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Introduction

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For international standards, comments will be reviewed by the relevant UK national committee before sending the consensus UK vote and comments to the international committee, which will then decide appropriate action. If the international standard is approved, it is usual for the text to be published as a British Standard.

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Template for comments and secretariat observations

Date: xx/xx/20xx	Document: ISO/DIS xxxx
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1	2	(3)	4	5	(6)	7
MB	Clause No./ Subclause No./Annex (e.g. 3.1)	Paragraph/ Figure/Table/Note	Type of comment	Comment (justification for change) by the MB	Proposed change by the MB	Secretariat observations on each comment submitted
	3.1	Definition 1	ed	Definition is ambiguous and needs clarifying.	Amend to read '...so that the mains connector to which no connection...'	
	6.4	Paragraph 2	te	The use of the UV photometer as an alternative cannot be supported as serious problems have been encountered in its use in the UK.	Delete reference to UV photometer.	



DRAFT International Standard

ISO/DIS 23150-20

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

ICS: 43.040.15

ISO/TC 22/SC 31

Secretariat: DIN

Voting begins on:
2025-08-18

Voting terminates on:
2025-11-10

This document is circulated as received from the committee secretariat.

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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.

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 documents 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).

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

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

Sensors for highly automated driving according to the ISO 23150 series provide logical interfaces between a single sensor or a single-sensor cluster and the fusion unit or automated driving functions. Interfaces are defined on different levels. The interfaces on feature level, advanced detection level and detection level are technology specific and differ by each technology.

[Figure 1](#) shows the schematic and contextual relationships between the documents relating to logical interfaces of the ISO 23150 series.

