Technical Specification

ISO/TS 5474-5

First edition
2024-01

Electrically propelled road vehicles — Functional and safety requirements for power transfer between vehicle and external electric circuit —

Part 5: Automatic conductive power transfer

Véhicules routiers à propulsion électrique — Exigences fonctionnelles et de sécurité pour le transfert de puissance entre le véhicule et le circuit électrique externe —

Partie 5: Transfert de puissance automatique par conduction

Reference number
ISO/TS 5474-5:2024(en)

© ISO 2024

Documents
Document Sharing Hub

Full document details: ISO TS 05474-5-2024

COPYRIGHT PROTECTED DOCUMENT

© ISO 2024

All rights reserved. Unless otherwise specified, or required in the context of its implementation, 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
CP 401 • Ch. de Blandonnet 8
CH-1214 Vernier, Geneva
Phone: +41 22 749 01 11
Email: copyright@iso.org
Website: www.iso.org

Published in Switzerland

© ISO 2024 – All rights reserved

Documents
Document Sharing Hub

Full document details: ISO TS 05474-5-2024

Contents

Page

Foreword ... **iv**
Introduction ... **v**
1 Scope ... **1**
2 Normative references ... **2**
3 Terms and definitions ... **2**
4 System architecture ... **4**
4.1 General ... 4
5 Environmental and operational conditions ... **6**
6 General safety requirements ... **7**
6.1 General ... 7
6.2 Compatibility with interlock of the automatic EV supply equipment ... 7
6.3 Protection against mechanically caused injury ... 7
6.3.1 Limitation of force ... 7
6.3.2 Maximum velocity and energy ... 8
7 Functional requirements ... **8**
7.1 Vehicle position ... 8
7.2 Compatibility with vehicle inlet position detection by the automatic EV supply equipment ... 8
7.3 Manipulator requirements ... 8
7.3.1 General ... 8
7.3.2 Manipulator timing consideration ... 9
7.4 Mating space and package space ... 9
7.4.1 General ... 9
7.4.2 Package space dimensions ... 9
7.5 Manual undocking ... 9
7.6 ACD operation process and communication ... 9
7.7 Mechanical operational requirements ... 10
7.7.1 Mounting position of the vehicle inlet ... 10
7.7.2 Movement/displacement of immobilized vehicle ... 10
7.7.3 Forces during mating and unmating ... 11
8 Owner's manual and markings and instructions ... **11**
9 Test procedure ... **11**
Annex A (informative) **Heavy duty vehicles – movement/displacement of immobilized vehicle and inlet positions** ... **12**
Bibliography ... **14**

© ISO 2024 – All rights reserved

Documents
Document Sharing Hub
Full document details: ISO TS 05474-5-2024

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 document 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).

ISO draws attention to the possibility that the implementation of this document may involve the use of (a) patent(s). ISO 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, ISO 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 www.iso.org/patents. ISO shall not be held responsible for identifying any or all such patent rights.

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 37, *Electrically propelled vehicles*.

A list of all parts in the ISO 5474 series can be found on the ISO website.

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.

© ISO 2024 – All rights reserved

Documents
Document Sharing Hub
Full document details: ISO TS 05474-5-2024

Introduction

This document specifies requirements for the onboard side of an automatic connection system to charge electric vehicles. It gives guidance in terms of safety and compatibility with the offboard side of automatic connection systems.

Technological maturity:

It is pointed out, that this document has been established in parallel to the technological development of automatic connection systems. Due to the fact that the experience with the technology is very limited, the requirements given in this document do not comprehensively cover all aspects/requirements for an interoperable operation at this stage. Current and future product developments will continuously prove, disprove and refine the requirements of this document.

Furthermore, it is worthwhile to mention that at the date of publication of this document, no standard for a vehicle coupler of category 3 (at the underbody of the vehicle) is available.

Relation to other parts of the ISO 5474 series:

There is no direct relation of content or structure of this document to any other part of the ISO 5474 series (including ISO 5474-1). Wherever needed, other parts of the series are specifically referenced.

© ISO 2024 – All rights reserved

Documents
Document Sharing Hub

Full document details: ISO TS 05474-5-2024

Documents
Document Sharing Hub

Full document details: ISO TS 05474-5-2024

Electrically propelled road vehicles — Functional and safety requirements for power transfer between vehicle and external electric circuit —

Part 5:
Automatic conductive power transfer

1 Scope

This document defines requirements for the onboard system (vehicle side) related to the automatic connection for conductive alternating current (AC) and/or direct current (DC) power transfer between electrically propelled road vehicles (EVs) and external electric circuits. This document addresses the following aspects:

— electrical and mechanical safety requirements;

— compatibility requirements;

— environmental conditions;

— functionality requirements;

— test procedures.

This document applies to:

— EVs supporting automatic connection of a vehicle inlet according to IEC 62196-2, IEC 62196-3, IEC TS 62196-3-1 or IEC TS 63379[1)] (category 1) and

— EVs supporting automatic connection of a category 3 vehicle inlet or category 3 plug (typically at the underbody of the vehicle) according to IEC TS 61851-26.

NOTE 1 IEC TS 61851-26 does not include automatic connection of vehicle inlets or plugs of category 1 and category 2, that can also be mounted at the underbody of the vehicle.

Requirements for EVs equipped with an ACD or ACD counterpart of category 2 are specified in EN 50696 and IEC 63407[2)].

Requirements for simultaneous operation of multiple power transfer interfaces are under consideration and not covered in this document.

NOTE 2 Requirements for ACD infrastructure, communication sequence and communication interface are specified in IEC 61851-23-1, IEC TS 61851-26 and IEC TS 61851-27.

NOTE 3 EMC requirements for vehicles conductively connected to the supply network are defined in IEC 61851-21-1.

1) Under preparation. Stage at the time of publication: IEC TS/CDM 63379:2023.

2) Under preparation. Stage at the time of publication: IEC/CDM 63407:2023.

© ISO 2024 – All rights reserved

Documents
Document Sharing Hub

Full document details: ISO TS 05474-5-2024