
**Road vehicles — Product data
exchange between chassis and
bodywork manufacturers (BEP) —**

**Part 6:
Coding of hook loader bodywork**

*Véhicules routiers — Echange de données de produit entre les
fabricants de châssis et de carrosseries (BEP) —*

Partie 6: Codage des bras hydrauliques pour bennes amovibles



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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).

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. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents).

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 40, *Specific aspects for light and heavy commercial vehicles, busses and trailers*.

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.

A list of all parts in the ISO 21308 series can be found on the ISO website.

Introduction

Based on the ISO BEP (bodywork exchange parameters) system, this document specifically deals with the coding of dimensions and other characteristics of hook loaders. The aim is to ensure an efficient and unambiguous communication of dimensional installation data between the parties involved.

The document also covers coding of characteristics of hydraulic, electrical and electronic interfaces to the vehicle.

The document is useful for all parties involved in the installation of hook loaders to vehicles, e.g. hook loader manufacturers, truck chassis manufacturers, and bodywork manufacturers.

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Road vehicles — Product data exchange between chassis and bodywork manufacturers (BEP) —

Part 6: Coding of hook loader bodywork

1 Scope

This document series describes a generic system for the exchange of data between truck chassis manufacturers and bodywork manufacturers. It applies to commercial vehicles as defined in ISO 3833, having a maximum gross vehicle mass above 3 500 kg.

The process of exchanging the above information can involve:

- chassis manufacturer;
- chassis importer;
- chassis dealer;
- one or more bodywork manufacturers; and
- bodywork component suppliers, e.g. manufacturers of demountable bodies, cranes and loading equipment, tipping equipment.

This document specifically deals with the coding of dimensions and other characteristics of hook loaders, to ensure an efficient and unambiguous communication of installation data between the parties involved.

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 21308-1, *Road vehicles — Product data exchange between chassis and bodywork manufacturers (BEP) — Part 1: General principles*

ISO 21308-2, *Road vehicles — Product data exchange between chassis and bodywork manufacturers (BEP) — Part 2: Dimensional bodywork exchange parameters*

ISO 21308-3, *Road vehicles — Product data exchange between chassis and bodywork manufacturers (BEP) — Part 3: General, mass and administrative exchange parameters*

3 Terms and definitions

For the purposes of this document the terms and definitions given in ISO 21308-2 and the following apply.

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

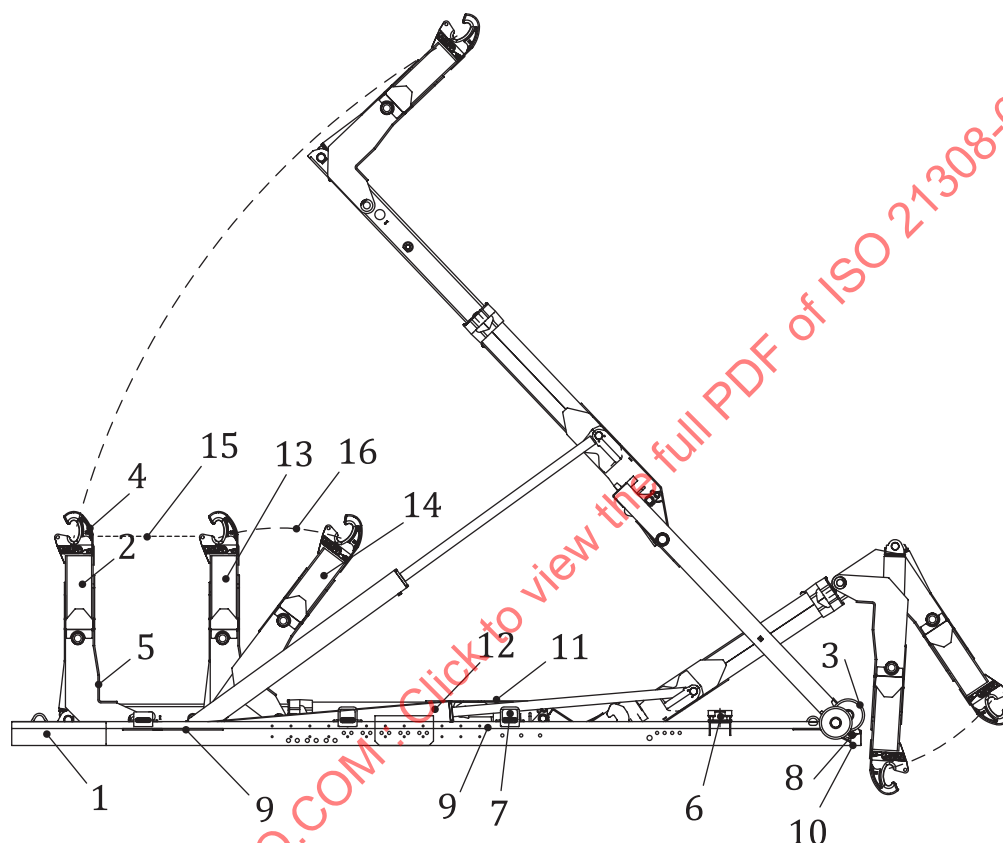
- IEC Electropedia: available at <http://www.electropedia.org/>
- ISO Online browsing platform: available at <https://www.iso.org/obp>

3.1 hook loader hook lift

vehicle or trailer mounted powered equipment comprising of a hook arm column that can move longitudinally in a telescopic and articulated path, designed for loading, unloading and tipping containers and other demountables equipped with hook lift frames

Note 1 to entry: Both expressions (hook loader and hook lift) are used worldwide. In this document, the term hook loader is used.

Note 2 to entry: [Figure 1](#) shows the main parts of a hook loader referred to in this document.



Key

1	hook loader subframe	9	container load bed
2	hook arm	10	reference point
3	rear roller	11	middle frame highest point
4	hook	12	main cylinder
5	push-back block	13	non-articulated hook arm
6	container locking mechanism	14	articulated hook arm
7	container support	15	telescopic movement
8	tipping pivot point	16	articulation movement

Figure 1 — Main parts and characteristics of hook loader

4 Coding principles

4.1 BEP codes of bodywork for hook loaders

Each characteristic, related to the hook loader and its interfaces to truck chassis, is assigned a code composed of the items given below. A prefix “BEP”, followed by a dash (-), shall be used to avoid confusion with other coding systems.

BEP codes are formatted according to the principles in [Table 1](#).

Table 1 — BEP coding principles

BEP-ppMccc.n.p.q.s.t		
Item	Assignment	Description
pp	Bodywork category	pp = None or 00 for codes related to vehicle chassis (ISO 21308-2 and ISO 21308-3) pp = 01 for codes related to loader cranes (ISO 21308-5) pp = 02 for codes related to hook loaders (ISO 21308-6) pp = 03 for codes related to skip loaders (ISO 21308-7) Future parts of the ISO 21308 series may introduce new pp numbers.
M	Measure type	A capital letter, which denotes the type of code: H = Z direction, coordinate system in accordance with ISO 4130 L = X direction, coordinate system in accordance with ISO 4130 W = Y direction, coordinate system in accordance with ISO 4130 C = Coordinate (x,y) or (x,y,z) in the Cartesian coordinate system R = Radius V = Angle M = Mass (m), or mass point (m,x,y,z) F = Force (static or dynamic) T = Moment (static or dynamic) G = General A = Administrative
ccc	BEP code number	Code number given by the standard
.n	Index number	.n is used to designate object number n
.p	Entity number	.p is used to designate a certain set of object characteristics or entities (e.g. dimensions, coordinates, address information) Where both .n and .p are specified, they are given in the .n .p order.
.q	Corner number	.q is used to designate contour corner index number
.s	Side designator	L or R
.t	Type designator	.t is used to designate a certain type (e.g. “Rigid” or “Flexible”)

NOTE Dimensions, except for radius, can be positive or negative.

4.2 Units of BEP code values

The following units are preferred when reporting values related to BEP codes (see also ISO 21308-1):

- dimensions (L, W, H, R) and coordinates (x, y, z) in millimetres (mm);
- masses in kilograms (kg);

- forces in Newtons (N), or kN;
- moments in Newtonmetres (Nm), or kNm; and
- angles in degrees (°).

NOTE Guidance on units is shown in the unit column for each BEP code.

4.3 References for measurements

4.3.1 Global coordinate system (X, Y, Z)

A vehicle coordinate system according to ISO 4130 is applied, see [Figure 2](#). Global coordinates for the vehicle are denominated X, Y and Z (uppercase letters).

