TECHNICAL DATA SHEET

LPI® Lightning Warning System (LWS) MKIII

Features

- Early detection of lightning activity within approximately 25 km
- “Alarm” signalled when lightning approaches within approximately 8-10 km
- All Clear indication provided once the storm has passed
- Wireless communication between console, sensor and range extenders
- Flexible installations to suit different applications

Product Description

The LPI Lightning Warning System is a non-directional lightning detection instrument designed to provide indication of nearby lightning strikes and significant changes in the local electrostatic field. The LPI Lightning Warning System MKIII provides the user with the ability to manage the lightning risk and to fulfil a duty of care to employees, customers and all related personnel. As occupational health and safety laws strengthen globally, senior management across a wide variety of industries and recreational pursuits are now faced with a realisation that they have a duty to warn individuals of the pending risks associated from lightning. Recent court cases have shown a dramatic change from the once acceptable “Act of God” defence, to a realisation that management now has a duty to warn.

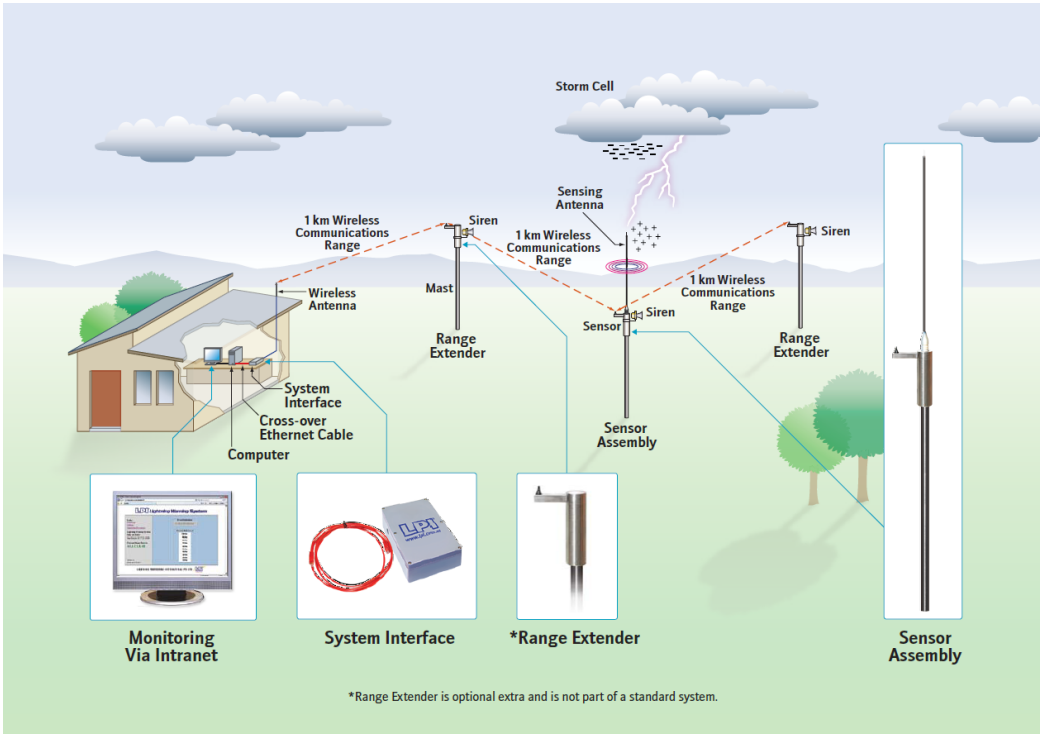


Figure 1: Lightning Warning System Overview

LWS Operation

On detection of a nearby lightning event or significant increase in the electrostatic field, the system will provide a warning or alarm to personnel that an event has occurred or is likely to occur. Detection and alarm indication (via a siren/strobe) is performed by the sensor unit (see figure 2), with results being sent via a datalink to the console for more detailed event indication and logging. (see figure 1)

