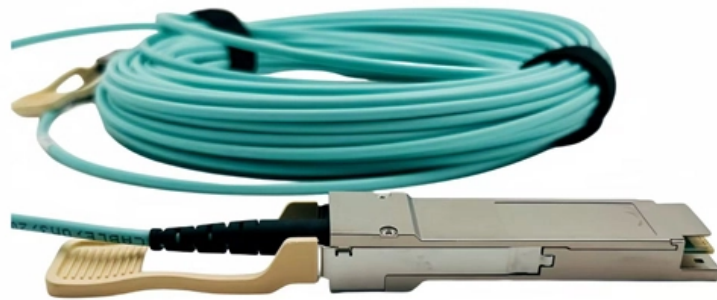




**Adam Tas Corridor Energy**

# **Relay protection waveform recording time requirements**





## Relay protection waveform recording time requirements

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### Meeting NERC Requirements for Oscillography and Disturbance



The foundation of the AEP-GEM system is the ability of standard protective relays to record disturbance data at resolutions typically found in conventional monitoring equipment.

### Continuing Evolution of Fault Recording

Distributed recording: Microprocessor-based protective relays include the ability to capture waveforms and sequence of events logs and may include the ability to



### SEL Advanced Digital Fault Recorder (DFR) Solutions

Record Disturbances and Exceed NERC PRC-002 Requirements Capture power system data to support event analysis and locate faults. Easily exceed requirements for standards such as NERC PRC-002.

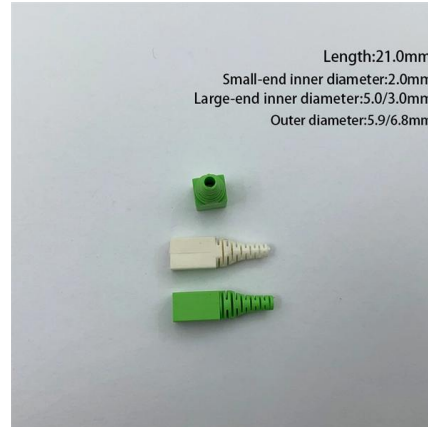


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Global Positioning System (GPS) satellites provide in the GPS IRIG-B (and other) time code formats the ability to synchronize and time



stamp the disturbance records of DFRs, protective relays and other



### Troubleshooting Protective Relay Operations Using Field Recorded

In order to operate the breaker failure relays with the test set, it was needed to use a recorded digital quantity to operate an output on the test set, which applied a voltage to the trip input on the test relay

### IEEE Guide for Protective Relay Applications to Power Transformers

Types of transformer failures This guide deals primarily with the application of electrical relays and over-current protective devices to detect the fault current that results from an insulation failure.



### CN112345846A

The invention triggers wave recording at the time specified by the millisecond fixed value, and the invention does not use the analog quantity or the input quantity of the device, thereby



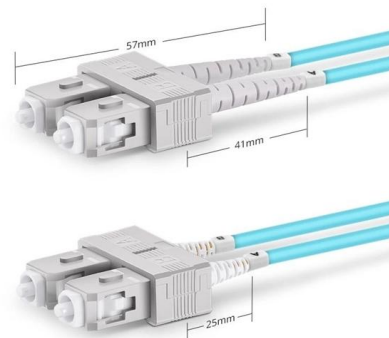
## Data Capture and Storage Capabilities of SEL Products

Agenda Types of disturbance monitoring  
Recording capabilities of SEL relays  
Time synchronization  
Capturing and storing disturbances using SEL automation products.



## Continuous Recording in Waveform Recorder

To make the waveform recorder stop recording continuously: Check which events are configured to trigger the Waveform Recorder (), e.g. Protection Alarm.



Duplex SC UPC

## Installing and Maintaining Protective Relay Systems

Ensuring that protection systems operate reliably is crucial, and a good preventive maintenance program ensures that protection and relay systems function properly without causing additional problems.



## A GUIDE TO DIGITAL FAULT RECORDING EVENT ANALYSIS

Digital fault recorders (DFRs) and microprocessor-based relays offer recording capabilities in the form of waveforms and sequences of events. However, these two differ in the sampling rate processing



### 7PG21 Solkor Rf

If a numeric Overcurrent guard relay is used, a spare contact from the Solkor can be wired to a binary input of the Guard relay and used to trigger a waveform record such that the waveform recording for

## Substation-wide disturbance, fault, and event recording for

All modern protection and control relays contain their own disturbance, fault, and event recording functionality, ensuring that no event is lost. Despite that these modern protection and control relays





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What is the sampling rate and record length?  
How can it affect fault analysis? Through the use of actual examples this paper will demonstrate that while these relay event records are sufficient for the

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During the tests, the waveforms from each test file are automatically sent to the simulator hardware, which is connected to the protective relay. The outcome of the relay's behavior under the tested

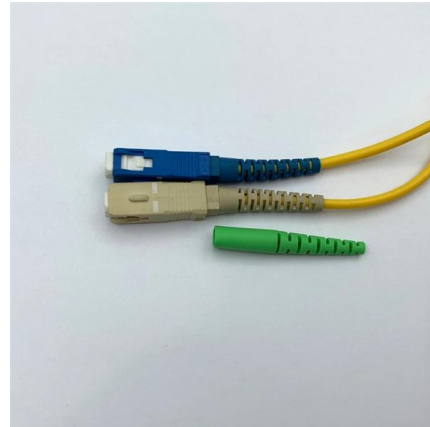


## Architecture, modelling and role of Digital Fault Recorders in Digital

The value of this data is such that several countries have a minimum set of requirements defining overall characteristics for fault recording systems. For example, in North America, with NERC PRC-002-2,

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The paper aims to help engineers/technicians performing protection and disturbance analysis clearly understand the value of DFRs in power systems, specifically the differences in recording information



## Documentation Requirements for Recording Relay Trip Investigations

Discover the essential documentation requirements for recording relay trip investigations and resolutions, including event identification, relay details, data collection, root cause analysis,



## Capture Every Disturbance With Continuous Waveform Recording

Monitoring devices--including protective relays and power quality meters--capture several cycles of waveform disturbance data based on predefined event conditions.



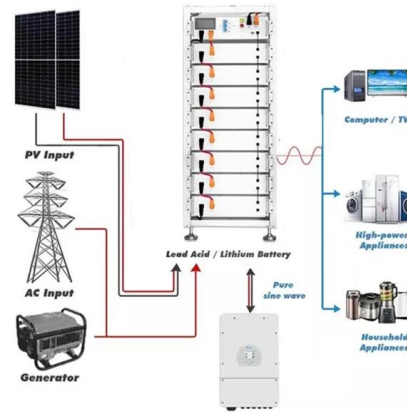
## Working Group I21, Relaying Practices Subcommittee

To more accurately determine the time of a particular recording being analyzed, frequency may be calculated from the available data by calculating the time between consecutive rising zero crossings



## Substation-wide disturbance, fault, and event recording for

Time synchronization challenges. Old numerical relays may have time synchronization with serial protocols, whereas modern numerical protection relays have time synchronization through Simple



## Using Event Recordings to Verify Protective Relay Operations

The ability to use event recordings to verify protective relay operations is now a reality. Automatic data collection of fault records assures the timely capture of events.

## Troubleshooting Protective Relay Operations Using

PDF , The paper describes the use of automated analysis reports and field recorded signals in troubleshooting protection system operation.



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