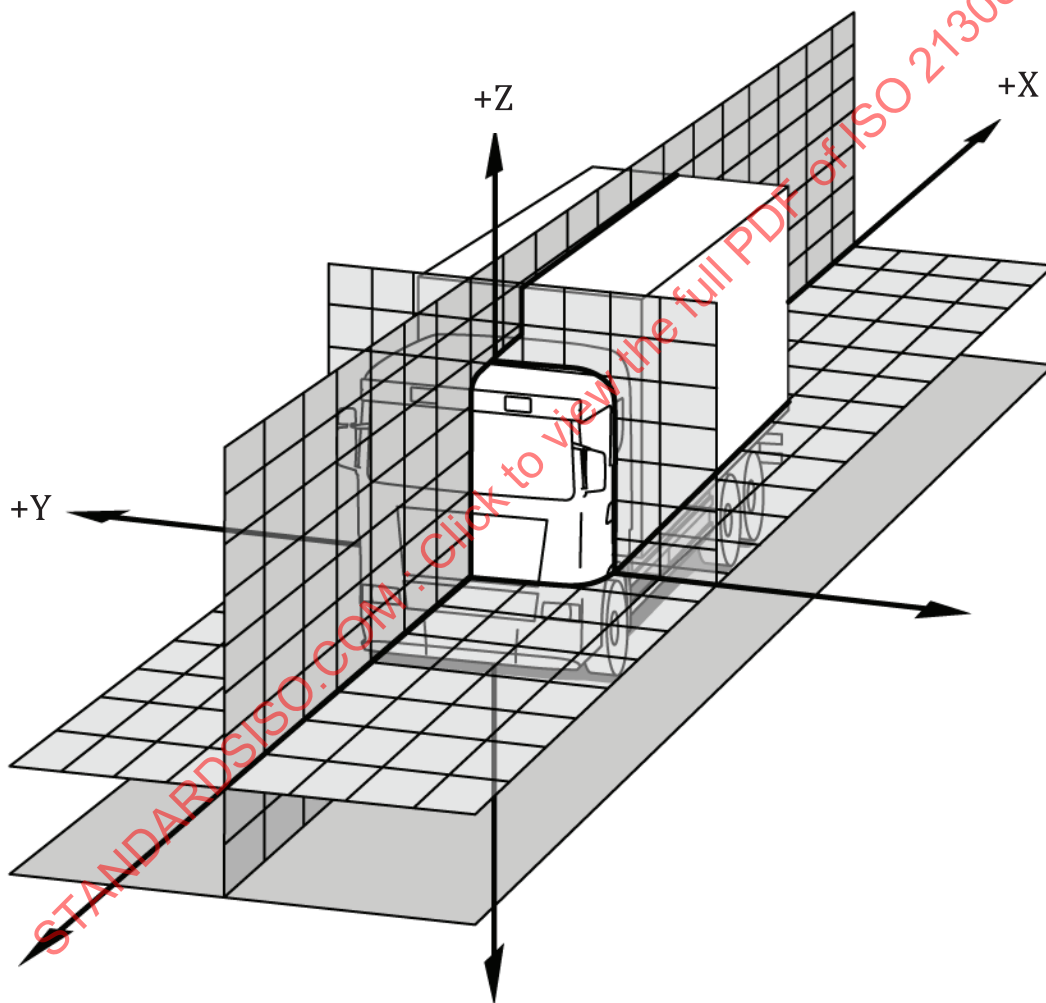


Figure 2 — Vehicle coordinate system according to ISO 4130

4.3.2 Hook loader coordinate system

For a default mounting position, the principle should be that the hook loader coordinate directions should coincide with those of the vehicle. Local bodywork coordinates are denominated x, y and z (lowercase letters), see [Figure 3](#).

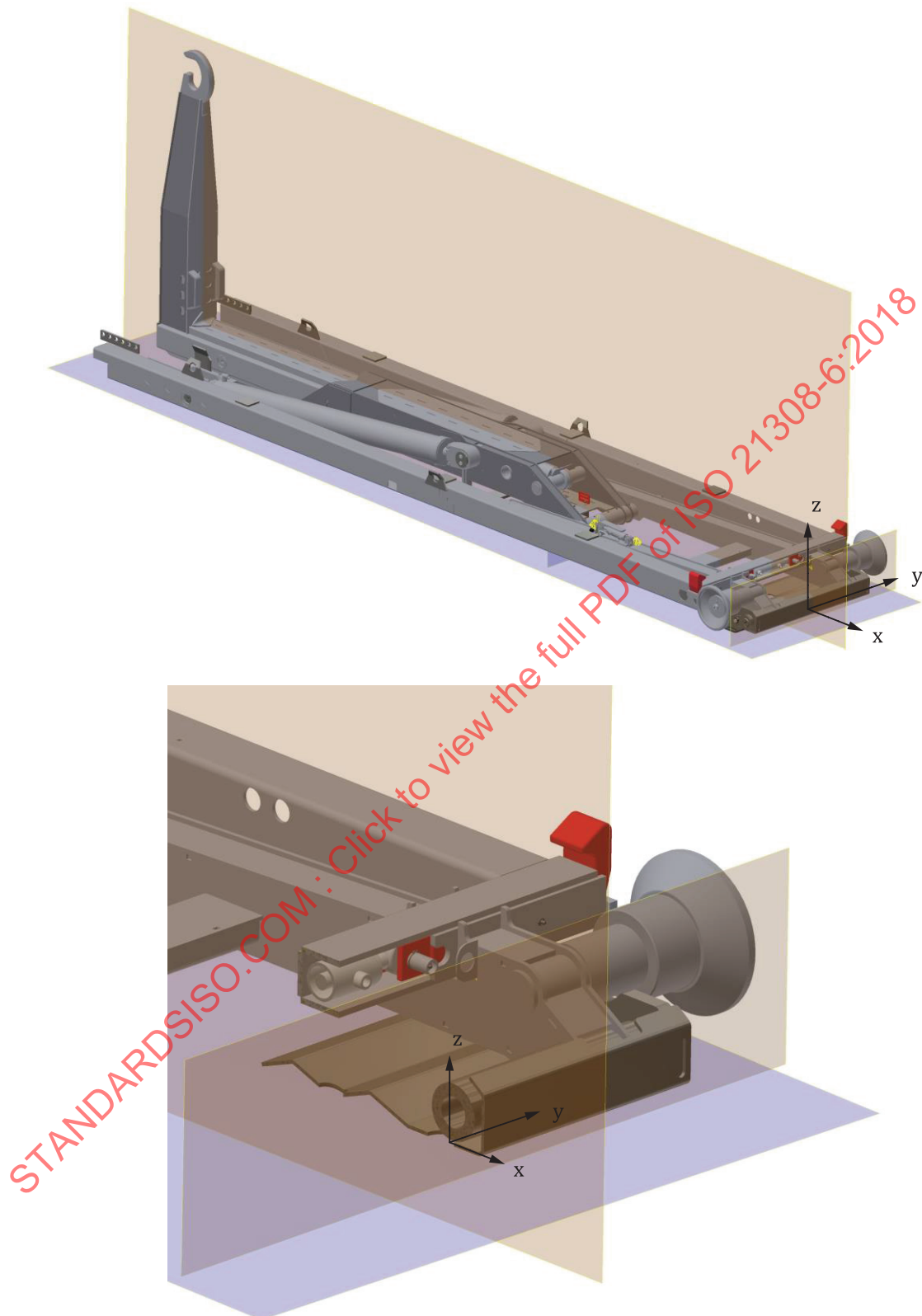


Figure 3 — Local coordinate system for hook loader

The origin of the coordinate system for a hook loader (referred to as zero reference point in this document) is defined by:

- Local $x = 0$ for the plane through the centre of the tipping shaft;

- Local $y = 0$ for the longitudinal plane through the single pickup point of the hook loader; and
- Local $z = 0$ at the lower mounting plane of the hook loader subframe.

NOTE For installation of a hook loader on a truck chassis, an additional frame could be required between the chassis top mounting plane and hook loader lower mounting plane.

4.4 Related XML coding

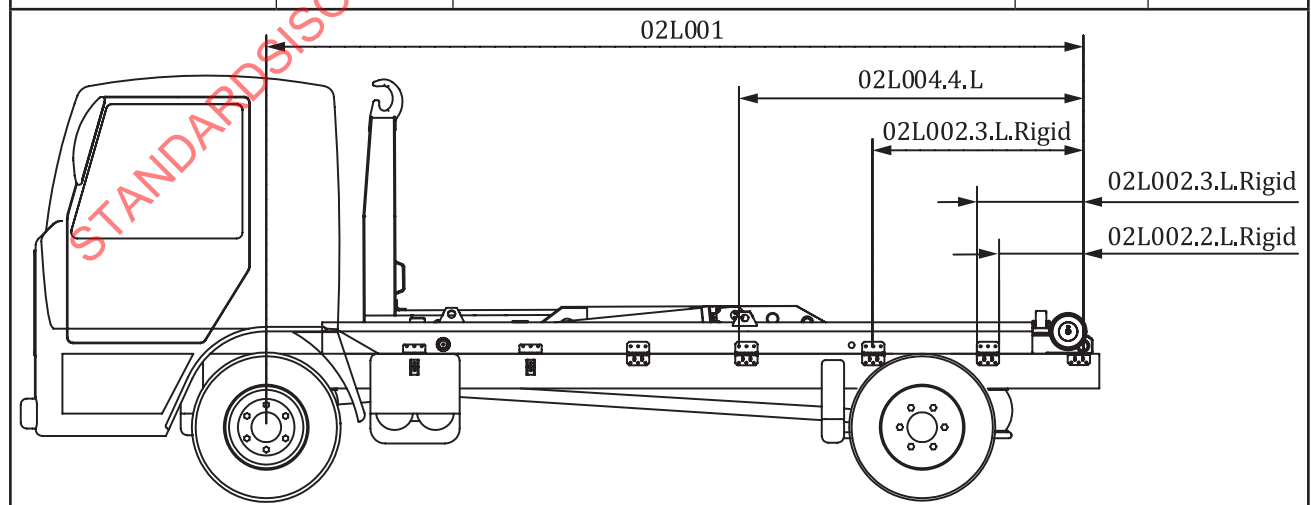
Any XML implementation for the communication of BEP codes shall follow the requirements given in ISO 21308-1. The XML coding related to this document shall be written according to the indications in [Annex A](#)

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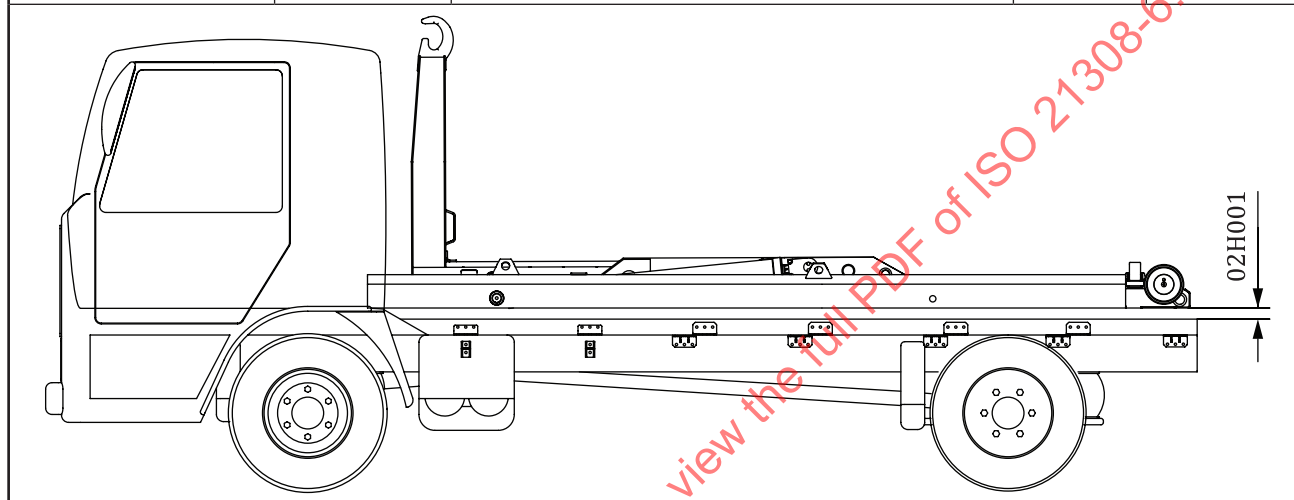
5 Coding of geometrical data and space requirements

