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Date: 13 September 2024

Origin: International

Latest date for receipt of comments: 06 November 2024

Project No. 2023/00735

Responsible committee: TPR/1 Technical Product Realization

Interested committees:

Title: Draft BS EN ISO 20223 Technical product documentation (TPD) - Representation and identification of situation features.

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Introduction

This draft standard is based on national and international discussions. Your comments on this draft are invited and will assist in the preparation of the consequent standard.

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.

For national standards, comments will be reviewed by the relevant UK national committee and the resulting standards published as a British Standard.

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Please indicate whether you consider the UK should submit a negative (with supporting technical reasons) or positive vote on this draft. Please indicate if you are aware of any reason why this draft standard should not be published as a British Standard.

Submission of Comments

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- All comments should be submitted online at <https://standardsdevelopment.bsigroup.com/>. You will need to register in order to comment.

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 20223

Technical product documentation (TPD) — Representation and identification of situation features

*Documentation technique des produits (TPD) — Représentation
et identification des éléments de situation*

ICS: 01.110

ISO/TC 10/SC 1

Secretariat: **BSI**

Voting begins on:
2024-09-13

Voting terminates on:
2024-12-06

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Reference number
ISO/DIS 20223:2024(en)

Full document details: 24/30472123 DC

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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.

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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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 10, Technical Product documentation (TPD)/SC1, Basic conventions.

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

This document is a technical product documentation (TPD) standard and should be regarded as a complementary standard.

To any integral surface or collection of integral surfaces can be assigned a minimum set of one to three situation features, each being of a different type, depending on the invariance class it belongs to. Situation features are defined in ISO 17450-1:2011 as being a point, a straight line or a plane. Altogether, the situation features allow for situating (i.e., orienting and / or positioning) the corresponding integral surface or collection of integral surfaces with respect to other geometrical features.

The purpose of this document is to standardize the means to graphically represent and identify the situation features of a single feature or of a compound feature (collection of features), thereby, explicitly indicating the relationship between an integral feature and its situation features.

Drawings and models are used in a variety of situations, e.g. functional design, manufacturing and verification (see ISO/TS 21619 on Types of documents with GPS). In many cases, it can be challenging to communicate unambiguously when referencing in different documents a specific situation feature, whether orally or in writing, without depicting the part or specific details of the part that are not necessarily illustrated adequately on the drawing.

Furthermore, situation features identifiers can be used to clarify a TPD. This is the intention of TC213, Dimensional and geometrical product specifications and verification, to use them in ISO GPS standards as a means to clarify the expression of geometrical specifications. Human-readable identifiers for situation features are needed to ease the communication between stakeholders and clarify with respect to which situation features other situation features are specified, i.e. establish human-understandable traceability, and provide means to establish traceability between the drawing and other TPD. CAD-vendors are encouraged to implement a harmonized unique identifier for situation features to support the implementation of the benefits given above in this introduction and in the standard.

Technical product documentation (TPD) — Representation and identification of situation features

1 Scope

This document defines how to, if requested, represent the situation features of an integral surface or of a collection of integral surfaces, and how identify them uniquely by an alphanumerical in a technical product documentation (particularly in a drawing). It also defines how to indicate, if required, the type of each situation feature or the type of each minimum set of situation features, and how to represent, if required, the positive direction of a situation feature, and the intrinsic mobilities inside a minimum set of situation features.

The proportions and dimensions of the graphical symbols to be used are also defined.

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 1101:2017, *Geometrical product specifications (GPS) — Geometrical tolerancing — Tolerances of form, orientation, location and run-out*

ISO 5459:2011, *Geometrical product specifications (GPS) — Geometrical tolerancing — Datums and datum systems*

ISO/FDIS 5459:2011/DAM1:2024, *Geometrical product specification (GPS) — Geometrical tolerancing — Datum and datum systems*

ISO/FDIS 7499:2024, — *Technical product documentation (TPD) — Unique Integral Feature Identification (UIFI)*

ISO 17450-1:2011, *Geometrical product specifications (GPS) — General concepts — Part 1: Model for geometrical specification and verification*

3 Terms and definitions

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

ISO and IEC maintain terminological 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/>

3.1

situation feature

point, straight line, plane, from which the situation of a geometrical feature can be totally or partially defined

[SOURCE: ISO 17450-1:2011, 3.3.1.1.3 modified]

Note 1 to entry: In ISO 17450-1:2011, it is considered that a situation feature can also be a helix. This case is discarded in this document, see [6.3.5](#) and [B.2.4](#).