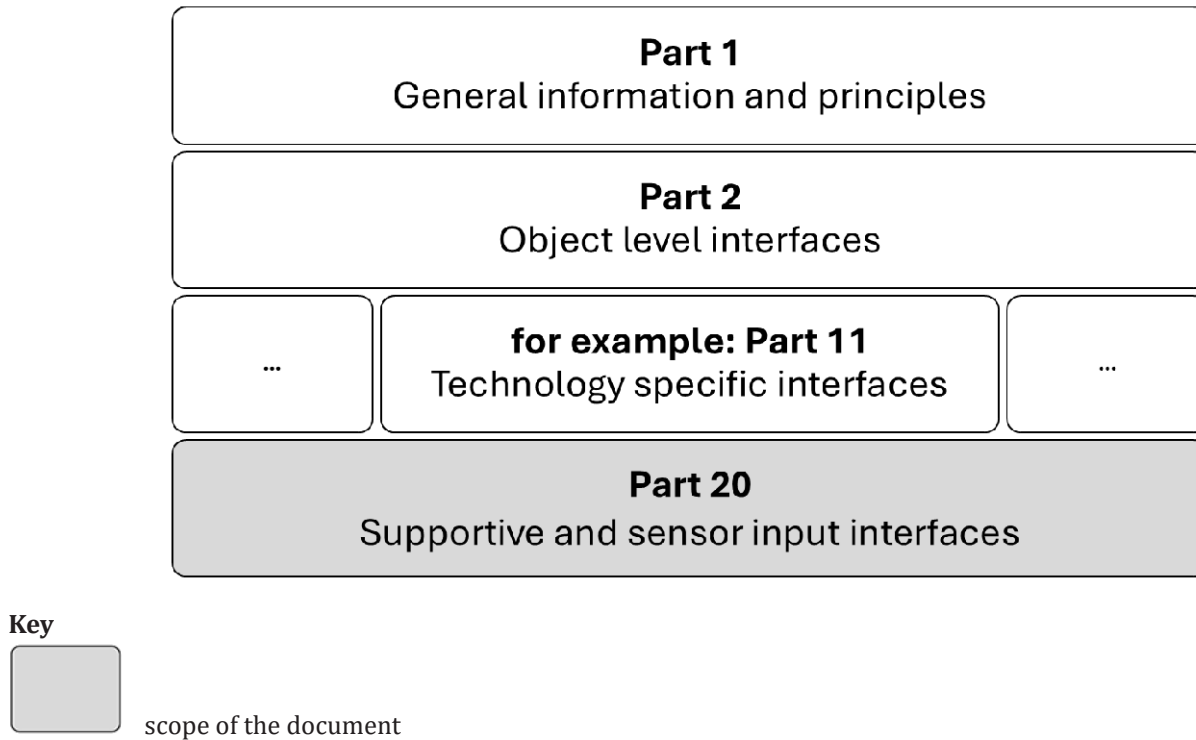


Figure 1 — Relationship of the ISO 23150 series

This document specifies additional interfaces for supportive sensor interfaces and sensor input interfaces. 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 base on the generic specifications of the supportive sensor interface and the sensor input interface in the ISO/DIS 23150-1. 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);
- on feature-, advanced detection- or detection level (see technology specific parts of ISO 23150 series).

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

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. The document series specifies the logical interface between in-vehicle environmental perception sensors and the fusion unit which generates a surround model and interprets the scene around the vehicle based on the sensor data. The interface is described in a modular and semantic representation and provides information on different abstraction levels based on sensor technology specific information.

This part of the ISO 23150 document series specifies the supportive sensor interfaces for sensors or sensor clusters:

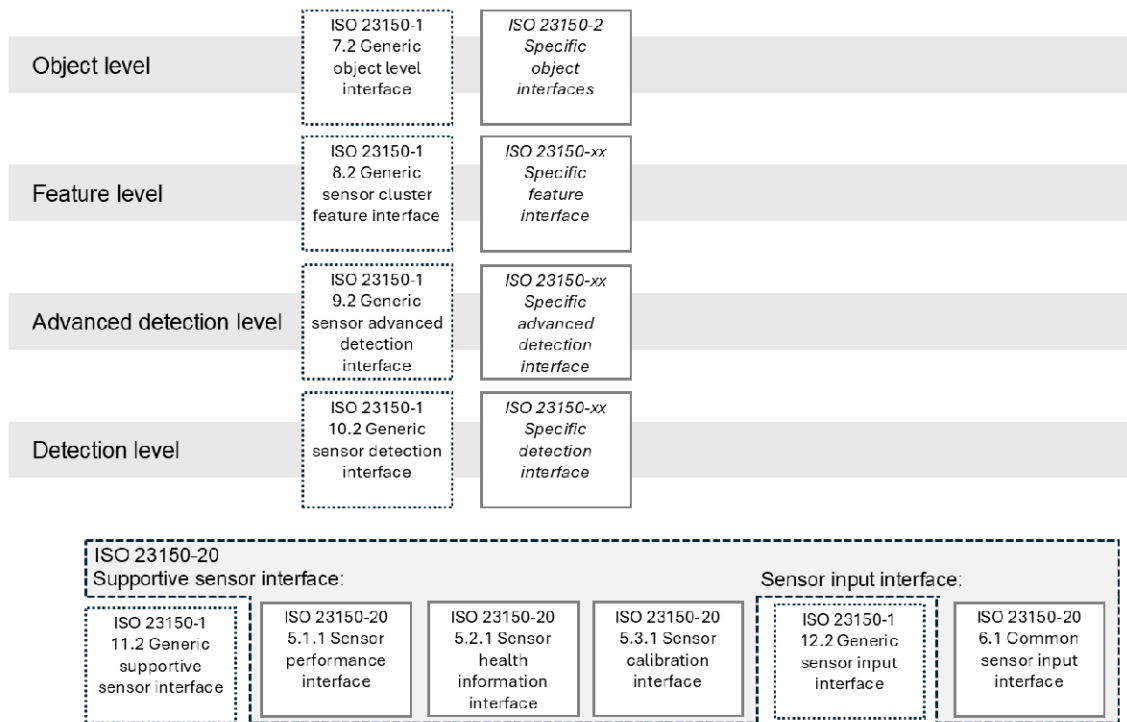
- Sensor performance interface;
- Sensor health information interface;
- Sensor calibration interface;

and specifies the sensor input interface:

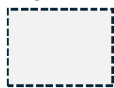
- Common sensor input interface.

