



THOR GUARDIAN

INTEGRATED LIGHTNING PREDICTION AND WARNING SYSTEM

Owner's Handbook

INSTALLATION AND OPERATIONS MANUAL

Thor Guard 17.1

THOR GUARD
Customer Resale Position Statement

THOR GUARD, Inc. has been designing, creating and manufacturing the most technologically advanced lightning warning systems ever developed for more than 35 years. The company is constantly monitoring the electrostatic nature of severe storms world-wide and implements upgrades periodically as new data is observed, studied and deemed necessary to improve the capabilities of every THOR GUARD system. Each customer on record with THOR GUARD, Inc. located in Sunrise, Florida, is provided the opportunity to keep their system current, maintaining the best possible performance of their THOR GUARD system.

Though rare, a customer will occasionally “re-sell” a part, or the entire THOR GUARD system to an entity who may not be known to THOR GUARD. In such cases, THOR GUARD will not provide support for those customers and will abdicate any responsibility for system operation, any malfunctions, failures or upgrade/service. Both the new customer and the original owner of the system who sells the THOR GUARD may share full legal responsibility for any lightning event which causes injury or death.

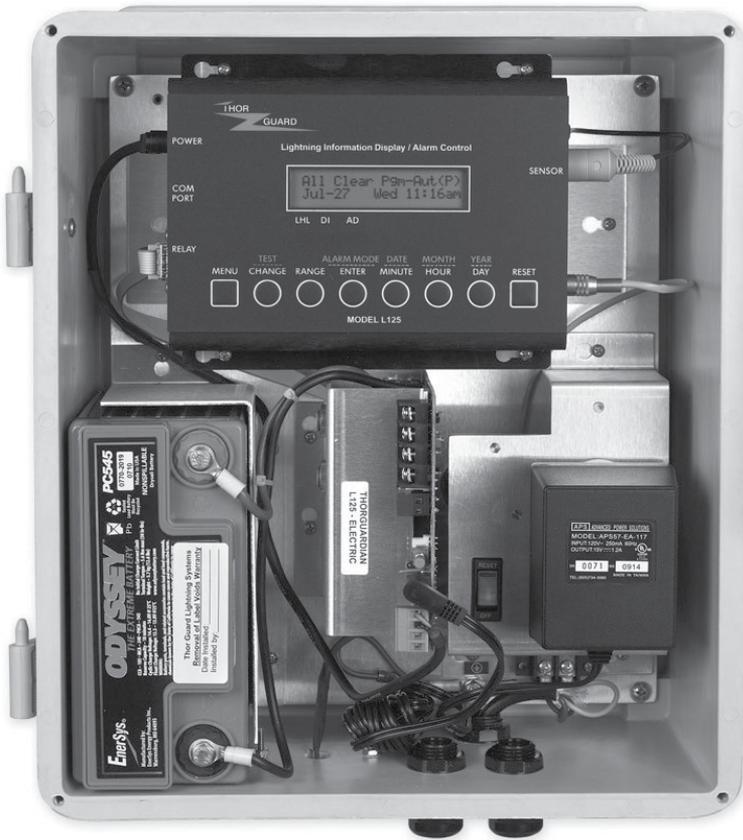
Should you be considering selling to a third party, that purchaser should contact THOR GUARD and have a full and complete analysis performed at the factory in Sunrise, Florida to insure the system is current. The new purchaser will then provide THOR GUARD information consistent with all new THOR GUARD customers. The cost of analysis will be dependent on what is found by a THOR GUARD technician.



THORGUARDIAN



Thor Guard 17.1



THOR GUARDIAN CONTROL BOX

(Electric Model)

REPLACE BATTERY ONLY WITH
ENERSYS ODYSSEY PC545
THOR GUARD PART BAT104K

The protection provided by the equipment may be impaired if there is failure to use the equipment in a manner consistent and as specified by THOR GUARD in this manual.

THOR GUARD

Hardware License Agreement

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Termination

User’s license will automatically terminate upon any attempted transfer of the Product. User must notify THOR GUARD of any intent to transfer, including in such notice the name and address of the intended transferee. The transferee must accept these License Terms as a condition to the transfer. Otherwise, THOR GUARD does not authorize the transfer and the User and transferee will be in violation of this Agreement should the transferee use the Product. THOR GUARD and its affiliates will not be liable and / or responsible for the necessary system Hardware maintenance of equipment, specifically but not limited to (a) written notification to THOR GUARD of any electrostatic altering devices installed after a THOR GUARD Installation, (b) the relocation of the Sensor by the User from the original installed location, and (c) periodic testing of complete system. This license will automatically terminate upon User’s failure to comply with any of these License Terms. Upon termination, User and any unreported transferee must stop using the product.

Limited Warranty

THOR GUARD warrants to User that the Hardware will perform substantially in accordance with the published specifications for a period equal to 2 years from the original date of purchase when properly installed and used. Warranty does not apply to defects resulting from (a) improper or inadequate maintenance, (b) software, interfacing, parts or supplies not supplied by THOR GUARD, and (c) unauthorized modification of the Software or the Products. If THOR GUARD receives notice of a covered defect(s) during the warranty period, THOR GUARD will replace Software that does not perform substantially in accordance with published specifications. THOR GUARD does not warrant that the operation of the Software and / or Products will be uninterrupted or error free. If THOR GUARD is unable, within a reasonable time, to repair or replace Hardware or Software to a condition warranted, User shall be entitled to a refund of the purchase price, subject to THOR GUARD.

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THOR GUARD Lightning Data

The information recorded by the THOR GUARD lightning system is used exclusively for the purpose of providing lightning prediction at a single site location. The data, which is available by means of a serial port, ‘RS232,’ or any communication device, both wired and wireless, is of a proprietary format exclusive to THOR GUARD. Use of this data for the purpose other than the connection with a THOR GUARD system, or THOR GUARD software, is a violation of this Agreement.

General

This Agreement shall be deemed to have been made and executed in the State of Florida and both parties agree that any dispute arising hereunder related to this Agreement or the Product will be governed by the laws of the State of Florida exclusive of its conflicts of law principles and that the courts in the County of Broward, Fla. will have exclusive jurisdiction over all such disputes. FURTHER THE PARTIES HEREBY WAIVE TRIAL BY JURY IN CONNECTION WITH ANY ACTION OR SUIT ARISING UNDER THIS AGREEMENT OR OTHERWISE ARISING FROM THE RELATIONSHIP BETWEEN THE PARTIES. This Agreement shall be binding upon the parties authorized successors and assignees. Neither party’s waiver of any breach or failure to enforce any of the provisions of this Agreement at any time shall in any way affect, limit or waive such party’s right here after to enforce or compel strict compliance with every other provision. No modification of this Agreement shall be effective unless in writing, signed by both parties.

