



Road vehicles — LED lamp characteristics for bulb compatible failure detection —

Part 1: LED lamps used for direction indicator and stop lamps

*Véhicules routiers — Caractéristiques des lampes LED pour détection de défaut compatible avec l'ampoule —
Partie 1: Lampes LED pour feux indicateurs de direction et feux de stop*

ICS 43.040.20; 43.040.30

In accordance with the provisions of Council Resolution 15/1993 this document is circulated in the English language only.

Conformément aux dispositions de la Résolution du Conseil 15/1993, ce document est distribué en version anglaise seulement.

To expedite distribution, this document is circulated as received from the committee secretariat. ISO Central Secretariat work of editing and text composition will be undertaken at publication stage.

Pour accélérer la distribution, le présent document est distribué tel qu'il est parvenu du secrétariat du comité. Le travail de rédaction et de composition de texte sera effectué au Secrétariat central de l'ISO au stade de publication.

THIS DOCUMENT IS A DRAFT CIRCULATED FOR COMMENT AND APPROVAL. IT IS THEREFORE SUBJECT TO CHANGE AND MAY NOT BE REFERRED TO AS AN INTERNATIONAL STANDARD UNTIL PUBLISHED AS SUCH.

IN ADDITION TO THEIR EVALUATION AS BEING ACCEPTABLE FOR INDUSTRIAL, TECHNOLOGICAL, COMMERCIAL AND USER PURPOSES, DRAFT INTERNATIONAL STANDARDS MAY ON OCCASION HAVE TO BE CONSIDERED IN THE LIGHT OF THEIR POTENTIAL TO BECOME STANDARDS TO WHICH REFERENCE MAY BE MADE IN NATIONAL REGULATIONS.

RECIPIENTS OF THIS DRAFT ARE INVITED TO SUBMIT, WITH THEIR COMMENTS, NOTIFICATION OF ANY RELEVANT PATENT RIGHTS OF WHICH THEY ARE AWARE AND TO PROVIDE SUPPORTING DOCUMENTATION.

PDF disclaimer

This PDF file may contain embedded typefaces. In accordance with Adobe's licensing policy, this file may be printed or viewed but shall not be edited unless the typefaces which are embedded are licensed to and installed on the computer performing the editing. In downloading this file, parties accept therein the responsibility of not infringing Adobe's licensing policy. The ISO Central Secretariat accepts no liability in this area.

Adobe is a trademark of Adobe Systems Incorporated.

Details of the software products used to create this PDF file can be found in the General info relative to the file; the PDF-creation parameters were optimized for printing. Every care has been taken to ensure that the file is suitable for use by ISO member bodies. In the unlikely event that a problem relating to it is found, please inform the Central Secretariat at the address given below.

Copyright notice

This ISO document is a Draft International Standard and is copyright-protected by ISO. Except as permitted under the applicable laws of the user's country, neither this ISO draft nor any extract from it may be reproduced, stored in a retrieval system or transmitted in any form or by any means, electronic, photocopying, recording or otherwise, without prior written permission being secured.

Requests for permission to reproduce should be addressed to either ISO at the address below or ISO's member body in the country of the requester.

ISO copyright office
Case postale 56 • CH-1211 Geneva 20
Tel. + 41 22 749 01 11
Fax + 41 22 749 09 47
E-mail copyright@iso.org
Web www.iso.org

Reproduction may be subject to royalty payments or a licensing agreement.

Violators may be prosecuted.

Contents

Page

Foreword	iv
1 Scope	1
2 Normative references	1
3 Terminals	1
4 Functional description	1
4.1 Principle	1
4.2 Parallel operation of LED and bulb lamps	2
5 Dimensions	3
5.1 Pulse current	3
5.2 Pulse Timing	4
6 Other dimensions	4
7 Further details	5
8 Trailer Detection	5
8.1 General	5
8.2 Method for powerless trailer detection	5

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.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. 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.

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.

