IEC 61439-4

Edition 2.0 2023-10

INTERNATIONAL STANDARD

NORME INTERNATIONALE

Low-voltage switchgear and controlgear assemblies –
Part 4: Particular requirements for assemblies for construction sites (ACS)

Ensembles d'appareillage à basse tension –
Partie 4: Exigences particulières pour ensembles de chantiers (EC)

IEC 61439-4:2023-10(en-fr)

IEC Secretariat
3, rue de Varembé
CH-1211 Geneva 20
Switzerland

Tel.: +41 22 919 02 11
info@iec.ch
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
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 It also gives information on projects, replaced and withdrawn publications.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
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
If you wish to give us your feedback on this publication or need further assistance, please contact the Customer Service Centre: sales@iec.ch.

IEC Products & Services Portal - products.iec.ch
Discover our powerful search engine and read freely all the publications previews. With a subscription you will always have access to up to date content tailored to your needs.

Electropedia - www.electropedia.org
The world's leading online dictionary on electrotechnology, containing more than 22 300 terminological entries in English and French, with equivalent terms in 19 additional languages. Also known as the International Electrotechnical Vocabulary (IEV) online.

A propos de l'IEC
La Commission Electrotechnique Internationale (IEC) est la première organisation mondiale qui élabore et publie des Normes internationales pour tout ce qui a trait à l'électricité, à l'électronique et aux technologies apparentées.

A propos des publications IEC
Le contenu technique des publications IEC est constamment revu. Veuillez vous assurer que vous possédez l'édition la plus récente, un corrigendum ou amendement peut avoir été publié.

Recherche de publications IEC - webstore.iec.ch/advsearchform
La recherche avancée permet de trouver des publications IEC en utilisant différents critères (numéro de référence, texte, comité d'études, …). Elle donne aussi des informations sur les projets et les publications remplacées ou retirées.

IEC Just Published - webstore.iec.ch/justpublished
Restez informé sur les nouvelles publications IEC. Just Published détaille les nouvelles publications parues. Disponible en ligne et une fois par mois par email.

Service Clients - webstore.iec.ch/csc
Si vous désirez nous donner des commentaires sur cette publication ou si vous avez des questions contactez-nous: sales@iec.ch.

IEC Products & Services Portal - products.iec.ch
Découvrez notre puissant moteur de recherche et consultez gratuitement tous les aperçus des publications. Avec un abonnement, vous aurez toujours accès à un contenu à jour adapté à vos besoins.

Electropedia - www.electropedia.org
Le premier dictionnaire d'électrotechnologie en ligne au monde, avec plus de 22 300 articles terminologiques en anglais et en français, ainsi que les termes équivalents dans 19 langues additionnelles. Egalement appelé Vocabulaire Electrotechnique International (IEV) en ligne.

IEC 61439-4

Edition 2.0 2023-10

INTERNATIONAL STANDARD

NORME INTERNATIONALE

Low-voltage switchgear and controlgear assemblies –
Part 4: Particular requirements for assemblies for construction sites (ACS)

Ensembles d'appareillage à basse tension –
Partie 4: Exigences particulières pour ensembles de chantiers (EC)

INTERNATIONAL
ELECTROTECHNICAL
COMMISSION

COMMISSION
ELECTROTECHNIQUE
INTERNATIONALE

ICS 29.130.20

ISBN 978-2-8322-7538-2

CONTENTS

INTERNATIONAL ELECTROTECHNICAL COMMISSION

LOW-VOLTAGE SWITCHGEAR AND CONTROLGEAR ASSEMBLIES –

Part 4: Particular requirements for assemblies for construction sites (ACS)

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 61439-4 has been prepared by subcommittee 121B: Low-voltage switchgear and controlgear assemblies, of IEC technical committee 121: Switchgear and controlgear and their assemblies for low voltage. It is an International Standard.

This second edition of IEC 61439-4 cancels and replaces the first edition published in 2012. This edition constitutes a technical revision.

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

a) alignment with IEC 61439-1:2020 regarding the structure and technical content, as applicable.

The text of this document is based on the following documents:

Draft	Report on voting
121B/183/FDIS	121B/188/RVD

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/publications.

This document is to be read in conjunction with IEC 61439-1:2020. The provisions of the general rules dealt with in IEC 61439-1:2020 are only applicable to this document insofar as they are specifically cited. When this document states “addition”, “modification” or “replacement”, the relevant text in IEC 61439-1:2020 is to be adapted accordingly.

Subclauses that are numbered with a 101 (102, 103, etc.) suffix are additional to the same subclause in IEC 61439-1:2020.

Tables and figures in this document that are new are numbered starting with 101.