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Foreword

THOR GUARD is a precision electrical instrument and requires some basic care to consistently provide the high standard of service designed into the equipment. Adhering to the following operational guidelines are mandatory.

Don't Always Wait

THOR GUARD is designed to provide its user with reliable lightning prediction. If, however, you ever feel “uncomfortable” with incoming weather and THOR GUARD has yet to issue a RED ALERT...

Don't Wait

Issue a warning to cease activities in your area. When it comes to safety, the only mistake you can make is through “INACTION”.

THORGUARDIAN Alarm Signals

When the conditions are prevalent for a Red Alert hazard, the horn will sound continuously for 15 seconds. The strobe light will turn on and stay on. Upon returning to a safe environment, the All Clear signal will sound; 5 seconds on, 2 seconds off, repeated two more times. The strobe light will turn off.

Introduction

Thank you for choosing THOR GUARD as your Lightning Prediction and Warning System.

THOR GUARD is the only company in the world that provides lightning prediction technology. For more than 25 years, our method has proven to be extremely accurate.

You join many golf courses, parks, colleges, airlines and numerous industrial facilities that have selected THOR GUARD.

We are sure your THORGUARDIAN system will provide many years of trouble-free operation. This system is a complete lightning warning system which is provided in one compact package. The L125 is the computer within the THORGUARDIAN that determines the current lightning hazard and controls the activation of the horns and strobe.

A THORGUARDIAN can be installed outdoors as a single unit, or you can locate the fiberglass controller box in a secure environment. The use of 120 VAC or a solar panel allows for flexibility of operation.

The area of coverage can be a maximum of 2 ½ miles in radius. The air-horns have a range of approximately 700 yards, configured in a 360-degree pattern. A strobe light is included to provide a visual notification of the current hazard. Using the system timer, the daily hours of operation when lightning warning is required can be controlled.

The THORGUARDIAN provides the user with the ability to view and record lightning events using the optional software, THOR PCX. Using the PC, the user can “Replay” and view a specific storm. This is an optional product of THOR GUARD and works exclusively with all THOR GUARD products.

THOR GUARD Approach to Lightning Warning

Lightning is the result of a massive exchange of electrostatic energy in the atmosphere. Shifts and changes of positively and negatively charged “ions” in the atmosphere and in the ground could create an energy flow that may result in a lightning strike once a conductive cloud to ground path is available. A lightning “prediction” system senses and evaluates these shifts and changes in the electrostatic field that precede the occurrence of an actual lightning strike.

The THOR GUARD system was designed to evaluate the electrostatic field and compare the energy migration of the positive and negative “ions” to a computer model developed during thousands of hours of recorded storm data. The THOR GUARD system is comprised of two essential elements. The first, the “Decoupled Atmospheric Static Accumulator” sensor (D-ASA), constantly monitors the electrostatic field from its typical location on the top of a structure. The primary coverage area for this system is calculated using a maximum, but adjustable, radius of 2.5 miles (5 miles in diameter). The total area being monitored, however, is a range that is adjustable to a maximum radius of approximately 15 miles.

The sensor communicates the data over special cable to the second element, the THOR GUARD L125. The computer evaluates the information 500 times per second within its integrated circuitry and produces two important potential lightning threat levels. The first is called the Lightning Hazard Level, or “LHL.” The “LHL” is displayed on a scale of zero (0) to nine (9) and represents the threat of lightning potential in the total area being monitored. The “LHL” responds to instantaneous positive and negative energy shifts and relative intensity.

(Note: All THOR GUARD systems are accurate to 1mv at 15 miles.)

The second important lightning threat level is called the Dynamic Index, or “DI.” The “DI” represents the lightning threat in the immediate (2.5 mile or less radius) area being monitored. This value is ascertained by relating the overall “LHL” level to local shifts in positive and negative energy. As above, the “DI” threat level is displayed numerically, on a scale from 0% to 99%.

System Technical Terms

Polarity – THOR GUARD distinguishes between positive and negative polarity because, during most storm conditions, a negative electrostatic field of the same intensity as a positive field poses a much higher lightning hazard threat level. The intensity and shifts in polarity may be observed on the “LCD Module”. Negative polarity is displayed as the symbol (-) and positive polarity is displayed as a (+).

LHL (Lightning Hazard Level) – This is the probability of a lightning strike occurring within the defined area or range (up to 15 miles) being monitored by the facility. The LHL will be the first and last indication that energy is present in the total area monitored.

DI (Dynamic Index) – The measurement of the electrical activity in the immediate area and the probability, from 0-99%, that if lightning strikes, it will strike nearby (2.5 mile radius or less). The DI determines the warning level based on energy migration in your immediate area. A “DI” of three (3.0) will trigger a “Red Alert” condition that should provide a warning margin of eight (8) to twenty (20) minutes before the arrival of local lightning activity.

BOB (Bolt out of the Blue) – The condition in which a very powerful lightning discharge may occur, even with no clouds at all in the immediate area. A BOB may emanate from a weather front up to 50 miles away.

AD (Activity Detector) – The “Activity Detector” is an estimate of how much time will elapse before normal activities may resume. This number will be reset every time a major excursion of energy (i.e., lightning strike) is recorded. The Activity Detector indicates the time in minutes before an “All Clear” will sound. During a storm, the AD will reset depending upon the discharge and the energy present. The Activity Detector running time has a maximum of 10 minutes, after which the system will return to the “All Clear” status.

FCC (Field Collapse Count) – The FCC represents individual electrical energy discharges within the total coverage area and is a good indication of the storm intensity.

Range – This is the total area being monitored by the THOR GUARD sensor. The Range setting may be adjusted to give a longer or shorter time interval between a “Red Alert” warning and the arrival of local lightning.

Operation

Front Panel



Reset.....Restarts the L125 computer, turning off strobe lights, and reinitializing current lighting data.

MenuPermits access to setting alarm times and specific lightning parameters.

Change/Test ...Allows user to initiate testing of the System; permits adjustments when in the Menu mode.

RangeInstant adjustment of System Sensitivity settings.

Enter.....Allows user to program & access the alarm times.

Alarm Mode...Auto (active) to Manual Mode (inactive).

Date/Minute ...Entry used while setting clock or alarm settings.

Month/Hour....Entry used while setting clock or alarm settings.

Year/Day.....Entry used while setting clock or alarm settings.

Operation

System Display Data



All Clear Pgm-Aut ()
Mar-15 Tue 1:00pm

All Clear.....The current hazard level of the system is displayed. The month and date are displayed until a LHL, DI and AD become active.

PGM-AUTOThe user can select from three modes of operation, execute the entered alarm active time, place the system in a PGM-ON mode, or disable the horns, PGM-OFF. Each mode can be accessed by pressing the **ENTER** key.

