



BSI Standards Publication

# Road vehicles — Electrical disturbances from conduction and coupling

Part 5: Enhanced definitions and verification methods for harmonization of pulse generators according to ISO 7637

**National foreword**

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**Road vehicles — Electrical  
disturbances from conduction and  
coupling —**

Part 5:  
**Enhanced definitions and verification  
methods for harmonization of pulse  
generators according to ISO 7637**

*Véhicules routiers — Perturbations électriques par conduction et par  
couplage —*

*Partie 5: Amélioration des définitions et des méthodes de vérification  
pour l'harmonisation des générateurs d'impulsions selon la norme  
ISO 7637*



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## 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](http://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](http://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 World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT) see the following URL: [www.iso.org/iso/foreword.html](http://www.iso.org/iso/foreword.html).

The committee responsible for this document is ISO/TC 22, *Road vehicles*, Subcommittee SC 32, *Electrical and electronic components and general system aspects*.

A list of all parts in the ISO/TR 7637 series can be found on the ISO website.

## Introduction

Pulses in vehicles are generated by different switching events of electrical loads connected to the supply system and coupled via the wiring harness to other components or wires. For test purpose, these pulse phenomena are simulated by pulse generators and coupled via coupling structures to the wiring of a device under test. The test pulses are not real pulses but representatives for the wide range of pulse shapes, amplitudes, source resistances and pulse energy observed in vehicles. The definition of the test pulses and the coupling structures are described in ISO 7637-1, ISO 7637-2 and ISO 7637-3. Based on the standard definition, test equipment has been developed and is commercially available.

The experience with existing test equipment shows some difficulties in terms of result reproducibility for the same DUT dependent on the used generator, which is caused by different realization of test generators coupling and decoupling networks. The intention of this document is to describe the background for these variances and to define methods for harmonization of different generator behaviour.

# Road vehicles — Electrical disturbances from conduction and coupling —

## Part 5:

# Enhanced definitions and verification methods for harmonization of pulse generators according to ISO 7637

## 1 Scope

This document proposes extended definitions for pulse generators and verification methods necessary for harmonization of different generators used for pulse testing in accordance to ISO 7637-2 to ensure the comparability and reproducibility of test results independent on generator types. It presents generator verification results based on current definitions of ISO 7637-2, which shows significant differences depending on the used generator type and explains the technical background of the variances.

This document is based on ISO 7637-1, ISO 7637-2 and ISO 7637-3.

## 2 Normative references

There are no normative references in this document.

## 3 Terms and definitions

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

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- IEC Electropedia: available at <http://www.electropedia.org/>
- ISO Online browsing platform: available at <http://www.iso.org/obp>

### 3.1

#### device under test

##### DUT

one single component or a combination of components as defined to be tested

### 3.2

#### ground plane

##### GP

flat conductive surface whose potential is used as a common reference

Note 1 to entry: Where applicable, the test voltage should also be referenced to the ground plane.

## 4 Test pulse generator description

### 4.1 Existing generator description

The main parts of pulse generators are the pulse shaping and coupling networks, (important for generating and applying the test pulses to the DUT) and the decoupling network (important for protecting the connected power supply and effecting the pulse coupling to DUT). A block diagram is shown in [Figure 1](#).