



SLOVENSKI STANDARD

oSIST prEN IEC 63002:2020

01-november-2020

Specifikacije in komunikacijske metode medobratovnosti zunanjih napajalnikov, ki se uporabljajo pri računalniških in potrošniških elektronskih napravah (TA 18)

Interoperability specifications and communication method for external power supplies used with computing and consumer electronics devices (TA 18)

iTeh STANDARD PREVIEW

Méthode d'identification et d'interopérabilité des communications des alimentations externes utilisées avec les dispositifs informatiques portatifs

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Ta slovenski standard je istoveten z: prEN IEC 63002:2020

ICS:

| | | |
|--------|---|--|
| 31.020 | Elektronske komponente na splošno | Electronic components in general |
| 35.020 | Informacijska tehnika in tehnologija na splošno | Information technology (IT) in general |

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100/3463/CDV

COMMITTEE DRAFT FOR VOTE (CDV)

| | |
|--|---|
| PROJECT NUMBER: IEC 63002 ED2 | |
| DATE OF CIRCULATION: 2020-09-04 | CLOSING DATE FOR VOTING: 2020-11-27 |
| SUPERSEDES DOCUMENTS: 100/3421/CD, 100/3450/CC | |

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|---|---|
| IEC TA 18 : MULTIMEDIA HOME SYSTEMS AND APPLICATIONS FOR END-USER NETWORKS | |
| SECRETARIAT: Japan | SECRETARY: Mr Keisuke Koide |
| OF INTEREST TO THE FOLLOWING COMMITTEES: TC 108 | PROPOSED HORIZONTAL STANDARD: <input type="checkbox"/> Other TC/SCs are requested to indicate their interest, if any, in this CDV to the secretary. |
| FUNCTIONS CONCERNED: <input type="checkbox"/> EMC <input type="checkbox"/> ENVIRONMENT <input type="checkbox"/> QUALITY ASSURANCE <input type="checkbox"/> SAFETY | |
| <input checked="" type="checkbox"/> SUBMITTED FOR CENELEC PARALLEL VOTING | <input type="checkbox"/> NOT SUBMITTED FOR CENELEC PARALLEL VOTING |
| <p>Attention IEC-CENELEC parallel voting</p> <p>The attention of IEC National Committees, members of CENELEC, is drawn to the fact that this Committee Draft for Vote (CDV) is submitted for parallel voting.</p> <p>The CENELEC members are invited to vote through the CENELEC online voting system.</p> | |

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TITLE:

Interoperability specifications and communication method for external power supplies used with computing and consumer electronics devices (TA 18)

PROPOSED STABILITY DATE: 2026

NOTE FROM TC/SC OFFICERS:

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1 CONTENTS

| | | |
|----|---|----|
| 2 | FOREWORD | 4 |
| 3 | INTRODUCTION | 6 |
| 4 | 1 Scope | 7 |
| 5 | 2 Normative references | 8 |
| 6 | 3 Terms, definitions and abbreviations | 8 |
| 7 | 3.1 Terms and definitions | 8 |
| 8 | 3.1.1 vendor identification (VID) | 8 |
| 9 | 3.1.2 power source or power supply or Source | 9 |
| 10 | 3.1.3 power sink or Sink | 9 |
| 11 | 3.1.4 external power supply (EPS) | 9 |
| 12 | 3.1.5 Programmable Power Supply (PPS) | 9 |
| 13 | 3.1.6 fixed supply or fixed voltage supply | 9 |
| 14 | 3.1.7 USB PD power (PDP) | 9 |
| 15 | 3.1.8 charging cable | 9 |
| 16 | 3.1.9 captive or permanently attached cable | 9 |
| 17 | 3.2 Abbreviations | 10 |
| 18 | 4 EPS interoperability based on USB technologies | 10 |
| 19 | 4.1 General | 10 |
| 20 | 4.2 USB Standard Charging Summary and Interoperability | 11 |
| 21 | 4.3 USB Type-C® Current | 12 |
| 22 | 4.4 USB Power Delivery (USB PD) | 12 |
| 23 | 5 External power supply (EPS) Specification | 14 |
| 24 | 5.1 General hardware specification | 14 |
| 25 | 5.1.1 A.C. input characteristic | 14 |
| 26 | 5.1.2 Environmental specification | 14 |
| 27 | 5.1.3 EPS detection | 14 |
| 28 | 5.2 EPS Protection | 14 |
| 29 | 5.3 Important characteristics of an external power supply | 15 |
| 30 | 5.3.1 General | 15 |
| 31 | 5.3.2 Positive identification of a unique power source model | 15 |
| 32 | 5.3.3 Static characteristics of the external power source performance and | |
| 33 | design | 15 |
| 34 | 5.3.4 Example usage scenarios of enhanced reporting from the power source | 18 |
| 35 | Annex A (informative) Open issues related to arbitrary combinations of power source | |
| 36 | and device | 20 |
| 37 | A.1 EMC, safety and performance | 20 |
| 38 | A.2 Authentication, attestation, and data integrity protection | 20 |
| 39 | A.3 Conducted noise from the power source | 20 |
| 40 | Annex B (informative) USB Type-C® and USB Power Delivery robustness and | |
| 41 | interoperability | 22 |
| 42 | B.1 USB Type-C Cable and Connector (IEC 62680-1-3) | 22 |
| 43 | B.1.1 Current capacity and cable identity | 22 |
| 44 | B.1.2 Interoperability | 22 |
| 45 | B.1.3 Legacy Support | 23 |
| 46 | B.2 USB Power Delivery (IEC 62680-1-2) | 23 |
| 47 | B.2.1 Robustness | 23 |

