Liva® grup

ELEKTRİK ELEKTRONİK İNŞAAT
TAAHHÜT SAN. ve TİC. LTD. ŞTİ.

LIGHTNING ROD AND GROUNDING SYSTEMS

LIVA ACTIVE LIGHTNING RODS

ACTIVE LIGHTNING CONDUCTOR

Because of the above-mentioned disadvantages of those lightning protection systems of cage method and simple capturing rod, alternative systems of lightning protection are preferred more, today. One of those alternatives is the Active Lightning Conductor.
Our company has 7 different types of product, in this scope. Six of these products are designed to function in accordance with the principle of "Early Streamer Emission (ESE)," and the other lightning conductor method is designed both to work in accordance with the principle of "Early Streamer Emission" and the "Piezo Crystallized Emission System."

LIVA ACTIVE LIGHTNING RODS

A. The Lightning Rods Working with Early Streamer Emission (ESE)

1. LİVA "LAP-DX 250 Active Lightning Rod (ESE)
2. LİVA "LAP-AX 210 Active Lightning Rod (ESE)
3. LİVA "LAP-BX 175 Active Lightning Rod (ESE)
4. LİVA "LAP-BX 125 Active Lightning Rod (ESE)
5. LİVA "LAP-CX 070 Active Lightning Rod (ESE)
6. LİVA "LAP-CX 040 Active Lightning Rod (ESE)

B. Early Streamer Emission System (ESE) and Piezo Crystallized Lightning Rod:

7. LİVA "LAP-PEX 220 Active Lightning Rod" (ESE+ Piezo Crystallized)
You can find below detailed information about the lightning conductors that we produce, which work with Early Streamer Emission System (ESE). You will also find information about our Piezo Crystallized Lightning Rods in the following pages.

A. The Lightning Rods that Work with Early Streamer Emission System (ESE)

MATERIAL: The metal components of the conductor rod, which will carry the lightning, are produced of stainless steel (Inox) to resist against chemical interactions and corrosion. This feature of the lightning rod allows it to remain strong and durable against heavy elements of the nature.

WORKING SYSTEM: Electro Atmospheric Field Effective Liva Active Lightning Rod, which works in accordance with the principle of Early Streamer Emission System (ESE), obtains its energy from the density changes between electrostatic and electromagnetic fieds.
The lightning rods have four main components:

1. Capture Terminal
2. Body; (a) Ionic Tunnel (b) Energy Block
3. Bottom Mil
4. Conductor Connection Adaptor

TESTS AND DOCUMENTS

We present below the tests and certificates we have obtained with regards to Liva Active Lightning Rods. (*)

A. The Standard Strike Voltage Test: The Lightning Rod has been tested at the High Voltage Laboratories of the Middle East Technical University (METU) Department of Electrics and Electronics. The lightning strike value was tested between 1020 and 1675 kV (+) Positive and (-) Negative and was considered to be appropriate.

B. Lightning Rod Strike Voltage Jumping Time (Δt) Test:

1. The Lightning Rod Strike Voltage Jumping Time (Early Streamer Warning) (Δt) was applied to the Lightning Rod at NFC 17-102 (Appendix C) standarts at METU Department of Electrics and Electronics and the certificate of approval to relevant standarts was obtained for the Lightnig Rod.

2. Strike Voltage Jumping Time (Early Flow Warning) (Δt) Test was applied to the Lightning Rod at IEC 61083-1, IEC 60060-1 and NFC 17-102 (Appendix C) standards at CNAS (Ilac-MRA) Laboratories, which has International Accredation Certificate, and it was documented to be in conformance with the relevant standards.

C. Lightning Rod Strike Voltage Heavy Current Strike (Short Circuit kA) Test:

1. The Lightning Rod was tested with 25kA current strikes at High Voltage Laboratories of the METU Department of Electrics and Electronics, and it was certified that no change or deterioration took place in its qualities.

