



Integrated Lightning Prediction and Warning Systems

MODEL L150

LIGHTNING PREDICTION SYSTEM

INSTALLATION AND OPERATIONS MANUAL

THE THOR GUARD "PREDICTION" APPROACH TO LIGHTNING WARNING

Lightning is basically the result of a massive exchange of electrostatic energy in the atmosphere. Shifts and changes of Positive and Negative charged "ions" in the atmosphere and in the ground will create an energy flow that may result in a lightning strike once a conductive 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 "hyperstatic sensor" assembly, 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 radius of 2.5 miles (5 miles in diameter). The total area being monitored, however, is a range that is adjustable to a maximum of approximately 15-miles in radius.

The sensor communicates the data over special cable to the second element, the THOR GUARD computer console. The computer evaluates the information fifty times every 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 one (1) 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 its 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 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 of one to nine.

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THOR GUARD SENSOR INSTALLATION & SETUP

Choosing the Sensor Location

The location of the Sensor will be dependent upon the desired location of the THOR GUARD console, the type of existing roofing material, the design of the roof, 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. **NOTE: THIS SYSTEM WILL NOT OPERATE PROPERLY UNLESS THE SENSOR IS MOUNTED WITH A CLEAR “VIEW” OF THE SURROUNDING SKY. IF A SUITABLE LOCATION CANNOT BE FOUND, DO NOT INSTALL!**

The following should be considered when locating the Sensor:

- Within the standard 125' cable length (200' Cable lengths available).
- At least 10' 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 and high power lines.
- Outside a 30 degree angle from building structures or trees (trees absorb signal).
- As far as possible from electric chargers or transformers.
- A metal roof is not advisable, but if necessary isolate the sensor from the roof and elevate it as much as possible.
- High enough so that curious hands cannot inadvertently touch the Sensor Plate.
- **MAKE SURE THAT ANY MAST OR TRIPOD UTILIZED TO MOUNT THE SENSOR IS NOT GROUNDED.**
- **SENSOR MUST BE ACCESSIBLE FOR REGULAR CLEANING** (See “Sensor Cleaning”).

Running the Triaxial Cable

You have been supplied with a predetermined length of special, triaxial cable, already connected to the Sensor. The path available for the cable will also dictate the final location of the Sensor and Console. Apart from avoiding the obvious obstacles, attention should be given to the following:

- Do not cut cable without discussing it with your representative/factory.
- The cable does not carry any a/c 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 **never tie-wrap to another cable of any type.**
- Avoid sharp bends, metal edges, or anything that might tear outer jacket.
- Avoid pulling too tightly and stretching or crimping the cable.
- Leave a “service loop” when you mount the Sensor.
- Avoid using staples to secure cable.

Mounting the Sensor

The Sensor was designed to be mounted 5'-10' above any surface using a 3'-5' piece of 1" rigid pipe, screwed into the threaded bushing (BUSHING MUST BE GLUED INTO BOTTOM PVC). It is advisable to set the Sensor plate at a level that is accessible for cleaning, regardless of which type of mast is utilized. Most installations will accept one of the following mounting techniques:

1. Mount directly to a wall using a pair of appropriate wall mounts (from Radio Shack, or equivalent) and a short piece (3'-5') of 1" rigid pipe:

4" #15-883, 8" #15-886, 12" #15-885
Eaves Mount #15-891, Or Custom Mount

2. Mount directly to pipe stub or antenna mast with stainless hose clamps.

3. Tripod (also found at Radio Shack, or equivalent): 3' #15-517

How the tripod is mounted depends upon the material and construction of the desired roof location. Please note that care should be taken if you choose to penetrate any roofing material in order to secure the legs of the tripod. Lag bolts and screws should be accompanied by liberal amounts of waterproof silicone. **DO NOT GROUND THE TRIPOD TO A LIGHTNING ROD OR BUILDING.**

Choosing the L150 Location/Installation & Orientation

The Console should be located where it can be monitored by responsible personnel.