LIG-EXT.....Whenever the Horn and Strobe Alarm active times are different, the display will indicate this.

().....The L125 will check the sensor every 24 hours. After the test, the results are displayed with a single letter, except after power turn on when a blank is indicated.

Test () Blank / No Test / Power was off
Test (P) Pass sensor test in last 24 hours
Test (F) Failed sensor test
Test (H) Requires L125 Replacement

Operation

Lightning Display Data

**Warning Pgm-Aut ()
6 2.5 10 Tue 5:00pm**

LHL Lightning Hazard Level (6), on a scale from 0 to 9, indicates the threat of a lightning potential in the **total area monitored**.

DI Dynamic Index (2.5) may have a value from 0.0 to 9.9. The value represents the immediate lightning threat (2.5 mile radius or less) in the area monitored. As shifts in energy occur, the DI will increase or decrease. At a value of 3.0, the Red Alert hazard is activated and will be maintained until an All Clear level is determined.

AD..... Activity Detector (10) is the time in minutes before the THORGUARDIAN will indicate a clear and safe environment. The beginning of a storm starts the value at 10 minutes. The 4 (four) separate hazard levels are All Clear, Caution, Warning, and Red Alert, each based on the LHL and DI values.

All Clear.... There is no significant energy. This will generally indicate a safe environment.

Caution..... Normal atmosphere energy shifts are occurring and, depending on the situation, may increase to a Warning.

Warning.... A significant amount of energy has moved into the area being monitored. Depending on the storm, it may pass by without achieving a Red Alert level.

Red Alert... The conditions for a local strike are prevalent. Activities should cease and those outside should seek immediate cover. Increasing DI values increase the possibility of a local strike and represent increased risk.

Operation

System Operating Mode

All Clear Pgm-Aut ()
Mar-15 Tue 1:00pm

All Clear Man - Off ()
Mar-15 Tue 1:00pm

All Clear Man - On ()
Mar-15 Tue 1:00pm

The current alarm mode can be changed to accommodate cleaning of the sensor or allow extended operation of the L125. By pressing the **ALARM MODE** key, you will sequence through “Man-Off”, “Man-On”, or “PGM-AUT”.

The Man-Off mode will disable the horns and strobe. This is useful to allow for cleaning of the sensor.

The Man-On mode, or extended operation, enables the horns and strobe continuously. The installed alarm program is overridden.

PGM-AUT is the normal mode that the L125 should be in for unattended operation.

The L125 will remain in whatever alarm mode that the user has selected. After sensor cleaning, or extended operation, ensure the L125 is returned to the PGM-AUT or Man-Off mode for correct operation. Pressing the **RESET** key will return the L125 to the specific operating mode for this time of day.

Operation

Range Settings



Current Range is 12
4 6 8 10 (12) 15

The THORGUARDIAN permits the user to adjust the system to compensate for specific local environments. The amount of time you require to suspend activities can be controlled.

The factory setting is (12). After several storms, and observing the performance of the THORGUARDIAN, adjustments can be made to “fine tune” the hazard notification time.

A smaller selected value will allow for a shorter amount of time to be provided before a RED ALERT is sounded. As the value is increased, an earlier hazard notification will take place.

Prior to making any adjustments, ensure that the sensor is mounted in the ideal location, and that the sensor has been recently cleaned.

Cleaning of the sensor on a regular basis will provide for optimal performance.

Press the **CHANGE** key and the () will move to the right. Continue until you have selected the desired range. Press the **ENTER** key to save your new range selection.

Note: If there are any DI values present, the current range value cannot be altered.

Operation

Range Settings (cont'd)

Current Front End	2
New Front End.....	2

After observing the performance of the THORGUARDIAN, it may be desired that the front-end response be accelerated.

Using the **CHANGE** key, the current setting can be altered.

A value of (2) is the factory setting.

A value of (1) will increase system sensitivity.

When complete, press the **ENTER** key.

Current Back End	3
New Back End.....	3

Additionally, after several storms have left your area, you may feel that an excessive amount of time has elapsed before the All Clear is sounded. The sensitivity can be adjusted.

Using the **CHANGE** key, the current setting can be altered.

A value of (3) is the factory setting.

A value of (6) will decrease the time, allowing for a quicker All Clear signal to be sounded.

When complete, press the **ENTER** key.

Note: If there are any DI values present, the current parameter values cannot be altered.

Operation

Left and Right Panels

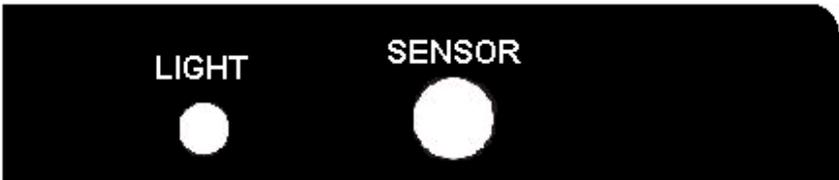


The power for the L125, 15 - 18 volts DC, connects here and to the top of the relay bracket board.

Battery charging status, valid AC, and both Horn and Strobe control signals are connected between the L125 and the relay connection and the relay board.

A RS232 Com Port is provided to allow access of the L125 lightning data. Data is sent at 9600 baud, updating once per second

For a visual display of the lightning and to store lightning events in your computer, you can install THOR PCX, available only from THOR GUARD.



The THOR GUARD sensor, located on the roof, connects to the sensor input. When attaching the sensor to the L125, examine the sensor connector, and insert with the recessed notch in the metal facing up. There is only one direction that the connector will seat properly.

A test plug is included to facilitate testing of the L125 in the event of a continuous failure of the Sensor.

Operation

Operational Light

The THORGUARDIAN has incorporated an exterior Operational Light. The rated life of the LED exceeds 100,000 hours.

During the time when the alarm is active, the light on the bottom of the enclosure will illuminate. This light connects to the L125 on the right side.

In the case of repeated Sensor failures, or a failure of the L125, the Operational Light will be off.

Especially during the active storm season, it is strongly recommended that responsible individuals check the system light on a daily basis. The irregular operation of this light can indicate the immediate need for service.



System Setup

Menu, Change, and Enter Keys

Three (3) keys are used to alter system parameters. All changes will be stored regardless of the power status of the system until otherwise modified by the user.

“**MENU**”: This permits you to access the **SETUP MENU** for the purpose of customizing your system operation. Continue pressing **MENU** until the **EXIT** option is given, then press **ENTER**.

“**CHANGE**”: This will allow you to access or to make the required change in a parameter, depending on the options available.

For individual parameters, the current value that you are changing will blink as an aid.