New annexes in this document are lettered AA, BB, etc.

In this document, terms written in small capitals are defined in Clause 3.

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

A list of all parts of the IEC 61439 series, under the general title *Low-voltage switchgear and controlgear assemblies,* 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 webstore.iec.ch in the data related to the specific document. At this date, the document will be:

- reconfirmed,
- withdrawn,
- replaced by a revised edition, or
- amended.

LOW-VOLTAGE SWITCHGEAR AND CONTROLGEAR ASSEMBLIES –

Part 4: Particular requirements for assemblies for construction sites (ACS)

1 Scope

NOTE Throughout this document, the abbreviation ACS (assembly for construction site, see 3.1.101) is used for a low-voltage switchgear and controlgear assembly intended for use on construction and similar sites.

This document defines the specific requirements of ACS as follows:

– assemblies for which the rated voltage does not exceed 1 000 V in case of AC or 1 500 V in case of DC;

– assemblies where the nominal primary voltage and the nominal secondary voltage of transformers incorporated in ACS are within the limits specified above;

– assemblies intended for use on construction sites, both indoors and outdoors, i.e. temporary places of work to which the public do not generally have access and where building construction, installation, repairs, alteration or demolition of property (buildings) or civil engineering (public works) or excavation or any other similar operations are carried out;

– transportable (semi-fixed) or MOBILE assemblies with enclosure.

The manufacture and/or assembly can be carried out by an entity other than by the original manufacturer (see 3.10.1 of IEC 61439-1:2020).

This document does not apply to individual devices and self-contained components, such as motor starters, fuse switches, electronic equipment, etc. which will comply with the relevant product standards.

This document does not apply to assemblies for use in the administrative centres of construction sites (offices, cloakrooms, meeting rooms, canteens, restaurants, dormitories, toilets, etc.).

Requirements for electrical protection provided by equipment manufactured according to this document are given in IEC 60364-7-704.

2 Normative references

This clause of IEC 61439-1:2020 is applicable except as follows:

Addition:

IEC 60068-2-27, *Environmental testing – Part 2-27: Tests – Test Ea and guidance: Shock*

IEC 60068-2-42*, Environmental testing – Part 2-42: Tests – Test Kc: Sulphur dioxide test for contacts and connections*

IEC 60364-7-704:2017, *Low-voltage electrical installations – Part 7-704: Requirements for special installations or locations – Construction and demolition site installations*

IEC 61439-1:2020, *Low-voltage switchgear and controlgear assemblies – Part 1: General rules*

IEC 61558-2-23, *Safety of transformers, reactors, power supply units and combinations thereof – Part 2-23: Particular requirements and tests for transformers and power supply units for construction sites*

3 Terms and definitions

This clause of IEC 61439-1:2020 applicable except as follows:

Additional terms and definitions:

3.1 General terms

3.1.101
low-voltage switchgear and controlgear assembly for construction sites
ACS
combination of one or several transforming or low voltage switching devices with associated control, measuring, signalling, protective and regulating equipment complete with all their internal electrical and mechanical connections and structural parts, designed and built for use on all construction sites, indoors and outdoors

3.2 Constructional units of assemblies

3.2.101
metering unit
functional unit equipped with apparatus for metering electrical energy

3.2.102
transformer unit
functional unit consisting mainly of one or several transformers

Modifications:

3.3 External design of assemblies

3.3.1
open-type assembly

This term of IEC 61439-1:2020 does not apply.

3.3.2
dead-front assembly

This term of IEC 61439-1:2020 does not apply.

Replacement:

3.3.3
enclosed ACS
ACS which is enclosed on all sides with the possible exception of its mounting surface in such a manner as to provide a defined degree of protection

3.3.7
box-type ACS
ENCLOSED ACS intended:

– either to be mounted on a vertical surface;

– or to stand on a horizontal surface supported by feet or legs (articulated or not) or by a mounting not forming part of the ACS (see 3.4.2 of IEC 61439-1:2020)

Modification:

3.5 Conditions of installation of assemblies

3.5.1
assembly for indoor installation

This term of IEC 61439-1:2020 does not apply (see 3.1.101).

3.5.2
assembly for outdoor installation

This term of IEC 61439-1:2020 does not apply (see 3.1.101).

3.5.3
stationary assembly

This term of IEC 61439-1:2020 does not apply.

3.5.4
movable assembly

This term of IEC 61439-1:2020 does not apply.

Additional terms and definitions:

3.5.101
transportable ACS
semi-fixed ACS
ACS intended for use in a place where it is not permanently fixed

Note 1 to entry: The location of a TRANSPORTABLE ACS can vary during work on the same site. When the equipment is moved to another place, it is first disconnected from the supply.