5.1 Installation of hook loader on vehicle

BEP-code	Assignment	Description	Unit	Presented in
BEP-02L001	Front axle to zero point of hook loader	Distance from the centre of the first front axle to the zero reference point of the hook loader.	mm	2D, 3D, TD
BEP-02L002.p.s.t	Distance between zero reference point and installation interface bracket, minimum	Fixed distance, or minimum distance, from the zero reference point to the centre of interface of the installation interface p of the hook loader. NOTE 1 If the installation interfaces are not symmetrical, different values for right and left hand side apply, marked with .R or .L. NOTE 2 The method of installation is defined in different types (t), specified e.g. "Rigid" or "Flexible". NOTE 3 If L003 exists, L002 is the minimum distance, otherwise it is the fixed distance. EXAMPLE BEP-02L002.3.L.Rigid.	mm	2D, 3D, TD
BEP-02L003.p.s	Maximum distance between zero reference point and installation interface bracket	Maximum distance from the zero reference point to the centre of interface of the installation interface p of the hook loader. NOTE 1 If the installation interfaces are not symmetrical, different values for right and left hand side apply, marked with .R or .L. NOTE 2 If L002 is a fixed distance, L003 is omitted.	mm	2D, 3D, TD
BEP-02L004.p.s	Distance between zero reference point and installation interface hole	Distance from the zero reference point to the first (index) hole of the installation interface p of the hook loader.	mm	2D, 3D, TD



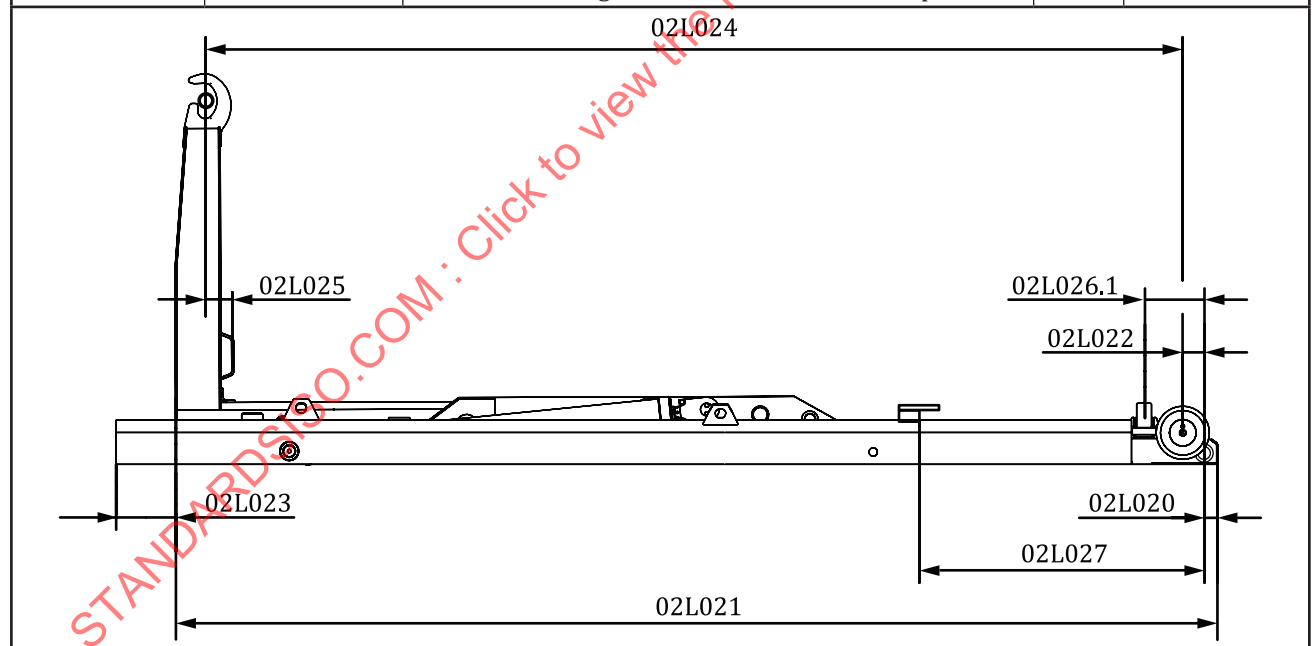
BEP-code	Assignment	Description	Unit	Presented in
BEP-02H001	Distance to reference plane of hook loader	Distance between mounting plane and the reference plane of the hook loader NOTE 1 Mounting plane is either the upper plane of the chassis frame or the upper plane of the additional subframe. The height of an additional subframe is defined in ISO 21308-2 by the code BEP-H070. NOTE 2 02H001 can be used to describe e.g. a space needed for weighing cells. NOTE 3 If there is no distance, 02H001 can be omitted.	mm	2D, 3D, TD



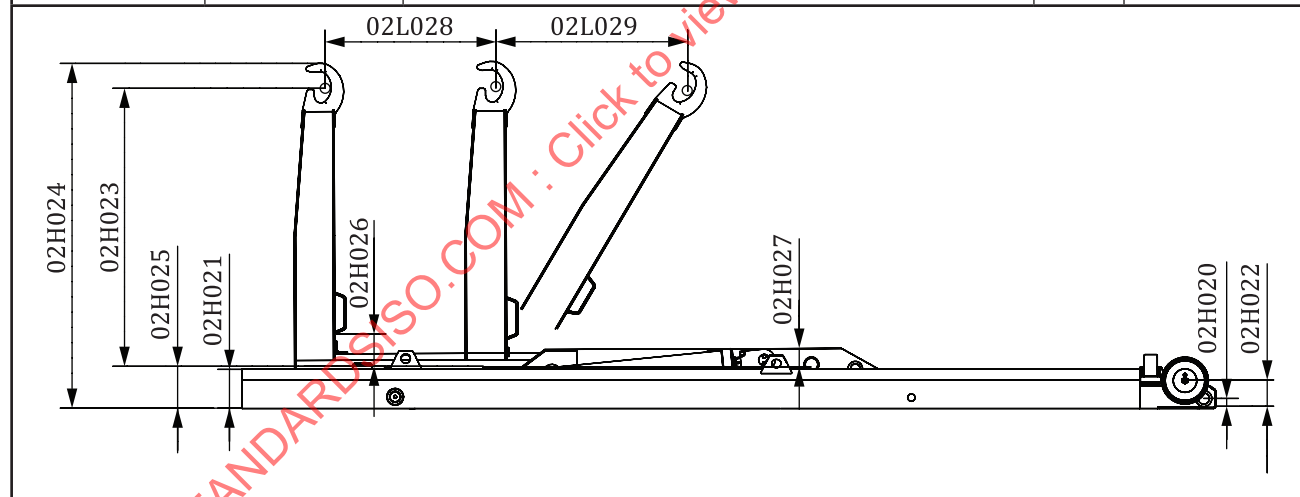
5.2 Main dimensions hook loaders

5.2.1 Transport position

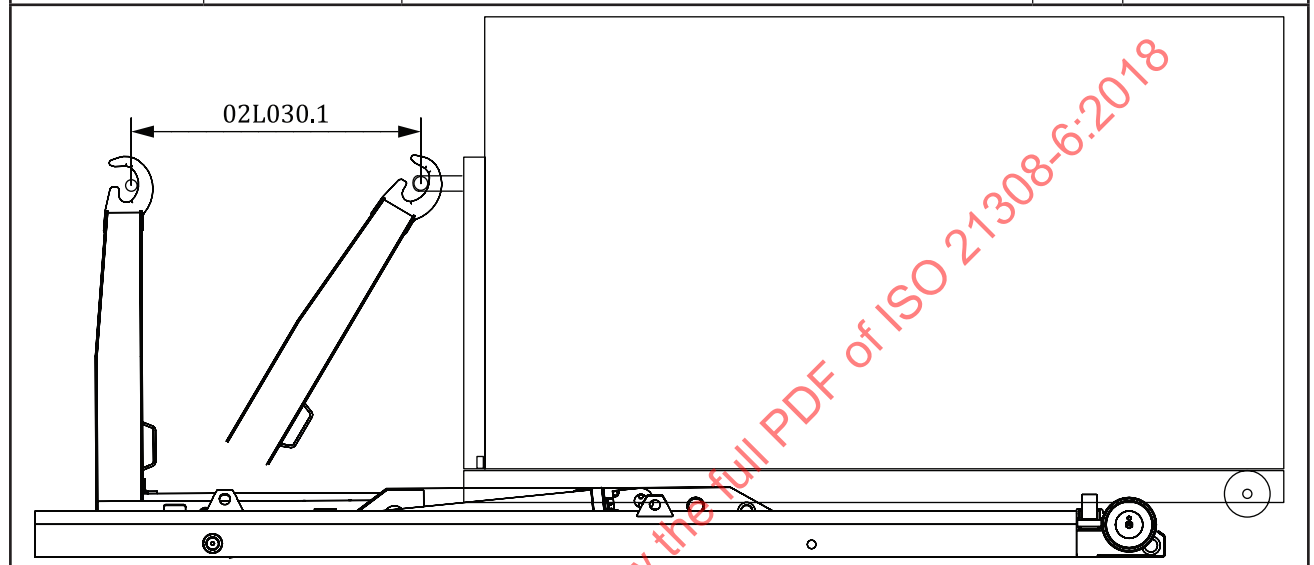
BEP-code	Assignment	Description	Unit	Presented in
BEP-02L020	Subframe overhang rear	Horizontal distance between reference point and rear end of hook loader subframe	mm	2D, 3D, TD
BEP-02L021	Minimum length	Minimum required installation length NOTE The frontmost part can be the vertical hook arm or a cross-member.	mm	2D, 3D, TD
BEP-02L022	Rear roller displacement	Horizontal distance between reference point and centre of rear rollers	mm	2D, 3D, TD
BEP-02L023	Front overhang	Horizontal distance between the frontmost part of the hook arm and the frontmost part of the subframe	mm	2D, 3D, TD
BEP-02L024	Rear roller to hook distance	Horizontal distance between the nominal position of the container bar and the centre of rear rollers	mm	2D, 3D, TD
BEP-02L025	Push-back plane	Horizontal distance between the nominal position of the container bar and the rearmost part of the push-back block	mm	2D, 3D, TD
BEP-02L026.p	Hydraulic lock distance	Horizontal distance between the n-th hydraulic container locking mechanism and the reference point	mm	2D, 3D, TD
BEP-02L027.p	Mechanical lock distance	Horizontal distance between the n-th mechanical container locking mechanism and reference point	mm	2D, 3D, TD



