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TECHNICAL SPECIFICATION

colour inside

Industrial-process measurement, control and automation system interface between industrial facilities and the smart grid

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IEC Central Office
3, rue de Varembé
CH-1211 Geneva 20
Switzerland

Tel.: +41 22 919 02 11
Fax: +41 22 919 03 00
info@iec.ch
www.iec.ch

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CONTENTS

INTERNATIONAL ELECTROTECHNICAL COMMISSION

INDUSTRIAL-PROCESS MEASUREMENT, CONTROL AND AUTOMATION SYSTEM INTERFACE BETWEEN INDUSTRIAL FACILITIES AND THE SMART GRID

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Technical specifications are subject to review within three years of publication to decide whether they can be transformed into International Standards.

IEC TS 62872, which is a technical specification, has been prepared by IEC technical committee 65: Industrial-process measurement, control and automation.

The text of this technical specification is based on the following documents:

Enquiry draft	Report on voting
65/590/DTS	65/598/RVC

Full information on the voting for the approval of this technical specification can be found in the report on voting indicated in the above table.

This publication has been drafted in accordance with the ISO/IEC Directives, Part 2.

A review of this Technical Specification will be carried out not later than 3 years after its publication with the options of: extension for another 3 years; conversion into an International Standard; or withdrawal."

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

- transformed into an International standard,
- reconfirmed,
- withdrawn,
- replaced by a revised edition, or
- amended.

A bilingual version of this publication may be issued at a later date.

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INTRODUCTION

The World Energy Outlook 2013 [13][1] reported that industry consumed over 40 % of world electricity generation in 2011. Furthermore, industry itself is a significant generator of internal power, with many facilities increasingly implementing their own generation, co-generation and energy storage resources. As a major energy consumer, the ability of some industries to schedule their consumption can be used to minimize peak demands on the electrical grid. As an energy supplier, industries with in-house generation or storage resources can also assist in grid load management. While some larger industrial facilities already manage their use and supply of electric power, more widespread deployment, especially by smaller facilities, will depend upon the availability of a readily available standard interface between industrial automation equipment and the “smart grid”.

NOTE In this document “smart grid” is used to refer to the external-to-industry entity with which industry interacts for the purpose of energy management. In other documents this term may be used to refer to all of the elements, including internal industrial energy elements, which work together to optimize energy generation and use.

Standards are already being developed for home and building automation interfaces to the grid; however the requirements for industrial facilities differ significantly and are addressed in this Technical Specification. Specifically excluded from the scope of this Technical Specification are the protocols needed for the direct control of energy resources within a facility where the control and ultimate liability for such control is delegated by the industrial facility to the external entity.

[1] Numbers in square brackets refer to the bibliography.

INDUSTRIAL-PROCESS MEASUREMENT, CONTROL AND AUTOMATION SYSTEM INTERFACE BETWEEN INDUSTRIAL FACILITIES AND THE SMART GRID

1 Scope

This Technical Specification defines the interface, in terms of information flow, between industrial facilities and the “smart grid”. It identifies, profiles and extends where required, the standards needed to allow the exchange of the information needed to support the planning, management and control of electric energy flow between the industrial facility and the smart grid.

Industry is a major consumer of electric power and in many cases this consumption can be scheduled to assist in minimizing overall peak demands on the smart grid. In addition, many industrial facilities have in-house generation or storage resources which can also assist in smart grid load management. While some larger industrial facilities already manage their use and supply of electric power, more widespread deployment, especially by smaller facilities, will depend upon the availability of readily available standard automated interfaces.

Standards are already being developed for home and building automation interfaces to the smart grid; however the requirements of industry differ significantly and are addressed in this Technical Specification. For industry, the operation of energy resources within the facility will remain the responsibility of the facility operator. Incorrect operation of a resource could impact the safety of personnel, the facility, the environment or lead to production failure and equipment damage. In addition, larger facilities may have in-house production planning capabilities which might be co-ordinated with smart grid planning, to allow longer term energy planning.

Specifically excluded from the scope of this Technical Specification are the protocols needed for the direct control of energy resources within a facility where the control and ultimate liability for such direct control is delegated by the industrial facility to an external entity (e.g. distributed energy resource (DER) control by the electrical grid operator).

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

IEC 62264-1, *Enterprise-control system integration - Part 1: Models and terminology*

IEC 62264-3, *Enterprise-control system integration - Part 3: Activity models of manufacturing operations management*

IEC TS 62443-1-1, *Industrial communication networks - Network and system security - Part 1-1: Terminology, concepts and models*

IEC 62443-2-1, *Industrial communication networks - Network and system security - Part 2-1: Establishing an industrial automation and control system security program*

IEC TR 62443-3-1, *Industrial communication networks - Network and system security - Part 3-1: Security technologies for industrial automation and control systems*

IEC 62443-3-3, *Industrial communication networks - Network and system security - Part 3-3: System security requirements and security levels*

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

3.1 General

3.1.1
profile
set of one or more base standards and/or other profiles and, where applicable, the identification of chosen classes, conforming subsets, options and parameters of those base standards, or profiles necessary to accomplish a particular function

[SOURCE: IEC/ISO TR 10000-1:1998, 3.1.4, modified – reference to international standard profiles has been removed]

3.1.2
level
group of functions categorized with the functional hierarchy model of production systems defined in IEC 62264-1

Note 1 to entry: The highest level, Level 4, typically includes enterprise resource planning and similar functions, while the lowest level, Level 0, represents the physical industrial process itself.

3.1.3
level 4
functions involved in the business-related activities needed to manage a manufacturing organization

[SOURCE: IEC 62264-1:2013, 3.1.16]

3.1.4
level 3
functions involved in managing the work flows to produce the desired end-products

[SOURCE: IEC 62264-1:2013, 3.1.17]

3.1.5
level 2
functions involved in monitoring and controlling of the physical process

[SOURCE: IEC 62264-1:2013, 3.1.17]

3.1.6
level 1
functions involved in sensing and manipulating the physical process

[SOURCE: IEC 62264-1:2013, 3.1.18]

3.1.7
level 0
actual physical process

[SOURCE: IEC 62264-1:2013, 3.1.19]