Requirements include:

- A verified 110 volt, 60 cycle a/c power outlet for the power supply **that is known to be securely grounded**. A UPS for backup is advisable.
- Plug the black triaxial cable into the connector labeled SENSOR, on the rear panel.
- Attach the power cord from the enclosed power supply. After startup it may be necessary to push the RESET button to clear any lingering energy on the Sensor Plate. NOTE: IF YOU'RE A/C POWER SOURCE DOES NOT HAVE A GROUNDED PLUG (3 WAY) THEN YOU WILL NEED TO USE THE ADJACENT GROUND SCREW.
- Push the "TEST" button to insure proper installation of the Sensor and cable. Should the "TEST" light not turn green following the test, remove the Sensor plug and insert the enclosed test plug and re-run the test to see if the problem is in the unit or in the Sensor/cable run. If the "TEST" is passed with the test plug, then the problem is in either the Sensor or cable.
- Initiate the "MENU" settings on the status display starting with the correct date and time and continuing through the other settings (see "Setup Menu").
- Attach required output applications such as Voice of THOR Base Driver (external horns), etc

TESTING AND CLEANING

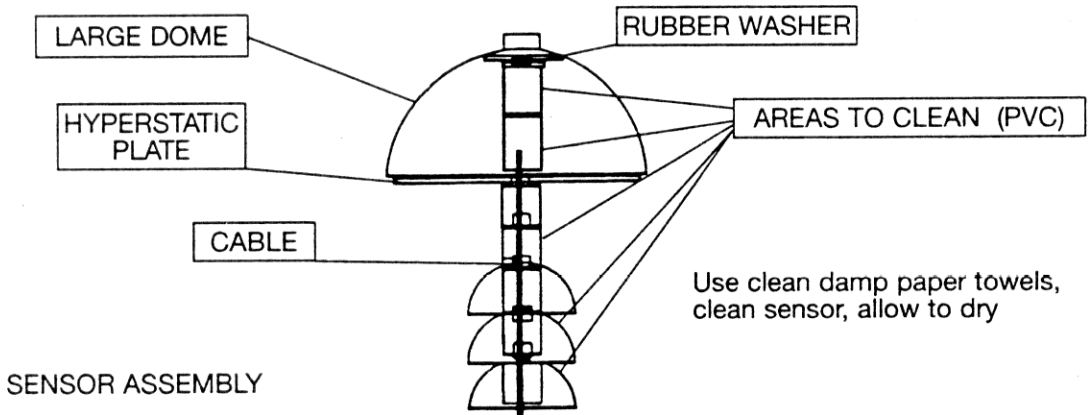
Your THOR GUARD has been programmed to run an internal diagnostic test of the entire system every 24 hours. If the system passes the test, the “TEST” button will be green. The test may also be run manually (unless there is storm activity) by depressing the “TEST” button on the front panel. In the event of a failure, the “TEST” button will turn to red, however, the system will continue to operate as long as the sensor cable is attached. A “Fail” message will also be visible on the LCD Display. Three more tests will automatically be run over the next 24 hours. Should the unit fail these additional tests the “TEST” button will begin blinking, as will all the warning lights, indicating a “final failure”.

THE SYSTEM WILL NOT BE OPERATIONAL IN FINAL FAILURE MODE!

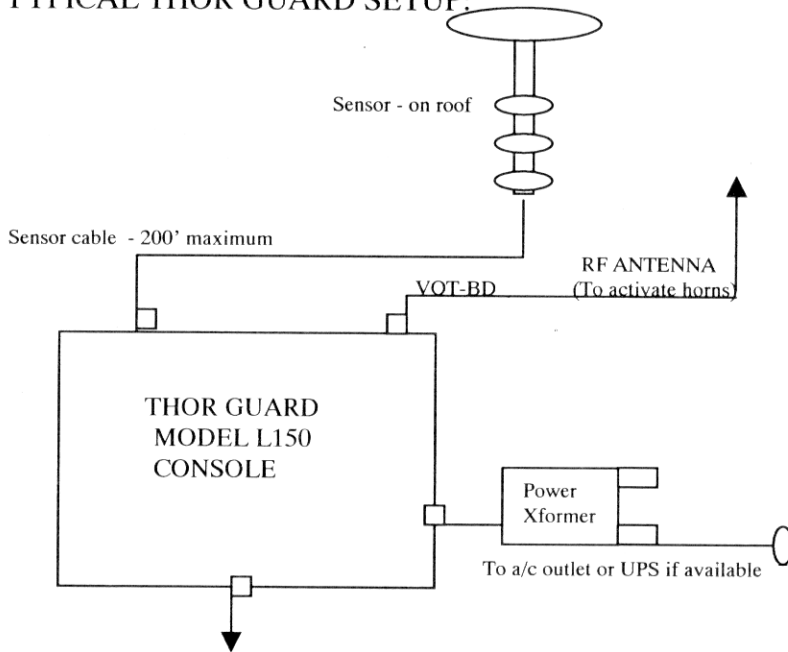
- Check that the Sensor connection on the back of the L150 is secure.
- Clean the Sensor on the roof of all dirt that may have accumulated on all of the white plastic PVC parts, any cobwebs between the large stainless Dome (on top) and round plate, and any excess dirt on the plate, itself. This should be accomplished with ONLY clean paper towels (dampen only with water), as cleaning rags may contain solutions that will contaminate the surfaces. Then dry the area cleaned with other paper towels. The large Dome may be slightly tilted to allow your hand entry, but care should be taken to avoid damage to any of the small, wire connections. NOTE: REGULAR CLEANING OF THE SENSOR WILL MINIMIZE THESE FAILURES. SOME ENVIRONMENTS WILL NECESSITATE MORE CLEANING (see “System Maintenance”).

