



Early Streamer
Emission Air
Terminal Pioneer
LY-ESE 3.0



Guangzhou Leisidun
Electrical Technology Development
Co.,Ltd.

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COMPANY PROFILE

Guangzhou Leisidun Electrical Technology Development Co.,Ltd.,

Established in 2010, is a high-tech enterprise specializing in the research and production of lightning protection products with innovative technological capabilities and strong market influence in the industry. Its registered trademark is "REAZY".

The multiple innovative products developed and produced by the company have been tested and certified by authoritative national institutions, possessing strong market competitiveness and sustainable development capabilities.

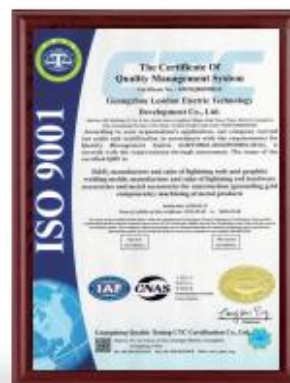
The company has a strong technical team and a comprehensive after-sales service system, providing customers with a series of lightning protection and grounding overall solutions and all-round after-sales service content at any time.



NF C 17-102:2011
Standard Test Report



CE Certificate



ISO 9001 Certificate



reazy®

LIGHTNING RODS AND ACCESSORIES

EXTERNAL LIGHTNING
PROTECTION SYSTEMS

Leisidun, your protection partner



NF C 17-102
leisidun

SPECIALIST IN EXTERNAL LIGHTNING PROTECTION

Pioneers in the design and manufacture of lightning and earthing, leisidun has been manufacturing high quality solutions and products for over 15 years using the most innovative technologies.

Leisidun's leader position in this field is supported by its clear commitment to innovation and the latest trends. An example of this is the new reazy® R lightning rod series, an online IOT cloud-based monitoring system, for convenient monitoring of events and maintenance.

SAFETY AND RELIABILITY

- Bringing together the experience in the principal international manufacturing and test standards for lightning rods (NF C and UNE).
- A world-class laboratory for lightning and protection testing, with accreditations to NF C 17-102 and UNE 21186, etc.

COMPREHENSIVE PROTECTION

As the French Building Technical Code, based on the NF C 17-102:2011 standard, states, effective lightning protection must combine the following protection systems:

External protection
(ESE lightning rods and faradization).



System for protection against direct lightning strike.
These capture the lightning within the protected area and lead it, in a controlled manner, safely to earth.



Earthing system

Systems that allow atmospheric discharge currents to be dispersed into the ground. The need for monitoring the grounding system. Leisidun offers a wide range of products for each of these systems. It also provides custom products, advice, consulting and the best after-sales service.

LEISIDUN GUARANTEES THE SAFETY OF YOUR FACILITIES

Leisidun designs and manufactures in accordance with the strictest quality standards and certifies its products to the most stringent standards (e.g. IEC, EN, UNE-EN, NF C) through independent certifying organisations such as CNAS.



