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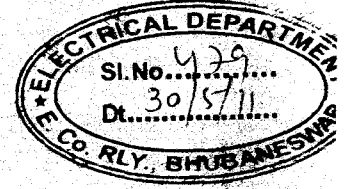
भारत सरकार रेल मंत्रालय
अनुसंधान अभिकल्प और मानक संगठन
मानक नगर लखनऊ - 226 011
Government of India, Ministry of Railways
Research Designs & Standards Organisation
Manak Nagar, Lucknow - 226 011

No. TI/PSI/GAPLA/POLICY/11

Date : 06-05-2011
12

Chief Electrical Engineer,

1. South Eastern Railway, Garden Reach, Kolkata-700 043
2. Eastern Railway, Fairlie Place, Kolkata-700 001
3. Northern Railway, Baroda House, New Delhi - 110 001
4. Southern Railway, Park Town, Chennai - 600 003 (TN)
5. South Central Railway, Rail Nilayan, Secunderabad - 500 371
6. Western Railway, Churchgate Stn. Bldg, Mumbai - 400 020
7. Central Railway, 2nd floor, Electrical Branch, Parcel Office Bldg. Mumbai - 400 001
8. South West Railway, DRM's Office, Hubli (Karnataka)
9. West Central Railway, Jabalpur (MP)
10. East Coast Railway, B-Rental Colony, Chandrashekharpur, Bhubaneswar (Orissa)
11. East Central Railway, Hajipur (Bihar)
12. North Central Railway, Block-A, Subedarganj, Allahabad 211 033
13. South East Central Railway, Bilaspur (Chattisgarh)
14. Northeast Frontier Railway, Guwahati
15. North West Railway, Jaipur (Raj.)
16. Central Organization for Railway Electrification, Allahabad- 211001



JB
Sub: Technical instruction No. TI/IN/0030 for lightning arrester.

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Encls: As above
31-5-2011
Copy to :- ED/EE(M)/ Railway Board, New Delhi
For kind information please.

Please find enclosed here with the Technical instruction No. TI/MI/0030 related to the installation and commissioning of the 42 kV Metal oxide gapless Lightning Arresters provided on Traction systems on Indian Railways.

Sumit Bhatnagar
6.5.11
(Sumit Bhatnagar)
for Director General, TI

Encls: As above

Copy to :- ED/EE(M)/ Railway Board, New Delhi

For kind information please.

Encls: As above

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(Sumit Bhatnagar)
for Director General, TI

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Government of India

भारत सरकार



सत्यमेव जयते

रेल मंत्रालय

अनुसंधान अभिकल्प और मानक संगठन

मानक नगर, लखनऊ - 226 011

Ministry of Railways

Research Designs & Standards Organisation

Manak Nagar, Lucknow - 226 011

Technical Instruction No.: TI/IN/0030

Technical instructions related to the installation and commissioning of
the 42 kV Metal oxide gapless Lightning Arresters provided on
Traction systems on Indian Railways

Important points related to the installation and commissioning of the 42 kV Metal oxide gapless Lightning Arresters

1.0 Background

Functioning of the 42 kV lightning arresters (provided on 25 kV side) to a large extent depends upon its correct installation. Similarly it is important to understand the construction and working of the Lightning Arresters to fully appreciate its failure modes and importance of the installation and commissioning aspects. Failures of 42 kV LA's are on higher side as compared to the LA's provided on HV supply at TSS. Some failures of Lightning Arresters are reported from Railways however the failure investigation part is generally missing therefore investigation of failed LA's is also covered in this instruction.

1.1 Historical developments related to the provision of 42 kV class LA's over IR

1.1.1 Gapless Metal Oxide Lightning arresters are compulsorily provided at all the Traction substations and switching posts. The LA's provided at TSS are for protection of equipment there while LA's provided at SP/SPP mainly acts to divert travelling surges on OHE. Lightning Arresters provided at AT locations were gradually removed from 1982 onwards due to the reliability issues associated with them.