ISO 13207-1 was prepared by Technical Committee ISO/TC 22, *Road vehicles*, Subcommittee SC 3, *Electric and electronic equipment*.

ISO 13207 consists of the following parts, under the general title *Road vehicles — LED lamp characteristics for bulb compatible failure detection*:

- *Part 1: LED lamps used for direction indicator*
- *Part 2: LED lamps used for other lamp functions*

Road vehicles — LED lamp characteristics for bulb compatible failure detection —

Part 1: LED lamps used for direction indicator and stop lamps

1 Scope

This International Standard specifies characteristics of LED lamps used as direction indicator and stop, when optionally monitored, within the installation requirements of ECE Reg. 48. Primarily to be installed on 24V truck/trailer combinations, it will enable lamp failure detection on the drawn vehicle to be compatible to bulbs when analysed by the towing unit.

2 Normative references

The following referenced documents are indispensable for the application 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 4082: *Road vehicles – Motor vehicles – Flasher units*

ISO 1185: *Road vehicles -- Connectors for the electrical connection of towing and towed vehicles -- 7-pole connector type 24 N (normal) for vehicles with 24 V nominal supply voltage*

ISO 3731: *Road vehicles – Connectors for the electrical connection of towing and towed vehicles – 7-pole connector type 24 S (supplementary) for vehicles with 24 V nominal supply voltage*

ISO 12098: *Road vehicles – Connectors for the electrical connection of towing and towed vehicles -- 15-pole connector for vehicles with 24 V nominal supply voltage*

DIN 72601: *Lamps for road vehicles*

3 Terminals

The connection between the towing vehicle and the towed vehicle should be either as described in ISO 1185 and ISO 3731 or as described in ISO 12098. Towing vehicles should be equipped with electronic control units, which drive the trailer direction indicator lamps as described in ISO 4082.

4 Functional description

4.1 Principle

Lamp failure monitoring electronics are required for mandatory mounted direction indicator functions. For this purpose, the LED direction indicator function generates a current impulse at a certain time which corresponds in terms of amount with the current of a conventional bulb lamp. If the LED direction indicator fails (related to the legal requirement of the photometric output), this pulse is not generated. An electronic control unit or intelligent flasher interprets whether the LED direction indicator fails on the basis of this pulse. The result should be used to inform the driver accordingly.