Lightning

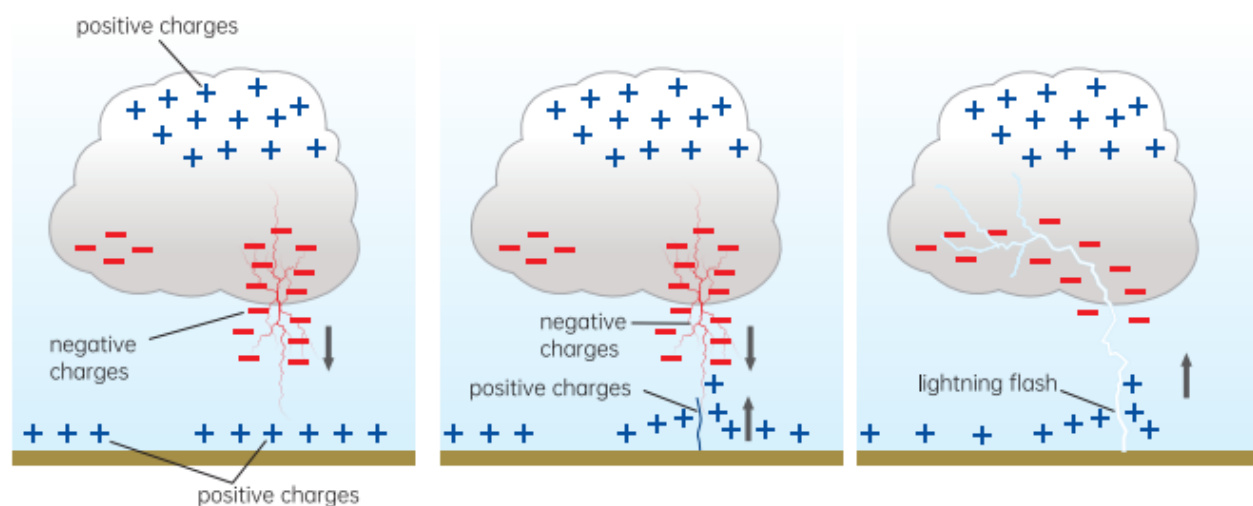
The need for protection

HOW LIGHTNING FORMS

Lightning is a powerful natural discharge of static electricity, produced during a thunderstorm and generating an electromagnetic pulse. Under normal conditions, there is a balance between positive and negative charges in the atmosphere.

- During the formation of a cumulonimbus, there is an increase of ionization and a potential difference is generated between the cloud and the ground, which gives rise to small discharges.
- As the electric field gains in strength, the descending leader breaks up the dielectric field in the air.
- Eventually, it manages to break down the layers of the dielectric field in the air and meets the ascending leader from the surface.

How lightning develops



THE DESTRUCTIVE EFFECTS OF LIGHTNING

30kA

Average current of a lightning strike

5.000.000

Lightning strikes per day

61%

Electrical damage due to transient surges¹

The effects of lightning pose a serious hazard to people, property, equipment and structures, and for this reason protection is essential.

Catastrophic consequences for people and animals

The flow of a current of a certain intensity for a short period of time is sufficient to cause electrocution and severe burns to the subject in question, sometimes leading to death.

Substantial financial losses:

- Damage to buildings. A direct lightning strike causes damage to structures (e.g. buildings, telecommunications antennas, manufacturing facilities and photovoltaic installations, etc.).
- Fires. The formation of sparks and heat dissipation due to the Joule effect can cause fires.
- Destruction of equipment/service interruption.

An indirect lightning strike generates surges which damage equipment connected to the electrical network, telephone network, ethernet, etc.

Lightning Effective protection

REGULATORY FRAMEWORK

The destructive capacity of lightning makes it necessary to assess the need for protection, and possibly to install an effective protection system.

In the field of lightning protection, using either ESE lightning rods or faradization systems, the following principle standards are used:

- NF C 17-102: "Protection of structures and open areas against lightning by a lightning rod with early streamer emission device" Internationally used French standard.
- UNE-EN 62305, IEC 62305: "Lightning Protection". European and international standard.
- EN/IEC 62561:2011. "Lightning protection system components (LPSC)". European and international standard. It consists of 7 parts specifying the requirements of the various components involved in lightning protection. These include cables, clamps, counters, earth rods, earth enhancer compounds and earth inspection pits, among others.

PRODUCT CERTIFICATION

Due to its construction and accessibility, an ESE lightning rod is designed for high durability, and accessing and replacing it is usually complicated and expensive. So it is especially important for it to be certified and have undergone tests (mechanical, climate chambers, current impulses) in accordance with the above standards, which guarantee its reliability and robustness.

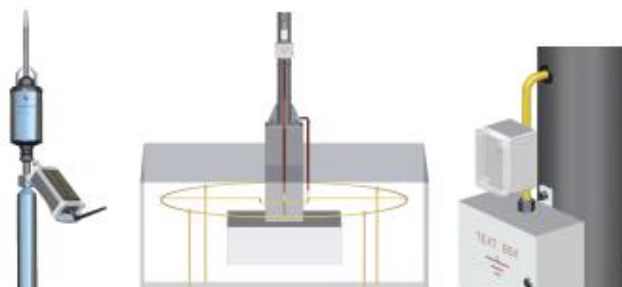
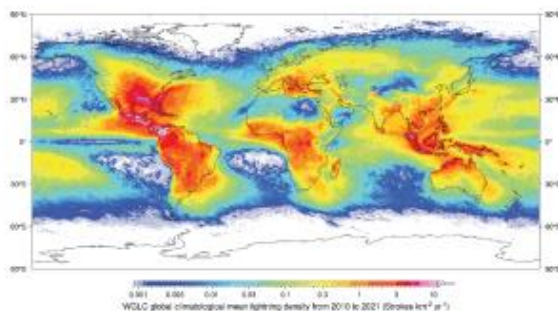
Product test certifications must be carried out by recognized (accredited) laboratories or entities, in order to ensure that the product complies with the applicable standards and meets the specified safety requirements.