BEP-code	Assignment	Description	Unit	Presented in
BEP-02H020	Tipping pivot height	Vertical distance between the reference point and the centre of the tipping pivot point	mm	2D, 3D, TD
BEP-02H021	Subframe height	Vertical distance between the reference point and the top plane of the subframe	mm	2D, 3D, TD
BEP-02H022	Rear roller height	Vertical distance between the reference point and the centre of the rear rollers	mm	2D, 3D, TD
BEP-02H023	Nominal container bar height	Vertical distance between the container load bed and the nominal position of the container bar	mm	2D, 3D, TD
BEP-02H024	Overall hook height	Vertical distance between the reference point and the top of the hook arm	mm	2D, 3D, TD
BEP-02H025	Load bed height	Vertical distance between reference point and the container load bed	mm	2D, 3D, TD
BEP-02H026	Lower buffer height	Vertical distance between the container load bed and the lowest edge of the push-back block	mm	2D, 3D, TD
BEP-02H027	Required tunnel height	Vertical distance between the container load bed and the highest point of the middle frame NOTE Items connected to the middle frame, e.g. parts of the main cylinder, can be the highest point.	mm	2D, 3D, TD
BEP-02L028	Telescopic range	Horizontal distance between nominal position of the container bar and the position of the container bar when shifted to the rearmost position	mm	2D, 3D, TD
BEP-02L029	Articulation range	Horizontal distance of the container bar between the non-articulated hook arm and the maximum articulated hook arm	mm	2D, 3D, TD

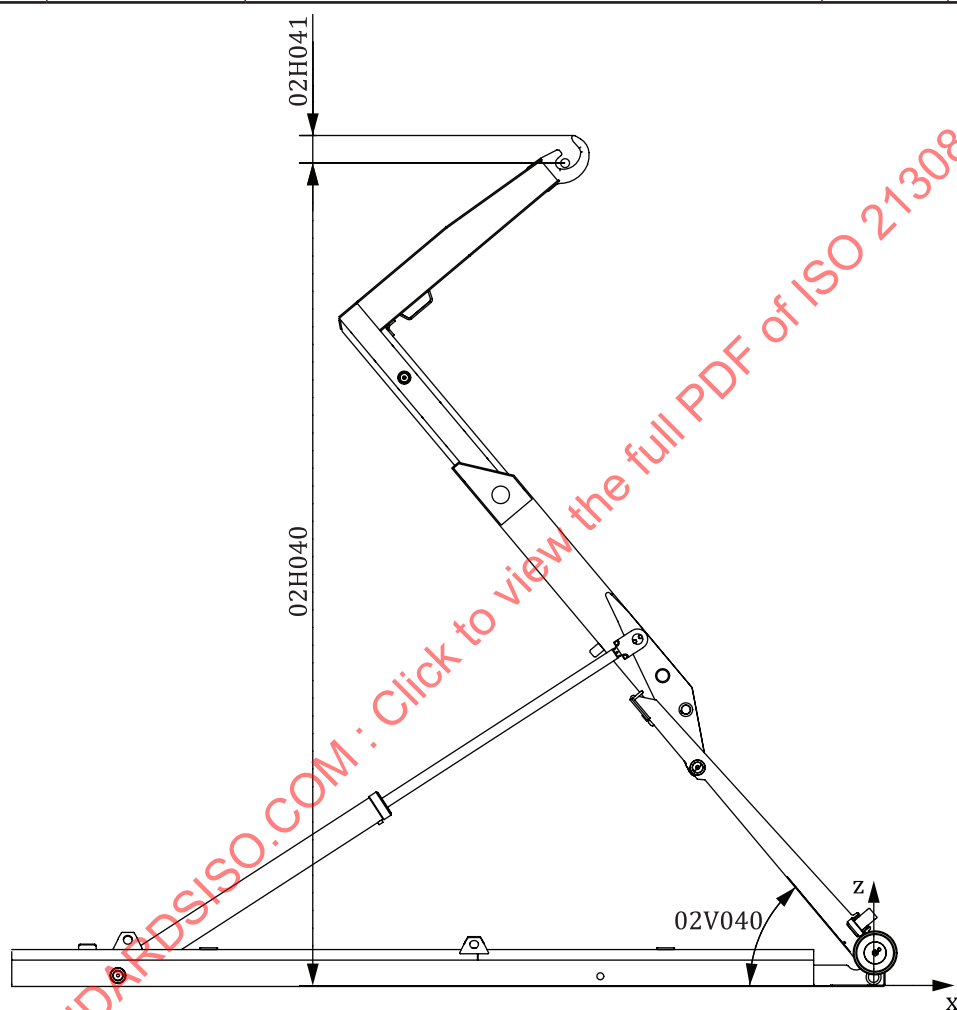


BEP-code	Assignment	Description	Unit	Presented in
BEP-02L030.p	Distance in actual transport position	Horizontal distance of the container bar between the frontmost position and the position applied for transporting container p NOTE 1 This distance can be obtained by any combination of telescopic and articulation movement. NOTE 2 The total length of the hook loader and container combination, measured from the frontmost bar position, is given by 02L030.n + 02R200 + 02L204.	mm	2D, 3D, TD

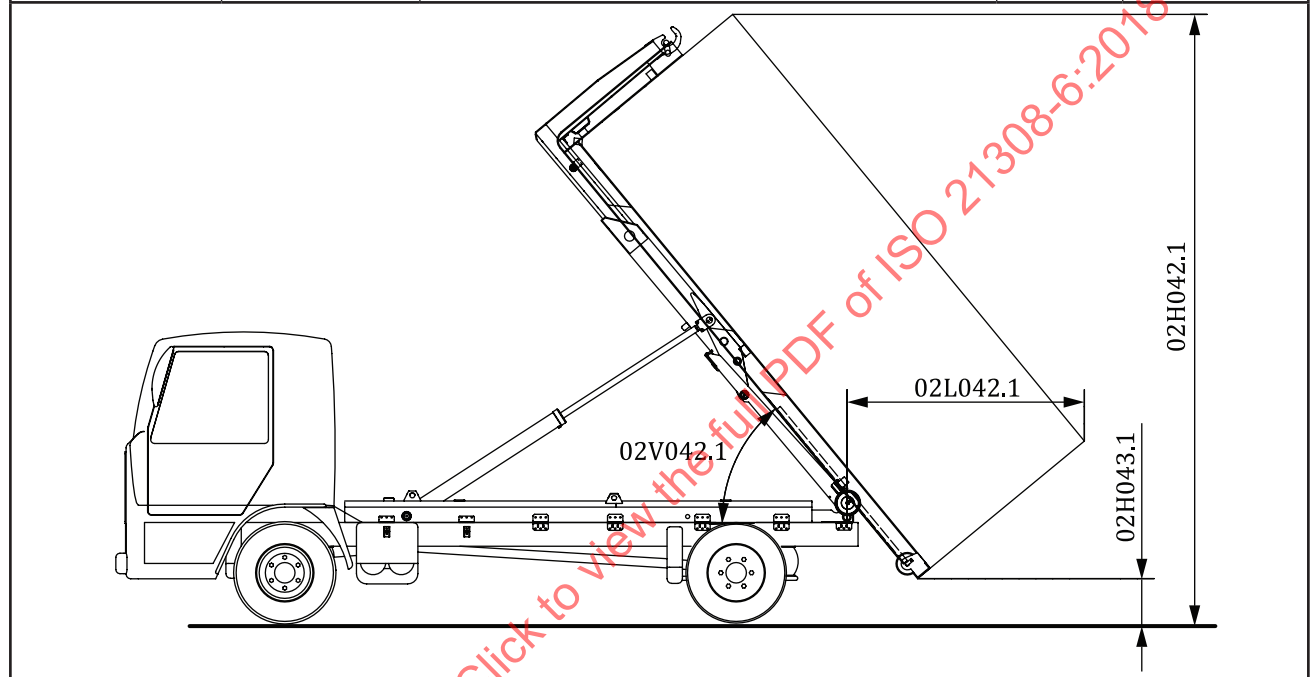


5.2.2 Tipping/dumping position

BEP-code	Assignment	Description	Unit	Presented in
BEP-02H040	Topmost hook bar point	Distance from mounting plane to the topmost hook bar centre point at maximum tipping angle.	mm	2D, 3D, TD
BEP-02H041	Topmost hook point	Distance from the topmost hook bar centre point to the highest point of the hook at maximum tipping angle.	mm	2D, 3D, TD
BEP-02V040	Maximum tipping angle	The maximum angle when tipping.	°	2D, 3D, TD

