International Standard

ISO 23150-20

First edition
2026-06

Road vehicles — Logical interface between sensors and data fusion unit for automated driving functions —

Part 20: Supportive and sensor input interfaces

Véhicules routiers — Interface logique entre capteurs et unité de fusion de données pour les fonctions de conduite automatisée —

Partie 20: Interfaces d'entrée et de support de capteur

Reference number
ISO 23150-20:2026(en)

COPYRIGHT PROTECTED DOCUMENT

ISO copyright office
CP 401 • Ch. de Blandonnet 8
CH-1214 Vernier, Geneva
Phone: +41 22 749 01 11
Email: copyright@iso.org
Website: www.iso.org

Published in Switzerland

Contents

Page

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 document 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).

ISO draws attention to the possibility that the implementation of this document may involve the use of (a) patent(s). ISO takes no position concerning the evidence, validity or applicability of any claimed patent rights in respect thereof. As of the date of publication of this document, ISO had not received notice of (a) patent(s) which may be required to implement this document. However, implementers are cautioned that this may not represent the latest information, which may be obtained from the patent database available at www.iso.org/patents. ISO shall not be held responsible for identifying any or all such patent rights.

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation of 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 www.iso.org/iso/foreword.html.

This document was prepared by Technical Committee ISO/TC 22, *Road vehicles*, Subcommittee SC 31, *Data communication*.

This first edition of ISO 23150-20, together with ISO 23150-1 [1], ISO 23150-2 [2], ISO 23150-11 [3], ISO 23150-12 [4], ISO 23150-13 [5], ISO 23150-14 [6] and ISO 23150-15 [7], cancels and replaces ISO 23150:2023, which has been technically revised.

The main changes are as follows:

— reorganisation of the document structure; use of generic interfaces, generic signals, generic profiles and terms and definitions defined in ISO 23150-1 [1] as a basis for this document;

— specific collection of interfaces in separated documents; in this document specific collection of all supportive and sensor input interfaces;

— revise of the logical interfaces;

— new logical interfaces for sensor calibration.

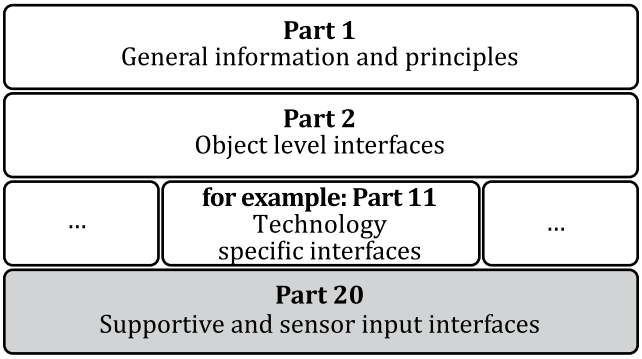
A list of all parts in the ISO series can be found on the ISO website.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

Introduction

Vehicle environmental perception sensors (single sensor or sensor cluster) provide logical interfaces according to the ISO 23150 series to the fusion unit or automated driving functions. The fusion unit generates a surround model and interprets the scene around the vehicle based on the sensor data. Interfaces are defined on different levels and described in a modular and semantic representation. The interfaces at the feature level, advanced detection level and detection level are technology specific and differ for each technology.

Figure 1 shows the schematic and contextual relationships between the documents relating to logical interfaces of the ISO 23150 series.



