

# INTERNATIONAL STANDARD

---

**Household appliances network and grid connectivity –  
Part 1: General requirements, generic data modelling and neutral messages**



**THIS PUBLICATION IS COPYRIGHT PROTECTED**  
**Copyright © 2025 IEC, Geneva, Switzerland**

All rights reserved. Unless otherwise specified, no part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from either IEC or IEC's member National Committee in the country of the requester. If you have any questions about IEC copyright or have an enquiry about obtaining additional rights to this publication, please contact the address below or your local IEC member National Committee for further information.

IEC Secretariat  
3, rue de Varembe  
CH-1211 Geneva 20  
Switzerland

Tel.: +41 22 919 02 11  
[info@iec.ch](mailto:info@iec.ch)  
[www.iec.ch](http://www.iec.ch)

**About the IEC**

The International Electrotechnical Commission (IEC) is the leading global organization that prepares and publishes International Standards for all electrical, electronic and related technologies.

**About IEC publications**

The technical content of IEC publications is kept under constant review by the IEC. Please make sure that you have the latest edition, a corrigendum or an amendment might have been published.

**IEC publications search -**  
[webstore.iec.ch/advsearchform](http://webstore.iec.ch/advsearchform)

The advanced search enables to find IEC publications by a variety of criteria (reference number, text, technical committee, ...). It also gives information on projects, replaced and withdrawn publications.

**IEC Just Published - [webstore.iec.ch/justpublished](http://webstore.iec.ch/justpublished)**  
Stay up to date on all new IEC publications. Just Published details all new publications released. Available online and once a month by email.

**IEC Customer Service Centre - [webstore.iec.ch/csc](http://webstore.iec.ch/csc)**  
If you wish to give us your feedback on this publication or need further assistance, please contact the Customer Service Centre: [sales@iec.ch](mailto:sales@iec.ch).

**IEC Products & Services Portal - [products.iec.ch](http://products.iec.ch)**

Discover our powerful search engine and read freely all the publications previews, graphical symbols and the glossary. With a subscription you will always have access to up to date content tailored to your needs.

**Electropedia - [www.electropedia.org](http://www.electropedia.org)**

The world's leading online dictionary on electrotechnology, containing more than 22 500 terminological entries in English and French, with equivalent terms in 25 additional languages. Also known as the International Electrotechnical Vocabulary (IEV) online.

**Warning! Make sure that you obtained this publication from an authorized distributor.**

## CONTENTS

FOREWORD .....	9
INTRODUCTION .....	11
1 Scope .....	13
2 Normative references .....	13
3 Terms and definitions .....	13
4 Process and requirements to enable interoperability .....	17
4.1 Introduction .....	17
4.2 Process .....	17
4.3 Architecture .....	19
5 Reader's guide .....	21
5.1 Finding the right information .....	21
5.2 Reading the tables .....	21
5.3 Reading the graphics .....	22
5.3.1 Flowcharts .....	22
5.3.2 Sequence diagram .....	22
6 User Stories .....	23
6.1 Introduction .....	23
6.2 User stories .....	23
6.2.1 General .....	23
6.2.2 Appliance Energy Flexibility .....	23
6.2.3 Remote Control of a Smart Appliance .....	26
6.2.4 Remote Monitoring of a Smart Appliance .....	26
6.2.5 Manual Operation of a Smart Appliance .....	27
7 Use cases .....	28
7.1 Introduction .....	28
7.2 User Stories and Use Cases .....	28
7.3 Flexible Start for White Goods .....	29
7.3.1 General .....	29
7.3.2 Actors .....	32
7.3.3 Scenario overview .....	32
7.3.4 Scenario support requirements .....	32
7.3.5 Scenario flow .....	33
7.3.6 Scenario details .....	34
7.3.7 Scenarios and Use Case Functions (UCFs) .....	37
7.3.8 Dependencies to other Use Cases .....	37
7.3.9 Assumptions and Prerequisites .....	37
7.4 Incentive Table-based Power Consumption Management .....	37
7.4.1 Actors .....	37
7.4.2 Scenario Overview .....	38
7.4.3 Scenario support requirements .....	38
7.4.4 Scenario Flow .....	38
7.4.5 Scenario Details .....	39
7.4.6 Scenarios and Use Case Functions (UCFs) .....	50
7.4.7 Dependencies to other Use Cases .....	50
7.4.8 Assumptions and Prerequisites .....	51
7.5 Install/Remove Device .....	51

