PORTABLE LIGHTNING MAST PROTECTION
PLP SERIES

INSTRUCTION MANUAL

LBA Technology, Inc.
Greenville, NC

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1. INTRODUCTION

The PLP Series Portable Lightning Mast Protection systems, designed and manufactured by LBA Technology, Inc. of Greenville, North Carolina (LBAT), provide lightning protection for equipment and structures when mobile or fixed protection is required. The PLP systems can be installed quickly and easily at a desired location to give immediate protection coverage, then easily dismantled and stowed for future deployments. Current products in the PLP Series include 14’, 22’, 30’ and 38’ models.

This manual describes the components of the PLP Series units, applications, safety concerns, installation procedures, and maintenance directions.

2. PLP CONFIGURATIONS AND COMPONENTS

The PLP units may be deployed in three ways: either “fixed”, “portable” or “embedded” configuration.

The PLP units are composed of three components: the mast, the air terminal and the base assembly.

a. The mast is composed of structural aluminum tubes that are fit together with couplings. Each of the upper sections is 8.5’ in length. The bottom base section is 3.5’ in length.

b. LBA provides a streamer retarding or “static dissipater” for its air terminal. The PLP’s UL listed air terminal/static dissipater will serve as an efficient conductor pathway to electrical ground, providing protection for items in near proximity to it, static dissipaters reduce the probability of lightning strikes.

c. The PLP-Series conform with requirements of the NFPA for lightning masts.

The PLP may be directly embedded in concrete without the use of either of the optional bases. Alternatively, it may be mounted in the fixed configuration by joining with the optional fixed base plate (designated as PLP-FB models), or it may employ the portable base - tripod assembly (PLP-PB models). Stainless steel hardware (1/2”) is used to secure the base components. The hardware is also used as ground lead attachment points.
When the PLP portable configuration is selected for use, three copper clad steel ground rods (5/8” diameter and 5.0’ in length) will be installed near the base and electrically attached to the base assembly with #4 stranded and insulated copper wire and bi-metal connectors provided. The portable base is secured by placement of sand bags (provided) on each of the three tripod legs. Additionally, six base securing stakes are included to be driven through the holes provided in the tripod legs.

For the PLP-FB base plate, 1/2” stainless steel hardware will be used to secure the plate to a solid structure (provided by others). The installer will determine and follow, as required, local and/or other applicable codes and standards for all bonding and grounding of the mast. Bolted connection points on each of the gussets on the base pipe mount will serve as an appropriate electrical point for the user furnished ground connections.

3. APPLICATIONS

The LBAT PLP Series units are to be installed where no lightning protection systems are in use and yet are needed to provide special protection services to a particular piece of outside equipment or structure that would be susceptible to damage from lightning. Typical applications include:

a. Camps of portable buildings or vehicles
b. Petroleum, water pumping and utilities installations
c. Emergency responder or military command posts
d. Portable communications equipment
e. Environmental monitoring huts

Calculating or estimating specific lightning strike threat and risk assessments are beyond the scope of this manual; however, the end users should make their own determination of the requirement for special and specific lightning protection.

When placed in close proximity to the structure or equipment to be protected, the PLPs will provide a zone of protection around the mast. When necessary, multiple PLP masts can be deployed together to give significant spatial coverage.
There are several means of estimating the shape of the zone of protection around the mast1 and how far this zone extends beyond the mast. Logically, the closer the item to be protected is to the mast and the higher the air terminal is over the item, the more protection is provided to it. Determination of adequate placement of the item to be protected within the zone of protection is the user’s responsibility and LBAT expressly does not warrant or otherwise guarantee performance for the user's specific circumstance.

4. SAFETY FIRST!!!

Do not attempt to deploy the LBA Technology PLP Series systems near any type of overhead line (Figure 1). Should your installation come into contact with power lines, you can be killed! Be sure the PLP mast is out of falling distance of any overhead wires – including the lead into any building. Read all instructions within manual before you begin erection, or call your supervisor in charge.

