

This is a preview of "DS/ISO 21780:2020". [Click here to purchase the full version from the ANSI store.](#)

Vejkøretøjer – Forsyningsspænding på 48 V – Elektriske krav og test

Road vehicles – Supply voltage of 48 V –
Electrical requirements and tests

DANSK STANDARD
Danish Standards Association

Göteborg Plads 1
DK-2150 Nordhavn

Tel: +45 39 96 61 01
dansk.standard@ds.dk
www.ds.dk

This is a preview of "DS/ISO 21780:2020". [Click here to purchase the full version from the ANSI store.](#)

DS projekt: M332633

ICS: 43.040.10

Første del af denne publikations betegnelse er:

DS/ISO, hvilket betyder, at det er en international standard, der har status som dansk standard.

Denne publikations overensstemmelse er:

IDT med: ISO 21780:2020

DS-publikationen er på engelsk.

DS-publikationstyper

Dansk Standard udgiver forskellige publikationstyper.

Typen på denne publikation fremgår af forsiden.

Der kan være tale om:

Dansk standard

- standard, der er udarbejdet på nationalt niveau, eller som er baseret på et andet lands nationale standard, eller
- standard, der er udarbejdet på internationalt og/eller europæisk niveau, og som har fået status som dansk standard

DS-information

- publikation, der er udarbejdet på nationalt niveau, og som ikke har opnået status som standard, eller
- publikation, der er udarbejdet på internationalt og/eller europæisk niveau, og som ikke har fået status som standard, fx en teknisk rapport, eller
- europæisk præstandard

DS-håndbog

- samling af standarder, eventuelt suppleret med informativt materiale

DS-hæfte

- publikation med informativt materiale

Til disse publikationstyper kan endvidere udgives

- tillæg og rettelsesblade

DS-publikationsform

Publikationstyperne udgives i forskellig form som henholdsvis

- fuldtekstpublikation (publikationen er trykt i sin helhed)
- godkendelsesblad (publikationen leveres i kopi med et trykt DS-omslag)
- elektronisk (publikationen leveres på et elektronisk medie)

DS-betegnelse

Alle DS-publikationers betegnelse begynder med DS efterfulgt af et eller flere præfikser og et nr., fx **DS 383**, **DS/EN 5414** osv. Hvis der efter nr. er angivet et **A** eller **Cor**, betyder det, enten at det er et **tillæg** eller et **rettelsesblad** til hovedstandard, eller at det er indført i hovedstandard.

DS-betegnelse angives på forsiden.

Overensstemmelse med anden publikation:

Overensstemmelse kan enten være IDT, EQV, NEQ eller MOD

- **IDT:** Når publikationen er identisk med en given publikation.
- **EQV:** Når publikationen teknisk er i overensstemmelse med en given publikation, men præsentationen er ændret.
- **NEQ:** Når publikationen teknisk eller præsentationsmæssigt ikke er i overensstemmelse med en given standard, men udarbejdet på baggrund af denne.
- **MOD:** Når publikationen er modificeret i forhold til en given publikation.

This is a preview of "DS/ISO 21780:2020". [Click here to purchase the full version from the ANSI store.](#)

First edition
2020-08-03

Road vehicles — Supply voltage of 48 V — Electrical requirements and tests

Véhicules routiers — Tension d'alimentation de 48 V — Exigences électriques et essais



Reference number
ISO 21780:2020(E)

© ISO 2020

This is a preview of "DS/ISO 21780:2020". [Click here to purchase the full version from the ANSI store.](#)



COPYRIGHT PROTECTED DOCUMENT

© ISO 2020, Published in Switzerland

All rights reserved. Unless otherwise specified, no part of this publication may be reproduced or utilized otherwise in any form or by any means, electronic or mechanical, including photocopying, or posting on the internet or an intranet, without prior written permission. Permission can be requested from either ISO at the address below or ISO's member body in the country of the requester.

ISO copyright office
Ch. de Blandonnet 8 • CP 401
CH-1214 Vernier, Geneva, Switzerland
Tel. +41 22 749 01 11
Fax +41 22 749 09 47
copyright@iso.org
www.iso.org

This is a preview of "DS/ISO 21780:2020". [Click here to purchase the full version from the ANSI store.](#)