This document enhances the ISO/DIS 23150-1 and bases in particular on generic specifications of ISO/DIS 23150-1 (see [Figure 2](#)):

- Generic supportive sensor interface (ISO/DIS 23150-1, 11.2);
- Generic sensor input interface (ISO/DIS 23150-1, 12.2);
- General level-independent profiles (ISO/DIS 23150-1, 6.5).



Key



scope of the document

Figure 2 — Interfaces in the scope of this document and the related interfaces of 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	— dirt, dust	— operation	— position
— snow	— condensation	— diagnosis	— calibration
— particles (air)	— scratch	— defects	— and so forth
— and so forth	— and so forth	— cleaning	
		— 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 supportive sensor interfaces (SSI) (see 5.1, 5.2, 5.3) may be required to correctly interpret information from object-, feature-, advanced detection- and detection level interface. Data consistency over the sensor's interfaces shall be assured. Supportive sensor interfaces may have LSGs which the sensor shall provide. If an SSI is not provided, the SSI relevant LSGs will be provided by other interfaces as defined (ISO/DIS 23150-1, B.3.4).

The sensor input interface (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 shall be defined. The information source and the way how the signals are provided shall be defined during the system design phase to meet the safety and system design requirements (for example, that the fusion unit may provide certain SIIs).

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/DIS 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/DIS 23150-1 apply.

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

- IEC Electropedia: available at <http://www.electropedia.org/>
- ISO Online browsing platform: available at <http://www.iso.org/obp>

4 Abbreviated terms

For the purposes of this document, the abbreviated terms given in ISO/DIS 23150-1 and the following apply.

CSII	common sensor input interface
FFT	fast Fourier transform
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
NIR	near infrared
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
SPI	sensor performance interface

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/DIS 23150-1 clause 11. The supportive sensor interfaces base on the "Generic supportive sensor interface" (ISO/DIS 23150-1, 11.2). [Table 2](#) defines the general structure of the sensor performance interface (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.		

[Table 3](#) defines the logical structure of the SPI.

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/DIS 23150-1, A.1.2)	M	Profile: Uniqueness of interface versioning (ISO/DIS 23150-1, 6.5.1)
		Interface ID (ISO/DIS 23150-1, A.1.3)	O	Profile: Uniqueness of interface versioning (ISO/DIS 23150-1, 6.5.1)
		Number of valid serving sensors (ISO/DIS 23150-1, A.1.4)	M	Profile: Uniqueness of interface versioning (ISO/DIS 23150-1, 6.5.1) Optimise LL (ISO/DIS 23150-1, B.1.2) Alternative UTL (ISO/DIS 23150-1, B.1.7) Key: Sensor ID (ISO/DIS 23150-1, A.1.5)
		Size type: dynamic/fixed Size #: Number of valid serving sensors (ISO/DIS 23150-1, A.1.4)		
		Sensor ID (ISO/DIS 23150-1, A.1.5)	M	Profile: Uniqueness of interface versioning (ISO/DIS 23150-1, 6.5.1) Alternative VRO (ISO/DIS 23150-1, B.1.4)
		Number of valid applicable interfaces (ISO/DIS 23150-1, A.2.59)	O	Profile: Reference interface list (ISO/DIS 23150-1, 6.5.14) Optimise LL (ISO/DIS 23150-1, B.1.2) Alternative UTL (ISO/DIS 23150-1, B.1.7) Key: Interface ID reference (ISO/DIS 23150-1, A.2.60)

Table 3 (continued)

