
**Road vehicles — Child seat presence
and orientation detection system
(CPOD) —**

**Part 2:
Resonator specification**

*Véhicules routiers — Système de détection de la présence d'un siège
enfant et de son orientation (CPOD) —*

Partie 2: Spécifications relatives aux résonateurs



This document is a preview generated by ERS



COPYRIGHT PROTECTED DOCUMENT

© ISO 2018

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
Fax: +41 22 749 09 47
Email: copyright@iso.org
Website: www.iso.org

Published in Switzerland

Contents

Page

Foreword	v
1 Scope	1
2 Normative references	1
3 Terms and definitions	1
4 CPOD resonator components	2
5 Coil requirements	2
6 Electrical properties	3
6.1 Digital resonator protocol	3
6.2 Subcarrier bitstream	5
6.3 Modulation	7
6.3.1 General	7
6.3.2 Useful resonator signal, $\Phi_{\text{RESO,NORM}}(t)$	8
6.3.3 Lowpass filtering	11
6.3.4 Spectral contents of $\Phi_{\text{RESO,NORM}}(t)$	11
6.3.5 The useful signal, $\theta(f_{\text{TX}}, H_{\text{TX}})$	13
6.3.6 The useful signal power, $P_{\theta}(f_{\text{TX}}, H_{\text{TX}})$	13
6.3.7 Noise power, $P_{\text{NOISE}}(f_{\text{TX}}, H_{\text{TX}})$	13
6.3.8 The signal-to-noise ratio (SNR)	15
6.3.9 Definition of $W(H_{\text{TX}})$	15
6.3.10 Definition of $N(H_{\text{TX}})$	16
6.4 Modulation parameters	17
7 Resonator timing	19
7.1 General	19
7.2 Power-up	20
7.3 Reset	20
7.4 Relevant timing and reset parameters	21
8 Electrical and environmental parameters	22
8.1 Absolute maximum ratings	22
8.2 Operating ranges	23
8.3 Storage conditions	23
9 CPOD resonator compatibility test	23
10 Resonator environmental qualification	23
10.1 Application profile	23
10.2 Common test parameters	25
10.3 Operating states	25
10.3.1 General	25
10.3.2 Operating state A (transport and storage)	25
10.3.3 Operating state B (non-functional state)	25
10.3.4 Operating state C (functional state)	25
10.3.5 Operating state D (intermitting functional state)	26
10.4 Parametrical test and parameter checking	26
10.4.1 Parametrical test before/after every single test	26
10.4.2 Continuous parameter check	26
10.5 Qualification tests	26
10.5.1 General	26
10.5.2 Acceptance criteria	26
10.5.3 Temperature storage (transport and storage)	26
10.5.4 Low temperature durability test	27
10.5.5 High temperature operating endurance test	27
10.5.6 Power thermal cycle endurance (PTCE)	28
10.5.7 Thermal shock test	29

10.5.8	Temperature cycling test, constant humidity	30
10.5.9	High temperature and humidity endurance (HTHE)	31
10.5.10	Vibration test	31
10.5.11	Mechanical shock test	33
10.5.12	Fall test, not packed	34
10.5.13	Protection against intrusion of hard bodies	34
10.5.14	Protection against intrusion of fluids	35
10.5.15	Corrosion test with gutting corrosion gas	35
10.5.16	Salt spray test	36
10.5.17	Resistance to chemical substances	36
10.6	Electromagnetic compatibility (EMC) test	38
10.6.1	General	38
10.6.2	Functional status qualification	38
10.6.3	Acceptance criteria	39
10.6.4	Community	39
10.7	Electrostatic discharge (ESD) test	47
10.7.1	Test parameters	47
10.7.2	Discharge locations	47
10.7.3	Powered-up test	48
10.7.4	Packaging and handling test (unpowered test)	49
10.8	Magnetic field stress test	49
10.8.1	Test parameters	49
10.8.2	Test procedure	49
10.8.3	Acceptance criteria	49
10.9	Qualification flow chart	50
Annex A	(normative) CPOD resonator compatibility test set-up	51
Annex B	(normative) CPOD resonator compatibility test parameters	56
Annex C	(normative) Continuous parameter check	59
Annex D	(normative) CPOD reference resonator	62

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 on 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 the following URL: www.iso.org/iso/foreword.html.

This document was prepared by Technical Committee ISO/TC 22, *Road vehicles*, Subcommittee SC 36, *Safety and impact testing*.

This second edition cancels and replaces the first edition (ISO 22239-2:2009), which has been technically revised to take account of the development in technology since the first edition was published. The main changes compared to the previous edition are as follows:

- coil geometry parameters have changed;
- CPOD resonator protocol has changed;
- modulation parameters have been updated;
- the temperature storage test has been redefined;
- the CPOD resonator test parameters have been updated; and
- the ESD test has been updated.

A list of all parts in the ISO/TS 22239 series can be found on the ISO website.

Road vehicles — Child seat presence and orientation detection system (CPOD) —

Part 2: Resonator specification

1 Scope

This document specifies the child seat presence and orientation detection (CPOD) resonator as part of the CPOD system. It defines the electrical and environmental requirements to be met by the resonators as a condition for CPOD compatibility.

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 10605:2008, *Road vehicles — Test methods for electrical disturbances from electrostatic discharge*

ISO 11452-1, *Road vehicles — Component test methods for electrical disturbances from narrowband radiated electromagnetic energy — Part 1: General principles and terminology*

ISO 11452-2, *Road vehicles — Component test methods for electrical disturbances from narrowband radiated electromagnetic energy — Part 2: Absorber-lined shielded enclosure*

ISO 11452-3, *Road vehicles — Component test methods for electrical disturbances from narrowband radiated electromagnetic energy — Part 3: Transverse electromagnetic (TEM) cell*

ISO 20653, *Road vehicles — Degrees of protection (IP code) — Protection of electrical equipment against foreign objects, water and access*

ISO/TS 22239-1:2018, *Road vehicles — Child seat presence and orientation detection system (CPOD) — Part 1: Specifications and test methods*

ISO 22241-1, *Diesel engines — NOx reduction agent AUS 32 — Part 1: Quality requirements*

IEC 60068-2-11, *Environmental testing — Part 2: Tests. Test Ka: Salt mist*

IEC 60068-2-38, *Environmental testing — Part 2: Tests. Test Z/AD: Composite temperature/humidity cyclic test*

IEC 60068-2-60, *Environmental testing — Part 2: Tests — Test Ke: Flowing mixed gas corrosion test*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO/TS 22239-1 apply.

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

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