

Specifikation

SIS-ISO/PAS 19295:2016

Publicerad/Published: 2016-05-13
Utgåva/Edition: 1
Språk/Language: engelska/English
ICS: 43.120

Eldrivna vägfordon – Specifikation av underklasser inom spänningsklass B

Electrically propelled road vehicles – Specifications of voltage sub-classes for voltage class B

This preview is downloaded from www.sis.se. Buy the entire standard via <https://www.sis.se/std-8020415>

Standarder får världen att fungera

SIS (Swedish Standards Institute) är en fristående ideell förening med medlemmar från både privat och offentlig sektor. Vi är en del av det europeiska och globala nätverk som utarbetar internationella standarder. Standarder är dokumenterad kunskap utvecklad av framstående aktörer inom industri, näringsliv och samhälle och befrämjar handel över gränser, bidrar till att processer och produkter blir säkrare samt effektiviserar din verksamhet.

Delta och påverka

Som medlem i SIS har du möjlighet att påverka framtida standarder inom ditt område på nationell, europeisk och global nivå. Du får samtidigt tillgång till tidig information om utvecklingen inom din bransch.

Ta del av det färdiga arbetet

Vi erbjuder våra kunder allt som rör standarder och deras tillämpning. Hos oss kan du köpa alla publikationer du behöver – allt från enskilda standarder, tekniska rapporter och standardpaket till handböcker och onlinetjänster. Genom vår webbtjänst e-nav får du tillgång till ett lättnavigerat bibliotek där alla standarder som är aktuella för ditt företag finns tillgängliga. Standarder och handböcker är källor till kunskap. Vi säljer dem.

Utveckla din kompetens och lyckas bättre i ditt arbete

Hos SIS kan du gå öppna eller företagsinterna utbildningar kring innehåll och tillämpning av standarder. Genom vår närhet till den internationella utvecklingen och ISO får du rätt kunskap i rätt tid, direkt från källan. Med vår kunskap om standarders möjligheter hjälper vi våra kunder att skapa verklig nytta och lönsamhet i sina verksamheter.

Vill du veta mer om SIS eller hur standarder kan effektivisera din verksamhet är du välkommen in på www.sis.se eller ta kontakt med oss på tel 08-555 523 00.



Standards make the world go round

SIS (Swedish Standards Institute) is an independent non-profit organisation with members from both the private and public sectors. We are part of the European and global network that draws up international standards. Standards consist of documented knowledge developed by prominent actors within the industry, business world and society. They promote cross-border trade, they help to make processes and products safer and they streamline your organisation.

Take part and have influence

As a member of SIS you will have the possibility to participate in standardization activities on national, European and global level. The membership in SIS will give you the opportunity to influence future standards and gain access to early stage information about developments within your field.

Get to know the finished work

We offer our customers everything in connection with standards and their application. You can purchase all the publications you need from us - everything from individual standards, technical reports and standard packages through to manuals and online services. Our web service e-nav gives you access to an easy-to-navigate library where all standards that are relevant to your company are available. Standards and manuals are sources of knowledge. We sell them.

Increase understanding and improve perception

With SIS you can undergo either shared or in-house training in the content and application of standards. Thanks to our proximity to international development and ISO you receive the right knowledge at the right time, direct from the source. With our knowledge about the potential of standards, we assist our customers in creating tangible benefit and profitability in their organisations.

If you want to know more about SIS, or how standards can streamline your organisation, please visit www.sis.se or contact us on phone +46 (0)8-555 523 00



Denna specifikation är inte en svensk standard. Detta dokument innehåller den engelska språkversionen av ISO/PAS 19295:2016.

This Specification is not a Swedish Standard. This document contains the English version of ISO/PAS 19295:2016.

© Copyright/Upphovsrätten till denna produkt tillhör SIS, Swedish Standards Institute, Stockholm, Sverige. Användningen av denna produkt regleras av slutanvändarlicensen som återfinns i denna produkt, se standardens sista sidor.

© Copyright SIS, Swedish Standards Institute, Stockholm, Sweden. All rights reserved. The use of this product is governed by the end-user licence for this product. You will find the licence in the end of this document.

Uppllysningar om sakinnehållet i detta dokument lämnas av SIS, Swedish Standards Institute, telefon 08-555 520 00. Standarder kan beställas hos SIS Förlag AB som även lämnar allmänna uppllysningar om nationell och internationell standard.