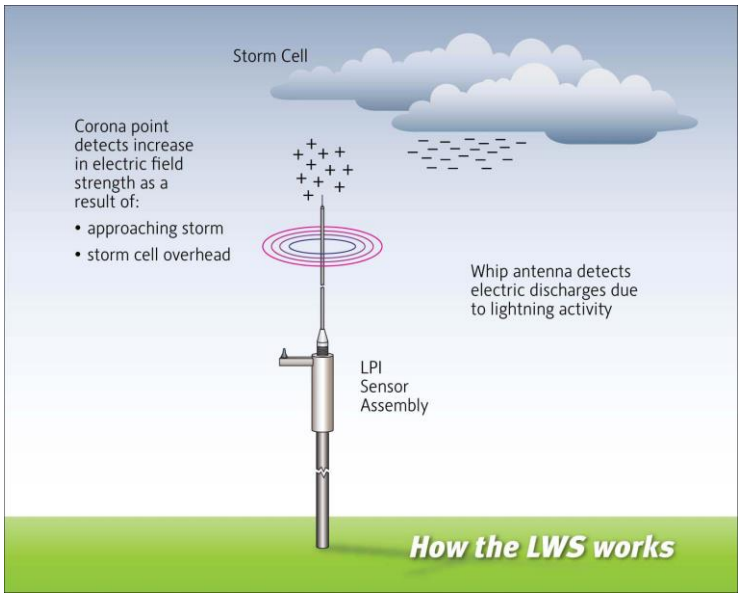


Figure 2: How the LWS works

LWS Functionality

LWS Console

The LWS console is the interface which communicates to the sensors installed in the field and allows the user to access information about the current lightning event status (near, far or all clear) and the current electrostatic field level (high or low electric-field). The console is typically sited in a secure location where it can either be connected directly to a computer by cross-over ethernet cable, or by straight-through ethernet cable to a local network, allowing the user to access the relevant data and system settings. The console also has alarm relay outputs for alarm, warning and all clear suitable for switching contacts.

LWS Sensor Assembly

The LWS sensor assembly (microprocessor, sensing antenna, alarm/warning/all clear indicator and earth rod) is the integral component of the LWS system, it provides all decision making in regards to recorded lightning events and subsequent alerts.

The LWS sensor assembly is typically mounted at a suitable location at site and the monitoring of all lightning activity is controlled by an on board microprocessor, which works in conjunction with the sensing antenna to detect changes in the electric field and approaching lightning discharges. Depending on the intensity of the electric field or proximity of the lightning, the sensor provides an event indication via a data link to the console unit. The data link is normally wireless, it has a 1km range if there is good line of sight. This wireless range can be extended using range extenders. Alternatively a wired data link using the communications cable is an option for shorter distances. This cable is normally 50m in length. The applicable ordering code is LWS Mk3 - Communications Cable.

Each sensor also contains an alarm/warning/all clear indication device. Depending on customer preference this is provided by a siren/strobe, which allows the user to communicate situation events to all personnel in accordance with site safety policies and procedures.

LPI can also provide a suitable mounting pole (OD 70 mm, ID 61.5 mm) to mount the LWS sensor assembly to. If the mounting pole option is included, suitable locking bolts are also provided to keep the LWS sensor assembly secure.

Event Indication Levels

As the LWS sensor detects lightning activity or increases in the electric field, event indications are made at the sensor and are communicated to the console for processing. If the event falls within a predetermined level, the following indications are provided to the user.

Warning Indication

A warning indication occurs when either a far lightning strike or a low electric field is detected. Far lightning strikes are defined as lightning events that occur within a radius of approximately 10 to 25 km of the sensor. Low electric-field events are defined as being when the local electric field rises above a level of 3 kV/m. A warning status provides the user with an indication, that a storm is within a relatively close range and may move towards the area where the sensors are stationed. When a storm is within 25 km it may arrive in the area in approximately 20-30 minutes.