2. The Lightning Rod went through tests with 115kA current strikes at TS EN 50164-1 Standards at SIGMA Testing Laboratories, which certified that no change or deterioration took place in its qualities.

D. Temperature Test (-40 °C ile +120 °C) was applied to the Lightning Rod at Accredited Laboratories, which proved that no deterioration happened in its operation at these temperatures.

E. The Lightning Rod went through "Protection Test against Reaching Unsafe Parts and Solid Bodies, and Water Resistance Test" at TS 3033 EN 60529 standards at Laboratories accredited by European Co-operation for Accreditation (EA) and International Laboratory Accredetation Cooperation (ILAC). As a result of the tests, its conformity with relevant criteria was licensed.

F. Gost Document: The Lightning Rod has "GOST" Document

G. CE Certificate: The Lightning Rod has received "CE" Conformity to Europe document.

H.Warranty Period: The Lightning Rod has "30-Year Warranty" Document.

LIVA ACTIVE LIGHTNING RODS

B. Early Streamer Emission System (ESE) and Piezo Crystallized Lightning Rod:

MATERIAL: The metal components of the conductor rod, which will carry the lightning, are produced of stainless steel (Inox) to resist against chemical interactions and corrosion. This feature of the lightning rod allows it to remain strong and durable, just like the first day, against heavy elements of the nature.

OPERATION SYSTEM:
Electro Atmospheric Field and Wind Effective Liva Active Lightning Rod, which works in accordance with the principle of Early Streamer Emission System (ESE) and Piezo Crystallized Emission System, obtains its energy from the density changes between electrostatic and electromagnetic fieds in the air, and making use of the dynamic energy of the wind.

1. Capture Terminal
2. Wind Wings
3. Body;
   (a) Energy Block
   (b) Piezo Crystals and related equipment
4. Bottom Mil
5. Conductor Rod Connection Adaptor

TESTS AND DOCUMENTS

You can find below the tests that Liva Active Lightning Rods underwent.

Lightning Surge Voltage By-Passing Time (Δt) Test: Lightning Surge Voltage By-Passing (Early Streamer Warning) Time(Δt) Test at NFC 17-102 (Appendix C) was applied to the Lightning Rod at the High Voltage Laboratories of the Middle East Technical University (METU) Department of Electrics and Electronics. The tests proved that the Lightning Rod is in conformity with the relevant standards.

Gost Document: The Lightning Rod has "GOST" Document.
CE Certificate: The Lightning Rod has received "CE" Conformity to Europe document.

Warranty Period: The Lightning Rod has "30-Year Warranty" Document.

You can also find detailed information about our Active Lightning Rods on our website www.livaparatoner.com

TABLE OF LIVA LIGHTNING RODS PROTECTION LEVELS

Protection Levels		LEVEL- 1							LEVEL- 2							LEVEL- 3							LEVEL- 4						
Type of Lightning Rods		LAP-AX 210	LAP-BX 175	LAP-BX 125	LAP-CX 070	LAP-CX 040	LAP-DX 250	LAP-PEX 220	LAP-AX 210	LAP-BX 175	LAP-BX 125	LAP-CX 070	LAP-CX 040	LAP-DX 250	LAP-PEX 220	LAP-AX 210	LAP-BX 175	LAP-BX 125	LAP-CX 070	LAP-CX 040	LAP-DX 250	LAP-PEX 220	LAP-AX 210	LAP-BX 175	LAP-BX 125	LAP-CX 070	LAP-CX 040	LAP-DX 250	LAP-PEX 220
		Radius of Protection Area (Mt.)							Radius of Protection Area (Mt.)							Radius of Protection Area (Mt.)							Radius of Protection Area (Mt.)						
Height of the Pole (m)	4	100	81	58	48	39	115	155	108	89	65	55	45	123	164	120	100	74	64	53	134	176	130	110	83	72	60	146	188
	5	100	82	58	49	39	115	155	109	90	65	56	46	124	164	121	100	75	65	54	135	177	131	110	84	72	61	146	188
	6	101	82	58	49	40	115	155	109	90	66	56	46	124	164	121	101	76	65	54	135	177	131	111	84	73	62	146	188
	8	102	82	59	50	40	115	156	110	90	66	57	47	124	165	122	101	77	66	56	136	177	132	111	85	75	63	147	189
	10	102	82	59	50	41	116	156	110	91	67	58	48	124	165	122	102	77	67	57	137	178	133	112	87	76	65	148	190
	15	102	83	60	51	42	116	156	111	92	68	59	50	125	165	123	104	80	70	60	138	178	135	114	89	79	69	149	191
	20	102	83	60	51	42	116	156	112	92	69	60	51	126	166	125	105	81	72	62	139	179	136	116	92	82	72	151	192