Lastly, it is important to have a certification by an external entity which audits the production process, thus guaranteeing its industrial quality. As a matter of fact, when calculating the protection radius of an ESE lightning rod, the early emission is the only factor that depends on the lightning rod itself rather than on the characteristics of the facility. Which means that the reliable calculation of this value, certified by an accredited lab, is crucial for the correct protection of the facility.

RISK ANALYSIS

To determine the need for lightning protection and the level of protection required for a given facility, the various lightning rod standards specify a risk calculation. This calculation consists of knowing the levels of risk in the event of a lightning strike and its derivatives from parameters related to the facility (e.g. its dimensions, the annual level of lightning strikes, the materials of the structures, the type of wiring, and whether it is a cultural asset or open to the public).

This calculation will determine the need to establish various protection measures to effectively mitigate the risk (lightning rod, or others).



Lightning protection system

The destructive capacity of the lightning makes it essential to evaluate the need for protection and, perhaps, to install a system to ensure effective protection. The current regulatory framework in each country defines the need for protection and sets out the steps to follow for designing a system which guarantees protection against lightning.

ASSESS THE NEED FOR PROTECTION

The need for protection of a facility is established starting from the evaluation of the degree of safety required and associated risk factors. Whenever the expected strike frequency (N_e) is greater than the permissible risk (N_a), protection must be installed. The calculation of the need for protection is quite complex and depends on the applicable regulatory framework.

Required efficiency (E)	Level of protection
$E \geq 0.98$	Level 1 Maximum safety
$0.95 \leq E < 0.98$	Level 2 High safety
$0.80 \leq E < 0.95$	Level 3 Medium safety
$0 \leq E < 0.80$	Level 4 Standard safety

DESIGNING A PROTECTION SYSTEM (REQUIRED COMPONENTS)

The standards define an effective lightning protection system as a set of equipment and devices to capture (never to attract) lightning and conduct it safely to earth:

- ① Capture system: lightning air terminals.
- ② Down conductor system: components required to conduct lightning energy in a controlled and safe manner.
- ③ Earthing systems: components required for dissipating lightning currents. A grounding system is essential for the proper operation of the protection system.



CHOOSE THE CAPTURE TECHNOLOGY

Various types of lightning protection systems are available, which may be more or less appropriate depending on the construction features of the facility to be protected, the overall installation costs, etc.

Protection by Faradisation terminals (passive systems)

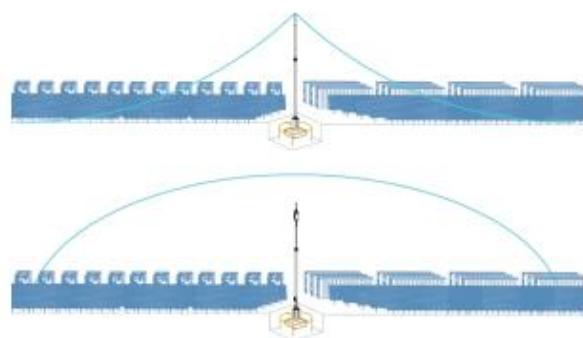
Standards: UNE EN 62305, IEC 62305.

Systems which capture by means of rods and meshes work by distributing and dissipating the lightning discharge current through a network of conductors.

Lightning rod protection with early streamer emission (ESE)

Standards: NF C 17-102, UNE 21186 etc.

Suitable for any installation type and open areas, where it optimizes the material and installation cost while ensuring proper safety



Lightning rods ESE Technology

THE MOST EFFICIENT SYSTEM

ESE (Early Streamer Emission) technology uses the atmospheric gradient to generate ionization which creates an upward propagating leader faster than any Franklin passive rod. The time difference ΔT is the "benefit" of ESE technology and is known as "early emission" (microseconds μs).

