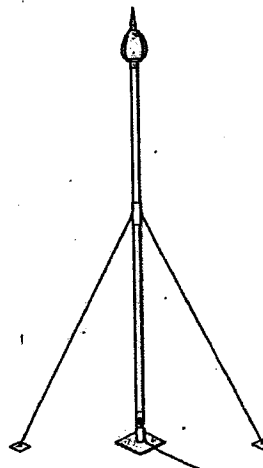


Guyed

When mounting a Stormaster ESE terminal, a typical guyed configuration would involve the following. See drawing STA-04 and Figure 37.

- Two sections of mast (Aluminium mast & FRP mast) coupled together with an inline coupling. Securing of guy wires is completed at the eyelets as provided on the inline coupling.
- Alternatively or in addition, a guy ring can be supplied which is installed at the neck of the mast in between the Stormaster terminal and the top section of the FRP. The guy ring provides eyelets for connection of the guy wires.

Figure 37. Guyed Mast



Freestanding

A freestanding mast configuration is typically used in situations where protection by isolation is required. For example a Stormaster ESE terminal is installed 5 metres or more away from a fuel storage tank.

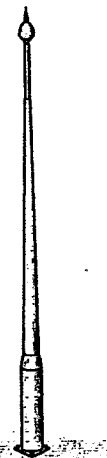
Prior to installing the freestanding mast, ensure that:

- A spigot has been supplied with the freestanding mast which allows for external or internal mounting of the FRP mast.
- The downconductor can exit through the base of the freestanding mast if run internally.
- Adequate information is provided for mast foundation requirements.

Mast Bases

LPI supplies a mast base welded directly onto the required length of aluminium mast.

Figure 38. Freestanding Mast



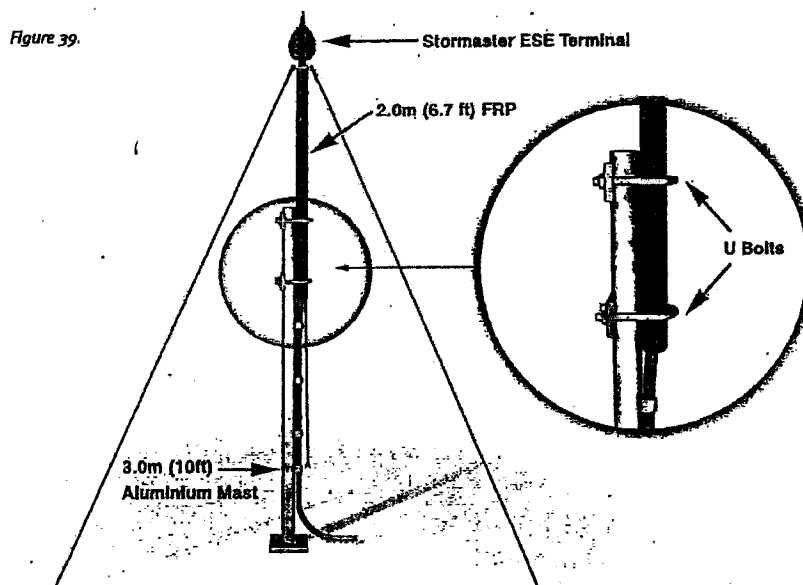
Mast Couplings and Guying Points

There are two methods of coupling two sections of mast:

1. The U-Bolt set uses two stainless steel U-Bolts to clamp the two masts together. (Figure 39)
2. The inline coupling fixes the upper and lower mast sections together and provides guying points and an exit point for the HVSC downconductor.

U-Bolts and Inline Couplings nuts must be tightened to no more than 55kg/cm (45in.lb).

A Guying Ring is supplied for guy points for any two piece masts that require double guying. This fits on the terminals mast butt adaptor between the Stormaster ESE terminal and the top of the mast. See Figure 40



Guying

LPI offers a standard 4m (13 ft) and 7m (22.75 ft) guy kit made up of light weight plastic coated fibreglass, non-conductive cable. The LPI GUYKIT-4M and GUYKIT-7M are both non-conductive guying kits. They are designed to be installed with the use of a Guy Ring at the top section of the FRP Mast as illustrated in figure 40. When guying from the LPI Inline Coupling, the use of stainless steel guy wire kits (GUYKIT-4M-SS, GUYKIT-7M-SS) is recommended.

Important Recommendations:

- The guying angle must be no greater than 60° from horizontal.
- The inline coupling couples the upper and lower mast sections and provides guying points and an exit point for the HVSC downconductor.
- Minimum of 3 guying grips per guy end.
- Guying grips spaced at a minimum of 25mm (1 in.).
- Grips are correctly orientated –saddle on the longer length side of the guy and U-bolt over the tail side of the guy.
- Tighten grips to no more than 60cN.m (5lbf.in) of torque.
- Customised guy kits can be supplied upon request.