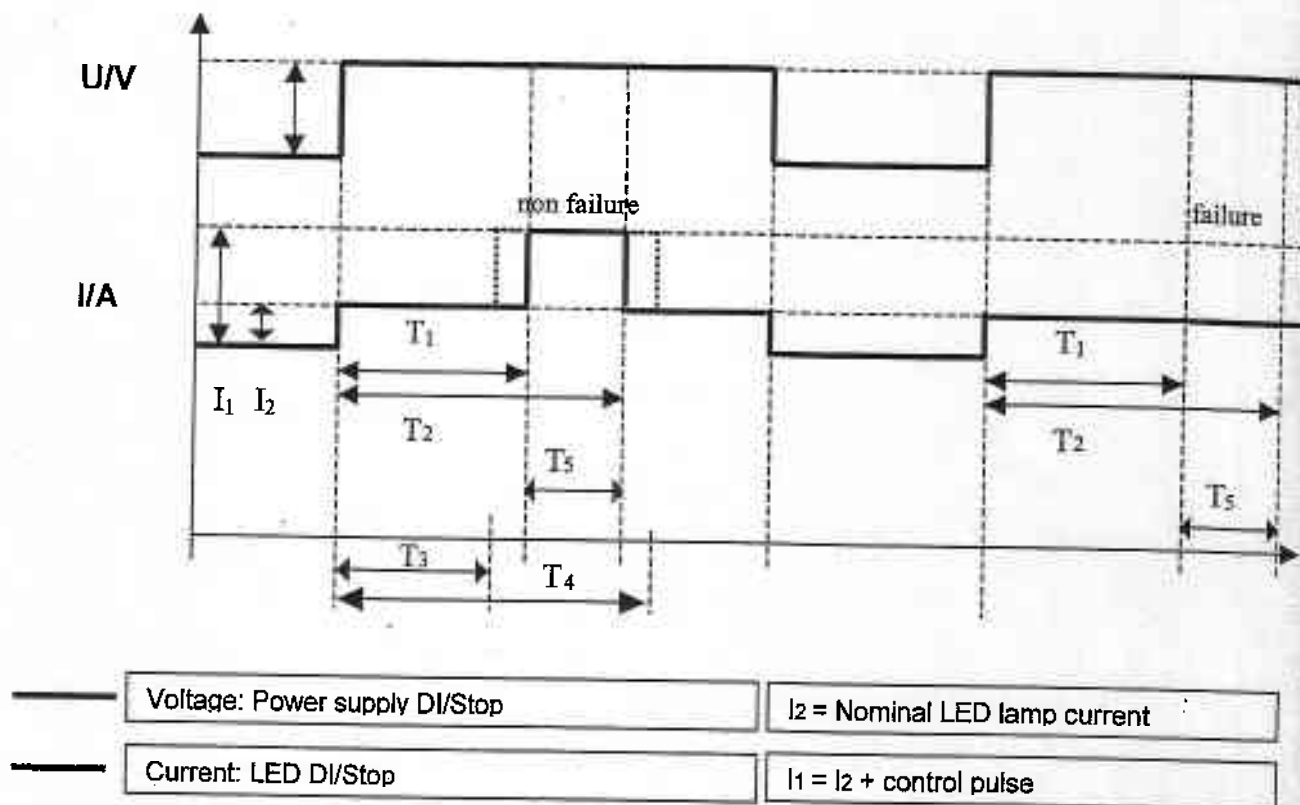


Figure 1 — Profile diagram 1

The functional description of the profiles is shown in Figure 1. The top profile describes the path of the voltage of two flashing processes. The central profile describes the path of the current with (first process), and without the current pulse (second process) generated by the LED direction indicator. T_5 describes the time frame, where the designated pulse should be detected by the monitoring circuit of the control unit. If a current as described in Figure 3 is recognised in this time frame, the lamp is recognised as "non failure". T_1 indicates the starting point of the designated pulse time frame, T_2 the end of the designated pulse time frame. T_3 specifies the earliest start point for the control pulse, T_4 the latest end point. Function is only guaranteed for a full cycle.

4.2 Parallel operation of LED and bulb lamps

By switching several direction indicators in parallel, the number of functioning direction indicators shall be determined on the basis of the amplitude of the pulse. Also in the case of a lamp with mixed LED/21W bulb light sources, the amplitude of the pulse provides information about the number of functioning direction indicators connected.

