

INTERNATIONAL STANDARD

NORME INTERNATIONALE



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

Spécifications d'interopérabilité et méthode de communication pour les alimentations externes utilisées avec les dispositifs informatiques et les dispositifs électroniques grand public



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CONTENTS

FOREWORD	4
INTRODUCTION	6
1 Scope	7
2 Normative references	8
3 Terms, definitions and abbreviated terms	8
3.1 Terms and definitions	8
3.2 Abbreviated terms	10
4 EPS interoperability based on USB technologies	10
4.1 Overview	10
4.2 General	10
4.3 USB standard charging summary and interoperability	12
4.4 USB Type-C® Current	13
4.5 USB Power Delivery (USB PD)	13
5 External power supply (EPS) specification	14
5.1 General hardware specification	14
5.1.1 General	14
5.1.2 AC input characteristic	14
5.1.3 Environmental specification	14
5.1.4 EPS detection	14
5.2 EPS protection	15
5.3 Important characteristics of an external power supply	15
5.3.1 General	15
5.3.2 Positive identification of a unique power source model	15
5.3.3 Static characteristics of the external power source performance and design	15
5.3.4 Example usage scenarios of enhanced reporting from the power source	18
Annex A (informative) Open issues related to arbitrary combinations of power source and device	21
A.1 EMC, safety, and performance	21
A.2 Authentication, attestation, and data integrity protection	21
A.3 Conducted noise from the EPS	22
Annex B (informative) USB Type-C and USB Power Delivery robustness and interoperability	23
B.1 Overview	23
B.2 USB Type-C Cable and Connector (IEC 62680-1-3)	23
B.2.1 General	23
B.2.2 Current capacity and cable identity	23
B.2.3 Interoperability	23
B.2.4 Legacy support	24
B.3 USB Power Delivery (IEC 62680-1-2)	24
B.3.1 General	24
B.3.2 Robustness	24
B.3.3 Error detection and recovery	25
Annex C (informative) USB charging profiles and device charging performance	26
C.1 Overview	26
C.2 USB Type-C and USB PD power capabilities model	26

C.3	Battery charging performance	28
C.4	Fixed Supply charging versus PPS charging	29
Annex D (informative)	Common charging interoperability use cases	30
D.1	General.....	30
D.2	Examples of device use cases	30
D.2.1	General	30
D.2.2	Smartphone	30
D.2.3	Higher power computing devices (tablets, notebook computers, etc.)	30
D.2.4	Other consumer electronics devices (smart watches, electric toothbrushes, etc.).....	31
D.3	Examples of consumer use cases	31
Annex E (informative)	Conformance and market considerations.....	32
E.1	General.....	32
E.2	Summary of reported items and test references	32
E.3	USB-IF Compliance Program [7]	33
E.4	General regulatory compliance for a power source.....	34
E.5	Other considerations for system testing	35
E.6	After-market firmware updates to power source	35
Bibliography	36
Figure 1	– Scope of the identification, communication and control method	7
Figure 2	– USB EPS charging application model.....	11
Figure 3	– Measurement of holdup time	16
Figure C.1	– Source power rules for Fixed Supply operation	27
Figure C.2	– Source power rules for PPS operation	28
Figure C.3	– 30 W PDP PPS example	28
Figure E.1	– USB certified charger logos	34
Table 1	– USB standard power modes and charging interoperability	12
Table E.1	– Summary of reported parameters from USB PD power source and their test references.....	32
Table E.2	– Examples of current regulations and standards in the US and EU applicable to external power supplies used with devices (non-exhaustive list).....	34

INTERNATIONAL ELECTROTECHNICAL COMMISSION

**INTEROPERABILITY SPECIFICATIONS AND COMMUNICATION METHOD
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This second edition cancels and replaces the first edition published in 2016. This edition constitutes a technical revision.

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

- a) title is changed from *Identification and communication interoperability method for external power supplies used with portable computing devices*;
- b) Clause 4, *EPS interoperability based on USB technologies*, is added;
- c) Clause 5, *EPS specification*, adds hardware and protection requirements; overvoltage protection is changed from optional to normative;

- d) Annex B and Annex C are added, providing an explanation of the design features in USB Power Delivery that enhance reliability and an explanation of the concepts of charge rate and power.