Key

scope of the document

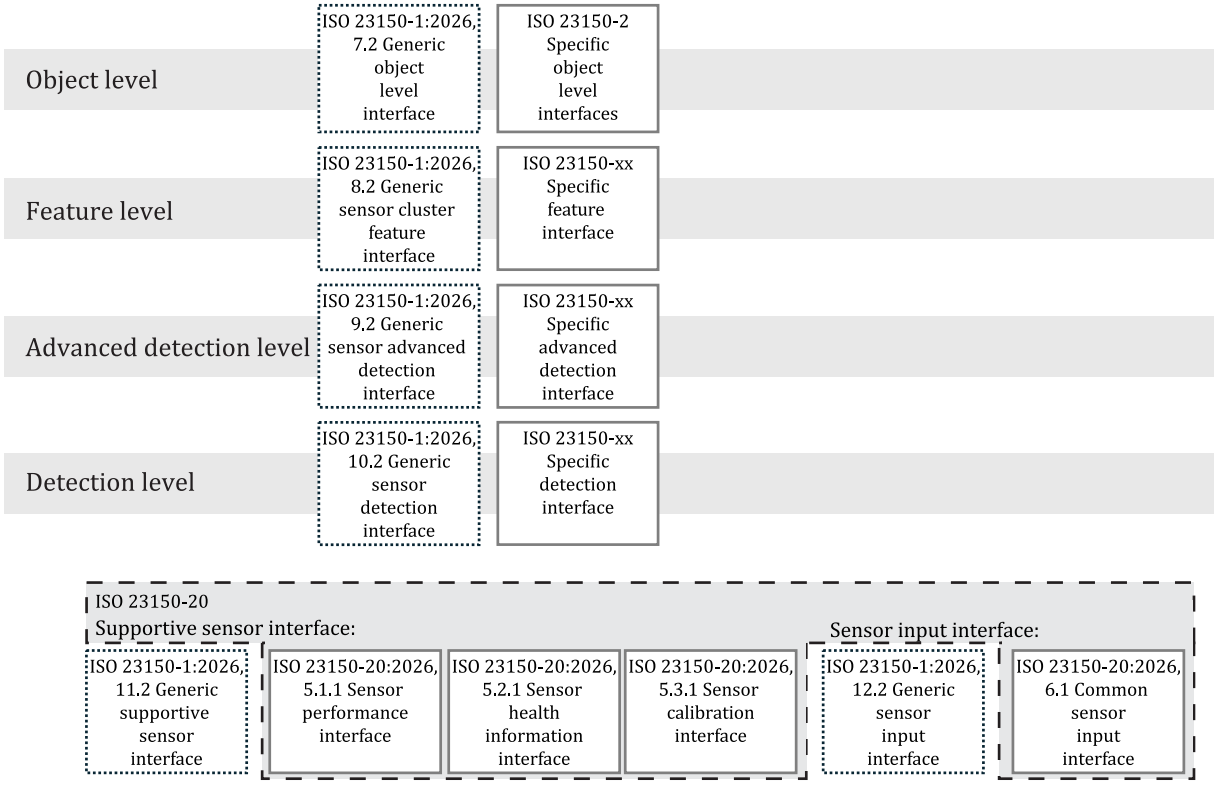
Figure 1 — Relationship of the ISO 23150 series

This document is based on the generic specifications in ISO 23150-1 [1] as shown in Figure 2:

— generic supportive sensor interface;

— generic sensor input interface;

— general level-independent profiles.



Key

scope of this document

Figure 2 — Interfaces in the scope of this document and the related interfaces of the ISO 23150 series

This document specifies the additional interfaces for supportive sensor interfaces (SSI) and sensor input interfaces (SII). These include the supportive sensor interfaces "sensor performance interface" (5.1.1), "sensor health information interface" (5.2.1) and "sensor calibration interface" (5.3.1) as well as the sensor input interface "common sensor input interface" (6.1). These interfaces are based on the generic specifications of the supportive sensor interface and the sensor input interface in ISO 23150-1 [1]. They can be supplied by every sensor or sensor cluster. This document references to generic specifications of signals for the interface header, the generic interface levels and the profiles.

A sensor or sensor cluster may also implement (provide or receive) logical interfaces:

— on object level (see ISO 23150-2 [2]);

— on feature-, advanced detection- or detection level (see technology specific parts of the ISO 23150 series).

This document is not intended to replace the logical interface specifications of other documents in the ISO 23150 series.

Table 1 provides an overview over the differences and boundaries between the SSIs.