“**ENTER**”: This is primarily used in the alarm and strobe setup. This will cause changes to the alarm settings to be stored. You can also advance through each alarm setting, without any data entry, to verify the program you have entered is correct.

System Setup

Set Time and Date

Set Clock & Day
11:00am Mon

The display will show the current system time and day of the week. If the correct values are displayed, press the **MENU** key.

Continuously holding down the **HOUR**, **MINUTE** or **DAY** key will allow for the value to rapidly advance.

Adjust the Hour by pressing the **MONTH / HOUR** key until the correct hour is displayed. Observe that the proper **AM / PM** symbol has been selected.

Adjust the Minute by pressing the **DATE / MINUTE** key until the correct minute is displayed.

If the Day of the week is correct, press **MENU**, or press the **YEAR / DAY** key until the correct day appears. Now press the **MENU** key.

Set Month, Date, Year
03/15/05

The display will show the current system month, date, and year.

Adjust the Month by pressing the **MONTH / HOUR** key until the correct month is displayed.

Adjust the Date by pressing the **DATE / MINUTE** key until the correct date is displayed.

Select the Year by pressing the **YEAR / DAY** key until the correct year is displayed. Now press the **MENU** key.

System Setup

Set Alarm Active Time



Horn Active Pgm 1
9:00am Mon - Sun On

This is a (7) seven event timer. You can select an alarm time Mon – Sun, Mon – Fri, Sat & Sun, and any specific day of the week. Multiple alarm times can be set to occur within the same day.

Continuously holding down a key will allow for the value to rapidly advance.

Using the **DAY** key, select the day interval. Using the **HOUR / MINUTE** key, select the time the alarm will turn on.



Horn Active Pgm 1
-- -- . -- -- On

To delete a specific alarm cycle, press the **DAY** key until the display indicates - - . - - for the “time on”. Then press **ENTER**.



Horn Active Pgm 1
5:00pm Mon - Sun Off

Using the **HOUR / MINUTE** key, select the time that the alarm will be inactive.

When complete, press the **ENTER** key.

Continue this process to enter additional alarm cycles.

When alarm entry is complete, press the **MENU** key to exit.

System Setup

Set Strobe Active Time

**Strobe Active Pgm 8
9:00am Mon-Sun On**

Due to local city ordinances, the time of sounding of the horns may be restricted. The user has the ability to program the strobe light to stay on beyond a period selected for the horns.

Once the Horn Active program has been entered or changed, the Strobe Active program for this time will be similarly set.

As an example, you can select the horns and strobe to operate between 7:00AM and 9:00PM. Then, from 9:00PM until 11:00PM, the strobe light will continue to function and illuminate in the event that a lightning hazard is imminent.

The display indicates the current “Strobe On” time. This will be displayed for each setting (8 -15).

Use the **HOUR** key to select the “Hour Time On”. Use the **MINUTE** key to select the “Minute Time On”. Determine the days this will be active by pressing the **DAY** key.

Alarm Options when pressing the **DAY** key include: Monday – Sunday, Monday – Friday, Saturday and Sunday, and each day of the week. When your entry is complete, press the **ENTER** key and advance to the Strobe Off time for this setting. To exit the Strobe Alarm Setting, press the **MENU** key.

Verify that all program settings 8 – 15 have been set properly. By continued pressing of the **ENTER** key, check for a - - . - - in each setting that will not be used.

To eliminate a particular setting, wait for - :- - to appear when pressing the **DAY** key, then press **ENTER**. The strobe alarm for this setting, both on and off times, has been removed.

System Setup

Set System Test Time

Current Sensor Test Time
6:00 am

The THORGUARDIAN system will do a test on the sensor every 24 hours at a pre-selected time. The result of this test is placed on the main operation display while displaying lightning hazard data. If the system fails, internal re-testing will occur, attempting to get a "Test Passed" condition.

SET SYSTEM TEST TIME TO 6:00 AM

To set time, press **Menu** then use **HOUR** or **MINUTE** key. A continuous press will allow for the value to rapidly advance. Ensure the correct AM or PM setting.

If the time is correct, press the **MENU** key to advance to the next system setup item until **.SET SYSTEM TEST TIME** is displayed.

Press **HOURS** to alter the hours. Ensure the correct AM or PM setting.

Press **MINUTES** to alter the minutes. Press the **MENU** key when complete.

If continued failure occurs, the Operational Light will turn off.

**The System requires IMMEDIATE
attention to resume operations.**

FCC Rules & Regulations

FCC Rules and Regulations – Compliance Statement

THOR GUARD L125 Lightning Prediction System

This equipment has been tested and found to comply with the limits of a Class A digital device, pursuant to Part 15, of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

System Maintenance

Sensor: **Decoupled Atmospheric Static Accumulator (D-ASA)**

Material: Acrylonitrile Styrene Acrylate (ASA)

Features:

- Stress crack resistant
- Salt water resistant
- UV (Ultraviolet) resistant
- Maintenance-free



The new D-ASA sensor is a maintenance-free sensor, so no physical interaction is required.

Please Be Advised Of The Following:

Observe the sensor from time to time to confirm that all parts of the sensor are attached.

The daily Thor Guard test will confirm if the sensor cable is intact.

A test failure is an indication that part of the sensor assembly is damaged. This must be reported immediately to your local representative or Thor Guard service.



System Maintenance

Sensor Testing Procedure

Sensor / Diagnostic
Sen=Enter Diag=Menu

Your THORGUARDIAN has been programmed to run a sensor test every 24 hours. If the system passes the test, the display will indicate Test (P). The test may also be run manually (unless there is storm activity) by depressing the **TEST** key on the front panel. Then press the **ENTER** key when prompted.

Be sure to set the alarm to the manual mode by pressing the **ENTER** key, thereby placing the L125 in the MAN - OFF mode. Alarms may sound unless this is done.

If the sensor test fails, the letter (F) will be displayed; however, the system will continue to operate with reduced sensitivity as long as the sensor cable is attached. Additional tests will automatically be performed over the next 24 hours.

Should the unit continue failing the test on a clear day.....

