SLOVENSKI STANDARD
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Omrežje gospodinjskih aparatov in povezljivost mreže - 2. del: Mapiranje glede na proizvod, podrobnosti, zahteve in odstopanja

Household appliances network and grid connectivity - Part 2: product specific mappings, details, requirements and deviations

Netzwerk- und Stromnetz-Konnektivität von Haushaltsgeräten - Teil 2: Produktspezifische Mappings, Details, Anforderungen und Abweichungen

Appareils domestiques connectés au réseau et réseau intelligent - Partie 2: Mappings spécifiques aux produits, détails, exigences et déviations

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European foreword

This document (EN 50631-2:2023) has been prepared by WG 7 “Smart Household Appliances” of CLC/TC 59X “Performance of household and similar electrical appliances”.

The following dates are fixed:

• latest date by which this document has to be implemented at national level by publication of an identical national standard or by endorsement	(dop)	2024-02-07
• latest date by which the national standards conflicting with this document have to be withdrawn	(dow)	2026-02-07

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Introduction

Energy management systems will more and more become necessary due to change from fossil and nuclear to renewable production and the associated decentralization. Since an appropriate standard for a home and building management is in preparation, this document specifies how sets of products from multiple manufacturers can exchange information with Home and Building / Customer Energy Management Systems, located in a home network or in the cloud.

This document focuses on interoperability of household appliances and describes the necessary control and monitoring. It defines a set of functions of household and similar electrical appliances. The functions in this document cover next to energy-management main remote-control and – monitoring use cases.

This document does not deal with safety and security requirements. Safety requirements have been set in the EN 60335 series [1].

The EN 50631 series will provide interoperability on information exchange among various appliances in the home. The EN 50631 document series will be re-arranged regarding the further development and will be split into 6 parts:

EN 50631-1: *Household appliances network and grid connectivity — Part 1: General Requirements, Generic Data Modelling and Neutral Messages*

EN 50631-2: *Household appliances network and grid connectivity — Part 2: Product Specific mappings, details, requirements and deviations*

EN 50631**-3-x**: *Household appliances network and grid connectivity — Part 3: Specific Data Model Mapping*

EN 50631**-4-x**: *Household appliances network and grid connectivity — Part 4: Communication Protocol Specific Aspects*

EN 50631-5: *Household appliances network and grid connectivity — Part 5: General Test-Requirements and -Specification*

EN 50631-6: *Household appliances network and grid connectivity — Part 6: SPINE Data Model Toolbox*

Data communication heavily depends on the environment of appliances. Sometimes low bitrate or energy efficient communication puts strict requirements to selected communication technologies. Therefore, popular and de facto standards had been and will be developed by the industry to fulfil such requirements. To not influence common data modelling for appliances because of such restrictions, the standardized data models and neutral message structures need to be applied to communication technologies.

This standard series therefore is intended to separate data modelling and neutral message structure from the attached communication.

Part 1 defines general requirements, generic data modelling and generic neutral messages without relation to any specific communication technology or any product specific layout.

Part 2 lists and specifies product specific requirements and implementation guidance based on the generic data model and generic neutral messages.

Part 3 defines the mapping of neutral messages to examples of typical data models like SPINE, OCF, and so forth. These data models are neither mandatory nor to be seen as complete spectrum of data models.

Part 4 defines the mapping of neutral messages to examples of typical communication protocols. These communication protocols are neither mandatory, nor do they provide an exhaustive list of communication protocols.

Part 5 defines testing requirements and testing specifications. This part will be covered in the future by a New Work Item Proposal.

Part 6 provides the technical reference specification for the SPINE data model. This part will be covered in the future by a New Work Item Proposal.

1 Scope

This document maps the generic use cases, use case functions, and generic data definitions to categories of appliances (e.g. washer, dishwasher, water heater, HVAC devices) as well as any necessary appliance-specific details and deviations.

This document is part of the EN 50631 series, which defines the information exchange between Smart Appliances and management systems in homes and buildings including energy management.

2 Normative references

There are no normative references in this document.

3 Terms and definitions

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

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

— ISO Online browsing platform: available at https://www.iso.org/obp

— IEC Electropedia: available at https://www.electropedia.org/

3.1
appliance
electrical apparatus intended for household or similar use

EXAMPLES Refrigerators, dishwashers, clothes washers, clothes dryers, air conditioners, water heaters, circulation pumps, heat pumps, etc.

