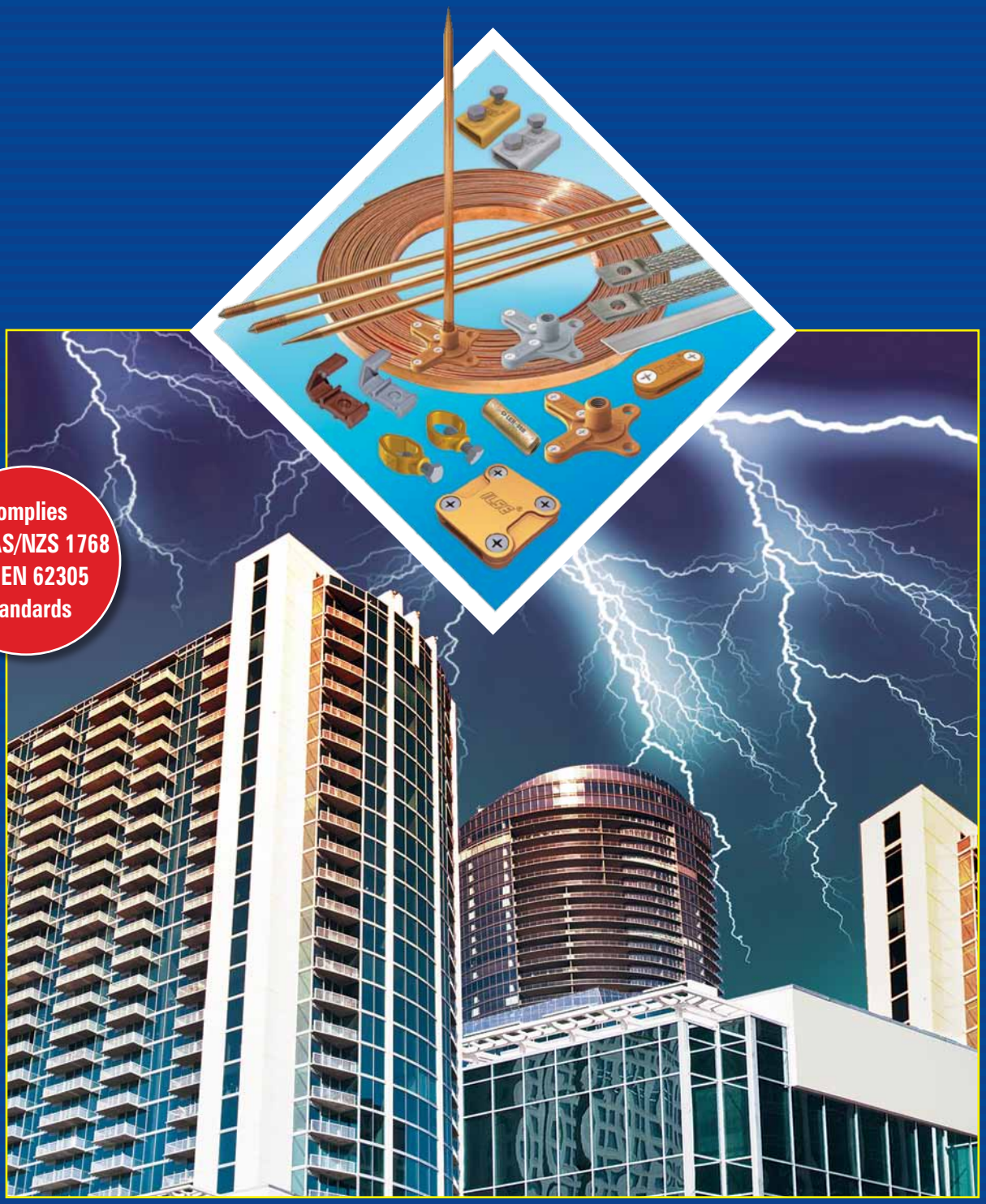


Complies with AS/NZS 1768 and EN 62305 Standards

ILSE® CONVENTIONAL
Lightning Protection System

ILSE® LIGHTNING PROTECTION INTERNATIONAL PTY LTD LPI®

Contents

EXPORT AWARD WINNER

NCS INTERNATIONAL CERTIFIED QUALITY MANAGEMENT SYSTEM ISO9001

Lightning Protection International Pty Ltd

The LPI story

Lightning Protection International Pty Ltd (LPI) is a fully Australian owned manufacturer and supplier of direct strike lightning protection, transient voltage surge suppression, and earthing / grounding solutions.

For many decades, the principals and senior management of LPI have been providing specialist lightning protection advice to customers in some of the most lightning prone areas of the world. Our personnel have extensive experience in risk management, system design, training, installation, certification, and commissioning of systems in a wide variety of industry groups including:

- Industrial Facilities
- Aviation - Civil and Military
- Petrochemical - Oil and Gas
- High-rise Buildings and Hotels
- Telecommunications and Broadcasting
- Sporting Centres, Golf Courses, Race Tracks, Stadiums
- Mining - Coal, Gold, Nickel, Iron, Copper, Bauxite etc.
- Defence - Communications, Surveillance and Ammunition Storage
- Power Generation and Distribution
- Rail and Other Transport Systems
- Monuments and Historical Sites
- Aviation - Civil and Military

LPI maintains a third party Quality Management System to ISO9001:2000. The company has been recognised within Australia for its outstanding export successes and has been awarded several prestigious export awards. Late in 2009 LPI celebrated the grand opening of its new head office, research and development and manufacturing facility in Hobart, Australia.

In 2010 LPI announced a new joint venture company – APEXLPI, China. This gave rise to the new ILSE branding for **I**nternational **L**ightning, **S**urge, and **E**arthing products, and provided increased access to the Chinese market for LPI's products and services.

A Global Company

With its head office and research facility based in Tasmania, LPI has regional offices in Western Australia, Thailand, Hong Kong, China, and Ecuador. From these offices, LPI Exports their range of products throughout the world.

LPI's Head Office, research and development and manufacturing facility located at Kingston, Tasmania, Australia.

LPI's 4-Step Approach to Facility Protection

Our aim is to provide comprehensive and effective lightning protection. LPI has identified 4 essential steps to ensure complete facility protection every time.

