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

Part 7: Coding of skip loader bodywork

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

Partie 7: Codage des multibennes

Reference number
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Foreword

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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 on 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 the following URL: 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 skip 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 skip loaders to vehicles, e.g. skip loader manufacturers, truck chassis manufacturers, and bodywork manufacturers.

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

Part 7:
Coding of skip 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 skip 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:

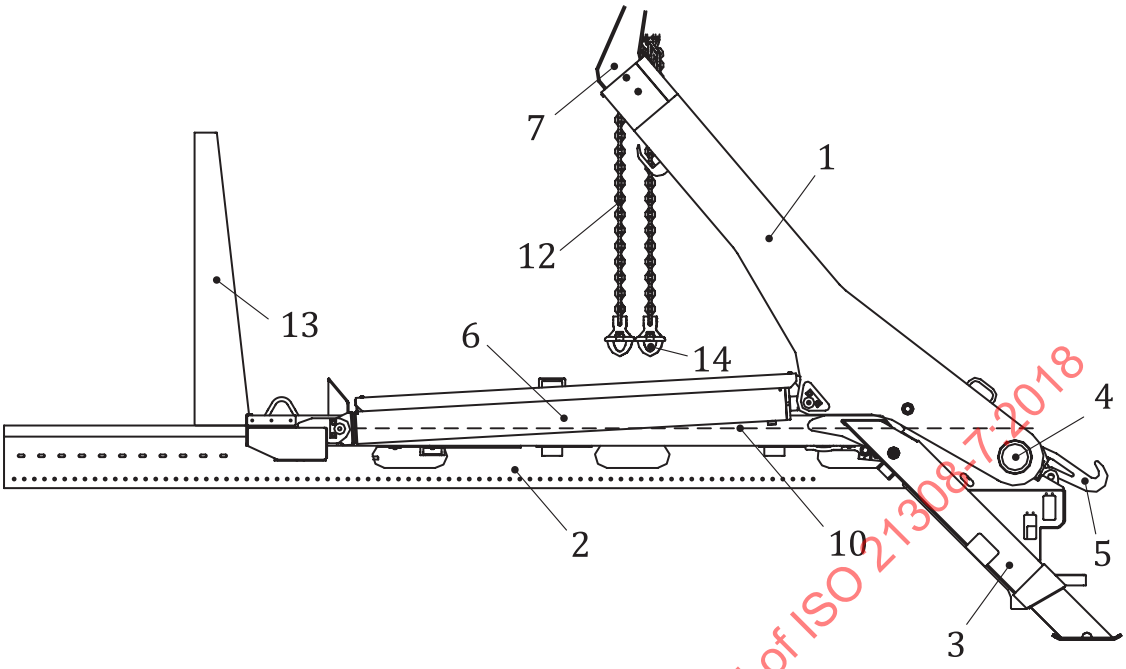
— IEC Electropedia: available at https://www.electropedia.org/

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

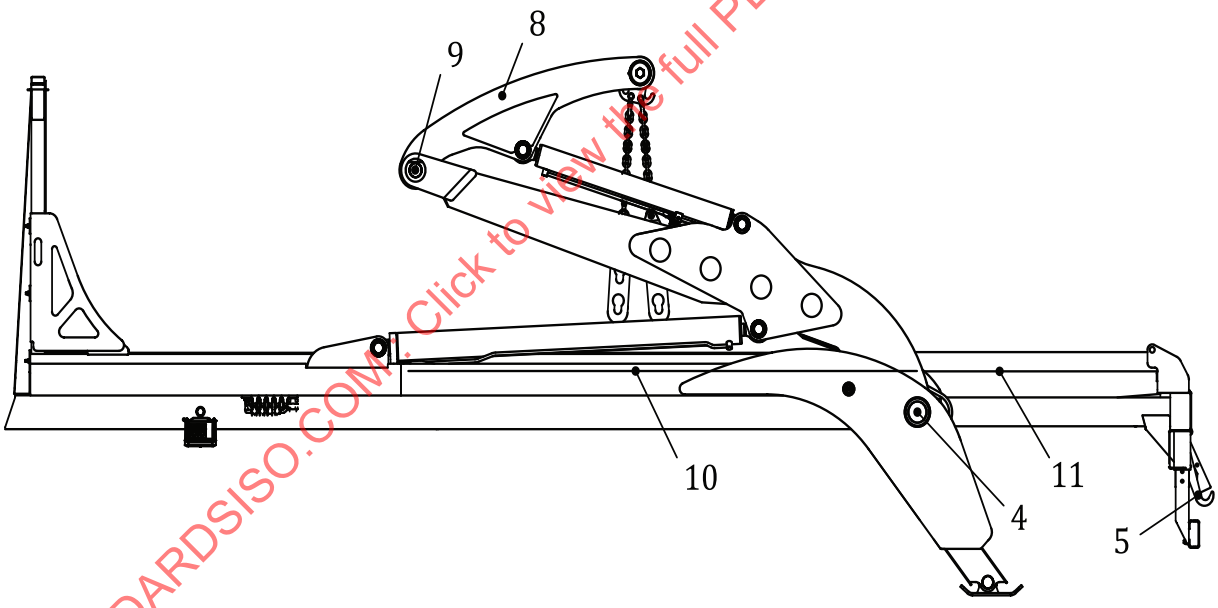
3.1
skip loader
vehicle mounted powered equipment comprising of two arms moving around a pivoting axis, using chains or similar for loading, unloading and tipping containers and other demountables

