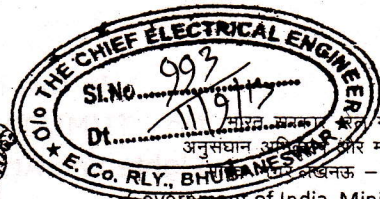


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सत्यमेव जयते



मानक संगठन
अनुसंधान और मानक संगठन
भारत - 226 011
Government of India, Ministry of Railways
Research Designs & Standards Organisation
Manak Nagar, Lucknow - 226 011

No. TI/PSI/GAPLA/POLICY/13

Dated, the 08th August, 2013

13

1. The Chief Electrical Engineer,
 - (i) Central Railway, Station Building, Mumbai CST-400001.
 - (ii) Eastern Railway, Fairlie Place, Kolkata-700001.
 - (iii) East Central Railway, Hajipur (Bihar)-844101.
 - (iv) East Coast Railway, Bhubaneshwar (Orissa)-751023.
 - (v) Northern Railway, Baroda House, New Delhi-110001.
 - (vi) North Central Railway, Block-A, Subedarganj, Allahabad-211033.
 - (vii) North Eastern Railway, Gorakhpur (UP)-220055.
 - (viii) North East Frontier Railway, Maligaon, Guwahati-781011.
 - (ix) North Western Railway, Jaipur-302017.
 - (x) Southern Railway, Park Town, Chennai-600003.
 - (xi) South Central Railway, Railnilayam, Secunderabad-500371.
 - (xii) South Eastern Railway, Garden Reach, Kolkata-700043.
 - (xiii) South East Central Railway, Bilaspur-495004.
 - (xiv) South Western Railway, DRM's office, Hubli-580028.
 - (xv) Western Railway, Churchgate, Mumbai-400020.
 - (xvi) West Central Railway, Jabalpur-482001.
 - (xvii) Central Organisation for Railway Electrification, Nawab Yusuf Road Allahabad -211001.

Sub: Maintenance Instructions for Provision of disconnector Assembly to the Lightning Arresters provided over 25 kV side.

Las perform a vital task in the transmission system and are critical elements in the insulation coordination.

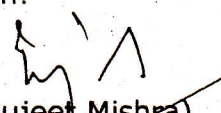
One of the problems being faced by IR has been that when the LA fails, there is no telltale sign of failure. When the LA fails in short-circuit mode, the line does not hold and till the LA is physically isolated by the maintenance gang. This causes very long traffic disruptions.

Given the fact that LAs can't be avoided to ensure insulation coordination and that their failure has serious effect on the traffic, it is imperative to give provision to disconnect the LA in case of a failure in short circuit mode for faster line restoration. Also, there is need to have a telltale sign so that faster identification can be done and the LA is replaced at the earliest opportunity, thereby restoring the line's insulation coordination.

A method has been developed which permits disconnection of the failed LA and its faster identification using components duly provided for in relevant IEC/BIS standards.

Handwritten signature/initials.

In this regard, please find enclosed here with the Maintenance instruction No. TI/MI/0048 related to the Provision of disconnector Assembly to the Lightning Arresters provided over 25 kV side of traction system.


(Sujeet Mishra)
Director-PSI
for Director General/T

Encl: As above

Copy to :-

2. The Secretary (RE), Ministry of Railway, Railway Board, Rail Bhawan, New Delhi- 110001.
3. The Director, Indian Railways Institute of Electrical Engineering, (IRIEEN), Post Box 233, Nasik Road - 422 101, Maharashtra (India).
4. The Director (Infrastructure), Dedicated Freight Corridor Corporation of India Ltd. 5th Floor, Pragati Maidan, Metro Station Building Complex, New Delhi - 110001.
5. The Executive Director (Electrical), M/s Rail Vikas Nigam Limited, 1st Floor, August Kranti Bhavan, Bhikaji Cama Palace, New Delhi-110017.
6. The Executive Director (Urban Infrastructure Division), RITES Ltd., RITES BHAWAN-1, Sector 29, Gurgaon, Haryana-122001.
7. The General Manager (Electrical), M/s IRCON, International Limited, C-4, District Centre, Saket, New Delhi-110017.