Introduction

LPI is pleased to launch the newly developed ILSE range of conventional lightning protection and earthing components. Carefully designed by a team of mechanical and electrical engineers in Australia, these products have been engineered to maximise versatility and appearance without compromising mechanical strength or electrical performance.

Each individual component has undergone rigorous stress analysis testing to ensure a complete system of the highest reliability. The end result is a modern looking range of compatible components with the following advantages:

- Designed to meet the requirements of EN 50164
- Complient with AS/NZS 1768 and EN 62305
- Innovative designs result in more versatile parts and lower stock holdings
- High quality casting materials provide increased strength and corrosion resistance
- Standardisation of metric threads & fasteners for greater compatibility
- Stainless steel (316 Grade) fasteners on the entire range
- Compact designs allowing lighter weight and even more competitive pricing
- Aluminium product range for even lighter weight and lower price alternative
- Innovative designs that are quicker and easier to install

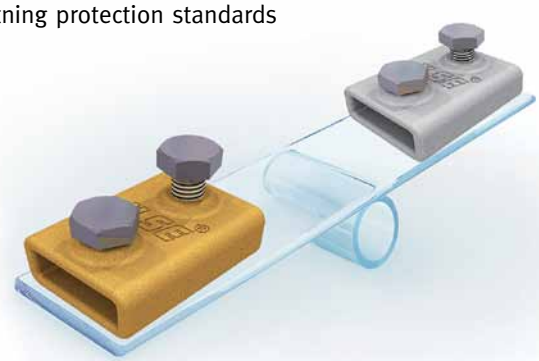
Why use Aluminium?

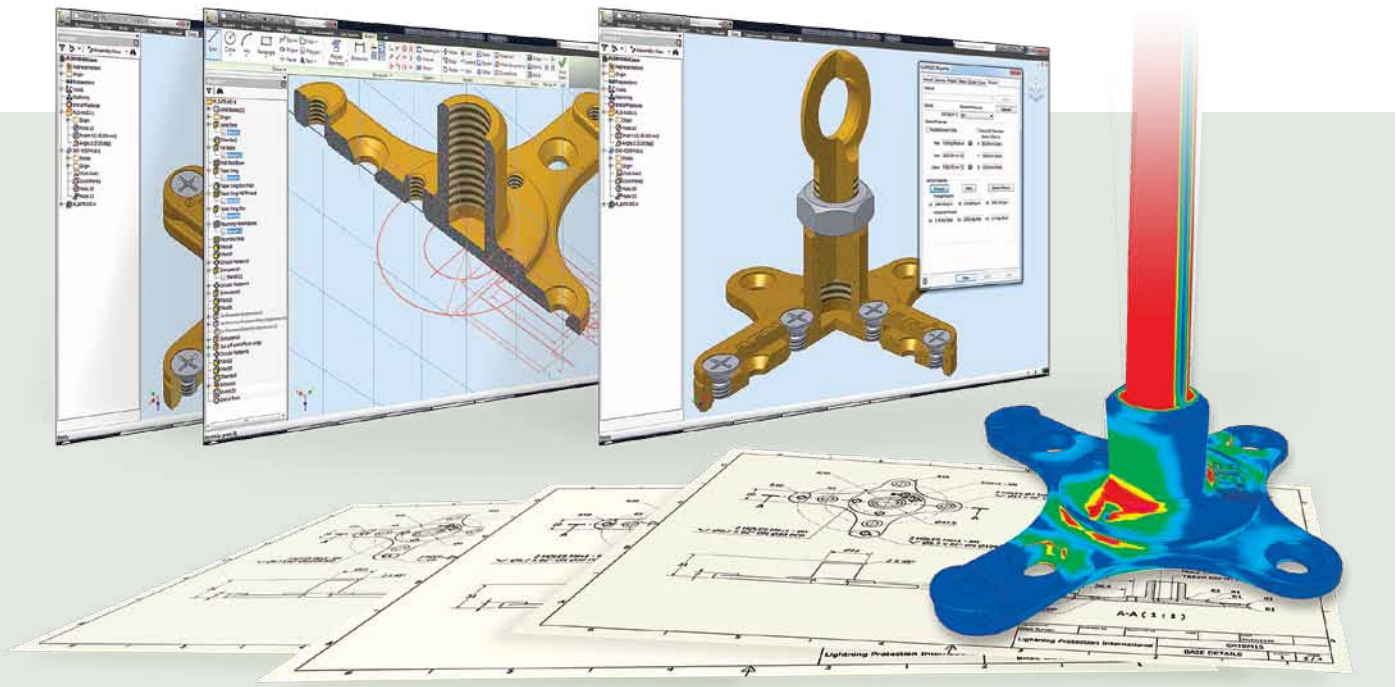
Aluminium is the most common areal conductor on the planet. It is a more cost effective material than copper, and less than 1/3 of the weight.

Aluminium is covered by all the major international lightning protection standards including EN 62305 and AS/NZS 1768. AS/NZS 1768 for example, recommends “aluminium conductors for structures where aluminium is employed externally”.

The ILSE lightweight aluminium system has the following benefits:

- Safer to manage when installing at height
- Corrosion resistant high strength aluminium alloy
- More cost effective than copper
- Lower freight cost
- Fully compliant with international lightning protection standards