7.5.1	General.....	51
7.5.2	Actors.....	51
7.5.3	Scenario Overview.....	51
7.5.4	Scenario support requirements.....	51
7.5.5	Scenario Flow.....	52
7.5.6	Scenario details.....	52
7.5.7	Scenarios and Use Case Functions (UCFs) .....	53
7.5.8	Dependencies to other Use Cases .....	53
7.5.9	Assumptions and Prerequisites .....	53
7.6	Limitation of Power Consumption .....	53
7.6.1	General.....	53
7.6.2	Actors.....	55
7.6.3	Scenario Overview.....	55
7.6.4	Scenario support requirements.....	56
7.6.5	Scenario Flow.....	56
7.6.6	Scenario details.....	56
7.6.7	Scenarios and Use Case Functions (UCFs) .....	60
7.6.8	Dependencies to other Use Cases .....	60
7.6.9	Further information and rules .....	60
7.6.10	Assumptions and Prerequisites .....	61
7.7	Limit Consumption to own Production .....	61
7.8	Manual Operation .....	61
7.8.1	General.....	61
7.8.2	Actors.....	61
7.8.3	Scenario Overview.....	62
7.8.4	Dependencies to other Use Cases .....	62
7.8.5	Assumptions and Prerequisites .....	62
7.9	Monitoring and Control of Smart Grid Ready Conditions .....	62
7.9.1	General.....	62
7.9.2	Actors.....	63
7.9.3	Scenario overview.....	63
7.9.4	Scenario support requirements.....	64
7.9.5	Scenario flow.....	64
7.9.6	Scenario details.....	64
7.9.7	Scenarios and Use Case Functions.....	65
7.9.8	Dependencies to other Use Cases .....	65
7.9.9	Assumptions and Prerequisites .....	65
7.10	Monitoring of Power Consumption .....	66
7.10.1	General.....	66
7.10.2	Actors.....	66
7.10.3	Scenario Overview.....	67
7.10.4	Scenario Support Requirements .....	67
7.10.5	Scenario Flow.....	68
7.10.6	Scenario details.....	68
7.10.7	Scenarios and Use Case Functions (UCFs) .....	71
7.10.8	Dependencies to other Use Cases .....	71
7.10.9	Assumptions and Prerequisites .....	71
7.11	Optimization of Self Consumption by Heat Pump Compressor Flexibility.....	71
7.11.1	General.....	71

7.11.2	User Story as an example .....	72
7.11.3	Detailed background information .....	72
7.11.4	Actors .....	75
7.11.5	Scenario Overview .....	75
7.11.6	Scenario Support Requirements .....	75
7.11.7	Scenario Flow.....	75
7.11.8	Scenario Details .....	77
7.11.9	Scenarios and Use Case Functions (UCFs) .....	80
7.11.10	Dependencies to other Use Cases .....	80
7.11.11	Assumptions and Prerequisites .....	80
8	Use Case Function (UCF) details .....	81
8.1	General .....	81
8.2	Concepts .....	81
8.3	UCF_AC_Measurement.....	81
8.3.1	Generic Description.....	81
8.3.2	Additional Information.....	91
8.4	UCF_Characteristics .....	92
8.4.1	Generic Description.....	92
8.4.2	Additional Information.....	93
8.5	UCF_Configure_Current_Power_Sequence .....	93
8.5.1	Generic Description.....	93
8.5.2	Additional Information.....	94
8.6	UCF_Consumption_Curve .....	95
8.6.1	Generic Description.....	95
8.6.2	Additional Information.....	97
8.7	UCF_Device_Configuration.....	97
8.7.1	Generic Description.....	97
8.7.2	Additional Information.....	101
8.8	UCF_Device_Connected .....	101
8.8.1	Generic Description.....	101
8.8.2	Additional Information.....	102
8.9	UCF_Heartbeat .....	102
8.9.1	Generic Description.....	102
8.9.2	Additional Information.....	103
8.10	UCF_Incentive_Table.....	103
8.10.1	Generic Description.....	103
8.10.2	Additional Information.....	120
8.11	UCF_Overrun.....	120
8.11.1	Generic Description.....	120
8.11.2	Additional Information.....	122
8.12	UCF_Plan_With_Power_Sequences .....	122
8.12.1	Generic Description.....	122
8.12.2	Additional Information.....	129
8.13	UCF_Power_Limit.....	129
8.13.1	Generic Description.....	129
8.13.2	Additional Information.....	131
8.14	UCF_Report_Status_Of_Power_Sequence.....	131
8.14.1	Generic Description.....	131
8.14.2	Additional Information.....	133

