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भारत सरकार के विभाग
 अन्तर्गत विभाग के लिए संचालक संयंत्रों में काम करने वाले संचालक संयंत्रों के लिए
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Dated 29.07.2021

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Sub: Special Maintenance Instruction No. TI/SMI/0048(Revision 1)

Please find enclosed herewith, the SMI No. TI/SMI/0048(Revision-1) for Provision of Disconnector Assembly to the Lightning Arresters provided over 25 kV side of traction system on Indian Railways for reference and compliance please.

Gyan Prakash Katiyar
 25/07/21

Gyan Prakash Katiyar

Director/TI-3

(ज्ञान प्रकाश कटियार /निदेशक-3)

For Director General/TI/RDSO

(महा निदेशक/ कर्षण निदे/ अ मा सं)

Encl. As stated above

Government of India



सत्यमेव जयते

Ministry of Railways

Research Designs & Standards Organisation

Manak Nagar, Lucknow - 226011

MAINTENANCE INSTRUCTION NO. TI/MI/0048 Rev.01

Maintenance Instructions

for

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

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1.0 This SMI superseded the earlier SMI no. TI/MI/0048 dated 08.08.2013.

2.0 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.

3.0 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.

4.0 Abbreviation

LA	– Lightning Arresters
kV	– Kilovolt
OHE	– Over Head Equipment
SMI	- Special Maintenance Instruction
PCD	- Pitch Center Diameter

5.0 Background:

5.1 In the event of failure of on-line LA, 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.

5.2 In the earlier SMI no. TI/MI/0048 dated 08.08.2013; it was mentioned to provide the Disconnector at the base side of the LA. With this provision, failures were reported from Zonal Railways that even after operation of Disconnector, the base Insulator of LA also got punctured and trip the line. Thus, the purpose of providing the Disconnector is not fulfilled. The issue was discussed in the 31st MSG (TrD) meeting held at Somnath and it was recommended to revise the SMI for providing the Disconnector on the top side of LA. The recommendations of the MSG have been approved by Railway board vide letter no. 2008/EEM/220/1 dated 27.10.2020.

5.3 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 disconnector assembly, which ensures the disconnector breaks up and disconnects LA from OHE thereby ensuring the OHE 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 having 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 & Disconnector mounting plate.

6.0 Applicable standards for Disconnector

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

SN	Standard/reference	Subject
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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 & application recommendation
c.	IS 3070 part-3	Lightning Arresters for Alternating Current Systems - Specification - Part 3: Metal Oxide Lightning Arresters without Gaps.
d.	IS 15086 part-3	Selection & application guide
e.	RDSO instructions TI/MI/0041	Maintenance instructions for Lightening Arresters
f.	RDSO Specification no. TI/SPC/PSI/MOGTLA/0101 (02/2015)	Specification for Metal Oxide Gapless Type Lightning Arrester for use on Railway Traction Sub Station and Switching Stations

7.0 PROCEDURE

i. 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.

ii. 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.

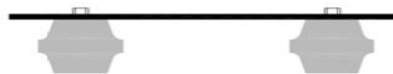
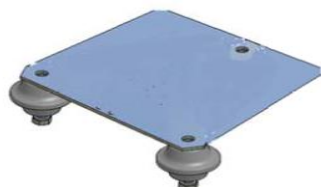
All electrical connections should be as short as possible but avoiding sharp bends and loops. Ensure that no excessive mechanical stress is applied to the disconnector through the connection. The ground connection should be made to a permanent and effective low resistance ground, preferably the main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

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

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

(b) 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.

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



- (d) 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.
- (e) Mount Disconnector Mounting plate on top of the LA terminal. Assemble Disconnector to other end of the of this 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.
- (f) The Jumper wire which is conventionally connected between top terminal of LA and OHE, is now to be connected between Disconnector and OHE. It must be ensured that the jumper from OHE to Disconnector should be of required length such that it should not touch any of the part of LA while hanging after operation of the Disconnector.
- (g) The earth lead of the LA is to be connected form one of the bolts of bottom flange of LA to 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.

8.0 A Photographs of a Location where the Disconnector on Top side of LA has been provided in IR is given below for reference. There are two disconnectors provided on the top of LAs, out of two one disconnector is hanging.