By reducing the start time, the streamer can be connected to the descending leader at a virtually located strike point well above the tip of the ESE lightning rod. This substantially increases the protected volume (or radius) and facilitates the protection of large areas, simplifying and reducing material

and installation costs.

Determining the protection radius is key for selecting the model most suitable lightning rod for each facility based on the level of early emission (ΔT).

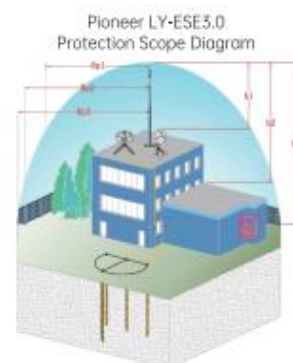
The main standards governing these devices are NF C 17-102:2011 and UNE 21186:2011. They establish the relationship between the early streamer emission time parameter of the lightning rod (ΔT) and its radius of protection/coverage.



WHAT ESE MODEL (ΔT) SHOULD BE INSTALLED?

The selection and installation of an ESE type lightning rod is carried out using risk assessment guidelines. An effective and safe design requires defining the level of protection or degree of safety required, calculating the volume of the facility to be protected and, depending on this, selecting the appropriate lightning rod based on its early emission time ΔT .

The table below determines the radius of protection (R_p) as a function of the height of the lightning rod above the surface to be protected (h), the value of early emission (ΔT) of each model and the level of protection. This level is determined from the risk assessment



Protection radius [m] according to NF C 17-102:2011

Pioneer Plus LY-ESE3.0 Advance Discharge Lightning Rod Protective Radius(R_p)											
Model	Effective Height of Installation $h(m)$										
	2	3	4	5	6	8	10	15	20	25	30
Level I ($r=20m$)											
LY-ESE3.0	32	47	63	79	79	79	79	80	80	80	79
Level II ($r=30m$)											
LY-ESE3.0	34	52	69	86	87	87	88	89	89	90	90
Level III ($r=45m$)											
LY-ESE3.0	39	58	78	97	97	98	99	101	102	103	104
Level IV ($r=60m$)											
LY-ESE3.0	43	64	86	107	107	108	109	111	113	115	116



reazy®

bess lightning protection project designer

LIGHTNING SYSTEM PROTECTION DESIGN FOR ANY TYPE OF FACILITY

BESS solar pv power project Lightning system protection design

The Importance of Lightning Protection for Energy Storage and Photovoltaic Systems

Lightning protection is a core link to ensure the safe, stable and economic operation of energy storage and photovoltaic (PV) systems. Direct lightning strikes, induced lightning and electromagnetic pulses can cause equipment damage, safety accidents and economic losses. A sound lightning protection system can mitigate such risks, ensure compliance and safeguard investment returns. Details are elaborated from multiple dimensions as follows:

Core Risks and Hazards



Equipment damage risk:

PV modules, inverters, power conversion systems (PCS) for energy storage, energy storage batteries and other core components are mostly power electronic devices with low insulation tolerance margins. Transient overvoltage caused by direct or induced lightning strikes is prone to device breakdown and burnout, and even trigger thermal runaway and explosion of energy storage batteries.



Personal safety hazards:

Lightning strikes may lead to electrification of equipment enclosures and step/contact voltage due to poor grounding, endangering the safety of operation and maintenance personnel. Meanwhile, fault arcs are likely to induce fires, threatening personnel and the surrounding environment.



System operation interruption:

Overvoltage can interfere with control and communication modules, causing data anomalies, communication interruptions and equipment malfunctions, which result in system shutdown, affect power generation and energy storage dispatching, and damage the revenue of power stations.



Huge economic losses:

The costs of equipment replacement, maintenance, power generation loss due to downtime and accident disposal are far higher than the initial investment in lightning protection. A single lightning strike may prolong the long-term cost recovery cycle of the project.

Core Value of Lightning Protection

1. Protect equipment safety: Through comprehensive protection measures such as lightning air terminals, down conductors, grounding and surge protection devices (SPD), lightning current is discharged to the ground rapidly, overvoltage is suppressed, core equipment including PV modules, inverters, PCS and batteries are protected, and their service life is extended.

2. Prevent safety accidents: Equipotential bonding, grounding and shielding measures can reduce the risks of electric shock, fire and explosion, protect personal and property safety, and meet the requirements of safety management.