LSG	RL LSG M/C/O	Signal	RL signal M/C/O	Option
		Size type: dynamic/fixed Size #: Number of valid applicable interfaces (ISO/DIS 23150-1, A.2.59)		
		Interface ID reference (ISO/DIS 23150-1, A.2.60)	M	Profile: Reference interface list (ISO/DIS 23150-1, 6.5.14) Alternative VRO (ISO/DIS 23150-1, B.1.4)
		Time stamp – <...> (ISO/DIS 23150-1, A.1.6)	M	
		Message counter (ISO/DIS 23150-1, A.1.7.2)	O	
		Interface cycle time (ISO/DIS 23150-1, A.1.8)	O	
		Interface cycle time – variation (ISO/DIS 23150-1, A.1.9)	O	
		Data qualifier (ISO/DIS 23150-1, A.1.10)	M	Optimise DE (ISO/DIS 23150-1, B.1.8) Optimise EES (ISO/DIS 23150-1, 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/DIS 23150-1, B.4.2)
Field of view segments				
Field of view segments information	M	Number of valid field-of-view segments (A.1.4.1)	M	Optimise LL (ISO/DIS 23150-1, B.1.2) Alternative UTL (ISO/DIS 23150-1, B.1.7) Key: Segment azimuth {begin, end} (ISO/DIS 23150-1, A.2.64) and Segment elevation {begin, end} (ISO/DIS 23150-1, 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/DIS 23150-1, A.2.64)	M	Profile: Segment (ISO/DIS 23150-1, 6.5.16) Alternative VRO (ISO/DIS 23150-1, B.1.4)
		Segment elevation {begin, end} (ISO/DIS 23150-1, A.2.65)	O	Profile: Segment (ISO/DIS 23150-1, 6.5.16) Alternative VRO (ISO/DIS 23150-1, 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/DIS 23150-1, B.1.8) Optimise EES (ISO/DIS 23150-1, B.1.9)

Table 3 (continued)

LSG	RL LSG M/C/O	Signal	RL signal M/C/O	Option
↔ Field-of-view reduction	0	Number of valid field-of-view reduction reasons (A.2.6)	M	Optimise LL (ISO/DIS 23150-1, B.1.2) Alternative UTL (ISO/DIS 23150-1, 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/DIS 23150-1, B.1.4) Optimise DE (ISO/DIS 23150-1, B.1.8) Optimise EES (ISO/DIS 23150-1, B.1.9)
		Field-of-view reduction reason type – confidence (A.2.8)	M	
↔ Real-world object recognition capabilities	C (ISO/DIS 23150-1, B.3.2) Exist: OLI and in scope of signals "Interface ID reference" (ISO/DIS 23150-1, A.2.60)	Number of valid recognisable object types (A.2.9)	M	Optimise LL (ISO/DIS 23150-1, B.1.2) Alternative UTL (ISO/DIS 23150-1, 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/DIS 23150-1, B.1.4) Optimise DE (ISO/DIS 23150-1, B.1.8) Optimise EES (ISO/DIS 23150-1, 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/DIS 23150-1, B.3.2) Exist: FLI, DLI and in scope of signals "Interface ID reference" (ISO/DIS 23150-1, A.2.60)	Number of valid reference target types (A.2.15)	M	Optimise LL (ISO/DIS 23150-1, 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/DIS 23150-1, B.2.2) Relevant: camera	Optimise DE (ISO/DIS 23150-1, B.1.8) Optimise EES (ISO/DIS 23150-1, B.1.9)
		Radar cross section reference target (A.2.17)	C (ISO/DIS 23150-1, B.2.2) Relevant: radar	
		Reflectivity reference target (A.2.18)	C (ISO/DIS 23150-1, B.2.2) Relevant: lidar, ultrasonic	

Table 3 (continued)

LSG	RL LSG M/C/O	Signal	RL signal M/C/O	Option
		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/DIS 23150-1, A.2.66)	M	Optimise IV (ISO/DIS 23150-1, 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/DIS 23150-1, A.2.64);
- Segment elevation {begin, end} (ISO/DIS 23150-1, 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/DIS 23150-1, 6.5.5)].

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

5.1.2 Sensor performance header

Table 4 defines the interface header for sensor performance information (5.1.2) and the changes due to the adaptation in comparison to the "Generic supportive sensor header" (ISO/DIS 23150-1, 11.3). 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/DIS 23150-1, A.1.2)	Mandatory	Profile: Uniqueness of interface versioning (ISO/DIS 23150-1, 6.5.1)
Interface ID (ISO/DIS 23150-1, A.1.3)	Optional	Profile: Uniqueness of interface versioning (ISO/DIS 23150-1, 6.5.1)
^a Further signals may be added to this header as defined in "Need of logical signal group" (ISO/DIS 23150-1, B.3.4) (see cell "Options"). ^b The number of field of view segments is deterministic. No performance information is required.		