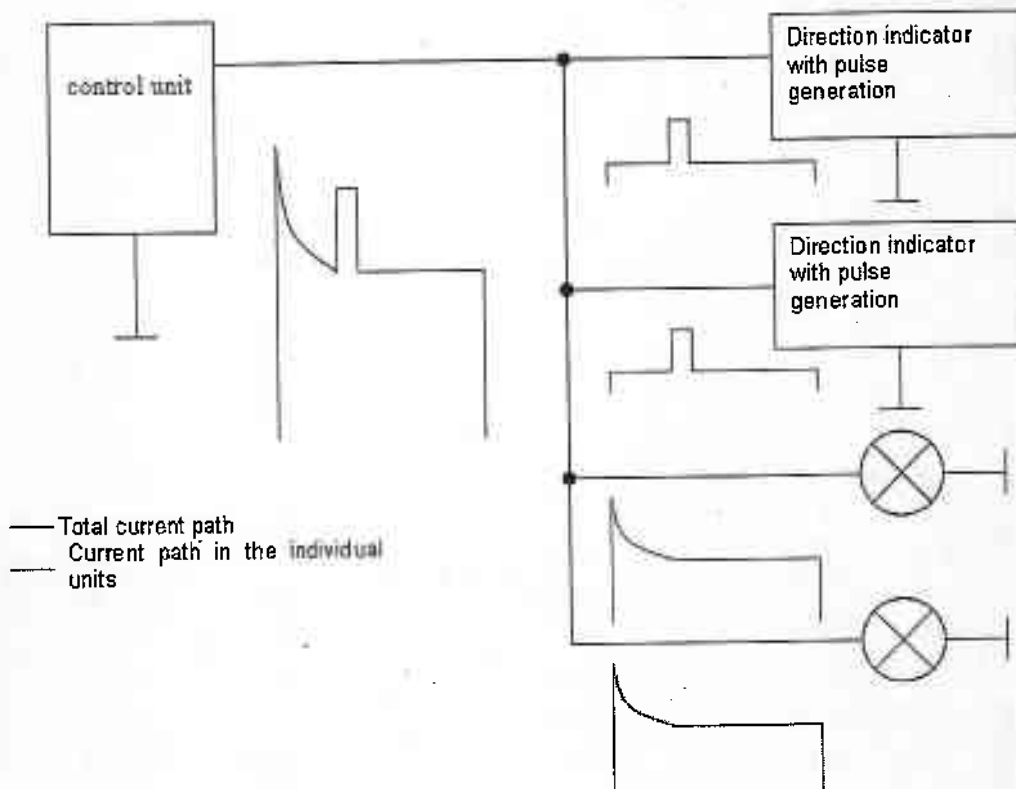


Figure 2 — Bulb lamps

Figure 2 shows 2x 21W bulbs lamps and 2x LEDs in a direction indicator, all other combinations are possible. For reasons of clarity, only one side of the vehicle direction indicators is illustrated.

5 Dimensions

5.1 Pulse current

The pulse current is directly related to the voltage supply as shown in Figure 3, here for the 24V/21W system.