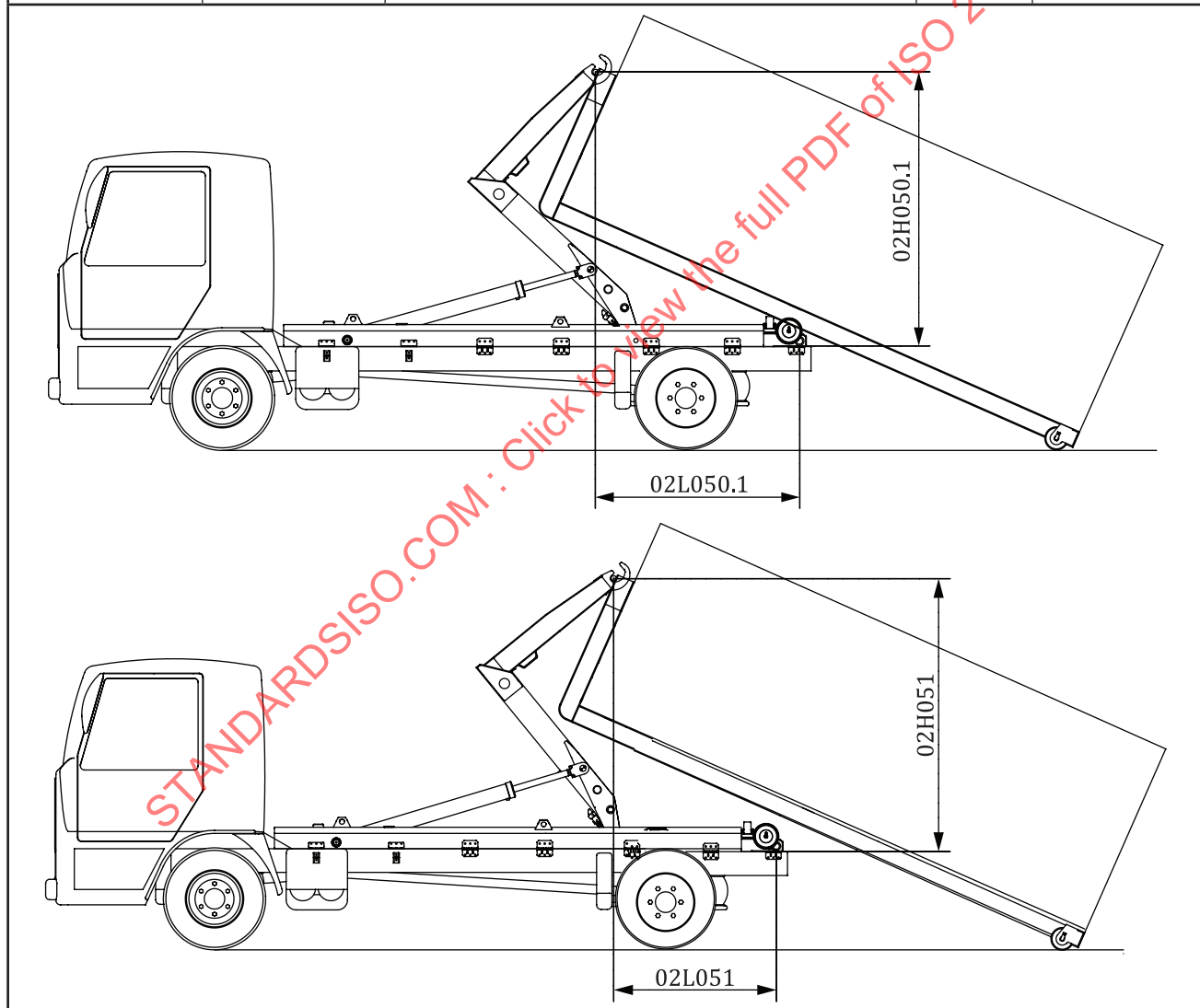


BEP-code	Assignment	Description	Unit	Presented in
BEP-02L042.p	Rearmost tipping point	Distance from reference point to rearmost point of container p when tipping.	mm	2D, 3D, TD
BEP-02H042.p	Highest tipping point	Distance from ground to highest point of container p when tipping.	mm	2D, 3D, TD
BEP-02H043.p	Lowest tipping point	Distance from ground to lowest point of container p when tipping NOTE Distance can be negative if below ground.	mm	2D, 3D, TD
BEP-02V042.p	Maximum tipping angle	Maximum angle between truck chassis and the container when tipping container p.	°	2D, 3D, TD



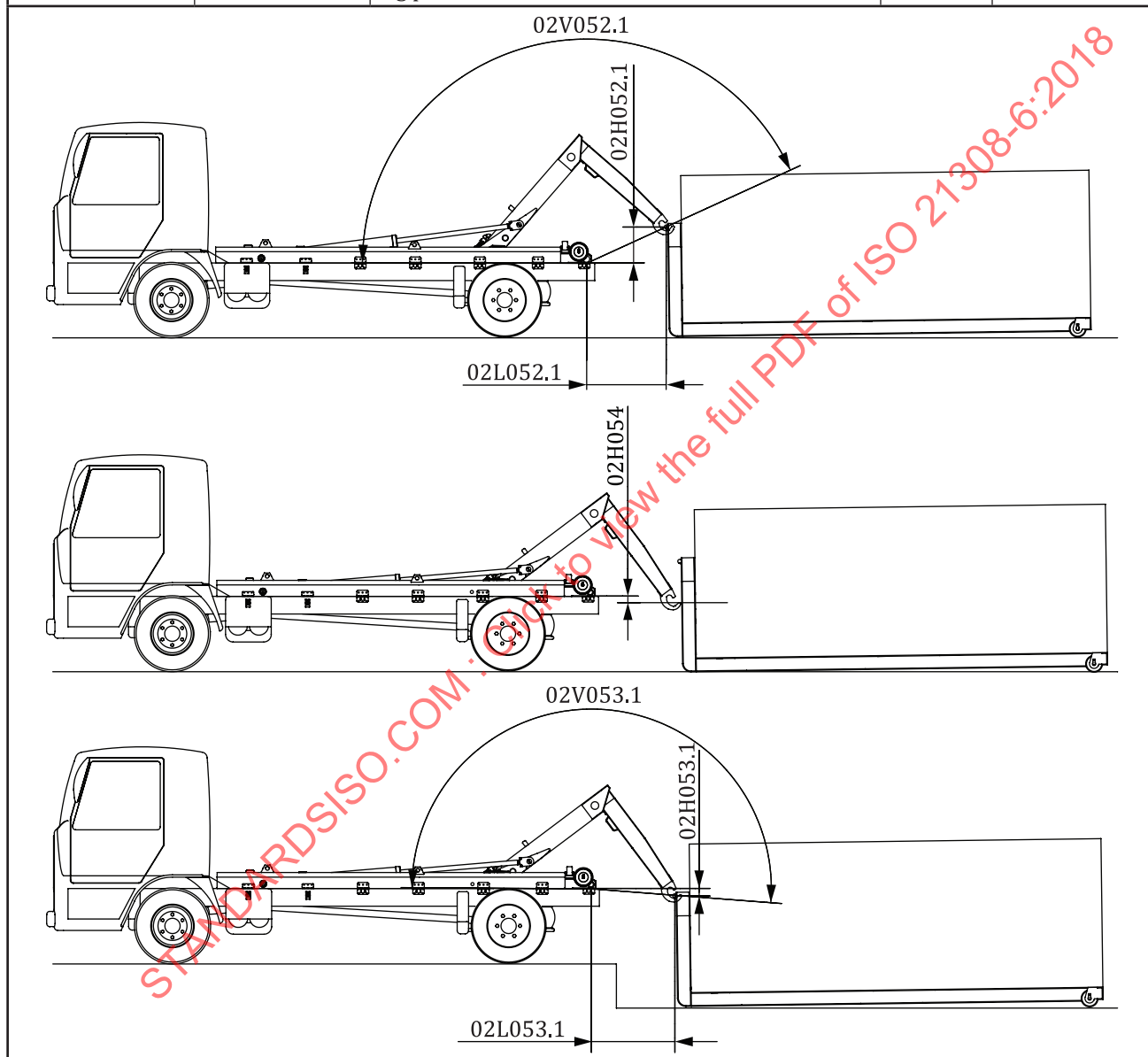
5.2.3 Loading/unloading position

BEP-code	Assignment	Description	Unit	Presented in
BEP-02L050.p	Horizontal distance at container touch down	Horizontal distance from reference point to container bar of container p when touching both rear rollers and ground.	mm	2D, 3D, TD
BEP-02H050.p	Vertical distance at container touch down	Vertical distance from reference point to container bar of container p when touching both rear rollers and ground.	mm	2D, 3D, TD
BEP-02L051	Horizontal distance to highest point	Maximum horizontal distance from reference point to container bar.	mm	2D, 3D, TD
BEP-02H051	Vertical distance to highest point	Vertical distance from reference point to container bar when the maximum horizontal distance applies.	mm	2D, 3D, TD



BEP-code	Assignment	Description	Unit	Presented in
BEP-02L052.p	Horizontal distance at maximum container angle, ground level	Horizontal distance from reference point to container bar of container p with container p at the maximum loading/unloading angle and at ground level.	mm	2D, 3D, TD
BEP-02H052.p	Vertical distance at maximum container angle, ground level	Vertical distance from reference point to container bar of container p with container p at the maximum loading/unloading angle and at ground level. NOTE Distance can be negative if below mounting plane.	mm	2D, 3D, TD
BEP-02V052.p	Maximum container angle, ground level	Maximum loading angle with container p at ground level. NOTE Mounting plane is used as zero reference for the maximum container angle.	°	2D, 3D, TD
BEP-02L053.p	Horizontal distance at maximum container angle, below ground level	Horizontal distance from reference point to container bar of container p with container p at the maximum loading/unloading angle when loading and unloading from the lowest possible distance below ground.	mm	2D, 3D, TD
BEP-02H053.p	Vertical distance at maximum container angle, below ground level	Vertical distance from reference point to container bar of container p with container p at the maximum loading/unloading angle when loading and unloading from the lowest possible distance below ground. NOTE Distance can be negative if below mounting plane.	mm	2D, 3D, TD

