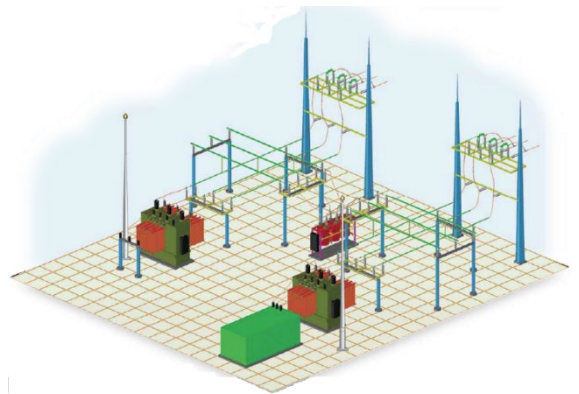


TECHNICAL DATA SHEET

LPI[®] Guardian Plus Protection Solution for HV Power Facilities and Slender Structures



- Placement of the Guardian Plus Air Terminals uses a methodology based on the Leader Inception Theory per IEEE Std. 998
- Family of Stainless Steel Air Terminals
- Easy to Install
- Manufactured to a Design Achieving Compliance with IEC 62651-2
- Cost Effective Lightning Protection
- Site Specific Design Calculation Customised to Suit Individual Projects
- For connection to HVSC Plus or 2 inch GI pipe
- See Page 2 for Market-Leading Advantages



TECHNICAL DATA SHEET

Market Leading Advantages

LPI's award-winning families of enhanced air terminals have the following key characteristics:

- First company to introduce corona minimising terminals with optimized blunt design and four independent panels;
- Extensive field experience with more than 50,000 installations over 15+ years in more than 75 countries around the world;
- Air terminal families designed to meet direct-strike placement methodologies in compliance with various international standards; and
- Proven technology based on international research findings, modelling and field testing.

Lightning Protection International Pty Ltd (LPI) was established by its principals in 2002 on the back of decades of experience in the lightning protection industry worldwide.

Recognising the need for reliable air terminals and having innovation as a core value of the company, LPI released its first range of air terminals based on a "blunt" configuration with an overall geometric design for reducing corona formation during the pre-stroke phase of a thunderstorm.

The detrimental effect of excessive pre-stroke corona space charge was first postulated by Prof. C. Moore et al in the USA in the 1990s. The theory was backed by the world's most extensive field experiment of its kind on a high mountain in New Mexico. His experiment has been running for more than 20 years and has proven conclusively that blunt air terminals are more effective at lightning capture than the original sharp rods proposed by Benjamin Franklin in the mid-1700s.

LPI was the first company in the world to release a "family" of air terminal with blunt tips and the corona-reduction concept flowing from the New Mexico experiments. All the LPI air terminal families are comprised of three sizes (small, medium and large), wherein installation of any particular size of air terminal is dictated by the height of installation.

LPI has received numerous export awards over the last 15 years for the air terminal design, including a "High Commendation" at the Australian Engineering Excellence Awards night in 2016. LPI's air terminals have had more than 15 years of proven experience in regions of the world with the highest lightning activity. More than 50,000 air terminals have now been installed. They protect a wide range of structures and facilities across all types of industries in more than 75 countries around the world.

Pre-stroke corona reduction, corona-streamer initiation and the launch of an upward leader that continuously propagates to intercept the lightning downward leader has been the major theme behind all LPI's research and development initiatives in air terminal technology. LPI air terminals also have other unique features. Such as four independent panels comprising the main body around the blunt central rod and use of materials that can withstand the harsh electrical and atmospheric environments to which the air terminals are subjected year after year.

LPI is one of very few companies in the world to offer different direct-strike placement methodologies for air terminals in compliance with various international standards.

The corona-reduction concept is now widely accepted in the lightning protection industry, as evidenced by recent publication of papers on this topic in prestigious journals by some of the world's leading lightning scientists, such as Prof. V. Cooray from Uppsala University.

TECHNICAL DATA SHEET

Placement Methodology (Software)

Optimisation of the hardware is one step in a two-step process. The correct placement of the air terminal on a structure or within a facility is also very important. Hence, a customised design is a crucial step in providing effective lightning protection.

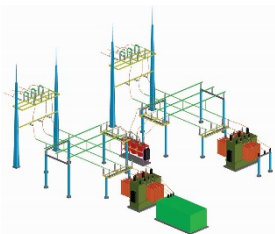
The placement of the GPLUS air terminal range on structures and around facilities is achieved via the Standards-compliant “leader inception theory” published in IEEE Std. 998 and other international codes. In brief, the steps required to obtain capture areas and volumes according to this method involve the computation of:

- (a) Geometric factor R (induced voltage component due to the physical geometry of the problem being solved);
- (b) Leader inception proximity factor (which quantifies the “suppressing influence” of the structure on which a protective air termination is installed);
- (c) Space potential proximity factor (ratio of space potential at the air terminal tip position to that which would have existed in the absence of the structure); and
- (d) Critical ambient electric field required to initiate and sustain the continuous upward leader.

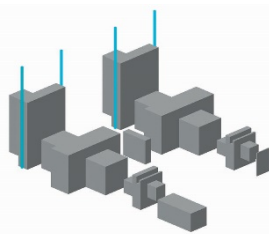
LPI’s in-house software (LITCalc) has been developed using a world-first three-step approach to identifying areas around the structure or facility where the strike probability exceeds a minimum level and treating those areas appropriately. The computational stages implemented are:

- (i) Identification of likely strike points on a structure using the rolling sphere method per IEC 62305-3 for a range of stroke currents per lightning statistics as published in IEC 62305-1;
- (ii) Computation of the capture areas and volumes of those likely strike points on a structure in accordance with the leader inception theory published in IEEE Std. 998; and
- (iii) Placement of air terminals on the structure at those locations and computations of the capture areas and volumes of the air terminals in accordance with the leader inception theory published in IEEE Std. 998.

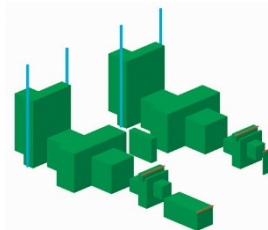
The LITCalc software is implemented within the latest AutoCad environment, enabling streamlined and efficient exchange of drawings with the customer.



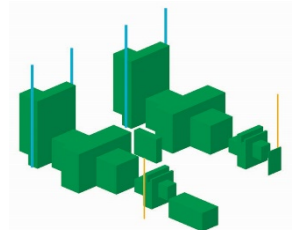
Case Study: 69 kV substation in IEEE Std. 998.



Step 1: Simplify the equipment and buses.



Step 2: Perform strike probability analysis (SPA) utilising a dynamic EGM and published lightning stroke statistics.



Step 3: Position air terminals in optimum locations based on the SPA and attractive radius calculations in accordance with LIT.

TECHNICAL DATA SHEET

Air Terminal (Hardware)

The new Guardian Plus™ (GPLUS) air terminal range has been developed after taking into account the latest international research into the effect of space charge and air terminal geometry, characteristics of long sparks, lightning characteristics and statistics, and the lightning attachment process itself.