8.15	UCF_Select_Power_Sequence.....	134
8.15.1	Generic Description.....	134
8.15.2	Additional Information.....	135
8.16	UCF_Shift_Preferred_Power_Sequence.....	136
8.16.1	Generic Description.....	136
8.16.2	Additional Information.....	137
8.17	UCF_System_Function.....	137
8.17.1	Generic Description.....	137
8.17.2	Additional Information.....	138
9	Glossary of definitions for UCFs.....	138
	Bibliography.....	144
	Figure 1 – SGAM Framework (from [9]).....	18
	Figure 2 – Process used in this document.....	18
	Figure 3 – Application of IEC 63510 series for the local and IoT/Cloud based operating modes.....	19
	Figure 4 – Applicability of resources to different scenarios.....	20
	Figure 5 – Applicability of IEC 63510 series .....	20
	Figure 6 – Planned application of IEC 63510 series using SPINE and SHIP.....	21
	Figure 7 – Example communication sequence diagram.....	22
	Figure 8 – The different layers of operation classes .....	23
	Figure 9 – Energy management with smart appliance and CCM .....	29
	Figure 10 – Power sequence: P(t) (power-over-time) modelling with slots and time constraints.....	30
	Figure 11 – Further possible properties of a scheduled power sequence .....	30
	Figure 12 – Scenario overview for Flexible Start for White Goods.....	32
	Figure 13 – Workflow of this Use Case .....	34
	Figure 14 – Scenario Overview .....	38
	Figure 15 – Workflow of this Use Case .....	39
	Figure 16 – Overview of Scenario 2 activity.....	41
	Figure 17 – Activity begin diagram of Scenario 2 .....	41
	Figure 18 – Activity branch "Update of Committed Power Plan" diagram of Scenario 2 .....	42
	Figure 19 – Activity branch "Autonomous operation" diagram of Scenario 2.....	43
	Figure 20 – Overview of Scenario 3 activity.....	45
	Figure 21 – Activity begin diagram of Scenario 3 .....	46
	Figure 22 – Activity branch "Update of Preliminary Power Plan" diagram of Scenario 3.....	47
	Figure 23 – Activity branch "Disable simulation phase" diagram of Scenario 3 .....	48
	Figure 24 – Install/Remove Device Scenario overview.....	51
	Figure 25 – Scenario Flow for Install/Remove Device.....	52
	Figure 26 – High-Level Use Case functionality overview .....	54
	Figure 27 – Scenario Overview for Limitation of Power Consumption .....	56
	Figure 28 – High-Level Use Case functionality overview .....	62
	Figure 29 – Scenario overview.....	64
	Figure 30 – High-Level Use Case functionality overview .....	66
	Figure 31 – Scenario overview.....	67