Push the RESET button and run the TEST again. If it fails this test then either the sensor is too wet, or a problem has developed with the cable, the sensor, or the L150 connector plug. Call the factory or your local representative.

SENSOR MUST BE ACCESSIBLE FOR REGULAR CLEANING

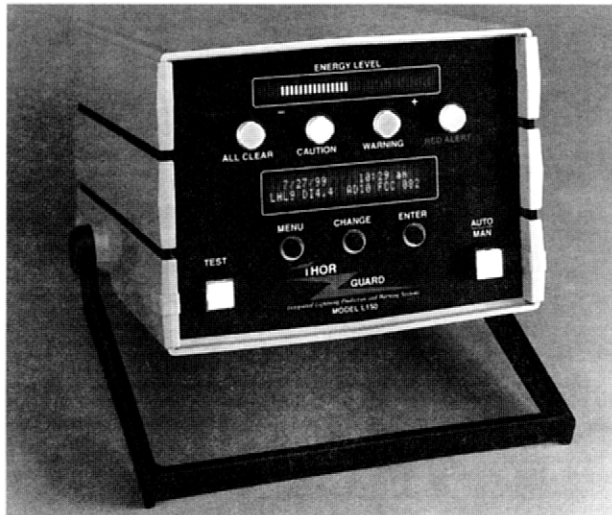


TYPICAL THOR GUARD SETUP:



ADDITIONAL OUTPUT SELECTIONS:

- RS 232 DATA OUTPUT CONNECTION FOR INTERFACE WITH COMPUTER NETWORK.
- RS 422 OUTPUT CONNECTION FOR LONG-RANGE DATA DELIVERY.
- 16 CONDUCTOR RELAY BRACKET TO DRIVE REMOTE WARNING LIGHTS OR TO PROVIDE EQUIPMENT SWITCHING CAPABILITIES.
- 12V OUTPUT CONNECTION TO DRIVE LOCAL WARNING DEVICE (STROBE LIGHT).



“Energy Level”: Red = The intensity of Negative (-) energy in the total area being monitored. Yellow = The Positive (+) energy in the same area.

“All Clear”: This button will normally be blinking **green** if there is power to the Console and if the system is sensing no local storm activity. This will also be the button you should push to trigger an external “all clear” signal after an alert and the subsequent clearing of the storm threat.

“Caution”: When the system first recognizes the presence of electrostatic energy within the area being monitored, the **white** Caution light will be illuminated. Although the primary purpose of this warning is to alert you of a change in surrounding conditions, fast moving storms can and will make this level of warning important to monitor.

“Warning”: The **yellow** Warning light indicates that electrical storm energy is migrating and shifting in your surrounding area. At this time you should also hear the Console’s internal alarm activate. In some situations this represents enough of an increased safety threat to also activate the external alarms, if you have any.

“Red Alert”: In addition to indicating a potentially dangerous lightning condition, the **Red Alert** switch may be depressed to activate any external alarms or switches.

It is definitely advisable to now curtail any outside activity!

“Test”: See “TESTING & CLEANING”

“Auto/Man”: When lighted (“Auto”) the system will automatically activate external alarms or switches. Manual activation may also be selected.