Information about the content of this document is available from the SIS, Swedish Standards Institute, telephone +46 8 555 520 00. Standards may be ordered from SIS Förlag AB, who can also provide general information about national and international standards.

Dokumentet är framtaget av kommittén för EI- och hybridfordon, SIS/TK 517.

Har du synpunkter på innehållet i det här dokumentet, vill du delta i ett kommande revideringsarbete eller vara med och ta fram standarder inom området? Gå in på www.sis.se - där hittar du mer information.

Contents

	Page
Foreword	iv
Introduction	v
1 Scope	1
2 Terms and definitions	1
3 Voltage sub-classes	2
4 Characteristics of voltage sub-classes	3
4.1 General.....	3
4.2 Component operating status.....	3
4.3 Voltage operating ranges.....	4
4.4 Under- and overvoltage.....	5
4.4.1 General.....	5
4.4.2 Overvoltage.....	5
4.4.3 Undervoltage.....	6
4.5 Allocation of voltage ranges and operation status — Overview.....	6
4.6 Voltage transients and ripple.....	7
4.6.1 General.....	7
4.6.2 Voltage slope.....	7
4.6.3 Voltage ripple.....	8
4.6.4 Load dump.....	10
Annex A (informative) Example for voltage ranges per voltage sub-class	11

Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation on the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the WTO principles in the Technical Barriers to Trade (TBT) see the following URL: [Foreword - Supplementary information](#)

The committee responsible for this document is ISO/TC 22, *Road vehicles*, Subcommittee SC 37, *Electrically propelled vehicles*.

Introduction

Electric systems operating at voltage class B are efficient systems for electrically propelled road vehicles. The requirements for voltage class B electric circuits that are used for electric power transfer for the propulsion of electric road vehicles are significantly different to those of voltage class A electric circuits used for power networks at, for example, 12 V d.c. or 24 V d.c.

This PAS provides definition of voltage sub-classes for rechargeable energy storage system (RESS) and electric propulsion system and lists up specified values based on maximum working voltage. Voltage sub-classes listed in this PAS are used for voltage class B systems of all kinds of current or future electrically propelled road vehicles. It enables vehicle manufacturers and automotive supply industry to evaluate the characteristics of a component according to the specified sub-class.

The voltage sub-class itself and the component characteristics have large cost impact on the component design and the overall design of the electric system. A high variety of different voltage sub-class and operating conditions hinders the use of an existing component in different vehicle models.

Today, a huge variety of different RESS and electric propulsion system maximum working voltages are used for electrically propelled road vehicles on the market. Because some systems use voltage boost converters, maximum working voltage of electric propulsion system can be different from that of RESS. This variety of maximum working voltages often results from different numbers of cells in the design of the electrical energy source, e.g. battery stack or variety of power requirement by each vehicle. As a consequence, many system or component designs of a voltage class B electric circuit are currently related to one specific working voltage. When a maximum working voltage is selected for the design, often only one supplier for a component is available. Hence, a change to another component supplier or a change of the dedicated maximum working voltage is not possible, when the system design is finished. It is necessary to reduce the variety of maximum working voltages in order to

- lower the component and system costs by limiting the variety of maximum working voltages,
- decouple the system or component designs of a voltage class B electric circuit from the design of the electric energy source,
- enable an exchange of components from different suppliers during and after the system development and to enable competition and access to the worldwide market for component suppliers, and
- support the system design by specifying basic voltage sub-classes for automotive propulsion systems within voltage class B.

This PAS lists only those RESS and electric propulsion system voltage sub-classes which are used or will be used in current or planned vehicle models and for which electronic parts, e.g. semiconductor switches, are currently available without any restrictions on the market.

The range of voltage class B is too wide to be used for a component design referring to voltage. Therefore, this PAS divides voltage class B in a set of voltages sub-classes, which enable a component design referring to voltage for each voltage sub-class.

This specification is not intended to restrict the development of component performance or technology. It does not exclude the use of other maximum operating voltages for an individual system design.

Electrically propelled road vehicles — Specification of voltage sub-classes for voltage class B

1 Scope

This PAS provides specification of voltage sub-classes for electric propulsion systems and conductively connected auxiliary electric systems of electrically propelled road vehicles.

The voltage sub-classes are related to d.c. electric circuits.

It applies only to electric circuits and components with maximum working voltages according to voltage class B.

This PAS provides specifications of characteristics which are relevant for design and operation of components and systems for the standardized voltage sub-classes.