10kV/m	
9kV/m	
8kV/m	
7kV/m	
6kV/m	
5kV/m	
4kV/m	
3kV/m	
2kV/m	
1kV/m	

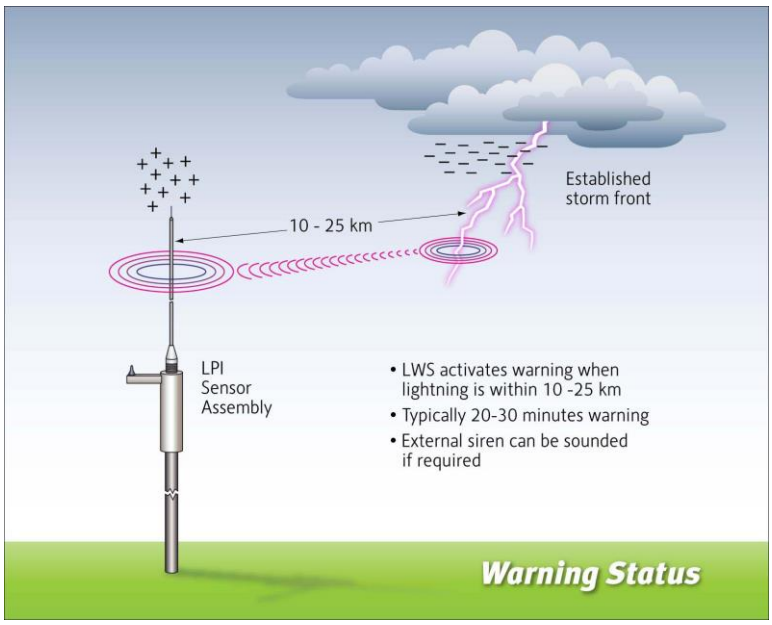


Figure 3: Warning Status at above 4kV/m

Alarm Indication

An alarm indication occurs when a near lightning strike or high electric field is detected. Near lightning strikes are defined as lightning events that occur within a radius of approximately 8 to 10 km of the sensor, which are close enough to pose a significant risk within approximately 10-15 minutes. High electric field events are defined as being when the local electric field rises above 7 kV/m. an alarm status provides to the user an indication that current activities at site should be suspended, allowing shelter to be taken in accordance with established safety procedures.

10kV/m	
9kV/m	
8kV/m	
7kV/m	
6kV/m	
5kV/m	
4kV/m	
3kV/m	
2kV/m	
1kV/m	

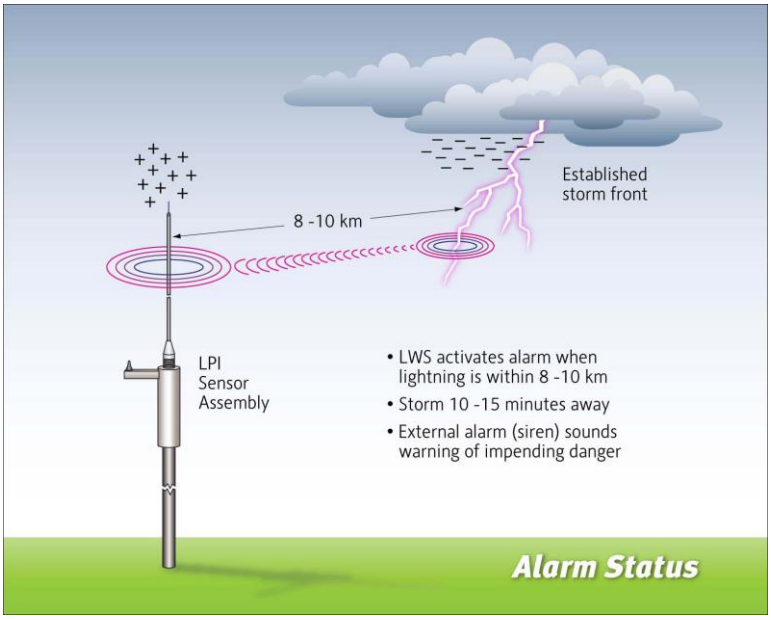


Figure 4: Warning Status at above 7kV/m

All Clear Indication

An all clear indication is given when no activity (far strikes, near strikes, low electric field or high electric field) has occurred within 15-30 minutes (programmable). After this period of no activity it is deemed safe to resume all activities.