- “**VOLUME**”:
Controls internal audible alert output:
(Solid Tone = “Warning”; Warble Tone = “Red Alert”).
- “**VOT-BD**”:
To interconnect with Voice of THOR Base Driver (transmitter).
- “**SENSOR**”:
To interconnect with THOR GUARD sensor cable.
- “**ACTIVE**”:
Key activated menu access (“Active” denotes availability).
- “**RESET**”:
Will restart all programs and sensing levels.
- “**LOCAL ALARM**”:
Contact strip (12V) to activate strobe light or other alarm.
- “**RS232/DTN**”:
Short distance data delivery interface (under 300’) for DTN
Weather System or PC interface for “THOR PC.”
- “**RS422**”:
Long distance data delivery interface (over 1000’).
- “**SERVICE**”:
Access for technical data by authorized technician.
- “**POWER**”:
Connector for AC power adapter.
- “**FUSE**”:
2AMP fuse holder.
- “**GROUND**”:
Ground post to be utilized if AC ground has not been verified

Optional Item (additional cost):

- “**RELAY OUTPUTS**”:
The 16-pin connector option also includes five (5),
5AMP @125V relays mounted inside the L150 for multiple switch-
ing capabilities. This relay will drive four (4) individual outputs over
long distance with dedicated cable connection.

SETUP MENU

The SETUP MENU may be accessed at any time in order to change selected parameters of the system. To access this menu, press the MENU key and continue to press the MENU key until you have highlighted the option you want to change. The following is the list of options in the SETUP MENU: **(NOTE: ALL ALARM RELATED FUNCTIONS MAY ONLY BE CHANGED WHEN THE SECURITY KEY IS IN PLACE, AND ACTIVATED.)**

1. SET CURRENT DATE & TIME
2. SET DEFAULT ALARM TIME
3. SET ALARM TIME
4. SET ALARM SIGNALS
5. SET AUTO / MAN ALARM
6. OTHER ALARM SYSTEMS
7. LOCAL ALARM LEVEL
8. REVIEW STORM DATA
9. RF OUTPUT TEST
10. BATTERY TEST
11. MAINTENANCE
12. EXIT MENU SETUP

LCD DISPLAY

Date			Time
LHL	DI	AD	FCC

Menu Change Enter

"MENU": This button permits you to access the SETUP MENU for the purpose of customizing your applications.

"CHANGE": This button permits you to make the required changes in any of the options available in the MENU section.

"ENTER": This button permits you to advance through the options in the "SETUP MENU." Once you have selected the option you want to modify and have verified the changes by pressing the CHANGE key, then press the ENTER key again, to make the change permanent.

1. **SET CURRENT DATE & TIME**

Set Current Date & Time			
MM/DD/YY	DAY	HH:MM &	AM/PM

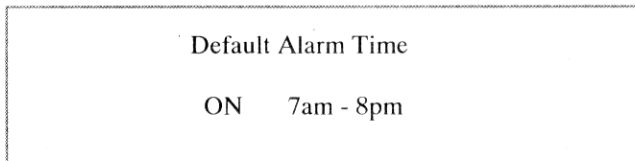
PROCEDURE:

Press MENU key until "SET CURRENT DATE & TIME" is displayed. Display will show the current date, day & time. To change either the date, day or time, do the following:

- a. Press the ENTER key until the location you want to change is blinking.
- b. Once the location is blinking, press the CHANGE key until you have made the changes you desire. **Check that the correct AM/PM has been selected.**

- c. Once you have made the changes desired, push the ENTER key to accept and record the changes.
- d. Press the ENTER key again to move to the next event location and repeat (b.) and (c.), above.

2. SET DEFAULT ALARM TIME

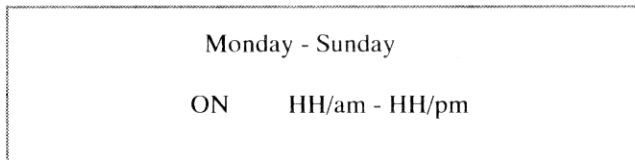


PROCEDURE:

Press MENU key until “DEFAULT ALARM TIME” is displayed (NOTE: All the default options are set for Monday - Sunday operation). If want to change the hours for the default setting:

- a. Press the ENTER key to review the other options which are: (7am -8pm), (7am - 5pm), (6am - 8pm), (6am – 9pm), and (DISABLED).
- b. Once you have made your selection, press the CHANGE key to select your new Default time and then press ENTER to accept and record the change.
- c. If none of the Default times meet your needs, then select the “OFF” mode.

3. SET ALARM TIME



PROCEDURE:

This setting is for those who desire to tailor the hours of operations to specific criteria. Please note that this Menu will be active **only** in the event that the “DEFAULT ALARM TIME” (above) has been programmed for the “OFF” mode. To select your specific options for the operation of your system:

- a. Press the ENTER key until the location you want to change is blinking.
- b. Once the location is blinking, press the CHANGE key until you have made the changes you desire.
- c. Once you have made the changes desired, push the ENTER key to accept and record the changes.
- d. Press the ENTER key again to move to the next event location and repeat (b.) and (c.), above.