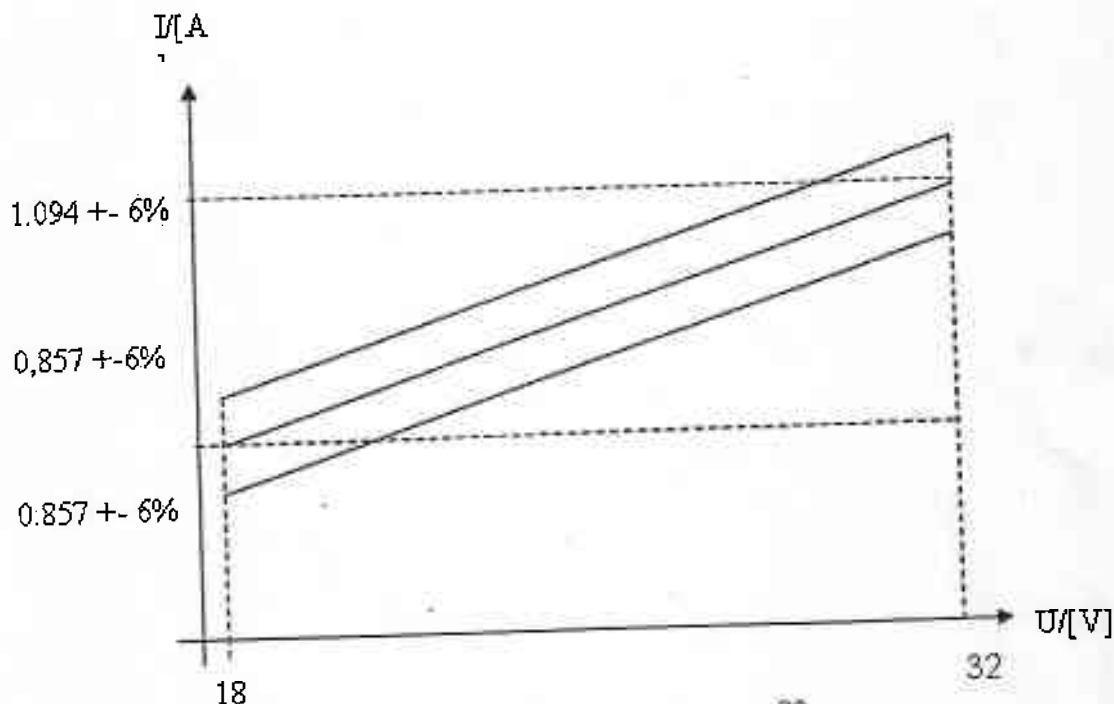


Figure 3 — Relation between pulse current and voltage supply

The circuit load characteristic of the pulse shall be equivalent to that of a 21W filament lamp, including tolerances (DIN 72601 and ECE-R37).

5.2 Pulse Timing

The pulse timing dimensions are given in Table 1.

Table 1 — Pulse timing

Description	Condition	value	Unit
$T_5 = T_2 - T_1$	Designated time frame for the pulse for non failure condition	20	ms
T_1	Designated switch-on point for the non failure pulse through the lamp	100	ms
T_2	Designated switch-off point for the non failure pulse through the lamp	120	ms
T_3	Earliest switch-on point for the non failure pulse through the lamp	95	ms
T_4	Latest switch-off point for the non failure pulse through the lamp	125	ms

6 Other dimensions

Lamp current I_2 for failure condition should be below 30 mA and above 60 mA (at 24V) for non failure condition to enable usage of plain constant measurement circuits with two levels (below 30 mA means non-functional LED-lamp): Other details not specified are left to the manufacturer's choice.

7 Further details

It is not possible to check whether the system is functioning before the first flashing process. The system should function under the environmental and test conditions specified in ISO 16750. The total number of LED direction indicators and conventional lamps in one measuring circuit is limited to 4.

The operating voltage range for the pulse control shall be between 18 V up to 32 Volt.

8 Trailer Detection

8.1 General

To facilitate uniform trailer detection by the towing unit a resistance load of 820 Ω for standardisation of the detection function for direction indicators is specified.

8.2 Method for powerless trailer detection

In the input circuit of a LED lamp a resistor $R = 820$ ohm is connected to ground via an electronic power switch S1. The power switch is closed in case of input voltage 0 ... 10V. When the voltage increases to values $> 10V$, the power switch is turned to open and disconnects the resistor from the input circuit.

Advantage:

The power consumption of the resistor should be determined at 250 mW.

To attain a powerless trailer detection, an ECU connects a voltage U_1 e.g. over a pull up resistor to the LED lamp. In case of a present trailer, the voltage is on a low level, in case of a non present trailer, the voltage is on a high level.

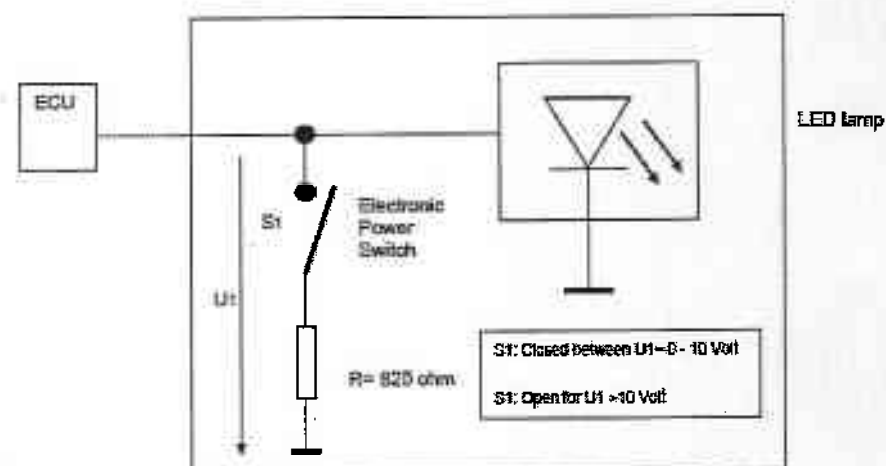


Figure 4 — Connection scheme