If an electrical accident should occur – DO NOT grab hold of the person in contact with the power line or equipment or you could be electrocuted!

The LBA Technology PLP Series system IS NOT designed to be climbed (Figure 2). Serious injury or death may result from climbing it.

IMPORTANT!!! ONLY PERSONS TRAINED IN THE SETUP AND OPERATIONAL PROCEDURES OF THE PLP SYSTEM SHOULD BE PERMITTED TO ATTEMPT

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1 One method is the “rolling sphere method” as described in the National Fire Protection Article 780 (NFPA 780: Standard for the Installation of Lightning Protection Systems, 2011 edition)
INSTALLATION AND OPERATION OF THIS SYSTEM. IMPROPER SETUP MAY RESULT IN EQUIPMENT DAMAGE AND/OR INJURY.

NEVER WORK ALONE!!

Proper safety training is critical in the movement, handling, erection, disassembly and work environment of the PLP Series units. Those persons not thoroughly familiar with the overall design concept of the system, as well as these safety concerns should not attempt to use or be in close proximity to the system in its fully installed condition.

In addition to the warning, above, regarding the erection of the PLP unit in close proximity to electrical power lines, installers should be keenly aware of the danger of erecting it when there is any indication of electrical storm activities anywhere in the vicinity of the installation site, notwithstanding that the actual purpose of the system is to provide lightning protection!

Operational planning should allow for installation well before such protection is actually required due to approaching storms.

Personnel should insure that the mast grounding system is in place before erection. Make ground connections to the PLP unit immediately after erection. For the portable configuration, drive the three ground rods first and prepare the wire ground leads prior to erection on site.

Installers and any other personnel operating in close proximity to the PLP mast should be aware of the warning and caution labels affixed to the system and pay heed accordingly.

5. INSTALLATION PROCEDURES

Below is a brief step-by-step process of erecting a PLP series lightning mast system. Following, in Section 8 of this manual, a more detailed pictorial presentation of the erection of a typical PLP-PB 30’ system is provided for reference.

a. Site Selection: Adequate care should be exercised in proper and safe selection of the actual mounting site for the PLP system. Of course, the site should allow for the positioning of both the mast and the equipment or structure it will be protecting. The site should be open, flat and free from any obstructing impediment to the mast’s raising or lowering (again, such as electrical wires, or vegetation).

b. Equipment preparation: Layout mast sections with the bottom section placed on spot where mast is desired when erected. Check all components against the
model's parts list provided by LBAT at shipment and become familiar with part identities. Make sure all coupling threads are clean and amply lubricated with Noalox® prior to assembly. Drive ground rods around desired mast base placement and connect the ground leads to the ground rods. Take care not to trip over them during mast erection process. Especially for the first use of the PLP product, a careful practice construction in a controlled environment is recommended prior to field deployment.

c. **Portable Base and Mast Assembly (PLP-PB Models):**

1) Remove the protective caps from the male threads of the mast section couplings just prior to connecting the sections and save them for reuse at disassembly. Thread the mast sections together, end to end. Firmly hand-tighten mast sections.

2) Thread the Air Terminal (static dissipater) in to the topmost section. Firmly hand-tighten.

3) Attach two of the three base legs to the mast as shown in Figure 3.

4) Raise mast. One man must hold base in place while the other pushes the mast to upright position.

5) Attached third leg to mast. One man holds mast upright while the other attaches the last leg. Tighten all hardware with 5/8” wrenches.

6) Immediately secure the mast base with sand bags and/or hold down stakes.

7) Apply Noalox® to the ground lead bi-metal ring terminals. Using provided 1/2” stainless steel hardware, connect the ground leads to the mast using the three remaining holes on the gussets. Sandwich the ring terminal directly to the mast gusset with a flat washer.

8) Re-tighten all hardware.
d. **Fixed Base and Mast Assembly (PLP-FB Models):**

1) Install the base plate (Figure 5) to the substrate in accordance with acceptable practices using the four corner mounting holes.

2) Prepare the ground system. Fixed base system and embedded mounting will rely on the customer provided ground system.