| | | | |
|----|--|---|----|
| 48 | B.2.2 | Error detection and recovery..... | 23 |
| 49 | Annex C (informative) | USB charging profiles and device charging performance..... | 25 |
| 50 | C.1 | Introduction..... | 25 |
| 51 | C.2 | USB Type-C and USB PD Power Capabilities Model..... | 25 |
| 52 | C.3 | Battery charging performance..... | 27 |
| 53 | C.4 | Fixed Voltage Charging versus PPS Charging..... | 28 |
| 54 | Annex D (informative) | Common charging interoperability use cases..... | 29 |
| 55 | D.1 | General..... | 29 |
| 56 | D.2 | Examples of device use cases..... | 29 |
| 57 | D.2.1 | Smartphone..... | 29 |
| 58 | D.2.2 | Higher power computing devices (tablets, notebook computers, etc.)..... | 29 |
| 59 | D.2.3 | Other consumer electronics (smartwatches, electric toothbrushes, etc.)..... | 30 |
| 60 | D.3 | Examples of consumer use cases..... | 30 |
| 61 | Annex E (informative) | Conformance and market considerations..... | 31 |
| 62 | E.1 | General..... | 31 |
| 63 | E.2 | Summary of reported items and test references..... | 31 |
| 64 | E.3 | USB-IF Compliance Program..... | 32 |
| 65 | E.4 | General regulatory compliance for a power source..... | 33 |
| 66 | E.5 | Other considerations for system testing..... | 33 |
| 67 | E.6 | After-market firmware updates to power source..... | 33 |
| 68 | Bibliography..... | | 34 |
| 69 | | | |
| 70 | Figure 1 – Scope of the identification, communication and control method..... | | 7 |
| 71 | Figure 2 – USB EPS Charging Application Model..... | | 11 |
| 72 | Figure 3 – Measurement of holdup time..... | | 16 |
| 73 | Figure 4 – Source Power Rules for Fixed Voltage Operation..... | | 26 |
| 74 | Figure 5 – Source Power Rules for PPS Operation..... | | 27 |
| 75 | Figure 6 – 30W PDP PPS Example..... | | 27 |
| 76 | Figure E.1—USB certified charger logos..... | | 32 |
| 77 | | | |
| 78 | Table 1 – USB Standard Power Modes and Charging Interoperability..... | | 12 |
| 79 | Table E.1 – Summary of reported parameters from USB PD power source..... | | 31 |
| 80 | Table E.2 – Examples of current regulations and standards in the US and EU | | |
| 81 | applicable to external power supplies used with devices (non-exhaustive list)..... | | 33 |

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

Interoperability specifications and communication method for external power supplies used with computing and consumer electronics devices

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.
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International Standard IEC 63002 has been prepared by technical area 18: Interfaces and methods of measurement for personal computing equipment, of IEC technical committee 100: Audio, video and multimedia systems and equipment.

This second edition cancels and replaces the first edition published in 2016 and constitutes a technical revision.