BEP-code	Assignment	Description	Unit	Presented in
BEP-02V053.p	Maximum container angle, below ground level	Maximum loading angle with container p below ground level. NOTE Mounting plane is used as zero reference for the maximum container angle.	°	2D, 3D, TD
BEP-02H054	Lowest possible pickup plane	Vertical distance from reference point to the lowest possible container bar pickup plane. NOTE Distance can be negative if below mounting plane.	mm	2D, 3D, TD



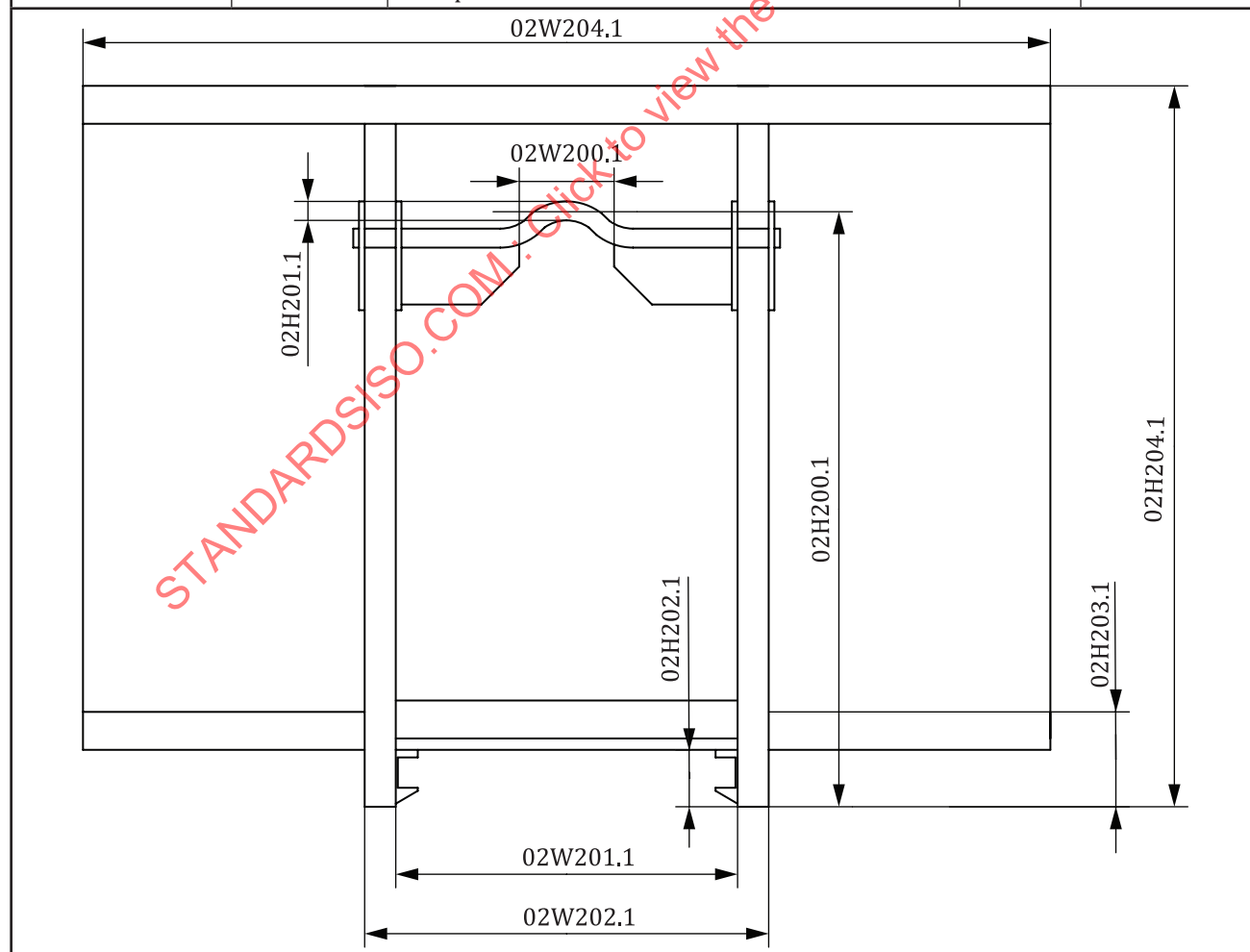
6 Coding of container dimensions and features necessary for the handling

NOTE 1 Only main dimensions are considered in the coding of hook lift containers.

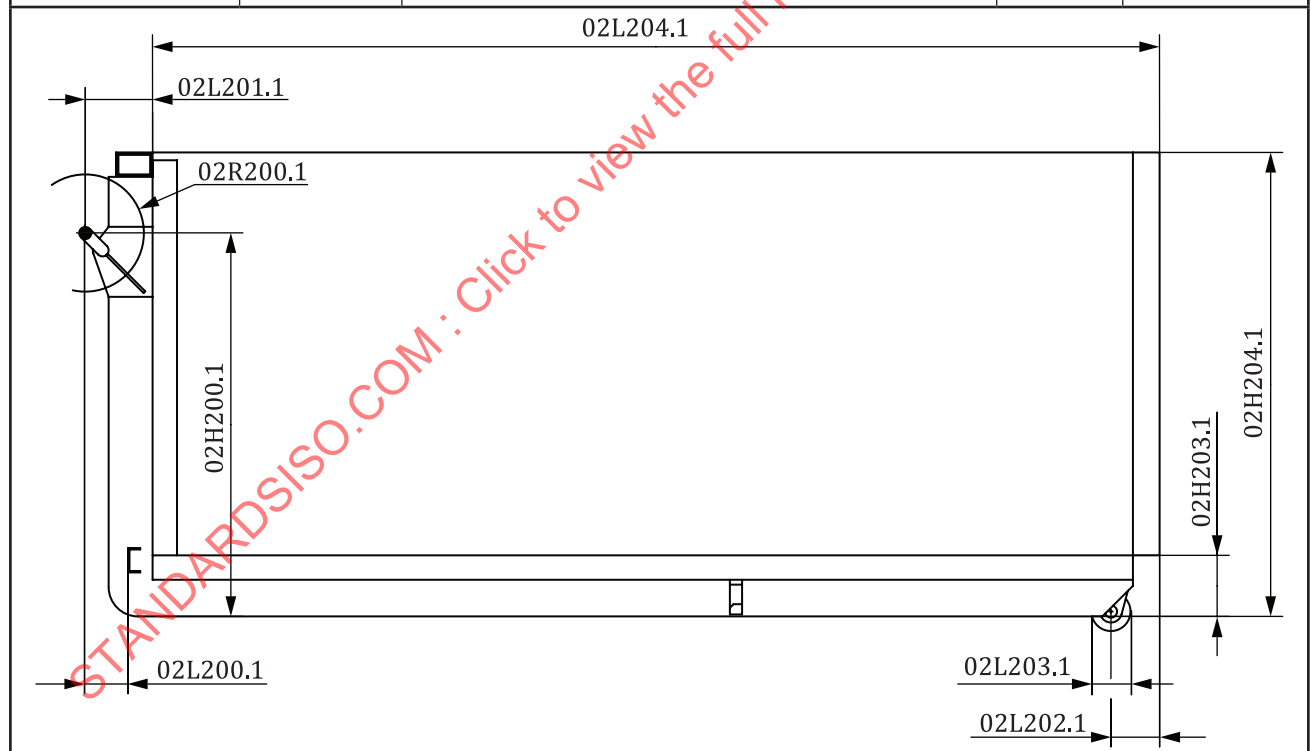
NOTE 2 [Annex B](#) shows an overview of main dimensions included in container frame standards and other technical specifications.

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BEP-code	Assignment	Description	Unit	Presented in
BEP-02G200.p	Profile type	Type of profile of the frame beam of the container EXAMPLE IPN / UPN extern / UPN Intern / Tube.	mm	2D, 3D, TD
BEP-02H200.p	Bar height	Distance between the centre of the bar and the lowest point of the container rail	mm	2D, 3D, TD
BEP-02W200.p	Bar width	Width of the container bar	mm	2D, 3D, TD
BEP-02H201.p	Bar diameter	Diameter of the container bar	mm	2D, 3D, TD
BEP-02H202.p	Tunnel height	Distance between the lowest point of the container rail and the lowest point of the cross section	mm	2D, 3D, TD
BEP-02H203.p	Load bed height	Distance between the lowest point of the rail and the top of the load bed	mm	2D, 3D, TD
BEP-02W201.p	Inner rail width	Horizontal distance between the container rails (excluding the rail width)	mm	2D, 3D, TD
BEP-02W202.p	Outer rail width	Horizontal distance between the container rails (including the rail width)	mm	2D, 3D, TD
BEP-02H204.p	Container height	Distance between the lowest point of the rail and the highest point of the container body	mm	2D, 3D, TD
BEP-02H205	Container height, max allowed	Distance between the lowest point of the rail and the highest allowed point of the container body for keeping the overall height within legal limits	mm	2D, 3D, TD
BEP-02W204.p	Container width	Distance between the left most point and the right most point of the container	mm	2D, 3D, TD



