INTERNATIONAL STANDARD

ISO 26021-2

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Road vehicles — End-of-life activation of on-board pyrotechnic devices —

Part 2: Communication requirements

Véhicules routiers — Activation de fin de vie des dispositifs pyrotechniques embarqués —

Partie 2: Exigences de communication

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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.

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 26021-2 was prepared by Technical Committee ISO/TC 22, *Road vehicles*, Subcommittee SC 3, *Electrical and electronic equipment*.

ISO 26021 consists of the following parts, under the general title *Road vehicles — End-of-life activation of on-board pyrotechnic devices*:

— *Part 1: General information and use case definitions*

— *Part 2: Communication requirements*

— *Part 3: Tool requirements*

— *Part 4: Additional communication line with bidirectional communication*

— *Part 5: Additional communication line with pulse width modulated signal*

NOTE Additional parts will be introduced as necessary to take into account requirements not yet covered by the standard.

Introduction

ISO 26021 describes a method for the in-vehicle deployment of pyrotechnically activated components (also referred to as pyrotechnic components or pyrotechnic devices) in cars.

Worldwide, nearly all new vehicles are equipped with one or more safety systems. Advanced protection systems using pyrotechnic actuators are becoming more common. All components which contain pyrotechnic substances should be handled in the same way.

Recycling of these vehicles requires a new process which ensures that the deactivation of airbags will be safe and cost-efficient. Based on the harmonization of the on-board diagnostics (OBD) interface, there is an opportunity to use this interface for on-board deployment, utilizing the same tools and processes.

The representatives of the global automobile industry have decided the following:

— automobile manufacturers do not support reuse as an appropriate treatment method for pyrotechnic devices;

— automobile manufacturers believe treatment of pyrotechnic devices is required before shredding;

— automobile manufacturers support in-vehicle deployment as the preferred method.

Based on this decision, the four major automobile manufacturer associations (ACEA, Alliance, JAMA and KAMA) started to develop a method for the in-vehicle deployment of pyrotechnic components in cars with the pyrotechnic device deployment tool (PDT). The vision is that, one day, a dismantler will need only one tool without any accessories in order to deploy all the pyrotechnic devices inside an end-of-life vehicle (ELV). The target is to use an existing interface to the car.

This part of ISO 26021 is applicable to the in-vehicle deployment of pyrotechnic devices in vehicles. It defines communication methods to be implemented by a pyrotechnic control unit (PCU) to allow the PDT to successfully establish and maintain communication with the PCUs in the vehicle to deploy all of the pyrotechnic devices sequentially.

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Part 2: Communication requirements

1 Scope

This part of ISO 26021 defines the deployment process, the system architecture, CAN-based communication methods and system preconditions which have to be implemented to fulfil the use cases defined in ISO 26021-1. Additionally, the relationship to and use with other existing standards are defined.

This part of ISO 26021 also describes the technical details of the on-board deployment method. The way in which the pyrotechnic devices contained in the vehicle function in conjunction with the PDT is the primary focus of this document. Under the provisions of this document, the design of the PDT or PCU can be implemented in accordance with specific functionality and hardware requirements.

This part of ISO 26021 specifies the access to the PCU. This includes communication as well as the logic sequences which are involved during the activation process.

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/IEC 10731, *Information technology — Open Systems Interconnection — Basic Reference Model — Conventions for the definition of OSI services*

ISO 11898-1, *Road vehicles — Controller area network (CAN) — Part 1: Data link layer and physical signalling*

ISO 14229-1, *Road vehicles — Unified diagnostic services (UDS) — Part 1: Specification and requirements*

ISO 15031-3, *Road vehicles — Communication between vehicle and external equipment for emissions-related diagnostics — Part 3: Diagnostic connector and related electrical circuits, specification and use*

ISO 15765-2:2004, *Road vehicles — Diagnostics on Controller Area Networks (CAN) — Part 2: Network layer services*

ISO 15765-3:2004, *Road vehicles — Diagnostics on Controller Area Networks (CAN) — Part 3: Implementation of unified diagnostic services (UDS on CAN)*

ISO 15765-4, *Road vehicles — Diagnostics on Controller Area Networks (CAN) — Part 4: Requirements for emissions-related systems*

ISO 26021-1, *Road vehicles — End-of-life activation of on-board pyrotechnic devices — Part 1: General information and use case definitions*

ISO 26021-4, *Road vehicles — End-of-life activation of on-board pyrotechnic devices — Part 4: Additional communication line with bidirectional communication*

ISO 26021-5, *Road vehicles — End-of-life activation of on-board pyrotechnic devices — Part 5: Additional communication line with pulse width modulated signal*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 14229-1 and the following apply.

3.1
key
data value sent from the external test equipment to the on-board controller in response to the seed in order to gain access to the locked services

3.2
pyrotechnic device deployment tool
tool designed to be plugged into the OBD interface in order to communicate via the internal computer network in an end-of-life vehicle with all control units which are able to activate pyrotechnic devices

NOTE This tool will comprise e.g. a computer, a connection between the computer and the diagnostic connector, and some software.

3.3
pyrotechnic control unit
PCU
electronic control unit in the vehicle network which controls the activation of pyrotechnic devices

3.4
safing
mechanism whose primary purpose is to prevent an unintended functioning of the PCU processor prior to detection of a crash situation

3.5
safing unit
part of the PCU (e.g. an electromechanically operated switch or a separate processor) that allows the pyrotechnic component deployment microprocessor (µP) to deploy the pyrotechnic devices via the driver stage

3.6
scrapping program module
module responsible for firing the selected pyrotechnic device loops one by one

3.7
scrapping program module loader
module responsible for converting the scrapping program module to an executable format

3.8
seed
pseudo-random data value sent from the on-board controller to the external test equipment, which is processed by the security algorithm to produce the key

4 Symbols and abbreviated terms

ACL additional communication line

CAN controller area network

ELV end-of-life vehicle

OBD on-board diagnostics