3.2
Appliance Energy Flexibility
ability of an appliance to change power consumption in response to an external stimulus

3.3
CCM
Customer Connectivity Manager
component or set of functions with the capability to:

1. receive and process Grid Information, Appliance Information and User Instructions, and
2. manage one or more Smart Appliances

Note 1 to entry: A CCM may be integrated with a Smart Appliance or may be physically separate.

Note 2 to entry: A CCM manages the energy-using behaviour as well as other aspects of device behaviour (e.g. setting of job status like starting, stopping, pausing, parameters like temperature, notifications...) of one or more Smart Appliances.

Note 3 to entry: In other documentation, CCM is often called Customer Energy Manager (CEM) with a dedicated focus on energy management or called Energy Management System (EMS) with a dedicated focus on energy management.

3.4
data model
definition of possible data (data structures, values) for the exchange of information (especially for communications systems) [2]

3.5
Demand Response
DR
action resulting from management of the electricity demand in response to supply conditions [2]

3.6
Demand Side Management
DSM
process that is intended to influence the quantity or patterns of use of electric energy consumed by end-use customers

3.7
grid information
information received by a CCM directly from or relating to the electricity grid

Note 1 to entry: Such information may include (but is not restricted to) the following categories:

— current and future energy prices;

— current and future network constraints;

— emissions-intensity of electricity supply;

— level of renewable energy generation;

— requests or instructions for load modification;

— directly sensed information (e.g. frequency and voltage).

3.8
HAN
Home **A**rea **N**etwork

3.9
interoperability
property permitting smart appliances and energy management systems in homes and buildings to exchange data together for the purpose of energy management [2]

3.10
JWG
Joint Working Group
Joint Working Group Use Cases & Requirements is a working group under the roof of IEC/TC 57/WG 21; it is a cross functional working group and develops Smart Grid and Smart Home&Building related user stories and use cases

Note 1 to entry: See IEC/TR 62746-2:2015 Use cases and requirements [1].

3.11
neutral message
information exchange independent of any specific communication solution

Note 1 to entry: EN 50631-4 describes the mapping of neutral messages to examples of typical communication protocols.

3.12
smart appliance
appliance that is capable of Smart Operation

Note 1 to entry: Notwithstanding the possibly broader concept related to the term “smart appliance”, a smart appliance under the framework of this document needs to be understood as follows:

1) It is an appliance that can respond to an external stimulus initiated by a CCM and/or Remote Agent to provide activities such as

   a. Support Appliance Energy Flexibility

   b. job status related functions such as starting, stopping, pausing,

   c. content or level related functions such as temperature, door status.

2) The appliance will respond when the user sets conditions and its status allows for a response;

3) The response is a change of the appliance’s behaviour like electricity consumption, job status and/or level or content pattern, or a notification thereof;

4) The specific technical smart capabilities need not be activated when the product is placed on the market; the activation can be done at a later point in time by the consumer or a service provider.

Note 2 to entry: Smart appliances in this context can communicate through a Customer Connectivity Manager function processing external signals, such as price information or availability of Renewable Energy Sources (demand response), or direct control signals (demand side management), being able to consider households’ preferences or the behaviour of the other home appliances.

3.13
smart operation
operation of an Appliance where the CCM has been set to modify operation automatically in response to Trigger Criteria

Note 1 to entry: Smart operation may be initiated by a CCM.

3.14
SPINE
Smart **P**remises **I**nteroperable **N**eutral-message **E**xchange

3.15
use case
textual description of a re-usable functionality, consisting of one or more messages from one or more participating actors, may be visualized with a sequence diagram; e.g. “A CCM shifts the energy usage of a washing machine”

3.16
Use Case Functions
Use Case Functions group basic functionalities that had been derived from use cases; these functions provide the entire information exchange required to implement the considered use cases and user stories

3.17
user story
complete (but specific) business case described from the perspective of a user, which can be separated into several use cases, e.g. “The user wants to get the laundry done by 8:00pm”

4 Mapping of Use Cases and Use Case Functions to categories of appliances

M = mandatory

O = optional

R = Recommended

N/A = Not Applicable

Table 1 — Mapping of Use Cases to Categories of Appliances – White Goods

	Flexible Start	Limitation of Power Consumption	Manual Operation	Monitoring of Power Consumption	Install Smart Appliance	Remove Smart Appliance
dishwashers	M	O	M	M	M	M
stationary cooking ranges hobs ovens and similar appliances	N/A	N/A	M	M	M	M
washing machines	M	O	M	M	M	M
tumble dryers	M	O	M	M	M	M
coffee makers	O	N/A	M	M	M	M