International Standard

ISO 20223

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

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

First edition
2026-07

Reference number
ISO 20223:2026(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 ... **iv**
Introduction ... **v**
1 Scope ... **1**
2 Normative references ... **1**
3 Terms and definitions ... **1**
4 Elements for the representation and identification of situation features ... **2**
5 Graphical symbols for the representation of situation features ... **2**
5.1 Single situation feature and minimum set of a single situation feature ... 2
5.2 Minimum set of a pair of situation features ... 3
5.3 Complete minimum set of situation features ... 4
5.4 Recommendation of representation ... 5
5.5 Representation of the positive direction of situation features of types [PL] or [SL] ... 5
5.5.1 Positive direction of a situation feature ... 5
5.5.2 Direct representation of the positive direction of a situation feature ... 5
5.5.3 Indirect representation of the positive direction of situation features by a Cartesian coordinate system ... 7
6 Situation feature identification ... **8**
6.1 Graphical symbol for the identification of situation features ... 8
6.2 Situation feature identifier ... 9
6.3 Identification of the situation features of a single integral surface ... 10
6.3.1 Identifier arrangement ... 10
6.3.2 Examples of identification of single situation features ... 10
6.3.3 Examples of identification of minimum sets of at least two situation features ... 11
6.3.4 Situation features of a single datum feature ... 13
6.3.5 Situation features of a surface of invariance class helical ... 14
6.4 Identification of the situation features of a collection of integral surfaces ... 15
6.4.1 Identifier arrangement ... 15
6.4.2 Examples ... 15
6.4.3 Situation features of a collection of datum features ... 16
6.5 Identification of the situation features of a member of a pattern of integral surfaces ... 18
6.5.1 Identifier arrangement ... 18
6.5.2 Example ... 18
6.6 Identification of multiple sets of situation features ... 19
6.6.1 Identification of multiple minimum sets of situation features ... 19
6.6.2 Identification of sets of situation features that do not constitute a minimum set of situation features ... 20
6.7 Identification of coordinate systems established on a complete minimum set of situation features ... 22
Annex A (normative) **Cases where a situation feature is implicitly represented** ... **23**
Annex B (normative) **Representation of intrinsic mobilities** ... **25**
Annex C (normative) **Proportions and dimensions of the graphical symbols** ... **32**
Bibliography ... **38**

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 10, *Technical product documentation*, Subcommittee SC 1, *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 regarded as a complementary standard.

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

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 set of situation features.

Drawings and models are used in a variety of situations, e.g. functional design, manufacturing and verification (see ISO/TS 21619). 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. They are also used in ISO GPS standards (see ISO 5459) 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 this document.

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

1 Scope

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

Annex A defines the cases where the representation of situation features is not required.

Annex B defines how to represent the intrinsic mobilities inside a minimum set of situation features.

Annex C defines the proportions and dimensions of the graphical symbols to be used.

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 128-2:2022, *Technical product documentation (TPD) — General principles of representation — Part 2: Basic conventions for lines*

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

ISO 7499, *Technical product documentation (TPD) — Unique integral feature identification (UIFI)*

ISO 10209, *Technical product documentation — Vocabulary — Terms relating to technical drawings, product definition and related documentation*

ISO 81714-1, *Design of graphical symbols for use in the technical documentation of products — Part 1: Basic rules*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 10209 and the following 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/

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 — In ISO 17450–1:2011, it is considered that a situation feature can also be a helix. That 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 straight line in plane

Note 1 to entry: When a 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
"point", or "straight line", or "plane", or "point in plane", or "point on line", or "line in plane", or "point on line in plane"

Note 1 to entry: These seven types of minimum sets of situation features are grouped into three categories: "minimum set of a single situation feature", "minimum set of a pair of situation features", and "complete minimum set of situation features", see Table 5.

3.4
identifier of the type of a minimum set of situation features
type identifier
identifier of the type of a single situation feature, or minimum set of a single situation feature (two letters between square brackets "[ ]"), or of the type of a minimum set of situation features made up of more than one situation feature (a combination of the letters identifying a single situation feature and of slash signs "/", between square brackets "[ ]")

Note 1 to entry: The list of type identifiers is given in Table 5.

4 Elements for the representation and identification of situation features

When situation features of an integral feature (single or compound, considered or not as a datum feature) are indicated in the TPD (3D model or 2D drawing), they shall be represented and identified with the following elements:

— the explicit representation according to the rules defined in Clause 5;

— the identification, as defined in Clause 6.

Annex A shall be used when a situation feature is implicitly represented and then does not require an explicit representation and identification.

Annex B shall be used to represent the intrinsic mobilities inside a minimum set of situation features.

5 Graphical symbols for the representation of situation features

5.1 Single situation feature and minimum set of a single situation feature

The explicit nominal representation of a single situation feature, or 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.