This edition includes the following significant technical changes with respect to the previous edition:

- 1) Title is changed from IDENTIFICATION AND COMMUNICATION INTEROPERABILITY METHOD FOR EXTERNAL POWER SUPPLIES USED WITH PORTABLE COMPUTING DEVICES.
- 2) Clause 4, required interoperability of USB Type-C®, is added.
- 3) Clause 5, EPS specification, adds hardware and protection requirements. Overvoltage protection is changed from optional to normative.

136 4) Annex B and Annex C are added, providing an explanation to the design features in USB
 137 Power Delivery that enhance reliability and an explanation on the concepts of charge rate
 138 and power.

139 The text of this standard is based on the following documents:

| | |
|------------|------------------|
| FDIS | Report on voting |
| XX/XX/FDIS | XX/XX/RVD |

140
 141 Full information on the voting for the approval of this standard can be found in the report on
 142 voting indicated in the above table.

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

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

- 147 • reconfirmed,
- 148 • withdrawn,
- 149 • replaced by a revised edition, or
- 150 • amended.

151 The National Committees are requested to note that for this publication the stability date
 152 is 2023-12.

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153 THIS TEXT IS INCLUDED FOR THE INFORMATION OF THE NATIONAL COMMITTEES AND WILL BE DELETED
 154 AT THE PUBLICATION STAGE.

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INTRODUCTION

157 The objective of this International Standard is to enable common charging interoperability of
158 external power supplies (EPS) used with the increasing variety of computing and consumer
159 electronic devices that implement the IEC 62680-1-3: USB Type-C¹ cable and connector and
160 the IEC 62680-1-2: USB Power Delivery standards. Broad market adoption of this
161 International Standard is expected to make a significant contribution to the global goals of
162 consumer convenience and re-usability of power supplies by expanding common charging
163 interoperability across different product categories while preserving backwards compatibility
164 with the installed base of billions of IEC 62680 compliant devices worldwide.

165 This International Standard specifies the minimum technical requirements for interoperability
166 and includes recommendations for EPS functionality when used with computing and electronics
167 devices. The approach taken by this International Standard, focused on enabling common
168 charging interoperability, can allow manufacturers to innovate in aspects such as technical
169 design, system performance, and energy efficiency. Furthermore, common charging
170 interoperability enables manufacturers to design specific EPS that match the requirements of
171 target devices (functionality, cost, etc.) and use cases, while at the same time enabling
172 consumers to use the EPS for charging other IEC 62680 compliant devices, across various
173 product types.

174 IEC 62680-1-3 adoption is well underway in global markets for a wide range of devices using
175 as much as 100 Watts including notebook computers, tablets, smartphones, small form-factor
176 desktop computers and other consumer electronics. This International Standard enables the
177 reporting of the identity and power characteristics of power sources (external power supplies
178 (EPS) and other Sources) supported by IEC 62680-1-3 (USB Type-C) and specifies
179 interoperability guidelines when using IEC 62680-1-2 (USB Power Delivery). The method for
180 identification of a specific power source can enable equipment manufacturers to ensure
181 compliant operation using these specifications and promotes data communication that can be
182 used by the device to predict and mitigate interoperability concerns when an unfamiliar or
183 incompatible EPS is connected to the device. EPS power delivery applications can in the
184 future extend beyond 100 Watts given updates to IEC 62680 that appropriately address the
185 needs of higher-power products in the computing and consumer device market.

186 This International Standard also provides important information regarding consumer safety,
187 system reliability as well as relevant global standards and regulatory compliance.

188 Other international and regional standards, and government policies for “universal/common
189 power adapters” that reference this International Standard should take into account open
190 technical and regulatory compliance issues that are associated with untested or arbitrary
191 combinations of EPS and devices such as those identified in Annex A, as well as the
192 limitations and issues with approaches to define “common chargers” in meeting market needs.
193 For clarity, this International Standard focuses on interoperability specifications in order to
194 support global industry in developing safe, convenient, environmentally conscious, and end-to-
195 end interoperable charging solutions that meet regulatory compliance and market requirements.

196

¹ USB Type-C[®], USB-C[®] and USB 2.0 Type-C[™] and USB4[™] are trademarks of the Universal Serial Bus Implementers Forum (USB-IF).