Figure 32 – High-Level Use Case functionality overview .....	71
Figure 33 – Single electricity meter .....	72
Figure 34 – Multiple electricity meters.....	72
Figure 35 – PV generation and consumption .....	73
Figure 36 – Excess and surplus power.....	73
Figure 37 – Scenario overview for Optimization of Self Consumption by Heat Pump Compressor Flexibility.....	75
Figure 38 – Workflow of "phase A" of Scenarios 1, 2.....	76
Figure 39 – Workflow of "phase B" of Scenarios 1, 2.....	77
Figure 40 – Message sequence of UCF_AC_Measurement.....	82
Figure 41 – Message sequence of UCF_Characteristics .....	92
Figure 42 – Message sequence of UCF_Configure_Current_Power_Sequence .....	93
Figure 43 – Messaging sequence for UCF_Consumption_Curve.....	95
Figure 44 – Message sequence of UCF_Device_Configuration.....	97
Figure 45 – Communication sequence diagram for UCF_Device_Connected.....	101
Figure 46 – Runtime messaging sequence for UCF_Heartbeat.....	102
Figure 47 – MESSAGING SEQUENCE FOR UCF_INCENTIVE_TABLE .....	103
Figure 48 – Sequence diagram for UCF_Overrun.....	121
Figure 49 – Message sequence of UCF_Plan_With_Power_Sequences .....	122
Figure 50 – Valid state transitions of a Device .....	128
Figure 51 – Generic Message sequence of UCF_Power_Limit.....	129
Figure 52 – Message sequence of UCF_Report_Status_Of_Power_Sequence.....	131
Figure 53 – Message sequence of UCF_Select_Power_Sequence.....	134
Figure 54 – Message sequence of UCF_Shift_PREFERRED_Power_Sequence.....	136
Figure 55 – Sequence diagram for UCF_HVAC_System_Function .....	137
Table 1 – Presence indication description .....	22
Table 2 – Explanation of symbols used in flowcharts.....	22
Table 3 – Mapping of User Stories, Use Cases, and Use Case Functions.....	28
Table 4 – Flexible Start for White Goods scenario implementation requirements for Actors .....	33
Table 5 – Flexible Start for White Goods: Scenarios and primary Use Case Functions (UCFs) .....	37
Table 6 – Scenario implementation requirements for Actors .....	38
Table 7 – Scenario 1 – Negotiation options .....	39
Table 8 – Scenarios and primary Use Case Functions (UCFs).....	50
Table 9 – Install/Remove Device Scenario implementation requirements for Actors .....	52
Table 10 – Scenarios and primary Use Case Functions (UCFs).....	53
Table 11 – Controllable System power limitation behaviour.....	54
Table 12 – Limitation of Power Consumption Scenario implementation requirements for Actors .....	56
Table 13 – Scenario 1 – Control active power limit – Data point list .....	57
Table 14 – Scenario 2 – Failsafe values – Data point list.....	58
Table 15 – Scenario 3 – Heartbeat – Data point list.....	59