Table 4 (continued)

Signal	RL signal		Option
Number of valid serving sensors (ISO/DIS 23150-1, A.1.4)	Mandatory		Profile: Uniqueness of interface versioning (ISO/DIS 23150-1, 6.5.1) Optimise LL (ISO/DIS 23150-1, B.1.2) Alternative UTL (ISO/DIS 23150-1, B.1.7) Key: Sensor ID (ISO/DIS 23150-1, A.1.5)
↔ Sensor ID (ISO/DIS 23150-1, A.1.5)	Mandatory		Profile: Uniqueness of interface versioning (ISO/DIS 23150-1, 6.5.1) Alternative VRO (ISO/DIS 23150-1, B.1.4)
Number of valid applicable interfaces (ISO/DIS 23150-1, A.2.59)	Optional		Profile: Reference interface list (ISO/DIS 23150-1, 6.5.14) Optimise LL (ISO/DIS 23150-1, B.1.2) Alternative UTL (ISO/DIS 23150-1, B.1.7) Key: Interface ID reference (ISO/DIS 23150-1, A.2.60)
↔ Interface ID reference (ISO/DIS 23150-1, A.2.60)	Mandatory		Profile: Reference interface list (ISO/DIS 23150-1, 6.5.14) Alternative VRO (ISO/DIS 23150-1, B.1.4)
Time stamp – <...> (ISO/DIS 23150-1, A.1.6)	Mandatory		
Message counter (ISO/DIS 23150-1, A.1.7.2)	Optional		
Interface cycle time (ISO/DIS 23150-1, A.1.8)	Optional		
Interface cycle time – variation (ISO/DIS 23150-1, A.1.9)	Optional		
Data qualifier (ISO/DIS 23150-1, A.1.10)	Mandatory		Optimise DE (ISO/DIS 23150-1, B.1.8) Optimise EES (ISO/DIS 23150-1, B.1.9)
Vanishing point {azimuth, elevation} (A.1.2)	RL LSG optional	Mandatory	
Vanishing point {azimuth, elevation} – error (A.1.3)		Optional	Implementation EM (ISO/DIS 23150-1, B.4.2)
... ^a			Need of logical signal group (ISO/DIS 23150-1, B.3.4) Profile: Vehicle coordinate system (ISO/DIS 23150-1, 6.5.4) Profile: Sensor pose (ISO/DIS 23150-1, 6.5.5) Profile: Calibration (ISO/DIS 23150-1, 6.5.6) Profile: Sensor cluster (ISO/DIS 23150-1, 6.5.7)
^a Further signals may be added to this header as defined in "Need of logical signal group" (ISO/DIS 23150-1, B.3.4) (see cell "Options").			
^b The number of field of view segments is deterministic. No performance information is required.			

Table 4 (continued)

Signal	RL signal	Option
Field of view segments		
Number of valid field-of-view segments (A.1.4.1)	Mandatory	Optimise LL (ISO/DIS 23150-1, B.1.2) Alternative UTL (ISO/DIS 23150-1, B.1.7) Key: Segment azimuth {begin, end} (ISO/DIS 23150-1, A.2.64) and Segment elevation {begin, end} (ISO/DIS 23150-1, A.2.65)
↪ Field of view segment entities ^b		
^a Further signals may be added to this header as defined in "Need of logical signal group" (ISO/DIS 23150-1, B.3.4) (see cell "Options").		
^b The number of field of view segments is deterministic. No performance information is required.		

5.1.3 Sensor performance entity

Each sensor performance segment for FOV of a sensor describes the performance in this segment and consists of several LSGs.

- **Status:** the status describes the geometry of the FOV segment.
- **Field-of-view reduction causes:** the FOV reduction causes describe the causes (for example, extrinsic or intrinsic) for an FOV reduction.
- **Real-world object recognition rates:** the real-world object recognition rates describe the estimated recognition rates for real-world recognition of different real-world objects.
- **Reference target recognition rates:** the reference target recognition rates describe the estimated recognition rates for synthetic, well-defined recognition of different synthetic, well-defined objects.