3. Maintain system stability: Reduce electromagnetic interference, ensure the reliable operation of control and communication systems, lower the shutdown rate, improve the efficiency of power generation and energy storage, and guarantee the quality of power output.

4. Meet compliance requirements: Compliance with standards such as IEC 62305, GB 50057 and NB/T 42086 is a necessary condition for power station acceptance, grid connection and operation, which avoids legal and operational risks.

5. Improve investment returns: The initial investment in lightning protection is far lower than the losses caused by lightning strikes. It can reduce unplanned downtime and maintenance costs, ensure the whole-life-cycle revenue, and enhance the risk resistance of the project.

Strengthened Requirements for Special Scenarios

Outdoor deployment characteristics:

PV arrays and energy storage containers are mostly located in open areas and are vulnerable to lightning strikes. The risk is even higher in lightning-prone areas such as coastal regions and plateaus, requiring targeted enhanced protection.

Specificity of DC side:

The DC side voltage of PV systems can reach 1500V, with long and widely distributed lines, leading to a prominent risk of induced overvoltage. It is necessary to adopt DC SPD and equipotential design for the DC side.

Challenges of system integration:

High integration of equipment reduces the internal insulation margin, making the system more susceptible to transient overvoltage, which requires refined lightning protection design and test verification.

Key Points of Lightning Protection System

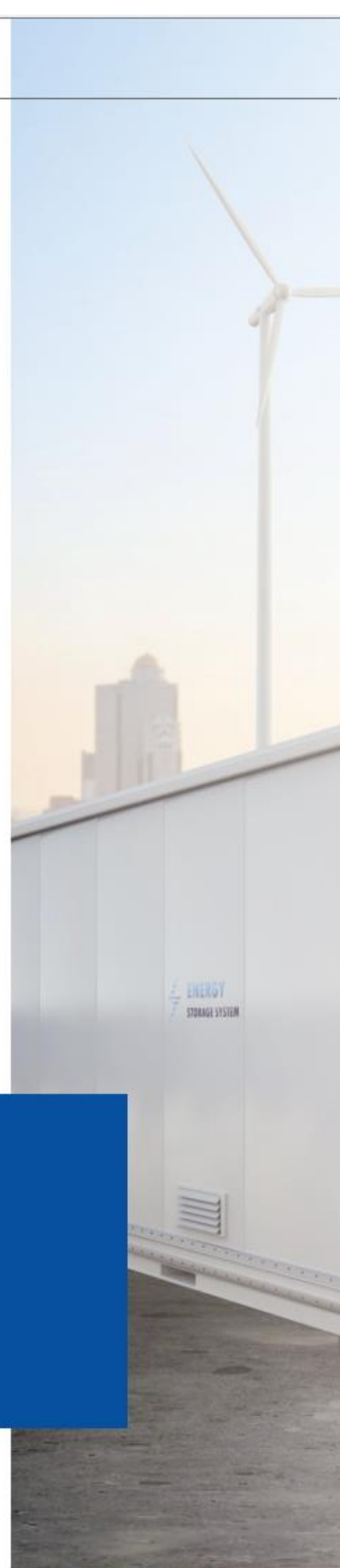
External lightning protection: Composed of lightning air terminals, down conductors and grounding devices, the protection range of air terminals is designed by the rolling sphere method to ensure the rapid discharge of lightning current to the ground.

Internal lightning protection: Adopt equipotential bonding, shielding and SPD configuration to suppress induced overvoltage on lines and protect power electronic and control equipment.

Layered protection: Install SPDs in grades on the DC side, AC side, signal and communication lines to achieve coordinated cooperation and improve protection reliability.

