

# TECHNICAL SPECIFICATION



Low-voltage electrical installations –  
Part 8-3: Functional aspects – Operation of prosumer's electrical installations  
(standards.iteh.ai)

IEC TS 60364-8-3:2020

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Technical Specifications are subject to review within three years of publication to decide whether they can be transformed into International Standards.

IEC TS 60364-8-3, which is a Technical Specification, has been prepared by IEC technical committee 64: Electrical installations and protection against electric shock.

The text of this Technical Specification is based on the following documents:

Draft TS	Report on voting
64/2400/DTS	64/2427/RVDTS

Full information on the voting for the approval of this Technical Specification 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 in the IEC 60364 series, published under the general title *Low-voltage electrical installations*, can be found on the IEC website.

The reader's attention is drawn to the fact that Annex A lists all of the "in-some-country" clauses on differing practices of a less permanent nature relating to the subject of this document.

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

There is a need for the development of new standards in smart grid that can apply to prosumers' electrical installations in low-voltage level. New standards relating to prosumers' low-voltage electrical installations that are different from existing facilities are needed in order to provide bidirectional power and information while being connected to upper smart grid systems, unlike other existing low-voltage electrical installations built in accordance with published standards, and in order to evaluate the power quality of electrical power supply.

The new standards should be able to verify the stability, interoperability, security which are characteristics of smart grid according to IEC TR 63097, published by IEC SyC Smart Energy. When a bidirectional power network is operating, it is very important to ensure the safety of homes and buildings and the protection of electrical installations in low-voltage against lightning and fault.

A new standard for the verification of the prosumer's electrical installations should in the first instance define the power system of low-voltage and require criteria for information exchange between the prosumer's electrical installations while connecting to other power systems.

This document is the first attempt in the development of a framework for low-voltage electrical installations. In order to match this overall framework, TC 64 made modifications to suit the needs of the prosumer's electrical installations in low-voltage, based on the framework and architecture that have already been developed by IEC, IEEE and ETSI. Up till now, no attempt to match the frame of other systems such as utilities, service providers, to other prosumers' electrical installation systems has been made and this new development will help in setting-up prosumers' electrical installations effectively.

As low-voltage to a prosumer's electrical installation is applied, the biggest change is the mode of the power supply. Direct feeding mode, reverse feeding mode and island mode are discussed in IEC 60364-8-2. The reliability of the system operation mode is important for the stability, safety, protection of the prosumer's low-voltage electrical installations, depending on the mode of the power supply.

In order to transfer the power consumption, failure and accident information to other systems or other prosumers' electrical installations, it is important to ensure the interoperability of the systems. This document defines the model of exchange information to facilitate the exchange of data between systems, defines a framework to ensure interoperability, but does not define how to secure communications for interoperability as communication type and methods.

In this document, a method of power supply and a data exchange model based on the framework are suggested and the role of a prosumer who can directly produce and distribute energy is defined.



## LOW-VOLTAGE ELECTRICAL INSTALLATIONS –

### Part 8-3: Functional aspects – Operation of prosumer's electrical installations

#### 1 Scope

This part of IEC 60364 specifies requirements and recommendations for the safe and proper functioning of prosumers' electrical installations.

It is intended for use by contractors, users, facility managers and similar of electrical low-voltage installations.

This document also provides requirements and recommendations on technical parameters and their limiting values influencing:

- a) safety:
  - protection;
  - alarm;
- b) proper functioning:
  - stability (voltage, frequency, etc);
  - reliability (power quality, interoperability of communication, etc);
  - energy management (power, power factor, current, stored energy, etc);
  - ability to ensure correct operation of equipment.

This document also provides requirements and recommendations on data exchange models, and test procedures for the prosumer's electrical installations that could include the following applications:

- local generating sources (e.g. photovoltaic systems, rotating generators, wind turbines);
- energy storage units (e.g. stationary secondary batteries);
- electric vehicle charging and/or discharging;
- prosumer's energy measurement unit (PEMU);
- control and monitoring system;
- loads which can be controlled.

This part of IEC 60364 is intended to be applied in conjunction with the other parts of IEC 60364.

#### 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 60364-8-1, *Low-voltage electrical installation – Part 8-1: Functional aspects – Energy efficiency*

IEC 62053 (all parts), *Electricity metering equipment*

IEC TS 62786, *Distributed energy resources connection with the grid*

### 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:

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

#### 3.1

##### **prosumer**

entity or party who can be a producer and a consumer of electrical energy

[SOURCE: IEC60364-8-2:2018, 3.6]

#### 3.2

##### **prosumer's electrical installation**

##### **PEI**

electrical installation connected or not to a public distribution network able to operate:

- local power supplies, and/or
- local storage units

[SOURCE: IEC 60364-8-2:2018, 3.2, modified – Deletion of the second part of the definition.]

