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Road vehicles — Electrical disturbance by conduction and coupling —

Part 0: Definitions and general

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

Partie 0: Définitions et généralités



Reference number
ISO 7637-0:1990(E)

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.

Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

International Standard ISO 7637-0 was prepared by Technical Committee ISO/TC 22, *Road vehicles*.

This first edition cancels and replaces the first edition of the Technical Report, ISO/TR 7637-0:1984, of which it constitutes a technical revision.

ISO 7637 consists of the following parts, under the general title *Road vehicles — Electrical disturbance by conduction and coupling*:

- *Part 0: Definitions and general*
- *Part 1: Passenger cars and light commercial vehicles with nominal 12 V supply voltage — Electrical transient conduction along supply lines only*
- *Part 2: Commercial vehicles with nominal 24 V supply voltage — Electrical transient conduction along supply lines only*

NOTES

1 Future parts of this International Standard will cover *Vehicles with nominal 12 V supply voltage — Electrical transient transmission by capacitive and inductive coupling via lines other than supply lines; Vehicles with nominal 24 V supply voltage — Electrical transient transmission by capacitive and inductive coupling via lines other than supply lines; On-board vehicle test procedures*.

2 The second element of the general title of ISO 7637 is now given as "*Electrical disturbance...*" instead of the "*Electrical interference...*" used previously.

3 A future International Standard is also being prepared to cover radiated electromagnetic interference and electrostatic discharge.

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Introduction

Electrical and radio frequency disturbances occur during the normal operation of many items of motor vehicle equipment, and is generated over a wide frequency range. It may be distributed to on-board electronic devices and systems by conduction or radiation.

During recent years, an increasing number of electronic devices have been introduced into vehicle designs in order to perform, for example, control, monitoring and display functions. It has been necessary therefore to consider the electrical and electromagnetic environment in which these devices are required to operate, and, in particular, disturbance generated in the vehicle electrical system itself. This disturbance can cause a temporary malfunction or even permanent damage to the electronic equipment. "Worst case" situations usually result from disturbances generated on the vehicle itself, for example ignition systems, power generating systems, electric motors and controls.

While narrow-band signals generated on or outside the vehicle may also affect the performance of electronic devices (broadcasting and radio communications transmitters), protection from this potential disturbance has to be considered as part of total system certification; it is outside the scope of this document and is therefore not covered.

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Road vehicles — Electrical disturbance by conduction and coupling —

Part 0: Definitions and general

1 Scope

This part of ISO 7637 defines basic terms used in the various parts for electrical disturbance by conduction and coupling. It also gives general information relating to the whole International Standard and common to all parts (which are indicated in the Foreword).

Parts 1 and 2 consist of test procedures, techniques to improve the electromagnetic compatibility of devices, evaluation of transient emissions from disturbance sources, and failure mode severity classification for, respectively, 12 V and 24 V vehicles.

2 Normative reference

The following standard contains provisions which, through reference in this text, constitute provisions of this part of ISO 7637. At the time of publication, the edition indicated was valid. All standards are subject to revision, and parties to agreements based on this part of ISO 7637 are encouraged to investigate the possibility of applying the most recent edition of the standard indicated below. Members of IEC and ISO maintain registers of currently valid International Standards.

IEC 50(151):1978, *International Electrotechnical Vocabulary — Electrical and magnetic devices*.

3 Definitions

Definitions of basic terms concerning electromagnetic compatibility are given in IEC 50(151).

In addition, for the purposes of this International Standard, the following definitions apply.

3.1 transient: Pertaining to or designating a phenomenon or a quantity which varies between two consecutive steady-states during a time interval short compared to the time-scale of interest.

3.1.1 transient duration, t_d : Time from the instant when a value rises to 10 % of the maximum amplitude to the instant when it falls below that value.

3.1.2 rise time, t_r : Time taken for the value of the amplitude to increase from 10 % to 90 % of the amplitude.

3.1.3 fall time, t_f : Time taken for the value of the amplitude to decrease from 90 % to 10 % of the amplitude.

3.1.4 pulse cycle time, t_1 : Time between the start of two transients or between the start of two transient bursts.

3.2 failure mode severity classification: System of classification as in 3.2.1 to 3.2.3.

3.2.1 functional status classification: Operational status of a device during and after exposure to an electromagnetic environment.

3.2.2 test pulse and method: Representative test pulse applied to the device under test and test method. This information is contained in each applicable part of ISO 7637.

3.2.3 test pulse severity: Specification of severity level of essential pulse parameters.

3.3 coupling¹⁾: Interaction between circuits, transferring energy from one circuit to another.

3.3.1 coupling network: Electrical circuit for the purpose of transferring energy from one circuit to another.

3.3.2 decoupling network: Electrical circuit for the purpose of eliminating disturbances from one circuit to another.

3.3.3 coupling clamp: Device of defined dimensions and electromagnetic characteristics for common mode coupling of the disturbance transient to the circuit under test without any galvanic connection to it.

4 General aim and practical use

ISO 7637 is concerned with the problem of electrical transient disturbances in road vehicles with internal combustion engines, and trailers. It deals with emission of transients, transient transmission via

the electrical wiring and potential susceptibility of electronic components to electrical transients.

The recommended test methods, procedures, test instrumentation and limits presented in the various parts are intended to facilitate component specification for electrical disturbance by conduction and coupling. A basis is provided for mutual agreement between vehicle manufacturers and component suppliers, intended to assist rather than restrict them.

Certain devices are particularly susceptible to some characteristics of electrical disturbances, such as pulse repetition rate, pulse width, time relation to other signals, etc. A standard test, therefore, cannot apply to all cases and it is necessary for the designer of potentially susceptible equipment to anticipate the appropriate test conditions through an in-depth knowledge of the design and function of the particular equipment.

A device shall be subjected only to those tests in the relevant part of ISO 7637 which apply to that device.

1) Definition in IEC 50 (726-14-01): 1982 is given as "A means or a device for transferring power between systems".