Conclusion

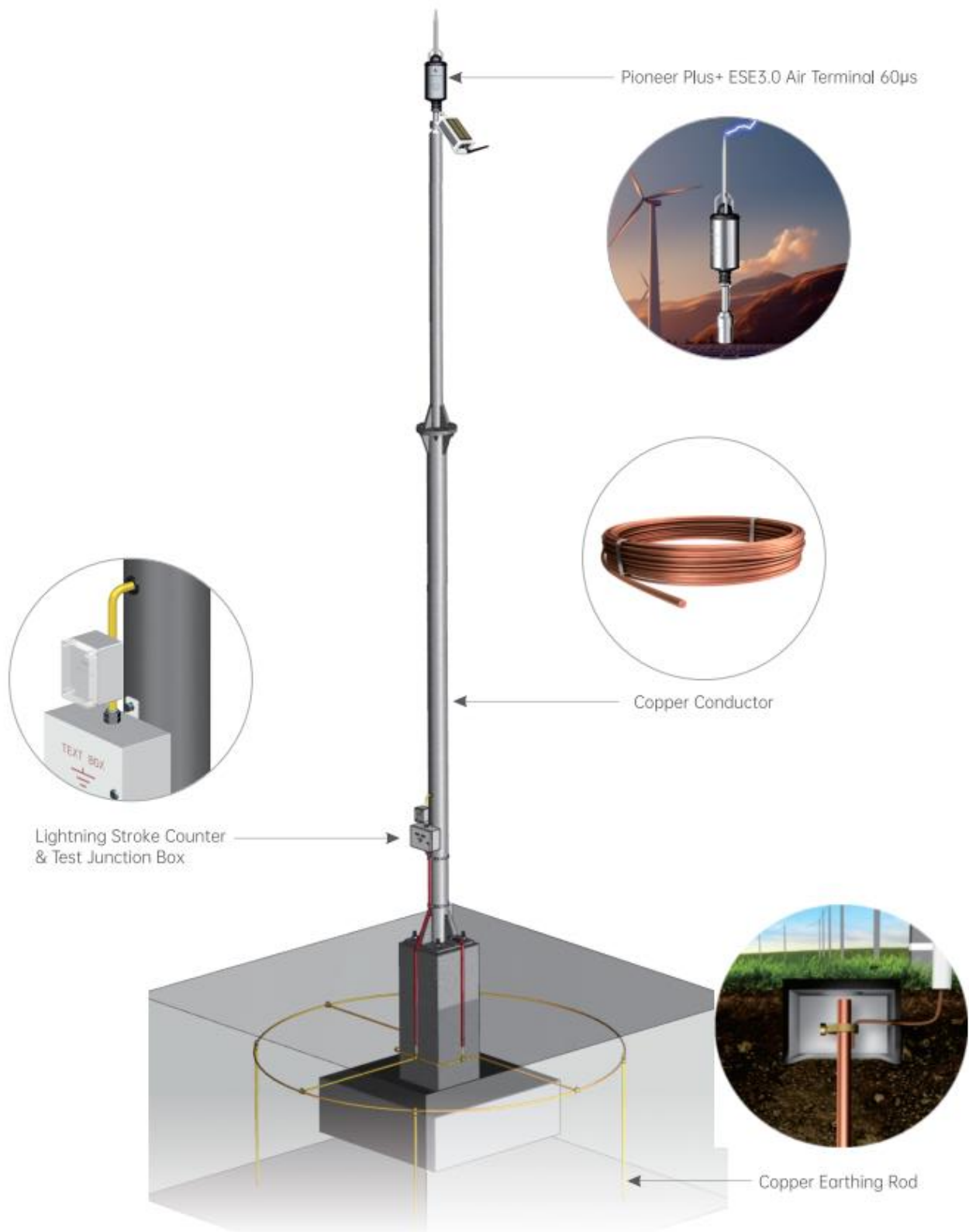
Lightning protection is a lifeline project for energy storage and PV systems. It is necessary to build a comprehensive "external + internal + layered" lightning protection system in combination with scenario characteristics, relevant standards and equipment performance, so as to maximize the protection of safety, stability and economic benefits with the minimum investment.





reazy®

ESE lightning rod with remote test
Technology using the universal R-Tester
(accessory)



Capture system

LIGHTNING STRIKE COUNTER

LY-3000 is Leisidun's lightning strike counter.

It complies with the latest applicable Lightning Protection related Standards (IEC 62561-6).

FEATURES AND BENEFITS

- Open core technology: LY-3000 is a "Clip-on" counter that can be installed around the conductor. Ideal also for retrofitting.
- Universal: Installation around flat tapes and cable conductors.
- LY-3000 is totally protected against the effect of dust and against the effect of immersion (Ip67).



IEC62561-6



Model	Threshold current(8/20)[ka]	Max. counting & withstand discharge current(10/350)[ka]	Max.flat tape width[mm]	Max.diameter of cable[mm]
LY-3000	1	300	40*5mm	10-50 mm

ADAPTOR

Adapting piece for fixation of reazy® to the mast, with fixation for cable or tape down conductor.

