



QUOTATION

Project Name: LSG ESE PKG
Quote #: 24OQLSGP2
Company: Residential-Protection Packages



These are Residential Packages for Houses at Kerala State only, ALL KERALA FREE DELIVERY, NO HIDDEN CHARGES, FIXED RATE

Terms: ***
Ship via: Land Cargo
C&F Landed at site
Weight: *** As applicable

LSG Protect-TGD30

Supply of External Lightning Protection System LSG PROTECT – Thunderguard® ESEs are made of non-corrosive materials, utilize advance and sustainable technologies, maintain a 15 Yrs warranty, are independently tested certified to NFC 17102 and UNE 21186 standards. Level IV 75 mtrs by capturing dangerous lightning discharges and safely channelling it to earth. All mounting mast connected with FRP mast for Protection of Side Flash Lightning Current and Test link Joint Kit IP 55/65 weather proof enclosure for testing the earth pit. Insulation material used to electrically isolate the panels, The lightning air terminal is maintenance free type & frequent testing is not necessary for ensuring the working of it. The central finial shall be elevated above the spheroid and it is sharp pointed & made-up of stainless steel alloy for long and reliable operations. An air gap provided between the individual electrically isolated 4 panels and the finial tip of the central rod.

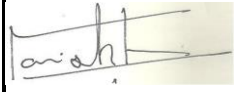
| Number | Item | Description | Qty. | Unit | Unit Cost | Total Cost |
|-----------------------------|------------------------------|--|------|--------------------|---------------|---------------|
| | | Lightning Protection System | | | (in INR) | (in INR) |
| 1 | ThunderGuard 30 | LSG ThunderGuard 30 Lightning Arrester with SS ADAPTOR | 1 | No | INR 38,900 | INR 38,900 |
| 2 | Earthing | Maintenance free Earthing For Lightning Arrester: Using 2 no's of 2 Mtr long / 250 micron, 14.2mm Dia DOLPHIN UL Listed Copper bonded Steel Rod & TEKSO ELECTRON FILL, a low resistivity, RoHS certified & Maintenance free Grounding Enhancement backfill Compound Model:-TEKSO ELECTRON FILL(22 kg) | 1 | Set | INR 8,000 | INR 8,000 |
| 3 | Elevation Mast | Specially designed 3 mtrs GI mast Setting, and 1 mtr FRP top section insulation mast; Roof top/Tower side mounting arrangement & fixing accessories (anchoring rope & anchoring plate, Base -for roof top installation). The mast coated with paint for additional protection, Cable connector Adaptor | 1 | Set | INR 8,000 | INR 8,000 |
| 4 | Down Conductor | 50 Sq MM V Guard HRFR Insulated Copper Cable | 25 | Mtrs | INR 700 | INR 17,500 |
| 5 | Surge Protector Device | LSG Protect BC100 Imported 3 Phase 1+2 Combicontrol 100KA AC Surge protection device | 1 | No | COMPLEMENTARY | COMPLEMENTARY |
| 6 | Lightning Strike counter | LSG PROTECT Imported 6 Digit analogue lightning strike counter | 1 | No | INR 10,000.00 | INR 10,000.00 |
| 7 | Equipotential bonding Device | LSG PROTECT EQB50, Lightning impulse current Limp 50KA 10/350, I _{max} 8/20 50KA, Protection against reverse path effect and equal distribution of lightning current to earth rods. | 1 | No | INR 8,500.00 | INR 8,500.00 |
| 8 | Installation | Installation of ESE Lightning Protection System, tester system, SPDs with Down conductor routing from the LA terminal to the earth pit. Earth termination, fixing & Backfilling | 1 | Job | INR 9,000 | INR 9,000 |
| Quotation Valid For 20 days | | | | GRAND TOTAL | | INR 99,900.00 |

Terms & Conditions

- 1 Price Landed at site
- 2 Customers Scope: Material safety will be customer scope after delivery
- 3 Approvals /Permission of work/storage of tools & equipment/safety etc : At customers scope

Thank you,

Best Regards



ELSAFE PROTECTION & CONTROL SYSTEMS

CALL US AT 0731-4600-313

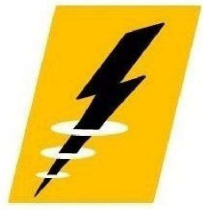


Doc. No. : ES242512121

Rev. No. :

Rev. Date :

THUNDER **GUARD**®



LSG PROTECT®

**TAKE
THE
EXTRA
STEP
TO
SAFETY**



ESE LIGHTNING ARRESTERS

THUNDER GUARD

ThunderGuard series ESE Lightning Arresters Developed and designed in our highly advanced labs is specially designed with unique design philosophy as per NFC-French Standard.

Thunderguard adopts synthesis techniques of leader discharge, impedance to limit current, air-gap discharge etc to produce leader channel in advance, improve lightning effect, reduce discharge voltage and change the discharge process of lightning current.

Thus it broaden the lightning wave, flatten the leading wave, decrease the amplitude and enlarge the scope of protection avoiding side striking and shielding failure then finally actively suppress the damage of Ground Potential Counter attack. Therefore it is an ideal device to prevent direct lightning.

ThunderGuard Series ESE lightning Arresters come in with widest Protection coverage area. Find Our protection radius coverage table for reference.



| LSG THUNDERGUARD PROTECTION RADIUS | | | |
|------------------------------------|------|-----------------|-----------------|
| | H(m) | ThunderGuard 30 | ThunderGuard 60 |
| LEVEL 1 | 2 | 20 | 32 |
| | 3 | 30 | 48 |
| | 4 | 40 | 65 |
| | 5 | 50 | 79 |
| | 6 | 50 | 79 |
| | 8 | 51 | 79 |
| LEVEL 2 | 10 | 51 | 81 |
| | 2 | 23 | 38 |
| | 3 | 35 | 55 |
| | 4 | 47 | 74 |
| | 5 | 58 | 89 |
| | 6 | 58 | 90 |
| LEVEL 3 | 8 | 59 | 92 |
| | 10 | 60 | 92 |
| | 2 | 27 | 42 |
| | 3 | 40 | 62 |
| | 4 | 53 | 82 |
| | 5 | 66 | 99 |
| LEVEL 4 | 6 | 66 | 99 |
| | 8 | 68 | 101 |
| | 10 | 69 | 101 |
| | 2 | 30 | 45 |
| | 3 | 45 | 65 |
| | 4 | 59 | 87 |
| LEVEL 4 | 5 | 74 | 108 |
| | 6 | 74 | 108 |
| | 8 | 76 | 110 |
| | 10 | 77 | 111 |



ESE LIGHTNING ARRESTERS **THUNDER GUARD**

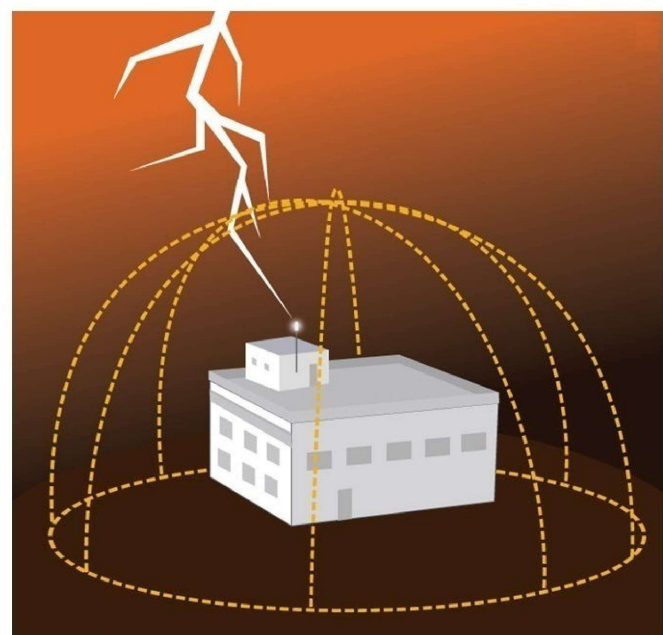
Product Structure:

- Central bar
- Reflector
- Trigger gear
- Exciter
- Dead plate of exciter
- Trigger gear, reflector and central bar all are insulating
- Reflector and central bar show good electrical connection to the earth
- The base of exciter is made up of synthetic resin thus applicable to any corrosion environment



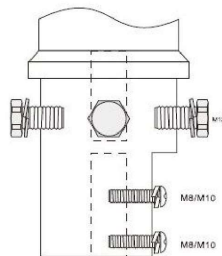
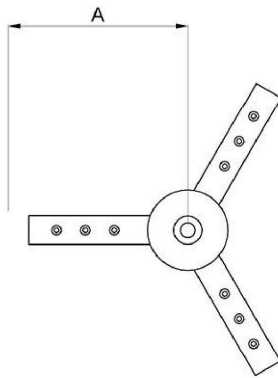
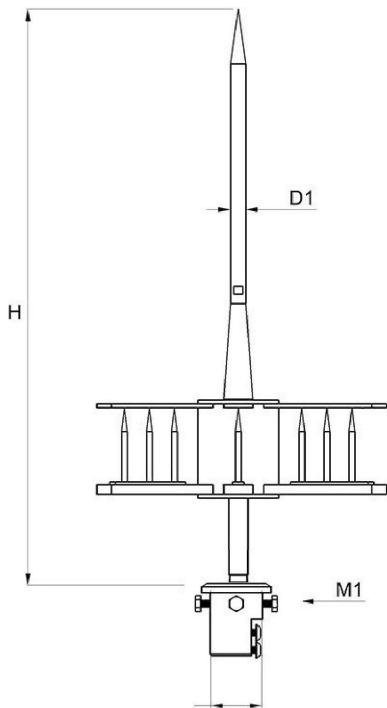
Advantages:

- Non-electronic type, long life.
- Guaranteed electrical continuity and sustainability after repeated lightning strike.
- High radius of protection for user selection.
- Non-electrical system, will not be effected by surge impact.
- Only self-activated during lightning strike and initiative intervene the lightning protection system.



