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INTERNATIONAL STANDARD

ISO 13044-1

First edition
2012-05-15

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

Reference number
ISO 13044-1:2012(E)

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Published in Switzerland

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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*

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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

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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

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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.

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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”.

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Annex A
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Classification of coupling systems

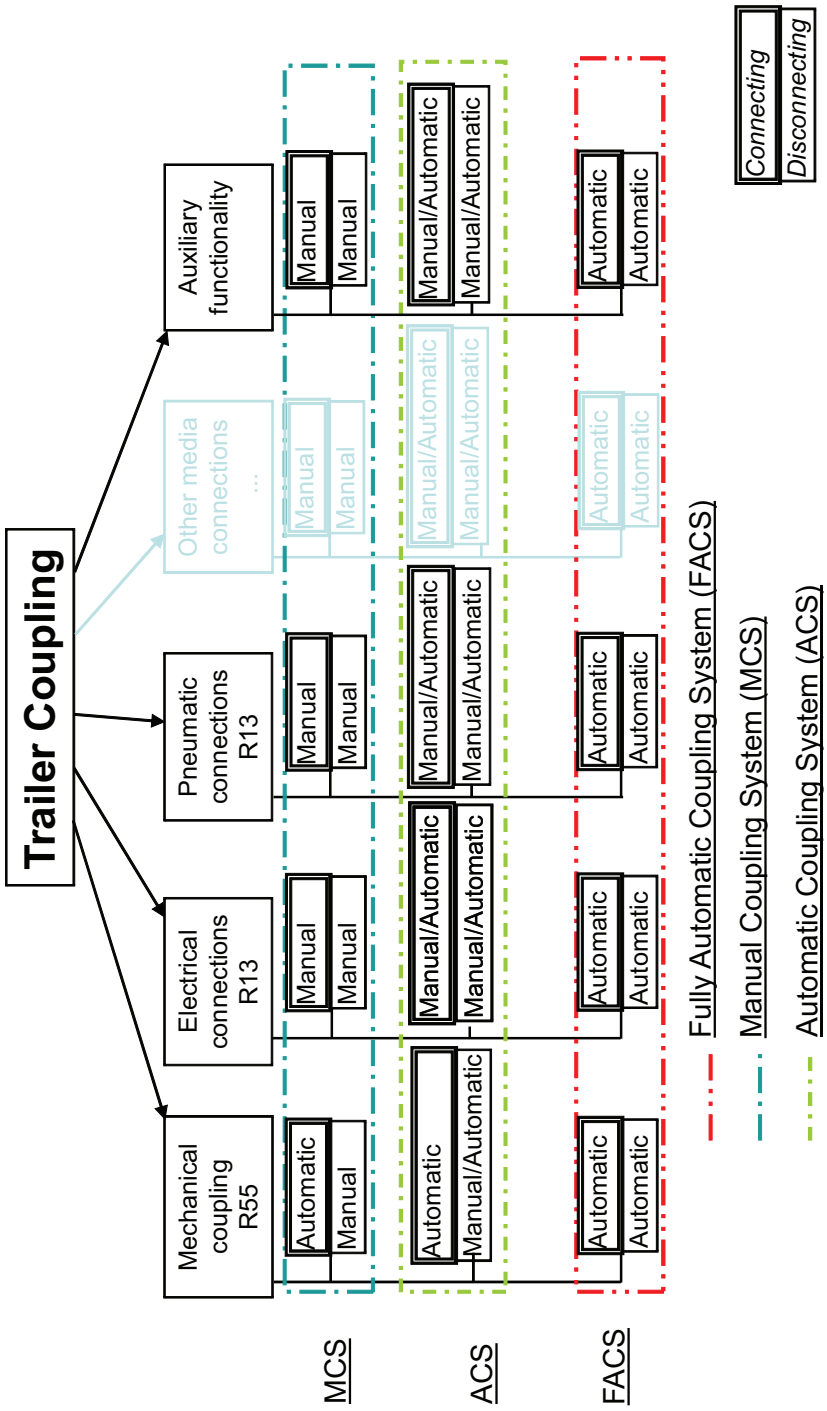

Figure A.1 — Classification of coupling systems

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Bibliography

[1] ISO 3583, *Road vehicles — Pressure test connection for compressed-air pneumatic braking equipment*

[2] 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*

[3] 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*

[4] ISO 4009, *Commercial vehicles — Location of electrical and pneumatic connections between towing vehicles and trailers*

[5] ISO 1728, *Road vehicles — Pneumatic braking connections between motor vehicles and towed vehicles — Interchangeability*

[6] ISO 4141 (all parts), *Road vehicles — Multi-core connecting cables*

[7] ECE R13, *Uniform provisions concerning the approval of vehicles of categories M, N and O with regard to braking*

[8] ECE R48, *Uniform provisions concerning the approval of vehicles with regard to the installation of lighting and light-signalling devices*

[9] ECE R55, *Uniform provisions concerning the approval of mechanical coupling components of combinations of vehicle*

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