Interoperability specifications and communication method for external power supplies used with computing and consumer electronics devices

1 Scope

This International Standard defines common charging interoperability guidelines for power sources (external power supplies (EPS) and other Sources) used with computing and consumer electronics devices that implement the IEC 62680-1-3: USB Type-C^{®1} Cable and Connector Specification.

This document defines normative requirements for an EPS to ensure interoperability, in particular it specifies the data communicated from a power source to a device (Figure 1) and certain safety elements of the EPS, cable, and device. While the requirements focus of this document is on the EPS (External Power Supply) and the behavior at its USB Type-C connector interface, it is also important to comprehend cable assembly and device capabilities and behaviors in order to assure end-to-end charging interoperability. The scope does not apply to all design aspects of an EPS. An EPS compliant with this standard is also expected to follow other applicable global standards and regulatory compliance requirements for aspects such as product safety, EMC and energy efficiency.

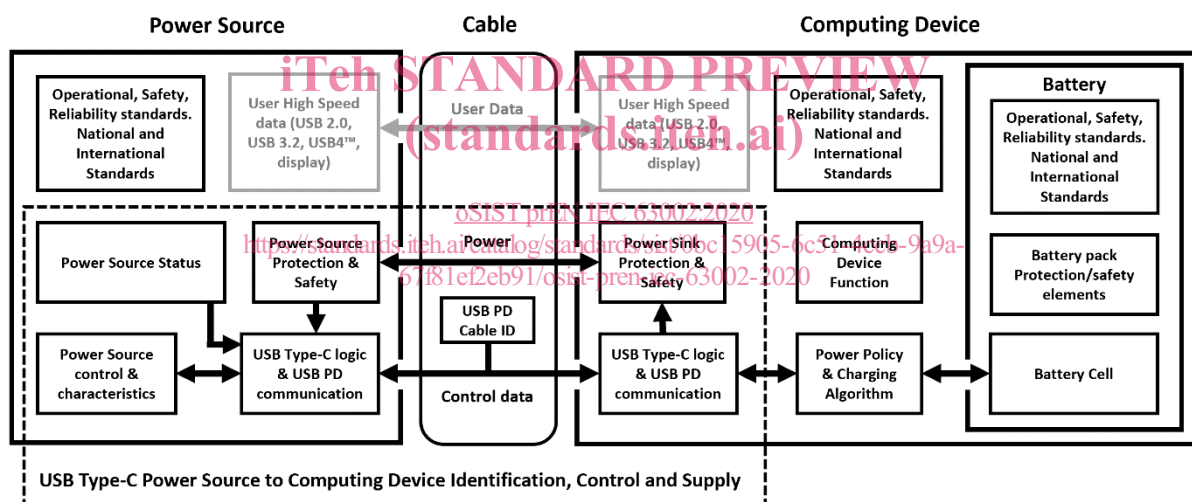


Figure 1 – Scope of the identification, communication and control method

This International Standard provides recommendations for the behavior of a device when used with a power source compliant with this document. This International Standard specifies the minimum hardware specification for an EPS implementing IEC 62680-1-3: USB Type-C. This International Standard also specifies the data objects used by a charging system utilizing IEC 62680-1-2: USB Power Delivery Specification to understand the identity, design and performance characteristics, and operating status of an external power supply. IEC 62680-1-2 and IEC 62680-1-3 focus on power delivery applications ranging to 100W for a variety of computing and consumer electronic devices including notebook computers, tablets, smartphones, small form-factor desktops, monitor displays and other related multimedia devices.

Future updates to IEC 62680-1-2 and IEC 62680-1-3 specifications will extend to enable power delivery applications that require more than 100W while remaining within the technical limitations of the USB Type-C cable and connector solution.

This document relies on established mechanical and electrical specifications, and communication protocols specified by IEC 62680-1-2 and IEC 62680-1-3. These specifications

230 support methods for establishing the best performing interoperability between untested combinations
231 of EPS and devices with the aim of improving consumer satisfaction.

232 Information describing the USB charging interoperability model, overview of USB Type-C and
233 USB Power Delivery specifications, and factors for charging performance are also provided to
234 support implementation of this standard.