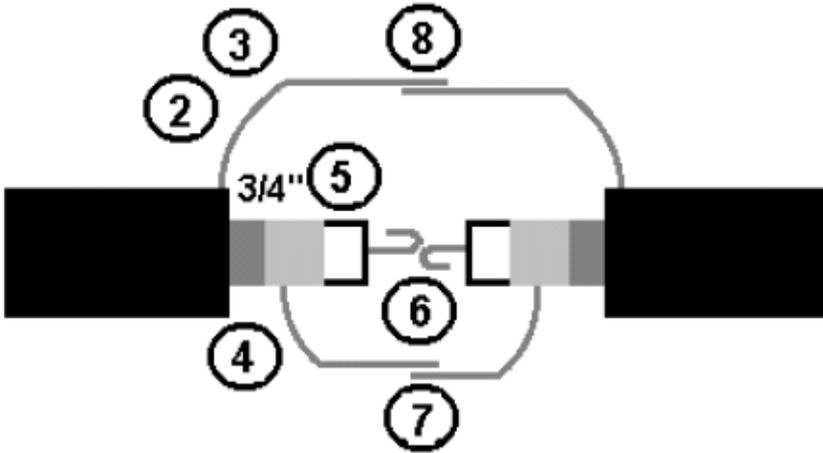
THE SYSTEM MAY NOT BE OPERATIONAL

Check that the Sensor connection on the side of the L125 is secure.

Remove L125 power, detach sensor cable and attach test plug.

Run sensor test, and if test passes, remove power, re-attach sensor cable. Press **TEST**, followed by **ENTER** and run sensor test. If test fails, contact your area representative or THOR GUARD.

System Maintenance



Sensor Cable Splice

- (1) Cut a piece of sensor cable approx. 8" long and set it aside.
- (2) Strip 3" of the black outer cover of the tri-axial cable.
- (3) Push down on braided wire to loosen, then carefully separate and twist into a single, bushy piece.
- (4) Strip clear sheath leaving approx. $\frac{3}{4}$ " from the base of the braid above. Remove the aluminum foil cover. Repeat step 3, except braid wires on opposite side.
- (5) Strip white center cable $\frac{3}{4}$ " from inner braid leaving 1" of solid copper wire exposed. Connect two center wires, ensuring both set of braids will overlap. Adjust lengths of wires if necessary.
- (6) Hook center conductors together and solder using rosin core 60/40 solder. Ensure solid connection. Tape over connection.
- (7) Make solder connection between each set of braids, leaving a smooth finish. Tape to insure good insulation and avoid contact with second set of braided wires.
- (8) Repeat step 7 with outer braid.
- (9) Take the 8" piece of cable and tape to outside of the entire splice.
- (10) Cover splice liberally with tape to protect from water.

System Diagnostics

Horn, Strobe and Op Test

Sensor / Diagnostic
Sen=Enter Diag=Menu

The THORGUARDIAN provides you with the ability to test both the horn and strobes using the L125. The output battery status signals from the relay bracket are also displayed. Press the **TEST** key followed by the **MENU** key.

Horn & Strobe Test
Horn=Hour Strobe=Day
Horn Active
Horn=Hour Strobe=Day

Press the **HOUR** key and the horns will sound.

Strobe Active
Horn=Hour Strobe=Day

Press the **DAY** key and the strobe light will illuminate.

Oper. Light On
Horn=Hour Strobe=Day

Press the **MINUTE** key and the Operation Light will illuminate.

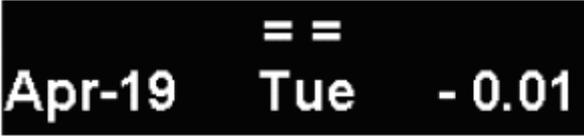
When you test the horns, the battery voltage will be checked. The battery will indicate “good” whenever the voltage of the battery under load is greater than 10.5v.

Press the **TEST** key to view both the battery voltage status and the battery charging circuit.

To exit from this mode press the **ENTER** or **RESET** key.

System Diagnostics (cont'd)

Sensor Diagnostic



The image shows a black rectangular display with white text. At the top, there are two equals signs '=='. Below that, the text is arranged in two lines: 'Apr-19' followed by 'Tue' and '- 0.01'.

The THORGUARDIAN allows you to monitor and see the current electrostatic energy in the atmosphere. A digital voltmeter is displayed with the ideal condition being 0.01. Some causes for a ramping of the bar graph can include a dirty or contaminated sensor, tall nearby metal poles holding energy, waving nylon tarps, high voltage electric lines nearby, or nearby irrigation electric pumps.

Press the **ENTER** key and place the L125 in the “Man – Off” mode. This will prevent the alarms from activating while you check the system.

Press the **TEST** key and wait 10 seconds. The L125 will now display the current electrostatic energy. The top line is a bar graph of the voltage.

By touching the sensor plate, the bar graph will change and the LHL, DI, and AD values will update.

To exit this mode, press the **RESET** key.

System Software Revision



The image shows a black rectangular display with white text. The text is arranged in two lines: 'All Clear' followed by 'A1225' on the top line, and 'Apr- 21' followed by 'Thu 10:05am' on the bottom line.

The software revision and system parameters can be displayed while in the main screen by pressing the **DATE**, **MONTH**, or **YEAR** key. The letter “A” is the software, “12” is the range, “25” is the front and back parameters.

Technical Support

Questions and Answers

Question

My system has been working fine. What would cause my THORGUARDIAN system to become less sensitive?

Answer:

1. New equipment installed on the roof is affecting Sensor reception.
2. An adjacent tree has grown taller and is absorbing energy.
3. A new building structure is restricting airflow.
4. A grounding strap has been attached to the Sensor.
5. Recent painting in the area has coated the Sensor.
6. Check the ground for the L125.

Question

The system goes off on a clear day. What would cause my THORGUARDIAN to become overly sensitive?

Answer:

1. A compressor or electric motor has been located near the sensor and is sharing the same AC circuit.
2. Someone has installed (or tied) an energized cable along the same path as the sensor cable.
3. Check for tarps located near the Sensor that can charge the air.

Question

My system has been passing the sensor test repeatedly; however ,now my system is failing the test. What should I do?

Answer:

1. Check to see that the sensor plug is attached to L125 firmly.
2. Try using the sensor test plug, and see if sensor test passes.
3. Contact a representative or THOR GUARD if problem persists.

Technical Support

Questions and Answers

Question

I just installed my system, and after a few storms I feel I am given too much time before the storm arrives. What can be done?

Answer:

The Range of your system needs to be adjusted. Refer to the Range Section of this manual and reduce the range by one value. As an example, if your range was at 12, change it to 10.

Question

I just installed my system, and I have storms that are too close before I am notified. What do I do?

Answer:

1. First, make sure the Sensor has been mounted as required and sufficient airflow exists at the Sensor location.
2. In some geographic areas, storms come predominantly from one direction. See if Sensor placement can be relocated to maximize airflow.
3. The Range of your system needs to be increased. Refer to the Range Section of this manual and increase the range by one value. If your range was at 10, increase it to 12.

Question

I just installed my system, the storm has left, but I feel that too much time has gone by before I am given the ALL CLEAR signal. Is it possible to shorten the time?

OR: The ALL CLEAR signal sounds and then, within 2–5 minutes, the RED ALERT is re-sounded.

