

## **ON LINE HEALTH CHECK OF LIGHTNING ARRESTER**

-----  
Surge Arresters ( Lightning Arresters ) are the protective devices for limiting the surge voltages on the equipments / power distribution system. These arresters help in discharging this surge current, thus protecting the system and equipment from dangerous overvoltages and also disturbances.

These Lightning arresters, age out during its period of services due to,

- Moisture ingress, due to sealing problems.
- Ageing of Zinc Oxide Varistors.
- Dust particles on external surface.
- Cracks on porcelain surface.

As we are all aware, when Lightning Arrester fails it explodes with porcelain splinters and apart from creating a Short Circuit, it also mechanically damages the other surrounding equipments like CTs, PTs, Transformer Bushing etc, thus creating a total disruption of power circuit.

In view of above, it is necessary to monitor the health of Lightning Arrester periodically, particularly, before stormy weather or monsoon.

This lightning arrester can be tested online. Online testing of Lightning Arrester is carried out by harmonic analysis of leakage current. The harmonic analysis is used as a tool to diagnose the health / reliability of the Lightning Arrester.

- 1.0 Testing of surge arresters is carried out as follows,
  - 1.1 A Test instrument with a clip on meter is connected in the ground connection of the arrester.
  - 2.1 Following parameters are measured.
    - 2.1.1 True rms value of total current, flowing through ground circuit.
    - 2.1.2 Peak value of total current
    - 2.1.3 True rms value of third harmonic leakage current.
    - 2.1.4 Ambient Temperature.
  - 2.2 An increase in the third harmonic resistive component of leakage current brings the arrester to thermal overloading and finally causes breakdown. If the increase in the 3<sup>rd</sup> harmonic current is monitored and detected earlier, then arrester can be repaired or replaced, thus preventing damage.
  - 2.3 The parameters of currents recorded are compared with previous measured values on the same arrester. The values are also compared with arrester of similar make and type, operating under similar conditions over a period of time.
- 3.0 The recommendations for measurement are:
  - 3.1 Resistive current is to be measured after installation and then over a period of two years.
  - 3.2 Measurements shall be carried out after severe overvoltages experienced in the system.
  - 3.3 Lightning Arresters located in stormy weather or polluted area, shall be tested every 12 months.
  - 3.4 Arresters, which are in service for many years shall be periodically tested to trend and monitor their condition.

**Power-Linker group is already working for condition monitoring and diagnostic analysis of Transformers, Generators, Motors etc. for past few years. The equipment for ON line health checkup of “Lightning Arrester” of ISA Italy make, Type SCAR10. is available with POWER-LINKER, to carry out this important test to detect any abnormalities within the Lightning Arrester. (For more information, log on to [www.isatest.com/products/scar10.asp](http://www.isatest.com/products/scar10.asp) ).**

You may write to us for any of your requirement for Lightning Arrester testing or any other condition monitoring and diagnostic test, which are being carried out by POWER-LINKER, you may refer ANNEXURE given below.

We now look forward to receiving your enquiry, if any for “Lightning Arrester” checks and measurements.

**ANNEXURE**  
**LIST OF CONDITION MONITORING TESTS CARRIED OUT**  
**BY**  
**POWER-LINKER**

Following diagnostic test are carried out by Power-Linker,

**1.0 Generator Testing:**

**1.1 Stator Testing :**

1.1.1 Insulation Resistance & Polarization Index

1.1.2 Capacitance & Tan Delta Test.

1.1.3 DC Winding Resistance

1.1.4 Optional: ELCID (Electromagnetic core imperfection detection test). This test is ND test and preferred, as compared to 'Stator core ring full flux test' which is DTesting.

1.1.5 Partial Discharge Measurement.

**1.2 Rotor Testing :**

1.2.1 IR value of main field winding at low voltage

1.2.2 DC Winding Resistance

1.2.3 Winding Impedance

1.2.4 RSO (Recurrent Surge Oscillograph by Reflectometer) test for detecting rotor interturn short or rotor earth fault.

**1.3 Exciter Testing :**

1.3.1 IR value Measurement at Low voltage for exciter Stator + Rotor.

1.3.2 DC Winding Resistance for Stator + Rotor.

1.3.3 Winding Impedance of Stator + Rotor.

1.3.4 Checking of Diodes + fuses.

## **2.0 Testing of Transformers :**

2.1 IR, PI value measurement.

2.2 DC winding resistance

a) Primary winding on all taps.

b) Secondary winding.

2.3 Turns ratio measurement

2.4 Capacitance, tan delta measurement for

a) Primary winding.

b) Secondary winding.

c) Bushings.

2.5 Magnetic balance check.

2.6 SFRA: Sweep Frequency Response Analysis.

## **3.0 Testing of Motors :**

2.7 Insulation Resistance & Polarization Index Measurement.

2.8 D.C. Winding Resistance Measurement

2.9 Partial Discharge Measurement

2.10 Capacitance Measurement & Tan Delta Measurement

2.11 RTD Checks.

## **4.0 Lightning Arrester :**

On line checking of Lightning Arresters for 3<sup>rd</sup> harmonic current resistive component measurement.