235 **2 Normative references**

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

240 IEC 60950-1: *Information technology equipment – Safety – Part 1: General requirements*

241 IEC 62368-1: *Audio/video, information and communication technology equipment – Part 1:*
242 *Safety requirements*

243 IEC 62680-1-1: *Universal Serial Bus interfaces for data and power – Part 1-1: Common*
244 *components – USB Battery Charging Specification, Revision 1.2*

245 IEC 62680-1-2: *Universal Serial Bus interfaces for data and power – Part 1-2: Common*
246 *components – USB Power Delivery specification*

247 IEC 62680-1-3: *Universal Serial Bus interfaces for data and power – Part 1-3: Common*
248 *components – USB Type-C® Cable and Connector Specification²*

249 IEC 62680-1-4: *Universal Serial Bus interfaces for data and power – Part 1-4: Common*
250 *Components – USB Type-C® Authentication Specification*

251 IEC 62680-2-1: *Universal serial bus interfaces for data and power – Part 2-1: Universal Serial*
252 *Bus Specification, Revision 2.0*

253 IEC 62680-2-2: *Universal serial bus interfaces for data and power – Part 2-2: Micro-USB Cables*
254 *and Connectors Specification, Revision 1.01*

255 IEC 62680-2-3: *Universal Serial Bus interfaces for data and power - Part 2-3: Universal Serial*
256 *Bus Cables and Connectors Class Document, Revision 2.0*

257 IEC 60990: *Methods of measurement of touch current and protective conductor current*

258 **3 Terms, definitions and abbreviations**

259 **3.1 Terms and definitions**

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

261 **3.1.1 vendor identification (VID)**

262 a unique 16-bit unsigned value assigned by the USB-IF to a given vendor

263 **3.1.2 power source or power supply or Source**

264 device designed to comply with IEC 62680-1-2 that supplies power over VBUS

265 EXAMPLE A USB connector on a PC, laptop computer, vehicle, AC outlet, docking station, battery pack, or EPS

266 **3.1.3 power sink or Sink**

267 device designed to comply with IEC 62680-1-2 that receives and consumes power over VBUS

268 NOTE: Sometimes referred to as the device.

269 EXAMPLE: a computing device

270 **3.1.4 external power supply (EPS)**

271 power source contained in a separate physical enclosure external to the device casing and
272 designed to convert mains power supply to lower DC voltage(s) for the purpose of powering the
273 device

274 EXAMPLE: a charging block

275 NOTE: an EPS is a Source in the USB Power Delivery specification

276 **3.1.5 Programmable Power Supply (PPS)**

277 an optional capability in IEC 62680-1-2 where a device (Sink) can adaptively adjust the EPS
278 (Source) output voltage in small increments and set maximum current within its advertised range

279 **3.1.6 fixed supply or fixed voltage supply**

280 a power source where output voltage is regulated

281 NOTE: Standardized voltages in IEC 62680-1-2 are 5V, 9V, 15V and 20V
282 <https://standards.iteh.ai/>
<https://standards.iteh.ai/standards/iec/63002-2020/4b2705-6c51-4ccb-9a9a-6781ef2eb91/osist-pr-en-iec-63002-2020>

283 **3.1.7 USB PD power (PDP)**

284 the nominal power capacity of the charger defined by IEC 62680-1-2 for use to indicate to
285 consumers

286 NOTE: The PDP rating is indicated both on the USB charger certification logo and within the USB PD source
287 capabilities advertisement to the Sink. For any given PDP rating, the minimum capabilities in terms of supported
288 voltages and currents are deterministic as defined in IEC 62680-1-2.

289 **3.1.8 charging cable**

290 the cable used between the EPS and device to be charged

291 NOTE: The cable connection to the EPS is a USB Type-C plug per IEC 62680-1-3. The cable connection to the
292 device can be either a USB Type-C plug, a legacy USB plug (e.g. USB Micro-B per IEC 62680-2-2), or a non-USB
293 device-specific connection (either permanent or detachable). Charging cables can be application-specific to enable
294 interoperability between the USB Type-C-based EPS defined by this standard and both existing and future devices
and including devices that are not able to accommodate USB Type-C receptacles, e.g. smart watches.

295 **3.1.9 captive or permanently attached cable**

296 a cable that has a USB Type-C plug on one end and is either hard-wired into a device on the
297 other end or has a device-specific plug on the other end

298 NOTE: When a device-specific plug is used on one end, the cable can be detachable in a physical sense but is
299 considered "functionally captive" to the device given it does not use a USB-defined connector on the device end but
300 otherwise functions as a USB device. This definition has remained the USB definition since it was originally
301 specified in IEC 62680-2-1 (USB 2.0).