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**Road vehicles — 24 V fully automatic  
coupling systems (FACS) for heavy  
commercial vehicle combinations —**

**Part 1:  
General requirements and definitions**

*Véhicules routiers — Dispositifs d'attelage entièrement automatiques  
(FACS) à 24 V pour ensembles routiers lourds —*

*Partie 1: Exigences générales et définitions*



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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 13044-1 was prepared by Technical Committee ISO/TC 22, *Road vehicles*, Subcommittee SC 15, *Interchangeability of components of commercial vehicles and buses*.

ISO 13044 consists of the following parts, under the general title *Road vehicles — 24 V fully automatic coupling systems (FACS) for heavy commercial vehicle combinations*:

- *Part 1: General requirements and definitions*
- *Part 2: Electrical and pneumatic interface for 50 mm fifth wheel couplings*

## Introduction

This part of ISO 13044 specifies general requirements and definitions to ensure the safe operation of fully automated coupling systems (FACS).

The introduction of FACS has brought new perspectives and needs into the area of trailer couplings. This has made evident the need for a resilient structure among trailer coupling classes. The ISO 13044 series is intended to facilitate interaction between International Standards and relevant regulations.

The drivers for the introduction of FACS are the following:

- personnel injury hazards associated with coupling and uncoupling operations;
- system availability and operating cost;
- convenience.

It is foreseen that interfaces for media other than those included in this part of ISO 13044 will be entering the area of trailer coupling in the future. Examples of those other media are hydraulic and radio frequency transmissions. Definitions and general requirements for those interfaces will be included in later editions of this part of ISO 13044.

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# Road vehicles — 24 V fully automatic coupling systems (FACS) for heavy commercial vehicle combinations —

## Part 1: General requirements and definitions

### 1 Scope

This part of ISO 13044 defines coupling classes, different levels of automation and the general limitations in terms of topology and procedures with respect to electrical and pneumatic connections. This part of ISO 13044 provides a framework under which detailed connector designs applicable for fifth wheel or drawbar couplings may be standardized. The framework refers to vehicle combinations that include trailers with a technical maximum mass in excess of 3 500 kg.

### 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 4091, *Road vehicles — Connectors for the electrical connection of towing vehicles and towed vehicles — Definitions, tests and requirements*

ISO 7638-1, *Road vehicles — Connectors for the electrical connection of towing and towed vehicles — Part 1: Connectors for braking systems and running gear of vehicles with 24 V nominal supply voltage*

ISO 7638-2, *Road vehicles — Connectors for the electrical connection of towing and towed vehicles — Part 2: Connectors for braking systems and running gear of vehicles with 12 V nominal supply voltage*

ISO 11992-1, *Road vehicles — Interchange of digital information on electrical connections between towing and towed vehicles — Part 1: Physical and data-link layers*

ISO 11992-2, *Road vehicles — Interchange of digital information on electrical connections between towing and towed vehicles — Part 2: Application layer for brakes and running gear*

ISO 11992-3, *Road vehicles — Interchange of digital information on electrical connections between towing and towed vehicles — Part 3: Application layer for equipment other than brakes and running gear*

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*

### 3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

#### 3.1 Operation modes

##### 3.1.1

##### **mechanical coupling and uncoupling**

physical engagement and disengagement of the towing vehicle and trailer

**3.1.1.1**

**manual mechanical coupling**

manual procedure required to safeguard the completion of the mechanical engagement

**3.1.1.2**

**manual mechanical uncoupling**

manual procedure required to safeguard the completion of the mechanical disengagement

**3.1.1.3**

**remote mechanical coupling**

engagement procedure completed by indirect operation of a remote device requiring additional action from the operator

**3.1.1.4**

**remote mechanical uncoupling**

disengagement procedure completed by indirect operation of a remote device requiring additional action from the operator

**3.1.1.5**

**automatic mechanical coupling**

procedure performed by reversing the towing vehicle against the trailer in order to completely engage the coupling, to lock it automatically and to indicate proper engagement of the locking devices without any external intervention

**3.1.1.6**

**automatic mechanical uncoupling**

disengagement of the locking mechanism performed as part of an automatic process, in order to separate the two vehicles