3.5.102
mobile ACS
ACS capable of being moved as work advances on the site, without being disconnected from the supply

Additional terms and definitions:

3.101 Function of the ACS

3.101.1
incoming supply function
suitability for connection of the ACS either to electricity public supply network or to the transformer substation or to on site generator

3.101.2
metering function
suitability for the metering of electrical energy consumed on the site

3.101.3
distribution function
suitability to provide the distribution and protection of electrical supply on the construction site by means of terminal connection or socket-outlets

3.101.4
transformer function
suitability to provide means for transformer voltages or to provide measures of electrical protection

Note 1 to entry: Details for their requirements are given in 101.1.

4 Symbols and abbreviations

This clause of IEC 61439-1:2020 is applicable.

5 Interface characteristics

This clause of IEC 61439-1:2020 is applicable, except as follows.

5.3.1 Rated current of an assembly (I_{nA})

Replacement of title and text:

5.3.1 Rated current of an ACS (I_{nA})

The rated current of an ACS is **group rated current** I_{ng} of its incoming circuit.

This current shall be carried without the temperature rise of the individual parts exceeding the limits specified in 9.2 of IEC 61439-1:2020.

5.4 Rated diversity factor (RDF)

Addition:

The assumed loading of the outgoing circuits of the ACS or group of outgoing circuits shall be declared by the assembly manufacturer and can be based on the values in Table 101.

When the manufacturer does not declare any RDF, the values of Table 101 apply.

5.6 Other characteristics

Replacement:

The following characteristics shall be declared:

a) the function(s) assigned by the manufacturer (see 3.101);
b) the external design (see 3.3);
c) the mobility (see 3.5.101 and 3.5.102);
d) the degree of protection (see 8.2);
e) the method of mounting, for example fixed or removable parts (see 8.5.1 and 8.5.2);
f) protection against electric shock (see 8.4);
g) the resistance to corrosion (see 10.2.2.101);
h) special service conditions, if applicable (see 7.2);
i) electromagnetic compatibility (EMC) classification (see Annex J of IEC 61439-1:2020).

6 Information

This clause of IEC 61439-1:2020 is applicable except as follows.

6.1 Assembly designation marking

Replacement of title and text:

6.1 ACS designation marking

The assembly manufacturer shall provide each ACS with one or more labels, marked in a durable manner and located in a place such that they are visible and legible when the ACS is installed and in operation.

Compliance is checked according to the test of 10.2.7 and by inspection.

The following information regarding the ACS shall be provided on the label(s):

a) assembly manufacturer's name or trade mark (see 3.10.2);
b) type designation or identification number or any other means of identification, making it possible to obtain relevant information from the assembly manufacturer;
c) means of identifying date of manufacture;
d) IEC 61439-4;
e) type of current (and the frequency in the case of AC);
f) rated voltage (U_n) (of the ACS) (see 5.2.1);
g) rated current of the ACS (I_{nA}) (see 5.3.1);
h) degree of protection (see 8.2);
i) the weight where this exceeds 30 kg.

If the indication of the name or trademark of the manufacturer appears on the ACS, it shall not be given on the nameplate.

6.2.1 Information relating to the assembly

Replacement of title and text:

6.2.1 Information relating to the ACS

The following additional information, where applicable, shall be provided in the assembly manufacturer’s technical documentation supplied with the ACS:

a) rated operational voltage (U_e) (of a circuit) (see 5.2.2);
b) rated impulse withstand voltage (U_{imp}) (see 5.2.4);
c) rated insulation voltage (U_i) (see 5.2.3);
d) rated current of each circuit (I_{nc}) (see 5.3.2);
e) rated peak withstand current (I_{pk}) (see 5.3.4);
f) rated short-time withstand current (I_{cw}) together with its duration (see 5.3.4);
g) rated conditional short-circuit current (I_{cc}) (see 5.3.5);
h) rated frequency (f_n) (see 5.5);
i) rated diversity factor(s) (RDF) (see 5.4);
j) functions (see 3.101);

k) all necessary information relating to the other declared classifications and characteristics (see 5.6);

l) the short-circuit withstand strength and characteristics of short-circuit protective device(s) (see 9.3.2);

m) overall dimensions (including projections e.g handles, covers, doors).

6.2.2 Instructions for handling, installation, operation and maintenance

Addition:

The manufacturer of the ACS should specify in its technical documentation supplied with the ACS the other types of assemblies which can be connected to it. This information should indicate whether the compatibility is based upon the type of system earthing employed and/or on the need for co-ordination of the electrical protection within the complete installation.