Table 16 – Scenario 4 – Constraints – Data point list .....	59
Table 17 – Limitation of Power Consumption scenarios and primary Use Case Functions (UCFs) .....	60
Table 18 – Scenario implementation requirement for Actors .....	64
Table 19 – Scenarios and Use Case Functions .....	65
Table 20 – Scenario implementation requirements for Actors .....	67
Table 21 – Scenario 1 – Monitor power consumption – Data point list .....	68
Table 22 – Scenario 2 – Monitor consumed energy – Data point list .....	68
Table 23 – Scenario 3 – Monitor current – Data point list .....	69
Table 24 – Scenario 4 – Monitor voltage – Data point list .....	70
Table 25 – Scenario 3 – Monitor frequency – Data point list .....	70
Table 26 – Scenarios and UCFs .....	71
Table 27 – High-Level Use Case "Optimization of Self Consumption by Heat Pump Compressor Flexibility" scenarios .....	75
Table 28 – Heat Pump Flexibility: Scenarios and primary Use Case Functions (UCFs) .....	80
Table 29 – Definition of Data Types for UCFs .....	81
Table 30 – Generic Information content for Measurement Description at Actor Device for Power (for "Monitoring of Power Consumption") .....	83
Table 31 – Generic Information content for Measurement Constraints at Actor Device for Power .....	83
Table 32 – Generic Information content for Measurement Data at Actor Device for Power .....	84
Table 33 – Generic Information content for Measurement Description at Actor Device for Energy (for "Monitoring of Power Consumption") .....	84
Table 34 – Generic Information content for Measurement Constraints at Actor Device for Energy (for "Monitoring of Power Consumption") .....	84
Table 35 – Generic Information content for Measurement Data at Actor Device for Energy (for "Monitoring of Power Consumption") .....	85
Table 36 – Generic Information content for Measurement Description at Actor Device for Current .....	85
Table 37 – Generic Information content for Measurement Constraints at Actor Device for Current .....	85
Table 38 – Generic Information content for Measurement Data at Actor Device for Current .....	86
Table 39 – Generic Information content for Measurement Description at Actor Device for Voltage .....	86
Table 40 – Generic Information content for Measurement Constraints at Actor Device for Voltage .....	86
Table 41 – Generic Information content for Measurement Data at Actor Device for Voltage .....	87
Table 42 – Generic Information content for Measurement Description at Actor Device for Frequency .....	87
Table 43 – Generic Information content for Measurement Constraints at Actor Device for Frequency .....	87
Table 44 – Generic Information content for Measurement Data at Actor Device for Frequency .....	88
Table 45 – Generic Information content for Electrical Connection Description at Actor Device – Power .....	88



Table 46 – Generic Information content for Electrical Connection Parameters for phase-specific power measurements at Actor Device (for "Monitoring of Power Consumption") .....	89
Table 47 – Generic Information content for Electrical Parameters for non-phase-specific power measurements at Actor Device (for "Monitoring of Power Consumption") .....	89
Table 48 – Generic Information content for Electrical Connection Description at Actor Device – Energy .....	89
Table 49 – Generic Information content for Electrical Connection Parameters at Actor Device – Energy .....	90
Table 50 – Generic Information content for Electrical Connection Description at Actor Device – Current .....	90
Table 51 – Generic Information content for Electrical Connection Parameters at Actor Device – Current .....	90
Table 52 – Generic Information content for Electrical Connection Description at Actor Device – Voltage (for "Monitoring of Power Consumption") .....	91
Table 53 – Generic Information content for Electrical Connection Parameters at Actor Device – Voltage .....	91
Table 54 – Generic Information content for Electrical Connection Description at Actor Device – Frequency .....	91
Table 55 – Generic Information content for Electrical Connection Parameters at Actor Device – Frequency .....	91
Table 56 – Generic Information content for Characteristics at Actor Device .....	93
Table 57 – Information content for Pause/Resume/Stop at Actor CCM .....	94
Table 58 – Information content for Time Series Description at Actor Device (Scenario 2+5) .....	96
Table 59 – Information content for Time Series Description at Actor Device (Scenario 3) .....	96
Table 60 – Information content for Time Series Data at Actor Device (Scenario 2, 3+5) .....	96
Table 61 – Generic Information content for Device Configuration Data at Actor Controllable System – Failsafe Power Limits .....	98
Table 62 – Generic Information content for Device Configuration Data at Actor Controllable System – Failsafe Duration Minimum .....	98
Table 63 – Generic Information content for Device Configuration Data at Actor Energy Consumer – Incentives Simulation Cycles Max .....	98
Table 64 – Generic Information content for Device Configuration Data at Actor Energy Consumer – Incentives Simulation Concurrent .....	98
Table 65 – Generic Information content for Device Configuration Data at Actor Energy Consumer – Incentives Timeout Incentive Request, Incentives Wait Incentive Writable .....	99
Table 66 – Generic Information content for Device Configuration Data at Actor Controllable System – Failsafe Power Limits .....	99
Table 67 – Generic Information content for Device Configuration Data at Actor Grid Connection Point – PV Curtailment Limit Factor, Actor Energy Consumer – Incentives Simulation Cycles Max .....	99
Table 68 – Generic Information content for Device Configuration Data at Actor Actor Energy Consumer – Incentives Simulation Concurrent .....	99
Table 69 – Generic Information content for Device Configuration Data at Actor Controllable System – Failsafe Duration Minimum .....	99
Table 70 – Generic Information content for Device Configuration Data at Actor Energy Consumer – Incentives Timeout Incentive Request, Incentives Wait Incentive Writable .....	100
Table 71 – Generic Information content for Device Configuration Data at Actor Controllable System – Failsafe Power Limit .....	100