**3.1.2**

**electrical connection and disconnection**

physical engagement and disengagement of the electrical interfaces between towing vehicle and trailer

**3.1.2.1**

**manual electrical connection**

manual procedure required to safeguard the completion of the electrical engagement

**3.1.2.2**

**manual electrical disconnection**

manual procedure required to safeguard the completion of the electrical disengagement

**3.1.2.3**

**remote electrical connection**

electrical connection procedure completed by indirect operation of a remote device requiring additional action from the operator

**3.1.2.4**

**remote electrical disconnection**

electrical disconnection procedure completed by indirect operation of a remote device requiring additional action from the operator

**3.1.2.5**

**automatic electrical connection**

electrical connection procedure performed as part of an automatic process

**3.1.2.6**

**automatic electrical disconnection**

electrical disconnection procedure performed by disengaging the connectors as part of an automatic process

**3.1.3**

**pneumatic connection and disconnection**

physical engagement and disengagement of the pneumatic interfaces between the towing vehicle and the trailer

**3.1.3.1****manual pneumatic connection**

manual procedure required to safeguard the completion of the pneumatic engagement

**3.1.3.2****manual pneumatic disconnection**

manual procedure required to safeguard the completion of the pneumatic disengagement

**3.1.3.3****remote pneumatic connection**

pneumatic engagement procedure completed by indirect operation of a remote device requiring additional action from the operator

**3.1.3.4****remote pneumatic disconnection**

pneumatic disconnection procedure completed by indirect operation of a remote device requiring additional action from the operator

**3.1.3.5****automatic pneumatic connection**

pneumatic connection procedure performed as part of an automatic process

**3.1.3.6****automatic pneumatic disconnection**

pneumatic disconnection procedure performed by disengaging the connectors as part of an automatic process

**3.2 Auxiliary functionality****3.2.1****auxiliary functionality**

functionality that assists the driver in the coupling and uncoupling process, e.g. handling of landing legs, under-run protection, etc.

**3.3 Coupling system operation classes****3.3.1****coupling system operation class**

classification grouping coupling systems based on their level of automation in the connection procedure for different media, i.e. mechanical, electrical and pneumatic

See Annex A.

**3.3.1.1****manual coupling system****MCS**

system whereby all operations are performed manually except for the closing of the mechanical coupling, which is automatic

**3.3.1.2****automatic coupling system****ACS**

system whereby some but not all operations, i.e. mechanical, electrical, pneumatic and applicable auxiliary functions, are performed automatically

**NOTE** As a minimum, the closing of the mechanical coupling is performed automatically, while at least one further connection/disconnection is performed either automatically or by means of a remote control.

3.3.1.3

**fully automatic coupling system**

**FACS**

coupling and uncoupling system where all operations, i.e. mechanical, electrical, pneumatic and applicable auxiliary functions, are performed automatically, enabling the coupling and uncoupling process to be completed without direct manual intervention

**3.4 Mixed mode**

3.4.1

**mixed mode**

vehicle combination whereby not all vehicles are equipped with fully automatic coupling systems (FACS)

**4 Requirements**

**4.1 Performance**

**4.1.1 General**

With respect to performance level in the mechanical, electrical and pneumatic areas, requirements applicable to non-FACS vehicles also apply to FACS vehicles, e.g. ISO 4091 is applicable to the electrical interface. However, note that due to the physical design of a FACS, some specific requirements do not apply, e.g. pull-out force for the cable.

**4.1.2 Endurance**

The connectors shall be designed and manufactured such that, in normal use and with correct maintenance and replacement of wearing parts, they will continue to function satisfactorily.

**4.1.3 Means of mechanical protection of connectors**

As a minimum, mechanical protection of the connectors, when engaged and disengaged, shall be such that contamination from water, dirt or grease does not cause a malfunction of the connection itself. The requirements of ISO 4091 apply, except those rendered obsolete by the physical design of the FACS.

**4.2 Mixed-mode connection**

In the case of mixed-mode connection, safe operation shall be ensured; communication shall be in accordance with ISO 11992, and the signal delay requirements for pneumatic connections shall be met.