Table 1 — Brief overview over the differences and boundaries between the SSIs

Sensor performance		Sensor health information	Sensor calibration
Impairment on observed field	Impairment in sensor effect chain	Sensor internal	Sensor and vehicle
— rain, fog — snow — particles (air) — and so forth	— dirt, dust — condensation — scratch — and so forth	— operation — diagnosis — defects — cleaning — and so forth	— position — calibration — and so forth
Classification into several measurement ranges Relevant for safety concept		Global information for the complete sensor Relevant E/E information	Sensor pose in the vehicle Misalignment: hardware and software calibration

The data of SSI (see 5.1, 5.2, 5.3) can be required to correctly interpret information from object-, feature-, advanced detection- and detection level interfaces. Data consistency over the sensor's interfaces needs to be assured. Supportive sensor interfaces may have LSGs which the sensor provides. If an SSI is not provided, the SSI relevant LSGs will be provided by other interfaces as defined (ISO 23150-1:2026 [8], B.3.4).

The SII (see Clause 6) provides information and parametrisation for a sensor or a sensor cluster. The sensor receives the SIIs via the in-vehicle communication. Each SII can be sent to the sensor or sensor cluster by different ECUs. Also, several ECUs can provide complementary parts of the interface (for example, one ECU provides weather information, and a second ECU provides road information of the common sensor input interface). During the system design phase, each received SIIs of a sensor or a sensor cluster and the ECUs that originate these interfaces are defined. The information source and how the signals are provided are defined during the system design phase to meet the safety and system design requirements (for example, that the fusion unit may provide certain SIIs).

Road vehicles — Logical interface between sensors and data fusion unit for automated driving functions —

Part 20: Supportive and sensor input interfaces

1 Scope

This document is applicable to road vehicles with automated driving functions and specifies the supportive sensor interfaces for sensors or sensor clusters:

— sensor performance interface;

— sensor health information interface;

— sensor calibration interface;

and specifies the sensor input interface:

— common sensor input interface.

This document does not provide electrical and mechanical interface specifications. Raw data interfaces are also excluded.

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 23150-1:2026, *Road vehicles — Logical interface between sensors and data fusion unit for automated driving functions — Part 1: General information and principles*

ISO 23150-1, *Road vehicles — Logical interface between sensors and data fusion unit for automated driving functions — Part 1: General information and principles*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 23150-1 apply.

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

— ISO Online browsing platform: available at https://www.iso.org/obp

— IEC Electropedia: available at https://www.electropedia.org/

4 Abbreviated terms

A2I	assign to interface
AD	automated driving
ADLI	advanced detection level interface
AER	alternative entity representation
C	conditional
CSII	common sensor input interface
D	dimensional
DE	default enumerators
DLI	detection level interface
ECU	electronic control unit
EES	extended enumeration signal
EM	error model
FFT	fast Fourier transform
FLI	feature level interface
FLP	front-left position of the ego-vehicle
FOV	field-of-view
FRP	front-right position of the ego-vehicle
FWHM	full width at half maximum
GPS	global positioning system
ID	identifier
IQR	interquartile range
IR	infrared
IRI	international roughness index
IV	implicit value
LL	list length
LSG	logical signal group
M	mandatory
NIR	near infrared
O	optional
OLI	object level interface

RL requirement level

RLP rear-left position of the ego-vehicle

RRP rear-right position of the ego-vehicle

SCI sensor calibration interface

SHII sensor health information interface

SII sensor input interface

SPI sensor performance interface

SSI supportive sensor interface

UTL unrolling tuple list

VRO value representation optimisation

5 Supportive sensor interfaces

5.1 Sensor performance

5.1.1 Sensor performance interface

The generic specification of the supportive sensor interfaces is defined in ISO 23150-1:2026, Clause 11. The supportive sensor interfaces shall base on the generic supportive sensor interface as specified in ISO 23150-1:2026, 11.2. Table 2 provides the logical structure of the SPI.

Table 2 — Sensor performance interface structure

Structure	Multiplicity	Option
Sensor performance header (5.1.2)	1	
Segments	Multiple [a]	Size type: dynamic/fixed
[a] The number of segments are sensor or sensor cluster specific. The contribution is not dependent on the surrounding. The sensor performance entities are valid for the referenced interfaces in the header.		