Page 1 of 6	Effective from 08.08.2013	Maintenance Instructions for Provision of Disconnector Assembly to the Lightening Arresters provided over 25 kV side of traction system	TI/MI/004
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Government of India



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Ministry of Railways

Research Designs & Standards Organisation

Manak Nagar, Lucknow - 226011

MAINTENANCE INSTRUCTION NO. TI/MI/0048

Maintenance Instructions

for

**Provision of Disconnector Assembly to the Lightening
Arresters provided over 25 kV side of traction system
on Indian Railways**

Page 2 of 6	Effective from 08.08.2013	Maintenance Instructions for Provision of Disconnecter Assembly to the Lightening Arresters provided over 25 kV side of traction system	TI/MI/CJ48
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Scope:

The technical instructions compiled in this document are related to the installation/provision of disconnector assembly to the LA provided over 25 kV side of traction system of Indian Railways.

Objectives:

This disconnector is to be installed with LA provided at switching stations with a view to:

- i. Provide tell-tale sign of failure and also
- ii. Disconnect failed LA from OHE, thereby ensuring that tripping of the line does not occur and the system remains live.

Abbreviation

LA	- Lightning Arresters
kV	- Kilo volt
OHE	- Over Head Equipment
SMI	- Special Maintenance Instruction
PCD	- Pitch Center Dia

Background:

In the event of failure of LA on line if not accompanied by shattering of the hollow insulator, the line does not hold till failed LA is identified and physically isolated. This leads to serious traffic interruption. Hence a need is felt to install a disconnector which will disconnect the LA from OHE upon failure; thereby ensuring that the traffic interruption does not occur and also permitting much faster restoration. Also this device will give tell-tale indication for visual identification of failed LA.

Dis-connectors

Dis-connectors, often used on medium-voltage arresters, provide a visual indication of a failed LA by disconnecting it from the system. Once the LA has failed, the current continues to flow through the disconnector, energizing a compound in the assembly, which ensures the disconnector breaks up and disconnects the earth connection from the Surge arrester there by ensuring the line remains live. The dis-

connector may be an integral part of the LA or insulating bracket, or a separate unit installed in series with the LA installed with insulating base. The advantage is that the line remains in operation after disconnection of the LA.

The Dis-connector assembly consists of insulating base, adaptor plate & earth plate.

Applicable standards for Disconnecter

This SMI is based on following standards, specifications and RDSO documents:

S.No.	Standard/reference	Subject
a.	IEC 60099- 4	Surge arresters – Part 4: Metal-oxide surge arresters without gaps for a.c. systems
b.	IEC 60099-5	Surge arresters-selection & applicati recommendation
c.	IS 3070 part-3	Lightning Arresters for Alternati Current Systems - Specification - Pa 3: Metal Oxide Lightning Arreste without Gaps.
d.	IS 15086 part-3	Selection & application guide
e.	RDSO instructions TI/MI/0041 dated 27- 09-05	Maintenance instructions for Lightenin Arresters

PROCEDURE

Initial Inspection:

The Dis-connector and its associated components should be carefully inspected for physical damage of any kind. If any damage is found, it should not be installed and energised. Prior to installing the Dis-connector assembly, it is to be ensured that the Dis-connector and its associated components are cleaned thoroughly using a soft cloth to wipe out any dust or other foreign particles present on the surface.

Installation:

The LA should be provided on insulating base and should be fitted

between the mounting surface and the bottom unit of the LA and must be installed first and the LA then assembled on top of it.

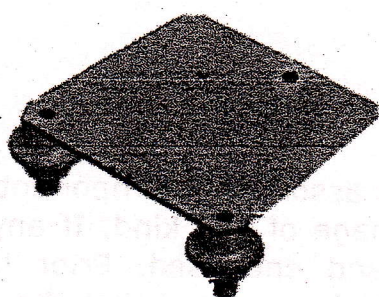
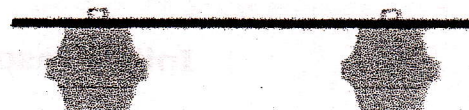
All electrical connections should be as short as possible but avoiding sharp bends and loops. Ensure that no excessive mechanical stress is applied to the disconnecter through the connection. The ground connection should be made to a permanent and effective low resistance ground, preferably the main system ground, and interconnected with structure wherever possible.