Table 72 – Generic Information content for Device Configuration Data at Actor Controllable System – Failsafe Duration Minimum.....	100
Table 73 – Generic Information content for Device Configuration Data at Actor Controllable System – Failsafe Power Limits .....	100
Table 74 – Generic Information content for Device Configuration Data at Actor Controllable System – Failsafe Duration Minimum.....	101
Table 75 – Information content for Heartbeat at Actor CCM or Device.....	103
Table 76 – Information content for Incentive Table Description at Actor Device (Scenario 2+4) .....	104
Table 77 – Information content for Incentive Table Description at Actor Device (Scenario 3).....	107
Table 78 – Information content for Incentive Table Constraints at Actor Device (Scenario 2, 3+4).....	108
Table 79 – Information content for Incentive Table Data at Actor Device (Scenario 2+4) ....	109
Table 80 – Information content for Incentive Table Data at Actor Device (Scenario 3).....	111
Table 81 – Information content for Incentive Table Description at Actor Device (Scenario 2+4) .....	113
Table 82 – Information content for Incentive Table Description at Actor Device (Scenario 3).....	115
Table 83 – Information content for Incentive Table Data at Actor Device (Scenario 2+4) ....	117
Table 84 – Information content for Incentive Table Data at Actor Device (Scenario 3).....	119
Table 85 – Information Content of Overrun Description.....	121
Table 86 – Information Content of HVAC Overrun Data .....	122
Table 87 – Information content for Power Plan for Use Case "Flexible Start for White Goods" at Actor Device .....	123
Table 88 – Details for "Power Sequence" references of Table 88 without "completed" for (*P1) (see (*S1)).....	126
Table 89 – Information content for Power Plan for Use Case "Optimization of Self-Consumption by Heat Pump Flexibility" at Actor Device.....	126
Table 90 – Description of state transitions of a power sequence.....	129
Table 91 Generic Information content for Active Power Limit Description at Actors Device and CCM .....	130
Table 92 – Generic Information content for Active Power Limit Data at Actor Device .....	130
Table 93 – Generic Information content for Active Power Limit Data at Actor CCM .....	131
Table 94 – Information content for Status of Power Sequence at Actor Device.....	132
Table 95 – Information content for UCF_Select_Power_Sequence at Actor CCM .....	135
Table 96 – Information content for UCF_Shift_Preferred_Power_Sequence at Actor CCM .....	137
Table 97 – Information Content of System Function Description .....	138
Table 98 –Definitions for Elements .....	138

## INTERNATIONAL ELECTROTECHNICAL COMMISSION

# Household appliances network and grid connectivity - Part 1: General requirements, generic data modelling and neutral messages