The design of the GPLUS was based on detailed modelling and calculations geared towards achieving optimum corona performance in the quasi-static phase of a thunderstorm. Some of the key technical factors considered in the optimised design included the:

- * Dome size (there are three sizes to cater for all practical installation scenarios);
- * Tip radius of curvature and tip protrusion (optimised to minimise corona discharge);
- * Materials (robust, long-lasting yet cost-effective options).

Furthermore, under the dynamic phase of lightning, i.e., during the descent of the downward leader, the response of the air terminal to the rapidly-escalating electric field is achieved via capacitive coupling to four independent panels on the air terminal, leading to a triggering spark that changes the spatial electric field as part of the leader initiation process.

Final optimisation of the GPLUS corona performance and upward leader initiation under dynamic electric fields was achieved via extensive testing at a state-of-the-art high-voltage test laboratory, namely the National Engineering Laboratory for Ultra High Voltage Technology (NELUHVT) located near Kunming in China. The NELUHVT is an outdoor facility and hence the air terminals were not only tested under different electrical conditions but also a range of environmental effects.



TECHNICAL DATA SHEET

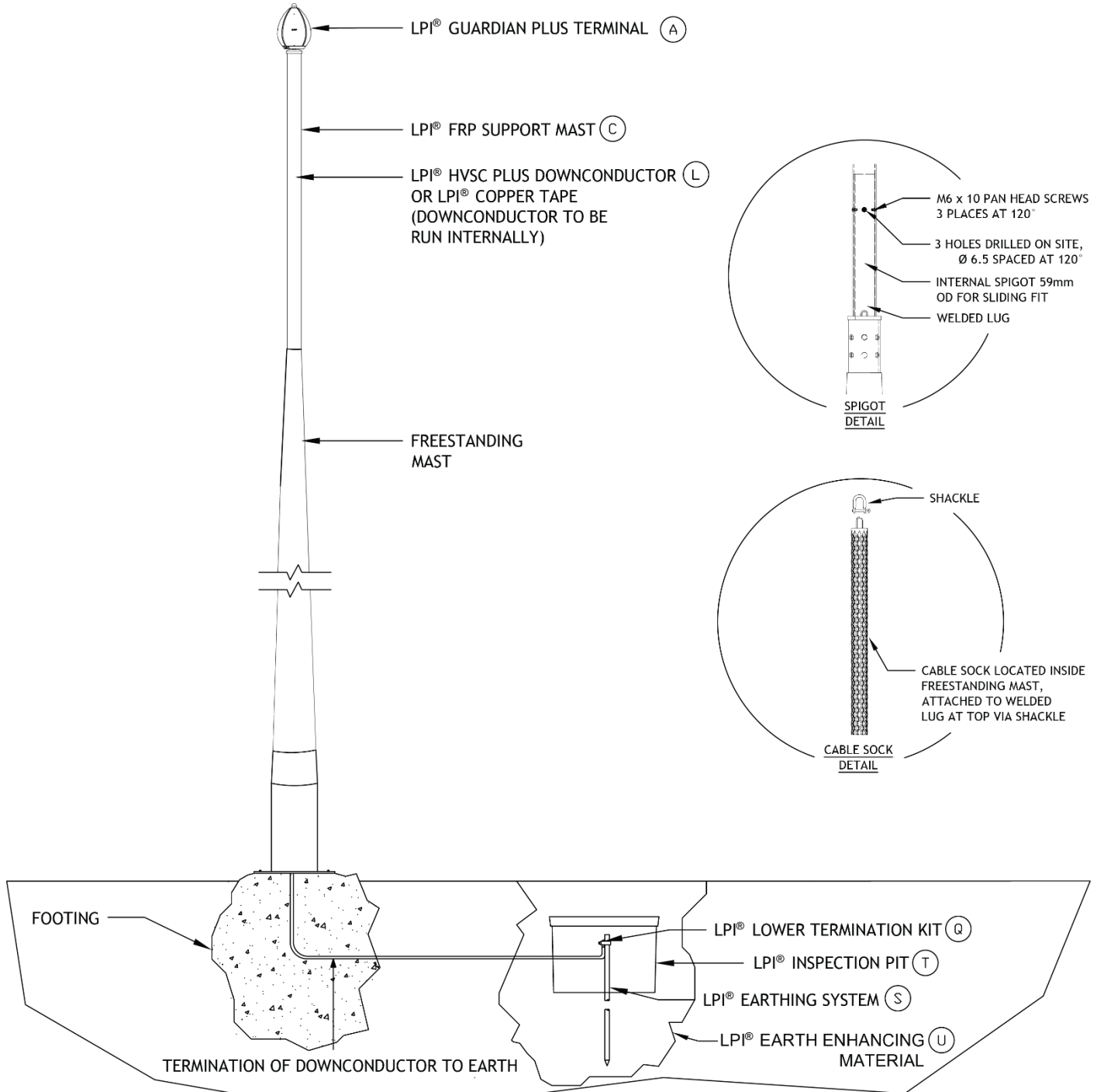
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TECHNICAL DATA SHEET

Installation Type 1

Freestanding mast arrangement typically used to protect substation.
Guardian Plus with FRP mast and HVSC Plus.