3.2**minimum set of situation features**

set of situation features consisting of at most one point, at most one straight line, and at most one plane, following the condition: point on line in plane

Note 1 to entry: When the minimum set of situation features consists of all three types of situation features, the set is called a complete minimum set of situation features.

3.3**type of a minimum set of situation features**

geometrical type of a minimum set of situation features:

- type “Point”, type “Straight Line”, or type “Plane”, when the minimum set of situation features consists of one single situation feature;
- type “Point in Plane”, type “Point on Line”, or type “Line in Plane”, when the minimum set of situation features consists of two situation features of different types
- type “Point on Line in Plane”, when the minimum set of situation features is complete

3.4**type identifier of the type of a minimum set of situation features**

identifier made of two to five letters between square brackets, as indicated in [Table 5](#)

4 Elements for the representation and identification of situation features

When required, the situation features of an integral feature (single or compound) shall be represented and identified in the TPD (nominal model or 2D drawing) with the following elements:

- The explicit representation of each situation feature, according to the rules defined in [clause 5](#);
- The situation feature identification, as defined in [clause 6](#).

When used, the explicit representation of a situation feature shall be complemented with the corresponding situation feature identification.

These elements are optional. [Annex A](#) stipulates when a situation feature is implicitly represented.

5 Graphical symbols for the representation of situation features**5.1 Minimum set of a single situation feature**

The explicit nominal representation of a minimum set of a single situation feature (set of only one situation feature of type point, or of type straight line, or of type plane) shall be made in accordance with [Table 1](#). Type identifiers are defined in [Table 5](#).

[Annex C](#) provides the proportions and dimensions of the graphical symbols.

A situation feature of type “point” shall be represented by a wide line cross, either of standard height or of extended height; or if required for legibility, by a circled cross with two quarters blackened, either of standard height or of extended height.

NOTE The choice of the type of cross to be used in TPD shall be determined by the legibility. The default representation shall be with a wide line cross of standard height.

A situation feature of type “straight line” shall be represented by a long-dashed double-short-dashed wide line (type 09.2 of ISO 128-2:2022). If viewed end-on, it shall be represented by a wide line cross, either of standard height or of extended height.

NOTE If viewed-on, only the wide line cross shall be used.

A situation feature of type “plane” shall be represented by four straight segments drawn with long-dashed double-short-dashed wide lines (type 09.2 of ISO 128-2:2022), forming a rectangle (in 2D), or a parallelogram (in 3D), representing the borders of the plane. If viewed edge-on, a long-dashed double-short-dashed wide line (type 09.2 of ISO 128-2:2022).

Table 1 — Representation of a minimum set of a single situation feature

Type of the minimum set of situation features	Example in 3D	Example in 2D	
		Front view	End view
Point [PT]		×	
		×	
		⊗	
		⊗	
Straight line [SL]			
Plane [PL]			

5.2 Minimum set of a pair of situation features

The explicit nominal representation of a minimum set of a pair of situation features shall be made in accordance with [Table 2](#), each single situation feature being represented according to the rules defined in [5.1](#). Type identifiers are defined in [Table 5](#).

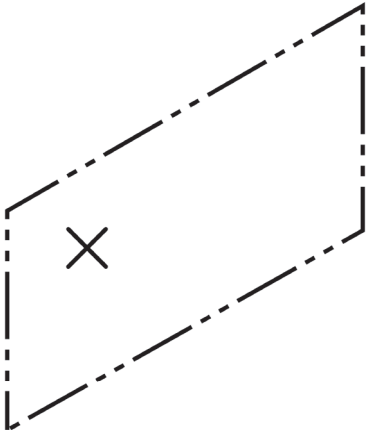
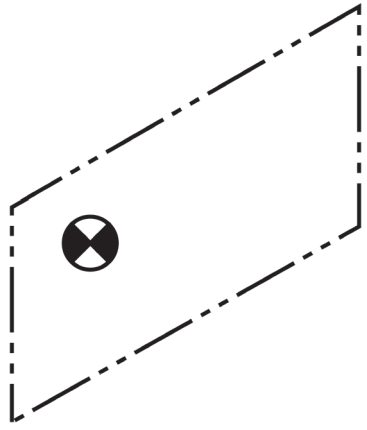
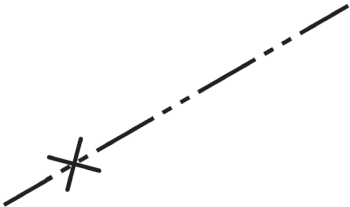
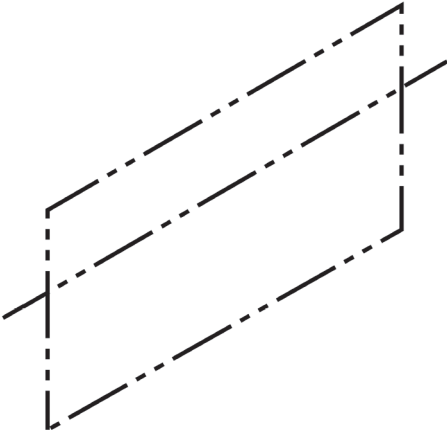
A minimum set of a pair of situation features of type “point in plane” shall be represented by a cross inside a plane, so that at least one of the two mediating lines of the cross is parallel to the outlines of the plane. If viewed end-on, it shall be represented by a cross on a straight line, the cross is oriented by the line. When the situation feature is alternatively represented by a circled cross with two blackened quarters inside the plane, its orientation shall not be constrained.