Simulation stress analysis for Air Terminal Base

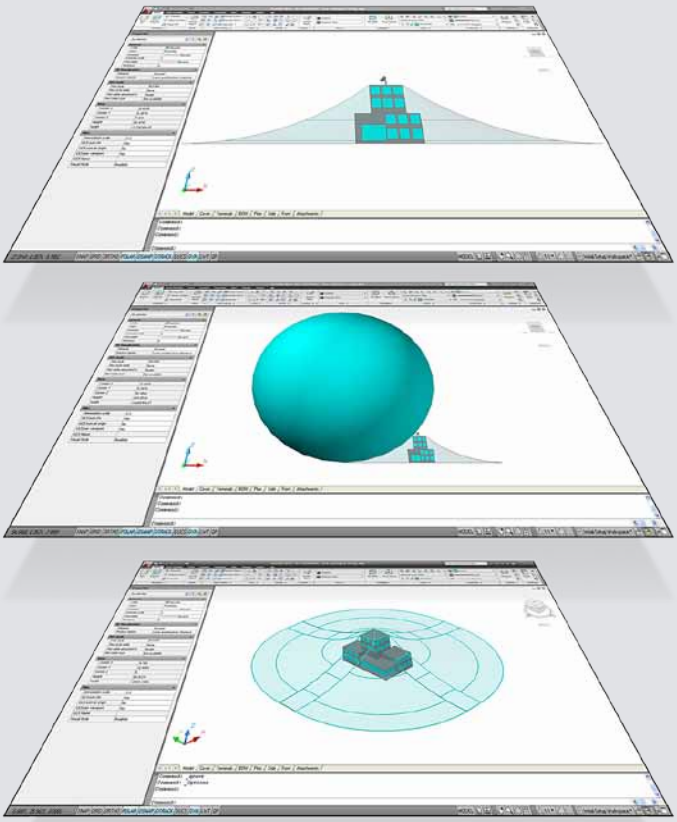
In-house Design Services

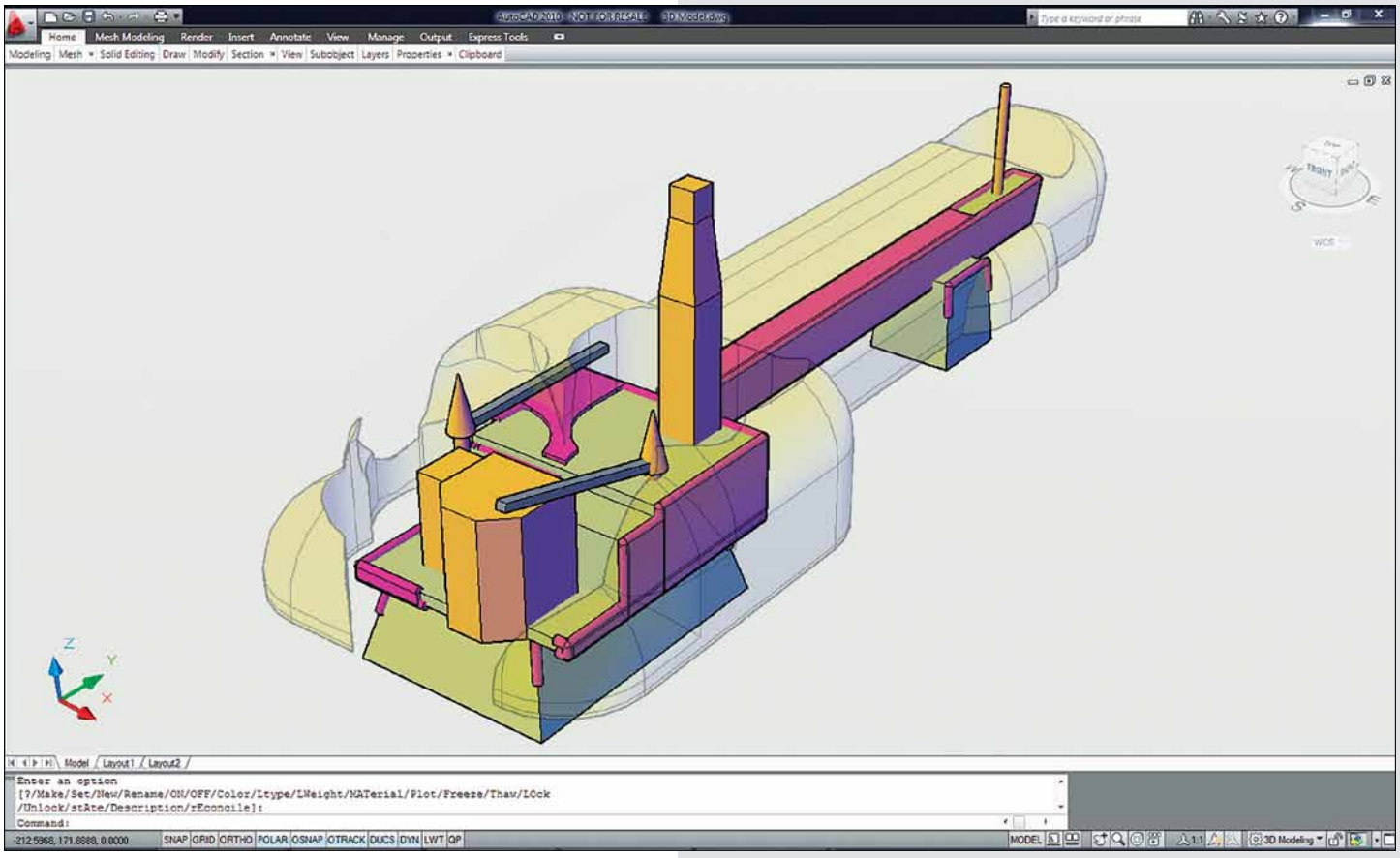
Lightning Protection International Pty Ltd offers an in-house design service producing customised direct strike lightning protection designs.

As a member of the AutoDesk Developer Network, LPI has been able to leverage the AutoCAD .NET API to create a powerful AutoCAD plugin which quickly analyses 3D solid models. This software capability allows LPI to confirm that a direct strike lightning protection design is fully compliant with the selected standard, and is able to clearly highlight any areas of a structure which may not be protected under that standard.

This software utility allows LPI to offer:

- Customised design for each project
- Full risk assessment in accordance with the relevant standard
- Accurate, efficient, and cost effective design
- Rolling sphere design compliant with AS/NZ 1768 and EN 62305
- Compliance with other international standards such as NFC 17-102
- PDF output including a 3D view of the site, bill of materials and generic specifications





Typical application of new ILSE product range

Step 1 *Definition and provision of area protection*

FL1 - Air Terminals

Refer to Page 6.