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

CDV	Report on voting
100/3463/CDV	100/3540B/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.

This document was drafted in accordance with ISO/IEC Directives, Part 2, and developed in accordance with ISO/IEC Directives, Part 1 and ISO/IEC Directives, IEC Supplement, available at www.iec.ch/members_experts/refdocs. The main document types developed by IEC are described in greater detail at www.iec.ch/standardsdev/publications.

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INTRODUCTION

The objective of this document is to enable common charging interoperability of external power supplies (EPSs) used with the increasing variety of computing and consumer electronics devices that implement IEC 62680-1-3 (USB Type-C¹ Cable and Connector Specification) and IEC 62680-1-2 (USB Power Delivery). Broad market adoption of this document is expected to make a significant contribution to the global goals of consumer convenience and re-usability of power supplies by expanding common charging interoperability across different product categories while preserving backwards compatibility with the installed base of billions of IEC 62680 compliant devices worldwide.

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

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

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

Other international and regional standards, and government policies for "universal" or "common power adapters" that reference this document are expected to take into account open technical and regulatory compliance issues that are associated with untested or arbitrary combinations of EPSs and devices such as those identified in Annex A, as well as the limitations and issues with approaches to define "common chargers" in meeting market needs. For clarity, this document focuses on interoperability specifications in order to support global industry in developing safe, convenient, environmentally conscious, and end-to-end interoperable charging solutions that meet regulatory compliance and market requirements.

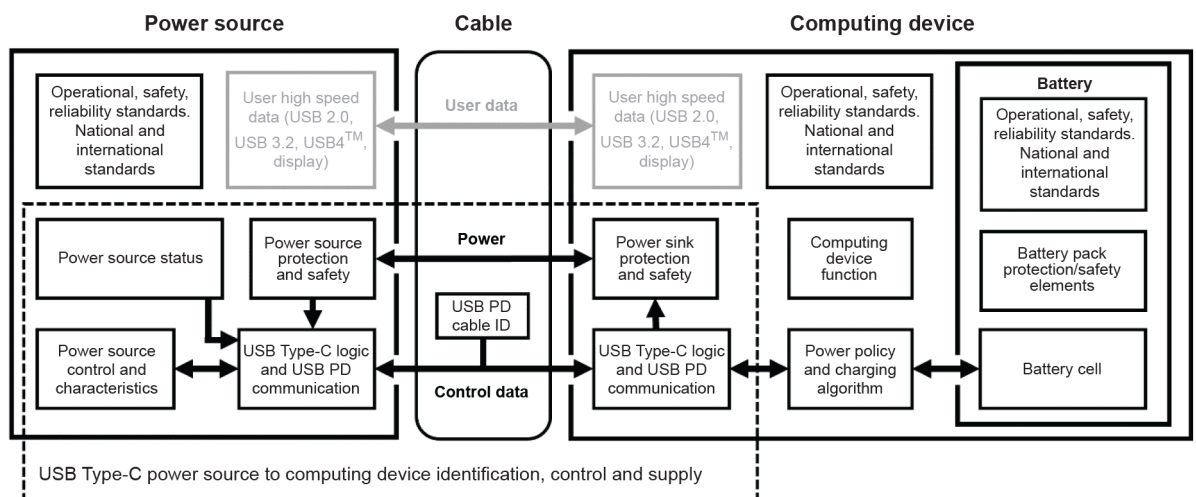
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INTEROPERABILITY SPECIFICATIONS AND COMMUNICATION METHOD FOR EXTERNAL POWER SUPPLIES USED WITH COMPUTING AND CONSUMER ELECTRONICS DEVICES

1 Scope

This document defines common charging interoperability guidelines for power sources (external power supplies (EPSs) and other Sources) used with computing and consumer electronics devices that implement IEC 62680-1-3 (USB Type-C 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 and the behaviour at its USB Type-C connector interface, it is also important to comprehend cable assembly and device capabilities and behaviours in order to assure end-to-end charging interoperability. This document does not apply to all design aspects of an EPS. This document does not specify regulatory compliance requirements for aspects such as product safety, EMC or energy efficiency.



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

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

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