

User's Guide



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FEATURES

Lightning Warning System LWS MK-II is a non-directional local warning instrument designed to provide early warning of an approaching storm front that contains lightning discharges. It has been designed to provide protection for personnel and equipments.

Early warning of lightning in close proximity allows appropriate safety precautions to be implemented by those involved in a diverse range of activities, mining, construction, quarrying, seismic surveying, oil and gas exploration, oil and gas production, ship loading, where explosives are being used and for those engaged in outdoor recreational activities like golf or soccer.

Lightning Warning System is microprocessor controlled which provides concise easily understood alarms; it provides an alarm situation when the internal analysis of prevailing conditions indicates the approach of lightning.

The system antenna senses alterations in the electric field strength and also detects both near and far lightning discharges. An alarm is triggered when either the static field changes or when a far or nearby lightning discharge is detected. Two levels of alarm status are provided by the system.

WHAT YOU NEED TO GET STARTED

Verify that the LWS MK-II package consists of the following components:

Main console

Antenna assembly with 50m cable

Electronic siren with 20m cable

RS232 cable for PC based event logging

(Software can be downloaded from website)

Grounding kit (One (1) 12 x 500mm Ground Rod and One (1) Rod Clamp)

AC Power cord

Optional Items: Motor SirenS, Relay kits for remote alert with motor siren



Control Console



Power cord



Siren Assy



9 Pin RS232 cable



Ground Rod



Sensing Antenna

INSTALLATION DETAILS

Installing the Antenna

1. Survey the intended location of the sensing Antenna. It should be located on a ground level where there is a clear area away from bushes, trees, water towers, antennas, etc. As a guide it should be located at an isolated area at a distance of about twice the height of protruding objects nearby.

The sensing antenna must be kept clear of any debris and is placed on a well drained area. The antenna is provided with the grounding kit to provide static earthing; this must be connected to the sensing antenna to ensure correct operation.

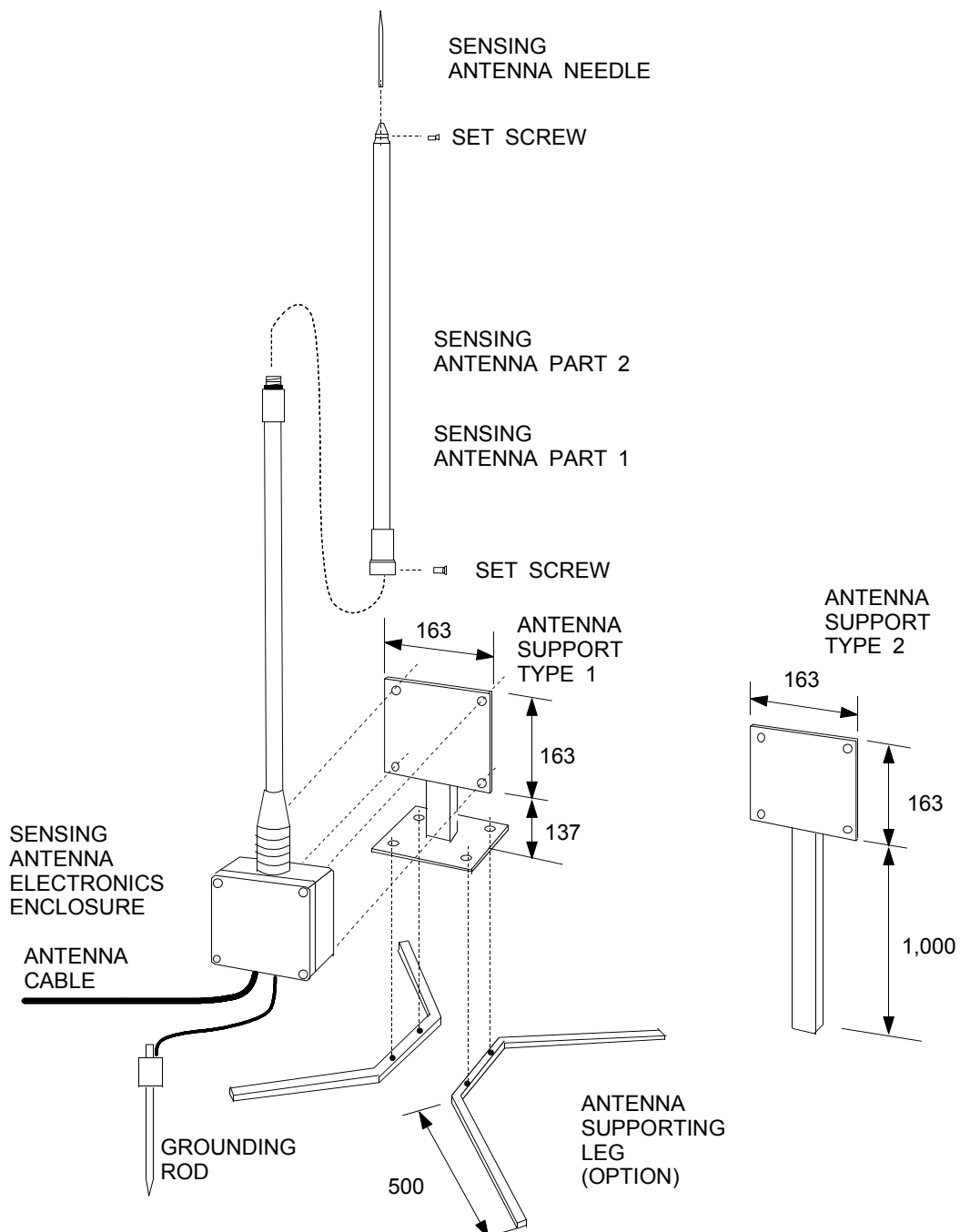
The sensing antenna has been designed for ground level use and shall provide the best result. However roof top position could be a possible alternative position provided:

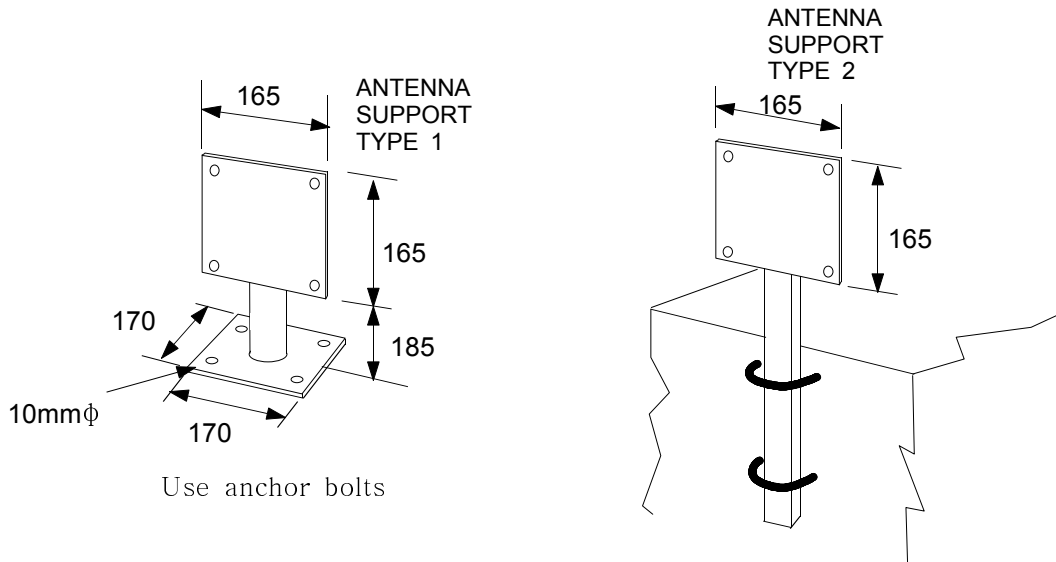
- The roof is very nearly level,
 - The roof is not more than 6m above ground level,
 - The roof is at least twice the width of its height above ground level, and
 - The antenna is positioned near the centre of the roof as possible. DO NOT install the antenna near the edges of the roof.
2. Fix Antenna base unit fixing leg (supplied) to ground.
 - Remove antenna base unit cover by undoing the four fasteners on the front cover.
 - After removal of the antenna base unit cover, carefully remove the antenna lead from the PCB spade connector, (short wire with ring lug attached).
 - Unscrew the bolt from the base of the antenna, a black plastic disc will separate from the body of the antenna once the bolt is unscrewed, remove the plastic disc.
 - Apply gasket grease to the rubber O-ring at the base of the antenna, this ensures a water tight connection (do not use silicon).
 - Place the steel washer and the lug of the antenna lead on to the bolt, thread the bolt through the black plastic disc with the lip on the inside of the disc inserted into the antenna box hole, the black disc should sit flat against the inside of the box with the lip inside the antenna hole, refer Fig 6.
 - Tighten bolt securely.
 - Prior to plugging the antenna lead onto the PCB spade connector, test the resistance between the bolt and earth (metal case) with a multimeter, resistance must be greater than 10 Meg Ohms.
 - Fix the antenna base unit to the square stainless steel section fixing leg using the two countersunk screws provided. The fixing leg is designed to be driven into soft soil, alternatively, it may be concreted in place for a permanent fixture.
 - Mount the antenna box to the base plate (four screws are provided).
 - Attach the needle to the top of the antenna using the small allen key provided. Screw the two antenna sections together, secure with the supplied philips head screw.
 - Replace cover. **Note;** the lid fits one way only for a water tight fit. Ensure gaskets are seated into lid grooves.
 - Drive ground rod (supplied) to ground. Connect earth cable and secure with the ground rod clamp (supplied).