The logical structure of the SPI shall be implemented in accordance with the interface definition specified in Table 3, the signals as defined in Annex A and ISO 23150-1:2026 [8], Annex A. Furthermore, the generic profiles as defined in 5.1.4 and in ISO 23150-1 [1] as well as the signal options defined in ISO 23150-1:2026, Annex B shall also be considered.

Table 3 — Sensor performance interface

LSG	RL LSG M/C/O	Signal	RL signal M/C/O	Option
Information: interface	M	Interface version ID {major, minor, patch} (ISO 23150-1:2026 [8], A.1.2)	M	Profile: Uniqueness of interface versioning (ISO 23150-1:2026 [8], 6.5.1)
		Interface ID (ISO 23150-1:2026 [8], A.1.3)	O	Profile: Uniqueness of interface versioning (ISO 23150-1:2026 [8], 6.5.1)

Table 3 *(continued)*

LSG	RL LSG M/C/O	Signal	RL signal M/C/O	Option
		Number of valid serving sensors (ISO 23150-1:2026 [8], A.1.4)	M	Profile: Uniqueness of interface versioning (ISO 23150-1:2026 [8], 6.5.1) Optimise LL (ISO 23150-1:2026 [8], B.1.2) Alternative UTL (ISO 23150-1:2026 [8], B.1.7) Key: Sensor ID (ISO 23150-1:2026 [8], A.1.5)
		Size type: dynamic/fixed Size #: Number of valid serving sensors (ISO 23150-1:2026 [8], A.1.4)		
		Sensor ID (ISO 23150-1:2026 [8], A.1.5)	M	Profile: Uniqueness of interface versioning (ISO 23150-1:2026 [8], 6.5.1) Alternative VRO (ISO 23150-1:2026 [8], B.1.4)
		Number of valid applicable interfaces (ISO 23150-1:2026 [8], A.2.59)	O	Profile: Reference interface list (ISO 23150-1:2026 [8], 6.5.14) Optimise LL (ISO 23150-1:2026 [8], B.1.2) Alternative UTL (ISO 23150-1:2026 [8], B.1.7) Key: Interface ID reference (ISO 23150-1:2026 [8], A.2.60)
		Size type: dynamic/fixed Size #: Number of valid applicable interfaces (ISO 23150-1:2026 [8], A.2.59)		
		Interface ID reference (ISO 23150-1:2026 [8], A.2.60)	M	Profile: Reference interface list (ISO 23150-1:2026 [8], 6.5.14) Alternative VRO (ISO 23150-1:2026 [8], B.1.4)
		Time stamp – <...> (ISO 23150-1:2026 [8], A.1.6)	M	
		Message counter (ISO 23150-1:2026 [8], A.1.7.2)	O	
		Interface cycle time (ISO 23150-1:2026 [8], A.1.8)	O	
		Interface cycle time – variation (ISO 23150-1:2026 [8], A.1.9)	O	
		Data qualifier (ISO 23150-1:2026 [8], A.1.10)	M	Optimise DE (ISO 23150-1:2026 [8], B.1.8) Optimise EES (ISO 23150-1:2026 [8], B.1.9)
Information: sensor surrounding	O	Vanishing point {azimuth, elevation} (A.1.2)	M	
		Vanishing point {azimuth, elevation} – error (A.1.3)	O	Implementation EM (ISO 23150-1:2026 [8], B.4.2)
Field of view segments				