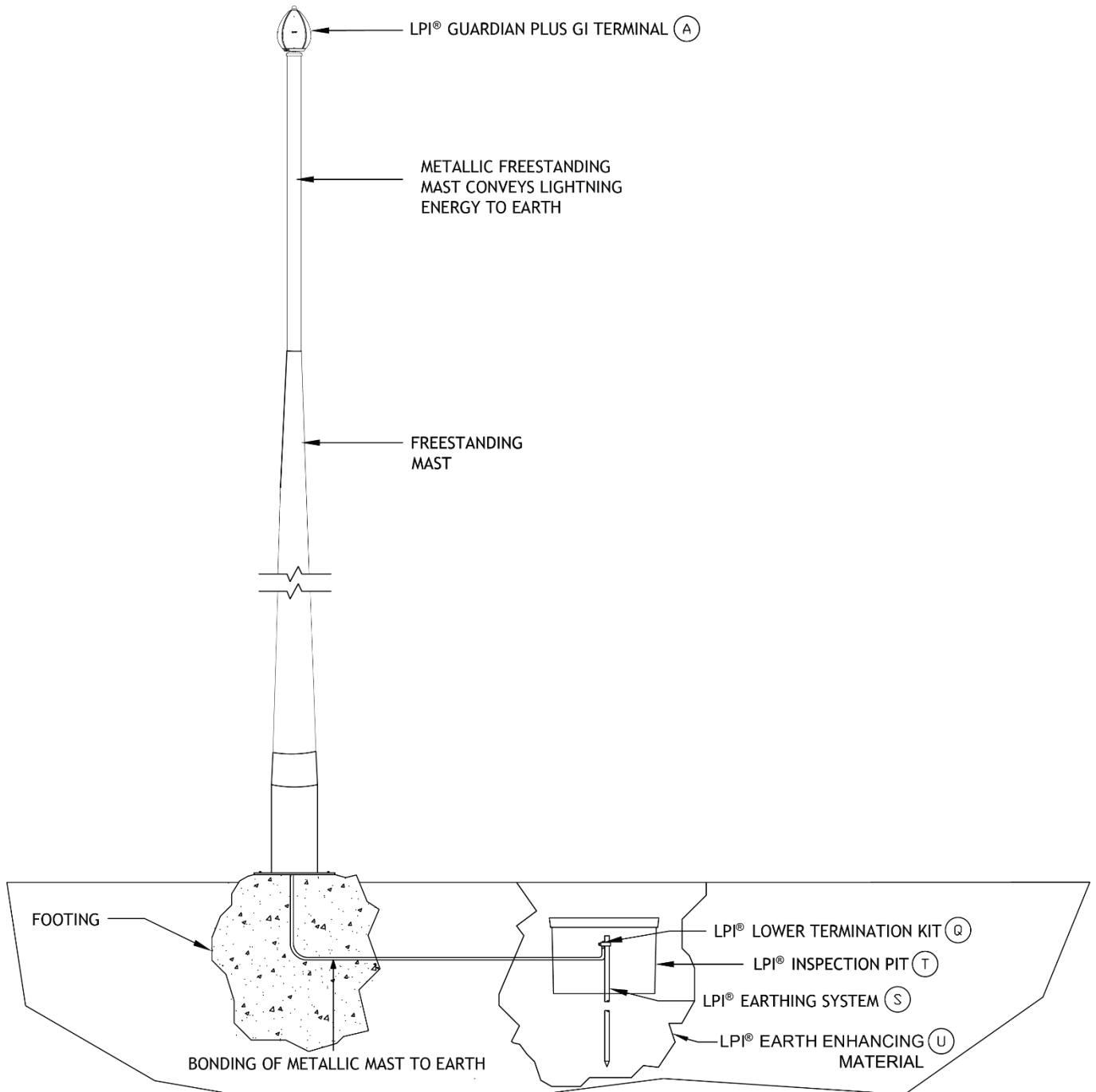


Please refer to page 28 for recommended earthing installation

TECHNICAL DATA SHEET

Installation Type 2

Freestanding mast arrangement typically used to protect substation.
Guardian Plus used in conjunction with metallic mast as downconductor.

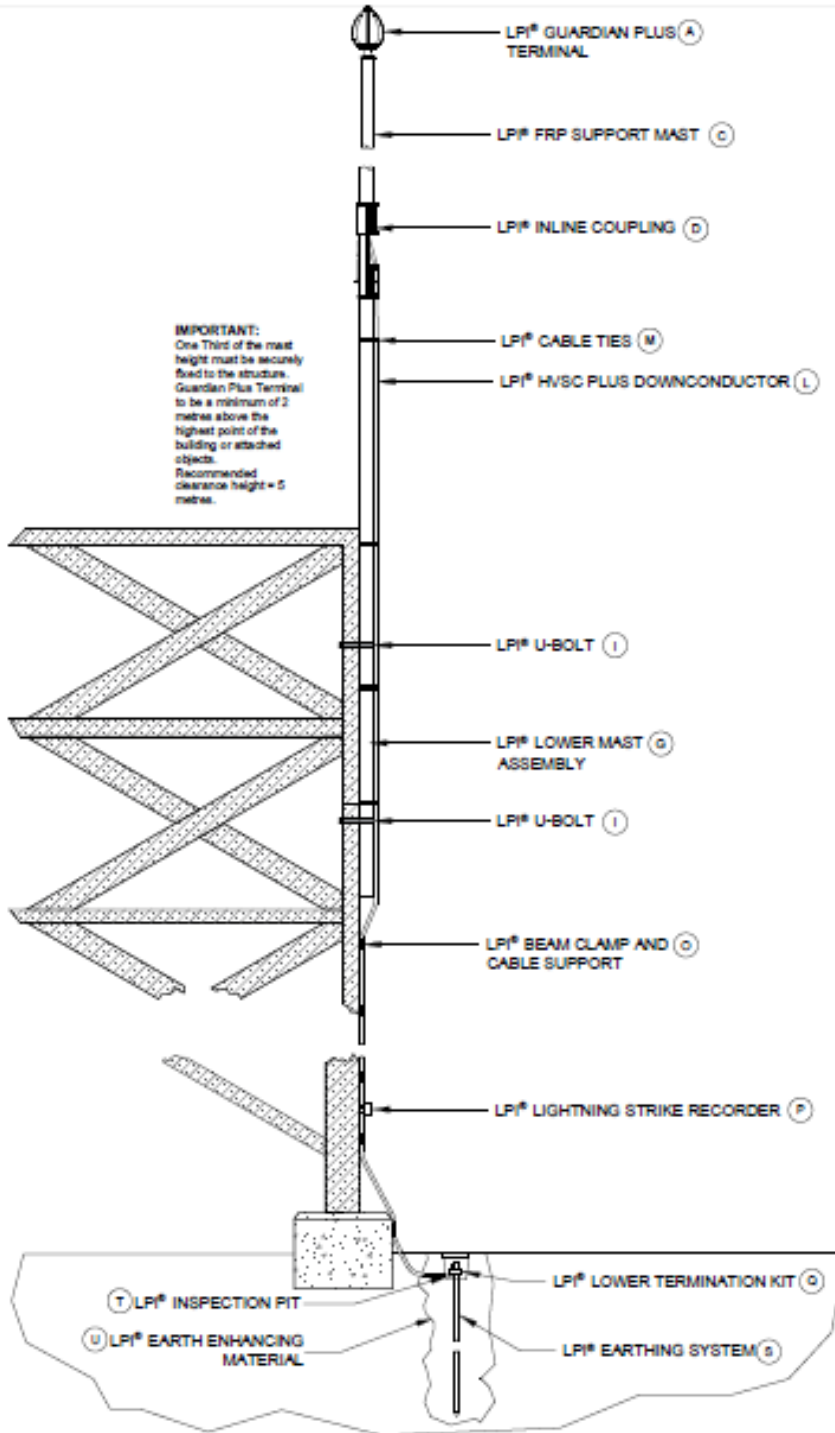


Please refer to page 28 for recommended earthing installation

TECHNICAL DATA SHEET

Installation Type 3

Cantilevered arrangement typically used on gantry within substation.
Guardian Plus and HVSC Plus.