Base insulators are used to isolate the base end of the LA from ground.

Ensure that the mounting surface must be flat and level, so that the unit, when installed with base insulators, is standing true and vertical.

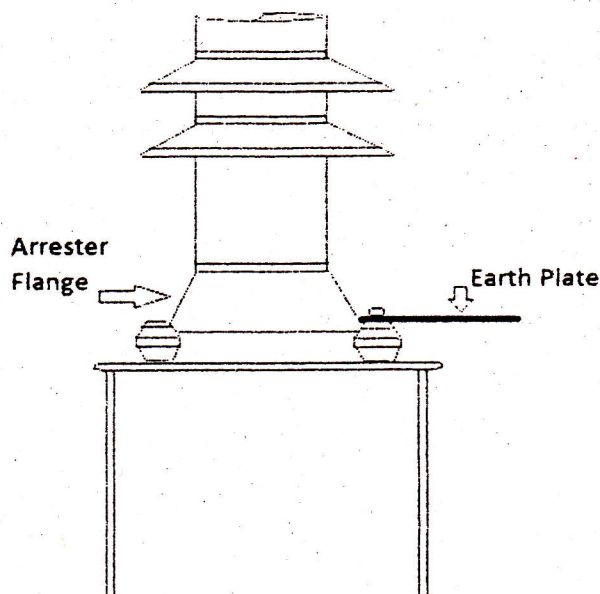
Before start of installation, holes to be drilled on to the adaptor plate in order to match hole size & PCD of LA flange in use. Also holes to be drilled on to the top plate of the existing structure in the substation to match to PCD of adaptor plate such that the base insulators can be secured on to the structure. Ensure that the holes drilled should be sprayed with "Zinc Galvanizing Spray Paint" to prevent rusting.

Base insulators must be bolted directly to the adaptor plate mounting surface. Typical diagram of the same is shown below. Max torque value for tightening shall be 50 Nm.

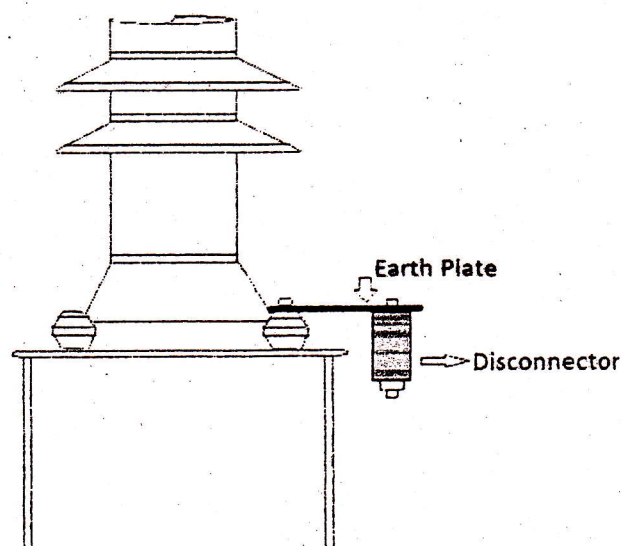


LA is then assembled on top of the adaptor plate. It is to be bolted in such a way that, bolt head should face bottom of the adaptor plate in order to have sufficient clearance between structure and adaptor plate.

Mount earth plate on one of the bolts of flange and secure. Typical diagram is shown below



Assemble disconnector to other end of the of the earth plate. Max. torque shall be 30 Nm. Note that applying excessive torque may lead to breakage of disconnector. Torque wrench to be used to ensure usage of correct torque. Typical diagram as below



Connect earth lead to the ground of disconnector. Max torque should be 30 Nm. Note that while tightening, there should not be any excess cantilever load coming on to the disconnector which may lead to

breakage.

The disconnector earth lead to be connected to line of surge counter.

Flexible insulated cable of 35 mm² is to be used as lead for earth connection. It is required to use lugs on both ends of lead for connection. Typical diagram is shown below