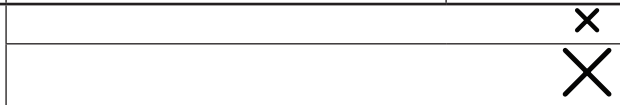
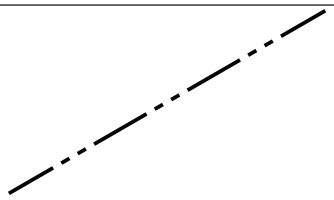
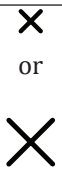
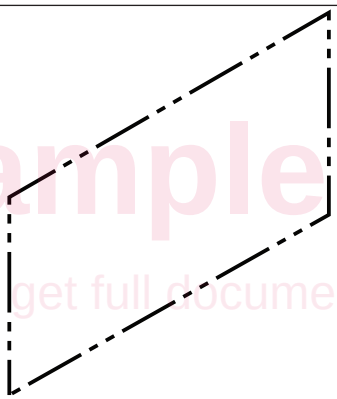
The proportions and dimensions of the graphical symbols shall follow Annex C.

A situation feature of type "point" shall be represented by a wide line cross, either of standard height or of extended height. The choice of the type of cross to be used in TPD shall be determined by the visibility. 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, Table D.1). If viewed end-on, a wide line cross, either of standard height or of extended height, 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 a plane. If viewed end-on, a long-dashed double-short-dashed wide line (type 09.2 of ISO 128-2:2022) shall be used.

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

Type name and type identifier	Example in 3D	Example in 2D	
		Front view	End view
Point [PT]			
Straight line [SL]			 or
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.

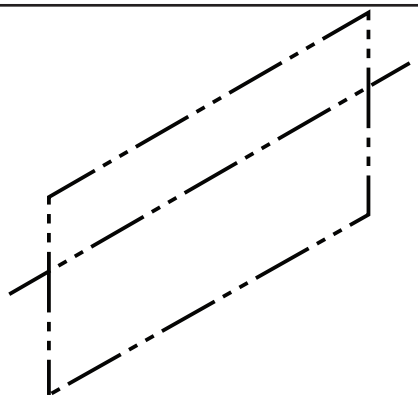
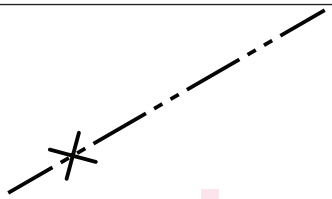
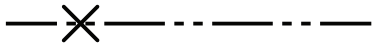
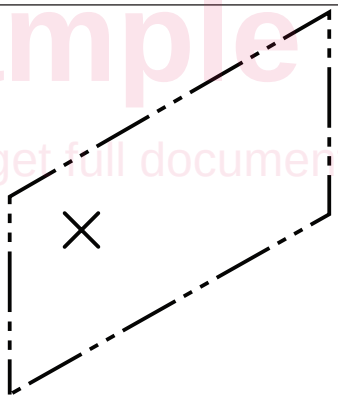
A minimum set of a pair of situation features of type “line in plane”, or “LiP”, shall be represented by a straight line inside a parallelogram. Two of the four borders of the parallelogram shall be parallel to the straight line, at a distance from the straight line at least equal to ten times the width of the line. The straight line shall extend beyond both sides of the two other borders of the parallelogram by a length at least equal to ten times the width 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 bisecting line of the cross.

A minimum set of a pair of situation features of type “point on line”, or “ToL”, shall be represented by a cross on a straight line, oriented so that the straight line is a bisecting 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 “point in plane”, or “TiP”, shall be represented by a cross inside a parallelogram. The extension of the representation of the situation feature of type plane shall be large enough to include the representation of the situation feature of type point. At least one of the two bisecting lines of the cross shall be made parallel to the outlines of the plane. If viewed end-on, the situation

feature of type point shall be represented by a cross on a straight line, the cross shall be oriented by the line so that the straight line is a bisecting line of the cross.

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

Type names, and type identifier	Example in 3D	Example in 2D	
		Side view	End view
Line in plane, or LiP [SL/PL]			
Point on line, or ToL [PT/SL]			
Point in plane, or TiP [PT/PL]			

NOTE In all cases where a situation feature of type “point” is one of the elements of the minimum set of situation features, it can be represented by either way presented in Table 1.