## FOREWORD

- 1) The International Electrotechnical Commission (IEC) is a worldwide organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of IEC is to promote international co-operation on all questions concerning standardization in the electrical and electronic fields. To this end and in addition to other activities, IEC publishes International Standards, Technical Specifications, Technical Reports, Publicly Available Specifications (PAS) and Guides (hereafter referred to as "IEC Publication(s)"). Their preparation is entrusted to technical committees; any IEC National Committee interested in the subject dealt with may participate in this preparatory work. International, governmental and non-governmental organizations liaising with the IEC also participate in this preparation. IEC collaborates closely with the International Organization for Standardization (ISO) in accordance with conditions determined by agreement between the two organizations.
- 2) The formal decisions or agreements of IEC on technical matters express, as nearly as possible, an international consensus of opinion on the relevant subjects since each technical committee has representation from all interested IEC National Committees.
- 3) IEC Publications have the form of recommendations for international use and are accepted by IEC National Committees in that sense. While all reasonable efforts are made to ensure that the technical content of IEC Publications is accurate, IEC cannot be held responsible for the way in which they are used or for any misinterpretation by any end user.
- 4) In order to promote international uniformity, IEC National Committees undertake to apply IEC Publications transparently to the maximum extent possible in their national and regional publications. Any divergence between any IEC Publication and the corresponding national or regional publication shall be clearly indicated in the latter.
- 5) IEC itself does not provide any attestation of conformity. Independent certification bodies provide conformity assessment services and, in some areas, access to IEC marks of conformity. IEC is not responsible for any services carried out by independent certification bodies.
- 6) All users should ensure that they have the latest edition of this publication.
- 7) No liability shall attach to IEC or its directors, employees, servants or agents including individual experts and members of its technical committees and IEC National Committees for any personal injury, property damage or other damage of any nature whatsoever, whether direct or indirect, or for costs (including legal fees) and expenses arising out of the publication, use of, or reliance upon, this IEC Publication or any other IEC Publications.
- 8) Attention is drawn to the Normative references cited in this publication. Use of the referenced publications is indispensable for the correct application of this publication.
- 9) IEC draws attention to the possibility that the implementation of this document may involve the use of (a) patent(s). IEC takes no position concerning the evidence, validity or applicability of any claimed patent rights in respect thereof. As of the date of publication of this document, IEC had not received notice of (a) patent(s), which may be required to implement this document. However, implementers are cautioned that this may not represent the latest information, which may be obtained from the patent database available at <https://patents.iec.ch>. IEC shall not be held responsible for identifying any or all such patent rights.

IEC 63510-1 has been prepared by IEC technical committee 59: Performance of household and similar electrical appliances. It is an International Standard.

It is based on EN 50631-1:2023 and was submitted as a Fast-Track document.

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

Draft	Report on voting
59/817/CDV	59/833/RVC

Full information on the voting for its approval can be found in the report on voting indicated in the above table.

The language used for the development of this International Standard is English.

The structure and editorial rules used in this publication reflect the practice of the organization which submitted it.

This document was developed in accordance with ISO/IEC Directives, Part 1 and ISO/IEC Directives, IEC Supplement, available at [www.iec.ch/members\\_experts/refdocs](http://www.iec.ch/members_experts/refdocs). The main document types developed by IEC are described in greater detail at [www.iec.ch/publications](http://www.iec.ch/publications).

A list of all parts in the IEC 63510 series, published under the general title *Household appliances network and grid connectivity*, can be found on the IEC website.

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

- reconfirmed,
- withdrawn, or
- revised.

## 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 IEC 60335 series [2]<sup>1</sup>.

The IEC 63510 series provides interoperability on information exchange among various appliances in the home. The IEC 63510 series is split into 4 parts:

*IEC 63510-1: Household appliances network and grid connectivity – Part 1: General Requirements, generic data modelling and neutral messages*

*IEC 63510-2: Household appliances network and grid connectivity – Part 2: Product specific mappings, details, requirements and deviations*

*IEC 63510-3-x: Household appliances network and grid connectivity – Part 3: Specific Data Model Mapping*

*IEC 63510-4-x: Household appliances network and grid connectivity – Part 4: Communication Protocol Specific Aspects*

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, SPINE-IoT, OCF, and so forth. These data models are neither mandatory nor to be seen as complete spectrum of data models.

---

<sup>1</sup> Numbers in square brackets refer to the Bibliography.

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.

## **1 Scope**

This document defines data models for Interoperable Connected Household Appliances. The data models are derived from a logical decomposition of use cases into functional blocks that themselves were realized by abstract actions on the data model itself.

This document is part of the IEC 63510 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.