4. SET ALARM SIGNALS

Red Alert	1X	15 seconds
All Clear	3X	5 seconds

PROCEDURE:

The alarm sequence you see displayed is the “default” setting. This setting has two other options that are selected by pushing the ENTER and CHANGE keys as above:

- a. Red Alert (1X @ 15 sec.); All Clear (3X @ 5 sec.) “DEFAULT”
- b. Red Alert (2X @ 10 sec.); All Clear (3X @ 5 sec.)
- c. Red Alert (1X @ 15 sec.); All Clear (2X @ 5 sec.)

Note: This is the USGA tournament setting. If this mode is selected you have the option (IN THE “MANUAL” MODE ONLY, SEE BELOW) to choose between two different “Red Alert” signal sequences:

- 1. “Immediately Suspend Play” (1X @ 15 sec.) (DEFAULT).
- 2. “Suspend Play” (3X @ 5 sec.) Note: This option may only be selected after pressing the “Red Alert” button on the Front Panel, then the “Change” button. The display will reflect the change from the 1X sequence, to the 3X sequence.

5. SET AUTO/MANUAL ALARM

Set Auto/Manual Alarm
Alarm Auto Mode

PROCEDURE:

The “Default” setting for this item is “AUTO” (light is on). This means that the external outputs will automatically be activated when the L150 senses the “Red Alert” and/or “All Clear” signal. To change this setting to the “MANUAL” mode push CHANGE, then ENTER when display reflects your need.

NOTE: The “AUTO/MANUAL” button on the Front Panel may be utilized to over-ride this setting for a finite period of time. **NOTE: ON CERTAIN UNITS THE “MANUAL” FUNCTION HAS BEEN INTERNALLY DISABLED SO THE UNIT WILL ONLY OPERATE IN THE “AUTO” MODE.**

6. OTHER ALARM SYSTEMS

Other Alarm Systems
Relay Active: 05 Seconds

PROCEDURE:

This option will only be utilized in the event that the external alarm system was manufactured by someone other than THOR GUARD, Inc., and you desire to impulse the external switch for this system through the L150. You will first need to connect the L150 to the external switch through the “RELAY OUTPUTS” connector on the Rear Panel. Follow the directions provided by the other manufacturer as to proper hookup and duration of impulse signal. The time “Default” setting for the impulse signal is 5 seconds, as seen above. However, this time may be changed to fit custom needs by pushing the CHANGE Key to alter the value, then ENTER to accept the change.

7. LOCAL ALARM

Local Alarm
Output on Red Alert

PROCEDURE:

This option is available to activate a local strobe light or other equipment. The connections would be made through the “LOCAL ALARM” block on the Rear Panel (Labeled 12V & Ground). The L150 will send an impulse through this connection at your choice of three alert levels: “Red Alert” (Default), “Warning,” or “Caution.” You may select the setting of your choice by pushing the CHANGE Key to alter the value, the ENTER to accept the change.

8. REVIEW STORM DATA

Review Storm Data

PROCEDURE:

The L150 will store information about a storm. This data may be retrieved to show the date and time that alarms were active (auto or manual entry) as well as “red alert” and “warning” trigger times and duration. This information may also be downloaded to a printer by connecting to either the “RS232” or “RS422” outputs on the rear panel (Optional item at additional cost).

9. **RF OUTPUT TEST**

RF Output Test #__ __	RF Site#
ACTIVE	

PROCEDURE:

The RF Output Test has been designed to see if the signal from the Transmitter is being transmitted and received by the various Remote Alarm locations. When activated, this test continuously sends the RF signal (every 30 seconds, per display) for a period of 30 minutes, unless manually deactivated through this Menu. To initialize the Test, push the ENTER Key and the “ACTIVE” notice should start blinking, indicating that the Test is running. A counter of how many Test signals have been sent will be displayed on the top line of this display. If you don’t want to wait 30 seconds between tests, push the ENTER Key and the test will be repeated. The RF Site number is also displayed in the right corner to insure compliance with your remotes.

10. **BATTERY TEST**

Battery Test

PROCEDURE:

The Voice of THOR Base Control utilizes a 12-Volt rechargeable battery to energize the Base Horns. To determine the status of the battery in this menu push the ENTER Key and the display will indicate the battery status: (Service), or (No Service).

