

INTERNATIONAL STANDARD

NORME INTERNATIONALE



**Power sources for a wireless communication device –
Part 3: Generic energy harvesting adapter module**
(standards.iteh.ai)

**Sources d'énergie pour un appareil de communication sans fil –
Part 3: Module générique d'adaptateur de récupération d'énergie**

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POWER SOURCES FOR A WIRELESS COMMUNICATION DEVICE –

Part 3: Generic energy harvesting adapter module

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This standard is to be used in conjunction with IEC 62952-1. Is it based on the first edition of that standard (2016).

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

FDIS	Report on voting
65B/1080/FDIS	65B/1084/RVD

Full information on the voting for the approval of this International Standard can be found in the report on voting indicated in the above table.

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

A list of all parts of the IEC 62952, under the general title *Power sources for a wireless communication device* 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 "<http://webstore.iec.ch>" in the data related to the specific document. At this date, the document will be

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INTRODUCTION

This document deals with a power module based on energy harvesting. It provides one profile of IEC 62952-1 and specifics for a generic energy harvesting adapter module (GEHAM) with a backup battery (Type C). It does not specify a battery specification.

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POWER SOURCES FOR A WIRELESS COMMUNICATION DEVICE –

Part 3: Generic energy harvesting adapter module

1 Scope

This part of IEC 62952 specifies requirements and a profile for a power source containing a generic energy harvesting adapter module (GEHAM) used as power source for wireless communication devices (WCD).

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.

IEC 60304, *Standard colours for insulation for low-frequency cables and wires*

IEC 61076-2-101, *Connectors for electronic equipment – Product requirements – Part 2-101: Circular connectors – Detail specification for M12 connectors with screw-locking*

IEC 62952-1:2016, *Power sources for a wireless communication device – Part 1: General requirements of power modules*

[IEC 62952-3:2017](https://standards.iteh.ai/catalog/standards/sist/6320888e-f883-44ce-9229-35df18701245/iec-62952-3-2017)

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3 Terms, definitions, abbreviated terms, acronyms and conventions

3.1 Terms and definitions

For the purposes of this document, the terms and definitions given in IEC 62952-1 and the following apply.

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

- IEC Electropedia: available at <http://www.electropedia.org/>
- ISO Online browsing platform: available at <http://www.iso.org/obp>

3.1.1 energy harvesting

process by which energy is derived from external sources (e.g., solar power, thermal energy, wind energy, salinity gradients and kinetic energy), captured, and stored

3.1.2 energy storage capacitor

power capacitor intended to store energy and to release it within a very short time

[SOURCE: IEC 60050-436:1990, 436-02-08]

3.2 Abbreviated terms and acronyms

For the purposes of this document, the abbreviated terms and acronyms given in IEC 62952-1 apply.

3.3 Convention for capitalizations

Capitalized terms are either based on the rules given in the ISO/IEC Directives Part 2 or emphasize that these terms have a specific meaning throughout this series of IEC 62952.

3.4 Convention for profiles

The profile is a selection of (sub)clause of one or more documents defined in tables, as shown in Table 1 and

Table 2. The selected base specifications are indicated just before the selection table(s). Selection is done at the highest (sub)clause level possible to define the profile selection unambiguously.

Table 1 – Layout of profile (sub)clause selection tables

Clause	Header	Presence	Constraints

Table 2 – Contents of (sub)clause selection tables

Column	Text	Meaning
Clause	<#>	(Sub)clause number of the base specifications
	Next clauses	Any following clauses up to the last clause of the base specification
	Next annexes	Any following annexes up to the last annex of the base specification
Header	<text>	(sub)clause title of the base specifications
Presence	NO	This (sub)clause is not included in the profile
	YES	This (sub)clause is fully (100 %) included in the profile In this case no further detail is given
	—	Presence is defined in the following subclauses
	Partial	Parts of this (sub)clause is included in the profile
Constraints	See <#>	Constraints/remarks are defined in the given subclause, table or figure of this profile document
	—	No constraints other than given in the reference document (sub)clause, or not applicable
	<text>	The text defines the constraint directly; for longer text, table footnotes or table notes may be used

If sequences of (sub)clauses do not match the profile, then the numbers are concatenated.

EXAMPLE 1 concatenated subclauses

3.4 – 3.7	—	NO	—
-----------	---	----	---

EXAMPLE 2 concatenated clauses up to the last clause

Next clauses	—	NO	—
--------------	---	----	---

EXAMPLE 3 concatenated annexes up to the last annex

Next annexes	—	NO	—
--------------	---	----	---

4 Specific requirements for power sources with energy harvesting

4.1 General

IEC 62952-1:2016, Figure 1 shows the possible various types of power modules that can be used as a power source within a WCD system level and architecture description.

Power modules are elements for WCD to provide power or supplementary power to the WCD.

4.2 GEHAM and energy harvester

Power Module Type C shall consist of GEHAM and energy harvester.

Annex A provides implementation options how the power source can be designed with the energy harvester and GEHAM as separated or integrated elements.

GEHAM accommodates the following functions.

