

TECHNICAL DATA SHEET

LPI[®] Lightning Strike Recorder LSR-MAX



Figure 1

Features

- Records more than 195,000 separate events
- Measures and records date/time and peak current for each event up to a maximum 250 events
- Instant validation of genuine LPI product
- Event data and battery status easily viewable and downloadable via the LPI App on any smart device
- 3+ year battery life
- All event data stored in non-volatile memory
- Ability to connect to LPI's AIMCB, with strike events delivered remotely via a cloud-based service

Product Description

LPI[®] Lightning Strike Recorder (LSR-MAX) is a lightning event counter (Figure 1). The LSR-MAX is simply mounted at any location along the down-conductor route. Its purpose is to record the number of lightning strikes captured by the lightning air terminal and conveyed by the down-conductor. It is not recommended for installation in earth pits, nor submerged in water.

The LSR-MAX operates by sensing current by means of an inductive pick-up loop. This loop detects lightning current impulses on the down-conductor, and these are recorded by the internal circuitry, with the results stored in non-volatile memory.

Recorded event data can be accessed and downloaded wirelessly via a smart device using the LPI App. The LSR-MAX will count up to 195,000 separate events, but only stores the full event data for up to 250 events. Once this limit is reached, the LSR-MAX will start to over-write the oldest sets of event data first.

Data recorded for each event include:

- date and time of the event. This is recorded in UTC time.
- intensity of the current strike, recorded as Small (< 20kA), Medium (< 60kA) and Large (> 60kA).
- total number of events detected

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Installation of Batteries

Prior to installation, the LSR-MAX should be fitted with 2 x AA Alkaline batteries. To install the batteries (refer to Figure 2):

1. Remove the clip-in cover from the base of the LSR-MAX device.
2. Insert batteries into the battery holder. Ensure batteries are installed in the correct polarity orientation.
3. Refit the clip-in cover to the base of the LSR-MAX device.
4. To replace batteries, repeat steps 1-3. Event data stored in the LSR-MAX will be retained indefinitely. However the time/date information will need to be updated if the batteries are removed for longer than ~ 10 minutes.



Figure 2

Installation of LSR-MAX

The LSR-MAX can be installed at any location on the downconductor route between the air terminal and the earthing system. Where possible, avoid installing the LSR-MAX in a position where it is exposed to direct sunlight. This can be achieved by installing the LSR-MAX in a suitable mounting cabinet.

The LSR-MAX should be mounted in line with the HVSC Plus downconductor as shown in Figure 3. If using flat downconductor or smaller down-conductor use the plastic spacer provided, per Figures 4 and 5. To remove or relocate the LSR-MAX, use a small flat bladed screwdriver to release the clip on the latching mechanism on the cable tie.



Figure 3



Figure 4



Figure 5

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Operation of LSR-MAX

The LSR-MAX requires no external intervention during normal operation – it will remain in a low power state until an event occurs. On detection of an event, the LSR-MAX will exit out of this lower power state, record details of the event store these in non-volatile memory and then return to the low power state.

Viewing Event Details using LPI App

To view details of recorded events, the LSR-MAX can be detected using the LPI App via a Bluetooth Low Energy (BLE) connection on a smart device.

Under normal operation, the LSR-MAX will automatically exit its low power state once every 15 seconds, briefly advertise over Bluetooth, and then return to low power mode. The LPI App can continuously scan for nearby devices and will detect the LSR-MAX during one of these periodic wake-up intervals. Once detected, the App will retrieve all relevant event information and display it, even after the LSR-MAX has returned to low power mode.

This automatic cycling between low power and active states occurs **only between 9:00 am and 5:00 pm local time**, provided the internal clock of the LSR-MAX has been set. When operating in this periodic wake/sleep mode, typical battery life is approximately **three years**.

If the internal time has **not** been set—such as when new batteries are first installed or if the batteries have been disconnected—the LSR-MAX will perform the 15-second wake-up cycle **continuously, 24 hours a day**. In this condition, the device must be scanned using the LPI App so the App can automatically update the internal time. Once the time has been set, the LSR-MAX will revert to the normal 9:00 am to 5:00 pm operating schedule. Leaving the device in 24-hour wake-up mode can reduce battery life to **less than 12 months**.

As with previous versions, the LSR-MAX can also be manually woken from low power mode using a magnet (minimum pull force 1.0 kg) positioned on the indented location on the top of the enclosure.