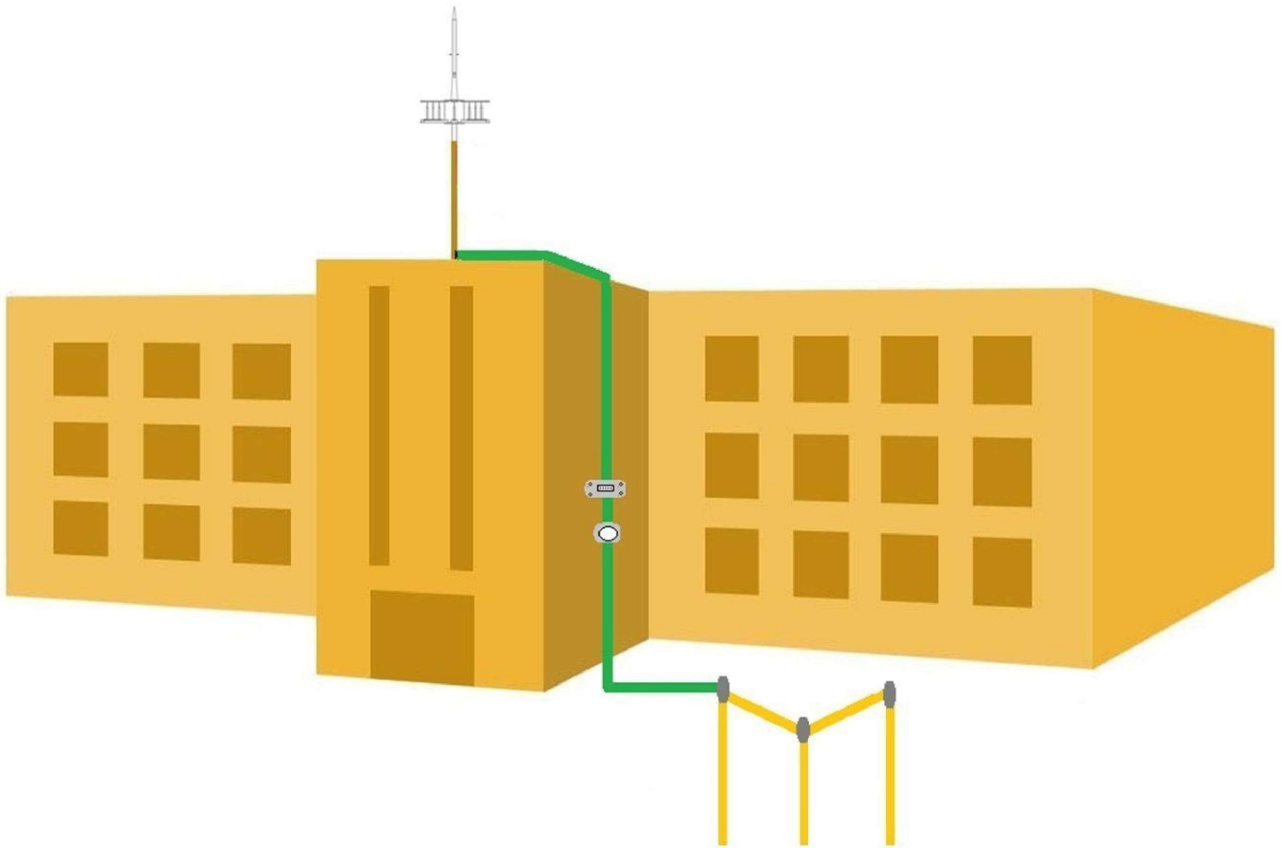
ESE LIGHTNING ARRESTERS **THUNDER GUARD**

Thunderguard 30



LSG TGD30[®] protection (UNE 21.186:2011, NFC 17.102:2011 and NP 4426:2013)

| Content No | Material | Height (mm) | Dimension (mm) | Weight (mm) |
|------------|-----------------|-------------|----------------|-------------|
| 232111 | Stainless Steel | 650 | 18 | 3700 |



LSG PROTECT

No.1 avenue de Luxembourg, Europa tower, 94320 Thiais, France
www.lsgprotect.com, cs@lsgprotect.com
Contact No 0033-7-61-52-75-00

CPRI

TEST REPORT



Central Power Research Institute

**(A Govt. of India Society,
P.B. No. 8066, Sadashivanagar, P.O.
Prof. Sir. C.V. Raman Road,
Bangalore - 560 080**



केन्द्रीय विद्युत अनुसंधान संस्थान

(भारत सरकार की सोसाइटी, विद्युता मंत्रालय)

प्रो.सर.सी.वी. रामन रोड, सदाशिवनगर डाक घर, पो.बा.सं. 8066, बेंगलूरु - 560 080

CENTRAL POWER RESEARCH INSTITUTE

(A.Govt.of India Society, Ministry of Power)

Prof. Sir C.V. Raman Road, Sadashivanagar Post Office, P.B. No. 8066, Bengaluru - 560 080 India

वेब सइट / website :<http://www.cpri.in>

सं./No. CPRI BLRHVDMISC19T0151

दिनांक/Date: 07-03-2019

सेवामें /To

म/एस. एनरटेक पावर सॉल्यूशन,
15/513 (59), पहली मंजिल, तीन सितारा प्लाजा,
स्टेडियम बायपास, पलक्कड़, केरल- 678013.

M/s. Enertek Power Solution,
No 15/513(59),1st Floor, Three Star Plaza,
Stadium Bypass, Palakkad, Kerala- 678013.

विषय/ Sub:-परीक्षणरिपोर्ट/ Test Report

महोदय /Dear Sir(s),

आपके दिनांक 18-12-2018 के अनुरोध पर रिपोर्ट सं CPRI BLRHVDMISC19T0151 दिनांक 07-03-2019 इसके साथ संलग्न है।

With Reference to your request dated 18-12-2018 we are enclosing herewith report No./s CPRI BLRHVDMISC19T0151 dated 07-03-2019 कृपया पावती भेजे / kindly acknowledge the receipt of the same.

कृपया ध्यान दें कि संलग्न परीक्षण रिपोर्ट में विषमताएँ /विसंगतियाँ, यदि कोई पाई गई तो इस पत्र की प्राप्ति के 45 दिनों के अंदर सीपीआरआई के ध्यान में लाएँ।

Please note that anomalies/discrepancies in the test report enclosed, if any, shall be brought to the notice of CPRI within 45 days of receipt of this letter.

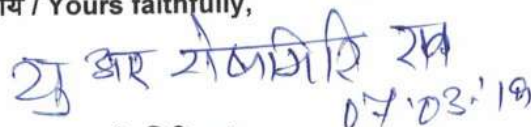
साथ ही, कृपया ध्यान दें कि इस पत्र के जारी दिनांक से 15 दिनों के भीतर परीक्षण के लिए लाए गए नमूने तथा उनके साथ लाई गई अतिरिक्त सामग्री उच्च वोल्टता प्रयोगशाला के परिसर से हटा दी जाएँगी। उपरोक्त अवधि के बाद किसी भी दावे पर विचार नहीं किया जाएगा तथा कुछ और दिनों के लिए नमूनों को रखने के लिए इस अवधि के अंदर कोई लिखित अनुरोध की अनुपलब्धि पर सीपीआरआई के मानकों के अनुसार नमूनों का निपटारा किया जाएगा।

Also, please note that the samples and any additional material brought along with them for the testing shall be removed from the High Voltage Laboratory premises within 15 days from the date of issue of this letter. No claims will be entertained after the above period and samples will be disposed off as per CPRI norms, unless written request is received within this period for retaining the samples for a few more days.

भविष्य में भी हमारी सर्वोत्तम सेवाओं का आश्वासन तथा धन्यवाद के साथ।

Thanking you and assuring you of the best of our services in the future also.

भवदीय / Yours faithfully,


07.03.19

(यू.आर.शेषगिरिराव)

U. R. SHESHAGIRI RAO

संयुक्त निदेशक और एचओडी / JOINT DIRECTOR & HOD

उच्चवोल्टताप्रभाग / HIGH VOLTAGE DIVISION

CENTRAL POWER RESEARCH INSTITUTE
(MEMBER STL)



TEST REPORT

Test Report Number : CPRIBLRHVDMISC19T0151 **Dated:** 07-03-2019

Name & Address of the customer : Enertek Power Solution,
No 15/513(59), 1st Floor, Three Star Plaza,
Stadium Bypass, Palakkad, Kerala-678013.
Ref: e-mail **Dated:** 18-12-2018

Name & Address of the Manufacturer : LSG Protect India,
#204, Lake view complex Nallasopara,
Palghar, Mumbai, Maharashtra 401209.