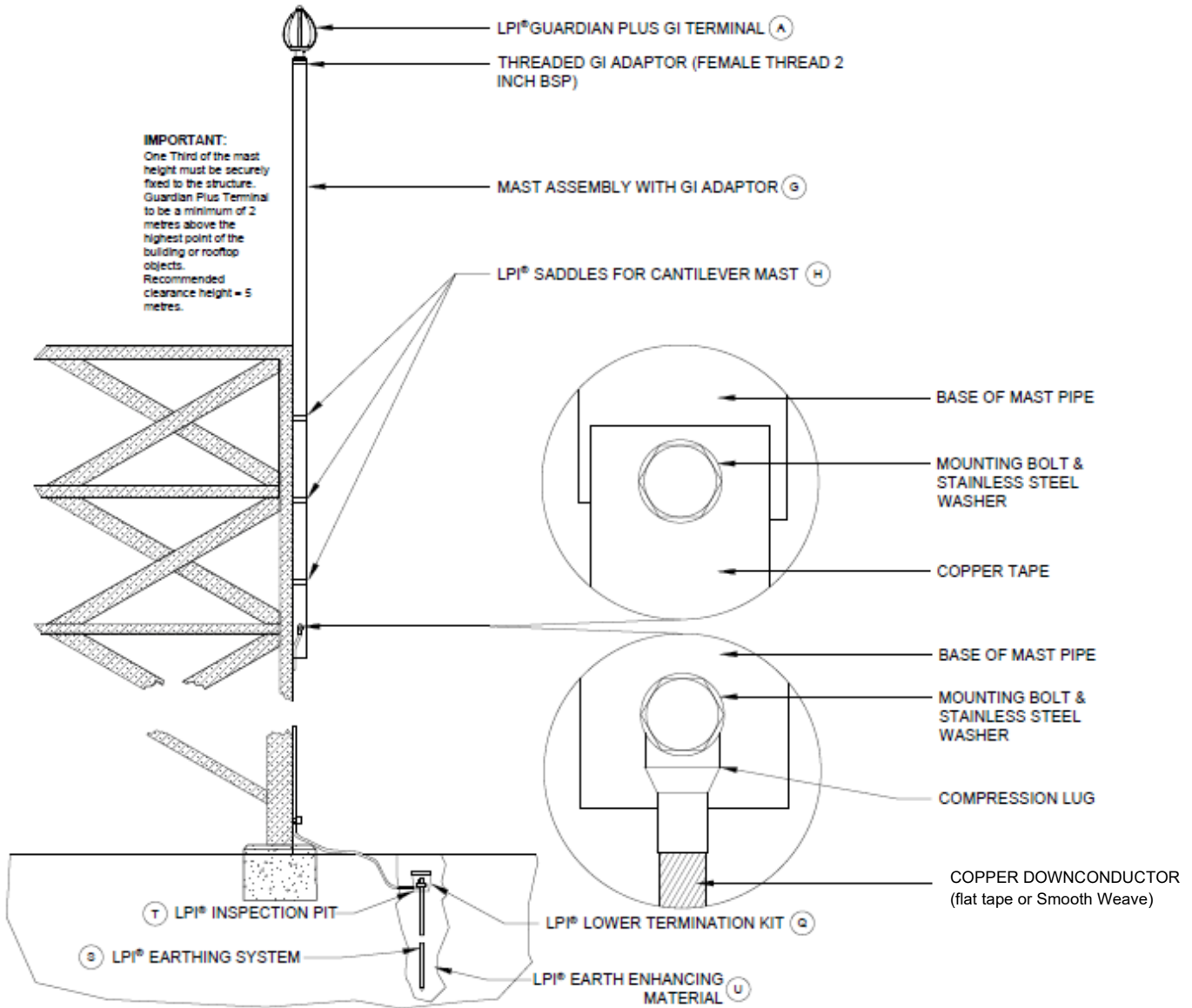


Please refer to page 28 for recommended earthing installation

TECHNICAL DATA SHEET

Installation Type 4

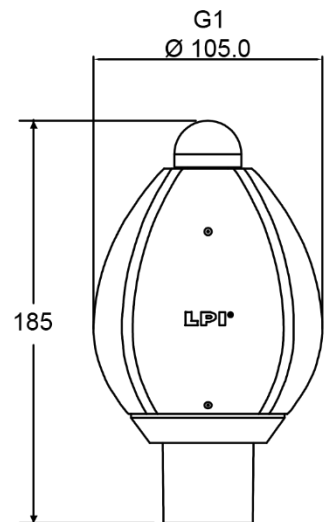
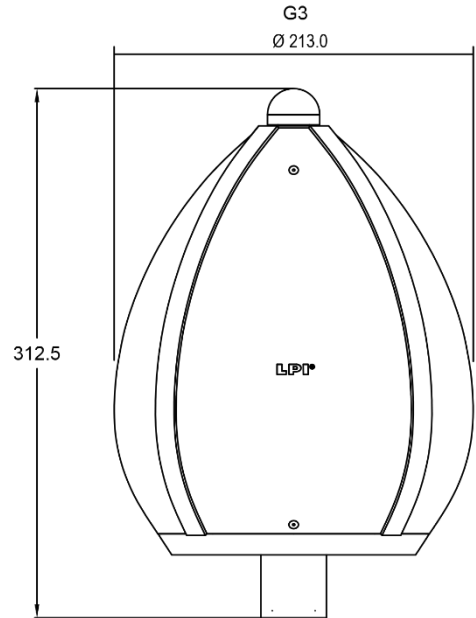
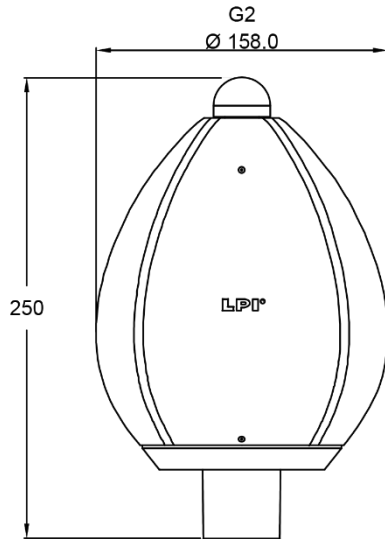
Cantilevered arrangement typically used on gantry within substation.
Guardian Plus and conventional downconductor.



Please refer to page 28 for recommended earthing installation

TECHNICAL DATA SHEET

Section A - LPI[®] Guardian Plus Terminals



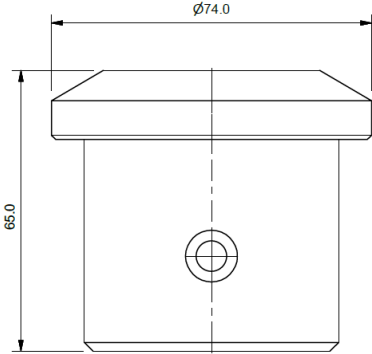
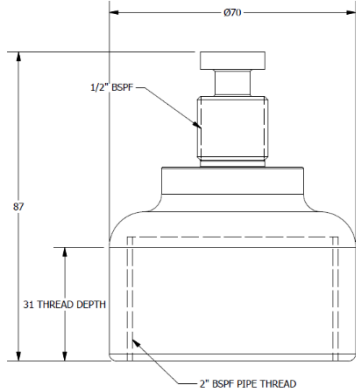
ORDERING CODE	MATERIAL	WEIGHT (KG)	COLOUR	INSULATION MATERIAL
GPLUS-1SS	Stainless steel 316	0.665	Silver	UV rated evoprene
GPLUS-2SS	Stainless steel 316	1.172	Silver	UV rated evoprene
GPLUS-3SS	Stainless steel 316	1.993	Silver	UV rated evoprene

- * For connection to 2" GI Pipe add "CM" to end of ordering code
- * For use with FRP Mast & HVSC Plus add "IM" to end of ordering code
- * For Supply without base add WO to end of ordering code