Note 1 to entry: Arms are usually moving in parallel. They may be fixed, extendable or articulated.

Note 2 to entry: Figure 1 shows the main parts of a skip loader referred to in this document.



a) Skip loader with extension arm



b) Skip loader with articulation arm and extended load bed

Key

1	main arm	8	articulation arm
2	subframe	9	articulation arm pivot point
3	stabilizer leg(s)	10	load bed (hidden)
4	main arm pivot point	11	extended load bed
5	tipping hook	12	lifting chain
6	main arm cylinder	13	cabin protection guard
7	extension arm	14	lifting connector

Figure 1 — Main parts of skip 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).

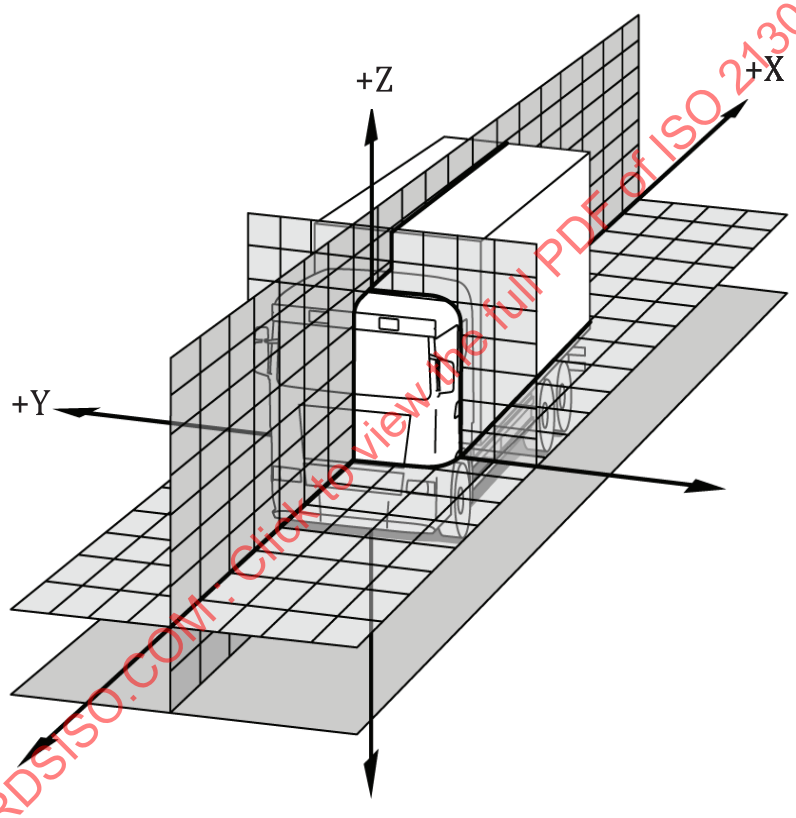


Figure 2 — Vehicle coordinate system according to ISO 4130

4.3.2 Skip loader coordinate system

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

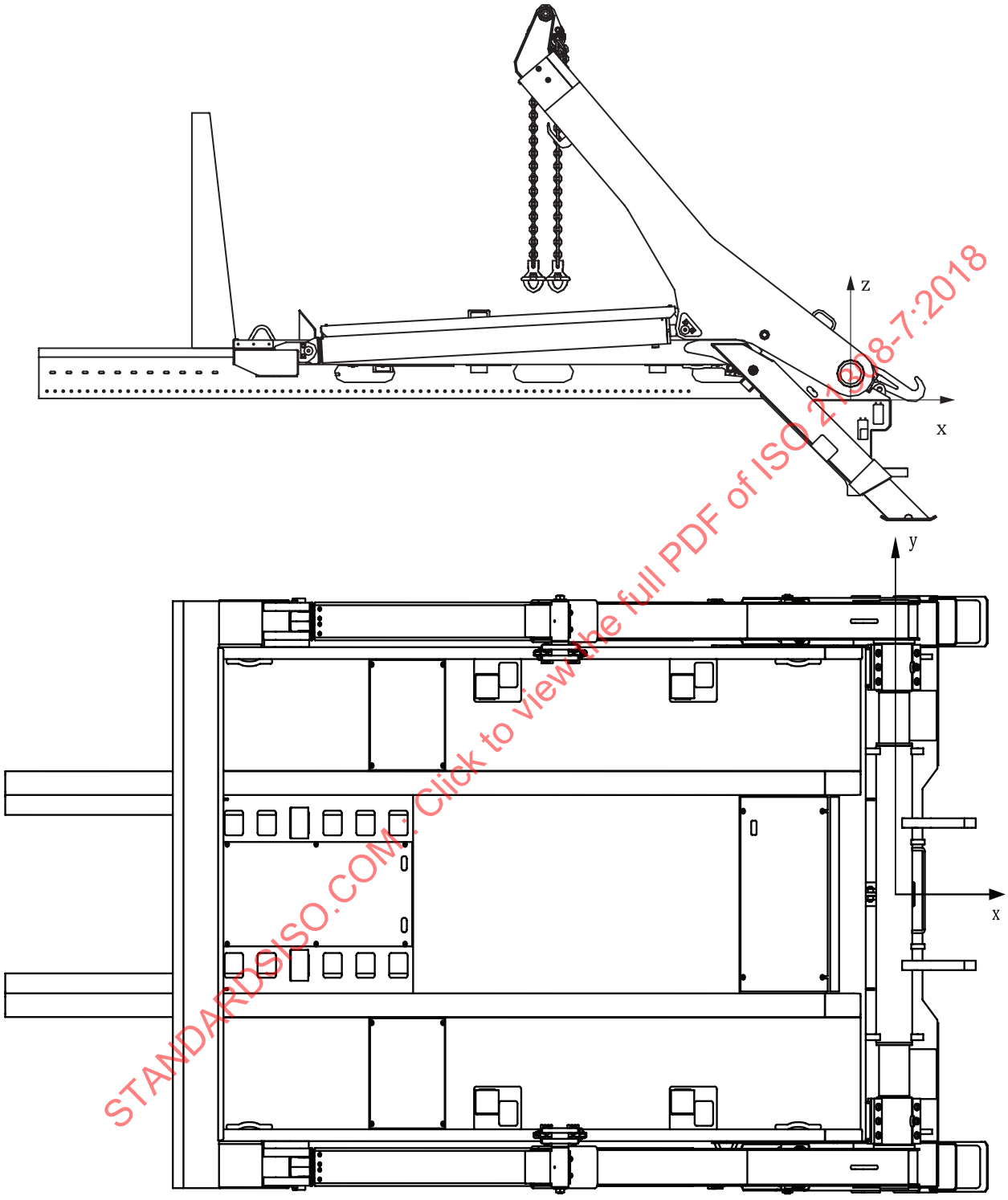


Figure 3 — Local coordinate system for skip loader

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

— Local x = 0 for the plane through the centre of the main arm pivot point;

— Local y = 0 for the longitudinal plane through the centreline of the skip loader;

— Local z = 0 at the lower mounting plane of the skip loader subframe.