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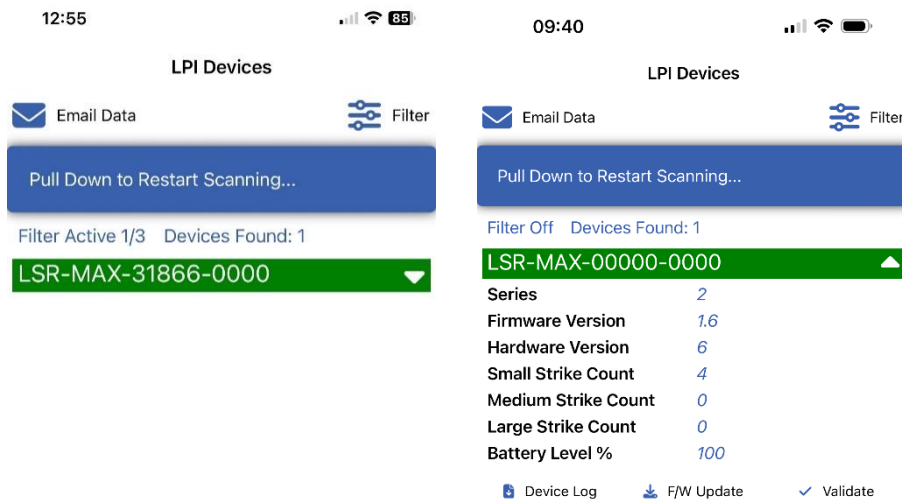


Figure 6

Figure 7

Once detected in the App, click on the pull-down menu for each device to expand out the Device Data Summary (see Figure 7).

- **Series** – this designates the series variant for the device.
- **Firmware version** – this is the currently installed firmware version for the device. This can be updated via the “F/W Update” option at the bottom of the device data summary.
- **Hardware Version** – version of hardware installed in the device.
- **Small Strike Count** – total number of Small (< 20kA) strikes detected. Maximum 100,000. *
- **Medium Strike Count** – total number of Medium (< 60kA) strikes detected. Maximum 100,000. *
- **Large Strike Count** – total number of Large (> 60kA) strikes detected. Maximum 100,000. *
- **Battery Level %** - current battery charge level (0-100%).

**This is based on the lightning current distribution curves as specified in IEC 62035*

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Underneath the Device Data Summary there are three further options:

- Device Log** – select this to view event details (see Figure 8 and 9). The App will need to Pair and Bond to the LSR-MAX via Bluetooth before you are able to access this information. Once paired and bonded, the smart device will remember the LSR-MAX next time, and this process will not need to be repeated. You will be prompted to do this the first time you access the Device Log on any LSR-MAX device (see Figure 10).
- F/W Update** – select this to check for firmware updates (see Figure 11). You will be given the option to upgrade the firmware if a newer version is available to install. As with the Device Log, the smart device needs to be paired and bonded to the LSR-MAX first.
- Validate** – select this to validate the LSR-MAX device (see Figure 12). This will check the Batch/Serial Number against that device’s unique ID in LPI’s records to confirm that it is a valid LPI device. Again, the smart device needs to be paired and bonded to the LSR-MAX before validation can be completed.

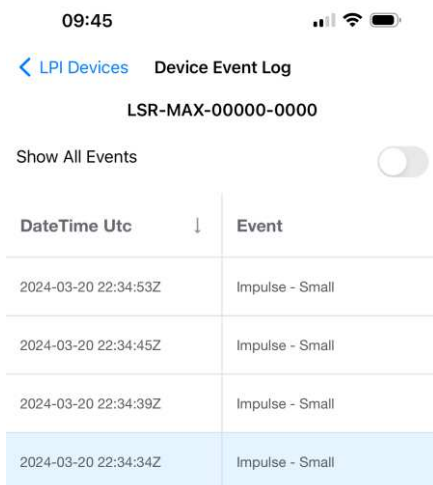


Figure 8 – portrait view



Figure 9 – landscape view

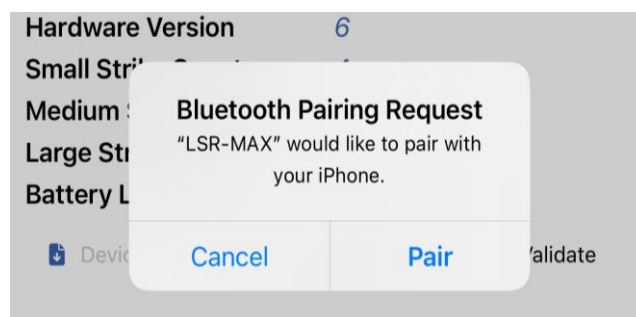


Figure 10

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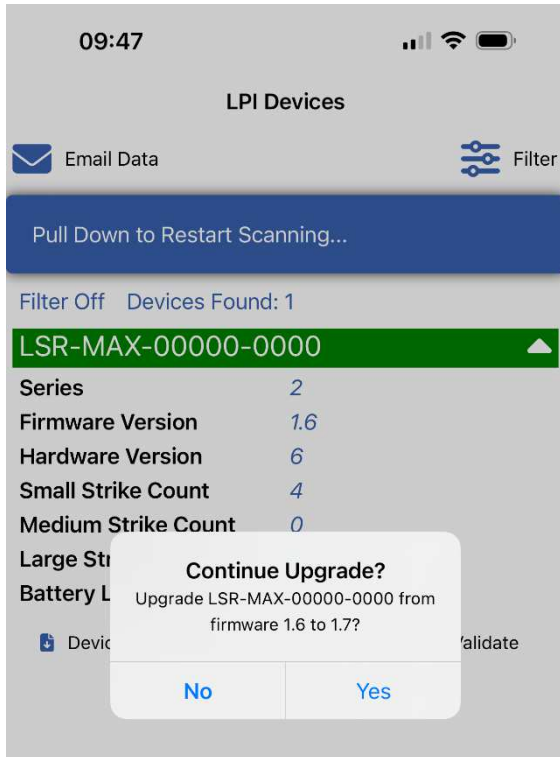