When installing on a roof, ensure the antenna is securely fixed to a solid point using support type 1 (refer fig 8), which must be ordered as an optional extra. Earthing of the antenna at roof top level should be completed via connection of the grounding cable to the nearest metallic point of the roof.

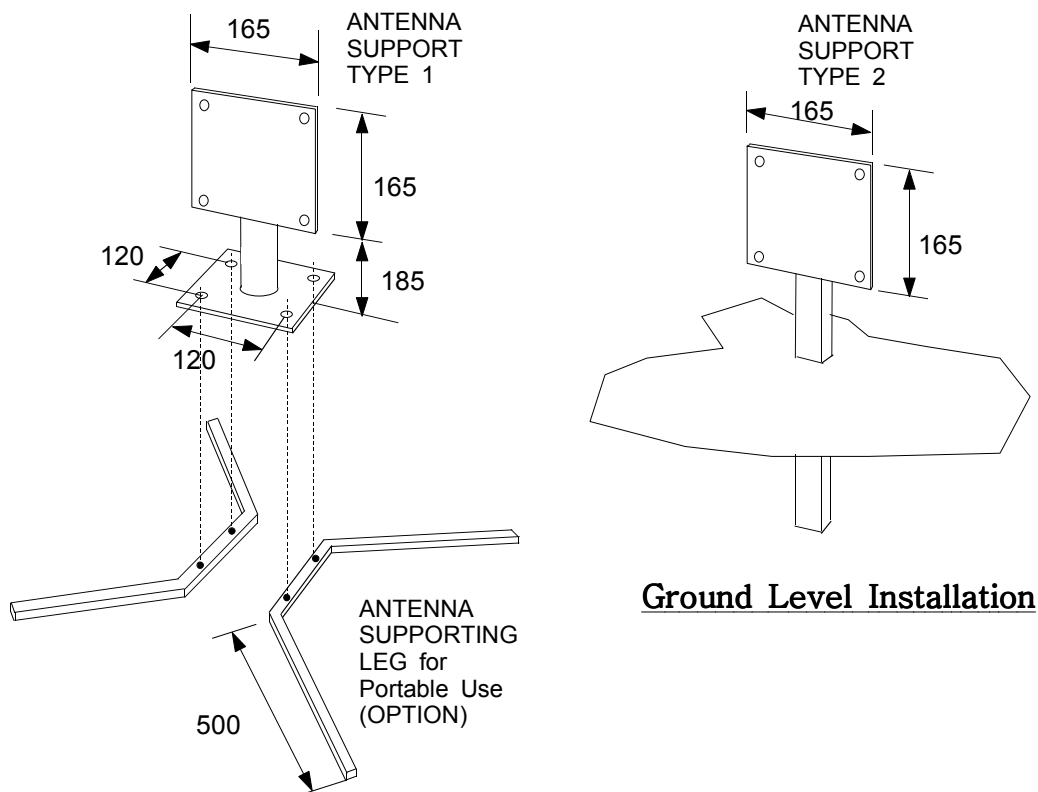
Route pre-assembled shielded cable fitted to the sensing antenna and connect to the "Antenna" terminal of the Main console.

Zero setting by the user is not required, as the setting value for the "warning" and "alert" siren are fixed in the software in the processor.





ROOF TOP Application recommended



Ground Level Installation

Installing the External Alert Siren

Survey the intended location of external alarm. It should be fitted in a secure area where it cannot be tampered with. The location selected should be able to provide maximum audibility when the external alert alarm is activated.