Applications

The LPI LWS is suitable for use in all open areas where human traffic and / or sensitive operations are subjected to the threat of lightning strikes. In situations where large open areas covering many kilometres require monitoring, LPI's LWS provides a high degree of accuracy in providing a safe working environment.

Typical industry and recreational applications for the LPI LWS include:

- Mining sites including applications where explosives are used for blasting purposes
- Military
- Construction sites
- Airports
- Ship loading facilities
- Refuelling facilities
- Power generation
- Oil and gas facilities
- Schools
- Theme parks
- Open sir events such as festivals and concerts
- General outdoor recreational activities
- Horse racing tracks
- Golf courses
- Sports stadiums
- Rail and transport
- Industrial






Technical Data

LPI offers two different packages for the LWS Mk3.

- **Package A** with a mains powered (with battery backup) sensor and antenna assembly, a siren/strobe and a mains powered console
- **Package B** with a solar panel powered sensor and antenna assembly, a siren/strobe and a mains powered console

Customized systems using range extender (LWS Mk3 - EX) can be configured to suit customer requirements. Contact LPI or an authorised representative for a customized design.

Ordering Codes	Description
LWS Mk3 - A	Lightning Warning System - 1 x sensor and antenna assembly (110-240 V ac power supply), console and siren/strobe
LWS Mk3 - B	Lightning Warning System - 1 x sensor and antenna assembly, solar panel power supply for sensor, and siren/strobe. Mains power supply for console
LWS Mk3 - EX- A	Lightning Warning System - Extender - power supply type
LWS Mk3 - EX - B	Lightning Warning System - Extender - solar panel type
LWS Mk3 – Siren/strobe	Lightning Warning System – Siren and strobe
LWS Mk3 - Communication Cable	Lightning Warning System - Communication cable, 50 m max
LWS Mk3 - 2 x Siren & Strobe	Lightning Warning System - 2 x High output 240 V siren and 1 strobe
LWS-Mk3 - Strobe	Lightning Warning System - Dual strobe of 240 V, 60f pm flash rate
LWS-Mk3 - Interface Module	Lightning Warning System – Interface Module to be used to hook up 3rd party devices

Control Console	
Box:	Die-cast, 172 mm (L) x 121 mm (W) x 55 mm(H)
Control:	Microprocessor controlled
Interface:	Webpage (default address 192.168.1.90)
Operation:	Console receives electrostatic field measurements and event notification from sensors in the field and displays received information on an easy to read webpage. Allows users to download and save a log of events that have occurred. Allows users to change a range of settings.
Relay Output:	3 Outputs (All clear, warning and alarm)
Weight:	840 g
Colour:	Grey
Power Supply:	6 V plug pack (110 V/240 V)
Wireless Frequency:	2.4GHz