All dimensions are given in mm UNO

TECHNICAL DATA SHEET

LPI® Guardian Plus Terminals

Standard Adaptor	GI Adaptor
<ul style="list-style-type: none"> For use with FRP mast & HVSC Plus downconductor Lug Connection to HVSC Plus completed with upper termination Weight: 0.22 kg 	<ul style="list-style-type: none"> Threaded GI adaptor Female thread 2 inch BSP for connection to GI pipe Weight: 0.02 kg 

Guardian Plus Tester

	<ul style="list-style-type: none"> Spark-over tester designed for testing the Guardian Plus range of terminals Portable tester Visual identification of terminal operation Rechargeable batteries
Ordering Code	AIR TERMINAL TESTER
Description:	LPI® Guardian Plus terminal tester
Construction:	Plastic enclosure
Charger operating voltage:	100 – 240 V
Batteries:	4 x 1.2 V rechargeable NiCad batteries
Dimension:	115 mm x 90 mm x 55 mm
Weight:	0.437 kg



TECHNICAL DATA SHEET

Section B - LPI® Upper Termination Kit

LPI® Upper termination kit is designed for use with the LPI HVSC Plus downconductor. The upper termination kit provides all accessories for the high voltage termination of the HVSC Plus downconductor to the Guardian Plus terminal.



Ordering Code	UTERMKIT-MK3
Description:	Upper Termination Kit Mark 3
Maximum voltage:	>500 kV 1.2/50 µs impulse
Operating temperatures:	- 20°C to + 85°C
Pack dimensions:	70 mm x 70 mm x 1250 mm
Weight:	1 kg
Contents:	Instruction, Semi-conducting tape, crimp lug, heat shrink tube, insulated friction cutting tool, insulation tape

Section C - LPI® FRP Support Mast

LPI® Fibreglass Reinforced Plastic (FRP) mast is an insulated and water resistant mounting pole which is designed to provide the necessary electrical isolation and mounting strength at the position where the high voltage upper termination between the HVSC Plus downconductor and LPI Guardian Plus terminal is completed.



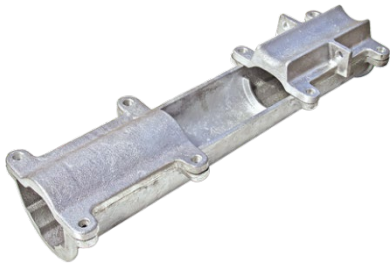
Description	Fibreglass Reinforced Pole (FRP)
Colour:	Black
Material :	Fibreglass
Construction type:	Pre-impregnated reinforced epoxy resin laminate (flame retardant)
Resin tensile strength:	70 MPa
Resin tensile modulus:	2.9 GPa
Resin tensile strain:	2.7%
Resin poisson ratio:	0.35

Ordering Code	Weight	Dimensions
FRP-2M	2.7 kg	Length 2000 mm, Outer diameter 68 mm, Inner diameter 60 mm
FRP-3M	4.3 kg	Length 3000 mm, Outer diameter 68 mm, Inner diameter 60 mm
FRP-4M	5.3 kg	Length 4000 mm, Outer diameter 68 mm, Inner diameter 60 mm

TECHNICAL DATA SHEET

Section D - LPI® Inline Coupling

LPI® Inline coupling is a purpose-designed coupling which enables clamping of the FRP mast to the aluminium lower mast. The inline coupling provides 3 guy anchoring points and provides an exit point for the HVSC Plus.



Ordering code	ILCOUPLING
Description:	Inline coupling
Material:	Cast aluminium
Dimension:	550 mm x 150 mm x 120 mm
Weight:	2.7 kg
Anchoring points:	3
Max. clamping torque:	55 kg/cm

Section E - LPI® Guy Kit

LPI® non-conductive and stainless steel guy kits are provided in variable lengths to suit specific mast and terminal heights. The purpose designed guying kits are designed for anchoring from a guy ring or an inline coupling.



Ordering Code	GUYKIT-7M
Description:	Stainless steel fittings and non conductive synthetic guy wire kits
Material:	DYNEEMA® is an UHMWPE* fibre, non conductive, UV stabilised, moisture resistant, chemical inert
Application:	Designed to provide additional stabilizing/securing of mast arrangement where deemed necessary
Diameter:	4 mm
Tensile yield strength:	560 kg
Weight:	0.53 kg

*UHMWPE – Ultra-High Molecular Weight Polythene



Ordering Code	GUYKIT-4M-SS	GUYKIT-7M-SS
Description:	Stainless steel guy wire kits	
Material:	Stainless steel, grade 316	
Application:	Designed to provide additional stabilizing/securing of mast arrangement from the inline coupling only	
Diameter:	3.2 mm	
Tensile yield strength:	450 kg	
Weight:	0.8 kg	1.2 kg

Stainless steel guy kits are not to be used at top section of mast or with guy ring and should be anchored from the inline coupling.

TECHNICAL DATA SHEET

Section F - LPI® Guy Ring

LPI® guy ring provides 3 guy points for mounting between the top section of the FRP mast and the Guardian Plus terminal.



Ordering Code	Guy Ring
Material:	Cast aluminium
Dimension:	110 mm x 110 mm x 10 mm
Weight:	0.12 kg
Guy hole diameter:	10 mm

Section G - LPI® Lower Mast Assembly

LPI® uses an aluminium mast as the lower mast assembly due to its high strength and light weight characteristics.



Description	Aluminium Mast
Colour:	Silver
Material:	Aluminium
Inside diameter:	51.2 mm
Outside diameter:	63.5 mm

Length	3 Metres	4 Metres	5 Metres	6 Metres
Weight:	9 kg, 10.5 kg (with base)	12 kg, 13.5 kg (with base)	15 kg, 16.5 kg (with base)	18 kg, 19.5 kg (with base)
No base:	ALUM-3M	ALUM-4M	ALUM-5M	ALUM-6M
With base:	ALUMB-3M	ALUMB-4M	ALUMB-5M	ALUMB-6M
With GI male adaptor:	ALUM3M-MGI	ALUMB4M-MGI	ALUMB5M-MGI	ALUMB6M-MGI

LPI® Guardian Plus GI terminals suitable for use with locally supplied 2" male threaded GI pipe.

TECHNICAL DATA SHEET

Section H - LPI[®] Cantilevering Saddles

Purpose designed stainless steel saddles for cantilevering the aluminium mast of 69.9 mm outer diameter to flat vertical surface.



Ordering Code	CANTSAD
Description:	63.5 mm saddles for mounting of aluminium mast (3 per set)
Material:	Stainless steel
Weight:	180 g per saddle, 540 g per set
Dimension:	130 mm (L) x 70 mm (W) x 1.2 mm (D)
Hole fixing diameter:	8 mm

Section I - LPI[®] U-Bolt

LPI[®] U-Bolt set is specifically designed to allow for the secure clamping of aluminium or FRP mast to tower section or handle rail.



Ordering Code	U-Bolt
Description:	U-Bolt, 2 per set
Material:	U-Bolt: stainless steel, Plate: aluminium
Weight:	0.75 kg per U-Bolt, 1.5 kg per set
Dimension:	80 mm diameter, 170 mm length

Section J - LPI[®] Mounting Bracket

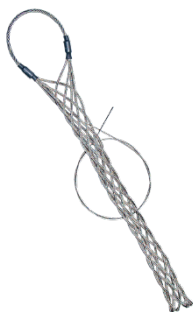
LPI[®] Offset brackets are designed for the offset cantilevering of aluminium support masts.