Particulars of Samples tested
Condition of the sample on Receipt : New.

Type : Thunderguard 60 ESE Lightning Arrester.
Description : Nil.
Serial Number : TGD 60/001.
Number of samples tested : One.
Date(s) of Test(s) : 18-12-2018 & 20-02-2019.
CPRI Sample Code Number : HVD18S0243.

Particulars of tests conducted : **Lightning Impulse Current withstand Test 8/20 μ s**
(60kA).

Test in accordance with standard/ Specification : As per Customer's Request.
Sampling Plan : Not Applicable
Customer's requirement : As per the Test Procedure declared by the Customer
(See Page 2).

Deviations if any : Nil.

Name of the witnessing persons
Customer's representatives : Shri. Sreenath .S.
Shri. Manish. J.

Other than customer's representatives : None.
Test subcontracted with Address of the laboratory : None.

Documents constituting this report (in words)
Number of sheets : Five.
Number of oscillogram/s : Six (Plus Two Sheets of Oscillograms).
Number of graphs : Nil.
Number of photo/s : Nil.
Number of Test Circuit Diagrams : Nil.
Number of drawings : One (1812001 REV 0).


(PRABHAKAR C.)
Test Engineer




(U. R. SHESHAGIRI RAO)
Joint Director/HOD
Approved By

CENTRAL POWER RESEARCH INSTITUTE
(MEMBER STL)

TEST REPORT



Test Report No. CPRIBLRHVDMISC19T0151

Dated: 07-03-2019

TEST PROCEDURE

Three positive & Three negative lightning impulse current shots of 8/20 μ s wave shape with a magnitude of 60kA (less than one pulse for three minutes) shall be applied through the input. The Sample should be checked for any physical deformation or discoloration after testing. The test was conducted as per the above procedure and the results are tabulated below.

Lightning Impulse Current Withstand Test:

| Sl. No. | Polarity | Current Applied (kA) | Osc. No |
|---------|----------|----------------------|---------|
| 1 | +Ve | 61.0 | 58400 |
| 2 | | 59.0 | 58401 |
| 3 | | 59.3 | 58402 |
| 4 | - Ve | 60.5 | 58403 |
| 5 | | 59.4 | 58404 |
| 6 | | 60.3 | 58405 |

(PRABHAKAR C.)
Test Engineer

CENTRAL POWER RESEARCH INSTITUTE
(MEMBER STL)

TEST REPORT



Test Report No. CPRIBLRHVDMISC19T0151

Dated: 07-03-2019

Photo 1. Before the Test

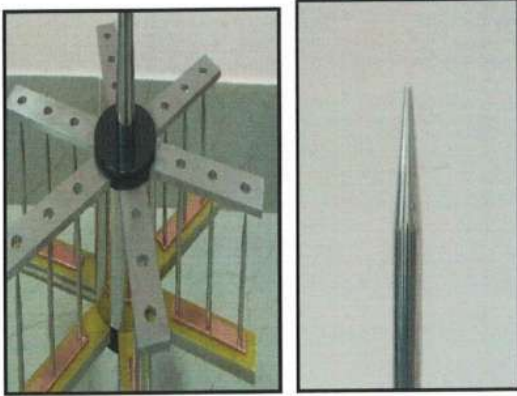


Photo 2. After the Test

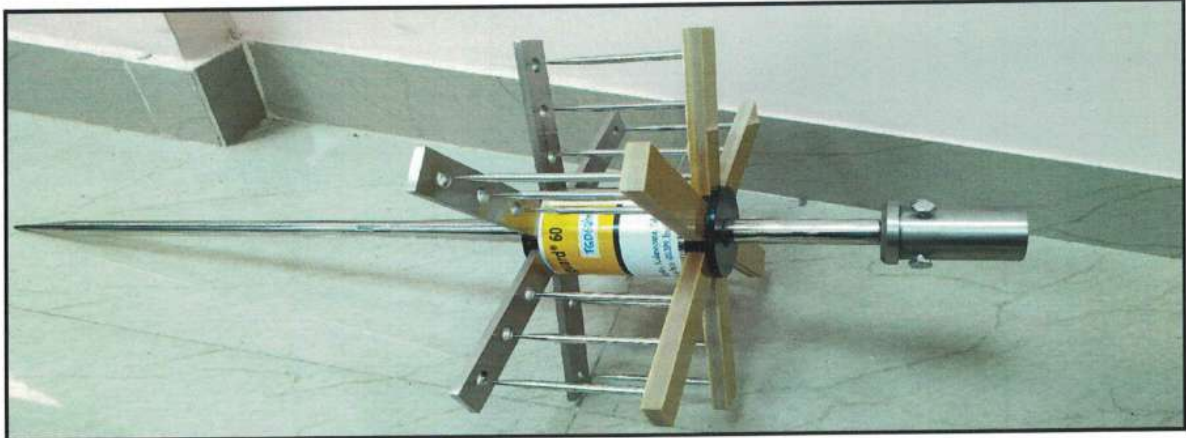
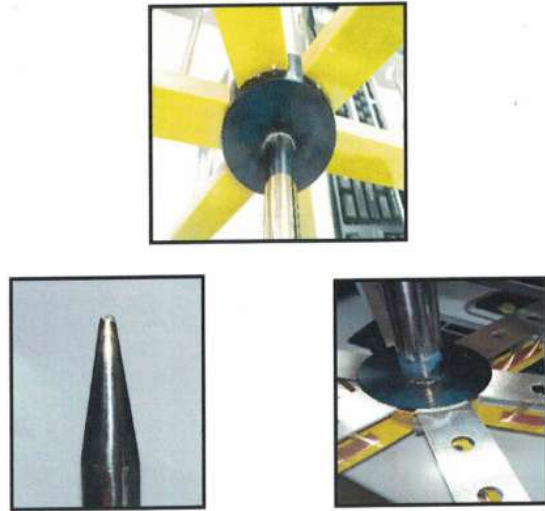


Photo 3.

(PRABHAKAR C.)
Test Engineer

CENTRAL POWER RESEARCH INSTITUTE
(MEMBER STL)

TEST REPORT



Test Report No. CPRIBLRHVDMISC19T0151

Dated: 07-03-2019

Observations: Sample is subjected to the required current impulses.

No physical deformation observed.

Laboratory Atmospheric conditions during the above tests.

| Temperature in Degree Celsius | | | Atmospheric Pressure in mm of Hg. |
|-------------------------------|----------|----------|--------------------------------------|
| Date | Dry Bulb | Wet Bulb | |
| 18-12-2018 | 23.5 | 19.0 | 684.5 |
| 20-02-2019 | 28.0 | 22.0 | 683.5 |

(PRABHAKAR C.)
Test Engineer

CENTRAL POWER RESEARCH INSTITUTE
(MEMBER STL)

TEST REPORT



CPRI

Test Report No. CPRIBLRHVDMISC19T0151

Dated: 07-03-2019

NOTE:

- a) The Test results relate only to the item(s) tested.
- b) Publication or reproduction of the test report /Certificate in any form other than by complete set of the whole test report /Certificate and in the language written is not permitted without the written consent of CPRI.
- c) Any Corrections/erasure invalidates the test Report/Certificate
- d) Any anomaly/discrepancy in the test report /Certificate should be brought to the notice of CPRI within 45 days from the date of issue.
- e) The verification of the sample drawings by CPRI is limited to dimensional checks only wherever possible.

(PRABHAKAR C.)
Test Engineer



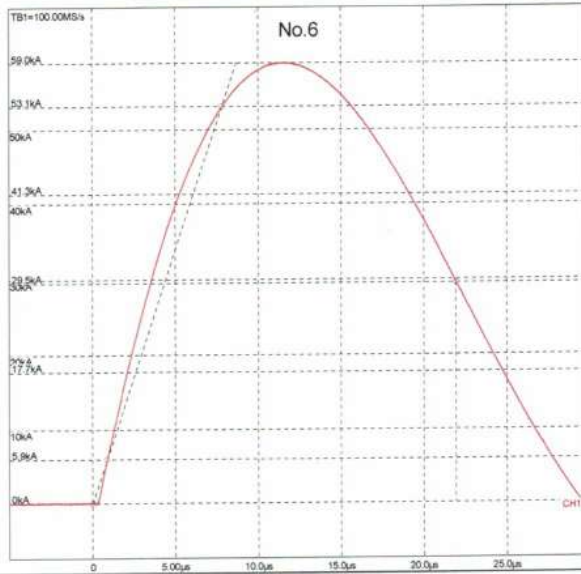
CPRI

Lightning Impulse Current Withstand Test – Positive polarity



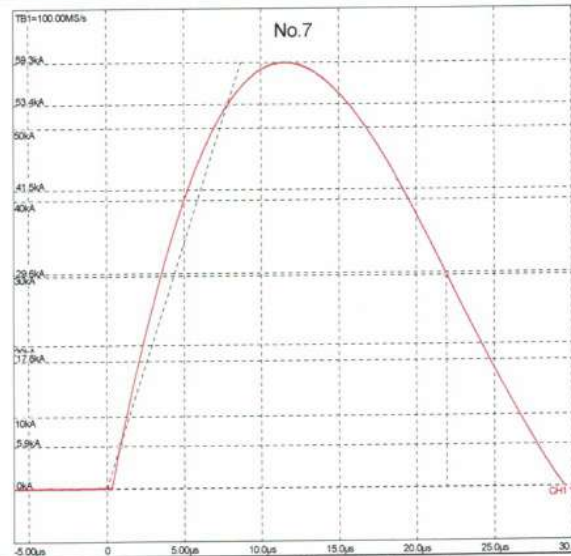
No.: 58400
 CH1 No. 58400
 Eval.: IC
 Ip= 61kA
 T1= 8.66µs
 T2= 21.9µs
RESULTS
 Q= 0.9872C