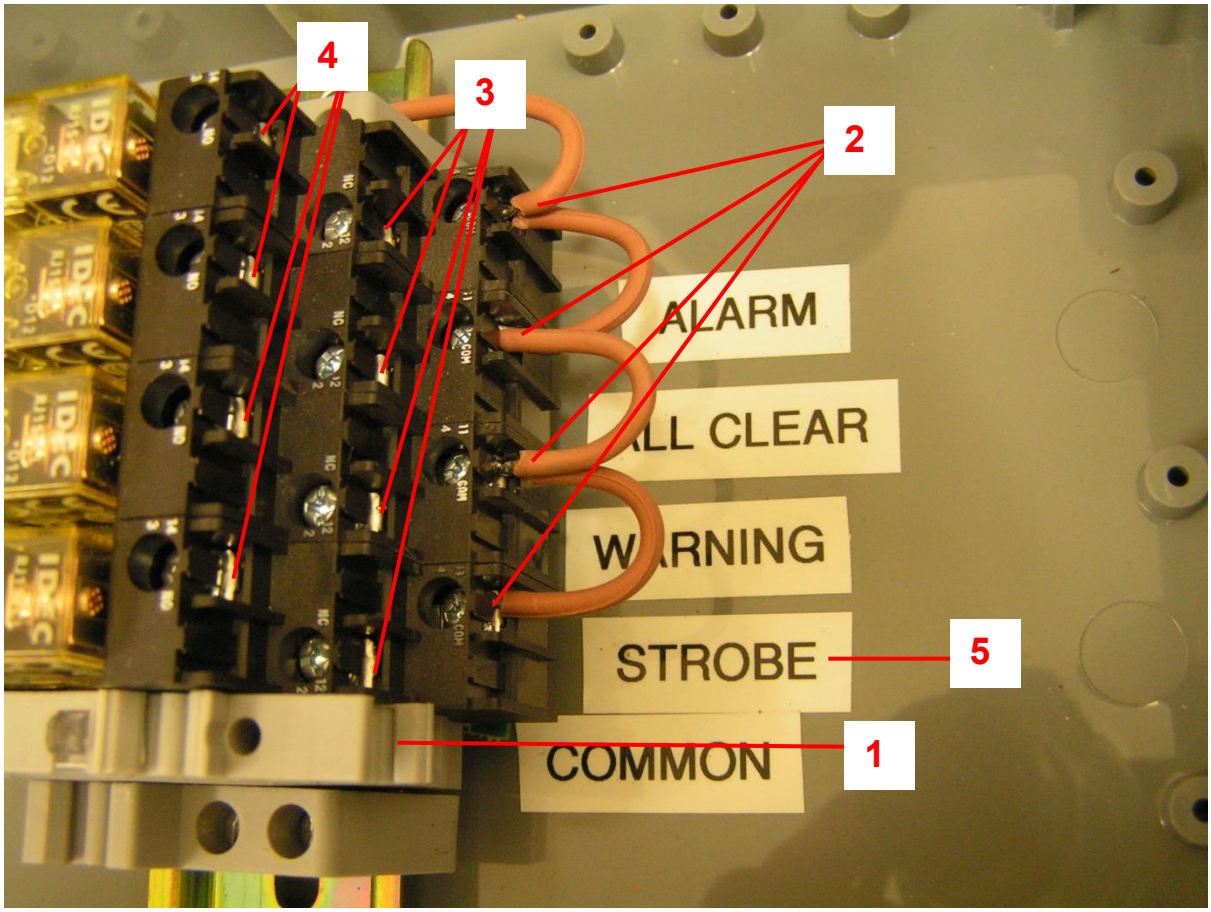
Note: For wired LWS system, please order the communication kit (Product Code: LWS Mk3 - Communication Cable)

Sensor Assembly	
Construction:	Stainless steel
Lightning Discharge Detection Range:	Far strike, approximately 10-25 km Near strike, less than approximately 10 km
Electric Field Measurement:	Negligible, approximately ± 0-4 kV/m Low E-field, approximately ± 4-7 kV/m High E-field, approximately ± 7-10 kV/m
Relay Output:	3 Outputs (all clear, warning and alarm)
Wireless Frequency:	2.4 GHz
Colour:	Bare stainless steel
Weight:	8 kg
Power Supply:	Package A — 110 V/240 Vac power supply with battery backup Package B — 12 Vdc solar panel and storage battery

Solar Panel	
Nominal Voltage:	12 Volt
Power:	20 Watt
Size:	639 mm x 294 mm x 23 mm
Weight:	2.4 kg
Type:	Monocrystalline

For Operation and Installation please refer to LWS MK III Installation and Operating Manual