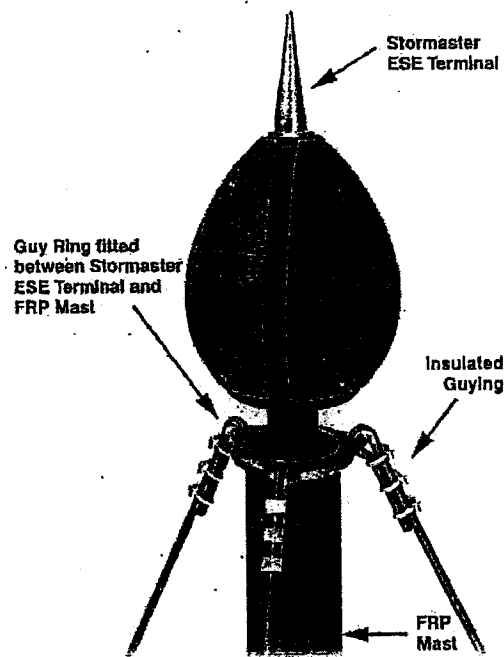


Figure 40.

Preparation for raising the Mast into position

With the upper termination of the HVSC completed and the FRP mast in position it is now time to finalise the mounting arrangement so that the mast can be raised and secured into position.

- If using the recommended installation methods as per drawings STA-01, STA-02, STA-03 and STA-04 (on pages 6, 7, 8 and 9) fit the inline coupling to the lower mast material.
- If required, fit the HVSC downconductor through the side entry of the inline coupling and through the FRP mast. Refer to Figure 42 on page 42.
- Feed the Upper Termination through the guying ring if required.
- Carefully fit the mast adaptor of the Stormaster terminal into the top of the FRP,
- It may be necessary to pull back any slack of HVSC downconductor through the FRP support mast to achieve a tight fit for the Stormaster terminal. This should be completed carefully so as to not damage the upper termination.
- Fix the FRP support mast firmly into the inline coupling and tighten the coupling so that the FRP mast and lower mast material are secured firmly into position with no more than 55kg/cm (45in/lb).
- If a guy kit is to be installed, the guys should be securely fixed to the eyelets as provided on the inline coupling and or the guy ring. See text and graphics as detailed under the heading Guying for more information.

Raising of the Mast

When raising the mast, ensure:

- Guys to inline coupling and/or guy ring are properly secured.
- Guys are not twisted, kinked or damaged.
- Guys are able to be easily secured at the lower guy anchoring points when the mast has been raised.

Turnbuckles or Rigging Screws are recommended at the base anchor points of the guys.

Other guying methods such as conductive stainless steel can be used only on aluminium masts or inline couplings below an FRP section.

Using a crane is recommended (or other suitable equipment) for anything over 6 metres (20ft.) in height, or for hazardous areas or high areas.

- It is very important to keep the mast straight during the lift to avoid damaging the mast.
- The Stormaster ESE terminal must NOT be used as a slinging point.
- When lifting the mast, ensure that the slings or ropes cannot damage the Stormaster ESE terminal, see Figure 41.

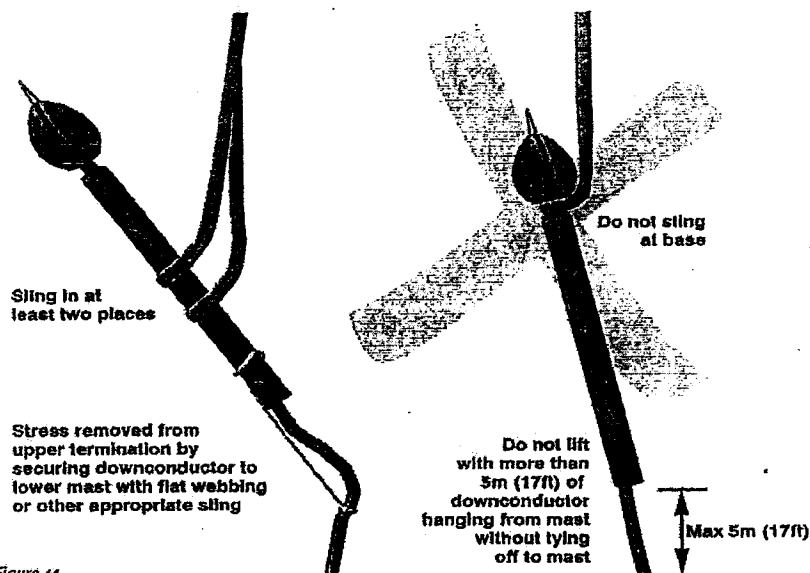


Figure 41.