Table 3 *(continued)*

LSG	RL LSG M/C/O	Signal	RL signal M/C/O	Option
Field of view segments information	M	Number of valid field-of-view segments (A.1.4.1)	M	Optimise LL (ISO 23150-1:2026 [8], B.1.2) Alternative UTL (ISO 23150-1:2026 [8], B.1.7) Key: Segment azimuth {begin, end} (ISO 23150-1:2026 [8], A.2.64) and Segment elevation {begin, end} (ISO 23150-1:2026 [8], A.2.65)
		Size type: Dynamic/fixed Size #: Number of valid field-of-view segments (A.1.4.1)		
↪ Status	M	Segment azimuth {begin, end} (ISO 23150-1:2026 [8], A.2.64)	M	Profile: Segment (ISO 23150-1:2026 [8], 6.5.16) Alternative VRO (ISO 23150-1:2026 [8], B.1.4)
		Segment elevation {begin, end} (ISO 23150-1:2026 [8], A.2.65)	O	Profile: Segment (ISO 23150-1:2026 [8], 6.5.16) Alternative VRO ISO 23150-1:2026 [8], B.1.4)
		Measurement grid resolution {radial distance, azimuth, elevation} (A.2.2)	O	
		Beam divergence {azimuth, elevation} (A.2.3)	O	
		Range gain (A.2.4)	O	
		Blockage status (A.2.5)	M	Optimise DE (ISO 23150-1:2026 [8], B.1.8) Optimise EES (ISO 23150-1:2026 [8], B.1.9)
↪ Field-of-view reduction	O	Number of valid field-of-view reduction reasons (A.2.6)	M	Optimise LL (ISO 23150-1:2026 [8], B.1.2) Alternative UTL (ISO 23150-1:2026 [8], B.1.7) Key: Field-of-view reduction reason type (A.2.7)
		Size type: Dynamic/fixed Size #: Number of valid field-of-view reduction reasons (A.2.6)		
		Field-of-view reduction reason type (A.2.7)	M	Alternative VRO (ISO 23150-1:2026 [8], B.1.4) Optimise DE (ISO 23150-1:2026 [8], B.1.8) Optimise EES (ISO 23150-1:2026 [8], B.1.9)
		Field-of-view reduction reason type – confidence (A.2.8)	M	

Table 3 *(continued)*

LSG	RL LSG M/C/O	Signal	RL signal M/C/O	Option
↪ Real-world object recognition capabilities	C (ISO 23150-1:2026 [8], B.3.2) Exist: OLI and in scope of signals "Interface ID reference" (ISO 23150-1:2026 [8], A.2.60)	Number of valid recognisable object types (A.2.9)	M	Optimise LL (ISO 23150-1:2026 [8], B.1.2) Alternative UTL (ISO 23150-1:2026 [8], B.1.7) Key: Recognised object type (A.2.10)
		Size type: Dynamic/fixed Size #: Number of valid recognisable object types (A.2.9)		
		Recognised object type (A.2.10)	M	Alternative VRO (ISO 23150-1:2026 [8], B.1.4) Optimise DE (ISO 23150-1:2026 [8], B.1.8) Optimise EES (ISO 23150-1:2026 [8], B.1.9)
		Detection range radial distance {begin, end} (A.2.11)	M	
		True positive rate (A.2.12)	O	
		False positive rate (A.2.13)	O	
		Positive predictive value (A.2.14)	O	
↪ Reference target recognition capabilities	C (ISO 23150-1:2026 [8], B.3.2) Exist: FLI, DLI and in scope of signals "Interface ID reference" (ISO 23150-1:2026 [8], A.2.60)	Number of valid reference target types (A.2.15)	M	Optimise LL (ISO 23150-1:2026 [8], B.1.2)
		Size type: Dynamic/fixed Size #: Number of valid reference target types (A.2.15)		
		Reference target type (A.2.16)	C (ISO 23150-1:2026 [8], B.2.2) Relevant: camera	Optimise DE (ISO 23150-1:2026 [8], B.1.8) Optimise EES (ISO 23150-1:2026 [8], B.1.9)
		Radar cross section reference target (A.2.17)	C (ISO 23150-1:2026 [8], B.2.2) Relevant: radar	
		Reflectivity reference target (A.2.18)	C (ISO 23150-1:2026 [8], B.2.2) Relevant: lidar, ultrasonic	
		Detection range radial distance {begin, end} (A.2.11)	M	
		True positive rate (A.2.12)	O	
		Relative radial velocity range {begin, end} (A.2.19)	O	
		Signal to noise ratio (ISO 23150-1:2026 [8], A.2.66)	M	Optimise IV (ISO 23150-1:2026 [8], B.1.6)
		Spatial separability {radial distance, azimuth, elevation} (A.2.20)	O	
		Velocity separability {radial distance, azimuth, elevation} (A.2.21)	O	