FL2 - Air Terminal Bases

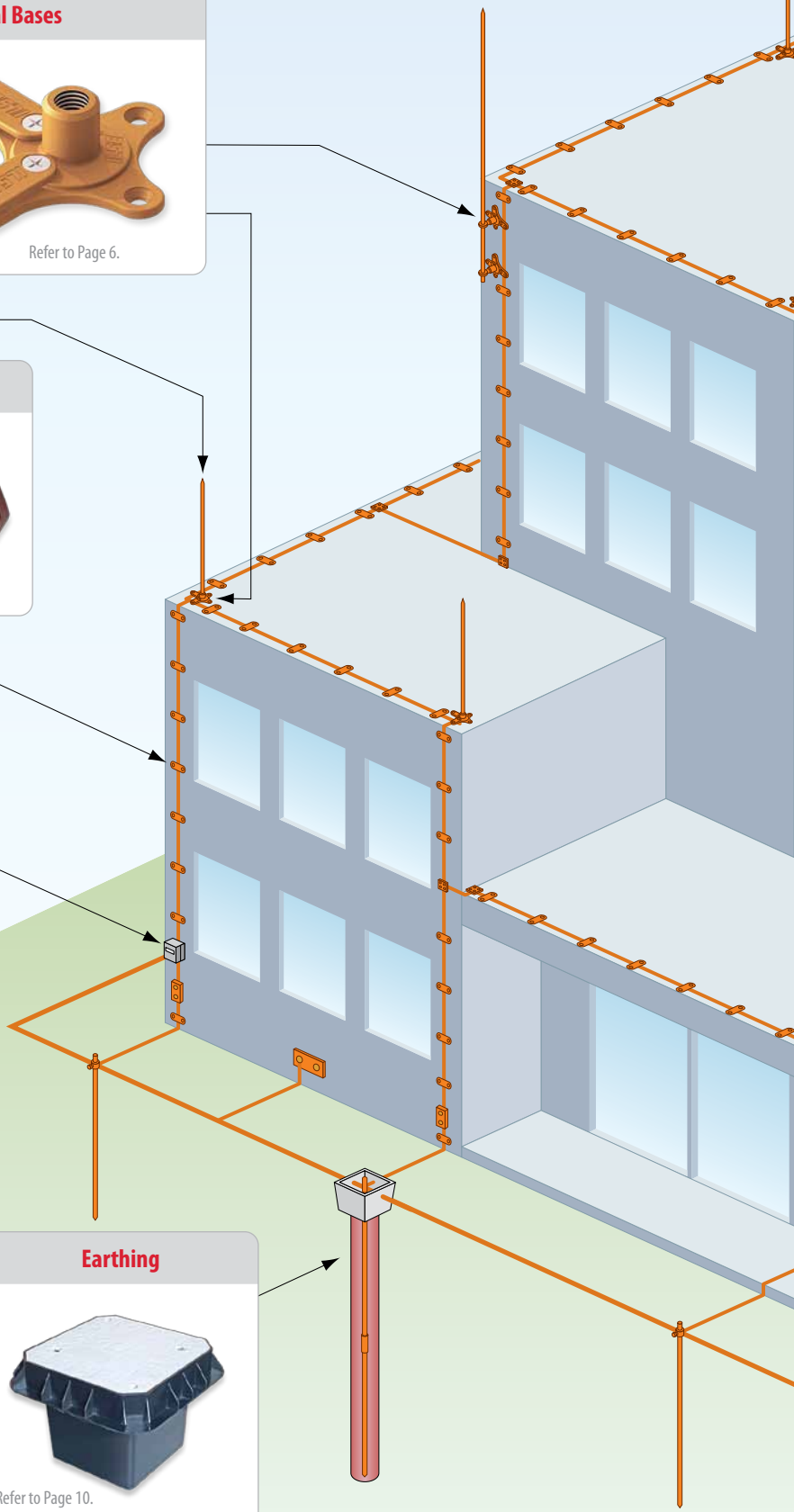
Refer to Page 6.

FL3 - D.C. Fixings

Refer to Page 7.

Accessories

Refer to Page 8.



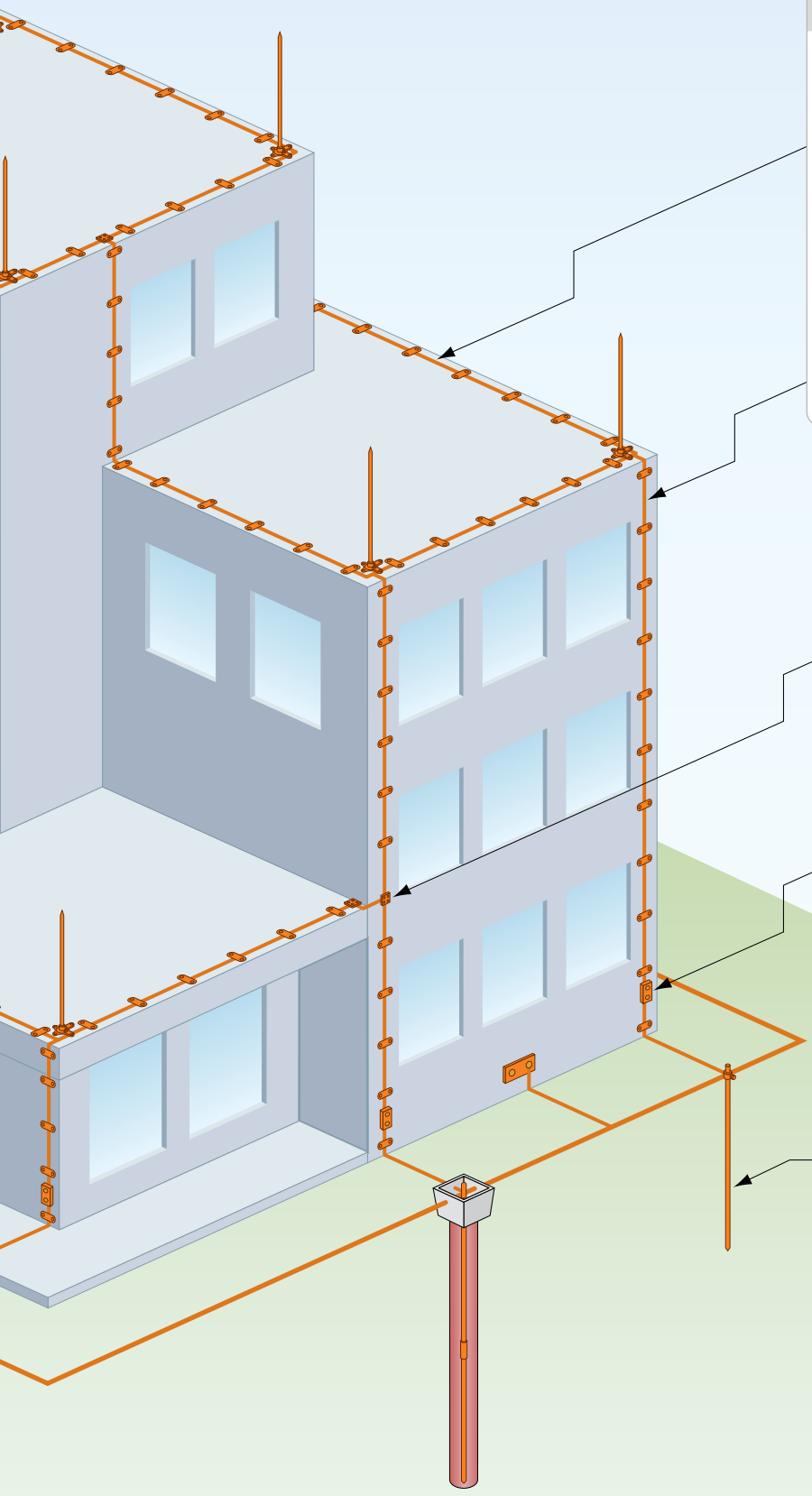
Step 2 *Creation of a bonded earthing system*