For two valid but geometric overlapping FOV segments (azimuth-, elevation range), the values for the earlier defined segment in the list will always stay valid. So typically, the segments will be defined from the inside to the outside (due to timing reasons, special regions of interest are more important than the general FOV segments and the special regions of interest shall be known to be subtracted from the general FOV segment).

5.1.4 Sensor performance profiles

For SPI, no specific profiles are defined.

5.2 Sensor health information

5.2.1 Sensor health information interface

The generic specification of the supportive sensor interfaces is defined in ISO/DIS 23150-1 clause 11. The supportive sensor interfaces base on the "Generic supportive sensor interface" (ISO/DIS 23150-1, 11.2). [Table 5](#) defines the general structure of the sensor health information interface (SHII).

Table 5 — Sensor health information interface structure

Structure	Multiplicity	Option
Sensor health information header (5.2.2)	1	
Sensor health information	1 ^a	Size type: fixed
Sensor cluster definition	1 ^a	Size type: fixed

^a The sensor health entity is valid for the entire sensor or sensor cluster.

[Table 6](#) defines the logical structure of the SHII.

Table 6 — Sensor health information interface

LSG	RL LSG M/C/O	Signal	RL signal M/C/O	Option
Information: interface	M	Interface version ID {major, minor, patch} (ISO/DIS 23150-1, A.1.2)	M	Profile: Uniqueness of interface versioning (ISO/DIS 23150-1, 6.5.1)
		Interface ID (ISO/DIS 23150-1, A.1.3)	O	Profile: Uniqueness of interface versioning (ISO/DIS 23150-1, 6.5.1)
		Number of valid serving sensors (ISO/DIS 23150-1, A.1.4)	M	Profile: Uniqueness of interface versioning (ISO/DIS 23150-1, 6.5.1) Optimise LL (ISO/DIS 23150-1, B.1.2) Alternative UTL (ISO/DIS 23150-1, B.1.7) Key: Sensor ID (ISO/DIS 23150-1, A.1.5)
		Size type: dynamic/fixed Size #: Number of valid serving sensors (ISO/DIS 23150-1, A.1.4)		
		Sensor ID (ISO/DIS 23150-1, A.1.5)	M	Profile: Uniqueness of interface versioning (ISO/DIS 23150-1, 6.5.1) Alternative VRO (ISO/DIS 23150-1, B.1.4)
		Time stamp - <...> (ISO/DIS 23150-1, A.1.6)	M	
		Message counter (ISO/DIS 23150-1, A.1.7.2)	O	
		Interface cycle time (ISO/DIS 23150-1, A.1.8)	O	
		Interface cycle time – variation (ISO/DIS 23150-1, A.1.9)	O	
		Data qualifier (ISO/DIS 23150-1, A.1.10)	M	Optimise DE (ISO/DIS 23150-1, B.1.8) Optimise EES (ISO/DIS 23150-1, B.1.9)
Sensor health information				

Table 6 (continued)