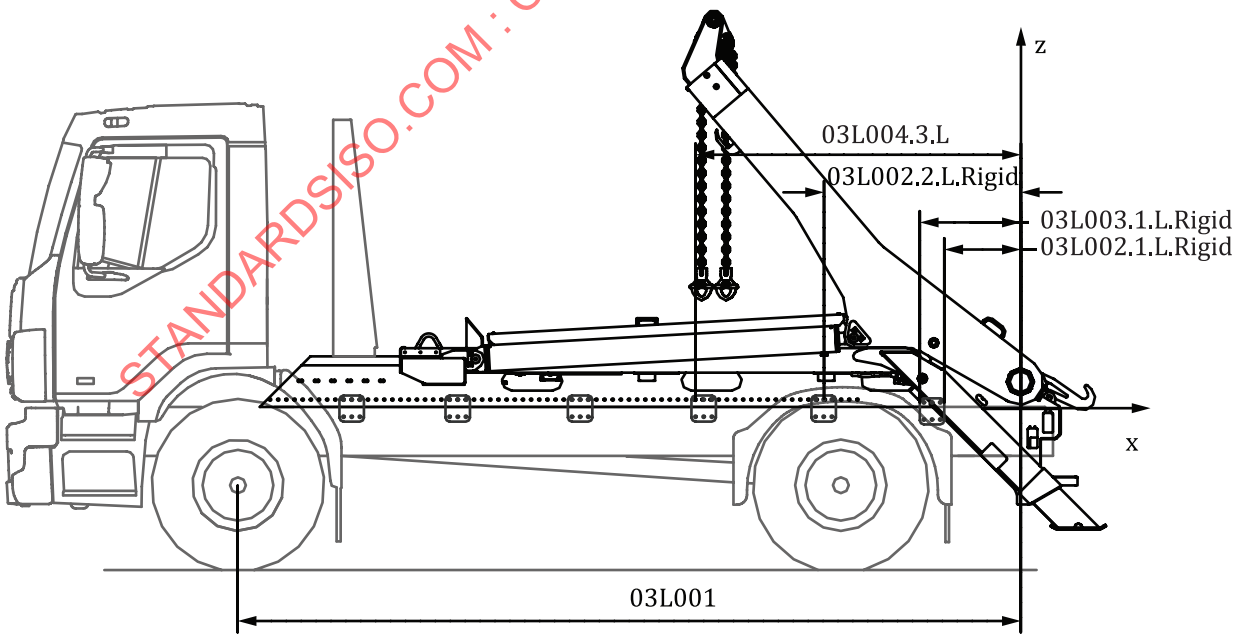
4.4 Related XML coding

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.

5 Coding of geometrical data and space requirements

5.1 Installation of skip loader on vehicle

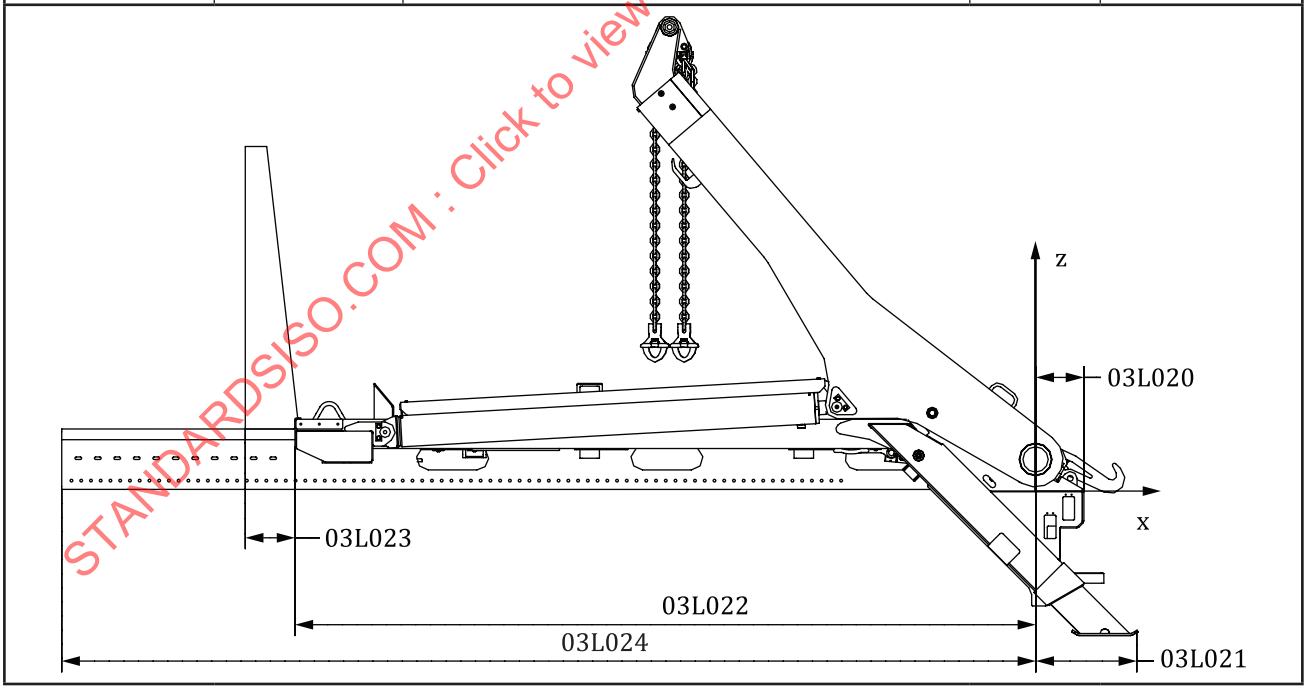
BEP-code	Assignment	Description	Unit	Presented in
BEP-03L001	Front axle to zero point of skip loader	Distance from the centre of the first front axle to the zero reference point of the skip loader.	mm	2D, 3D, TD
BEP-03L002.p.s.t	Distance between zero reference point and installation interface bracket, minimum	Fixed distance, or minimum distance, from the zero reference point to the centre of interface of the installation interface p of the skip 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-03L002.3.L.Rigid.	mm	2D, 3D, TD
BEP-03L003.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 skip 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-03L004.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 skip loader.	mm	2D, 3D, TD