Shot No. 1



No.: 58401
 CH1 No. 58401
 Eval.: IC
 Ip= 59kA
 T1= 8.67µs
 T2= 21.9µs
RESULTS
 Q= 0.9582C

Shot No. 2



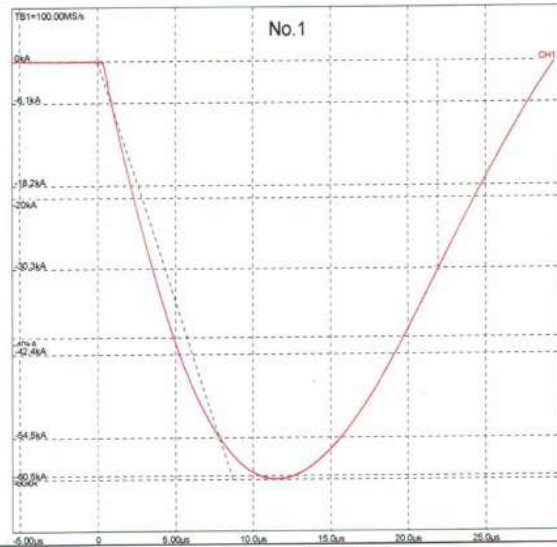
No.: 58402
 CH1 No. 58402
 Eval.: IC
 Ip= 59.3kA
 T1= 8.68µs
 T2= 21.9µs
RESULTS
 Q= 0.9611C

Shot No. 3



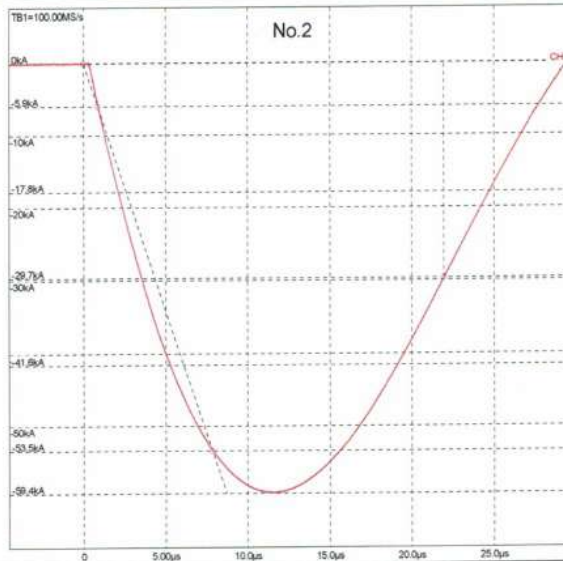
CPRI

Lightning Impulse Current Withstand Test – Negative polarity]



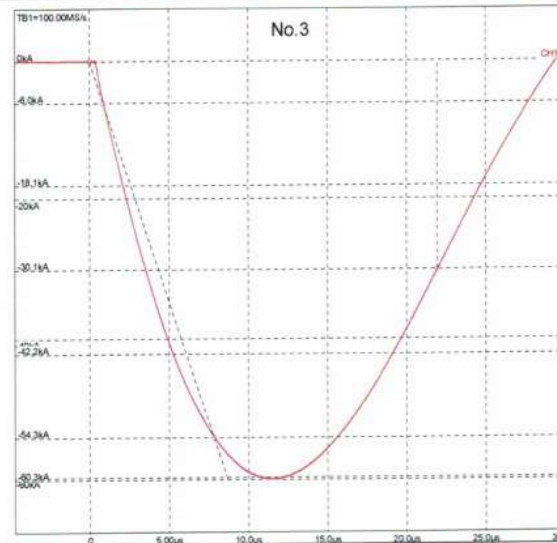
No.: 58403
 CH1 No: 58403
 Eval.: IC
 Ip= -60.5kA
 T1= 8.68µs
 T2= 21.9µs
RESULTS
 Q= -0.9948C

Shot No. 1



No.: 58404
 CH1 No: 58404
 Eval.: IC
 Ip= -59.4kA
 T1= 8.7µs
 T2= 22µs
RESULTS
 Q= -0.9765C

Shot No. 2

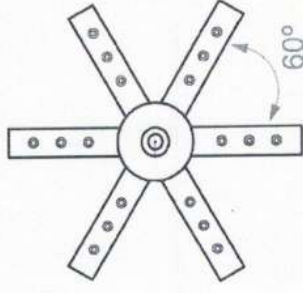
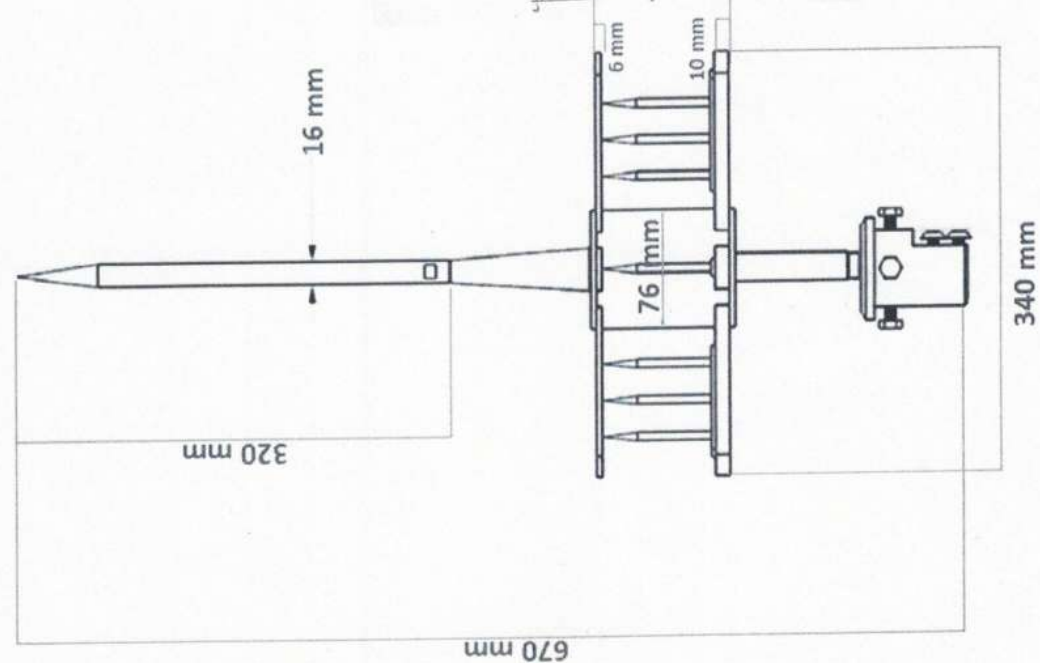


No.: 58405
 CH1 No: 58405
 Eval.: IC
 Ip= -60.3kA
 T1= 8.69µs
 T2= 22µs
RESULTS
 Q= -0.9902C

Shot No. 3

Model: THUNDERGUARD® 60

1. MATERIAL: Stainless steel-302
2. PRODUCT : Lightning Arrester



इस रेखाचित्र परीक्षण दस्तावेज
 सं. सीआरआईवीएलआरएचबी.....से संबंधित है।
 THIS DRAWING PERTAINS TO TEST REPORT
 No. CPRI/RLHV/PM/ISC/19/TO/51.....
 Dated.....07.03.2019.....