Fix the external alert siren by means of the two mounting holes with secure fasteners. Route external alert siren screened cable provided and connect to "**Siren 1**" terminal on the main console.

Where an auxiliary alarm type is used, take off the protective cover and jumper (No.4 and No.8 pin) on "**Siren 2**" terminal and connect the alarm using 9 pin connector. If it is necessary to disconnect the cable from the alarm to facilitate cable routing, ensure re-connection to be done as per original terminal connections.

The Main Console

The Main console location shall be located in a secure room occupied by the designated operator.

Unpack the Main Console and plug power cord to the main console. Plug power lead to 85 ~ 265V AC power supply.

Check sensing antenna has been connected to the main console.

Check external alert alarm has been connected to the main console.

Activate the Lightning Warning System by switching on the **POWER** switch. The unit will automatically enter the start up "*test procedure*". which will then initiate the Test Procedure. See operating procedure of the LWS MK-II below.

OPERATING PROCEDURE

The LPI Lightning Warning system is controlled by a microcomputer which provides concise easily understood alarms to the user based on its analysis of the prevailing atmospheric conditions.

The main console features the following LED display:

Electric Field Level	
Near Strike	Normal
Far Strike	Warning
Siren 1	Alert
Siren 2	System Fail
Power On	Battery Backup

Power ON Routine:

When the Lightning Warning system is switched on, it initiates an internal diagnostic test, system checks are displayed on an LCD screen and are displayed thus:

LPI LWS-MK-II
Power 12v OK
Power 5v OK
Sensor OK
Siren 1 OK· Siren 2 OK
Alert Signal
All Clear Signal
LED Check
System Start
Normal, YYYY MM:DD HH:MM

Refer to troubleshooting section of this manual if “System Fail” appears on the LCD screen

Push Buttons Functions:

Manual TEST : When **F1** button on the front panel is depressed it performs a maintenance routine. This initiates the unit to carry out the power-on routine without the actual power off/on switching.

Alarm Acknowledged : When **F2** button is depressed during operation, the operator can clear the internal buzzer sound "triggered" during Warning or Alert Status

Reset : Should the operator feel sure that a warning alert status has been falsely triggered, pressing **F3** button will clear the internal buzzer sound and all clear siren is sounded. The LCD display shows **ALL CLEAR** while the external alarm is sounded until the LCD display shows **NORMAL**.

User setup : Press F1 button and hold 3 seconds to get into User setup mode.

Button function at User setup mode	
Select	F1
Scroll Up	F2
Escape to pre-stage	F3
Menu 1	
Pass word Change	1 (Initial P/W set : 0000)
User Setup	2
Menu 2	
Time set	Setting the local time
Test time set	Setting the test Siren time (Initial set:1 sec,Max.9secs)
Siren time	Setting the actual siren time (Initial set:10 secs,Max.999secs)
Activation time	Setting the duration for automatic reset (Initial set:420 secs,Max.999secs)
View event	Up and DN using F2 button for check events at LCD

Warning Alert Status

Is given when the system detects the presence of lightning within a 10-15 kilometer radius or that the electric field strength approaches 4kV/m.

The Warning Alert is the first indication that a storm may be approaching and could arrive in the area being monitored in 20-30 minutes.

No action need be taken at the Warning Alert stage; this first level of alarm is to alert the user of lightning activity but that it may bypass the monitored area.

This first alarm level will trigger an internal buzzer in the console, which may be manually silenced by pressing **F2** button, however the Warning LED on the console will remain illuminated.

Alert Alarm Status

Is given when the system detects lightning discharges within an 8-10 kilometer radius or that the electric field strength has risen to 7kV/m.

The Alert Alarm indicates that the storm front is approaching the monitored area and is likely to arrive in 10-15 minutes.

In the event of a storm cell forming directly overhead the system will detect this and trigger the Alert Alarm.

When the Alert Alarm status is announced it will activate an external alarm (siren) to warn of impending danger.

Safety precautions should be implemented when the Alert Alarm is indicated, personnel in the open should proceed to safe area's, detonation circuits in mining, quarrying and construction sites should be isolated to avoid predetonation of explosives, and sensitive electronic equipment not adequately protected by transient protection devices should be disconnected.

LED displays will remain illuminated whilst an Alarm condition prevails.