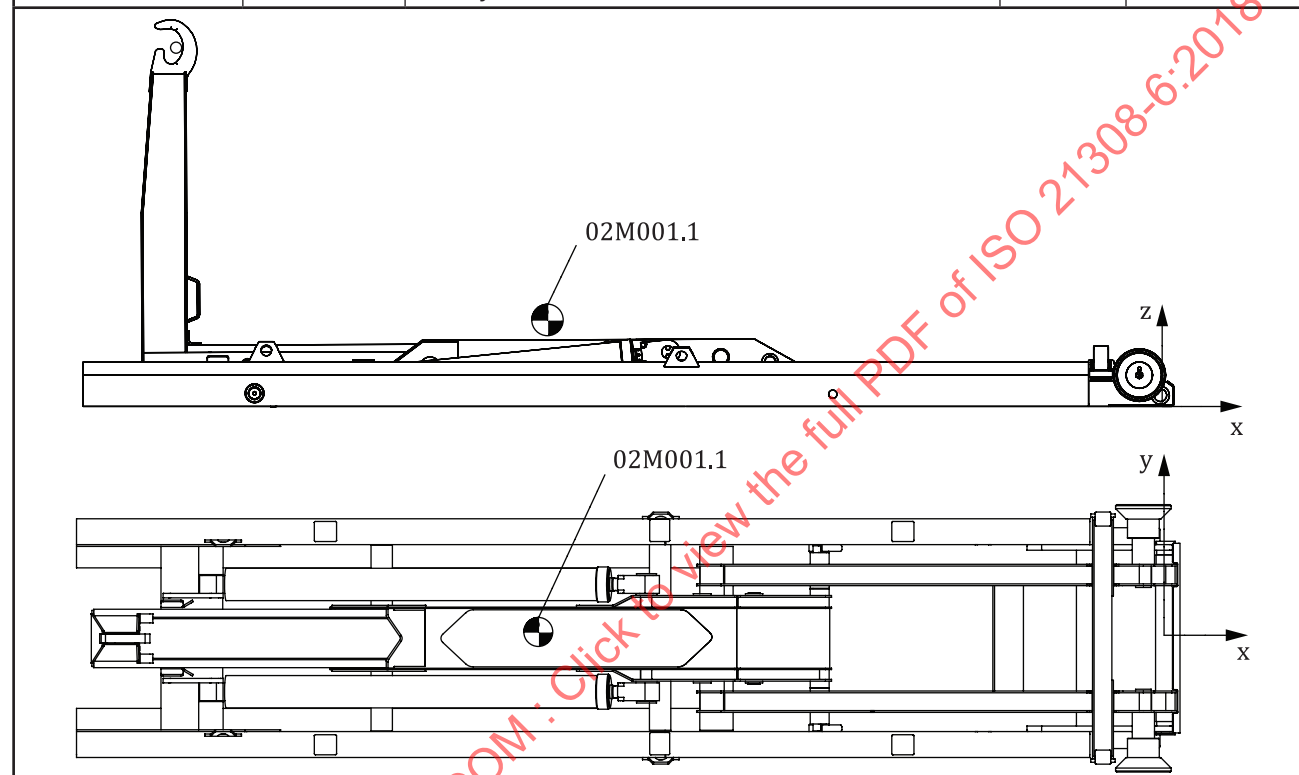
BEP-code	Assignment	Description	Unit	Presented in
BEP-02H200.p	Bar height	The distance between the centre of the bar and the lowest point of the container rail	mm	2D, 3D, TD
BEP-02R200.p	Bar clear- ance	The clearance around the bar required for the hook to be able to move without conflicts	mm	2D, 3D, TD
BEP-02L200.p	Lower clearance	The distance between the centre of the bar and the front of the container front wall at the bottom of the vertical hook arm	mm	2D, 3D, TD
BEP-02L201.p	Front wall distance	The distance from centre of the bar to the front container wall outside surface	mm	2D, 3D, TD
BEP-02L202.p	Roller dis- tance	Distance between rearmost point of the container and the centre of the roller	mm	2D, 3D, TD
BEP-02L203.p	Roller diam- eter	Diameter of the roller	mm	2D, 3D, TD
BEP-02H203.p	Load bed height	Distance between the lowest point of the rail and the top of the load bed	mm	2D, 3D, TD
BEP-02H204.p	Container height	The distance between the lowest point of the container rail and the highest point of the con- tainer body	mm	2D, 3D, TD
BEP-02L204.p	Container length	The distance between the frontmost point of the front wall end and the rearmost point of the container	mm	2D, 3D, TD



7 Coding of masses

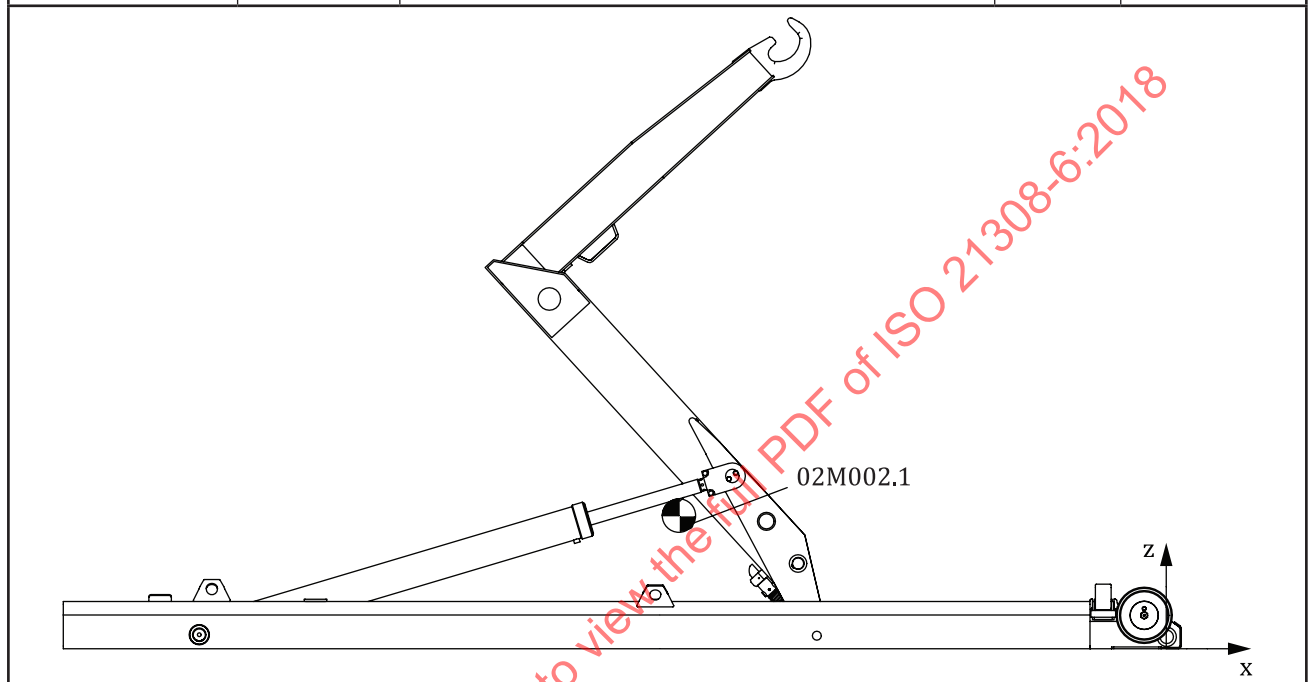
7.1 Mass point in transport position

BEP-code	Assignment	Description	Unit	Presented in
BEP-02M001.p	Mass point, transport position	Mass point of the hook loader in configuration for transporting container p. NOTE 1 Mass point is given without container. NOTE 2 Mass points are given in the local coordinate system.	kg, mm	2D, 3D, TD

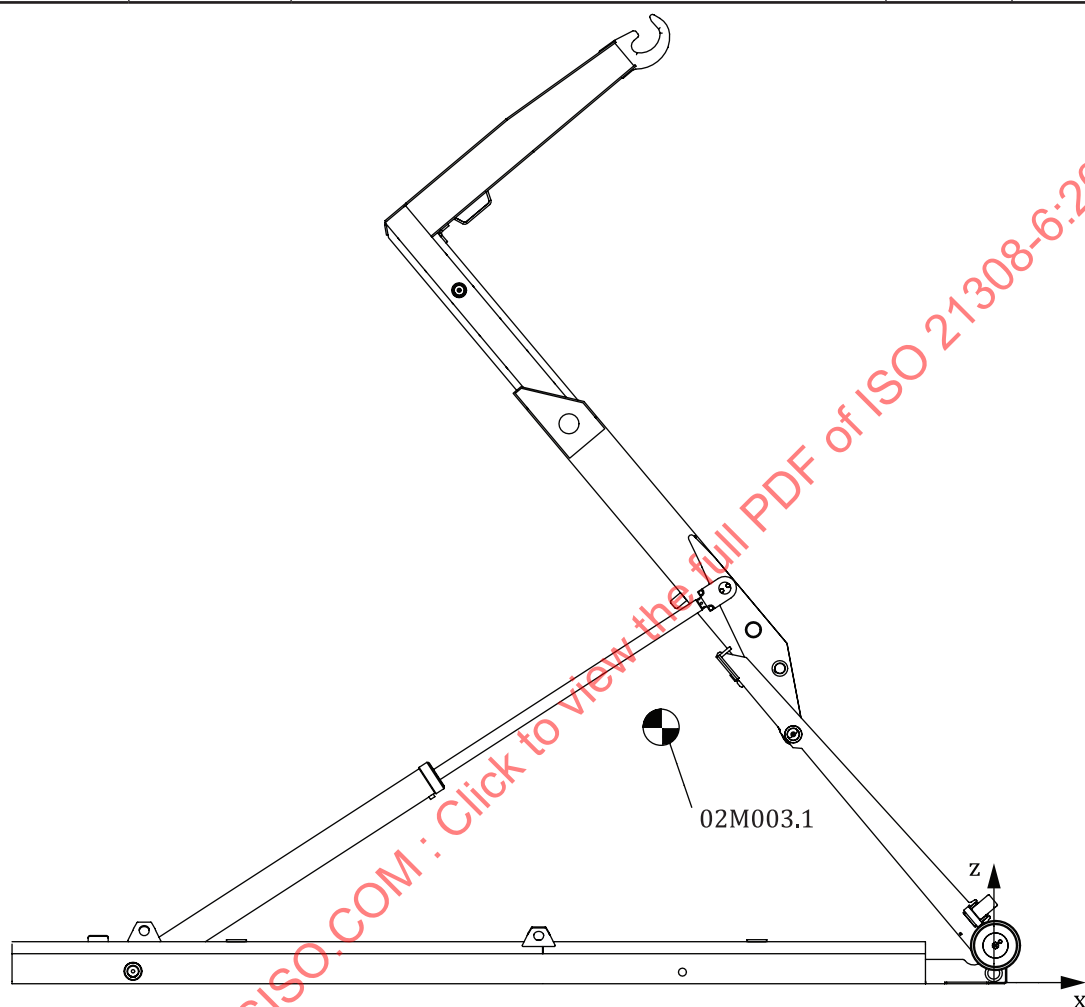


7.2 Mass point in working position

BEP-code	Assignment	Description	Unit	Presented in
BEP-02M002.p	Mass point, loading/unloading position	Mass point of the hook loader in configuration for loading/unloading container p. NOTE 1 Mass point is given without container. NOTE 2 Mass points are given in the local coordinate system.	mm	2D, 3D, TD