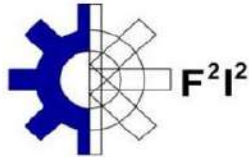
(Signature)

संयुक्त निदेशक
 Joint Director
 उच्च वोल्टेज प्रभाग
 High Voltage Division
 केन्द्रीय विद्युत अनुसंधान संस्थान
 Central Power Research Institute
 पो. बा. सं. 8066
 P.B. No. 8066
 बेगलूर - 560 080
 Bangalore-560 080

“यस चित्र को परीक्षण पर दस्तावेज”
 आभाषी को परीक्षण सीमित है।
 98 mm
 “ATTESTATION OF THIS DRAWING IS
 LIMITED TO THE CHECKING OF
 IMPORTANT DIMENSIONS ONLY”

| | | | | |
|-----------------------------------|-----------|---|----------------------|--|
| Material: | SEE NOTES | This drawing and any information or drawings prepared on it are the confidential and copyright property of LSG PROTECT INDIA and MUST NOT BE DISCLOSED, COPIED, LOANED in whole or part for any purpose without the written permission. | Description: | THUNDERGUARD® 60 Lightning rod with ESE (Early Streamer Emission) system |
| Product: | SEE NOTES | | Drawn by: | MANISH SINGH |
| Height (H) 670 mm Width 340 mm | | | Checked/Approved by: | KRISHNAKUMAR |
| Drawing Scale: 1:1 | | | Document Type: | Company Confidential |
| Approx Weight: 5.20 KG | | | Legal Owner: | LSG PROTECT INDIA |
| Projection Method: | | | Part Number: | 1 |
| Sheet Size: | | | Drawing Number: | 1812001 |
| | | | Revision: | 0 |

Dimensional Tolerance: +/- 5%



FUNDACIÓN PARA EL FOMENTO
DE LA INNOVACIÓN INDUSTRIAL

LCOE

LABORATORIO CENTRAL OFICIAL DE ELECTROTECNIA
FUNDACIÓN PARA EL FOMENTO DE LA INNOVACIÓN INDUSTRIAL
UPM Technological Center – Tecnogetafe
C/ Eric Kandel, 1 – 28906 Getafe (Madrid)
www.f2i2.net

TEST REPORT

2019 11 3F 0420-M

| | |
|-------------------------|---|
| TESTED DEVICE | ThunderGuard (TGD) Lightning E.S.E. (Early Streamer Emission Lightning Conductor) |
| REQUESTED BY | GENIUS PROTECTION SYSTEM PVT LTD Rama Market, Munirka, New Delhi. INDIA |
| APPLIED STANDARDS | NFC 17-102 September 2011 Standard UNE 21186:2011, Article C.3.4 100 kA 10/350 μ s. |
| Beginning of tests date | 10/11/2019 |
| End of tests date | 10/11/2019 |

This test report consists of pages 7 and 2 appendixes

Authorized signatory

Date of issue: 19/12/2019

2019.12.19
2 15:39:55
+01'00'



Mr. Abderrahim Khamlichi
Technical Responsible of HV Testing

Tested by: Mr. Juan Pablo Vega
HV Test Technician

CONDITIONS OF VALIDITY FOR THIS DOCUMENT:

- The results of the tests refer exclusively to the sample which was tested.
- The above mentioned sample is described in this report. If any modification of the sample has been made after it has been received, the details will also be given in the report and further documented in LCOE files.
- Partial reproduction of this document is prohibited
- This report will be considered void if it is altered in any way without prior authorization.

A. GENERAL DESCRIPTION

1. TESTED MATERIAL
 - 1.1. Marking
 - 1.2. Specimen description
2. TYPE OF TESTS
 - 2.1 Lightning impulse current withstand test:
100 kA of 10/350 μ s waveform
3. APPLIED STANDARDS
4. GENERAL DETAILS
 - 4.1 Ambient conditions.
5. MEASUREMENT UNCERTAINTY

1. TESTED MATERIAL

One (1) ThunderGuard (TGD) E.S.E. (Early Streamer Emission Lightning Conductor) was supplied to LCOE

1.1. Marking

Manufacturer: LSG PROTECT

Serial Numbers: s/n

1.2. Specimen description

The specimen, according to the customer, consists of one Early Streamer Emission Lightning Conductor.

2. TYPE OF TESTS

2.1 Lightning impulse current withstand test:
100 kA of 10/350 μ s waveform

$I_{peak} = 100 \text{ kA} \pm 10 \%$
 $W/R = 5625 \cdot \text{kJ}/\Omega \pm 35\%$
 $Q = 75 \text{ C} \pm 20 \%$
Duration < 10 ms.

3. APPLIED STANDARDS.

The test referred in section 2 has been made with applied current impulses waveforms, 100 kA of 10/350 μ s, according to NFC 17-102 September 2011 Standard and UNE 21186:2011, Article C.3.4.

4. GENERAL DETAILS

Tests were carried out at the L.C.O.E. facilities in Getafe, located in Diesel Street No 13, Industrial park El Lomo, 28906 Getafe, Madrid

Tests were performed by:

Juan Pablo VEGA
Ángel Ramírez

FFII –LCOE
FFII –LCOE

4.1 Ambient Conditions

Ambient conditions during the tests were:

Temperature: $25^{\circ}\text{C} \pm 3^{\circ}\text{C}$
Humidity: $40\% \pm 20\%$.

5. GENERAL DETAILS

The uncertainty of the test is calculated and at the disposal of the applicant.

B. TESTS

- I. TEST PROCEDURE
- II. TEST RESULTS

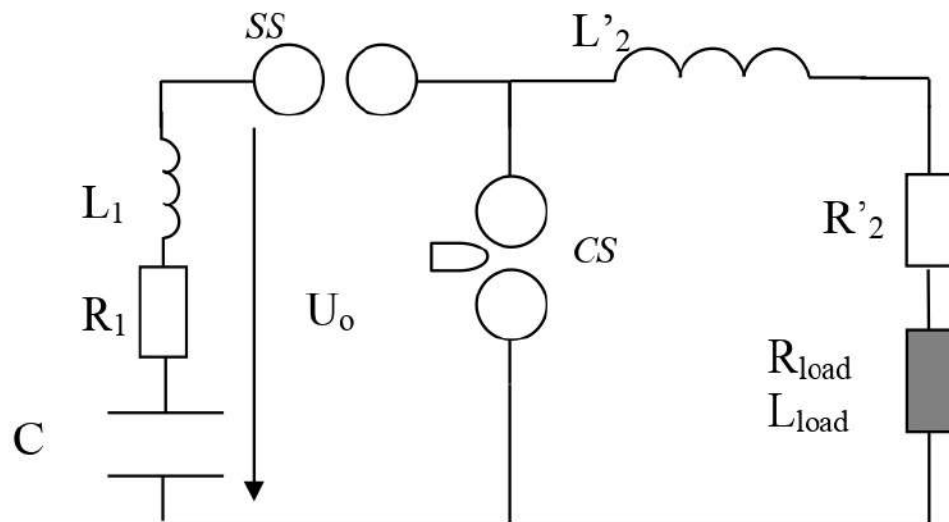
I. TEST PROCEDURE

I.1 INTRODUCTION

The purpose of the tests described in this report has been to test whether the tested sample has the ability to drain discharges of high current amplitude and high specific energy.

I.2 LIGHTNING TEST CURRENT GENERATION

It can be seen in figure 1 a schematic of the circuit generation for current impulses.



I.3 TEST PROCEDURE

The tested sample was subjected three times to a lightning impulse current of 100 kA of peak and 5625 kJ/Ω of specific energy. Sufficient time was allowed between each applied impulse in order to enable the sample to cool down to ambient temperature.

II. TEST RESULTS

II.1. Tabulated results

Table 1. Tabulated results for the tests

| Test | I_{peak} (kA) | W/R (kJ/Ω) | Q (C) | T₁ (μs) | Visual inspection |
|-------------|----------------------------------|-----------------------|------------------|-------------------------------|------------------------------|
| RJ28-02 | 97.3 | 5714 | 73.4 | 22.2 | OK |
| RJ28-03 | 98.9 | 5921 | 76.0 | 22.2 | OK |
| RJ28-04 | 98.4 | 5904 | 75.6 | 22.2 | OK |

II.2. Conclusions

The tested sample has successfully passed the test.

Appendix I

To Test Report

Photographs and current impulses waveforms

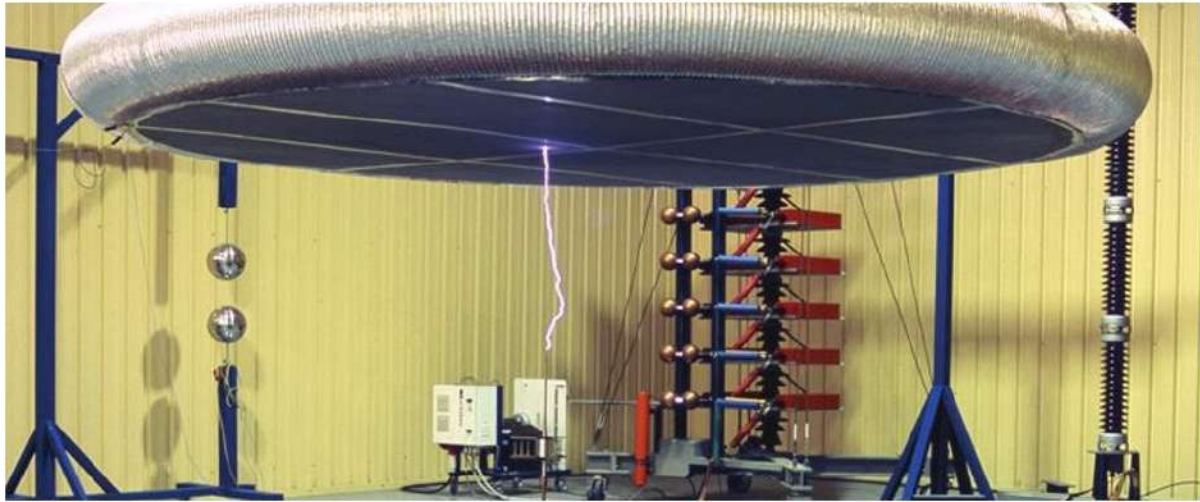


Figure . Test rig.