LIVA ACTIVE LIGHTNING RODS

LAP-DX 250

LAP-DX 250

PHYSICAL PROPERTIES LAP-DX 250

Order code	Size	Package Size	Δt Early Streamer Warning Time (according to NFC 17 – 102 standards) (*)	Protection Radius (Mt.) (according to NFC 17 – 102 standards) (**)			
				Level 1	Level 2	Level 3	Level 4
LAP-DX 250	Length: 70 cm Net weight: 5.00 kg Gross weight: 5.70 k	25x25x50 cm	96 µsec.	115	124	135	146

LAP-AX 210

LAP-AX 210

PHYSICAL PROPERTIES LAP-AX 210

Order code	Size	Package Size	Δt Early Streamer Warning Time (according to NFC 17 – 102 standards) (*)	Protection Radius (Mt.) (according to NFC 17 – 102 standards) (**)			
				Level 1	Level 2	Level 3	Level 4
LAP-AX 210	Length: 100 cm Net weight: 5.00 kg Gross weight:5.70 kg	17x17x100 cm	82 µsec.	101	109	121	131

(*) Δt value shows the early streamer time advantage that a lightning rod (ESE lightning rod, for instance) has in arresting the lightning, compared to an ordinary capture terminal (S.R.). Bigger Δt value means that the active reaction of the lightning rod is better. It shows that it can attract the lightning to itself at a higher point, at a larger protection diameter and fastly.)

(**) It involves the situation that the lightning rod is mounted at least 6 m. higher than tha highest point of the building to be protected, with the help of the lightning pole. The protection diameter is calculated by taking into account the approximate early streamer warning time.

LIVA ACTIVE LIGHTNING RODS

LAP-BX 175

LAP-BX 175

PHYSICAL PROPERTIES LAP-BX-175

Order code	Size	Package Size	Δt Early Streamer Warning Time (according to NFC 17 – 102 standards) (*)	Protection Radius (Mt.) (according to NFC 17 – 102 standards) (**)			
				Level 1	Level 2	Level 3	Level 4
LAP -BX 175	Length: 100 cm Net weight: 4.80 kg Gross weight: 5.50 kg	17x17x100 cm	63 µsec.	82	90	101	111

LAP-BX 125

LAP-BX 125

PHYSICAL PROPERTIES LAP-BX 125

Order code	Size	Package Size	Δt Early Streamer Warning Time (according to NFC 17 – 102 standards) (*)	Protection Radius (Mt.) (according to NFC 17 – 102 standards) (**)			
				Level 1	Level 2	Level 3	Level 4
LAP -BX 125	Length: 80 cm Net weight: 4.20 kg Gross weight: 4.60 kg	17x17x80 cm	40 µsec.	58	66	76	84

(*) Δt value shows the early streamer time advantage that a lightning rod (ESE lightning rod, for instance) has in arresting the lightning, compared to an ordinary capture terminal (S.R.). Bigger Δt value means that the active reaction of the lightning rod is better. It shows that it can attract the lightning to itself at a higher point, at a larger protection diameter and fastly.)

(**) It involves the situation that the lightning rod is mounted at least 6 m. higher than tha highest point of the building to be protected, with the help of the lightning pole. The protection diameter is calculated by taking into account the approximate early streamer warning time.

