# How to handle second harmonics in relay protection


## Overview

Set EHBL2P to Y to enable second harmonic blocking. Use the NOT HBL2T relay word bit in the 67P1TC torque equation to prevent the instantaneous high set phase overcurrent element from operating during inrush. Among these, the second (100/120Hz) and fifth (250/300Hz) harmonics are particularly problematic, necessitating their blockage in protection relays to ensure system reliability. In this extensive guide, we explore harmonic detection and mitigation strategies, delve into their technical. Harmonic restraining in differential protection is a technique used in transformer protection to prevent false tripping during inrush or over-fluxing conditions by detecting and blocking specific harmonic currents—mainly the 2nd and 5th harmonics —commonly present during non-fault events. Figure 1a is the oscillography captured. Protective relays exploit this characteristic through harmonic restraint logic: Typical 2nd harmonic restraint thresholds range from 15% to 25% of the fundamental.

## Article Content

Harmonic Restraint vs. Blocking in Transformer Protection

Explore harmonic restraint & blocking in transformer differential protection. Learn principles, math, and relay operation during

Improvements in Transformer Protection and Control

Abstract—This paper describes protection elements that detect transformer faults quickly and avoid unnecessary

A Consideration of Inrush Restraint Methods in

A digitally captured waveform of the inrush currents was analyzed and indicated that the 2nd harmonic restraining quantity in one of

Managing Harmonics: Protecting Relay Systems and Grid ...

Harmonics pose significant challenges for both relay protection systems and the broader grid infrastructure, affecting

Considerations for Using Harmonic Blocking and Harmonic Restraint ...

Abstract—The terms “harmonic restraint” and “harmonic blocking” are sometimes used interchangeably when talking about

What is the role of Harmonic 2 setting in Earth fault protection setting?

In case of using phase CT summation for residual current measurement, there is a general agreement that the second harmonic is

Harmonic Restraining in Transformer Protection

Learn how harmonic restraining using 2nd and 5th harmonics prevents false tripping in transformer differential

Harmonic Blocking Fundamentals with Practical Examples in

The following sections provide a practical explanation of harmonic blocking in 87T protection, supported by numerical

What Is the Substance and Principle of Second-Harmonic Restraint in ...

This article explains second-harmonic restraint''s substance principle and related excitation inrush current characteristics hazards to

Power Transformer Inrush Current Detection & Harmonic Sharing In ...

Power T ransformer Inrush Current Detection & Harmonic Sharing In Differential Relay Protection J.O. Aibangbee

Analysis of the Effects of Harmonics on a Digital

The results of studies involving signals with harmonics supplied to the relay are presented

What is the role of Harmonic 2 setting in Earth fault protection setting?

It is easy to estimate that there is some I0 which may cause to relay pick-up by earth fault protection. Consequently the relay will

Harmonic Detection and Mitigation for Relay Protection Engineers

Discover effective harmonic detection and mitigation strategies tailored for relay protection engineers in electric power transmission.

Analyzing the Second Harmonic Suppression for Differential

One widely used technique to improve the accuracy of differential protection is second harmonic suppression, which blocks

The Critical Role of Blocking Second and Fifth Harmonics in Protection ...

During inrush, the high second harmonic content (vs. <20% during faults) is a key discriminator. By blocking tripping

About differential protection 2nd,3rd,5th harmonic blocking..?

I agree with rcwilson. Blocking of differential protection on detection of 2nd or 5th harmonic content evolved based on

Using Harmonic Blocking to Prevent Spurious Trips During Inrush ...

A numerical feeder protection relay would trip when a collector feeder breaker is closed due to inrush at a solar PV

2nd Harmonic Testing Procedures | PDF | Computer Engineering ...

This document describes two methods for testing the second harmonic feature of relays using the Doble Engineering PROTEST

Evaluation of Harmonics Impact on Digital Relays

This paper presents the concept of the impact of harmonic distortion on a digital protection relay. The aim is to verify

Practical Experience in Setting Transformer Differential Inrush ...

The second harmonic inrush restraint function of transformer differential relays maintains security of the differential protection during

Harmonic Restraint Differential Relay for Transformer Protection

Harmonic Restraint Differential Relay for Transformer Protection: The operation of the relays because of magnetising inrush current

A Review of Literature on Effects of Harmonics on Protective Relays

This harmonics either current or voltage harmonics have a serious effect on the quality of electricity power supply and

Analysis of Transformer Inrush Current and Comparison of Harmonic ...

The second harmonic restraint method is the most common one used by various relay manufacturers and application engineers.

Microsoft Word

Methods using harmonic restraint, wave-shape recognition, and artificial neural networks (ANN) have been proposed to discriminate

Configuring 2nd Harmonic Inhibit for Transformer Energization ...

Understanding transformer inrush current and 2nd harmonic restraint in differential relays. Learn when and how to

Applying Second Harmonic Blocking in Distribution Relays

This application guide provides instructions on the use of the second-harmonic blocking element in the SEL-751 Feeder Protection

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Power Transformer Differential Relay Inrush Restraint Setting Applications DOI: 10.9790/1676-1101046875 70 |

## Contact Us

For more information, pricing, or custom solutions, please contact us:

Website: https://www.thebucketlistbook.co.za
Email: sales@thebucketlistbook.co.za
Phone: +33 1 42 78 39 16
Address: 10 Rue de la Paix, 75002 Paris, France

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