Ordering Code	Mounting Bracket
Description:	Offset bracket
Colour:	Silver
Material:	Stainless steel, 316
Nominal clamping OD:	70 mm
Weight	1 kg

Section K - LPI[®] Cable Sock

LPI[®] Cable sock is designed for the mounting support of the HVSC Plus downconductor when installing a free standing mast arrangement.



Ordering Code	Cable Sock
Description:	Cable sock for HVSC Plus support
Material:	Two-ply galvanised steel wire strand
To grip cable diameter:	28-40 mm
Grip length:	600 mm
Max. pull approx, (kn)	24

TECHNICAL DATA SHEET

Section L – Downconductors

LPI[®] High Voltage Shielded Cable



Withstand Voltage of $\geq 500kV!$

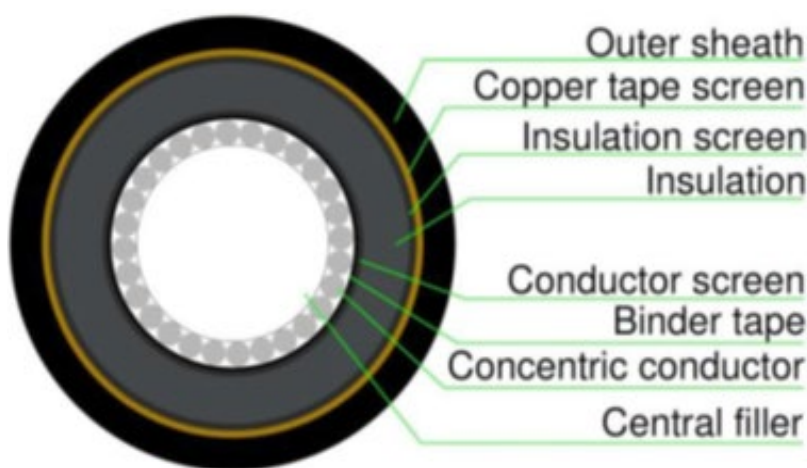
LPI’s “High Voltage Shielded Cable” (HVSC Plus) is a purpose-designed, high-integrity, low-impedance cable that is used to safely convey lightning currents to earth with minimal risk of side flashing or structure electrification. The design of the HVSC Plus incorporates carefully selected dielectric components to ensure optimum performance under the impulse or “transient” voltages and currents imposed by lightning discharges.

LPI’s new HVSC Plus provides improved features as a dedicated insulated lightning downconductor:

- Double the voltage withstand performance of past versions;
- 35% reduction in the mass per unit length of the cable;
- Improved manufacturing consistency via a continuous “triple extrusion” process;
- Reduced voltage stress via thin, semi-conductive screen layers; and
- Improved material parameters and performance.

The design of the cable is based on the optimisation of all of the key parameters associated with dealing with lightning discharges and the consequent voltage and current transients, including impedance, inductance, capacitance, insulation thickness (withstand voltage) and all of the relevant lightning statistics, plus practical aspects such as size, flexibility and mass.

Figure 1: Construction of the HVSC Plus lightning downconductor cable.



HVSC Plus has been tested by a certified, independent high voltage laboratory located at Monash University, Australia.

Product Ordering Code: HVSCPLUS-PM or HVSCPLUS-500

TECHNICAL DATA SHEET

Physical Specifications of HVSC Plus:

Mass per unit length	1.34 kg/m
Construction	Triple extruded
Concentric conductor material	Aluminium
Concentric conductor XSA	≥ 50 mm ²
Insulation	5 mm (nominal) of XLPE
Metallic screen	Copper tape
Outer sheath	3 mm (nominal) of PVC, UV Stabalised
Cable diameter	36 mm
Min. bending radius <i>before</i> installation	430 mm
Min. bending radius <i>after</i> installation	358 mm

Electrical Specifications of HVSC Plus:

Conductor DC resistance @ 20°C	0.641 Ω/km
Conductor DC resistance @ 90°C	0.821 Ω/km
Insulation resistance @ 20°C	5000 MΩ
Inductance	93 nH/m
Capacitance	285 pF/m
Impedance	18 Ω
Withstand voltage (1.2/50 μs impulse)	≥ 500 kV

TECHNICAL DATA SHEET

LPI® Aluminium Tape



Ordering Code	FL6T253A
Description:	Aluminium tape 25 x 3 mm (soft drawn)
Material:	Aluminium
Dimension:	25.00 mm (Width) x 3.00 mm (Thickness)
Weight:	0.2 kg per metre
Electrical conductivity:	>60% I.A.C.S
Package:	Supplied in pancake coil form (50 m per coil)

IEC 62561-2 has a requirement for copper and aluminium downconductors to have a cross-sectional area of 50 mm².

LPI® Stranded and Smooth Weave Copper Conductors

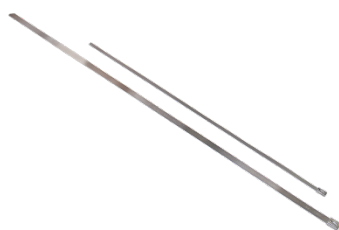
LPI® soft drawn stranded and Smooth Weave copper conductors are ideal for use as a conventional means of conveying lightning energy to ground. Manufactured in compliance with various standards, including BS6360, IEC 62561-2, IEC 62305, AS 1768 and UL96. Smooth Weave also available in Aluminium 50 mm² (BWAC50).



Ordering Code	SCC70	BWCC35
Description:	Stranded copper, 70 mm ²	Smooth Weave Copper, 35 mm ²
Material:	Copper	Bare or tinned copper
Strand diameter:	2.14 mm	1.15 mm
No. of strands:	19	34
Weight:	0.62 kg per metre	0.33 kg per metre

Section M - LPI® Cable Ties

LPI® Cable ties are designed for securing the HVSC Plus downconductor to structures and mast assembly.



Ordering Code	SS-CABTIES-L
Description:	Cable ties
Material:	Stainless steel
Length:	520 mm
Width:	7.9 mm
Weight:	10 g

TECHNICAL DATA SHEET

Section N - LPI® Saddles and Fixings

LPI® Saddles

LPI® SAD FIX are specially designed for securing of HVSC Plus downconductor to structures.



Ordering Code	SAD FIX
Description:	Saddles and fixings
Material:	Stainless steel, grade 304
Dimension:	90 mm Length, 1.2 mm thickness
Fixing hole diameter:	7 mm
Weight:	40 g



Ordering Code	SAD FIX-70
Description:	Saddles to suit 70 mm ² cable
Material:	Stainless steel, grade 316
Dimension:	44 mm Length, 1 mm thickness
Fixing hole diameter:	7 mm
Weight:	5 g

LPI® D.C Tape Clip

LPI® D.C Tape Clips are designed for the securing of Copper or Aluminium Tape to structures.