LIVA ACTIVE LIGHTNING RODS

LAP-CX 070

LAP-CX 070

PHYSICAL PROPERTIES LAP-CX 070

Order code	Size	Package Size	Δt Early Streamer Warning Time (according to NFC 17 – 102 standards) (*)	Protection Radius (Mt.) (according to NFC 17 – 102 standards) (**)			
				Level 1	Level 2	Level 3	Level 4
LAP-CX 070	Length: 70 cm Net weight : 2.40 kg Gross weight: 3.10 kg	13x13x70 cm	31 µsec.	49	56	65	73

LAP-CX 040

LAP-CX 040

PHYSICAL PROPERTIES LAP-CX 040

Order code	Size	Package Size	Δt Early Streamer Warning Time (according to NFC 17 – 102 standards) (*)	Protection Radius (Mt.) (according to NFC 17 – 102 standards) (**)			
				Level 1	Level 2	Level 3	Level 4
LAP-CX 040	Length: 70 cm Net weight:2.30 kg Gross weight: 2.90 kg	13x13x70 cm	22 µsn	40	46	54	62

(*) Δt value shows the early streamer time advantage that a lightning rod (ESE lightning rod, for instance) has in arresting the lightning, compared to an ordinary capture terminal (S.R.). Bigger Δt value means that the active reaction of the lightning rod is better. It shows that it can attract the lightning to itself at a higher point, at a larger protection diameter and fastly.)

(**) It involves the situation that the lightning rod is mounted at least 6 m. higher than tha highest point of the building to be protected, with the help of the lightning pole. The protection diameter is calculated by taking into account the approximate early streamer warning time.

LIVA LIGHTNING RODS
PIEZO CRYSTAL AND ESE TYPES

LAP-PEX 220

LAP-PEX 220

PHYSICAL PROPERTIES LAP-PEX 220

Order code	Size	Package Size	Δt Early Streamer Warning Time (according to NFC 17 – 102 standards) (*)	Protection Radius (Mt.) (according to NFC 17 – 102 standards) (**)			
				Level 1	Level 2	Level 3	Level 4
LAP-PEX 220	Length: 150 cm Net weight : 15 kg Gross weight: 16.5 kg	16x160 cm	136 µsec.	155	164	177	188

(*) Δt value shows the early streamer time advantage that a lightning rod (ESE lightning rod, for instance) has in arresting the lightning, compared to an ordinary capture terminal (S.R.). Bigger Δt value means that the active reaction of the lightning rod is better. It shows that it can attract the lightning to itself at a higher point, at a larger protection diameter and fastly.)

(**) It involves the situation that the lightning rod is mounted at least 6 m. higher than tha highest point of the building to be protected, with the help of the lightning pole. The protection diameter is calculated by taking into account the approximate early streamer warning time.

THE TESTER OF LIVA LIGHTNING RODS&LIGHTNING STRIKE COUNTERS

Order Code	Class	Type	Accessories
TESTER LLRT-A1	Active Lightning Rod and Lightning Counter Test Device	Digital	Power Supply Unit, Energy cable/ Detector / Reference Props and Magnetic Generator

TECHNICAL PROPERTIES

Working Voltage	Reference Value	Maximum Working Temperature	Size	
220 volt - 50/60 Hz.	3 - 10	-20 °C ile +50 °C	Measuring Device	110x190x60 mm
			Magnetic Generator	280 x Ø60 mm
			Weight of Device	1.60 Kgs

"Liva LLRT-A1 Liva Active Lightning Rod and Lightning Counter Testing Device" is a combined testing device that can test Liva Active Lightning Rods and Liva Lightning Counters.

FEATURES
Active Lightning Rod and Lightning Counter Testing Device;
The device can test the following:

1- Liva Active Lightning Rods, which can be tested directly (the ones that have testing sockets on),

2- Other Liva Active Lightning Rods, which do not have testing sockets on them,

3- Lightning Counters, which can be tested directly (the ones that have testing sockets on).