Earthing

Refer to Page 10.

Earthing

Refer to Page 10.



Step 1 *Definition and provision of area protection*

FL6 - Down Conductor

Refer to Page 8.

FL5 - Accessories

Refer to Page 8.

FL4 - D.C. Connectors

Refer to Page 7.

Step 2 *Creation of a bonded earthing system*

Earthing

Refer to Page 9.

FL5 - Earthing Accessories

Refer to Page 10.

FL1 Series – Air Terminals

Length	Nominal Diameter	Tip	Material	Conductivity	Approx. Shippping Mass	Thread	Product Code	Description
1m	14mm	Pointed	OC-ETP Copper	99.98% IACS	1.37kg	M16	FL1ATP1016C	Air Terminal, Pointed, 1m x 14mm Copper
2m	14mm	Pointed	OC-ETP Copper	99.98% IACS	2.74kg	M16	FL1ATP2016C	Air Terminal, Pointed, 2m x 14mm Copper
1m	15mm	Pointed	A96061 Aluminium		0.42kg	M16	FL1ATP1016A	Air Terminal, Pointed, 1m x 15mm Aluminium
2m	15mm	Pointed	A96061 Aluminium		0.84kg	M16	FL1ATP2016A	Air Terminal, Pointed, 2m x 15mm Aluminium
1m	14mm	Blunt	OC-ETP Copper	99.98% IACS	1.37kg	M16	FL1ATB1016C	Air Terminal, Blunt, 1m x 14mm Copper
2m	14mm	Blunt	OC-ETP Copper	99.98% IACS	2.74kg	M16	FL1ATB2016C	Air Terminal, Blunt, 2m x 14mm Copper
1m	15mm	Blunt	A96061 Aluminium		0.42kg	M16	FL1ATB1016A	Air Terminal, Blunt, 1m x 15mm Aluminium
2m	15mm	Blunt	A96061 Aluminium		0.84kg	M16	FL1ATB2016A	Air Terminal, Blunt, 2m x 15mm Aluminium

FL2 Series – Air Terminal Bases

Suits		Material	Mass	Box Qty	Product Code	Description
M16 Air Terminal	Tape 25 x 3mm	UNS-C38000 (high strength copper alloy)	290g	10	FL2ATB16C	Air Terminal Base M16 Copper
M16 Air Terminal	Tape 25 x 3mm	UNS-A13600 (high strength aluminium alloy)	90g	10	FL2ATB16A	Air Terminal Base M16 Aluminium
M16 Air Terminal	Tape 25 x 3mm	UNS-C38000 (high strength copper alloy)	370g	10 5 pairs)	FL2FMS16C	Air Terminal Base with Vertical Adaptor, M16 Copper
M16 Air Terminal	Tape 25 x 3mm	UNS-A13600 (high strength aluminium alloy)	120g	10 (5 pairs)	FL2FMS16A	Air Terminal Base with Vertical Adaptor, M16 Aluminium

Each product comes with:

- 316 Stainless steel fasteners
- 4 fixing holes suit M6 or 14 gauge fastener (not included)

FL3 Series – Down Conductor Fixings



Suits	Material	Mass	Box Qty	Product Code	Description
Tape 25 x 3mm	UNS-C38000 (high strength copper alloy)	43g	50	FL3DCTC253C	Tape Clamp, Copper
Tape 25 x 3mm	UNS-A13600 (high strength aluminium alloy)	14g	50	FL3DCTC253A	Tape Clamp, Aluminium
Tape 25 x 3mm	Plastic - Brown	10g	50	FL3PTCB253	Tape Clip, Brown Plastic
Tape 25 x 3mm	Plastic - Grey	10g	50	FL3PTCG253	Tape Clip, Grey Plastic

Each product comes with fixing hole to suit M6 or 14 gauge fastener (not included)
FL3DCTC products come with 316 stainless steel fasteners

FL4 Series – Down Conductor Connectors


Suits	Material	Mass	Box Qty	Product Code	Description
Tape 25 x 3mm	UNS-C38000 (high strength copper alloy)	43g	10	FL4STC253C	Square Tape Clamp, Copper
Tape 25 x 3mm	UNS-A13600 (high strength aluminium alloy)	14g	10	FL4STC253A	Square Tape Clamp, Aluminium
Tape 25 x 3mm	UNS-C38000 (high strength copper alloy)	10g	5	FL4OTC253C	Oblong Test Clamp, Copper
Tape 25 x 3mm	UNS-A13600 (high strength aluminium alloy)	10g	5	FL4OTC253A	Oblong Test Clamp, Aluminium

FL4STC products come with:
- 316 stainless steel fasteners
- Fixing hole to suit M6 or 14 gauge fastener (not included)