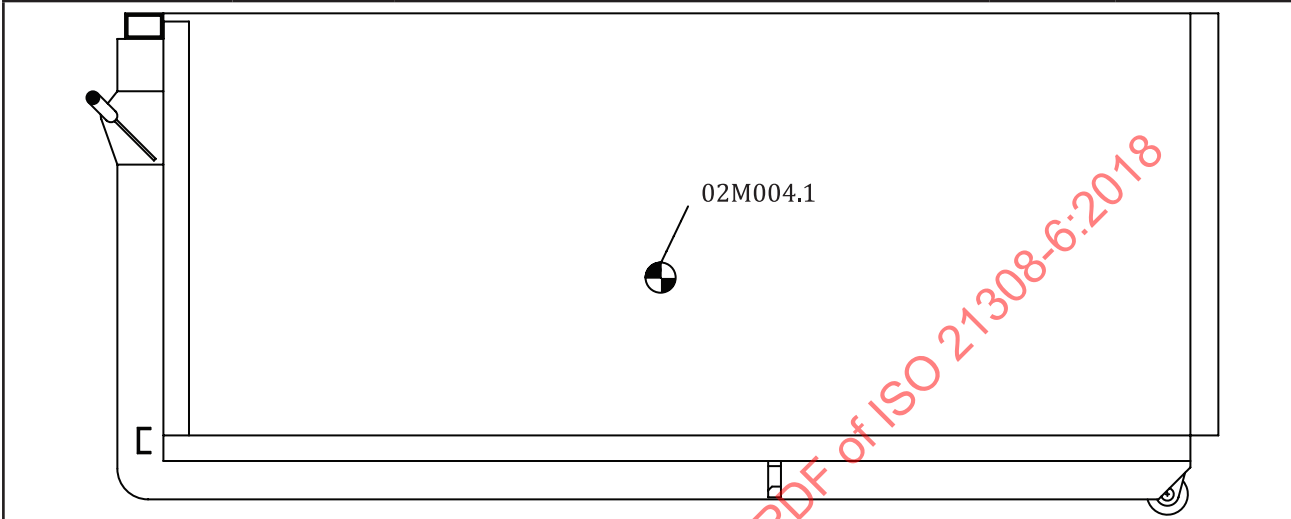


BEP-code	Assignment	Description	Unit	Presented in
BEP-02M003.p	Mass point, tipping position	Mass point of the hook loader in configuration for tipping container p. NOTE 1 Mass point is given without container. NOTE 2 Mass points are given in the local coordinate system.	mm	2D, 3D, TD



7.3 Mass point for container

BEP-code	Assignment	Description	Unit	Presented in
BEP-02M004.p	Mass point, container	Mass point of the container p including payload. NOTE Mass points are given in the local coordinate system.	mm	2D, 3D, TD



8 Coding of general hook loader data

8.1 General hook loader data

BEP-code	Assignment	Description	Presented in
BEP-02G000	Hook loader manufacturer administrative code set	Hook loader manufacturer party designation (.p) in accordance with administrative codes given in ISO 21308-3.	TD
BEP-02G001	Hook loader type	Type of hook loader. EXAMPLE Telescopic, tilting, articulated, etc.	TD
BEP-02G002	Hook loader model name	Official model name from manufacturer including fixed mounted equipment.	TD
BEP-02G003	ID and year of production	ID number of hook loader and year of production.	TD
BEP-02G004	Control type	Type of hook loader handling. EXAMPLE Electronic control, pneumatic control, lever, remote control.	TD
BEP-02G005	Oil tank type	Type of oil tank, integrated or external. NOTE BEP codes for chassis mounted objects, including external oil tanks, are given in ISO 21308-2.	TD
BEP-02G006	Oil cooler type	Type of oil cooler, integrated or external. NOTE BEP codes for chassis mounted objects, including external oil coolers, are given in ISO 21308-2.	TD
BEP-02G007	Type of weighing system	Type of weighing system.	TD

8.2 Mechanical interfaces to truck

BEP-code	Assignment	Description	Presented in
BEP-02G020	Installation method	General information about installing the hook loader on chassis. NOTE Type of fixation for each fixation bracket can be given by 02L002.	TD

8.3 Mechanical interfaces to container

BEP-code	Assignment	Description	Presented in
BEP-02G030.p	Type of hydraulic lock	Type of hydraulic lock p for securing the container. EXAMPLE Internal, external. NOTE .p refers to code BEP-02L026.	TD
BEP-02G031.p	Type of mechanical lock	Type of mechanical lock p for securing the container. EXAMPLE Reference to the applied container standard. NOTE .p refers to code BEP-02L027.	TD

8.4 Hydraulics equipment and interfaces

BEP-code	Assignment	Description	Unit	Presented in
BEP-02G040	Recommended oil flow	Optimal oil flow for working speed of the hook loader.	litres/min ^a	TD
BEP-02G041	Working pressure	Operating pressure of the hook loader.	MPa	TD
BEP-02G042	Oil tank volume	Required minimum volume of external oil tank.	litres ^b	TD
BEP-02G043	Type of oil	Recommended oil type from hook loader manufacturer.		TD
BEP-02G044	Oil cooler power	Required minimum power of external oil cooler.	kW	TD
^a SI unit m ³ /s is inconvenient to use in this case.				
^b SI unit m ³ is inconvenient to use in this case.				

8.5 Electrical/electronic equipment and interfaces

BEP-code	Assignment	Description	Presented in
BEP-02G060	Power supply	Required power supply to operate the hook loader. EXAMPLE Power [kW], number of signal I/O lines, grounding.	TD
BEP-02G061	Type of electronic interface	Description and serial number of electronic interface.	TD
BEP-02G062	CAN bus option	CAN bus signals and protocol type.	TD

Annex A (normative)

XML coding related to this document

A.1 XML version of this document

To facilitate the communication of BEP codes and values between the parties involved, an XML version has been drafted, following the rules and structure of ISO 21308-1.

Showing the complete code in [Annex A](#) would require many pages of plain XML code. Only a fraction of the code is shown under [A.2](#), to describe the principle.

A complete and validated xsd file is available at the ISO Standards Maintenance web site, at the following URL: <http://standards.iso.org/iso/21308>.

A.2 ISO 21308 Part 6 XML code (excerpt of ISO21308-6.xsd)

```
<xs:schema xmlns:xs="http://www.w3.org/2001/XMLSchema"
  targetNamespace="http://standards.iso.org/iso/21308"
  xmlns="http://standards.iso.org/iso/21308"
  elementFormDefault="qualified">
  <xs:annotation>
    <xs:appinfo>ISO 21308-6</xs:appinfo>
    <xs:documentation xml:lang="en-us">ISO21308 data exchange</xs:documentation>
  </xs:annotation>
  <!-- This schema extends ISO21308 part 5 by adding ISO21308 part 6 features to the BEP
  type -->
  <xs:redefine schemaLocation="http://standards.iso.org/iso/21308/ISO21308-5.xsd">
    <xs:complexType name="bepType">
      <xs:complexContent>
        <xs:extension base="bepType">
          <xs:sequence>
            <xs:element name="hookloader" type="hookloaderType" minOccurs="0"
maxOccurs="unbounded"/>
          </xs:sequence>
        </xs:extension>
      </xs:complexContent>
    </xs:complexType>
  </xs:redefine>

  <!-- Define the hook loader type -->
  <xs:complexType name="hookloaderType">
    <xs:sequence>
      <xs:element name="Installation" type="hookloaderInstallationType" minOccurs="0"
maxOccurs="1"/>
      <xs:element name="Geometry" type="hookloaderGeometryType" minOccurs="0"
maxOccurs="1"/>
      <xs:element name="Container" type="hookloaderContainerType" minOccurs="0"
maxOccurs="2"/>
      <xs:element name="Mass" type="hookloaderMassType" minOccurs="0" maxOccurs="1"/>
      <xs:element name="General" type="hookloaderGeneralType"/>
      <!--<xs:element name="Pictures" type="picturesType" minOccurs="0" maxOccurs="1">
        <xs:annotation>
          <xs:documentation> Drawing Files</xs:documentation>
        </xs:annotation>
      </xs:element-->
    </xs:sequence>
  </xs:complexType>
  ...
```

```

<!-- Define the hook loader Installation Type -->
<xs:complexType name="hookloaderInstallationType">
  <xs:sequence>
    <xs:element name="B02L001" type="nonNegativeIntegerReferencedType">
      <xs:annotation>
        <xs:documentation>Distance from the centre of the first front axle to the zero
reference point of the hook loader</xs:documentation>
      </xs:annotation>
    </xs:element>
    <xs:element name="B02L002" type="subframeFixationType">
      <xs:annotation>
        <xs:documentation>Fixed distance, or minimum distance, from the zero reference
point to the centre of interface of the installation interface p of the hook loader</
xs:documentation>
      </xs:annotation>
    </xs:element>
    <xs:element name="B02L003" type="nonNegativeIntegerReferencedLabeledSideType">
      <xs:annotation>
        <xs:documentation>Maximum distance from the zero reference point to the centre
of interface of the installation interface p of the hook loader</xs:documentation>
      </xs:annotation>
    </xs:element>
    <xs:element name="B02L004" type="nonNegativeIntegerReferencedLabeledSideType">
      <xs:annotation>
        <xs:documentation>Distance from the zero reference point to the first (index)
hole of the installation interface p of the hook loader</xs:documentation>
      </xs:annotation>
    </xs:element>
    <xs:element name="B02H001" type="nonNegativeIntegerReferencedType">
      <xs:annotation>
        <xs:documentation>Distance from the zero reference point to the first (index)
hole of the installation interface p of the hook loader</xs:documentation>
      </xs:annotation>
    </xs:element>
  </xs:sequence>
</xs:complexType>
...
</xs:schema>

```