The cables and other equipment that would be required for the operation of the testing device are given as accessories component to the device.

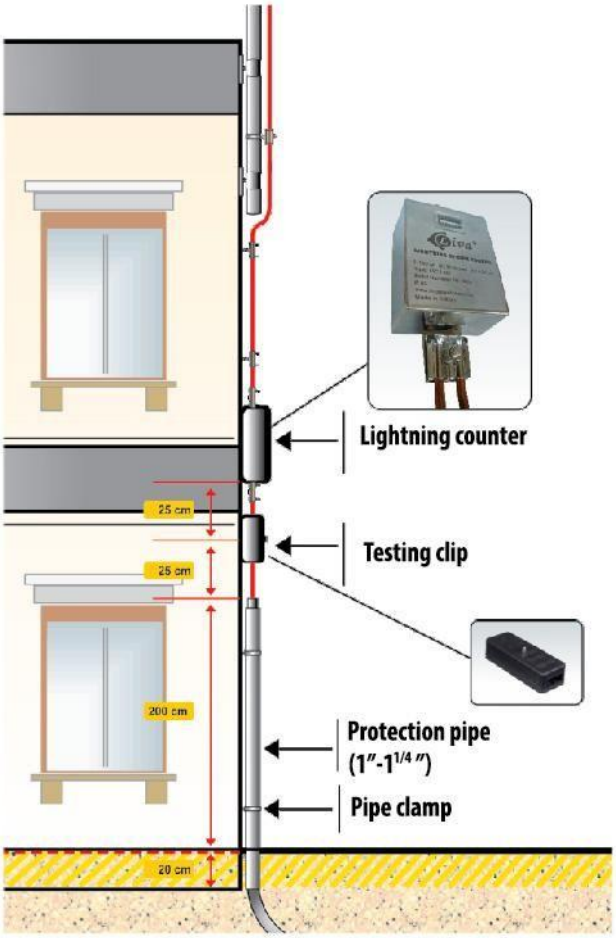
The device does not need any power supply other than it sown power supply for testing directly testable lightning rods and lightning counters.

The testing device has three testing sockets on it. Each socket is designed in a different way. In order to perform the test, the relevant socket is connected to the relevant cables present in the device content and/or other equipment can be used.

LIVA LIGHTNING STRIKE COUNTERS

Liva LG-4H Lightning Strike Counter : The device is designed to count and record the lightning strikes captured by lightning protection systems such as Active Lightning Rods, Simple Capturing Rods (Franklin Rod) and Cage Method (Faraday Method). The Lightning Counter is necessary to determine whether the lightning rod received any lightning strikes.
The device is connected to the landing line of the lightning and therefore it detects the impulse current caused by lightning discharge current, and it counts each strike and shows it by way of the numerator on it. With the help of the Lightning Counter, you can follow the number of lightning strikes arrested by your system of lightning protection and you can keep records about the operability of the system. The device does not need any maintenance within its operation limits. It does not require any additional power supply for its operation.

How to Mount the Device: The Lightning Counter is connected "in series" to the lightning landing line.
(1) In case of lightning protection systems having landing on just one line that had been installed by Active Lightning Rod and/or Simple Capturing Rod (Franklin Rod), the Lightning Counter can be connected on the landing line before the testing clamp or in place of the testing clamp.
(2) In case of lightning protection systems set in accordance with the Faraday Cage (Cage Method) and/or with Simple Capturing Rod where multiple landing lines are used, the device can be connected on the nearest landing line, close to the middle of the installment or the highest point of the building, having a potential of receiving lightning strike, before the testing clamp or in place of the testing clamp.
If the lightning protection system is used for projects where landing had been made through multiple lines or where the building is too high, we advice that a counter should be placed at each 100 meters.



