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TECHNICAL REPORT

Communication networks and systems for power utility automation – Part 90-21: Travelling Wave Fault Location

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CONTENTS

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COMMUNICATION NETWORKS AND SYSTEMS FOR POWER UTILITY AUTOMATION –

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FOREWORD

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IEC TR 61850-90-21 has been prepared by IEC technical committee 57: Power systems management and associated information exchange. It is a Technical Report.

The text of this Technical Report is based on the following documents:

Draft	Report on voting
57/2718A/DTR	57/2738/RVDTR

Full information on the voting for its approval can be found in the report on voting indicated in the above table.

The language used for the development of this Technical Report is English.

This document was drafted in accordance with ISO/IEC Directives, Part 2, and developed in accordance with ISO/IEC Directives, Part 1 and ISO/IEC Directives, IEC Supplement, available at www.iec.ch/members_experts/refdocs. The main document types developed by IEC are described in greater detail at www.iec.ch/publications.

A list of all parts in the IEC 61850 series, published under the general title *Communication networks and security systems for power utility automation*, can be found on the IEC website.

The committee has decided that the contents of this document will remain unchanged until the stability date indicated on the IEC website under webstore.iec.ch in the data related to the specific document. At this date, the document will be

- reconfirmed,
- withdrawn, or
- revised.

INTRODUCTION

The travelling wave technique for locating faults in transmission, distribution and cable network system has been maturing in recent years due to the advancement in technology. The technique is potentially more accurate and has a much wider application scope when compared with the traditional impedance-based method. However, the technique and its associated information exchange have not yet been fully modelled in IEC 61850. There is a need to do this so that the equipment can be integrated with other IEC 61850 compliant equipment, both in the substation level and in the network level.

COMMUNICATION NETWORKS AND SYSTEMS FOR POWER UTILITY AUTOMATION –

Part 90-21: Travelling Wave Fault Location

1 Scope

1.1 Scope of work

This part of IEC 61850, which is a Technical Report, aims to provide background information, use cases, data models and guidance on the application of such a technique.

This document will

1) describe the principles of fault location based on travelling waves aided by communications;
2) specify use cases for this method under the following application scenarios:
   a) Single-ended fault location,
   b) Double-ended fault location through communications between two devices,
   c) Double-ended fault location with communications to a master station,
   d) Wide area fault location applications,
   e) Pulse radar echo method,
   f) Substation integration with other fault location and disturbance recording functions,
   g) Testing and calibration;
3) describe the information model for each use case;
4) give guidance on scheme configuration.

1.2 Published versions of the standard and related namespace names

The table below provides a reference between all published editions, amendments or corrigenda of this document and the full name of the namespace.

Table 1 – Published versions of the namespace

Edition	Publication date	Webstore	Namespace
Edition 1.0	2024-10	IEC 61850-90-21:2024	(Tr)IEC 61850-90-21:2022A2

1.3 Namespace name and version

The parameters which identify this new release of this namespace are as follows:

1.4 Published versions of the standard and related namespace names

shows all attributes of (Tr)IEC 61850-90-21:2022A namespace.

Table 2 – Attributes of (Tr)IEC 61850-90-21:2022A namespace

Attribute	Content
Namespace nameplate	
Namespace Identifier	(Tr)IEC 61850-90-21
Version	2022
Revision	A
Release	2
Full Namespace Name	(Tr)IEC 61850-90-21:2022A2
Full Code Component Name	IEC_TR_61850-90-21.NSD.2022A2.Full
Light Code Component Name	IEC_TR_61850-90-21.NSD.2022A2.Light
Namespace Type	transitional
Namespace dependencies	
extends	IEC 61850-7-4:2007B version:2007 revision:B
Namespace transitional status	
Future handling of namespace content	The name space (Tr)IEC 61850-90-21:2022A is considered as "transitional" since the models are expected to be included in further editions IEC 61850-7-4xx. Potential extensions/modifications may happen if/when the models are moved to the International Standard status.

1.5 Code Component distribution

Each Code Component is a ZIP package containing the electronic representation of the Code Component itself, with a file describing the content of the package (IECManifest.xml).

The life cycle of a code component is not restricted to the life cycle of the related publication. The publication life cycle goes through two stages, Version (corresponding to an edition) and Revision (corresponding to an amendment). A third publication stage (Release) allows publication of Code Component in case of urgent fixes of InterOp Tissues, thus without need to publish an amendment.

Consequently new release(s) of the Code Component may be released, which supersede(s) the previous release, and will be distributed through the IEC TC57 web site at: http://www.iec.ch/tc57/supportdocuments.

The code component associated to this TR is an nsd file. It is available as a full version and a light version. The light version is freely accessible on the IEC website for download at: http://www.iec.ch/tc57/supportdocuments, but the usage remains under the licensing conditions.

The latest version/release of the document will be found by selecting the file for the code component with the highest value for VersionStateInfo e.g. *IEC_TR_61850-90-21.NSD.{VersionStateInfo}.Light*

In case of any differences between the downloadable code component and the IEC pdf published content, the downloadable code component is the valid one; it may be subject to updates. See included history files.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

IEC TS 61850-2, *Communication networks and systems for power utility automation – Part 2: Glossary*

IEC 61850-7-2, *Communication networks and systems for power utility automation – Part 7-2: Basic information and communication structure – Abstract communication service interface (ACSI)*