FL5 Series - Other Accessories

Bi-metallic Connector

Suits	Fasteners	Material	Mass	Box Qty	Product Code	Description
Tape 25 x 3mm (Cu/Al)	2 x M10 316 SS	Copper / Aluminium	220g	5	FL5BMC253	Bi-metallic Connector

Tinned Flexible Connector

Length	Material	Mass	Hole Size	Product Code	Description
200mm	Tinned Copper Braid	90g	Ø13mm	FL5TFC200C	Tinned flexible connector, 25 x 3.5, 200mm long
300mm	Tinned Copper Braid	120g	Ø13mm	FL5TFC300C	Tinned flexible connector, 25 x 3.5, 300mm long
400mm	Tinned Copper Braid	150g	Ø13mm	FL5TFC400C	Tinned flexible connector, 25 x 3.5, 400mm long

Lightning Strike Recorder

Operating range	Display	Operating Temp	Enclosure	Mass	Dimension (mm)	Product Code	Description
1.5kA 8/20μs to 220kA 8/20μs	Mechanical 6 digits (not re-settable)	-15° to 65° C	Polycarbonate IP 67	400g	80 (W) x 82 (H) x 65 (D)	LSR1	Lightning Strike Recorder

FL6 Series - Down Conductors

Material	Conductivity	Mass	Box Qty	Product Code	Description
OC-ETP Copper	99.98% IACS	0.67kg / linier metre	50m Coil	FL6T253C	Soft Drawn Copper Tape, 25 x 3mm
A91060	>60% IACS	0.2kg / linier metre	100m Coil	FL6T253A	Soft Drawn Alu Tape, 25 x 3mm

Earth Rods, Couplers and Clamps

Earth Rods

Nominal Length	Nominal Diameter	Thread	Core Material	Electrolytical Bond	Mass	Product Code	Description
1.2m	14mm	5/8" UNC	High tensile low carbon steel	99.9% pure copper, 254 μm	1.54kg	CBER1214	Copper Bonded Earth Rod, 1.2m x 14mm, 5/8" Threaded Both Ends, 254μm
1.2m	17mm	3/4" UNC	High tensile low carbon steel	99.9% pure copper, 254 μm	1.92kg	CBER1217	Copper Bonded Earth Rod, 1.2m x 17mm, 3/4" Threaded Both Ends, 254 μm

Earth Rod Couplers

Suits	Thread	Material	Mass	Product	Description Code
14mm Rods	5/8" UNC	High strength copper alloy	130g	LEH-58R	Coupling for threaded rod, 14mm, 5/8" Thread
17mm Rods	3/4" UNC	High strength copper alloy	130g	LEH-34R	Coupling for threaded rod, 17mm, 3/4" Thread

Earth Rod Clamps

Suits			Material	Mass	Box Qty	Product Code	Description
14mm Rods	17mm Rods	Cable 35mm² - 120mm²	UNS C84400 (high strength copper alloy)	90g	5	RCC35120	Rod to Cable Clamp, 14-17mm Rods, 35 – 120mm² Cable
14mm Rods	17mm Rods	Tape 25 x 3mm	UNS C84400 (high strength copper alloy)	90g	5	RTC253	Rod to Tape Clamp, 25 x 3mm Tape

All rod clamps supplied with 316 stainless steel fasteners

Earth Enhancing Compounds

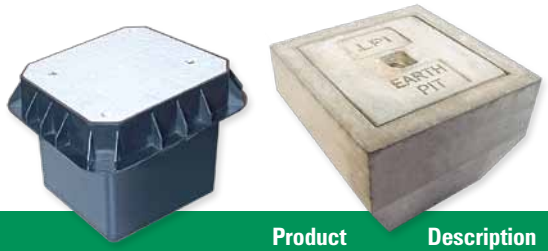
Mass	Box Qty	Product Code	Description
10kg	1 x 10kg kits	RESLO-10	Resistance Lowering Compound
2 x 5kg = 10kg	1 x 10kg kit	GRIP-10	2 part Ground Resistance Improvement Powder
2 x 20kg = 40kg	1 x 40kg kit	GRIP-40	2 part Ground Resistance Improvement Powder

All compounds comply with AS2239-2003 and are designed to comply with EN 50164-7

Earth Points

No of Holes	Thread	Hole Spacing	Mass	Stem Diameter	Material	Product Code	Description
2	M12, (18mm deep)	45mm	190g	10.5mm	UNS-C38000 (high strength copper alloy)	EP2M12	Earth Point, 2 x M12

Also available in single hole and four hole configurations



Inspection Pits

Material	Load Capacity	Mass	Dimensions (mm)	Product Code	Description
Polymer	5 Tonnes	1.9kg	293 x 293 (outside), 176 x 176 (inside), 210 (deep), Ø69 Access Hole	EPIT-P	Polymer Earth Pit
Concrete	4.5 Tonnes	32kg	310 x 310 (outside), 135 x 135 (inside), 192 (deep)	EPIT-C	Concrete Earth Pit

Equipotential Bonding

Rated DC sparkover voltage	Impulse spark-over voltage	Max. Discharge current (Imax)	Insulation resistance	Operating Temp.	Environ-ment Rating	Dims.	Mounting	Mass	Product Code	Description
400V - 750V (100V/s)	<1.5kV (1kV/μs)	150kA 8/20μs	> 1 G Ohms (at 100 Vdc)	-40°C to +90°C	IP 66	56mm (L) x Ø45mm	M8 stud, and 200mm flying lead with Ø 13mm lug	320g	TEC100	Transient Earth Clamp, 400V, 150kA 8/20μs

Earth Bars & Disconnect Links

Dimension (mm) Bar	Over all	Number Of Points	Disconnect Link	Mass	Product Code	Description
50 x 6 x 400 Long	80 x 100 x 400 Long	6	No	2.1kg	EB400	Earth Bar, 6 Way, 400mm
50 x 6 x 475 Long	80 x 100 x 475 Long	6	Yes	2.8kg	DL-4751	Earth Bar, 6 Way, 475mm, Disconnect Link

All fasteners 304 grade stainless steel
Bar material 99.95% pure copper
Other sizes available on request, contact LPI for more information.

