

Sampling Frequency Relay Protection



Article Overview

Sampling frequency in relay protection determines how often voltage and current signals are measured, directly impacting the accuracy of phasor, RMS, and fault detection calculations.

Overview of Sampling in Relays

Protective relays acquire signals from current transformers (CTs) and voltage transformers (VTs) and convert them into digital values for processing. The sampling frequency (f_s) is calculated as the number of samples per cycle multiplied by the system power frequency, e.g., 16 samples per cycle at 50 Hz results in 800 Hz sampling. High sampling rates improve the accuracy of phasor and RMS calculations, essential for detecting faults and abnormal conditions.

Signal Processing and Phasor Calculation

Once sampled, signals are processed through anti-aliasing filters and optionally quantized. Phasors for fundamental frequencies are computed using cosine filters or Discrete Fourier Transform (DFT) techniques, with the number of samples per DFT window typically equal to the number of samples per cycle. RMS values are derived from these sampled signals, ensuring accurate representation of the system's voltage and current magnitudes.

Frequency-Adaptive Sampling

Modern relays often implement frequency tracking, allowing the sampling frequenc...

Article Content

Synchronized Phasor Measurement in Protective Relays for Protection ...

Traditionally, numerical relays for line distance protection applications sample voltage and current signals at multiples of the

Protective Relay Synchrophasor Measurements During Fault Conditions

Fig. 2. PMCU sampling with an absolute time reference for synchronized phasor measurement applications and resampling at

CN101179184B

The present invention relates to a sampling frequency control method suitable for a digital protection relay or the like that protects a

Power System Protective Relays: Principles & Practices

Abstract: Protective relays and devices have been developed over 100 years ago to provide “last line” of defense for the electrical

Power System Frequency Measurement for Frequency Relaying

Spark Xue, Bogdan Kasztenny, Ilia Voloh and Dapo Oyenuga Abstract—Frequency protection is an important part of the art of power

Concurrent Implementation of 81 Frequency Elements Together With ...

Abstract—The use of 81 elements (over or under-frequency functions) necessitates the proper measurement of the local frequency.

Basic protection relay knowledge

A fast and selective arc fault mitigation for air-insulated LV & MV switchgear and Relion protection and control relays and sensor

Investigating performance of numerical distance relay with higher ...

This paper investigates the impact on operating time delay and relay maloperation i.e. selectivity, when high sampling rate is used in

Variable Digital Filter Response Time in a Digital Distance Relay

A digital relay will include analog filtering, but it is intended for anti-aliasing purposes rather than the removal of non-fundamental

Basics of Protective Relaying and Design Principles

The sample exercises for this chapter include: Perform power system simulations of selected faults and observe how a given

Protection: Signal Acquisition

It is set by the parameters entered in the “Electrical Characteristics” tab and uses the same inputs as the relay device. It samples the

Performance of IEC 61850 Sampled Values Relays for a Real-World

These relays have a protection and control processing rate of 8 samples per cycle, which equates to a 2-millisecond processing

Preparation of Papers in a Two-Column Format

B. Analog Filtering The Nyquist sampling theorem postulates that a given signal of frequency f can be completely reconstructed if

Case of the system frequency increase and sampling frequency of 12 ...

Download scientific diagram | Case of the system frequency increase and sampling frequency of 12 samples per 20 ms cycle from

Impacts of the Sampling Rate on Responses of Digital Protective Relays ...

Performance advantages of digital protective relays are always dependent on the resolution of data used as their inputs, along with

Microsoft Word

Records from DFRs vs. Records from Microprocessor-Based Relays Hugo Davila, IEEE Member Abstract--Today the use of digital

Impacts of the Sampling Rate on Responses of Digital Protective Relays

TLDR Test results show that low sampling rates adversely impact the accuracy and response speed of time- based, frequency

A digital sampling rate synchronization scheme for fully digital relay ...

Download Citation | A digital sampling rate synchronization scheme for fully digital relay protection | The application of

Impacts of the Sampling Rate on Responses of Digital Protective

This paper tests the performance of time-based, frequency-based, and time-frequency-based digital protective relays for various

Rate of change of frequency protection: towards a viable algorithm for ...

Also the sampling rate available on a protective relay must not be exceeded. Consulting the state of research we find algorithms for

Frequency tracking function in numerical protection devices

This paper discusses protection applications with multiple distributed generation resources where up to six frequency tracking groups

Contact Us

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

Website: <https://www.gmarkconstruction.co.za>

Email: sales@gmarkconstruction.co.za

Phone: +31-6-15-38-72-94

Address: Herengracht 456, 1017 BS Amsterdam, Netherlands

This document is for informational purposes only. Specifications subject to change without notice.