11. **MAINTENANCE**

Maintenance

PROCEDURE:

By pushing the ENTER Key in this menu, the L150 will allow cleaning of the Sensor without activating the external alarms. (Refer to sensor cleaning diagram)

12. **EXIT MENU SETUP**

PROCEDURE - This is the last choice of the menu. Simply press Enter to return to the “OPERATING SCREEN.”

OPERATIONAL 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 level. The intensity and shifts in polarity may be observed on the “Energy Level” LED bar. Negative polarity is displayed in red, and Positive polarity is displayed in yellow.

LHL (Lightning Hazard Level) – This is the probability, from 0-90%, 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 0-90%, that if lightning strikes, it will strike nearby (2.5 mile radius). The DI determines the warning level based on energy migration in your immediate area. A “DI” of three (3) will trigger a “Red Alert” condition which 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 very powerful lightning discharges may occur even with no clouds at all in the immediate area. A BOB may emanate from a weather front 10-20 miles away.

AD (Activity Detector) – The “Activity Detector” is an estimate of how much time 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 running time is 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 activity. If you believe the system is either too sensitive or not sensitive enough call your representative or the main office, in Sunrise, FL.

Default and Custom Options/Settings for the LI50

MENU ITEM	DEFAULT	CUSTOM
Current Date & Time		
Alarm Time (Active)	7am - 8pm (7am-5pm, 6am-9pm)	
Alarm Signals	1 @ 15 sec. 3 @ 05 sec.	TG27
Set Auto/Manual	Auto	
Other Alarm System	Relay Active @ 10 sec. Constant Closure	
Irrigation Control	Impulse on Red Alert (Warning, Caution)	

NOTE: Your LI50 is shipped with the above Default settings from the factory. Should you desire to customize or change the Default settings it is advisable make a notation on this page so you have a record of the current settings.

WARRANTY & SERVICE INFORMATION

Limited Warranty for Manufactured by THOR GUARD
(Does not apply to products supplied by third-party vendors)

THOR GUARD, INC. (“the warrantor”) will repair any product manufactured by the warrantor with new or refurbished parts, free of charge, in the USA for a limited period from the date of original purchase in event of a defect in material or workmanship. Please see the enclosed Warranty Information Sheet for more information about the warranty period or contact the THOR GUARD office. This Warranty is extended only to the original purchaser and only covers failures due to defects in material 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, lightning, line power surge, 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, or damage that is attributed to “Acts of God”.

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

LIMITS & EXCLUSIONS

There are no express warranties except as listed above.

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.

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 may not apply to you.

This warranty gives you specific rights and may also have other rights which vary from state to state. If a problem within this product develops during or after the warranty period, you may contact your representative or our General Offices in Sunrise, Florida.

Questions

Question

What would cause my THOR GUARD system to become less sensitive?

Answer:

1. Dirty Sensor
2. New equipment installed on roof affecting sensor reception (wires or motors).
3. Adjacent tree has grown taller and is absorbing energy.
4. New building construction within close proximity of existing structure.
5. A grounding strap has been placed on the Sensor mount (tripod).
6. The building ground through the outlet for the power transformer has been lost.

Question:

What would cause my THOR GUARD to become overly sensitive?

Answer:

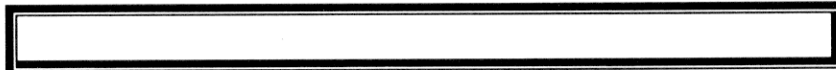
1. Someone has cleaned the Sensor with a cloth rag impregnated with fluid other than water.
2. One or more spider webs are grounding the plate and the bowls.
3. A compressor or electric motor has been located near the Sensor.
4. Someone has installed an energized cable along the same path (or tied) as the Sensor cable.
5. Birds have nested in the Sensor assembly.

Question:

How do I know when it is safe to resume outdoor activity after lightning activity?

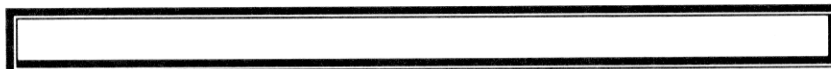
Answer:

Wait until the "Activity Detector" is zero (0) and the "Status" has returned to a "Caution."



NOTICE TO USERS

The THOR GUARD 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 system will automatically test every day at a pre-selected time. It is the user's responsibility to ensure the system is connected to a properly grounded source of power and that the unit displays a green light following its test. If the test should fail (red light), the user, after immediately following the "Testing & Cleaning" instructions in this booklet to solve the problem, should call THOR GUARD, Inc. at the number provided below.



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e-mail: service@thorguard.com