An internal timing device is initiated every time the system receives an updated signal that the atmospheric conditions remain above normal.

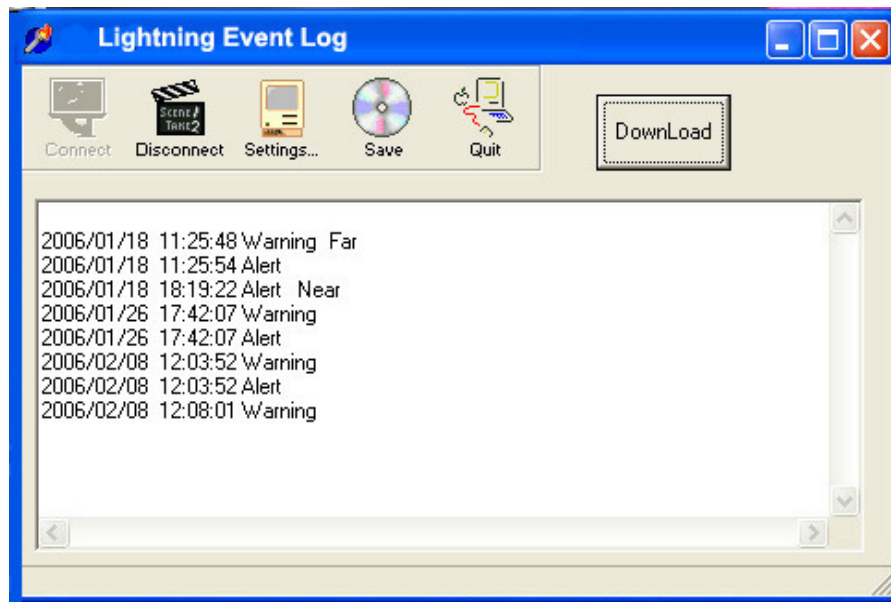
Seven minutes following the last detected Alarm condition the system automatically resets to the NORMAL condition and an ALL CLEAR signal is sounded 3 times for a period of 5 seconds with 2 second intervals.

Event Logging

The LWS internally logs events which it records, these can be monitored on the LCD display by using function key or may be downloaded to a personal computer utilizing the **LWS-MK-II** software, a copy of this software may be downloaded from our website.

1. Copy the file LWS-MK-II.exe (418KB) to your computer, click the program file and the "Lightning event log" window will appear.
2. Click the "**connect**" button on the menu and then click "**download**"
3. Type in a file name (e.g, 23/03/04) then save the file.

Once the event log is downloaded, the LWS internal system is cleared ready to record the next event.



Meaning of event records

Warning Far : Warning by Far strike
Warning : Warning by e-field level
Alert Near : Alert by Near strike
Alert : Alert by e-field level

TROUBLESHOOTING:

Operator must monitor the LCD display and verify the test step when the system failure occurred. LCD display the reason of system fail.

Check the unit in accordance to the reason of the system fail shown on LCD display and correct it and restart the unit.

TECHNICAL DATA

Description: *Lightning Warning System*

Model: *LWS MK-II*

Control Console Materials: *High Quality ABS Case with Front Legs*

Dimensions: *310mm (w) x 100mm (h) x 260mm (d)*

Weight: *3.0Kg*

Console Mode: *Micro Processor controlled via RS232 port*

Operation: *Measured electric field strength and detected lightning discharges are used to generate warning and alarm conditions, indicating likelihood of lightning discharge in the monitored area. Extensive external alarm facilities are provided together with self-test capabilities.*

AC Power Supply: *85 ~ 265v Free voltage, 50-60 Hz*

Sensing Antenna: *Fiberglass, 2 section total height 3 meters*

Sensing Antenna weight: *6.8 Kg (Including 50m cable)*

Sensing Modes: *Electrostatic Field Meter (0-10Kv/m) & Lightning Discharge Detector*

- Far Strike >approx. 10Km

- Near Strike <approx 10Km

Warning / Alert Alarm: *Electronic siren*

Material: *ABS, weather proof*

Weight: *1.8 Kg (Including 20m cable)*

System Packaging: *The system is shipped in heavy-duty reinforced cardboard cartons*

Dimensions: *1 x 165 x 10 x 10 cm*

1 x 55 x 24 x 65 cm

Gross Weight: *1 x 3kg*

1 x 14kg

LIGHTNING WARNING SYSTEM WIRING