1.1.2 Subsequently instructions were issued to SER, ER, ECR & SECR in 1/2005 for providing LA's before selected lightning prone AT locations and furnish performance to RDSO for further study of the issues. Afterwards, based on encouraging results submitted by Railways extensive trials of LA's at selected AT locations under lightning prone areas were advised to all Railways in 9/2006 & reiterated in 7/2008.

1.1.3 After field trials in above 100 locations, SR suggested provision of an additional arcing horn (gapped at 165 mm) at 9 - Tonne insulator prior to DO fuse of AT lightning prone areas in 8/08. Reduction in the cases of DO fuse blowing cases was confirmed by S.Rly. Subsequently on advise of RB, RDSO examined the issue and submitted its recommendations of providing additional arcing horns and monitor its performance to RB on 1/2009 which was approved in 7/2009 and RDSO issued a scheme of providing arcing horn at 9-T insulator prior to AT, to all Railways in 2/2010 and periodical performance feedback was requested.

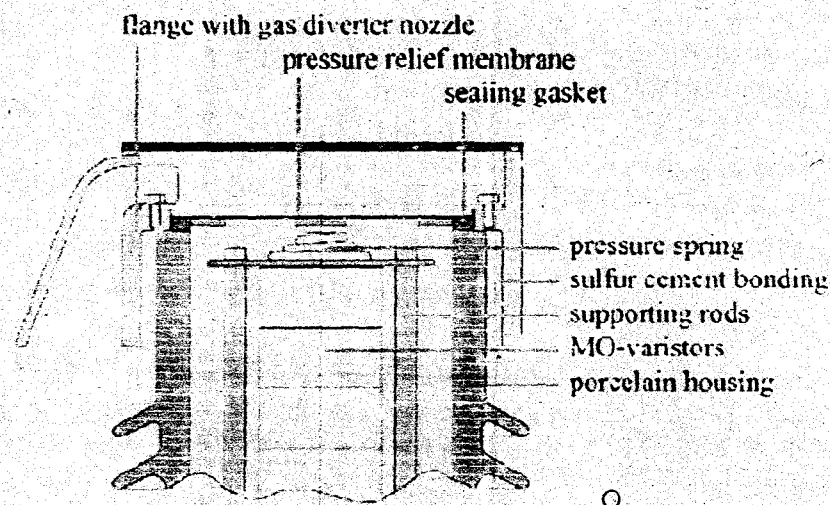
2.0 Other relevant RDSO documents and standards on LA maintenance

Document/Standard	Subject
RDSO specification No. TI/SPC/PSI/MOGLA/0100 (07/10)	Technical specification for metal oxide gapless type lightning arrester for use on 25 kV side of Railway traction substations and switching stations.
RDSO specification No. TI/SPC/PSI/LCMLA/0030 revision 1 (07/10)	Technical specification for leakage current monitor for lightning arresters.

RDSO Maintenance Instruction No. TI/MI/0041 Rev.1	Maintenance Instruction for lightning arresters.
IEC 60099-4	Metal oxide Surge arresters without gaps for a.c. system
IS 3070 part-III	Lightning arresters for alternating current system – specification – part 3: Metal oxide lightning arresters without gaps

3.0 Construction & working of the Lightning Arresters

A high voltage surge arrester basically consists of a stack of cylindrical MO elements kept together by a supporting structure and a housing. The main parts of arrester are its porcelain housing, Metal Oxide resistor blocks, pressure relief mechanism, spring mechanism to hold MO blocks and sealing arrangement as shown in the diagram below.



The general purpose of the housing is to:

- (i) Protect the MO elements from environmental impacts such as humidity and pollution as well as damages due to transport,
- (ii) Carry external forces, e.g. by conductor wires, wind or earthquake
- (iii) Control the pressure relief behavior in case of electrically overloading the arrester,
- (iv) Provide a dielectric strength (withstand voltage) above the protection level of the arrester and to
- (v) Keep the stack of MO elements together by maintaining a certain pressure within the stack.

A very important part of above design MO surge arresters with respect to safety and reliability is the sealing and pressure relief system. The sealing system is designed to prevent ingress of moisture for the whole lifetime of LA i.e. 15 years. Similarly the