The signals referring to angles as well as distances in the segments always refer to the sensor coordinate system and its origin. This affects the signals:

— Segment azimuth {begin, end} (ISO 23150-1:2026 [8], A.2.64);

— Segment elevation {begin, end} (ISO 23150-1:2026 [8], A.2.65);

— Measurement grid resolution {radial distance, azimuth, elevation} (A.2.2);

— Detection range radial distance {begin, end} (A.2.11);

— Relative radial velocity range {begin, end} (A.2.19);

— Spatial separability {radial distance, azimuth, elevation} (A.2.20);

— Velocity separability {radial distance, azimuth, elevation} (A.2.21).

The correlation between vehicle- and sensor coordinate system is determined by the sensor origin point and the sensor orientation of the sensor [see "Profile: Sensor pose" (ISO 23150-1:2026 [8], 6.5.5)].

The geometric information of the SSIs references the vehicle coordinate system [see "Profile: Vehicle coordinate system" (ISO 23150-1:2026 [8], 6.5.4)] as well as the sensor coordinate system [see "Profile: Sensor pose" (ISO 23150-1:2026 [8], 6.5.5)].

5.1.2 Sensor performance header

Table 4 defines the interface header for sensor performance information and the changes due to the adaptation in comparison to the "generic supportive sensor header" as specified in ISO 23150-1:2026, 11.3, which shall be used as the interface header. The header of the SPI specifies the list of valid FOV segment entities (see 5.1.3).

Table 4 — Specific signal grouping: Sensor performance header

Signal	RL signal	Option
Interface version ID {major, minor, patch} (ISO 23150-1:2026 [8], A.1.2)	Mandatory	Profile: Uniqueness of interface versioning (ISO 23150-1:2026 [8], 6.5.1)
Interface ID (ISO 23150-1:2026 [8], A.1.3)	Optional	Profile: Uniqueness of interface versioning (ISO 23150-1:2026 [8], 6.5.1)
Number of valid serving sensors (ISO 23150-1:2026 [8], A.1.4)	Mandatory	Profile: Uniqueness of interface versioning (ISO 23150-1:2026 [8], 6.5.1) Optimise LL (ISO 23150-1:2026 [8], B.1.2) Alternative UTL (ISO 23150-1:2026 [8], B.1.7) Key: Sensor ID (ISO 23150-1:2026 [8], A.1.5)
↪ Sensor ID (ISO 23150-1:2026 [8], A.1.5)	Mandatory	Profile: Uniqueness of interface versioning (ISO 23150-1:2026 [8], 6.5.1) Alternative VRO (ISO 23150-1:2026 [8], B.1.4)
Number of valid applicable interfaces (ISO 23150-1:2026 [8], A.2.59)	Optional	Profile: Reference interface list (ISO 23150-1:2026 [8], 6.5.14) Optimise LL (ISO 23150-1:2026 [8], B.1.2) Alternative UTL (ISO 23150-1:2026 [8], B.1.7) Key: Interface ID reference (ISO 23150-1:2026 [8], A.2.60)
↪ Interface ID reference (ISO 23150-1:2026 [8], A.2.60)	Mandatory	Profile: Reference interface list (ISO 23150-1:2026 [8], 6.5.14) Alternative VRO (ISO 23150-1:2026 [8], B.1.4)
Time stamp – <...> (ISO 23150-1:2026 [8], A.1.6)	Mandatory	
Message counter (ISO 23150-1:2026 [8], A.1.7.2)	Optional	

[a] The RL of the additional LSG is optional.

[b] Further signals may be added to this header as defined in "Need of logical signal group" (ISO 23150-1:2026 [8], B.3.4) (see cell options).

[c] The number of field of view segments is deterministic. No performance information is required.