It enables vehicle manufacturers and supply industry to evaluate the characteristics of components or systems for their specific vehicle applications.

2 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

2.1

component operating status

describes the general functional behaviour of components which depend directly on the voltage in voltage class B electric circuits

2.2

customer

party that is interested in using voltage class B component or system

2.3

DUT

device under test

2.4

electric circuit

entire set of interconnected live parts through which electrical current is designed to flow under normal operating conditions

2.5

electric propulsion system maximum working voltage

highest value of d.c. voltage that can occur in an electric propulsion system under any normal operating conditions according to the customer's specifications, disregarding transients

2.6

maximum working voltage

highest value of a.c. voltage (rms) or of d.c. voltage that can occur in an electric system under any normal operating condition according to the customer's specifications, disregarding transients

Note 1 to entry: In this definition taken from ISO 6469-3, transients include ripple.

2.7
rechargeable energy storage system
RESS

system that stores energy for delivery of electric power and which is rechargeable

EXAMPLE Batteries, capacitors, etc.

2.8
ripple

set of unwanted periodic deviations with respect to the average value of the measured or supplied quantity, occurring at frequencies which can be related to that of components within a system

2.9
supplier

party that provides voltage class B component or system

2.10
transient

pertaining to or designating a phenomenon or a quantity which varies between two consecutive steady states during a time interval short compared with the time-scale of interest

2.11
voltage class B

classification of an electric component or circuit with a maximum working voltage between 30 V a.c. (rms) and 1 000 V a.c. (rms) or between 60 V d.c. and 1 500 V d.c

Note 1 to entry: Values for voltage class B are taken from ISO 6469-3.

2.12
upper voltage limit

maximum voltage of a voltage class B sub-class

Note 1 to entry: Maximum working voltages within a voltage sub-class are less than or equal to the voltage limit.

2.13
voltage range

general term covering voltage sub-class, working voltages and deviations from working voltages

2.14
voltage sub-class

classification of an electric component or circuit with a d.c. voltage within the voltage class B

2.15
working voltage

a.c. voltage (rms) or d.c. voltage that can occur in an electric system under normal operating conditions according to the customer's specifications, disregarding transients

3 Voltage sub-classes

The specifications and requirements on voltage sub-classes shall apply to electric circuits, systems and components at voltage class B.

The specifications and descriptions of voltages for a component shall apply to the voltage at its terminals to the voltage class B electric circuit, if not otherwise stated in this International Standard.

The voltage sub-classes shown in [Table 1](#) are based on the specification of an upper voltage limit for each voltage sub-class.

Table 1 — Voltage sub-classes

Voltage sub-class	Upper voltage limit V d.c.
B_220	$U \leq 220$
B_420	$U \leq 420$
B_470	$U \leq 470^a$
B_750	$U \leq 750^b$
B_850	$U \leq 850$
B_1250	$U \leq 1\,250^c$

a B_470 is considering 700 V breakdown voltage for IGBT and dedicated module technology ([Table A.2](#)).

b B_750 is related to a voltage classification of 750 V d.c. given by regulation in Japan.

c B_1250 is considering the limit of 1 000 V a.c. for voltage class B.

4 Characteristics of voltage sub-classes

4.1 General

The specifications and characteristics for voltage sub-classes include the following subjects:

- component operating status;
- voltage operating ranges;
- under- and overvoltages;
- voltage transients and ripple for components.

The voltage ranges and operating status shall apply to all components for the selected voltage sub-class. The voltage sub-class depends on a vehicle project and shall be selected by an agreement between customer and supplier.

The requirements in accordance with [Table 1](#) shall apply to a RESS when it is disconnected from the voltage class B electric circuit.

Different requirements may be specified by the customer for a RESS when it is connected to the voltage class B electric circuit because the voltage of RESS is limited to the maximum working voltage of the vehicle project and given by the number of battery cells.

For each voltage sub-class, the corresponding working voltages, component operating status, overvoltage and under-voltage are described as follows.

4.2 Component operating status

The operating status is introduced to describe the general operating behaviour of components that depends directly on the voltage at the terminals of a component of the voltage class B electric circuit and is mainly focused on performance and electrical power.

In every operating status, the components shall fulfil the following requirements:

- it shall be ready to operate;
- it shall not enter any undefined states;
- it shall not cause any failure in other components.

The different operating statuses are described in [Table 2](#).