5.2 Main dimensions skip loaders

5.2.1 Transport position

BEP-code	Assignment	Description	Unit	Presented in
BEP-03L020	Distance between zero reference point and rear-most point, excluding support legs	Horizontal distance between zero reference point and rear end of skip loader platform, excluding support legs.	mm	2D, 3D, TD
BEP-03L021	Distance between zero reference point and rearmost point, including support legs	Horizontal distance between zero reference point and rear end of skip loader, including support legs.	mm	2D, 3D, TD
BEP-03L022	Distance to frontmost platform part	Distance between zero reference point and frontmost part of the skip loader platform.	mm	2D, 3D, TD
BEP-03L023	Cabin protection guard	Distance between frontmost part of the skip loader platform and the frontmost part of the cabin protection guard.	mm	2D, 3D, TD
BEP-03L024	Distance to skip loader flange	Distance between zero reference point and frontmost part of the skip loader flange.	mm	2D, 3D, TD



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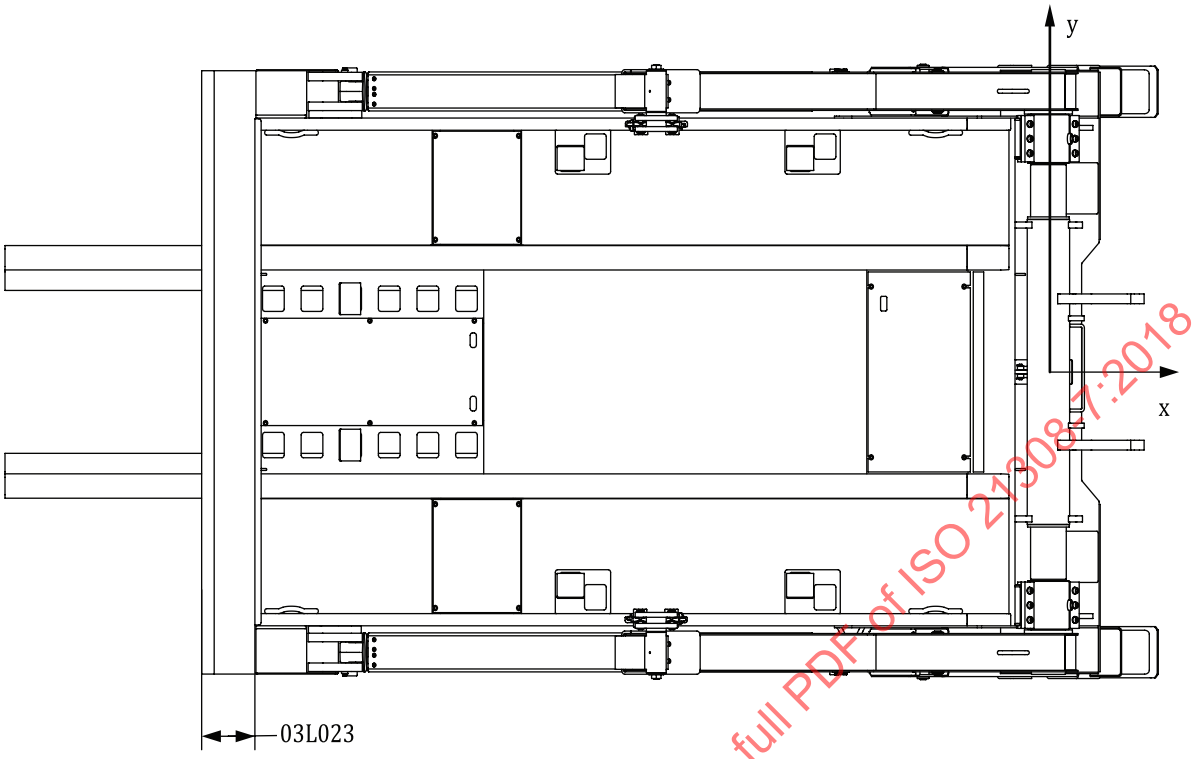
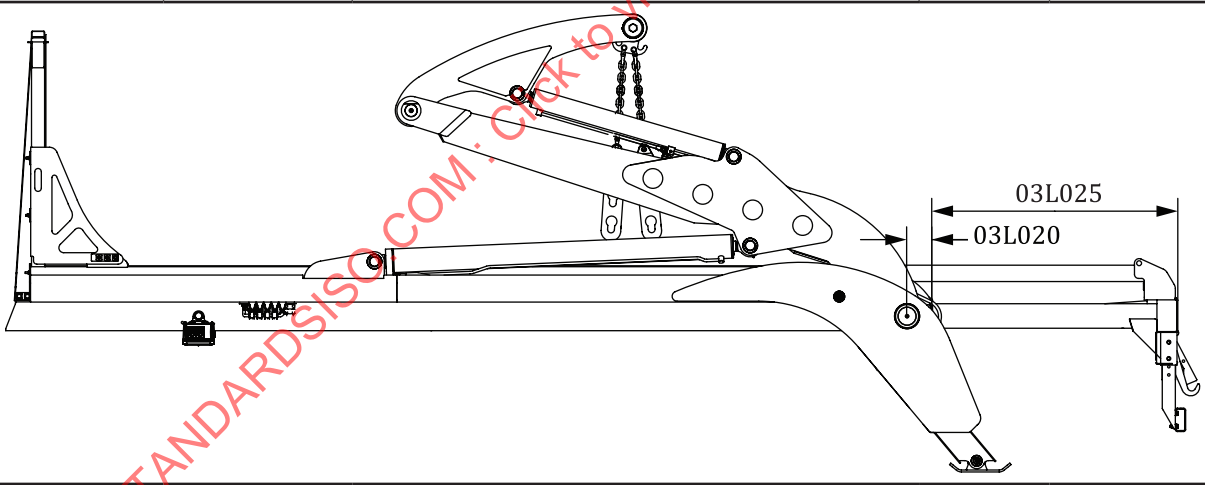
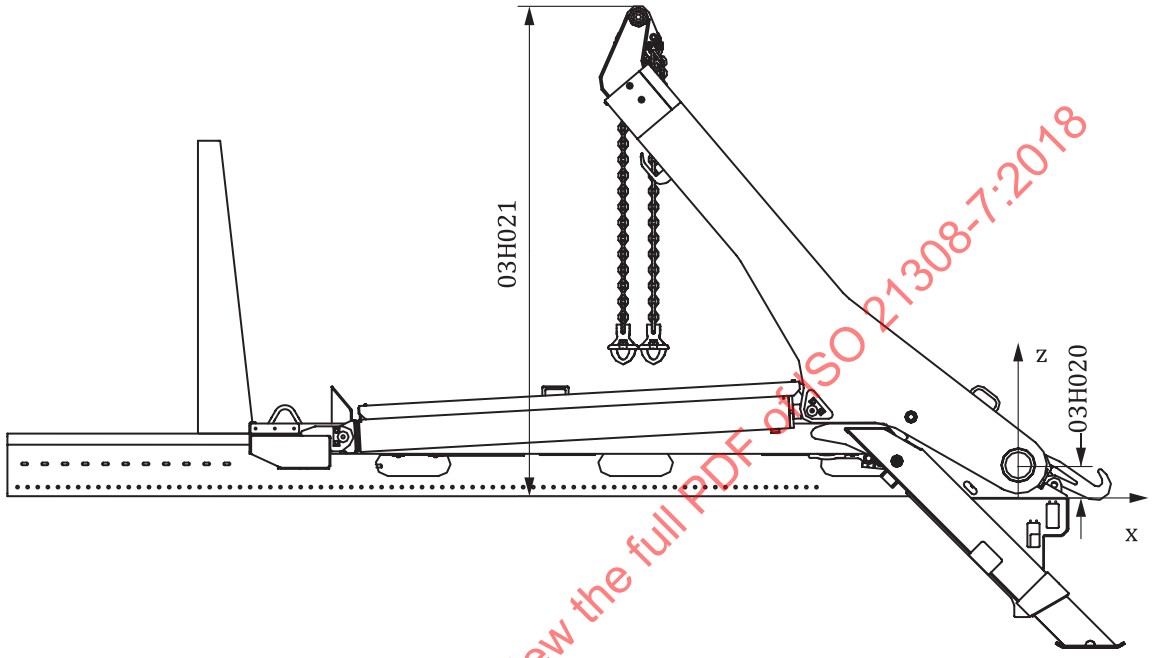
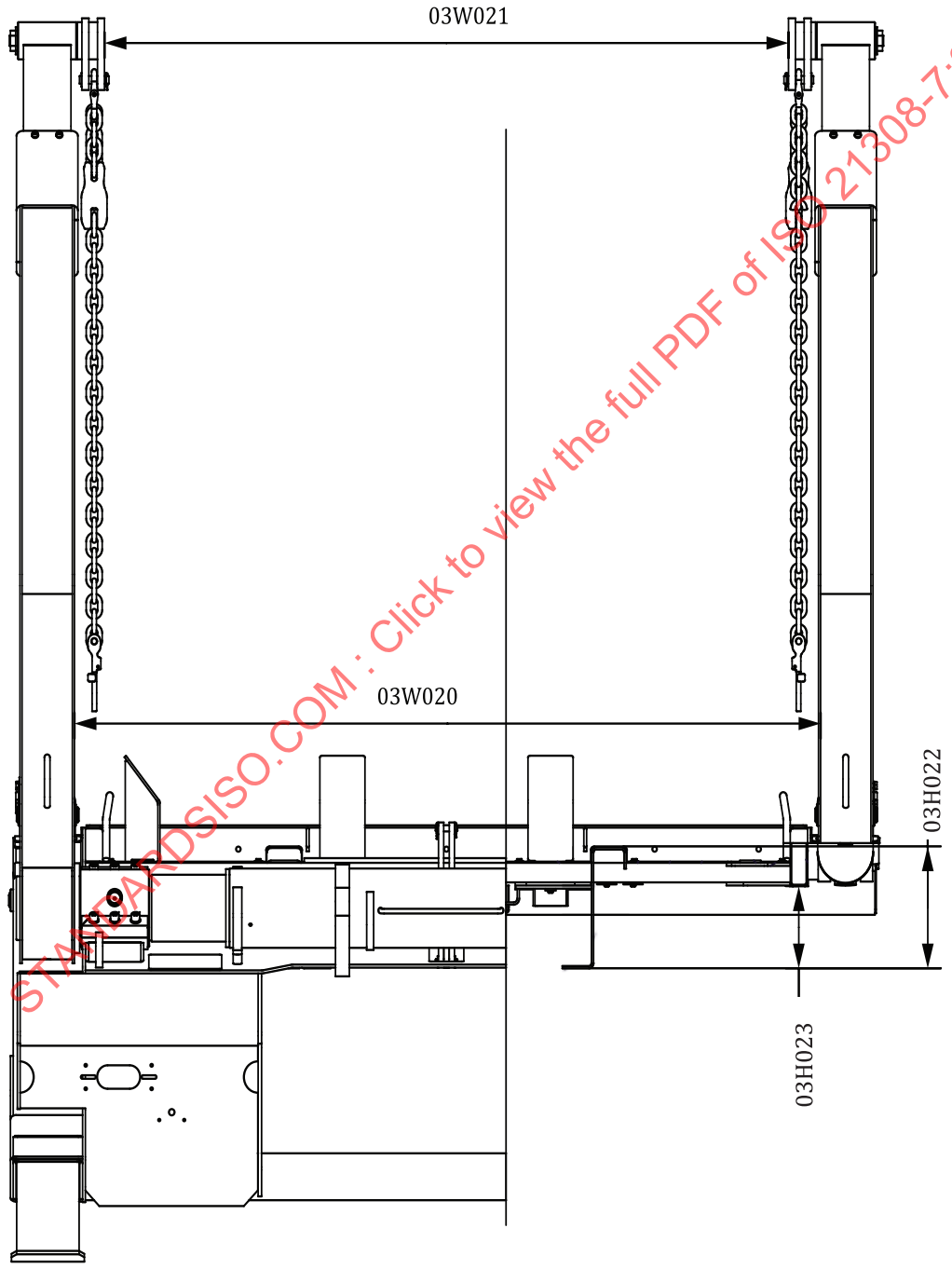
				