- GEHAM shall provide the necessary mechanical interface between the energy harvester and WCD.
- GEHAM should include any power conditioning such as rectification and voltage control to ensure that the GEHAM output conforms to this standard.
- GEHAM should provide the power management necessary to ensure that power is stored in a suitable energy storage capacitor or secondary battery.
- GEHAM shall supply energy at a suitable voltage to WCD.
- GEHAM may include batteries (primary or secondary) as backup in case power from the energy harvester is insufficient.
- GEHAM should ensure that power is used preferentially from the energy harvester before using power from the backup batteries included in the GEHAM.
- When the energy harvester supplies voltage above the nominal voltage then the GEHAM can provide intermediate energy storage capacity that is sufficient to power the device during high-power cycles.

4.3 Mechanical requirements

4.3.1 Connector

Connection shall be downward compatible with respect to capability of connector options (2, 3, 4, 5-pin options).

Example

If a 2-pin male connector is plugged into a 4-pin female cable end between the energy harvester and GEHAM, the connection shall work without the additional capability/information provided on the pins not connected.

In cases where a connector is used, IEC 61076-2-101 M12 A-Coded connectors shall be used. Male connectors shall be on both devices, and cable ends shall be female on both ends.

4.3.2 Flying lead

This document shall accommodate flying lead on either end, connecting to a terminal strip or similar on either or both devices.

If a flying lead is used to connect to the GEHAM/WCD, then the terminals shall be clearly labeled with text, for example with + and –.

4.3.3 Cable specification

Cable colors shall be compliant with IEC 60304. In case of a flying lead connection, the cable shall be between 5 mm and 10 mm in nominal outside diameter.

Wire shall be between 0,3 mm and 1,3 mm in nominal diameter depending on the conductors in the cable.

4.3.4 Enclosure shape

Enclosed type GEHAMS provide additional mechanical protection through having to fit inside the WCD similar to Type A and Type B defined in IEC 62952-1.

4.4 Electrical characteristics

4.4.1 General

GEHAM is an interface device between the energy harvester and the WCD. To ensure the interchangeability, input and output rating of GEHAM shall be complied.

4.4.2 Input rating of GEHAM

Maximum input power (P_i) shall be restricted to the capabilities of the used cable and connectors according to the regulations for electrical safety.

The maximum voltage (V_i) of the GEHAM shall be 30 V DC.

4.4.3 Output rating of GEHAM

The output voltage of GEHAM shall be DC, non-regulated and the ripple shall not exceed the stated maximum output voltage.

The maximum output voltage provided may be 5 V DC (for a nominal single battery, 3,6 V capacity) or 10 V DC (for a nominal dual battery, 7,2 V capacity).

The GEHAM shall be clearly labeled to identify whether it is 3,6 V or 7,2 V nominal.

4.4.4 Protections

It is recommended that WCD have over voltage input protection of >12 V DC for preventing inadvertent connection of GEHAM.

It is recommended that GEHAM have over voltage input protection of > 30 V DC for preventing inadvertent connection of harvester and disturbance as for example a surge.

This document does not override or replace the requirements of any hazardous area certification.

4.5 Communication interface

Pin 2 (see Clause B.3) is available for digital communication interface to provide static and dynamic information from an energy harvester.

5 Profile for power modules with energy harvesting

The general requirements for the power modules are specified in IEC 62952-1. Table 3 specifies general power module profile selection.

Table 4 specifies the Power Module Type C profile selection within IEC 62952-3.

Table 3 – General power module profile selection

Clause	Header	Presence	Constraints
1	Scope	YES	—
2	Normative references	YES	—
3	Terms, definitions, abbreviated terms, acronyms and conventions	YES	—
4	General requirements	—	—
4.1	General	YES	See also 4.1.
4.2	Compliance	YES	—
4.3	Design	YES	—
4.4	Logistics	YES	—
4.4.1	Storage and marking	YES	—
4.4.2	Maintenance	YES	—
4.4.3	Transportation in a plant	YES	—
4.4.4	Disposal	YES	—
4.5	Protection for explosive atmospheres	YES	Optional
4.6	Harsh environment	YES	Optional
4.7	Interchangeability	—	—
4.7.1	General	YES	—
4.7.2	Electrical interface	YES	—
4.7.3	Mechanical interface	YES	Subclause 4.3 shall also apply.
4.8	Electrical parameters	YES	The electrical interface between the external harvester and the GEHAM shall be according to 4.4.

Table 4 – Power Module Type C profile selection

Clause	Header	Presence	Constraints
4	Specific requirements for power sources with energy harvesting		
4.1	General	YES	—
4.2	GEHAM and energy harvester	YES	—
4.3	Mechanical requirements	Partial	Depends on design, see Annex A.
4.3.1	Connector		
4.3.2	Flying lead		
4.3.3	Cable specification		
4.3.4	Enclosure shape		
4.4	Electrical characteristics	YES	—
4.4.1	General		
4.4.2	Input rating of GEHAM		
4.4.3	Output rating of GEHAM		
4.4.4	Protections		
4.5	Communication interface	YES	—