3) Assemble the mast using steps 5.c 1) and 2) above.

4) Raise the mast with two people. One person will hold the base of the mast in place while the other raises the mast.

5) Using six of the provided 1/2” stainless steel hardware, attach the mast to the base plate and tighten the hardware with wrenches (Figure 6).

6) Using the stainless steel mounting hardware, attach the ground system to the mast. It is recommended that the ground leads make direct contact with the aluminum gusset/s of the mast.
e. **Guy Stay Kits:** To increase stability for the PLP-38 system, a stay guy kit is supplied. No external guy anchors are required.

1) Before erection of the mast system, slide the upper mast ring around the 1.25" mast section tube so that it rests on the tube’s lower coupling collar. Three carabiners are attached to the ring holes and receive the permanent loop of the guy line.

2) Attach the three aluminum tab connectors on the outer 1/2" bolt securing the base leg—angle leg brace. Attach the guy tensioners to the free hole in the tab connectors.

3) Loop the lower end of the guy lines through the guy tensioners (as displayed on the tensioners), using the jam cleat to secure the line. Tie several half-hitches around the guy line and secure remaining amount of guy line out of the way.
6. Dismantling and Disassembly

The PLP units should be taken down and disassembled in opposite order of the assembly and raising procedures.

7. Care and Maintenance

The PLP Series lightning mast protection systems require very little maintenance in order to keep them fully functional for many years.

a. The most critical maintenance action after use of the system is to visually inspect all components for any wear, excessive stress or damage. Check the threads to the mast section couplings for any signs of galling or cross-threading.

b. Especially when deployed in marine climates, the components should be rinsed off with fresh water before storing. This is particularly important for the static dissipater air terminal and the copper clad ground rods.

c. Clean off any old joint compound and apply a new cover of Noalox® anti-oxidant joint compound, provided. Insure only this or comparable joint compound is used for this application, and specifically prohibit the use of any graphite or graphite bearing lubricant for these connections. Do not sue Teflon or non-conductive compounds.

d. Check the ground connections for any corrosion and clean accordingly. Check the electrical connectors to insure no copper-bearing metal-to-aluminum interfaces are used. Only tinned or properly rated bi-metallic connectors and lugs must be used.
PORTABLE LIGHTNING MAST PROTECTION (PLP)
PICTURED ASSEMBLY GUIDE

Photo 1. Components of PLP-PB 30’ displayed at shipment

Photo 2. Components laid out prior to field assembly
1. First, construct the mast.

2. Mast extension tube is threaded onto universal mast section.

3. Hand tighten the couplings.
Photo 6. Add the additional mast extension tubes.

Photo 7. With all extensions added, install the static dissipater.

Note: With shorter masts, a reducing coupler may be added to the top extension tube prior to installing the dissipater.
Photo 8. Typical UL listed air terminal static dissipater, installed.

Photo 9. Example of assembled universal mast section with horizontal legs and angle leg braces.
Photo 10. Horizontal legs, braces and angle leg braces are prepared for assembly.

Photo 11. Legs are installed on two sides of the universal mast section.
Photo 12. Mast is readied for going vertical.

Photo 13. After going vertical, third leg is added.

Photo 14. Angle braces are tightened.
Photo 15. Outer horizontal braces are added, if available.

Photo 16. When vertical, adjust for balance.
Photo 17. Ground leads are bolted to universal mast section gussets.

Photo 18. Sand bags are placed on horizontal legs.
Photo 19. Anchor “J” spikes and installation hole in leg.

Photo 20. Installing “J” spikes into outer end of horizontal leg.
Photo 21. Guy stays are installed prior to raising the mast. Slide the upper mast ring onto the second mast extension tube (1 1/4” diameter). Install carabineers in the ring holes and clip onto the fixed loop of the guy stayl (PLP-38 online).

Photo 22. Guy stays are secured at outer ends of the horizontal legs.
Photo 23. The lower guy stay tensioners are illustrated to show how the line is attached, ending with securing it with the jam cleat and two half hitches around the vertical guy line.