Ordering Code	FL3DCTC253A
Description:	D.C tape clip to suit 25 mm x 3 mm tape
Material:	High strength aluminium alloy
Conductor size:	25 x 3 mm
Weight:	17 g

TECHNICAL DATA SHEET

LPI® Square Tape Clamp

LPI® Square tape clamps are designed to allow for the 2 and 4 way routing of copper and aluminium downconductors.



Ordering Code	FL4STC253A
Description:	Square tape clamp to suit 25 mm x 3 mm tape
Material:	High strength aluminium alloy
Conductor size:	25 x 3 mm
Weight:	78 g

LPI® Oblong Test Clamp

LPI® Oblong test clamp are designed to allow for the disconnection of copper and aluminium downconductors for testing purposes.



Ordering Code	FL4OTC253A
Description:	Oblong test clamp to suit 25 mm x 3 mm tape
Material:	High strength aluminium alloy
Conductor size:	25 x 3 mm
Weight:	118 g

Section O - LPI® Beam Clamp and Cable Support

LPI® Beam clamp and cable support are specifically designed for the securing of the HVSC Plus downconductor to tower legs.



Ordering Code	BEAM CLAMP / CABLE SUPPORT - HVSC
Description:	Beam clamp and cable support
Material:	Stainless steel, polymer
Dimension:	60 mm x 60 mm x 50 mm
Fixing hole diameter:	38 mm
Weight:	180 g

TECHNICAL DATA SHEET

Section P - LPI[®] Lightning Strike Recorder

LPI[®] Lightning Strike Recorder (LSR2) is a lightning strike counter. The LSR2 is simply mounted at any location along the downconductor route. Its purpose is to record the number of strikes captured and conveyed by the downconductor.



Ordering Code	LSR2
Description:	Lightning strike recorder
Current sensitivity:	1500 A 8/20 µs impulse
Operating range:	Min. 1500 A and Max. 220 kA 8/20 µs
Display:	Mechanical 7 digits display (not re-settable).
Dimension:	100 mm (B) x 100 mm (H) x 55 mm (D)
Weight:	0.56 kg
Mounting:	Releasable UV resistant plastic cable ties suitable for up to ø40 mm cable or 50 x 5 mm flat tape
Construction:	Polycarbonate enclosure
Colour:	Light grey & blue
Environment:	IP 67 (IEC 529)
Operating temperature:	-15°C to 65°C

LPI[®] Lightning Strike Recorder Tester

LPI[®] Lightning strike recorder tester is a high-current injection device designed to trigger a reading on an LPI Lightning Strike Recorder (LSR1).



Ordering Code	LSR1-TESTER MKII
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 mm (L) x 100 mm (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:	-15°C to 65°C
Batteries:	8 x AA 2000 mAh NiMH rechargeable Recharge time up to 16 hours

TECHNICAL DATA SHEET

Section Q - LPI® Lower Termination Kit

LPI® Lower termination kit provides accessories and tools for the termination of the HVSC Plus lower end to the dedicated lightning earth.



Ordering Code	LTERMKIT-MK3
Description:	Lower termination kit
Pack Dimensions:	270 mm (B) x 100 mm (H) x 40 mm (D)
Weight:	515 g
Contents:	1 x 95 mm crimp lug 1 x waterproofing tape 1 x earth rod clamp 2 x warning labels 1 x insulation friction cutting tool

Suitable for use with conventional downconductors as required.

Section R - LPI® Denso Tape

Denso Tape is used to waterproof earthing installations and prevent corrosion.



Ordering Code	DENSO-50mm
Description:	Waterproofing tape
Material:	Synthetic fabric, impregnated and coated with a neutral petrolatum compound
Pack:	50 mm x 10m
Weight:	800 g

TECHNICAL DATA SHEET

Section S - LPI® Earthing System LPI® Copper Bonded Earth Rods

LPI® Copper-bonded earth rods are made from high-tensile low-carbon steel and each rod is manufactured by molecularly bonding 99.9% pure electrolytic copper to the low-carbon steel core in accordance with national and international standards such as BS6651, BS7430 and UL467. Threads are rolled onto the rod, ensuring an even copper covering which eliminates the risk of chipping whilst driving.



Other sized rods available.

Ordering Code	CBER1214
Description:	Threaded copper bonded earth rod
Material:	Carbon steel bonded with copper
Length:	1.2 m
Rod diameter (actual):	14.3 mm
Threaded diameter:	5/8" UNC
Weight:	1.54 kg

LPI® Stainless Steel Earth Rods

LPI® Solid stainless steel earth rods are manufactured using 316 grade stainless steel and are highly resistant to corrosion. Stainless steel rods are best used for earthing installations where the problem of galvanic corrosion may take place between dissimilar metals buried in close proximity to each other and where highly corrosive soil conditions exist. All solid stainless steel earth rods manufactured by LPI are supplied with external threads.



Other sized rods available.

Ordering Code	SSER1215
Description:	Threaded stainless steel earth rod
Material:	316 grade stainless steel
Length:	1.2 m
Rod Diameter (Actual):	15.8 mm
Threaded Diameter:	5/8" UNC
Weight:	1.90 kg

LPI® Coupling for Copper Bonded and Stainless Steel Threaded Earth Rods

Whether connecting rod-to-rod or driving stud-to-rod the high strength copper alloy coupling is counter-bored to protect the earth threads from damage and subsequent corrosion.



Ordering Code	LEH-58R	LEH-58R-SS
Description:	Coupling for threaded Copper bonded earth rod 5/8"	Coupling for threaded Stainless steel earth rod 5/8"
Material:	High strength copper alloy	316 stainless steel
Thread type:	5/8" UNC	
Weight:	106 g	113 g

TECHNICAL DATA SHEET

LPI® Copper Tape

LPI® 25 x 3 mm soft drawn copper tape is manufactured using the latest European developed extrusion technologies. LPI® FL6T253C is a high-quality tape which provides our customers with a guaranteed copper purity of 99.95%. Flat copper tape in comparison to stranded copper cable is considered as the most efficient conductor for the transfer of lightning energy to the ground mass. Flat tape provides greater surface contact with the surrounding soil which assists greatly in the dissipation of the lightning energy.



Ordering Code	FL6T253C
Description:	Copper tape 25 x 3 mm (soft drawn)
Material:	99.95% Copper
Dimension:	25.00 mm (Width) x 3.00 mm (Thickness)
Weight:	0.67 kg per metre
Electrical conductivity:	Minimum 100% I.A.C.S
Standard:	BS1432
Tensile strength:	210 - 250 N/mm ²
Package:	Supplied in pancake coil form (50 m per coil)

LPI® Rod to Tape Clamp Type A

LPI® Rod to tape clamp provides a conductive and mechanically secure connection when installing a lightning protection earth encompassing flat copper tape and copper bonded earth rods.



Ordering Code	RTC253
Description:	Rod to tape clamp to suit 14-17 mm Dia rod & 25 x 3 mm tape
Material:	High strength copper alloy
Rod Diameter:	14-17 mm
Conductor size:	25 x 3 mm
Weight:	120 g

TECHNICAL DATA SHEET

Section T - LPI[®] Inspection Pits

LPI[®] Inspection pits provide a secure and user-friendly access point for maintenance purposes and the periodical measurement of electrical resistance of a buried earthing system. In order to complete routine measurements of electrical resistance, simply remove the lid from the installed earth pit and connect a lead from the resistance meter to the earthing conductor.



