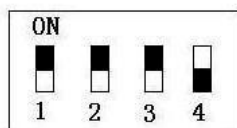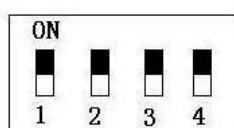POS RAD has five settings. The settings are illustrated as below:

POS RAD-USB

POS RAD-
All function

POS RAD-
Deactivation only

POS RAD-
Activation only

POS RAD-
DisAlarm only

POS RAD five setting types	Functions Descriptions
POS RAD-USB	Arm, Disarm, Disalarm the sentinel tags, and PC USB connection. If connected to PC, all operations on POS RAD are controlled by PC software; the switch button is invalid then. But LED is still active.
POS RAD-All function	Arm, Disarm, Disalarm the sentinel tags. The switch button is for switching among the three operation modes.
POS RAD-Deactivation only	Disarm the sentinel tags Only. The switch button is for activate or disable Disarm function.
POS RAD-Activation only	Arm the sentinel tags Only. The switch button is for activate or disable Arm function.
POS RAD-DisAlarm only	DisAlarm the sentinel tags Only. The switch button is for activate or disable DisAlarm function.

Dual Backup 24vac Powers Connection Diagram

This connection diagram provides the connection guidance to use one AC power relay, two 24vac power supplies (WG SPS-24 or customer's own 24vac power supplies) and one UPS to construct as a dual backup power supply systems which provides more stability to overall power supplies for sentinel.
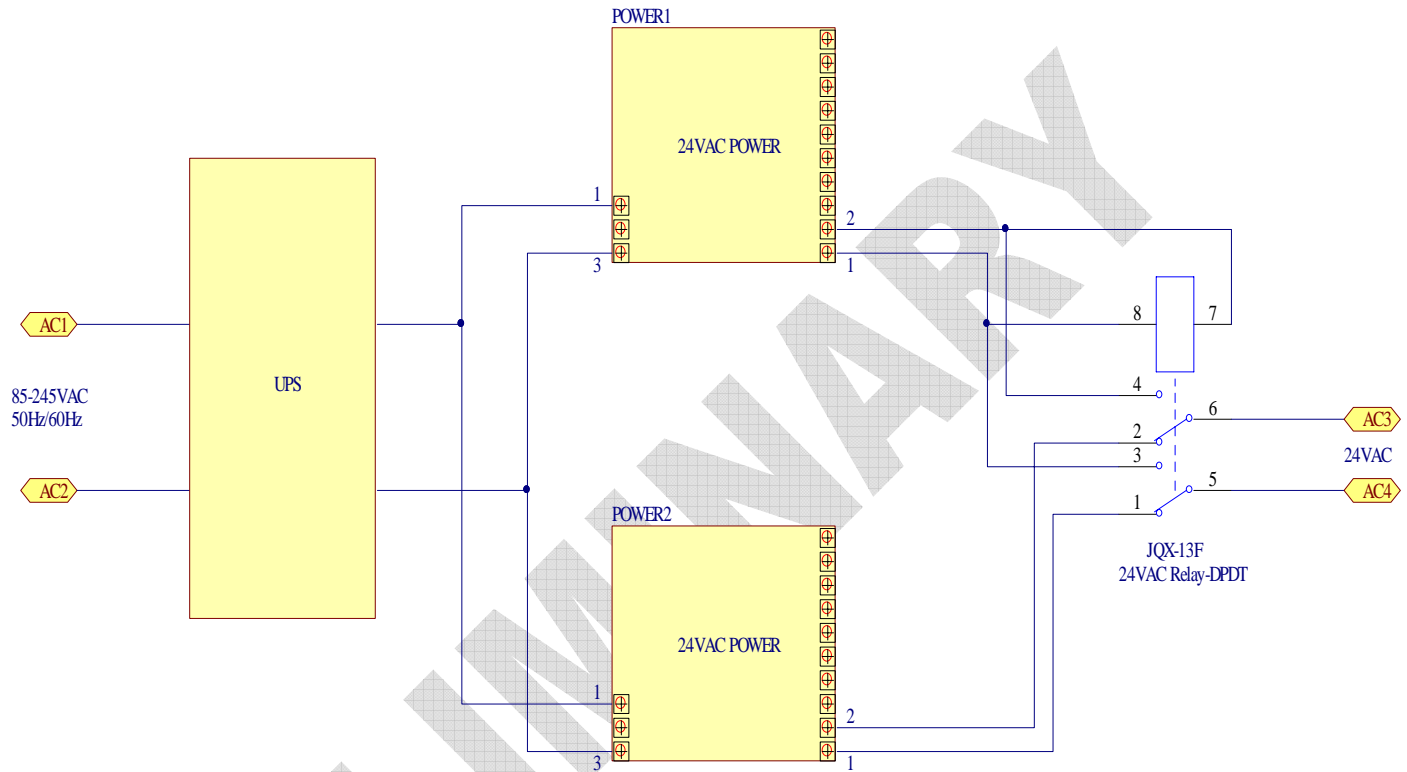
24vac Powers Connection Notice:

Pin1 and Pin2 is 24vac output

The middle pin don't connect to Ground.

***

Federal Communication Commission Interference Statement

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

FCC Caution: Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate this equipment. This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.