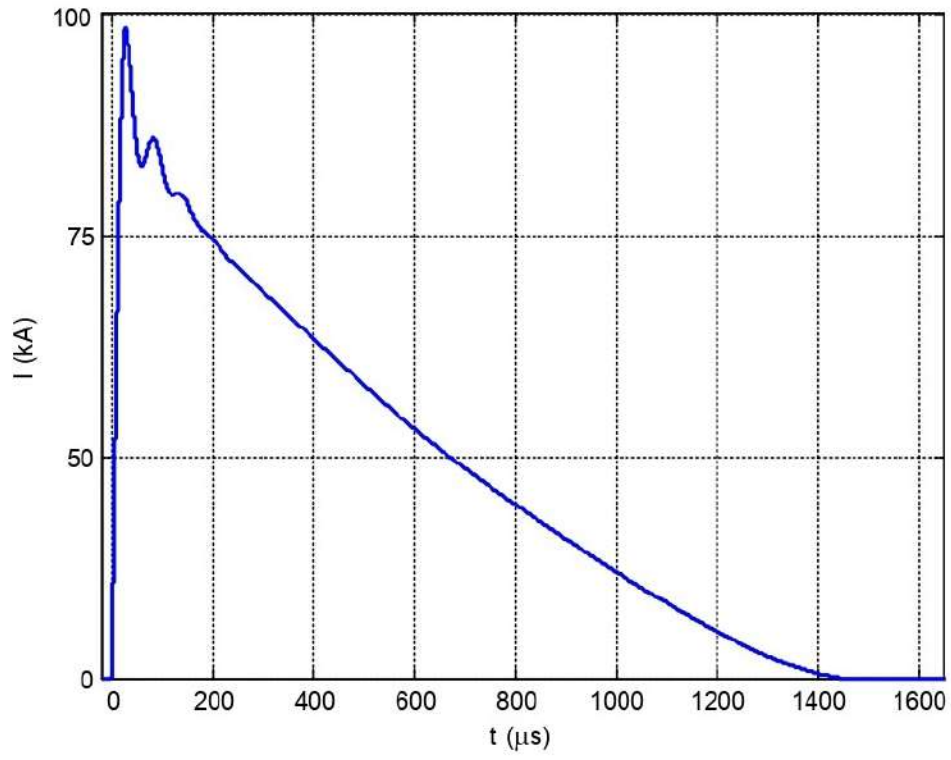


Figure. RJ28-02. Total Current Injected.

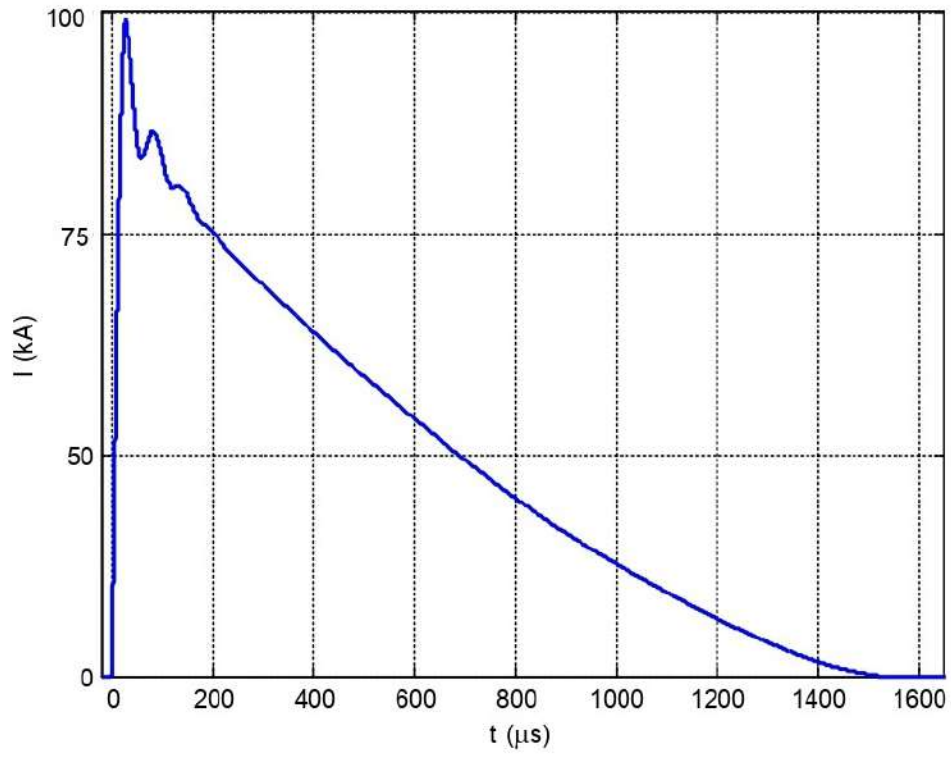


Figure . RJ28-04. Total Current Injected.

1. Test Facility

The component A and D waveforms were generated using a 52 μF capacitor bank charged up to 75 kV and a crowbar device. The output current waveform can be modified by varying the inductance and resistance in the generator and load circuit.

2. Measurement Systems and Calibration

Current Measuring System

Reference Number: III-4-IC-04

Acquisition:

Digital Storage Oscilloscope
Manufacturer: Yokogawa
Model: DL-750
Serial Number: 701210-F-J1-HE/C8
Reference number: III-1-OS-006

Measurement Software:

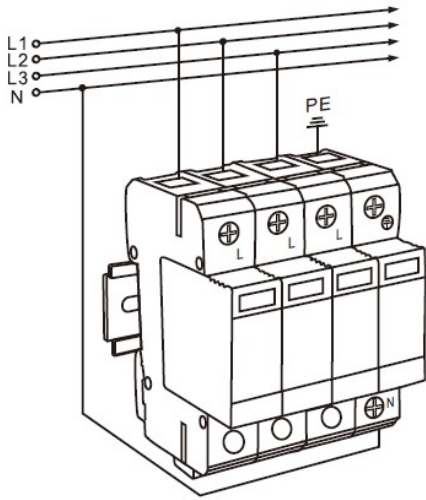
Reference number: III-1-SOFT-016
Ver. 1.0.3.

Last Calibration Date:

September 2019



AC SPD MODULE MODEL: **LSGBC50(2022)**



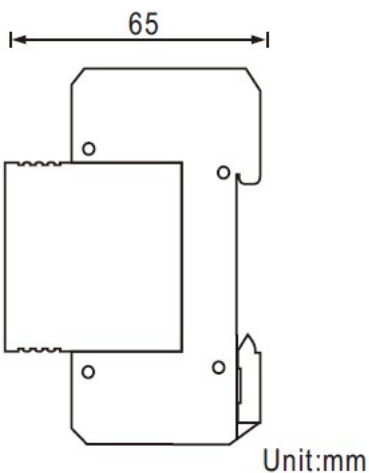
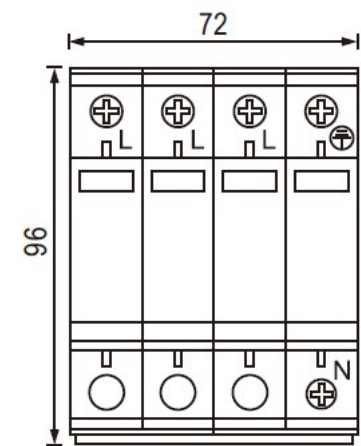
APPLICATIONS

- B+C class Surge Protective Device for AC Power System.
- Sensitive electronic equipment
- Telecom centers
- Automatic control centers
- Intelligent buildings
- Industrial enterprises
- Medical institutes

FEATURES:

- DIN rail mounting for easy installation
- Plug connectors for quick and easy connection or rewiring
- 50kA lightning impulse current Iimp
- Thermal disconnect device
- Status indicators visually verify protection level

TECHNICAL PARAMETER:



| Model | LSGBC50-2022 |
|--|--|
| Electrical Parameter | |
| Nominal working voltage Un | 50/60Hz 220/380V, |
| Max. continuous operating voltage Uc | 385V |
| Nominal discharge current (8/20μs) In | 50kA |
| Lightning impulse current(10/350μs) Iimp | 25kA |
| Protection level @20kA, 8/20μs Up | 1500V |
| Response time tA | <25ns |
| Protection model | L1/L2/L3-N,N-PE |
| Mechanical characteristics | |
| Dimension | 65 (H)×72 (W)×96(L)mm |
| Weight per unit | 0.47KG |
| Mounting | 35mm DIN rail |
| Connecting diameter | ≥10mm ² |
| IP code | IP20 |
| Working conditions | Temperature: -50 to 80°C, Relative humidity: ≤95% |
| Approval | FCC, CE, ROHS |

LSGBCN100 Power Surge Protective Device

Product Manual

Introduction

1. Standard : IEC 61643-11:2011 Low Voltage Surge Protective Devices (SPD) Part 11: Performance requirements and test methods for surge protective devices for low-voltage power supply systems.
2. Features : surge protective device has over-voltage protection, over-current protection, over-heat protection, fault indication, and remote signal alarm function. The product has good sealing, dust-proof, flame-retardant functions, and can work stably for a long time in harsh environments .
3. Application Scope: AC power line protection for low-voltage power supply systems and lightning surge protection for power equipment.
4. Working Environment: Installed indoors; the temperature is $-5^{\circ}\text{C} \sim +40^{\circ}\text{C}$, the humidity is $5\% \sim 95\%$; the air pressure is between $80 \text{ kPa} \sim 106 \text{ kPa}$, the corresponding altitude is $+2000\text{m} \sim -500\text{m}$.

