



# TECHNICAL SPECIFICATION

---

**Distributed energy resources connection with the grid -  
Part 2: Additional requirements for PV generation systems**

**(<https://standards.iteh.ai>)**

**Document Preview**

[IEC TS 62786-2:2026](#)

<https://standards.iteh.ai/catalog/standards/iec/06fcd0f8-a0a0-42c1-98cb-b832478b959b/iec-ts-62786-2-2026>



## THIS PUBLICATION IS COPYRIGHT PROTECTED

Copyright © 2026 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 Varembé  
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](https://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 It also gives information on projects, replaced and withdrawn publications.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](https://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](https://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](https://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](https://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.

<https://standards.iteh.ai>  
**Document Preview**

## IEC TS 62786-2:2026

<https://standards.iteh.ai/catalog/standards/iec/06fcd0f8-a0a0-42c1-98cb-b832478b959b/iec-ts-62786-2-2026>

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

## CONTENTS

|  |    |
|--|----|
| FOREWORD .....   | 4  |
| INTRODUCTION .....   | 6  |
| 1 Scope .....  | 8  |
| 2 Normative references .....   | 8  |
| 3 Terms and definitions .....  | 9  |
| 4 Requirements for PV systems .....  | 10 |
| 4.1 General .....  | 10 |
| 4.2 Reference points of requirements .....   | 11 |
| 4.3 Elements and configuration .....   | 11 |
| 4.3.1 Elements in PV systems .....   | 11 |
| 4.3.2 Configuration of PV systems .....  | 12 |
| 4.4 Basic operation .....  | 15 |
| 4.5 Protection and fault ride through function .....   | 16 |
| 4.6 Power control and grid support function .....  | 17 |
| 4.7 Electromagnetic compatibility for low frequency conducted disturbances .....   | 19 |
| 4.8 Information exchange for remote monitoring, control, and configuration .....   | 20 |
| 4.8.1 Remote monitoring .....  | 20 |
| 4.8.2 Remote control .....   | 22 |
| 4.8.3 Remote configuration .....   | 24 |
| Annex A (normative) Application of point of requirements for the connection of PV systems with electric power networks ..... | 30 |
| A.1 Reference points .....   | 30 |
| A.2 Relation between compatibility, immunity, emission and planning levels .....   | 31 |
| A.2.1 General .....  | 31 |
| A.2.2 Use of planning levels for each operation of PV systems .....  | 34 |
| Annex B (normative) Electromagnetic environment classes and compatibility levels specified in the IEC 61000 series .....     | 37 |
| B.1 Overview .....   | 37 |
| B.2 Electromagnetic environment classes .....  | 37 |
| B.3 Compatibility levels for each electromagnetic phenomenon .....   | 38 |
| B.4 Compatibility levels specified in IEC 61000-2-2, IEC 61000-2-4 and IEC 61000-2-12 .....                                  | 40 |
| Annex C (normative) Sign conventions for measurements of voltage, current and power .....                                    | 41 |
| C.1 General .....  | 41 |
| C.2 Reference polarity and direction .....   | 41 |
| C.2.1 Reference polarity of voltage .....  | 41 |
| C.2.2 Reference direction of current .....   | 41 |
| C.2.3 Sign conventions for measurements of voltage, current and power .....  | 42 |
| C.3 Reference frame of active and reactive power .....   | 42 |
| C.4 Physical meanings of the power flows of generators in regional standards .....   | 46 |
| Bibliography .....   | 49 |
| Figure 1 – Overview of IEC documents relevant to the grid connection of PV systems .....                                     | 7  |
| Figure 2 – Possible elements in PV systems .....   | 11 |
| Figure 3 – Example of a grid-tied PV system consisting of a single generating unit .....                                     | 12 |

|   |    |
|---|----|
| Figure 4 – Example of grid-tied PV systems consisting of multiple generating units .....            | 13 |
| Figure 5 – Example of remote information exchange in a PV system.....                               | 14 |
| Figure 6 – Example of the producer reference frame.....   | 16 |
| Figure A.1 – Three reference points where requirements are applied.....                             | 31 |
| Figure A.2 – Example of the location of PCC in the public low-voltage network .....                 | 32 |
| Figure A.3 – Illustration of EMC concepts .....   | 33 |
| Figure A.4 – Relation between compatibility, immunity, emission and planning levels .....           | 34 |
| Figure A.5 – Autonomous operation of PV systems .....   | 35 |
| Figure A.6 – Wide and remote area operation of DER and loads with an energy management system ..... | 36 |
| Figure C.1 –Reference polarity of voltage .....   | 41 |
| Figure C.2 – Reference polarity of current .....  | 41 |
| Figure C.3 – Reference polarity and direction for the measurements for DER .....                    | 42 |
| Figure C.4 – Reference polarity and direction for the measurements for Load.....                    | 42 |
| Figure C.5 – Rotating vector voltage and current for load.....                                      | 43 |
| Figure C.6 – Rotating vector voltage and current for DER .....                                      | 43 |
| Figure C.7 – Complex power for load .....   | 44 |
| Figure C.8 – Complex power for DER .....  | 45 |
| Figure C.9 – Power quadrants for load.....  | 45 |
| Figure C.10 – Power quadrants for DER .....   | 46 |

