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Introduction

This draft standard is based on national and international discussions. Your comments on this draft are invited and will assist in the preparation of the consequent standard.

For international standards, comments will be reviewed by the relevant UK national committee before sending the consensus UK vote and comments to the international committee, which will then decide appropriate action. If the international standard is approved, it is usual for the text to be published as a British Standard.

For national standards, comments will be reviewed by the relevant UK national committee and the resulting standards published as a British Standard.

UK Vote

Please indicate whether you consider the UK should submit a negative (with supporting technical reasons) or positive vote on this draft. Please indicate if you are aware of any reason why this draft standard should not be published as a British Standard.

Submission of Comments

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Template for comments and secretariat observations

Date: xx/xx/20xx	Document: ISO/DIS xxxx
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1	2	(3)	4	5	(6)	7
MB	Clause No./ Subclause No./Annex (e.g. 3.1)	Paragraph/Figure/ Table/Note	Type of comment	Commend (justification for change) by the MB	Proposed change by the MB	Secretariat observations on each comment submitted
	3.1	Definition 1	ed	Definition is ambiguous and needs clarifying.	Amend to read '...so that the mains connector to which no connection...'	
	6.4	Paragraph 2	te	The use of the UV photometer as an alternative cannot be supported as serious problems have been encountered in its use in the UK.	Delete reference to UV photometer.	



23K/84/CD

COMMITTEE DRAFT (CD)

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IEC 63402-1 ED1

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CLOSING DATE FOR COMMENTS:

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SUPERSEDES DOCUMENTS:

23K/59/NP, 23K/62A/RVN

IEC SC 23K : ELECTRICAL ENERGY EFFICIENCY PRODUCTS

SECRETARIAT:

France

SECRETARY:

Mr Philippe Vollet

OF INTEREST TO THE FOLLOWING COMMITTEES:

TC 13,TC 23,TC 57,TC 64,TC 69,SyC Smart Energy

PROPOSED HORIZONTAL STANDARD:

☐

Other TC/SCs are requested to indicate their interest, if any, in this CD to the secretary.

FUNCTIONS CONCERNED:

☐ EMC

☐ ENVIRONMENT

☐ QUALITY ASSURANCE

☐ SAFETY

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TITLE:

Energy Efficiency Systems - Smart Grid - Customer Energy Management Systems - General Requirements and Architecture

NOTE FROM TC/SC OFFICERS:

SC23K officers support this IEC 63402-1 CD circulation, and encourage each NC to comment. SC23K officers and WG3 experts agreed to renumber this International Standard as IEC 63402-1 instead of 63402 for more consistency in other future SC23K WG3 publications as explained in the introduction.

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

**Smart grid - Application specification - Interface and framework for customer;
Interface between the CEM and Home/Building Resource manager
General Requirements and Architecture**

FOREWORD

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The IEC 63402-1 ED1 has been prepared by subcommittee SC23K: Electrical Energy Efficiency, of IEC technical committee products. It is an International Standard.

The text of this International Standard is based on the following documents:

Draft	Report on voting
XX/XX/FDIS	XX/XX/RVD

This document is currently submitted to the Enquiry.

The following dates are proposed:

- latest date by which the existence of this document has to be announced at national level (doa) dor + 6 months
- latest date by which this document has to be implemented at national level by publication of an identical national standard or by endorsement (dop) dor + 12 months
- latest date by which the national standards conflicting with this document have to be withdrawn (dow) dor + 36 months
(to be confirmed or modified when voting)

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INTRODUCTION

In traditional electricity networks, energy flows in one direction and communications from the generator to the consumer is generally via the transmission and distribution systems.

Although there is some monitoring and control of equipment in the transmission and distribution systems, there is no communication with, or control of, consumer equipment. In particular, there is no means of requesting short-term control of consumer equipment to match the prevailing generation and/or transmission/distribution grid conditions. Generation equipment is controlled to match the open-ended (uncontrolled) demand of the consumer.

Today we are faced with an increase of energy consumption, this is directly linked to an increase of CO₂ production. The increased CO₂ density in the atmosphere supports the climate warming of the earth.

One significant way to cope with the increased energy consumption without increasing the CO₂ production is to use more renewable energy resources.

Unfortunately, the available renewable energy supply is not aligned with the energy demand. To increase efficiency, the energy demand should be aligned as much as possible with the available energy supply. The future grid will become generation led rather than demand led as it is today. In order to reach this goal, communications between the various equipment and systems of the stakeholders within the energy field is necessary. This new form of grid which exchanges information and energy between producers, consumers, distributors and metering is known as the "Smart Grid".

The IEC 63402 series describes aspects of this smart grid that relate specifically to the premises (home/building) part of the smart grid, including the common interface between equipment in the premises and the smart grid.

Note: The intention of this standard is to describe the whole energy management in the premises. To get a clear view on the energy management in a premises, it is recommended to split the topic into several parts for e.g. system architecture, data models, function description etc. Therefor SC23K officers and WG3 experts have agreed to change the number of this standard from 63402, as it was called in the NWIP to 63402-1. This allows to collect all energy management standard under the IEC63402 series.