LPI® Lightning Warning System MK3— Interface Module

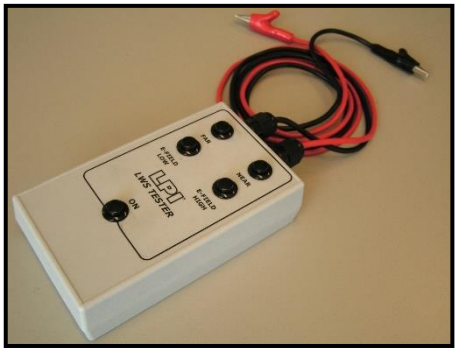


1. Connection point for the common to all output relays, maximum 10 Amps fused (spare fuse supplied 10 Amp slow blow).
   Common could be negative or positive DC voltage, AC neutral or active depending on what needs to be switched to drive the external device/devices
2. Common to output relays wired to “1” via 10 Amp slow blow fuse.
3. Connection point for individual relays using the normally closed relay contacts. Use this connection to connect common “1” to the external device/s when the appropriate LWS signal (alarm, all clear warning and strobe) is NOT activated.
4. Connection point for individual relays using the normally open relay contacts. Use this connection to connect common “1” to the external device/s when the appropriate LWS signal IS activated.
5. Strobe relay is activated continuously from when an LWS alarm signal is activated until an all clear signal is issued, which then deactivates the strobe relay.

Weight and Dimension: 31 x 20 x 11 cm @ 1kg

PLEASE NOTE: without this LWS-Mk3 – Interface Module 3rd party devices can not be added to our LWS system. LPI will take no responsibility for faulty systems with additional devices added without the use of this product.

LPI® Lightning Warning System MK3—Tester



Features:

- Tester for LWS
- Easy to use
- Battery powered operation
- Simulates FAR and NEAR strike events
- Simulates HIGH and LOW E-Field events

Technical Data

Ordering Code:	LWS-MKIII Tester
Description:	Tester for LWS MKIII
Operating Voltage:	9VDC (PPC Battery) - supplied
Output Voltage:	Up to 200VDC
Weight:	< 500g

WARNING - *DO NOT attempt to test the LWS if there is lightning activity in the area.*

CAUTION - *This tester generates potentially dangerous voltage levels. Avoid contact with the output terminals when operating the unit.*

Operating Instructions

When the unit is first unpacked, the supplied battery will need to be correctly connected. Refer to battery replacement instructions below for details.

1. Connect the RED test lead to the tip of the LWS Sensor Antenna.
2. Connect the BLACK test lead to the steel housing of the LWS Sensor Antenna.
3. Press *and hold* the ON button when operating the unit.
4. Press any of the other buttons (FAR, NEAR, HIGH E-FIELD, LOW E-FIELD) to simulate the desired event.
5. Check that the event is recorded on the console.

Battery Replacement

If the battery requires replacement, simply remove the battery compartment cover from the rear of the unit, disconnect the battery, install a new 9V PP3 battery and then replace the battery compartment cover.

Comprehensive Lightning and Surge Protection Solutions

The LPI Lightning Warning System is only one aspect of the overall lightning protection strategy, required for comprehensive structural, personnel and equipment safety. The installation of LPI's LWS in conjunction with the following range of LPI products, ensures a complete solution to your lightning problems.

Correctly installed direct strike protection systems such as the LPI Guardian and Stormaster range of air terminals, provides structural and area protection from direct lightning strikes.

A comprehensive range of earthing products and accessories for a low impedance earthing system.

Surge and transient protection products for powerline, shunt and series protection for applications in protecting power supply at the point of entry to your facility and protecting power supply to sensitive equipment.

Surge and Transient protection products for data, communications and signal lines.

Head Office | 49 Patriarch Drive, Huntingfield Tasmania, Australia 7055
Postal | PO Box 379 Kingston, Tasmania, Australia 7051
Web | www.lpi.com.au
Phone | + 61 3 6281 2475
Facsimile | + 61 3 6229 1900
Email | info@lpi.com.au