LSG	RL LSG M/C/O	Signal	RL signal M/C/O	Option
Status	M	Number of valid sensor cluster operation modes (A.2.22)	M	Optimise LL (ISO/DIS 23150-1, B.1.2) Alternative UTL (ISO/DIS 23150-1, B.1.7) Key: Sensor cluster operation mode (A.2.23)
		Size type: Dynamic/fixed Size #: Number of valid sensor cluster operation modes (A.2.22)		
		Sensor cluster operation mode (A.2.23)	M	Alternative VRO (ISO/DIS 23150-1, B.1.4) Optimise DE (ISO/DIS 23150-1, B.1.8) Optimise EES (ISO/DIS 23150-1, B.1.9)
		Sensor defect recognised (A.2.24)	M	Optimise DE (ISO/DIS 23150-1, B.1.8) Optimise EES (ISO/DIS 23150-1, B.1.9)
		Sensor defect reason (A.2.25)	M	Optimise DE (ISO/DIS 23150-1, B.1.8) Optimise EES (ISO/DIS 23150-1, B.1.9)
		Supply voltage status (A.2.26)	M	Optimise DE (ISO/DIS 23150-1, B.1.8) Optimise EES (ISO/DIS 23150-1, B.1.9)
		Sensor temperature status (A.2.27)	M	Optimise DE (ISO/DIS 23150-1, B.1.8) Optimise EES (ISO/DIS 23150-1, B.1.9)
		Number of valid sensor input signal statuses (A.2.28)	M	Optimise LL (ISO/DIS 23150-1, B.1.2) Alternative UTL (ISO/DIS 23150-1, B.1.7) Key: Sensor input signal type (A.2.29)
		Size type: Dynamic/fixed Size #: Number of valid sensor input signal statuses (A.2.28)		
		Sensor input signal type (A.2.29)	M	Alternative VRO (ISO/DIS 23150-1, B.1.4) Optimise DE (ISO/DIS 23150-1, B.1.8) Optimise EES (ISO/DIS 23150-1, B.1.9)
		Sensor input signal status (A.2.30)	M	Optimise DE (ISO/DIS 23150-1, B.1.8) Optimise EES (ISO/DIS 23150-1, B.1.9)
		Sensor externally disturbed (A.2.31)	O	Optimise DE (ISO/DIS 23150-1, B.1.8) Optimise EES (ISO/DIS 23150-1, B.1.9)

Table 6 (continued)

LSG	RL LSG M/C/O	Signal	RL signal M/C/O	Option
		Sensor transmit power reduced (A.2.32)	0	Optimise DE (ISO/DIS 23150-1, B.1.8) Optimise EES (ISO/DIS 23150-1, B.1.9)
		Sensor heating status (A.2.33)	0	Optimise DE (ISO/DIS 23150-1, B.1.8) Optimise EES (ISO/DIS 23150-1, B.1.9)
		Sensor cleaning status (A.2.34)	0	Optimise DE (ISO/DIS 23150-1, B.1.8) Optimise EES (ISO/DIS 23150-1, B.1.9)
		Sensor time sync (A.2.35)	0	Optimise DE (ISO/DIS 23150-1, B.1.8) Optimise EES (ISO/DIS 23150-1, B.1.9)
		Sensor time sync off-set value (A.2.36)	C (ISO/DIS 23150-1, B.2.3) * The signal "Sensor time sync" (A.2.35) has "STS_Offset" or a similar enumerator defined during the system design phase.	
Sensor cluster definition				
Sensor cluster	O Need of logical signal group (ISO/DIS 23150-1, B.3.4)	Number of valid sensors (ISO/DIS 23150-1, A.2.16)	M	Profile: Sensor cluster (ISO/DIS 23150-1, 6.5.7) Optimise LL (ISO/DIS 23150-1, B.1.2) Alternative UTL (ISO/DIS 23150-1, B.1.7) Key: Sensor ID reference (ISO/DIS 23150-1, A.2.17)
		Size type: Dynamic/fixed Size #: Number of valid sensors (ISO/DIS 23150-1, A.2.16)		
		Sensor ID reference (ISO/DIS 23150-1, A.2.17)	M	Profile: Sensor cluster (ISO/DIS 23150-1, 6.5.7) Alternative VRO (ISO/DIS 23150-1, B.1.4)

5.2.2 Sensor health information header

[Table 7](#) defines the interface header for sensor health information ([5.2.2](#)) and the changes due to the adaptation in comparison to the "Generic supportive sensor header" (ISO/DIS 23150-1, 11.3).

Table 7 — Specific signal grouping: Sensor health information header

Signal	RL signal	Option
Interface version ID {major, minor, patch} (ISO/DIS 23150-1, A.1.2)	Mandatory	Profile: Uniqueness of interface versioning (ISO/DIS 23150-1, 6.5.1)
^a Further signals may be added to this header as defined in "Need of logical signal group" (ISO/DIS 23150-1, B.3.4) (see cell "Options").		