1 Scope

This European Standard specifies General Requirements and Architecture of an application layer interface between the Smart Point of common coupling (PCC) and Smart Devices (SD) operating within the smart grid premises-side system (i.e. residential / commercial but not industrial premises).

This standard does not include requirements for:

- Safety;
- EMC;
- Data security; it is assumed that the underlying protocols will take the data security aspect into account;

Note: Although data security is not within the scope of this standard, clause 4 provides some high-level design guidelines for data security.

- Special equipment (e.g. legacy heat pumps) with a direct physical connection to the grid, as such equipment bypasses the CEM and is not HBES/BACS enabled (covered by other standards than the EN 50491 series).

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.

EN 50491-12 (all parts), *General requirements for Home and Building Electronic Systems (HBES) and Building Automation and Control Systems*

3 Terms, definitions and abbreviations

3.1 Terms and definitions

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

3.1.1

Customer Energy Manager

CEM

internal automation function for optimizing the energy consumption, production and storage within the premises according to the preferences of the customer using internal flexibilities and typically based on external information received through the Energy Management Gateway and possibly other data sources

3.1.2

Customer Energy Manager System

CEM system

allows the management of energy consumption, production and storage within the premises, consisting of a CEM connected to one or more Resource Managers which themselves act as gateways to HBES / BACS, SASS and / or Smart Appliances

3.1.3

Energy Management Gateway

EMG

access point (functional entity) sending and receiving smart grid related information and commands between an actor in the Grid and the CEM, letting the CEM decide how to process the events

Note to entry: The communication is often ensured through an internet connection.

3.1.4**Building Energy Management****BEM**

internal automation function for observing the Point of common coupling (PCC), to avoid an overload of the PCC and share the available energy between the different Sub systems which are represented by the connected CEM's. The BEM gets additional information (Voltage, Frequency, Cos Phi) from a Grid observer which allows to support the grid even in the case the IP communication is broken.

Note to entry: BEM is also called sometimes Facility Energy Manager (FEM)

3.1.5**Head End System****HES**

system that receives metering data in the advanced metering infrastructure

3.1.6**Home and Building Electronic Systems / Building Automation Control Systems****HBES / BACS**

logical group of devices which uses a multi-application communication system where the functions are distributed and linked through a common communication process

Note 1 to entry: HBES/BACS is used in homes and buildings plus their surroundings. Functions of the system are e.g.: switching, open loop controlling, closed loop controlling, monitoring and supervising.

Note 2 to entry: In literature, HBES/BACS may be referred also as "home control system/network", "home electronic systems" "building automation systems" etc.

Note 3 to entry: Examples of HBES/BACS applications are the management of lighting, heating, energy, water, fire alarms, blinds, different forms of security, etc.". See introduction in EN 50491-4-1.

3.1.7**Schema**

abstract model that documents and organizes the data required in a defined way, so it can be used for different purposes such as exchanging and / or storing information

3.1.8**Meter Data management****MDM**

software system that performs long-term data storage and management for the vast quantities of data delivered by smart metering systems

3.1.9**Resource Manager**

function that exclusively represents a logical group of devices or a single smart device, and is responsible for sending unambiguous instructions to the logical group of devices or to a single device, typically using a device-specific protocol

Note 1 to entry: In the context of this document the Resource Manager manages the energy flexibility of a logical group of devices or a single smart device.

Note 2 to entry: The Resource Manager may be implemented in a special device, in the smart device itself or outside of the device

3.1.10**premises**

can be a public or private building/home where energy is used and/or produced

3.1.11**Smart Appliance**

device that consumes energy that can be controlled by a Resource Manager, such as a washing machine, a freezer, a dishwasher

3.1.12**Smart Device****SD**

device that can consume, produce or store energy (or a combination thereof) and that can be controlled by a Resource Manager for the purpose of energy management, such as a lighting controller, an electric vehicle, a smart appliance, a renewable power source, an energy storage system

3.1.13**Single Application Smart System****SASS**

group of devices having a communication interface for a single application such as heating or lighting, that consume, produce or store energy (or a combination thereof) and that can be controlled by a Resource Manager for the purpose of energy management

3.1.14**Aggregator**

actor whose goal it is to maximize the value of flexibility, taking into account customer needs, economical optimization and grid capacity

3.1.15**Point of common coupling monitor**

Measures the Voltage, Frequency, Current at the PCC and sends this information to the BEM

3.1.16**Energy Management System****EMS**

is a Hardware with different functions included according to the system requirements. Every underlying subsystem, to be connected to the EMS, is connected via the RM function. A minimum EMS consists of a CEM and at least one RM.

3.1.17**Point of Common Coupling (PCC)**

point of common coupling PCC - point in an electric power system, electrically nearest to a particular load, at which other loads are, or may be, connected Note 1 to entry: These loads can be either devices, equipment or systems, or distinct network users' installations

Note to entry: Point Of Common coupling is equal to Grid connection Point

3.1.18**Energy Metering Service Provider**

party providing energy metering services

3.1.19**Distribution System Operator (DSO)**

securely operates and develops an active distribution system comprising networks, demand, generation and other flexible distributed energy resources

3.1.20**Energy Service Provider**

party providing energy (utility) or energy services (Aggregator, E-mobility Service provider, etc)