Technical Parameters

Table 1: Specification Parameter Table of Power Surge Protective Device

| parameter Model | Maximum Continuous Operating Voltage U_c | Nominal Discharge Current I_n (kA) | Maximum Discharge Current I_{max} (kA) | Voltage Protection Level U_p (kV) | Protection Mode | L1×W×H (mm) 1P |
|--------------------|--|--------------------------------------|--|-------------------------------------|----------------------------------|-------------------|
| LSGBCN100 | 275V AC | 60 | 100 | 2.5 | 1. L-PE N-PE 2. L-N-PE | 91*27*66 |

Mark: 1P means 1 module, when the protection mode is 1, the product has a combination of 1P, 2P, 3P, 4P, when the protection mode is 2, the product is a 3+1 combination; when the nP module is combined, the width is 1P width×n, length And the height does not change.

Installation Parameters

1. All levels of surge protective device for power lines should be installed at the entrance of the line into the building, the interface of the lightning protection zone and near the protected equipment.
2. The phase wire of the surge protective device should be connected by copper wire with a cross-sectional area $\geq 6\text{mm}^2$, and the grounding wire should be connected by a copper wire with a cross-sectional area $\geq 10\text{mm}^2$. The connecting wire should be as short, straight and neat as possible, and its length should not exceed 0.5m, and the grounding resistance should be less than 10Ω .
3. The bend angle of the grounding wire and the surge protective device connection wire should be greater than 90 degrees when turning, and the bend radius should be greater than 10 times the diameter of the wire. It is forbidden to make a loop when the connection wire is installed.
4. The wiring method for protection mode L-PE, N-PE (take 4P as an example) is shown in Figure 1, and the wiring method for protection mode LN-PE (take 3+1 as an example) is shown in Figure 2; the product has a remote monitoring and alarm function , the wiring method is shown in Figure 3 , and the product appearance size diagram is shown in Figure 4; the appearance of all products involved in the diagrams shall prevail in kind!

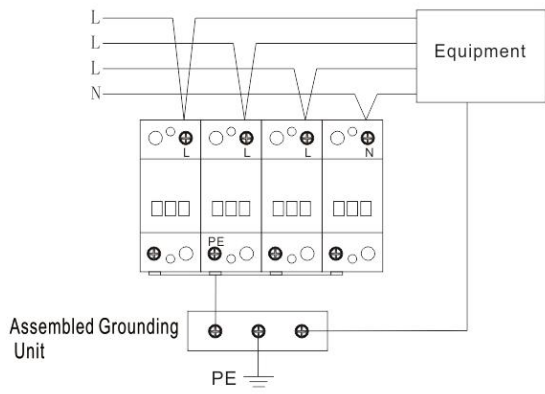


Figure 1: L-PE N-PE protection mode (4P) wiring diagram

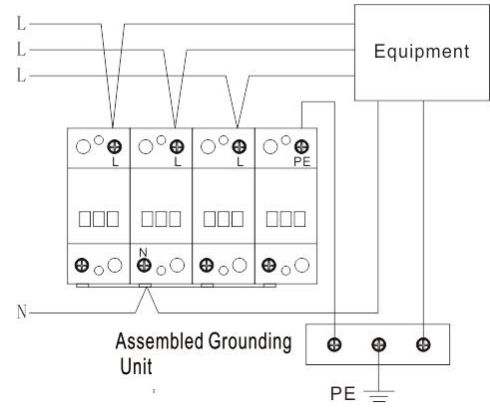
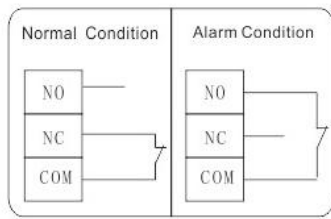
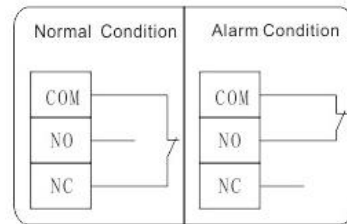


Figure 2: L-N-PE protection mode (3+1) wiring diagram



Mode 1



Mode 2

Figure 3: Schematic diagram of remote alarm status as mode 1, where DK-50G is as mode 2.

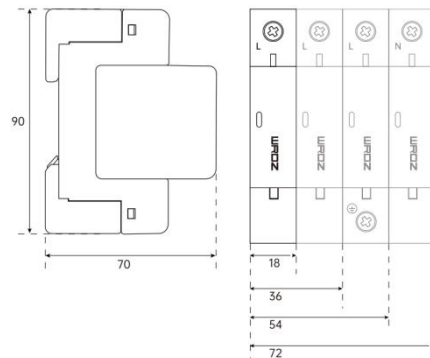


Figure 4: Schematic diagram of product size

Maintenance

For modules with an indicator window, when the module is damaged, the indicator window turns red. For modules without an indicator window, determine whether the module is damaged according to the status indication of the remote alarm terminal. See Figure 3 for details. If the module is damaged, remove the damaged module and replace it with a new one.

Lightning Strike Counter User Manual

I .Introduction

Lightning strike counter is a universal counter. When the lightning protection circuit system is normal, no current flows on the discharge line, and the lightning strike counter does not count; when lightning current discharge occurs in the line, the lightning protection circuit discharges lightning current to the ground, and there is current on the discharge line. When it flows through, the counter is coupled to the induced voltage, causing the counter to count.

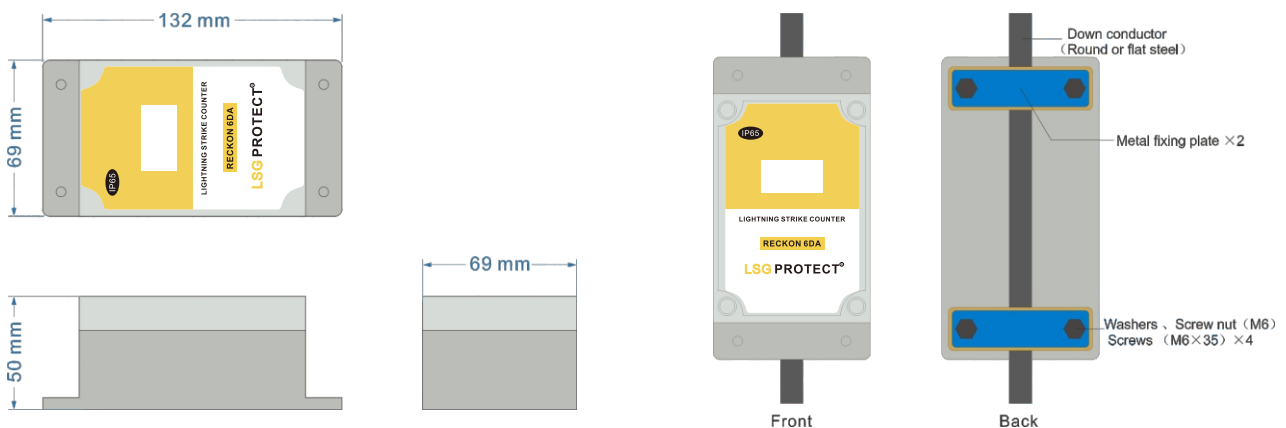
Lightning strike counter is suitable for all SPDs, lightning rods, etc. It can sense and discharge lightning current, and the cumulative number of lightning strikes is displayed on the counter. The product counts accurately and does not malfunction; it works without power supply, the counting value will not be lost for a long time, and cannot be reset to zero; it has dust-proof, waterproof and other functions.

II .Technical Parameters

1. Nominal Discharge Current I_n (8/20 μ s): 4kA ~ 150kA;
2. Impulse Discharge Current I_{imp} (10/350 μ s): 4kA ~ 50kA;
3. Maximum Diameter of Down Conductor $D \leq 20$ mm, Maximum Width of Flat Steel < 35mm, Thickness < 12mm;
4. Counting Number: 0-999999;
5. Protection Level: IP65;
6. L×W×H (mm) : 132×69×50, as below,
7. Working Temperature: -40°C ~ +85°C.

III. Installation

1. This product can be installed on the power SPD ground wire or lightning rod down wire using the matching screw and fixed metal sheet.
2. The power supply SPD ground wire or lightning rod down wire should be close to the plastic shell to avoid affecting the accuracy of counting.
3. After a thunderstorm, pay attention to check the counter value.



Product Installation Diagram

IV. Maintenance

This product works without power supply, requires no special maintenance, and is durable for a long time.

MODEL: EQB50
Equipotential connector manual

1) summarize

In order to prevent the difference in electric potential between various ground device, it is easy to strike back during lightning strikes, and equal potential connectors should be used.