Answer:

There is an adjustment that can be made. We would like you to call your area representative or THOR GUARD so the correct adjustments to your system can be made.

Technical Support

Questions and Answers

Question

We need to re-locate the THORGUARDIAN, but the sensor cable is too short. Where can I buy additional cable?

Answer:

The cable used is of a tri-axial type. THOR GUARD can supply you with a section of cable having the 6-pin Din connector pre-attached. Consult your representative or THOR GUARD.

Question

My display is out, OR the display is frozen. Where is the fuse? How do I reset the system?

Answer:

The L125 uses an internal self-resetting solid state fuse. Remove the power to the L125, and re-attach after 10 seconds. If there is still no display, check the battery, system AC power, and red charging "LED" on relay bracket. Disconnect power transformer from relay bracket board and measure voltage; it should be +18v.

Technical Support

Questions and Answers

Question

A storm is present and the current time is 7:05pm. My alarm active time is 8:00am to 7:00pm. What will the system do?

Answer:

All strobe lights, if on, will turn off at 7:00pm. The system will still monitor the storm; however, no horns will sound. Depending on your setting, the alarm will be active. You specify the time that THOR GUARD will provide you with audio (horns) and visual (strobe alerts).

Question

A storm in our area has been active for the last ½-hour. The current time is 7:00am. My alarm active time is 7:00am to 7:00pm. What will the system do?

Answer:

The L125 will show the current hazard and LHL and DI values. Depending on the alarm mode, automatic or manual, the RED ALERT horn will sound. The strobe light will turn on.

Question

The red light on the relay board is off. What does this mean?

Answer:

This indicates there is no voltage to charge the battery, either from the AC power or the solar panel. Check the AC system power switch; there is an internal circuit breaker, so turn it off and back on to reset.

Ensure green or red power light is on. Measure the output of the black transformer. There should be 18v DC, the inside is positive and the outside is ground. The battery may be a “dead short”; remove the battery cables.

Technical Support

Questions and Answers

Question

The display switches between ALL CLEAR and CAUTION, but I have an LHL of 4.0. The DI is 0.0 and there is no AD count. It has been this way for hours. What should I do?

Answer:

This is normal, as energy has moved into the area. There is no hazard at the present moment. A quantified discharge or activity must occur before THOR GUARD will trigger the AD.

THOR GUARD is programmed to discharge the sensor plate at periodic intervals. As the energy field dissipates, the LHL will return to (0).

Question

The horns will not sound and there is lightning present. What is the cause?

Answer:

First, verify the time of the system is correct and the word “PGM-AUTO” appears on the top line of the display. The alarm hazard must be at a “RED ALERT” level for the horns to sound. Press the “blue” button on the relay board to check the horns and strobe for correct function.

Question

The Operational Light is off, what does this indicate?

Answer:

The light is off for any of several reasons, which include: the alarm period is off, the sensor has failed repeatedly, the L125 has failed, or the battery or AC power has failed.

Installation

Getting Started

Complete reading of the “Installation Portion” of this manual prior to component installation will ensure the successful operation of your THORGUARDIAN lightning prediction system.

The location of the THORGUARDIAN enclosure and the horns will be determined by numerous factors. Aesthetics, serviceability, and audible coverage should govern the location for the system.

Some of the items necessary to complete the installation include: wall mount brackets, patio stones, anchoring lag screws, and 1” threaded galvanized pipe of a correct length.

Locate the control box in a secure environment for added security, and for easy access for servicing components such as the battery.

PVC cement is necessary to attach the enclosed 1½” threaded bushing to the horn.

Silicon sealant or similar should be used to seal holes wherever the sensor and / or horn cable pass through openings.

The sensor cable is an outdoors rated triaxial cable containing insulation foam. Use care and do not excessively bend or stretch cable.

NOTE!! Do not use “staples” to secure sensor cable in place

Installation

Selecting the Control Box Location

Each system is shipped with a heavy-duty tripod and a mounting bar for attaching the horn cluster, sensor, and strobe light. It is necessary to obtain a 5ft piece of 1" pipe, with one end threaded, to attach to the mounting bar to be secured by the tripod.

The location of the THORGUARDIAN control box is determined by the accessibility of AC power, unless solar power is used. Ensure that there is reliable, clean and grounded AC power within 3-ft. of your THORGUARDIAN.

Connections to AC sources that share motors, water coolers, laser printers, or refrigerated vending machines can cause erratic operation. In this case, find alternate power sources; solar power can be a viable alternative.

As an option, THORGUARDIAN can be operated where AC power is unavailable using a solar panel. It will be necessary to establish a reliable and secure ground to attach to the control box battery for the system to function correctly. Contact THOR GUARD.

The THORGUARDIAN control box is UL listed and fiberglass in construction, which permits for both outdoor and indoor mounting. The dimensions are 14"W x 12"L x 7 ½"H.

The sensor can be located a distance between 12-ft. and 125-ft. from the control box. A specific length of horn and sensor cable has been included with your order. After determining the sensor location is satisfactory, ensure the sensor cable length is adequate. Contact THOR GUARD if additional cable will be needed or if there will be a large amount of excessive cable.

Installation

Selecting the Sensor Location

The location of the Sensor will be dependent upon the desired location of the THORGUARDIAN enclosure, the type of existing roofing material, the design of the roof, the access to AC power, and the proximity of other equipment that may adversely affect the performance of the system. If a roof location is not possible, the sensor may be mounted on a post or pole using the T-Bar.

NOTE: SYSTEM PERFORMANCE WILL BE COMPROMISED UNLESS THE SENSOR IS MOUNTED WITH A CLEAR “VIEW” OF THE SURROUNDING SKY. ADJACENT TALL BUILDINGS CAN RESTRICT AIR FLOW, THEREBY REDUCING NOTIFICATION TIME. IF A SUITABLE LOCATION CANNOT BE FOUND, DO NOT INSTALL!

The following guidelines should be considered when placing the Sensor:

- Within the cable length supplied with the sensor.
- At least 5' from lightning rods.
- At least 15' from (and higher than) air conditioning units, vents, fans, etc.
- At least 15' from other antennas; e.g. TV, VHF, etc.
- Never under overhanging trees or high power lines.
- Outside a 30-degree angle from building structures or trees (trees absorb energy from “storms”).
- As far as possible from electric chargers or transformers.
- A metal roof is not advisable, but if necessary, isolate the sensor and tripod from the roof and elevate the sensor as much as possible.

MAKE SURE THAT ANY MAST OR TRIPOD UTILIZED TO MOUNT THE SENSOR IS NOT GROUNDED.

If you have any questions about your location, contact THOR GUARD prior to the installation of the sensor.

Installation

Selecting the Horn Location

The ideal configuration is to place the horns and strobe light next to the sensor on the T-bar. Determine if this setup will meet your requirements.