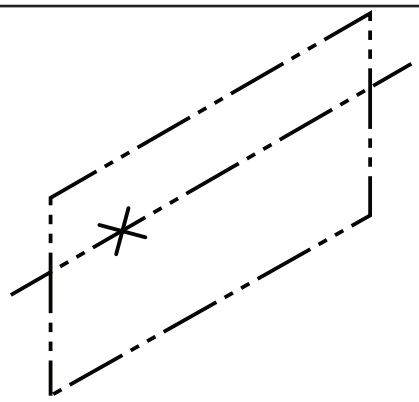
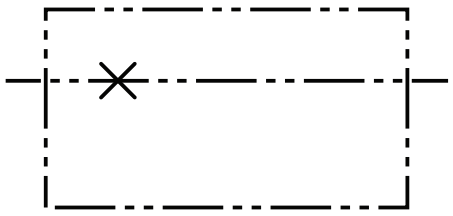
5.3 Complete minimum set of situation features

The explicit nominal representation of a complete minimum set of situation features, i.e. made of a “point on a straight line in a plane”, or “ToLiP”, shall combine the representations defined in 5.1. The cross representing the situation feature of type point shall be oriented by the line representing the situation feature of type straight line so that the line is a bisecting line of the cross.

Type identifier is defined in Table 5.

Table 3 shows the representation of a (complete) minimum set of situation features of type “ToLiP”.

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

Type names, and type identifier	Example in 3D	Example in 2D	
		Side view	End view
Point on line in plane, or ToLiP [PT/SL/PL]			

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

5.4 Recommendation of representation

On the TPD, it is recommended that the explicit nominal representation of a situation feature exceeds the extent of the corresponding integral feature (considered or not as a datum feature). The common practice for the representation of axes or median planes is to extend them by ten times the width of the line. It is recommended to follow this practice for the explicit representation of a situation feature. However, if needed to improve visibility, this representation can be extended further out or more limited. See examples in 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

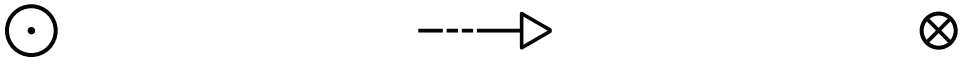
It can be useful or required to assign a positive direction to situation features of type “plane” or of type “straight line”. When useful or required, the positive direction of a situation feature shall be represented either directly (see 5.5.2), or indirectly when a coordinate system is established on a minimum set of situation features (see 5.5.3).

The proportions and dimensions of the graphical symbols shall follow Annex C.

5.5.2 Direct representation of the positive direction of a situation feature

5.5.2.1 Representation of the positive direction of a situation feature of type “straight line”

When required to explicitly assign a positive direction to a situation feature of type “straight line”, it shall be indicated with a plain arrowhead with an opening angle of 60° and with a line tail of type 09.2, as shown in 2D in Figure 1. The arrow termination shall indicate the positive direction.

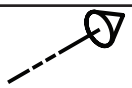
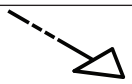
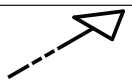
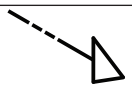
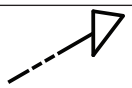


a) Front view **b) Side view** **c) Rear view**

Figure 1 — Generic symbol for the positive direction of a situation feature of type [SL] in 2D

The 3D representation of the positive direction is shown in Table 4.

Table 4 — 3D representation of the positive direction of a situation feature of type [SL], when annotated on a CAD model

	Front view tilted positive direction	Rear view tilted positive direction
In 3D		
In horizontal annotation planes		
In vertical annotation planes		

5.5.2.2 Representation of the positive direction of a situation feature of type “plane”

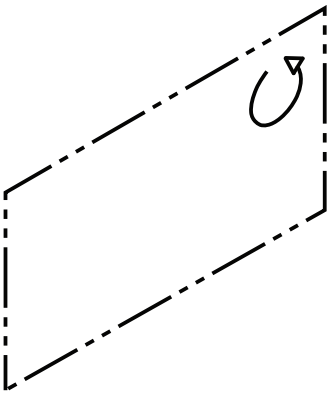
When required to explicitly assign a positive direction to a situation feature of type “plane”, the symbol shall be indicated with a 300° circular arrow, with a plain white arrowhead and a wide line tail, as defined in Figure 2.

Figure 2 — Symbol for the positive direction of a situation feature of type [PL]

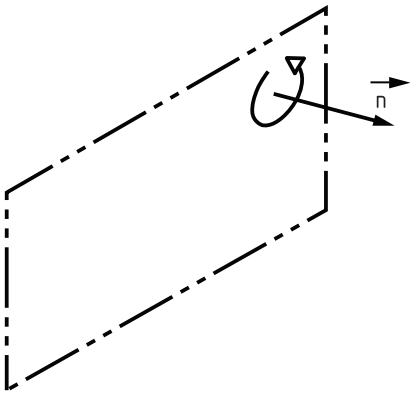
The symbol shall be put close to one of the corners of the situation feature, as shown in Figure 3. The choice of the corner as well as the distance between the symbol and the edge shall be determined by visibility conditions.

Figure 3 — Representation in 2D of the positive direction of a situation feature of type [PL]

The arrow indicates the direction of the normal vector to the plane, the normal vector matching the trigonometrical direct positive direction of the circle, as shown in Figure 4.



a) Representation in 3D of the positive direction



b) Corresponding direction of the normal to the plane