Standards
• IEC62561-6

Model	Material	Max.Dia.of Cable[mm2]	Min.Dia.of Cable[mm2]	Max.Mast Dia.[mm]	Min.Flat tape width[mm]
RY-ZJT001	SUS304L	50	35	50	25x3mm

MASTS

Steel mast for lightning rod elevation over the protected structure level, consisting of several segments of 3m each.



Model	Part number	Material	No.parts	Product height[mm]	Diameter[mm]
RY-ZCG-DX3M	Mast 3m feg	Galvanized steel	1 segment	3000	42
RY-ZCG-DX6M	Mast 6m feg	Galvanized steel	2 segments	6000	48
RY-ZCG-DX9M	Mast 9m feg	Galvanized steel	3 segments	9000	60
RY-ZCG-BXG3M	Mast 3m inox	Stainless steel	1 segment	3000	42
RY-ZCG-BXG6M	Mast 6m inox	Stainless steel	2 segments	6000	48
RY-ZCG-BXG9M	Mast 9m inox	Stainless steel	3 segments	9000	60

MAST ANCHORAGE FOR FLAT ROOF

Anchorage for mounting of the lightning rod mast on a flat roof.

PART NUMBERS



Model	Part number	Material	No.parts	Product height[mm]	Diameter[mm]
RY-ZCG-DX3M	Mast 3m feg	Galvanized steel	1 segment	3000	42
RY-ZCG-DX6M	Mast 6m feg	Galvanized steel	2 segments	6000	48

SPARK GAP

Spark gap for equipotential protection for the lightning rod down conductor system.

PART NUMBERS



Standard:
IEC62561-3:2012



Model	Lightning impulse current(10/350)[KA]	Voltage protection level[KV]	Connector material	Housing material	Application
RY-FDJX-MA	100	≤5	Stainless steel	Plastic	Mast-antenna protection
RY-FDJX-ET	100	≤5	Stainless steel	Plastic	Equipotential protection

COPPER CABLE DOWN CONDUCTOR

Round braided copper cable for lightning rod down conductor.

PART NUMBERS



Standard:
IEC62561-2:2012



Model	Material	Section[mm2]	Diameter[mm]	Packaging unit[m]
RY-TJX50	Copper	50	8	50
RY-TJX70	Copper	70	10	50

FLAT TAPE DOWN CONDUCTOR

Tinned copper tape for lightning rod down conductor.

PART NUMBERS



Standard:
IEC62561-2:2012



Model	Material	Min.flat tape width[mm]	Min.flat tape thickness[mm]	Packaging[m]
RY-TBD50	Copper	25	3	25
RY-TBD70	Copper	30	2	50

1. Mechanical Lightning Strike Counter

Type	Size mm	Current range KA	Counting range	Weight kg	Pack Quantity	Part Number
LY-3000	12.5x7.5x8.5	1-100	0-999999	0.53	1	LY-3000



2. Rod to Tape Connectors

Conductor Sizes mm	L mm	W mm	H mm	Unit Weight	Pack Quantity	Part Number
8&25x3	52	52	14	0.28	25	LCT 253



3. Square Tape Clamps

Conductor Sizes mm	L mm	W mm	H mm	Unit Weight	Pack Quantity	Part Number
25x3	50	50	13	0.15	25	LST 253
25x6	50	50	20	0.25	25	LST 256
31x3	60	60	14	0.22	25	LST 313
38x6	70	71	22	0.59	25	LST 386
50x3	80	80	16	0.50	10	LST 503
50x6	79	79	22	0.52	10	LST 506



4. Square Tape Clip

Conductor Sizes mm	L mm	W mm	H mm	Unit Weight	Pack Quantity	Part Number
20x3	50	20	10	0.06	50	LMD 203
25x3	50	20	10	0.06	50	LMD 253



5. Cross Connectors

Conductor Sizes mm	L mm	W mm	H mm	Unit Weight	Pack Quantity	Part Number
50	50	50	30	0.30	25	LSC 050
70	53	53	33	0.27	25	LSC 070
95	55	55	35	0.22	25	LSC 095