- When lifting the mast, the HVSC downconductor must be tied off to the mast to remove any strain on the HVSC downconductor termination to the Stormaster ESE terminal.
- Protect the HVSC downconductor at the base of the mast when lifting, maintain a minimum bending radius of 500mm (20 in.) and ensure it does not drag over rough or sharp surfaces.

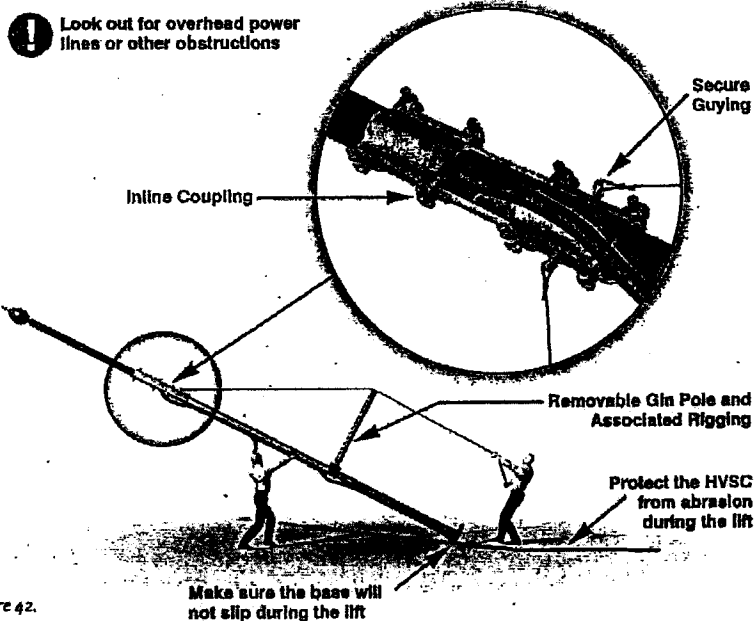


Figure 42.

Lightning Strike Recorder (LSR1)

The Lightning Strike Recorder (LSR1) should be installed at a position along the downconductor length where it can be accessed easily for inspection. Typically the LSR1 should be installed approximately 1.5m from ground level or alternatively within the earth pit at the lower termination point of the HVSC.

When installing the LSR1 the following should be considered:

- The LSR1 should be mounted away from areas where damage may occur due to theft, vandalism or nearby operations.
- The LSR1 can be enclosed in a security enclosure but the display should be kept visible to allow for the checking of recorded strikes.

Figure 43.
*Lightning Strike Recorder
Installed on HVSC
Downconductor*

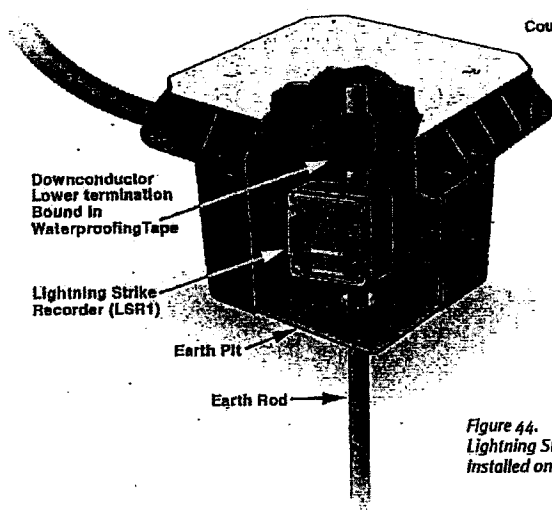
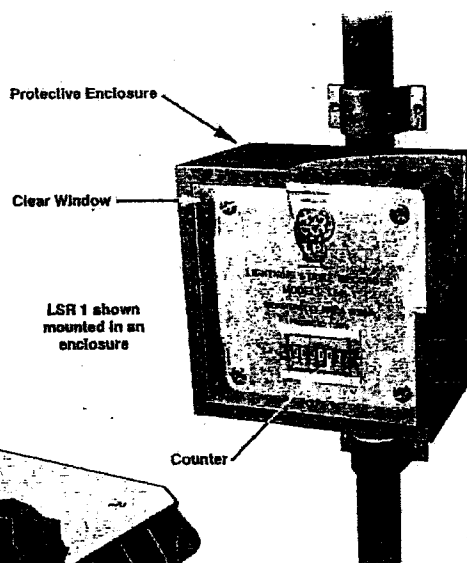


Figure 44.
*Lightning Strike Recorder
Installed on Rod.*

Certification

The certification of the LPI Stormaster ESE installation should be performed by an authorised LPI representative.

A certificate of compliance and warranty registration is provided with the installation manual. This certificate should be completed in full following the successful inspection and certification of the installation.