Figure 11



Figure 12

Returning the LSR-MAX to a low power idle state

To return the LSR-MAX to its low power state, where it will automatically wait for events, simply remove the magnet from the top surface of the enclosure.

The LSR-MAX will automatically return to the low power state after 3 minutes, even with the magnet still in position. This is to prevent the device being left in the active mode if the magnet is inadvertently left on the top of the LSR-MAX for an extended period. To 'wake up' the LSR-MAX after this has occurred, simply remove the magnet for approximately 1 sec, and then return it to the correct location. The LSR-MAX will exit the low power state and begin advertising again.

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LPI® Lightning Strike Recorder Tester LSR-TESTER**Product Description**

LPI® Lightning Strike Recorder Tester (LSR-TESTER) is a high current device designed to trigger a reading on an LPI Lightning Strike Recorder (LSR-MAX, hereafter simply referred to as “LSR”).

The tester is light, compact, and is powered by 8 x AA NiMH rechargeable batteries.

Features

- Ideal for maintenance and testing of LPI® Lightning Strike Recorders
- Simple operation
- Portable



Figure 13: Step 2



Figure 14: Step 3



Figure 15: Step 4

Testing

1. Note the initial strike count on the LSR using the LPI App.
2. To test the LSR, the supplied ‘pulse cable’ is positioned parallel to the down-conductor, through the mounting saddles as shown in Figure 13. The LSR unit can be removed from the down conductor by using the releasable cable ties, and this may make the following steps easier to complete.
3. Complete 3 loops of the pulse cable around the LSR, making sure that pulse cable is positioned vertically across the top of the LSR as shown in Figure 14. Plug the cable back into the tester.
4. Press the red button on the tester until the red LED is illuminated, as shown in Figure 15. This initiates the impulse circuit charging and firing process.
5. After a period of up to 20 seconds an audible ‘clunk’ sound should be heard. This indicates that the charging process has finished, and a current pulse has been sent through the pulse cable. The strike count on the LSR will increase by one (1).
6. If the LED fails to light when pressing the red button, or if no ‘clunk’ is heard after a period longer than 30 seconds then the LSR Tester batteries need to be recharged using the supplied charger.

Charging

The LSR Tester charger unit has two indication LEDs to indicate charger power and charging status. Press and hold the charging button for up to 1 second to start charging the battery. The LED will indicate RED. Once a battery has been fully charged, the charging LED will turn GREEN.

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Technical Data

Product Code: LSR-MAX

Description	Lightning Strike Recorder
Current Sensitivity	1500 A 8/20 µs
Operating Range	Min. 1500 A, 8/20 µs Max. 220 kA, 8/20 µs
Display	Information is accessed via the LPI App using a smart device No external display of event count on the LSR-MAX unit
Dimensions	55 (L) x 60 (H) x 75 mm (D)
Weight	125g (175g with batteries installed)
Mounting	Releasable UV resistant plastic cable ties Suitable for up to Ø40 mm cable or 25 x 3 mm flat tape
Construction	HDPE Enclosure
Colour	Black
Environment	IP 66 (IEC 529)
Working Temperature	-18°C to 55°C
Batteries	Requires 2 x AA 1.5V Alkaline Cells (not supplied)
Magnet	Minimum pull force of 1 kg (not supplied)

Product Code: LSR-TESTER

Description	Lightning Strike Recorder Tester
Impulse Output	2 kA Peak Simulated Lightning Impulse
Open Circuit Output	55 Volts
Time Between Impulses	20 seconds
Display	Red "Testing" LED Indicator
Dimensions	190 (L) x 100 (W) x 35 mm (H)
Mounting	Portable Unit No mounting required
Construction	Polycarbonate Enclosure, IP 30 rating
Colour	Light Grey
Weight	0.58 kg
Working Temperature	-12°C to 65°C
Batteries	8 x AA 2000 mAh NiMH Rechargeable Recharge time up to 16 hours

Warranty

This product is guaranteed to be free from materials and workmanship defects for a period of 5 years from the date of shipment from the manufacturer. As lightning is a natural event containing unpredictable energy levels, 100% protection is not guaranteed. These energy levels may exceed the product rating. In this case the manufacturer's liability is limited to repair or replacement at the manufacturer's discretion. This warranty does not offer any cover for consequential damage, loss of operation or loss of profit.

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