MOONRAKER

Type LPU

MF to HF Lightning Protection Unit
for marine and land based antenna systems

The Moonraker LPU is a horn gap overvoltage lightning protection system designed to be placed in MF/HF open wire antenna feeders. It gives an easy path to earth for high voltage static charges, such as those induced in the antenna system by lightning induction and other electromagnetic disturbances. When used with the CSS Coaxial Surge Suppressor, the range is extended to cover all frequencies from MF to 2 GHz.

The solid copper, nickel plated horns are mounted upon special ribbed high voltage insulators which facilitate easy horn gap adjustment. The device is completely enclosed in an IP56 rated (weatherproof) cast aluminium housing, finished with a high durability epoxy based coating, highly resistant to chemical attack, abrasion and the effects of ozone and ultra violet radiation. It is designed to be back mounted externally; close to the antenna feed point. The LPU metal housing ensures it is intrinsically safe from fire and explosion.

The unit exhibits low capacitance to earth in order to cause minimal effect upon antenna tuning. As most antenna tuning units (ATUs) provide little resistance to high reverse voltages, we also recommend that a Coaxial Surge Suppressor be fitted in the 50Ω coaxial cable between the ATU and the transmitter for HF installations.

Specifications

LPU	Tested in accordance with ANSI C6241 Category B, ie 45kV 1.2/50 micro second (rise/fall times) voltage pulse, 5kA 8/20 microsecond current pulse; observed breakdown with continuous RF at 3.3 MHz 1.5mm gap, 3.5kV rms (refer to installation instructions)
Housing Dimensions	55H x 120W x 170Lmm L (215mm including cable glands)
Maximum RF Power	1.2kW PEP
Adjustment	Screwdriver clamps on horns using feeler (thickness) gauges (refer to installation instructions)
Connection	1metre Moonraker HV silicone insulated antenna cable supplied at each end for connection to antenna feed stud, ATU and to earth
Weight	910g (2 lbs)
Packed Weight	1.5 kg (3.3 lbs)

Specifications subject to change – Issued 01/09/13

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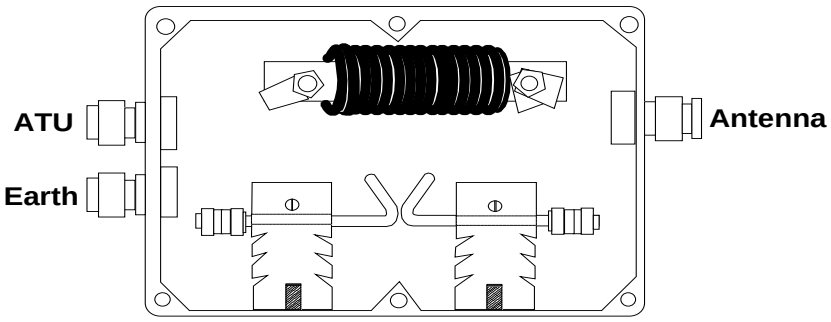
INSTALLATION INSTRUCTIONS
TYPE LPU



The unit is designed to be placed in the open wire feeder between the antenna and antenna tuning unit (ATU). A close by, low resistance earth point is essential for optimum protection.

MOUNTING

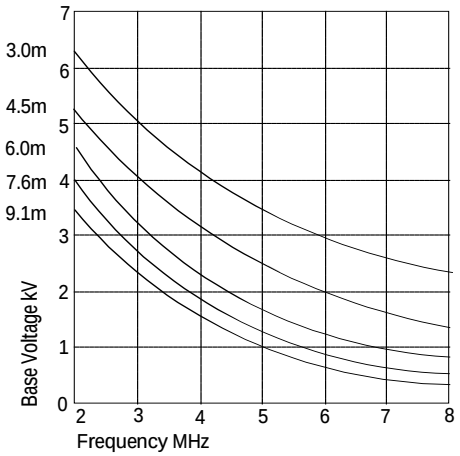
The LPU may be mounted on either a horizontal or vertical surface utilising the mounting holes in the bottom panel.

CONNECTION

Utilising the nuts, lugs and washers on the threaded ends of the horn gap rods, connect one horn to the antenna feed (preferably at or near the base of the antenna) and the other horn directly to a low resistance earth (ground). 1 metre of Moonraker HV Silicone Cable is supplied at each end for these connections. The antenna connection must be made to the horn connected internally to the coil. The earth lead should be as short and as direct (no sharp bends) to earth (ground) as possible. The ATU should be connected to the other end of the coil. Seal up all cable entries and unused mounting holes with silicone sealant to prevent moisture and insect ingress to housing.

ADJUSTMENT

The horn gap must now be adjusted to suit the particular installation.



Typical antenna base voltage at 100w using an ATU for various lengths of antenna / feedwire

- **Slacken the horn clamp screws at the top of the standoff insulators. The horns can now be oriented so that they are both in the same plane (exactly).**
- **Tighten the clamping screw on one of the horns. The other horn can now be slid in its clamp to facilitate gap adjustment relative to the other horn.**
- **Using the graph as a guide and from the approximate length of your antenna (including the length of feeder from the ATU) and the lowest frequency used, determine the likely maximum base voltage.**
- **Preset the horn gap to approximately 0.5mm (0.020in) per kV of calculated base voltage. The use of feeler gauges will assist here.**
- **Tune the system (transmitter and ATU) to the lowest frequency used. This ensures maximum transmit voltage is being applied across the horn gap. Use low power if possible. Increase transmitter power to maximum whilst observing the horn gap and the VSWR.**
- **If arcing effects are visible or tuning (ATU) needs to be varied, turn off the transmitter and increase the gap. Repeat until no arcing effects are observed at maximum power. (Arcing effects will show as a sudden change in VSWR as the horn gap is ionised and breakdown occurs.)**
- **Replace the cover after ensuring that the sealing gasket is seated correctly.**