The following should be checked for quality of workmanship and compliance to recommended installation instructions.

Certification checklist

- Correct mast and any associated brackets and fastenings have been used for installation.
- Guying, anchor points and fastenings.
- HVSC Downconductor routing, fixing and weatherproofing.
- Lower termination of HVSC Downconductor.
- Earthing System.
- Labelling.

Operation and Maintenance

The LPI Stormaster ESE Lightning Protection System is designed to react to the rise in electric field which is present in approaching thunder storms. The Stormaster ESE Terminal becomes active only during storm activity.

- The system operates without the need for external power supply or spare parts for standard operation.
- To keep the LPI Stormaster ESE Lightning Protection System operating at optimum levels it needs to be regularly checked.

Maintenance checks must be done:

- After each known lightning strike to the terminal.
- Once every twelve months.
- If changes have been made to the structure.

Checks to be conducted in standard maintenance inspection:

- Is there any damage to Stormaster ESE system?
- Has the structure to be protected been modified since the last maintenance check?
- Check finial tip for excessive pitting.
- Check all rigging, mast mounts, saddles and conductor fixings are secure and tight.
- Ensure that no dirt or other matter is sitting in the air gap between the finial tip and the surrounding panel edges.
- If conventional downconductors are used, check that all conductors are securely fixed and not damaged.
- Check for damage to the LPI HVSC. The downconductor should not be able to be accessed by non authorised people or machinery.
- All warning labels must still be in place.
- Check LSR1 for secure installation and record number of strikes.

Testing the Stormaster Terminal

LPI manufactures and supplies a terminal spark-over tester suitable for testing the Stormaster ESE range of terminals. Contact your local distributor for further details.

Testing the Lightning Earth and the HVSC Downconductor

Use the table on page 47 to record the results following completion of the following steps.

1. Remove the waterproofing tape from the lower termination.
2. Disconnect the HVSC downconductor from the lightning earth.
3. Disconnect the structure earth bonding cable from the earth system.
4. Measure the earth resistance of the lightning earth system and record in column 3 under the heading Earth Resistance Readings in the table provided on page 47.
5. Measure the earth resistance of the structure and record in column 4.

6. Reconnect the structure-earth bonding cable to the lightning earth and measure and record in column 5 the earth resistance reading.
7. Use a multimeter to measure the continuity between the inner and outer conductors of the HVSC downconductor. The measurement should exceed 10,000 ohms.
8. Reconnect the HVSC lower termination to the lightning earth and re-seal the termination using waterproofing tape to ensure that it is waterproof.
9. Report any problems arising from the above tests to your local LPI distributor for further advice.

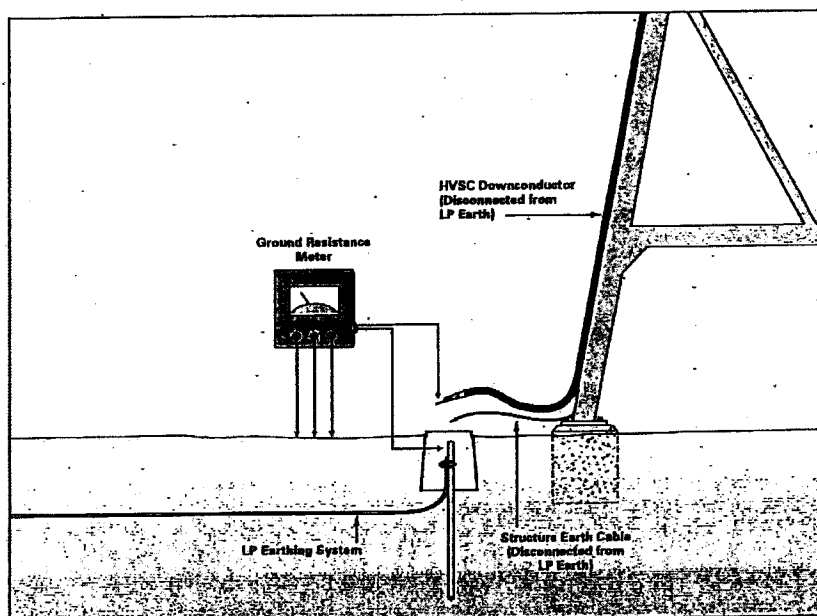


Figure 45.

Date of Inspection	Inspected by	Earth Resistance Reading #1	Earth Resistance Reading #2	Earth Resistance Reading #3	LSR Reading	Comments

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Lightning Protection International Pty Ltd

ABN 31 099 190 887

PO Box 379 Kingston, Tasmania, Australia 7051

■ Phone: +61 3 62271955 ■ Email: info@lpi.com.au

■ Fax: +61 3 62291900 ■ Web: www.lpi.com.au