**4.3 Standard common signals**

Pin numbering and description of functions shall be in accordance with ISO 12098 and ISO 7638. Pins in accordance with ISO 7638 shall be designated with the suffix "b".

**Annex A**  
(informative)

**Classification of coupling systems**

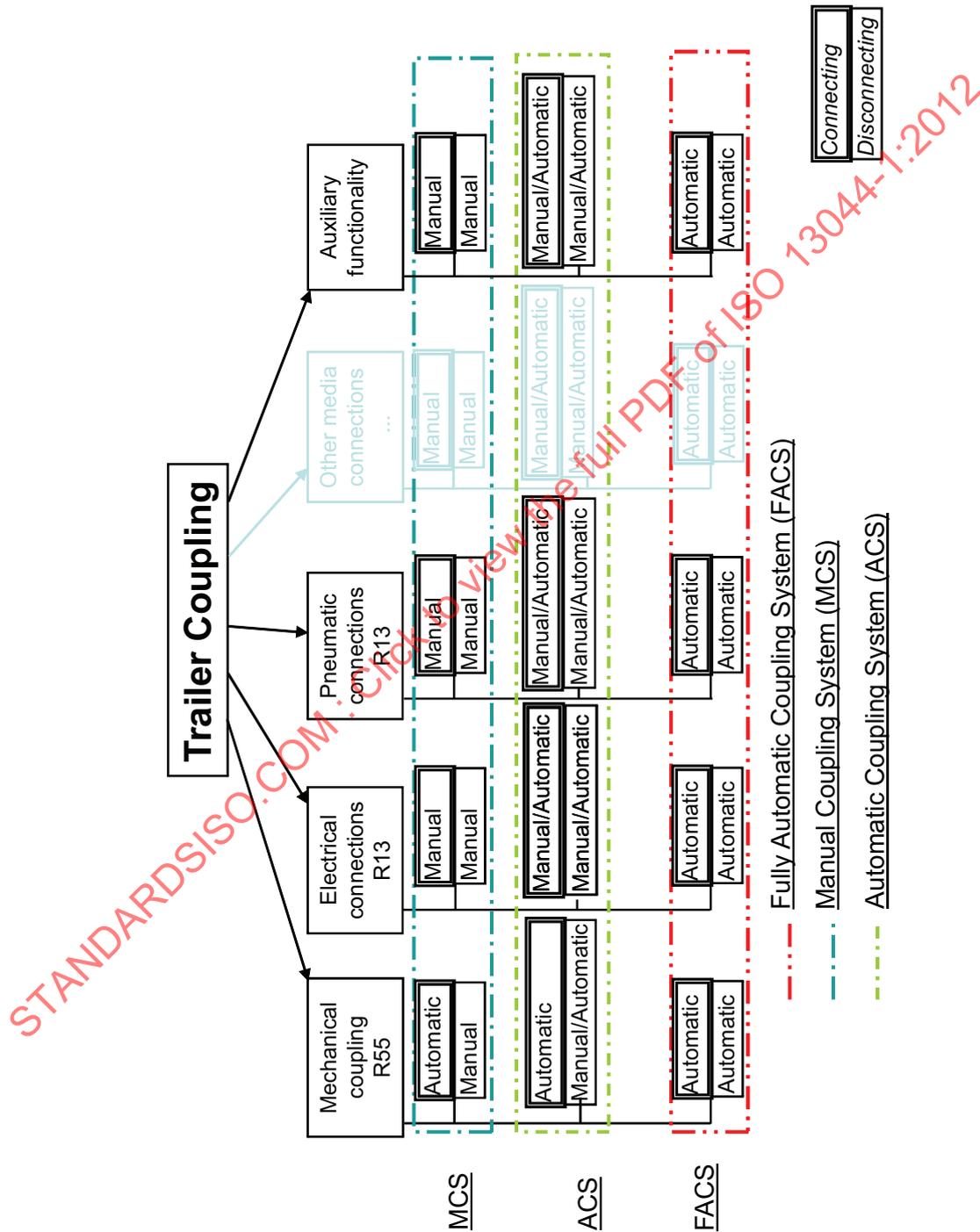


Figure A.1 — Classification of coupling systems