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Energy efficiency through automation systems

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National foreword

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

ENERGY EFFICIENCY THROUGH AUTOMATION SYSTEMS

FOREWORD

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The main task of IEC technical committees is to prepare International Standards. However, a technical committee may propose the publication of a technical report when it has collected data of a different kind from that which is normally published as an International Standard, for example "state of the art".

IEC 62837, which is a technical report, has been prepared by IEC technical committee 65: Industrial-process measurement, control and automation.

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

Enquiry draft	Report on voting
65/513/DTR	65/517/RVC

Full information on the voting for the approval of this technical report 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.

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

- reconfirmed,
- withdrawn,
- replaced by a revised edition, or
- amended.

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

IMPORTANT – The 'colour inside' logo on the cover page of this publication indicates that it contains colours which are considered to be useful for the correct understanding of its contents. Users should therefore print this document using a colour printer.

INTRODUCTION

Energy efficiency has received an ever growing attention worldwide since it is considered a major lever to help secure a sustainable society in view of climate change, growing population and security of supply [1][1]. Additionally the sustainability and conservation of resources need to be considered. Automation is the enabler of measures, solutions and systems for demand/response and energy efficiency. In the context of this TR we will only consider energy efficiency. IEC and ISO have both identified energy efficiency as one of their main areas of activity.

The current focus of the Standard Development Organisations (SDO) is harmonised terminology, calculation methods, indicators, energy management systems and standards for assessment and ratings (e.g. for buildings and industrial plants). For this purpose IEC SMB Decision 128/20 “New initiatives for IEC” work endorsed the SMB Strategic Group 1 on Energy Efficiency and Renewable Energy. This strategic group has since then developed 34 recommendations for future work in different domains. The three following recommendations cover the area of automation:

- Recommendation #7: IEC/TC 2, SC 22G and TC 65 together with ISO/TC 184 should develop guidelines for the design and operation of energy efficient systems in the field of industrial automation and industrial process control from a system point of view.
- Recommendation #27: In order to support the optimisation of automation and production processes already during the planning phase of production systems, SG1 recommends that all relevant product TC/SC include key data in their components/devices standards that are vital for a priori simulation of the component/device behaviour in an intended production system, as such simulation leads to optimised processes from an energy efficiency perspective.
- Recommendation #28: In order to support the optimisation of automation and production processes already during the planning phase of production systems, SG1 recommends that TC 65 and its SCs consider the development of simulation tools from a system point of view, to allow a priori optimisation of automation and production processes on the factory floor in terms of energy efficiency.

In line with the recommendation #7, a workshop organized by the quoted committees and by SC 17B reached the consensus to create JWG 14, settled in TC 65, to cover the objectives and perform the tasks specified in the above mentioned recommendations. This document identifies a number of technology areas in the scope of various technical committees that need standardisation.

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1 Numbers in square brackets refer to the Bibliography.

ENERGY EFFICIENCY THROUGH AUTOMATION SYSTEMS

1 Scope

This Technical Report provides to the technical committees a framework for the development and adaptation of documents in order to improve energy efficiency in manufacturing, process control and industrial facility management.

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 (all parts), *Enterprise-control system integration*

IEC 62264-1:2013, *Enterprise-control system integration – Part 1: Models and terminology*

ISO 20140-1:2013, *Automation systems and integration – Evaluating energy efficiency and other factors of manufacturing systems that influence the environment – Part 1: Overview and general principles*

ISO 22400-2, *Automation systems and integration – Key performance indicators for manufacturing operations management – Part 2: Definitions and descriptions*[2]

3 Terms and definitions

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

3.1 Energy

3.1.1
energy
capacity of a system to produce external activity or perform work

Note 1 to entry: Commonly, the term “energy” is used for electricity, fuel, steam, heat, compressed air and other like media. Energy can take a wide variety of forms, for example: chemical energy, mechanical energy, thermal energy, electric energy, gravitational energy, nuclear energy, hydraulic energy, etc.

Note 2 to entry: The SI unit for energy is joule (J), and for electric energy also watt-hour (W·h).

[SOURCE: CEN/CLC/TR 16103:2010, 4.1.1]

3.1.2
energy conversion
transformation of the physical or chemical form of energy

Note 1 to entry: The term “energy transformation” may be employed in this sense.

2 To be published.