Contents

	Page
Foreword	v
1 Scope	1
2 Normative references	1
3 Terms and definitions	1
4 Functional status	2
4.1 General.....	2
4.2 Functional status 1 (FS1).....	3
4.3 Functional status 2 (FS2).....	3
4.4 Functional status 3 (FS3).....	3
4.5 Functional status 4 (FS4).....	3
4.6 Functional status 5 (FS5).....	3
5 Supply voltage range	3
6 Functional categories	5
7 Operating modes	6
8 General tests conditions	6
8.1 Standard tolerances.....	6
8.2 General values.....	7
8.3 Sampling rate and value resolution.....	7
8.4 Description of interfaces.....	7
8.5 Restrictions on performing the tests.....	7
8.6 Number of tested samples.....	7
8.7 Test voltages.....	7
8.8 Test procedure.....	8
8.9 Parameter check.....	8
8.10 Continuous parameter monitoring with drift analysis.....	9
8.11 Physical analysis.....	9
9 General requirements	10
9.1 General.....	10
9.2 Prerequisites regarding the system in which the component is applied.....	10
9.3 Component requirements.....	10
10 Tests and requirements	11
10.1 Test-01: nominal voltage range.....	11
10.1.1 Purpose.....	11
10.1.2 Test.....	11
10.1.3 Procedure.....	11
10.1.4 Requirement.....	12
10.2 Test-02: lower and upper transitory voltage ranges.....	12
10.2.1 Purpose.....	12
10.2.2 Test.....	12
10.2.3 Procedure.....	13
10.2.4 Requirement.....	14
10.3 Test-03: short term overvoltage.....	14
10.3.1 Purpose.....	14
10.3.2 Test.....	14
10.3.3 Procedure.....	15
10.3.4 Requirement.....	15
10.4 Test-04: supply component load dump control test.....	15
10.4.1 Purpose.....	15
10.4.2 Test.....	15
10.4.3 Procedure.....	16
10.4.4 Requirement.....	16

This is a preview of "DS/ISO 21780:2020". [Click here to purchase the full version from the ANSI store.](#)

10.5	Test-05: starting profile.....	17
	10.5.1 Purpose.....	17
	10.5.2 Test.....	17
	10.5.3 Procedure.....	18
	10.5.4 Requirement.....	18
10.6	Test-06: long term overvoltage.....	18
	10.6.1 Purpose.....	18
	10.6.2 Test.....	18
	10.6.3 Requirement.....	19
10.7	Test-07: overvoltage with consumer components which may supply electrical energy.....	19
	10.7.1 Purpose.....	19
	10.7.2 Test.....	19
	10.7.3 Requirements for part 1 and part 2.....	22
10.8	Test-08: decrease and increase of supply voltage.....	23
	10.8.1 Purpose.....	23
	10.8.2 Test.....	23
	10.8.3 Requirement.....	24
10.9	Test-09: voltage ripples.....	24
	10.9.1 Purpose.....	24
	10.9.2 Test.....	24
	10.9.3 Requirement.....	26
10.10	Test-10: reinitialisation.....	26
	10.10.1 Purpose.....	26
	10.10.2 Test.....	26
	10.10.3 Requirement.....	27
10.11	Test-11: discontinuities in supply voltage.....	27
	10.11.1 Purpose.....	27
	10.11.2 Test.....	27
	10.11.3 Requirements.....	28
10.12	Test-12: ground loss.....	29
	10.12.1 Purpose.....	29
	10.12.2 Requirements.....	33
10.13	Test-13: fault current.....	34
	10.13.1 Purpose.....	34
	10.13.2 Test.....	34
	10.13.3 Requirement.....	35
10.14	Test-14: ground offset.....	36
	10.14.1 Purpose.....	36
	10.14.2 Test.....	36
	10.14.3 Requirement.....	37
10.15	Test-15: short circuit in signal line and load circuit.....	38
	10.15.1 Purpose.....	38
	10.15.2 Test.....	38
	10.15.3 Procedure.....	39
	10.15.4 Requirements.....	39
10.16	Test-16: quiescent current.....	39
	10.16.1 Purpose.....	39
	10.16.2 Test.....	40
	10.16.3 Requirements.....	41
Annex A (informative) Example of functional status and functional categories.....		42
Annex B (informative) Loss of <i>GND</i>₄₈ using the example CAN communication.....		44

This is a preview of "DS/ISO 21780:2020". [Click here to purchase the full version from the ANSI store.](#)

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 of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT) see www.iso.org/iso/foreword.html.

This document was prepared by Technical Committee ISO/TC 22, *Road vehicles*, Subcommittee SC 32, *Electrical and electronic equipment and general system aspects*.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

This is a preview of "DS/ISO 21780:2020". [Click here to purchase the full version from the ANSI store.](#)

This is a preview of "DS/ISO 21780:2020". [Click here to purchase the full version from the ANSI store.](#)

Road vehicles — Supply voltage of 48 V — Electrical requirements and tests

1 Scope

This document covers requirements and tests for the electric and electronic components in road vehicles equipped with an electrical system operating at a nominal voltage of 48 V DC.

This includes the following:

- general requirements on 48 V DC electrical systems;
- voltage ranges;
- slow voltage transients and fluctuations (not including EMC).

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.

[ISO 16750-1](#), *Road vehicles — Environmental conditions and testing for electrical and electronic equipment — Part 1: General*

[ISO 16750-2](#), *Road vehicles — Environmental conditions and testing for electrical and electronic equipment — Part 2: Electrical loads*

[ISO/IEC 17025](#), *General requirements for the competence of testing and calibration laboratories*

[EN 13018](#), *Non-destructive testing — Visual testing — General principles*