

Review on Field Testing of Protective Relays

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ABSTRACT: *The critical components of the electrical power system are today's protective relays. The collection is monitored by these relays electrical parameters such as voltage, current, etc., and initiate action to isolate the defective element from the electrical network to ensure that the healthy balance system continues to extend the services to its customers. Such major components in the to ensure their availability in the system, electrical systems need routine maintenance and field testing. This article for their reliable operation, the form of relays and their field maintenance specifications are to be summarized.*

KEY WORDS: *Protective Relay, Field Maintenance, Secondary Injection Testing, Static relay, Digital Relay*

INTRODUCTION

The primary diagnostic device in the electrical system is safety. Power network which monitors the power continuously the network and defines the faults as and when they occur. At the same time, they would separate the defective equipment from the faulty the network safeguards the network and There are different kinds of Protective relay types, such as electromechanical relays, as in fig. 1 Relays of Solid State, as shown in Fig. Digital relays and 1b, as in all of these relays need a reliable service for their reliable service, Periodic treatment and repair, such as preventive medical care human checkups[1].



Fig. 1: Electromagnetic Relay[2].



Fig. 2: Solid State Relay[3].

Maintenance of relays:

Like any other machines relays also requires regular maintenance on them. They are discussed here with categorywise[4].

Electro-Mechanical relays: These are the first generation relays having so many moving mechanical parts to be maintained as follows:-

1. Cleaning of relay case, terminals, and all the internals
2. Check the tightness of all the wire connections and parts
3. Lubrication of all the moving parts
4. Check for the free rotation of disc in case of IDMT(Inverse Definite Minimum Time) relays
5. Check the contact gap with feeder gauge
6. Check for any dents on the disc and repair/replace the worn out disc, other hardware like washers, springs and screws
7. Visual checking for intervals healthiness

Solid State Relays: The second generation of these is which do not typically have any mechanical/moving apart from contacts, components. There are some required for these relays as follows, maintenance[5]:

1. Cleaning of relay case, terminals, and all the internals
2. Check the tightness of all the wire connections and parts.
3. Check for overheated electronic components like Thyristors, heat sinks, resistors, inductors, capacitor etc.
4. Check for black spots on Printed Circuit Board (PCB)
5. Visual checking for internal healthiness.

Digital relays: Those are the third generation of the latest relays that require minimum basic maintenance. They are there are no moving or mechanical components, so they are more reliable, but the main culprit is dust. Their maltreatment.



Fig 3: Relay Testing Kit[6].

Desirable Properties of Protective Relays:

The desirable attributes are as follows:

i. Dependability- It means relay trips only when it is expected to trip

Dependability =	Number of correct trips Number of desired trips

This can be improved by increasing the sensitivity of the protection system. Is not desired to act. Security = Number of correct trips total Number of trips this can be improved by improving the selectivity of the protection system [7].

Reliability = Number of correct trips / (Number of desired trips + Number of incorrect trips)

ii.	Sensitivity: The relay shall be able to detect even the smallest faulty protected parameter. Security: It is nothing but the relay not acting when it
iii.	

iv.	Selectivity: It is the ability to discriminate between different faults Reliability: It is the performance of the relay consistently.
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Before doing these functional tests, the service set values are to be recorded and to be normalized on completion of tests. Since these tests will be carried out by injecting the required electrical parameters (like voltage or current), these tests are also known as Secondary Injection testing. The relays are to be tested off line (by removing from the system) with the test kit.

CONCLUSION

Different forms of relays with their fields in this paper it addresses repairs. The Field Requirement It highlights practical assessments and their schedule of testing. The Functional test sample formats are also given here. In These guidelines are followed by the defense framework, It certainly guarantees reliability, sensitivity, reliability, and Security & Selectivity

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