A minimum set of a pair of situation features of type “point on line” shall be represented by a cross on a straight line, oriented so that the straight line is a mediating line of the cross. If viewed end-on, it shall be represented by a cross.

A minimum set of a pair of situation features of type “line in plane” shall be represented by a line inside a plane. Two of the four borders of the plane shall be parallel to the straight line, at a distance from the straight line at least equal to ten times the thickness of the line. The straight line shall extend beyond both sides of the two other borders by a length at least equal to ten times the thickness of the line. If viewed end-on, it shall be represented by a cross on a straight line, oriented so that the straight line is a mediating line of the cross.

NOTE In all cases where a situation feature of type “point” is one of the elements of the minimum set of situation features, as exemplified in with [Table 2](#) for the type [TiP], it can be represented by either way presented in [Table 1](#).

Table 2 — Representation of a minimum set of a pair of situation features

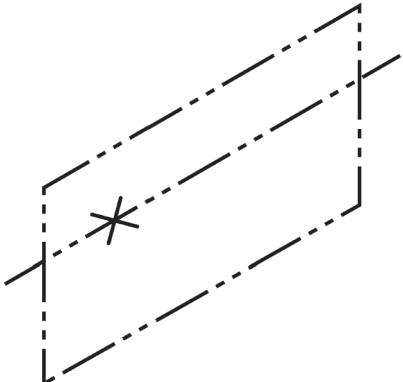
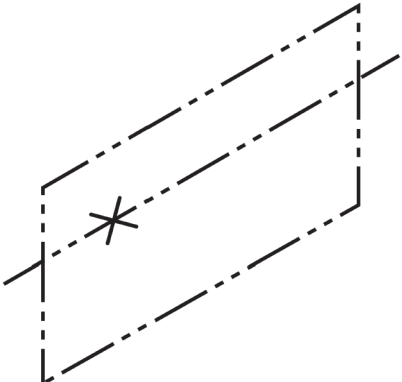
Type of the minimum set of situation features	Example in 3D	Example in 2D	
		Side view	End view
Point in Plane [TiP]			
			
Point on Line [ToL]			
Line in Plane [LiP]			

5.3 Complete minimum set of situation features

The explicit nominal representation of a complete minimum set of situation features, i.e. of a Point on a Line in a Plane (set of type [ToLiP]) shall follow the rules of representation defined in 5.1 and 5.2. Type identifiers are defined in Table 5.

Table 3 shows the representation of a (complete) set of situation features of type [ToLiP].

Table 3 — Representation of a (complete) minimum set of situation features

Type of the minimum set of situation features	Example in 3D	Example in 2D	
		Side view	End view
Point on Line in Plane [ToLiP]			

The situation feature of type “point” can be represented by either way presented in Table 1.

NOTE Since the point is on the straight line, this is the straight line that drives the orientation of the cross, and not the borders of the plane.

5.4 Rules of representation

On the TPD, it is recommended that the explicit nominal representation of a situation feature only slightly exceeds the extent of the corresponding integral feature (using the usual practice for the representation of axes or median planes). However, if needed to improve legibility, this representation may be extended further out or reduced.

See examples in Clause 6.3.

5.5 Representation of the positive direction of situation features of types [PL] or [SL]

5.5.1 Positive direction of a situation feature

It can be useful or required to assign a positive direction to situation features of type “plane” or of type “straight line”. This representation is optional.

When required, the positive direction of a situation feature shall be represented either directly, or indirectly if a coordinate system is established on a minimum set of situation features.

Annex C provides the proportions and dimensions of the graphical symbols.