

Australian Standard™

**Communication networks and systems
in substations
Part 7.2: Basic communication structure
for substation and feeder equipment—
Abstract communication service
interface (ACS-I)**

STANDARDS
Australia



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PREFACE

This Standard was prepared by the Standards Australia Committee EL-050, Power System Control and Communication.

The objective of this Standard is to provide users and manufacturers of substation automation equipment with a definition of the abstract communication service interface (ACSI) for use in the utility substation domain that require real-time cooperation of intelligent electronic devices.

This Standard is identical with, and has been reproduced from IEC/TR 61850-7-2, Ed.1 (2003), *Communication networks and systems in substations – Part 7.2: Basic communication structure for substation and feeder equipment—Abstract communication service interface (ACSI)*.

This Standard is Part of *Communication networks and systems in substations*. The series consists of the following:

- Part 1: Introduction and overview
- Part 2: Glossary
- Part 3: General requirements
- Part 4: System and project management
- Part 5: Communication requirements for functions and device models
- Part 6: Configuration description language for communication in electrical substations related to IEDs
- Part 7.1: Basic communication structure for substation and feeder equipment—Principles and models
- Part 7.2: Basic communication structure for substation and feeder equipment—Abstract communication service interface (ACSI) (this Standard)
- Part 7.3: Basic communication structure for substation and feeder equipment—Common data classes
- Part 7.4: Basic communication structure for substation and feeder equipment—Compatible logical node classes and data classes
- Part 8.1: Specific communication service mapping (SCSM)—Mappings to MMS (ISO/IEC 9506-1 and ISO/IEC 9506-2) and to ISO/IEC 8802-3
- Part 9.1: Specific communication service mapping (SCSM)—Sampled values over serial bidirectional multidrop point to point link
- Part 9.2: Specific communication service mapping (SCSM)—Sampled values over ISO/IEC 8802-3

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The terms 'normative' and 'informative' are used to define the application of the annex to which they apply. A normative annex is an integral part of a standard, whereas an informative annex is only for information and guidance.

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INTRODUCTION

This document is part of a set of specifications which details a layered substation communication architecture. This architecture has been chosen to provide abstract definitions of classes and services such that the specifications are independent of specific protocol stacks, implementations, and operating systems.

The IEC 61850 series is intended to provide interoperability between a variety of substation and feeder devices. Communication between these devices is achieved by the definition of a hierarchical class model (for example, logical device, logical node, data, data set, report control, or log) and services provided by these classes (for example, get, set, report, define, delete) in parts IEC 61850-7-x.

This part of IEC 61850 defines the abstract communication service interface (ACSI) for use in the utility substation domain that require real-time cooperation of intelligent electronic devices. The ACSI has been defined so as to be independent of the underlying communication systems. Specific communication service mappings¹ (SCSM) are specified in part 8-x and part 9-x of this standard.

This part of IEC 61850 defines the abstract communication service interface in terms of

- a hierarchical class model of all information that can be accessed via a communication network,
- services that operate on these classes, and
- parameters associated with each service.

The ACSI description technique abstracts away from all the different approaches to implement the cooperation of the various devices.

NOTE 1 Abstraction in ACSI has two meanings. First, only those aspects of a real device (for example, a breaker) or a real function that are visible and accessible over a communication network are modelled. This abstraction leads to the hierarchical class models and their behaviour defined in IEC 61850-7-2, IEC 61850-7-3, and IEC 61850-7-4. Second, the ACSI abstracts from the aspect of concrete definitions on how the devices exchange information; only a conceptual cooperation is defined. The concrete information exchange is defined in the SCSMs.

NOTE 2 This part of IEC 61850 does not provide comprehensive tutorial material. It is recommended that IEC 61850-5 and IEC 61850-7-1 be read first in conjunction with IEC 61850-7-2 and IEC 61850-7-3.

NOTE 3 Examples use names of classes (e.g. XCBR for a class of a logical node) defined in IEC 61850-7-4 and IEC 61850-7-3. The normative names are defined in IEC 61850-7-4 and IEC 61850-7-3 only.

¹ The ACSI is independent of the specific mapping. Mappings to standard application layers or middle ware technologies are possible.

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Communication networks and systems in substations
Part 7.2: Basic communication structure for substation and feeder
equipment—Abstract communication service interface (ACSI)

1 Scope

This part of IEC 61850 applies to the ACSI communication in substations and feeder applications. The ACSI provides the following abstract interfaces.

- a) Abstract interface describing communications between a client and a remote server for
 - real-time data access and retrieval,
 - device control,
 - event reporting and logging,
 - publisher/subscriber,
 - self-description of devices (device data dictionary),
 - data typing and discovery of data types, and
 - file transfer.
- b) Abstract interface for fast and reliable system-wide event distribution between an application in one device and many remote applications in different devices (publisher/subscriber) and for transmission of sampled measured values (publisher/subscriber).

This part of IEC 61850 may also be applied to describe device models and functions for additional activities, such as:

- substation to substation information exchange,
- substation to control centre information exchange,
- power plant to control centre information exchange,
- information exchange for distributed generation, or
- information exchange for metering.

2 Normative references

The following referenced documents are indispensable for the application 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.

References to international standards that are struck through in this clause are replaced by references to Australian or Australian/New Zealand Standards that are listed immediately thereafter and identified by shading. Any Australian or Australian/New Zealand Standard that is identical to the International Standard it replaces is identified as such.

~~IEC 61850-2, Communication networks and systems in substations — Part 2: Glossary~~

AS 61850.2, Communication networks and systems in substations, Part 2: Glossary (identical to IEC 61850-2)