6. Threaded Couplings

Type	L mm	D mm	Unit Weight	Pack Quantity	Part Number
1/2"	68	21	0.07	25	ERBO 12
5/8"	68	21	0.12	25	ERBO 16
3/4"	78	25	0.18	25	ERBO 20



7. Earth Bars

Conductor Sizes mm	L mm	W mm	H mm	Unit Weight	Pack Quantity	Part Number
6	400	50	60	2.00	1	EBC 006
8	500	50	60	2.30	1	EBC 008
10	650	50	60	3.20	1	EBC 010



8. Earth Pits

Lid Colour	D mm	H mm	L1 x W1 mm	Unit Weight kg	Pack Quantity	Part Number
Grey	180	200	245x245	1.75	1	ERH 20



9. Earth Rod to Cable 'G'Clamps

Earth Rod Shank mm	Conductor Range mm	L mm	W mm	H mm	Unit Weight	Pack Quantity	Part Number
9.5	6-35	32	20	16	0.04	25	ERR 1035
12.7	6-35	34	25	15	0.05	25	ERR 1235
14.2	35-70	41	25	15	0.05	25	ERR 1416
15.0	6-16	34	25	15	0.05	25	ERR 1516
16.0	6-70	41	25	17	0.08	50	ERR 1670
17.2	6-95	48	30	19	0.10	50	ERR 1795
20.0	6-70	48	30	19	0.10	50	ERR 2070



10. U Bolt Clamps

Maximum Rod mm	Hole Centres mm	L mm	W mm	H mm	Unit Weight	Pack Quantity	Part Number
16	30	58	62	33	0.15	20	ERU 016
25	37	70	62	33	0.15	20	ERU 025
31	41	85	68	33	0.28	10	ERU 031
38	46	90	75	33	0.28	10	ERU 038
50	63	100	90	33	0.45	10	ERU 050



11. Split Bolt Connectors

Main Conductor A mm2	Tap Conductor B mm2	W mm	H mm	Unit Weight kg	Pack Quantity	Part Number
10	1.5-10	20	20	0.02	200	SBC 010
16	2.5-16	23	23	0.03	150	SBC 016
25	2.5-25	28	28	0.04	100	SBC 025
35	2.5-35	29	29	0.05	80	SBC 035
50	2.5-50	35	35	0.08	50	SBC 050
70	2.5-70	39	39	0.12	35	SBC 070



12. Bare Copper Tapes

Size WxH mm	C.S.A mm2	Weight per Metre Kg	Standard Coil Size M	Part Number
25x3	75	0.67	50	CT 253
25x4	100	0.89	40	CT 254
30x3	90	0.80	40	CT 303
30x4	120	1.07	40	CT 304
40x3	120	1.06	40	CT 403
40x4	160	1.42	30	CT 404



13. Bare Copper Rods

D mm	C.S.A mm ²	Copper thickness mm	Weight per Metre Kg	Part Number
12	120	0.254	0.93	TBB012
14	150	0.254	1.26	TBB014
16	200	0.254	1.64	TBB016



14. Bare Stranded Copper Conductors

C.S.A. mm ²	Stranding No. mm	Nominal mm	Maximum Resistance 20°C	Weight per Metre Kg	Part Number
35	7x2.52	7.65	0.540	0.32	CHS 035
50	7x3.00	8.90	0.399	0.43	CHS 050
70	7x3.55	10.72	0.276	0.62	CHS 070
95	37x1.78	12.60	0.199	0.86	CHS 095



15. Handle Clamps

Description	Part Number
Small Handle Clamp	60101
Medium Handle Clamp	60102
Large Handle Clamp	60103



16. Exothermic Welding Powders

Description	Box Quantity	Part Number
90	240	090
115	160	115
150	120	150
200	120	200
250	80	250



17. Exothermic Welding Mould

Description	Part Number
BB1-Bar to Bar	WM
BR1-Bar to Earth Rod	WM
S1-Bar to Steel Surface	WM
CB1-Cable to Bar	WM
CR3-Cable to Earth Rod	WM
CRE2-Cable to Rebar	WM
CS7-Cable to Steel Surface	WM



18. Test Junction Box

Description	
Material	Stainless steel or iron coating
Size	300*200*120mm or custom made
Thickness	1.0mm or custom made



ACTIVE LIGHTNING PROTECTION SOLUTION

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