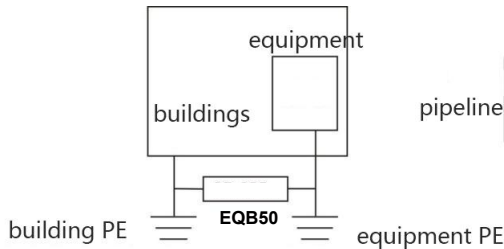
Equipotential connectors provide equipotential connections for non-charged metal part haven't connected to earth poles. The product can be used for equipotential protection between two close independent earth poles, insulation protection of insulation flanges, and metal devices that may exceed the voltage of 1kV or more in the ground network to prevent the risk of air discharge when lightning strikes. It can also be used for the oil (gas) pipelines which with cathodic corrosion protection function, which can prevent the danger of air discharge between metal pipelines and the earth pole. The interior of the equipotential connector is composed of two electrodes with a certain distance, and if a lightning strike occurs, gas discharge will occur in the insulated cavity due to the action of over voltage, so that the original isolation between the two electrodes will be transformed into a temporary electrical connection state, thereby eliminating the potential difference.

2) technical parameter

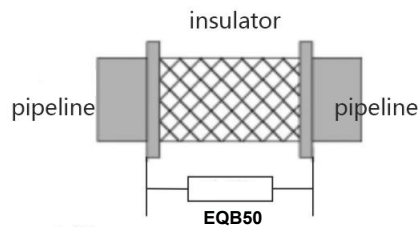
| | | |
|------------------------------------|----------------------------|--------|
| type | EQB50 | EQB100 |
| Lightning pulse current | 50ka | 100ka |
| Lightning pulse protection voltage | 1.5kv | |
| Response time | 100ns | |
| size | Φ 36*90 | |
| Connector | 10mm Stainless steel screw | |
| Protection class | IP66 | |

3) installation instructions

Equipotential connectors are installed between two different ground bodies and are secured by nuts and copper connectors. Cables should be connected using multi-strand copper conductors with a cross-sectional area of $\geq 25\text{mm}^2$. The cables should be short, straight, and neat. Wiring diagram as P1 P2.



P1 Industrial/civil buildings and electrical equipment Installation wiring diagrams



P2 Oil and natural gas pipeline installation wiring diagram

4) maintenance

The equipotential connector need tested at least once a year, or at any time as needed.



भारत सरकार Government of India
राष्ट्रीय परीक्षण शाला (द.क्षे.)
NATIONAL TEST HOUSE (SR)

तरमणी, चेन्नई - 600 113. Taramani, Chennai - 600 113.
Phone : 22432374, 22431157 Fax : 22433158 email : nthsr@tn.nic.in

परीक्षण प्रमाण पत्र

347218

TEST CERTIFICATE

INTERIM/FINAL REPORT

| परीक्षण प्रमाण पत्र नं Test Certificate No NTH(SR)/EL(C)/2014/00176A | जारी होने की तिथि Date of Issue 23/04/2014 | कोड नं Code No 1396938243840 | पृष्ठ Page 1 | पृष्ठों की संख्या No of Pages 2 |
|--|---|------------------------------------|--------------------|---------------------------------------|
| जिसे जारी करना है Issued To | TEKSAI POWER SECURE SOLUTION PVT.LTD. | | | |
| पता Address | 3/860, BLUE STAR INDUSTRIES COMPOUND, PUDUSSERY, KANJIKODE, PALLAKKAD, KERALA-678623 | | | |
| ग्राहक का सन्दर्भ सं एवं दिनांक Customer's Ref. No. | TPSS/2014 | Date: | 25/01/2014 | |
| पंजिका सं एवं दिनांक Register No & Date | 00176/NTH(SR)/EL(C)/08/04/2014 | | | |
| परीक्षण सामग्री का विवरण Description of Test Item | Earthing material | | | |
| परीक्षण सामग्री का पहचान Identification of Test Item | Printing marking on the bag:"Teksai-Ultra" | | | |
| नमूना का विशिष्टि (यदि हों) Product Specification (if any) | Electrical Resistivity test as per customer's specification | | | |
| नमूना प्राप्ति की तिथि Date of Receipt of the Test Item | 08/04/2014 | | | |
| कार्य सम्पादन की तिथि Date(s) of Performance of Tests | From: 08/04/2014 | To: | 23/04/2014 | |
| ब्यावहृत प्रणाली का पहचान Method(s) used for Test | Electrical Resistivity test as per customer's specification | | | |
| नमूना प्रक्रिया जहाँ प्रासंगिक हों Sampling Procedure where relevant | NA | | | |

Tested By

N. Joseph Kalai Selvan
Natarajan Joseph kalaiselvan

SO Electrical

Checked By

K. Jeyaraj

SO Electrical

Approved By

S.B. Nanda Kumar

Scientist-SC(Electrical)

**ARBRO™**PHARMACEUTICALS LIMITED
(ANALYTICAL DIVISION)

ISO 9001 : 2008 Certified

Govt. Approved Test House

4/9, Kirti Nagar Industrial Area, New Delhi-110 015

Tele : 011-45754575 Fax : 011-45754545

e-mail : arbrolab@arbropharma.com, Website : www.arbropharmaindia.com

CERTIFICATE OF ANALYSIS

P



Sample : **EARTHING BACKFILL COMPOUND** Report No. : NR-11060906
 Supplied By : N.S. Received On : 09/06/2011
 Submitted By : GENIUS PROTECTION SYSTEM. (P) LTD. Mfg.Lic.No. : N.S.
 Address : 248A, RATI COMPLEX, RAMA MKT., MUNIRKA, N DELHI. Ref. No. : N.S.
 Batch No. Mfg. Date Expiry Date Batch Size Sample Qty
 N.S. N.S. N.S. N.S. 100GM.

RESULTS OF ANALYSIS

Date of start of analysis 10-06-11 Date of Completion of analysis 13-06-11.

Description :- Black powder.

| <Sl.No.> | <Parameters> | <Results> | <Limit (MAX)> |
|------------------|----------------------|---------------------|---------------|
| B - TOXIC METALS | | : | |
| 1. | Mercury(as Hg) | :- 0.251ppm | 1000.0ppm |
| 2. | Lead(as Pb) | :- 8.225ppm | 1000.0ppm |
| 3. | Cadmium(as Cd) | :- 0.128ppm | 100.0ppm |
| 4. | Hexa-Chromium(as Cr) | :- Less than 1.0ppm | 1000.0ppm |

Remark :- Observed value for Pb,Cd,Hg & Cr+6 are very low from the max limit, Hence sample complies the ROHS.

REMARKS : PARTY ASKED FOR THE ABOVE TESTS ONLY

Page 1 of 1

Date : Monday, June 13, 2011

Person In Charge

ZERTIFIKAT CERTIFICAT CERTIFICADO BELGESI CERTIFICATE

CE



ACCREDIUM CERTIFICATIONS

ASSESSMENT SERVICES INTERNATIONAL



The American National Standards Institute (ANSI) supports its members and constituents to strengthen the U.S. marketplace position in the global economy while helping to assure the safety and health of consumers and the protection of the environment.

Certificate of Compliance Appendix-I to Certificate No: AC1599

This Appendix shall be an integral part of the Certificate. All expressions and terms defined or used in the Certificate shall have the same meaning in this Addendum, unless the context clearly requires otherwise.

Manufacturer : LSG PROTECT
Brand Name : TGD
Product Group : LIGHTNING PROTECTION SYSTEM, SURGE PROTECTION-LOW, MEDIUM & HIGH VOLTAGE DEVICES.

This certificate referred to above covers the following products:

- TGD 20/40/60
- EPB SERIES
- LSC SERIES
- LSG - LOW VOLTAGE DIN RAIL (AC SERIES)
- LSG - LOW VOLTAGE DIN RAIL (DC SERIES)
- LSG - LOW VOLTAGE WALL MOUNT (AC SERIES)
- LSG - LOW VOLTAGE WALL MOUNT (DC SERIES)
- LSG - MEDIUM VOLTAGE SERIES
- LSG - DATA LINE SERIES

The CE mark as shown above can be used, under the responsibility of the manufacturer, after completion of an EC declaration of conformity & Compliance with all relevant EC Directives. The statement is based on a single evaluation of one sample of above mentioned product. It does not imply an assessment of the whole production.

This certificate is issued under the condition that the quality system maintained in the manufacture of above referenced Models/ Products & it remains valid until the manufacturing conditions or the quality systems are changed is subject to continuous surveillance according to the CE Guidelines further. Certificate validity is conditioned by positive results of surveillance audits.



Authorised Signatory This is an Accredited Certificate Authorized for issue by the Global Accreditation of Certification Bodies Europe Limited in accordance with "ISO17021 Conformity Assessment Requirement for Bodies provides certification of Management Systems. Certificate holders are listed in the register of www.gacb.eu & www.accert.com

Such Products, Processes or Services shall be manufactured or offered at or from only the addresses given above. This Certificate is granted subject to the registration making compliance with the conditions of the certificate with the sole responsibility of the manufacturer. Transferable and remains the property of Accredium Certifications International. For more information, please contact Accredium Certifications International. The holder is not authorized to be accredited, or use the approved accreditation certificate assessment services of Accredium Certifications International. Accredium Certifications International is not responsible for the use of this certificate. The certificate is a non-transferable document and its use is restricted to the conditions and specifications of the registration to which it has been issued and Accredium Certifications International is not responsible for the use of this certificate.

