INTERNATIONAL STANDARD

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

Part 1:
General information and use case definitions

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

Partie 1: Informations générales et définitions de cas d'usage

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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.

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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.

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ISO 26021-1 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 deployment of all the pyrotechnic components 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 International Standard has been developed in order to define common requirements for communication between the tool and the pyrotechnic control unit (PCU) when deploying pyrotechnic devices. This communication should use earlier standardized hardware and software. Based on emissions-related diagnostics (see ISO 15031-3), the physical layer specified for legislated OBD and the diagnostic connector was defined. The software used is an implementation of diagnostic services and transaction protocols on CAN.

Because of the automobile manufacturers' specific requirements and safety concepts, an additional communication line (ACL) may be used beside the basic CAN communication method. This line is usable in two different ways:

— as an additional communication line with bidirectional communication for additional communication functions;

— as an additional communication line with a pulse width modulated signal for hardware safing.

Although primarily intended for airbag deployment systems, ISO 26021 has also been developed to meet requirements for other pyrotechnically activated systems.

To achieve this, this International Standard makes use of on-board diagnostics and is based on the open systems interconnection (OSI) basic reference model in accordance with ISO/IEC 7498-1 and ISO/IEC 10731 which structures communication systems into seven layers. When mapped on this model, the services used by a diagnostic tester (client) and an electronic control unit (ECU) (server) are broken down in accordance with Table 1, as follows:

— a pyrotechnic devices deployment application using application services, specified in this International Standard;

— application services (layer 7), specified in ISO 14229-1;

— communication services (layers 1 to 6).

Table 1 — Deployment of pyrotechnic devices — Specifications applicable to the OSI layers

Applicability	OSI layer	Airbag deployment application
Seven layers in accordance with ISO/IEC 10731	User application	ISO 26021-1
	Application (layer 7)	ISO 14229-1/ISO 15765-3
	Presentation (layer 6)	—
	Session (layer 5)	ISO 14229-1
	Transport (layer 4)	ISO 15765-2
	Network (layer 3)	ISO 15765-2
	Data link (layer 2)	ISO 11898/ISO 26021-4 and ISO 26021-5
	Physical (layer 1)	ISO 11898/ISO 26021-4 and ISO 26021-5

For the deployment of pyrotechnic devices via on-board diagnostics by a dismantler, it is required that future modifications to this International Standard provide long-term backwards compatibility.

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

Part 1:
General information and use case definitions

1 Scope

This part of ISO 26021 gives an overview of the structure of ISO 26021 and the way it has been divided into parts, as well as showing the relationship between the parts. In addition, it outlines the use case scenarios in which the ISO 26021 document set will be used. It also defines terminology that is used throughout the ISO 26021 document set.

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 7498-1, *Information technology — Open Systems Interconnection — Basic Reference Model: The Basic Model*

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

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

ISO 15765-3, *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 26021-2, *Road vehicles — End-of-life activation of on-board pyrotechnic devices — Part 2: Communication requirements*

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*