|   |    |
|---|----|
| Table 1 – List of requirements for PV systems and relevant clauses in IEC TS 62786-1.....         | 10 |
| Table 2 – Types of PV system with possible elements .....   | 12 |
| Table 3 – Example of some parts comprising PV systems, excluding the PCE .....                    | 14 |
| Table 4 – Requirements and relevant IEC documents on each function .....                          | 17 |
| Table 5 – Existing standards for immunity requirements.....                                       | 20 |
| Table 6 – Nameplate data .....  | 21 |
| Table 7 – Basic information (those data are not in the nameplate) .....                           | 21 |
| Table 8 – Status of the PV system .....   | 21 |
| Table 9 – Measured values of the PV system.....   | 22 |
| Table 10 – Minimum required parameters for Connect/Disconnect .....                               | 23 |
| Table 11 – Minimum required parameters for Constant power factor control .....                    | 23 |
| Table 12 – Minimum required parameters for Maximum active power control .....                     | 23 |
| Table 13 – Minimum required parameters for Active power control.....                              | 24 |
| Table 14 – Minimum required parameters for Reactive power control.....                            | 24 |
| Table 15 – Minimum required parameters for Protection and ride-through relevant to voltage.....   | 25 |
| Table 16 – Minimum required parameters for Protection and ride-through relevant to frequency..... | 25 |
| Table 17 – Minimum required parameters for Voltage – Var control .....                            | 26 |
| Table 18 – Minimum required parameters for Frequency – Watt control .....                         | 27 |
| Table 19 – Minimum required parameters for Voltage – Watt control.....                            | 28 |
| Table 20 – Minimum required parameters for dynamic-reactive current control .....                 | 29 |
| Table B.1 – Classes of electromagnetic environments defined in IEC 61000-2-4.....                 | 38 |

|   |    |
|---|----|
| Table B.2 – Total harmonic distortion .....   | 38 |
| Table B.3 – Power supply voltage amplitude variations .....   | 38 |
| Table B.4 – Power supply voltage unbalance .....  | 38 |
| Table B.5 – Power supply voltage frequency variations .....   | 39 |
| Table B.6 – Individual harmonic voltage .....   | 39 |
| Table B.7 – Compatibility levels specified in IEC 61000-2-2, IEC 61000-2-4 and IEC 61000-2-12 ..... | 40 |
| Table C.1 – Physical meanings of the power flows of loads .....                                     | 46 |
| Table C.2 – Physical meanings of the power flows of generators .....                                | 46 |
| Table C.3 – Physical meanings of the power flows of generators in Japan .....                       | 47 |
| Table C.4 – Physical meanings of the power flows of generators in IEEE 1547.1 .....                 | 47 |
| Table C.5 – Physical meanings of the power flows of generators in EN 50549-10 .....                 | 47 |
| Table C.6 – Physical meanings of the power flows of generators in AS/NZS 4777.2 .....               | 48 |

# iTeh Standards

## (<https://standards.iteh.ai>)

## Document Preview

[IEC TS 62786-2:2026](#)

<https://standards.iteh.ai/catalog/standards/iec/06fcd0f8-a0a0-42c1-98cb-b832478b959b/iec-ts-62786-2-2026>

## INTERNATIONAL ELECTROTECHNICAL COMMISSION

**Distributed energy resources connection with the grid -  
Part 2: Additional requirements for PV generation systems**

**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 TS 62786-2 has been prepared by IEC technical committee 8: System aspects of electrical energy supply. It is a Technical Specification.

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

| Draft      | Report on voting |
|------------|------------------|
| 8/1756/DTS | 8/1790/RVDTs     |

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 Technical Specification 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](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 62786 series, published under the general title *Distributed energy resources connection with the grid*, can be found on the IEC website.

This document is to be read in conjunction with IEC TS 62786-1:2023

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.

# iTeh Standards

## (<https://standards.iteh.ai>)

### Document Preview

[IEC TS 62786-2:2026](#)

<https://standards.iteh.ai/catalog/standards/iec/06fcd0f8-a0a0-42c1-98cb-b832478b959b/iec-ts-62786-2-2026>