#### 3.3

##### **prosumer's energy measurement unit**

##### **PEMU**

equipment used for measuring the electrical energy used or produced by the PEI or part of it,

- to collect and analyse data for an efficient usage of the electricity, and
- to inform the control and monitoring system for management of the electricity

#### 3.4

##### **grid connected PEI**

PEI connected to the distribution network, where local sources operate in parallel to the grid

Note 1 to entry: In case of power outage, the electrical installation cannot be supplied by the local supplies.

#### 3.5

##### **stand-alone PEI**

PEI designed for being never connected to a distribution network, supplied by its own local sources only

#### 3.6

##### **islandable PEI**

PEI connected to the distribution network, able to operate in island mode in case of distribution network outage

#### 3.7

##### **operating mode**

operation of an installation with respect to the different sources of electrical energy and to energy flow

[SOURCE: IEC 60364-8-2:2018, 3.11]

### 3.8 electrical energy storage EES

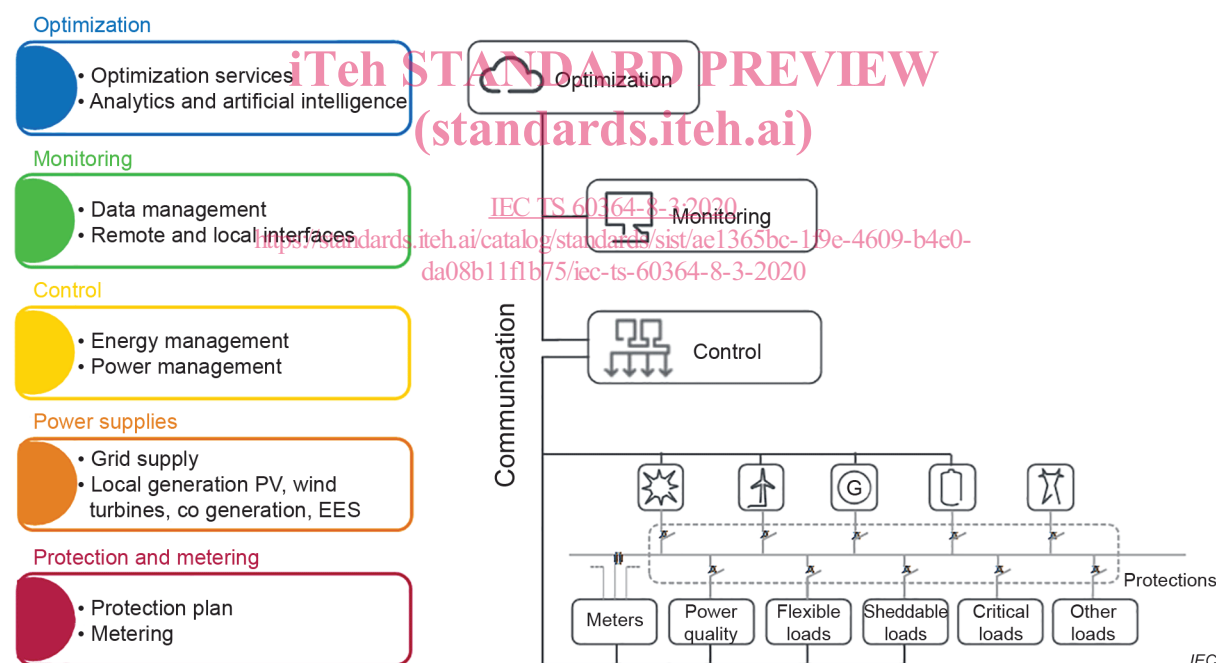
system for storing and releasing electrical energy based on the needs of the connected installation

## 4 General

### 4.1 PEI architecture

As shown in Figure 1, it can be considered that PEI architecture is composed of the following layers:

- protection and metering: equipment and devices in the installation for the purpose of safety, reliability, power and energy management;
- power supplies: includes the connection to the distribution network and local power supplies such as PV system, wind turbines, electrical energy storage;
- control system to ensure the proper functioning of the PEI;
- monitoring system;
- analytics and services for optimization of the power supplies usage.



**Figure 1 – PEI architecture: functional layers**

An example of physical PEI architecture is presented in Figure 2.