The manufacturer should furnish the appropriate documentation for the purpose to maintain the protective measures and the co-ordination of the protective devices within the complete installation.

7 Service conditions

This clause of IEC 61439-1:2020 is applicable except as follows.

Modifications:

7.1.2 Pollution degree

Replacement of the last paragraph with:

Only pollution degrees 3 and 4 are applicable.

The microenvironment can be reduced to pollution degree 2 if the degree of protection of the enclosure is at least IP5X and care is taken to avoid condensation.

7.2 Special service conditions

Addition of the following new item:

n) heavily polluted atmosphere.

8 Constructional requirements

This clause of IEC 61439-1:2020 is applicable except as follows.

8.1.1 General

Addition:

All the apparatus shall be placed inside the enclosure fitted with such removable panels, cover plates or doors as applicable for connection or maintenance with the possible exception of the items mentioned in 8.101 provided that they withstand the service conditions of Clause 7 and the requirements of 8.1.2 and 8.1.6.

8.1.2 Protection against corrosion

Replacement:

Protection against corrosion shall be ensured by the use of suitable materials or by protective coatings to the exposed surface taking account of the normal service conditions (see 7.1) and/or special service condition (see 7.2). Compliance to this requirement is checked by the test of 10.2.2.

8.1.4 Resistance to ultra-violet (UV) radiation

Replacement:

For enclosures and external parts made of insulating materials, resistance to ultra-violet radiation shall be verified according to 10.2.4.

For external parts made of insulating material of components covered by other IEC standard (for examples socket-outlets, handles of switch, push buttons, etc.), this test is not required.

8.1.5 Mechanical strength

Addition:

The ACS shall be constructed to withstand mechanical shocks having an acceleration of 500 m/s^2, a pulse shape of a half-sine wave of 11 ms duration (commensurate with equipment being carried loose in normal road or rail vehicles for long periods).

Compliance is verified according to 10.2.6.

8.1.6 Lifting provision

Replacement:

Lifting rings and/or handles (or any other equivalent system) shall be provided on the ACS and be firmly attached to the enclosure or supporting framework.

Compliance is checked according to the test of 10.2.5.

8.2.1 Protection against mechanical impact (IK code)

Additional paragraph:

The ACS shall also withstand impacts of 6 joules energy representing collisions with site construction mechanical handling equipment (see IEC 60068-2-27).

For protection against mechanical impact refer to 10.2.6.

NOTE In addition to 8.2.1, It is possible to make reference also to the IK code in case the enclosure has been tested according to other IEC 61439 parts.

8.2.2 Protection against contact with live parts, ingress of solid foreign bodies and water (IP code)

Replacement:

The degree of protection provided by an ACS against contact with live parts, ingress of solid foreign bodies and water is indicated by the IP code according to IEC 60529 and verified according to 10.3.

The degree of protection of the ACS shall be at least IP 44, with all doors closed and all removable panels and cover plates fitted.

Ventilation and drainage holes shall not reduce this degree of protection.

The degree of protection for an operating face inside a door shall be not less than IP 21 provided that the door can be closed under all conditions of use. Where the door cannot be closed the degree of protection for the operating face shall be at least IP 44.

Unless otherwise specified, the degree of protection indicated by the original manufacturer applies to the complete ACS, when it is installed in accordance with the original manufacturer's instructions.

Socket-outlets not protected by the enclosure of the ACS shall have a degree of protection at least equivalent to IP 44, both when the plug is removed or fully inserted.

Where the ACS does not have the same IP rating throughout, the original manufacturer shall declare in its technical documentation supplied with the ACS the IP rating for the separate parts. Example: IP 44, operating face IP 21.

No IP codes can be given unless the appropriate verifications have been made according to 10.3.

8.4.3.1 Installation conditions

Replacement of the first two paragraphs:

The ACS shall include protective measures and be suitable for installations designed to be in accordance with IEC 60364-7-704:2017.

8.4.4 Additional requirements for class II assemblies

e) This item of IEC 61439-1:2020 is not applicable.

8.4.6.2 Requirements related to accessibility in service by authorized persons

This subclause of IEC 61439-1:2020 is not applicable.

8.5.3 Selection of switching devices and components

Additional paragraphs:

Plugs of different rated currents or voltages shall not be interchangeable, so as to avoid errors in connecting (see IEC 60309-1 and IEC 60309-2).

Connections for three-phase socket-outlets shall be made in such a way as to retain the same order of phases.

Additional subclause:

8.5.101 Accessible parts of ACS

Only the socket-outlets, operating handles and control buttons can be accessible without the use of a key or tool. The actuator of the main switch shall be easily accessible (see 704.536.2.2 of IEC 60364-7-704:2017).