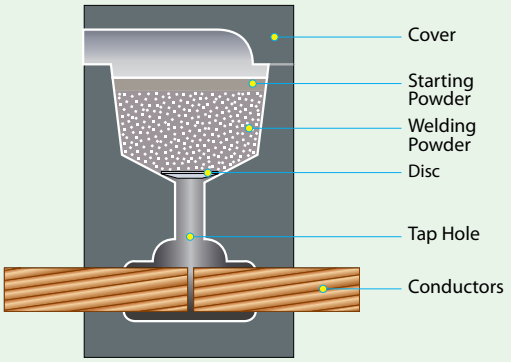
LPI® EXOWELD

The use of LPI® EXOWELD exothermic welding process is a safe and efficient way of providing a permanent connection between conductors.

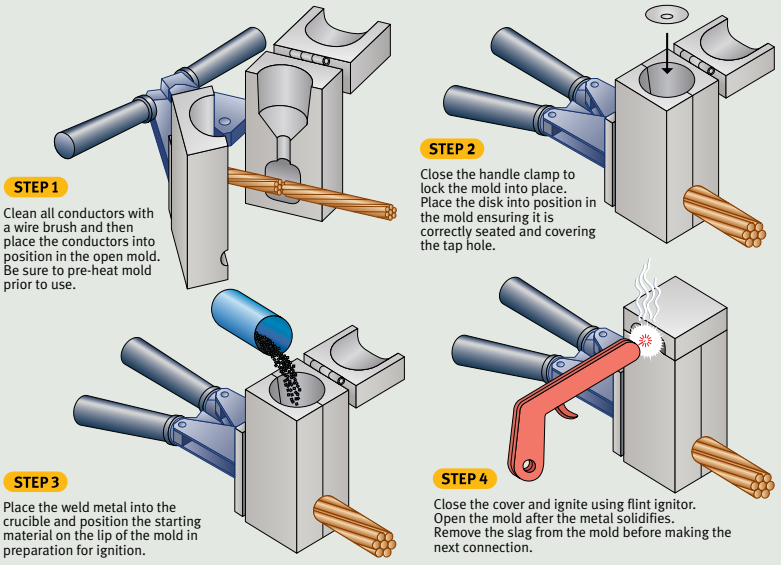
EXOWELD Exothermic welding is a cost effective method of completing a high quality electrical connection. The process is simple to follow and through the use of a high temperature reaction a long lasting, quality electrical bond is created between conductors.

- LPI® EXOWELD connections will not corrode or rust with age
- No water ingress like bolt type, crimping and compression connections
- Current carrying capacity equal to that of the conductor
- Economical and simple to install

Contact LPI or an authorised representative for details on the LPI EXOWELD range of products.



Making an EXOWELD connection



STEP 1
Clean all conductors with a wire brush and then place the conductors into position in the open mold. Be sure to pre-heat mold prior to use.

STEP 2
Close the handle clamp to lock the mold into place. Place the disk into position in the mold ensuring it is correctly seated and covering the tap hole.

STEP 3
Place the weld metal into the crucible and position the starting material on the lip of the mold in preparation for ignition.

STEP 4
Close the cover and ignite using flint ignitor. Open the mold after the metal solidifies. Remove the slag from the mold before making the next connection.

Advantages

1. Does not deteriorate with age since the connections are permanent.
2. Does not loosen as the EXOWELD connections create a permanent molecular bond.
3. Excellent corrosion resistance.
4. Electrical characteristics are higher than typical mechanical connections.
5. Does not increase resistance above that of the conductor.
6. No external power or heat is required to make connections.
7. Quality can be assessed visually.
8. Easy and simple to install.

LPI Consultancy Services

For many decades, the principals and senior management of LPI have been providing specialist lightning protection advice to customers in some of the most lightning prone areas of the world.

Using LPI's 4 Step Approach to Lightning Protection, our engineers work together with clients and contractors to conduct site surveys, risk assessments, and system designs with recommended improvements required to minimise risks presented by lightning.

All **ILSE** products are manufactured to the highest standard through modern manufacturing processes.

Research & Development

Lightning Protection International Pty Ltd maintains a strong commitment to research and development in order to better understand the lightning process. This leads to direct enhancements in the design and manufacture of all our products.

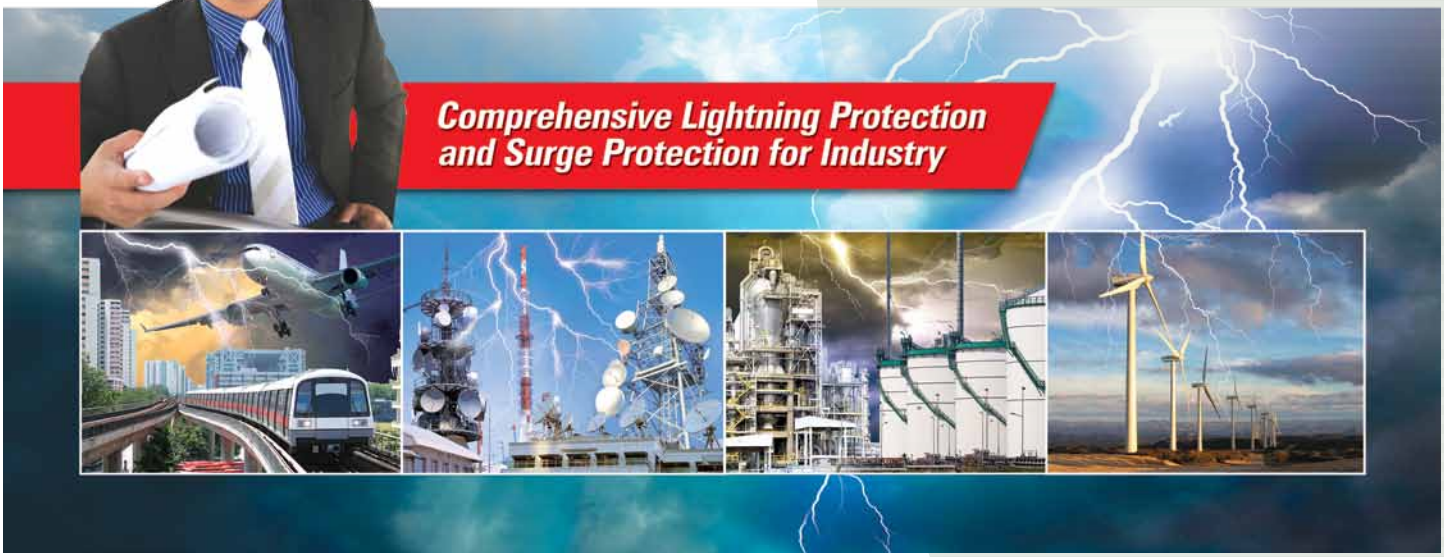
LPI has conducted extensive high voltage testing of products with independently accredited laboratories.