The horns have been supplied with the requested cable lengths. If necessary, the length can be increased to a maximum of 40-ft. from the control box. Excessive cable lengths will reduce the audible output.

The horns are a sealed component and require no maintenance.

You are supplied with an outdoor rated strobe light with 10- to 40-ft. of cable. The strobe light can be located up to 250-ft. from the control box. This is a low voltage, low current device requiring +12VDC@ 800ma.

Installation

Running the Sensor, Horn, and Strobe Cable

The sensor uses a 3/8" diameter, RG59 outdoor rated triaxial cable. The connector on the cable which attaches to the L125 requires a 1-1 1/2" opening to pass through any opening along the route of the cable path.

The horn uses a 7/16" diameter, 12AWG, 4-conductor UL listed outdoor cable that is sunlight resistant and utilizes a moisture resistant PVC jacket.

The strobe light uses a 1/4" diameter, 18AWG, 2-conductor UL listed outdoor cable that is sunlight and utilizes a moisture resistant PVC jacket.

If you are installing these cables in conduit, a minimum diameter of 1 1/2" should be used. Additionally, it may be required for you to cut the sensor connector off and splice the cable after installation.

You have been supplied with a predetermined length of Sensor Cable, which is connected to the Sensor. At this time, determine the L125 location and ensure that there is sufficient sensor cable.

Apart from avoiding the obvious obstacles, attention should be given to the following:

- None of the cables carry any AC power, so in most instances it won't be necessary to enclose it in conduit.
- When routing the cable, do not parallel lightning rod grounding wires or power runs, and refrain from tie wrapping to another cable of any type, except horns and strobe light.
- Avoid sharp bends, metal edges, or anything that might tear or chafe the outer jacket of any of the cables.
- Avoid pulling too tightly and stretching or crimping the cable.
- Refrain from using staples to secure sensor cable.

Installation

Mounting Sensor, Horns, and Strobe with T-Bar

The THORGUARDIAN is supplied with a “T-Bar” and tripod for mounting the sensor, horn and strobe light. A 5ft. piece length of 1” ridged pipe, one end threaded, needs to be acquired to connect between the tripod and the “T- Bar”.

The installation will dictate additional mounting components to be acquired such as patio stones. When using the tripod, the legs must be isolated from metal roofs using plastic wood or a similar non-conductive product. Direct contact with the roof will diminish the sensitivity. Ensure the mounting lag bolts remain isolated from the metal surface.

In some instances the strobe light will be placed in an area for a clear and direct visual notification. Lengthening of the cable can be done to a maximum of 200 feet. Also if needed, an additional strobe light can be connected in parallel.

T-Bar Assembly

Note: Horn and tripod plates are already secured on T-Bar.

- 1) Attach T-Bar to tripod pole using 1” coupler (included) and secure firmly.
- 2) Firmly screw horn PVC bushing to T-Bar location [a]
- 3) Place horn on bushing and turn until cable is facing in toward center of T-Bar for neat cable placement after assembly.
- 4) Remove horn and secure using PVC cement for permanent placement.
- 5) Secure Strobe plate over location (b) adjusting nuts for groove location. Tighten nuts making sure screws fit into groove.
- 6) Secure sensor to 24” pole with plate mount attached.
- 7) Secure sensor pole plate mount over location (c) adjusting nuts for groove location. Tighten nuts making sure screws fit into groove.
- 8) Check that All nuts from the 4 fixtures are firmly secured.
- 9) To complete T-Bar assembly dress all cables accordingly.



Installation

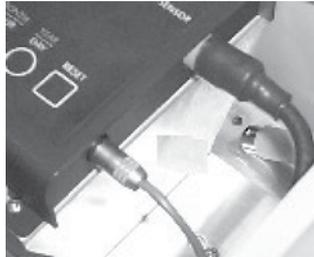
Connecting the Sensor, Horns, and Strobe

Your THORGUARDIAN is shipped with the battery cable unattached. Do not connect to AC power or the battery until all cables have been connected to the system.

Loosen the nut from the black strain relief on the sensor cable. Route the sensor cable through the available opening in the THORGUARDIAN enclosure. Reattach nut over strain relief.

Remove the Test Plug from the L125. Locate cable inside gray anchors and attach it to the L125.

Examine the sensor connector, and insert with the recessed notch in the metal facing up. There is only one direction the connector will seat properly.



Ensure that the Operational Light cable is securely attached to the L125 unit.

Installation

Connecting the Sensor, Horns, and Strobe (cont'd)

Determine where the enclosure will go, where the cables will run, and, if using a solar panel, ensure an unobstructed southerly exposure exists to attain the most amount of sunlight. If using a solar panel, mount panel to bracket, then attach to post.

Route horn cable, strobe cable and solar power cables through lower bushings, and cut excess cable, allowing for a service loop.

Secure horn cables to the black connector on the bracket, observing colors.

If using a solar panel, insert solar wires to the 2-position input labeled “Solar”; RD = Red wire, BK = black wire. A red light on the relay bracket indicating that the battery is charging should now be lit.

Connect strobe wires to the 2-position input labeled “Strobe”.

A black ground wire is supplied when solar power is used. Connect to the battery and to an established ground.

Note: A different relay board is used for solar. (AC relay board shown)



Installation

System Startup

If AC powered THORGUARDIAN, turn power switch (circuit breaker) on; a red neon light should illuminate.

Attach the red wire to the battery. To test the horns and strobe, press the blue button located on the relay board.

At this time, you should go to the “System Setup” section of this manual and make all necessary adjustments. The display on the L125 should be indicating an All Clear, and if operating within the alarm active time, the Operation Light should be on.

Anytime the alarm is active, the display will have “PGM-AUT”. While in this start up, using the **ALARM MODE** key, place the system in the “Man – Off mode. This will prevent the horns and strobe from activating.



Press the **TEST** key, followed by **ENTER**. The system will now perform a dynamic check of the sensor. The display should indicate the message “Sensor Passed”. If not, check that the sensor cable is installed correctly and re-test. If a failure continues, remove the sensor cable, attach Test Plug, and press **RESET**. Start the test again. If the test passes, the sensor or sensor cable is suspect. Check sensor cable for any chafing or kinks. If the sensor cable was spliced, check for shorts between shields and contact THOR GUARD.

Installation

System Startup (cont'd)

This test will ensure that the L125 will activate the horns and strobe when required. Press the **TEST** key, followed by **MENU**. The system will now permit you to test the Horn and Strobe.

Press the **HOUR** key and the horn should sound. Press the **DAY** key and the strobe light will illuminate.

Press the **ENTER** or **RESET** key to exit this mode.