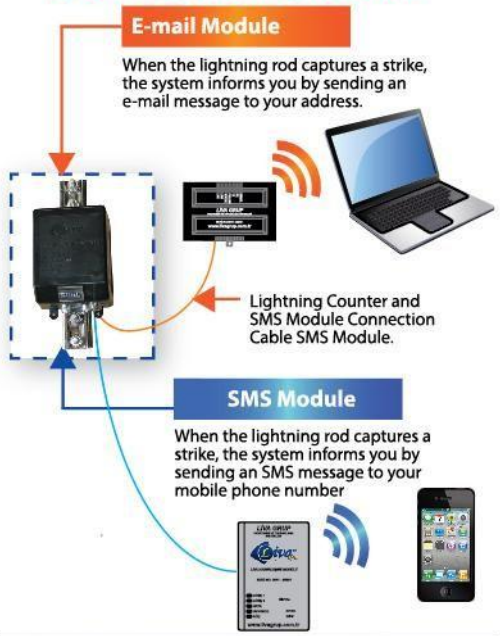
Types of Lightning Counter: We have three types of Lightning Counters:
1. Standard Lightning Counter: It detects and counts lightning strikes and shows the result on the screen.
2. SMS-Sending Lightning Counter: It detects and counts lightning strikes and shows the result on its screen. Also, these lightning counters have a connection socket so that additional modules can be attached. By way of connecting an SMS module to this socket, the Lightning Counter can send the previously loaded SMS text to 6 different GSM numbers, respectively, as soon as it detects a lightning strike.
(Note: The speed of delivering the message depends on the communication speed of the GSM company.)
3. E-Mail Sending Lightning Counter: It detects and counts lightning strikes and shows the result on its screen. Also, these lightning counters have a connection socket so that additional modules can be attached. By way of connecting an E-mail module to this socket, the Lightning Counter can send the previously loaded e-mail text to 8 different e-mail addresses, as soon as it detects a lightning strike. (Note: The speed of delivery depends on the speedof the internet.)

TECHNICAL PROPERTIES

Product Code	Ligtning Count	Interval Minimum discharge Stream and Discharge Time Interval	Maximum discharge Stream	Input-Output Conductor	Operating temperature range	Size	Protection Class
LG-4H-001	000000 - 999999	1 kA (8/20µs)	100 kA	2x50 mm2 (Ø 2x8mm) + 3x30 mm Bara	-30 °C ile +80 °C	120 x 95 x 50 mm (200 mm with the connection clip)	IP 65

NOTE: If your lightning protection system had received a lightning strike, you should definitely have done the periodic controls of your system, the shortest time possible. In this respect;
1.The ground passing resistance should be measured,
2. The system should be examined for the possibility of a damage and if there are problems, those should be removed.