- Stormaster ESE range of lightning protection terminals tested in compliance to NFC17-102
- Guardian System 5 lightning protection system (Cat Terminals, HVSC downconductor, LSR1) tested in compliance to IEC60-1:1989

Test Capability

Within their Australian based manufacturing facility, LPI maintains a comprehensive test laboratory equipped with a high impulse current generator for testing manufactured products in compliance with international standards.

LPI also collaborates with Australian based universities to pursue product testing and field trials.



Additional LPI Literature

Together with the products and systems shown in this catalogue, LPI also has available a number of publications and CD-ROM covering their entire range of Lightning Protection and Surge and Transient Protection products and systems. If you would like further information on any of these products, please contact Lightning Protection International Pty Ltd, or your nearest LPI Distributor, or visit: www.lpi.com.au

Step 1 *Definition and provision of area protection*

Step 3 *Protection of power lines*

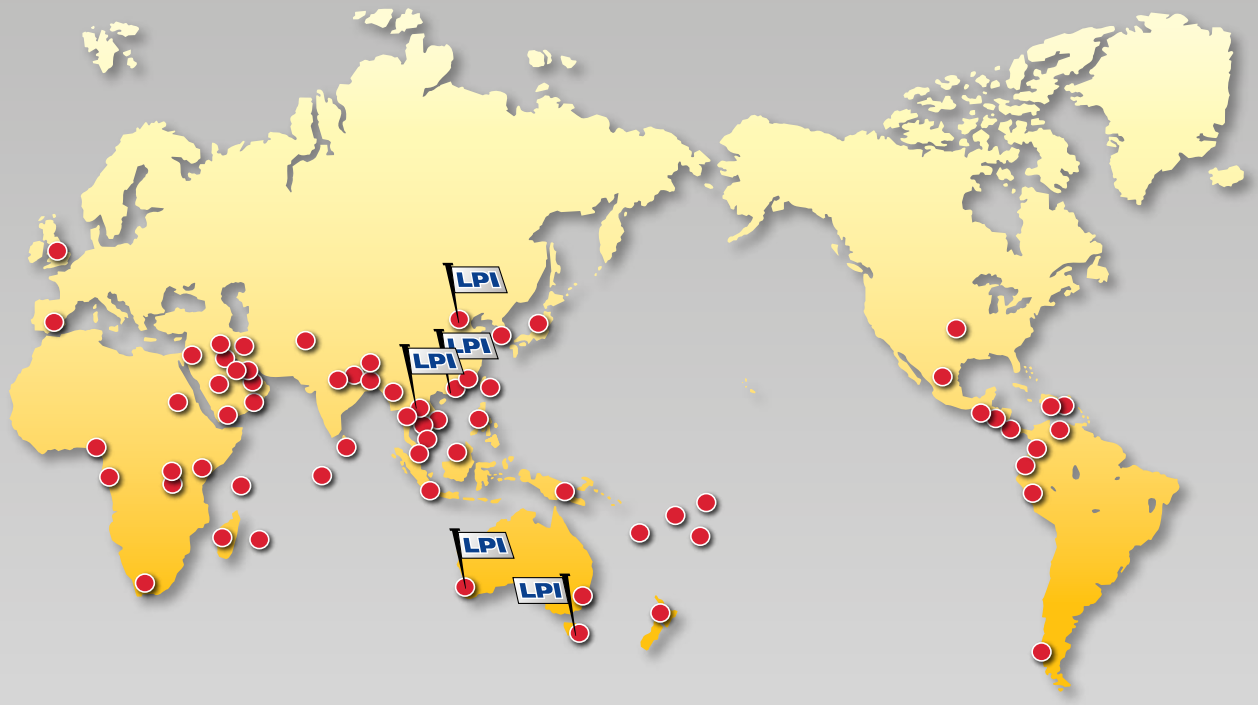
Step 2 *Creation of a bonded earthing system*

Step 4 *Protection of signal, data and communication lines*

Facility Protection *Application Brochures*

Disclaimer

- LPI maintains a policy of on-going product development, specifications are subject to change without notice.
- Application detail, illustrations and schematic drawings are representative only and should be used as guides.
- It should be noted that 100% (100 percent) protection level for direct strike lightning, lightning detection and surge and transient protection equipment is not possible and cannot be provided due to the lightning discharge process being a natural atmospheric event.



LPI Offices LPI Customers

LPI proudly services customers from the following countries:

- Afghanistan
- Australia
- Bahrain
- Bangladesh
- Bhutan
- Brunei
- Burundi
- Cambodia
- Chile
- China (PRC)
- Colombia
- Dominican Republic
- Ecuador
- El Salvador
- Fiji
- Gabon
- Guatemala
- Haiti
- Hong Kong
- India
- Indonesia
- Iran
- Iraq
- Japan
- Jordan
- Kenya
- Kuwait
- Laos
- Macau
- Madagascar
- Malaysia
- Maldives
- Mauritius
- Mexico
- Myanmar
- Nepal
- New Zealand
- Nicaragua
- Nigeria
- Oman
- Papua New Guinea
- Peru
- Philippines
- Qatar
- Rwanda
- Samoa
- Saudi Arabia
- Seychelles
- Singapore
- South Africa
- South Korea
- Spain
- Sri Lanka
- Sudan
- Taiwan
- Thailand
- Tonga
- UAE
- United Kingdom
- USA
- Vanuatu
- Venezuela
- Vietnam
- Yemen

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