Verify Battery Charging

This concludes the testing of the L125. A final check of the battery charging circuit can be done by looking at the red “LED” located on the relay bracket. It should be illuminated.



Battery Charging Indicator

WARRANTY

(Does not apply to products supplied by third-party vendors)

THOR GUARD, INC. (“the warrantor”) will repair the THORGUARDIAN product manufactured by the warrantor with new or refurbished parts, free of charge, subject to shipping charges in the USA for two (2) years from the date of original purchase in the event of a defect in material or workmanship. This warranty is extended only to the original purchaser and only covers failures due to defects in materials or workmanship that occur during normal operation. It does not cover damage that occurs in shipment or failures that are caused by products not supplied by the warrantor or failures that result from accident, misuse, abuse, neglect, mishandling, misapplication, alteration, modification, introduction of sand, dust, humidity and liquids or commercial use of this product or service by anyone other than a THOR GUARD factory or authorized representative.

Selective installations located outside the United States are warranted for one (1) year, subject to shipping charges, and included the above restrictions that may cause damage or failure.

In the event of a problem, please direct all inquiries to THORGUARD, INC., 1193 Sawgrass Corporate Parkway, Sunrise FL 33323, Telephone (888) 571-1212, or Fax (954) 835-0808, or email: service@thorguard.com.

The warranties of merchantability and fitness for a particular purpose are limited to the applicable warranty period set forth above.

Some states do not allow the exclusion or limitation of incidental or consequential damages, or limitations on how long an implied warranty lasts, so the above exclusions or limitations may not apply to you.

This warranty gives you specific rights, and you may also have other rights, which vary, from state to state. If a problem with this product develops during or after the warranty period, you may contact your representative or our General Offices in Sunrise, Florida. There are no express warranties.

LIMITS & EXCLUSIONS

THE WARRANTIES ON PRODUCTS PURCHASED FROM THIRD-PARTY VENDORS, WHICH INCLUDE BATTERIES, STROBE LIGHTS, UPS UNITS AND SOLAR PANELS, ARE COVERED FOR A PERIOD OF TWO (2) YEARS BY THOR GUARD.

AFTER TWO YEARS, THE WARRANTY ON THESE PRODUCTS IS THE RESPONSIBILITY OF THE CUSTOMER AND SUBJECT TO THE INDIVIDUAL LIMITATIONS OF EACH MANUFACTURER.

THE SENSOR ASSEMBLY, WHICH INCLUDES THE CABLE, IS COVERED FOR A PERIOD OF TWO YEARS.

THE AIR HORN ASSEMBLIES, STROBE AND PC BOARD ASSEMBLIES ARE COVERED FOR A PERIOD OF TWO YEARS.

THE WARRANTOR SHALL NOT BE LIABLE FOR INCIDENTAL OR CONSEQUENTIAL DAMAGES RESULTING FROM THE USE OF THESE PRODUCTS, OR ARISING OUT OF ANY BREACH OF THIS WARRANTY. ALL EXPRESS AND IMPLIED WARRANTIES, INCLUDING THE WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE, ARE LIMITED TO THE APPLICABLE WARRANTY PERIOD SET FORTH ABOVE.

THOR GUARDIAN SOFTWARE

THOR GUARD may modify the functionality and operation of the THOR GUARDIAN or the software without notice. Any changes that are made to the software will exempt current installed systems requiring immediate software replacement.

Systems outside the software warranty period will be quoted the fee required to install any upgraded software.

All shipping costs, both during and after the warranty period, to install the software will be the responsibility of the customer.

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THOR GUARD, Inc., Sunrise, Florida.

NOTICE TO USERS

If your facility has a lighting policy requiring people to seek shelter whenever lightning is observed, it then is your responsibility to enforce these policies. However, a THOR GUARD alert should never be dismissed.

The THOR GUARD THORGUARDIAN Lightning Prediction system is manufactured by THOR GUARD, Inc. for the express purpose of assisting the user in determining and evaluating the existence and extent of a potential for lightning discharges in the area being monitored by THOR GUARD. This product is in no way intended, nor is it represented to be, any form of protection for persons or property, whatsoever; and THOR GUARD, Inc. shall not be held liable for any damages or losses the user may experience from the effects of lightning, storm related damages, or personal injuries.

The THOR GUARD THORGUARDIAN system will test automatically every day at a pre-selected time. In the event of a system failure, the Operational Light will be off. The horns will sound briefly, and repeatedly to alert that immediate attention is required. The user needs to resolve the cause of fault.

It is the user's responsibility to ensure the system is connected to a properly grounded source of AC power, or, in a solar powered system, that the ground is secure.

A prudent policy to check that the Operational Light is illuminated during the user's designated hours of alarm operation should be established.

If and when the user has concluded that the reason for the fault cannot be determined, contact THOR GUARD.



**1193 Sawgrass Corporate Parkway
Sunrise, Florida 33323
(954) 835-0900
service@thorguard.com**

SELECTED SPECIFICATIONS

Model:	THORGUARDIAN L125
Power Requirements:	Voltage: 120-240 volts AC, 50-60 Hz, Single Phase Power: .25A, 30 Watts >> Optional Solar Power Using 40 Watt Panel
Power Supply:	100-240 volts AC 50-60 Hz 0.6A Dimensions: 1.96" W x 1.5" D x 2.8" H Safety Requirements: UL, CSA Power Cord: 5 ft. Weight: 5.22oz.
Enclosure Control Box:	Dimensions: 13" W x 6 ½" D x 15 ¼" H Safety Requirements: UL, CSA, Type 4X Material: Sealed Gray Fiberglass Enclosure Weight: 26 Lbs.
Model L125 THOR GUARD:	Dimensions: 7.325" W x 6.0" D x 1.5" H Power: 12V DC (Supplied by System Battery) Safety Requirements: FCC Part, 15 Class B
D-ASA Sensor:	Dimensions: 12" L x 6"W x 14"H Weight: 2 Lbs. (Excludes Cable)
Sensor Cable:	West Penn 5992 (Optional Plenum Cable) 3/8" Dia. Doubled Shielded Triaxial with Teflon Core
VOT Air Horn Cluster:	Manufacture: THOR GUARD Material: ASA; Dome & Horn Mounting Plate Weight: 8Lbs. (Excludes Cable) Cable: General Cable 234600 12 AWG (UL) Type TC-ER Sound Output: 113db @ 10ft., 700 Yard Radius, Typical Coverage
Strobe Light:	Manufacture: Whelen 51 Series (UL) Listed Dimensions: 3.90" H x 5.2" Dia. Weight 1Lb. Light Output: LED High Intensity Multi-Flash, Amber Cable: West Penn AQ224, 18 AWG 2-Conductor Length: Standard 12ft., 40ft. (Additional Lengths Available)

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