Ordering Code	EPIT-P
Description:	Polymer earth pit
Material:	Polymer
Dimension:	250 mm (top) x 180 mm (base) x 210 mm (deep)
Weight:	1.9 kg
Strength:	Withstand up to 5 tonnes

Section U - LPI[®] Earth Enhancing Compounds

LPI[®] SRIM PLUS

LPI[®] SRIMPLUS-20 is a highly conductive, cementitious earth enhancing compound which is supplied in 20kg bags. Designed for use in all soil conditions, SRIM PLUS offers an economical solution to improve and maintain the integrity of any earthing system.



Ordering Code	SRIMPLUS-20
Description:	Highly conductive, cementitious earth enhancing compound – 20 kg Bag
Application:	To lower earth electrode system resistance and impedance
Weight:	20 kg
Standard:	IEC62561-7, EPA 1311

LPI[®] RESLO

LPI[®] RESLO-20 is a low resistance, non-corrosive bentonite based earth enhancing compound which is supplied in easy to handle 20kg bags.

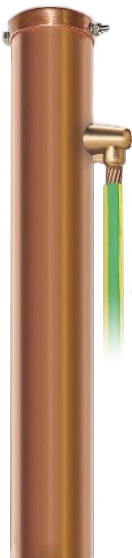


Ordering Code	RESLO-20
Description:	Bentonite-based earth enhancing compound – 20 kg Bag
Application:	To assist in achieving an earth resistance of less than 10 Ohms
Weight:	20 kg
Standard:	AS 2239. most of IEC 62561-7, EPA 1311

TECHNICAL DATA SHEET

Section V - LPI® Chemical Ground Rod

LPI® Chemical ground rod provides a low-impedance earth to effectively dissipate lightning and electrical fault currents. The chemical ground rod is ideal in situations where space is restricted and normal lightning earths such as radial and grid-type systems cannot be installed.

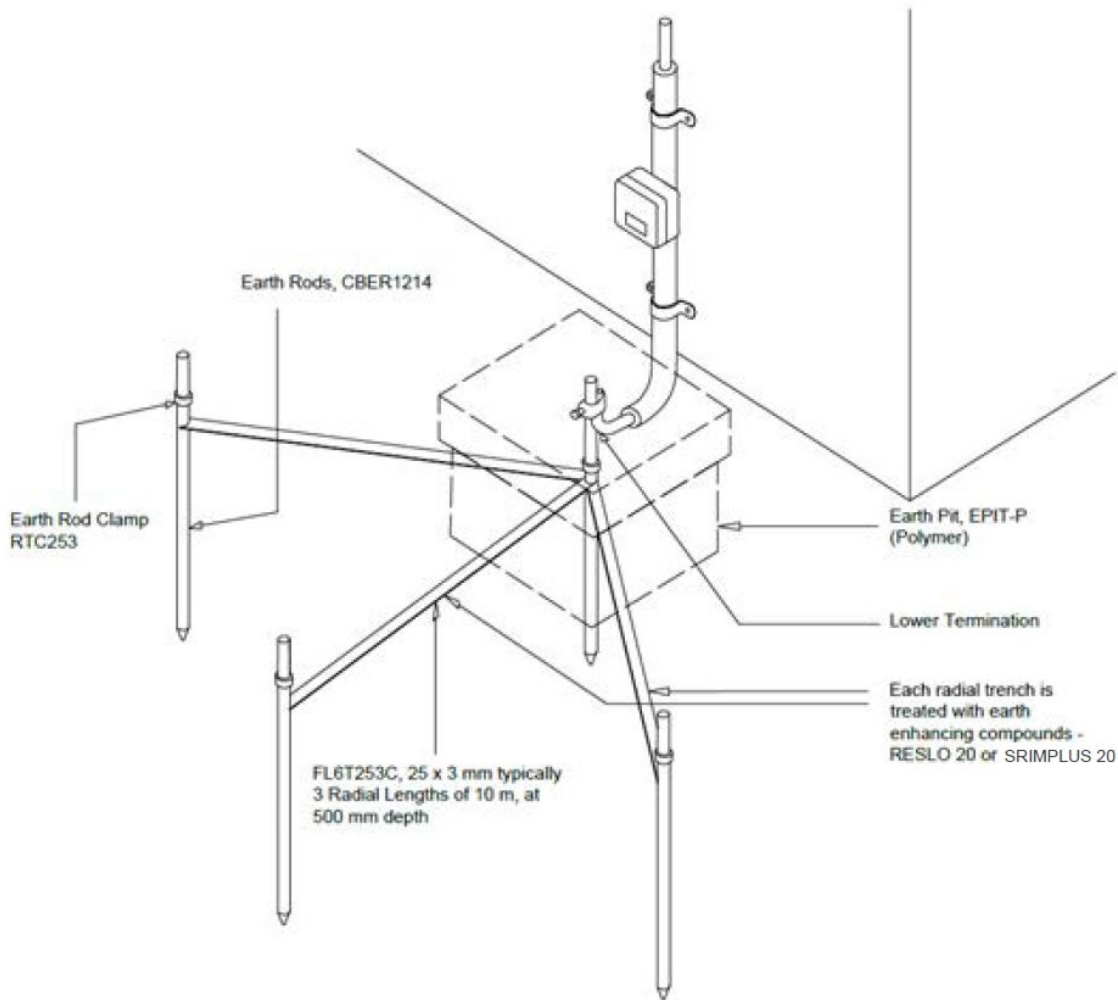


Ordering Code	CHEMROD-2M	CHEMROD-3M
Length:	2 m	3 m
Diameter:	63.5 mm	
Copper composition:	99.9% minimum	
Standard:	Australian Standard AS1432	
Melting point:	1083°C	
Specific heat capacity:	0.385 kJ (kg.K)	
Electrical conductivity (Annealed):	75-90% I.A.C.S.	
Wall thickness:	1.6 mm	
Copper:	Hard-drawn	
Cap:	Removable type with air breather holes	
Drainage holes:	4.5 mm diameter, provided every 40 cm for the length of the rod	
Mineral salts:	Pre-filled from factory with non-hazardous natural electrolytic salts	
Pigtail:	70 mm stranded copper cable, pre-welded from factory to allow for connection to earthing system	
Weight:	12 kg (CHEMROD) 40 kg (RESLO)	21 kg (CHEMROD) 60 kg (RESLO)

TECHNICAL DATA SHEET

Recommended Earthing Installation

This type of radial earth with rods is recommended for installation as a lightning protection earth.



ISO 9001 Certificate

Lightning Protection International Pty Ltd operates a certified management system that complies with the requirements of AS/NZS ISO9001:2008. ISO 9001 and ISO 14001 certified by BSI under certificate numbers FS603875, EMS641121.



Head Office	49 Patriarch Drive, Huntingfield Tasmania, Australia 7055	Phone	+ 61 3 6281 2475
Postal	PO Box 379 Kingston, Tasmania, Australia 7051	Facsimile	+ 61 3 6229 1900
Web	www.lpi.com.au	Email	info@lpi.com.au