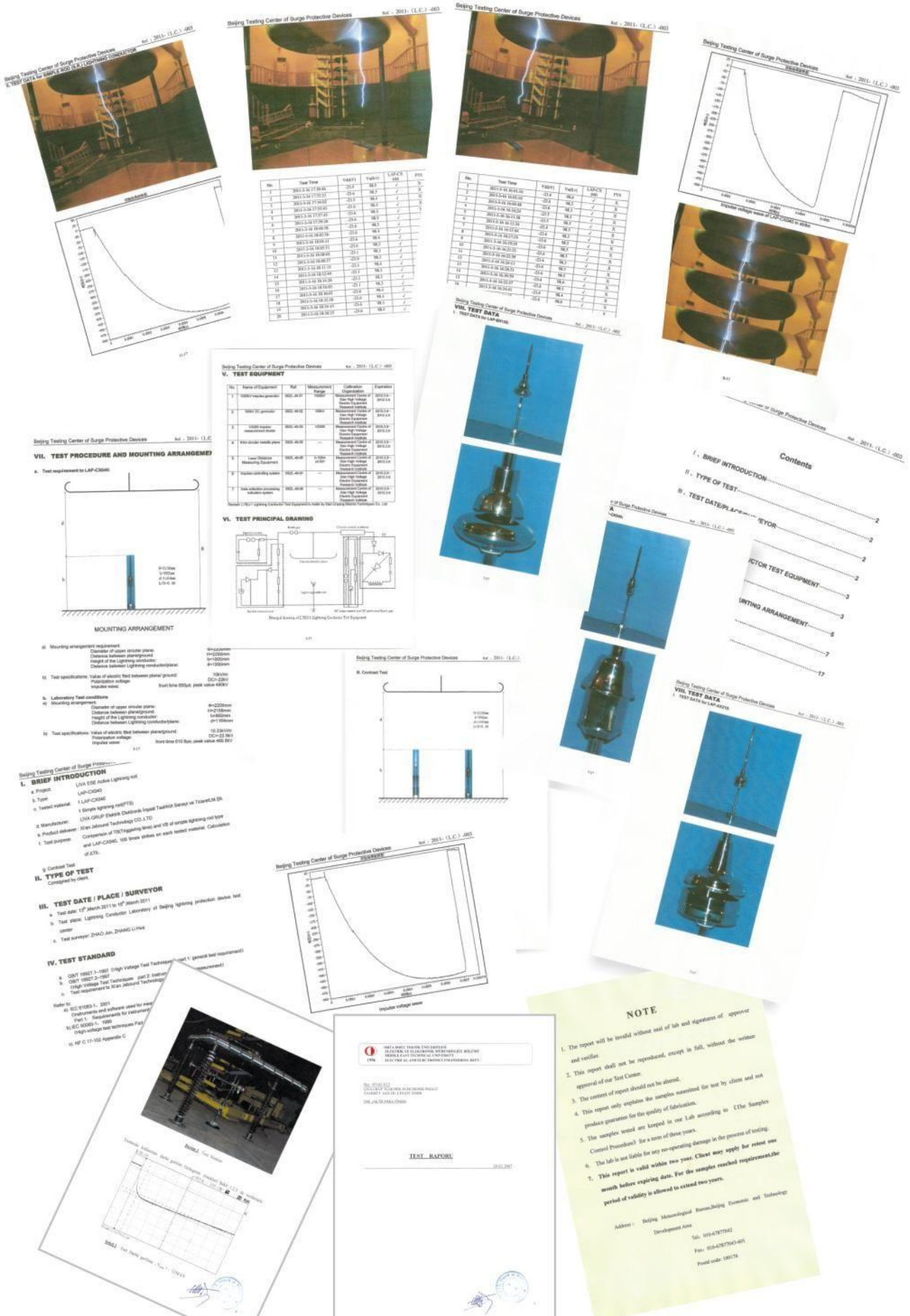
LIGHTNING WARNING SYSTEM



ORDER CODE	PRODUCT NAME
LG - 4H -001	Standard Lightning Strike Counter Bayındırlık Poz No: 980-311
LG4H - 0102	Testable Lightning Strike Counter
LG4H - 0103	Lightning Strike Counter with SMS Module
LG4h - 0104	Lightning Strike Counter with E-Mail Module

CERTIFICATES & DOCUMENTS

TEST CERTIFICATES&DOCUMENTS



Beijing Testing Center of Surge Protective Devices

V. TEST EQUIPMENT

VI. TEST PRINCIPAL DRAWING

VII. TEST PROCEDURE AND MOUNTING ARRANGEMES

MOUNTING ARRANGEMENT

I. BRIEF INTRODUCTION

II. TYPE OF TEST

III. TEST DATE / PLACE / SURVEYOR

IV. TEST STANDARD

VIII. TEST DATA

Contents

NOTE

1. The report will be invalid without seal of lab and signatures of approver and verifier.
2. This report shall not be reproduced, except in full, without the written approval of our Test Center.
3. The content of report should not be altered.
4. This report only explains the samples submitted for test by client and not product guarantee for the quality of fabrication.
5. The samples tested are keeped in our Lab according to CThe Samples Control Procedure) for a term of three years.
6. The lab is not liable for any no-operating damage in the process of testing.
7. **This report is valid within two year. Client may apply for retest one month before expiring date. For the samples reached requirement,the period of validity is allowed to extend two years.**

TEST RAPORU

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