BEP-03L025	Distance to extended load bed position	Distance from rear end of skip loader to maximum extended load bed position. NOTE For use with extendable load beds.	mm	2D, 3D, TD
				

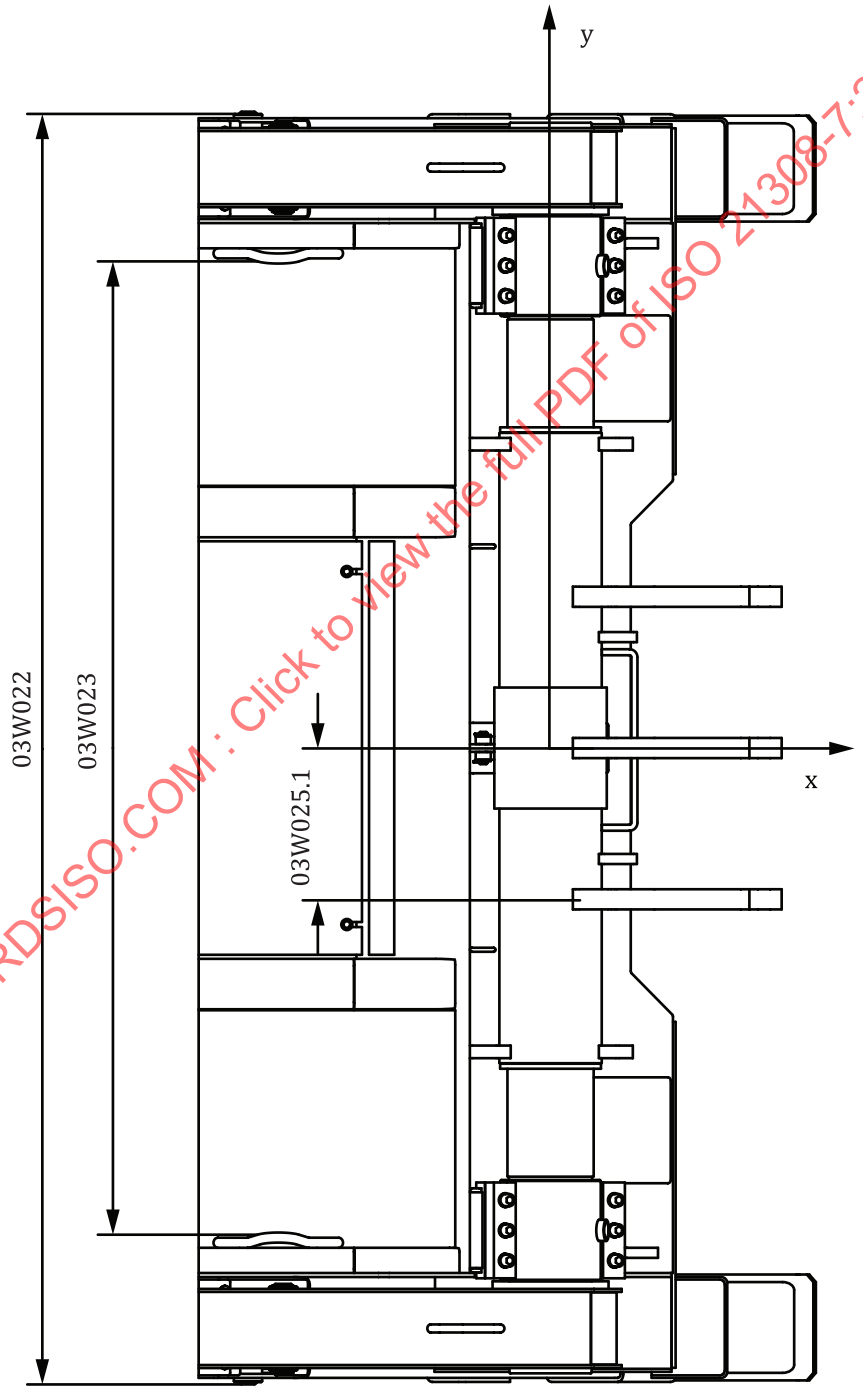
BEP-code	Assignment	Description	Unit	Presented in
BEP-03H020	Distance to main arm pivot point	Vertical distance between mounting plane and the centre of the main arm pivot point.	mm	2D, 3D, TD
BEP-03H021	Overall height in transport position	Vertical distance between mounting plane and the highest point of the skip loader in nominal transport position.	mm	2D, 3D, TD



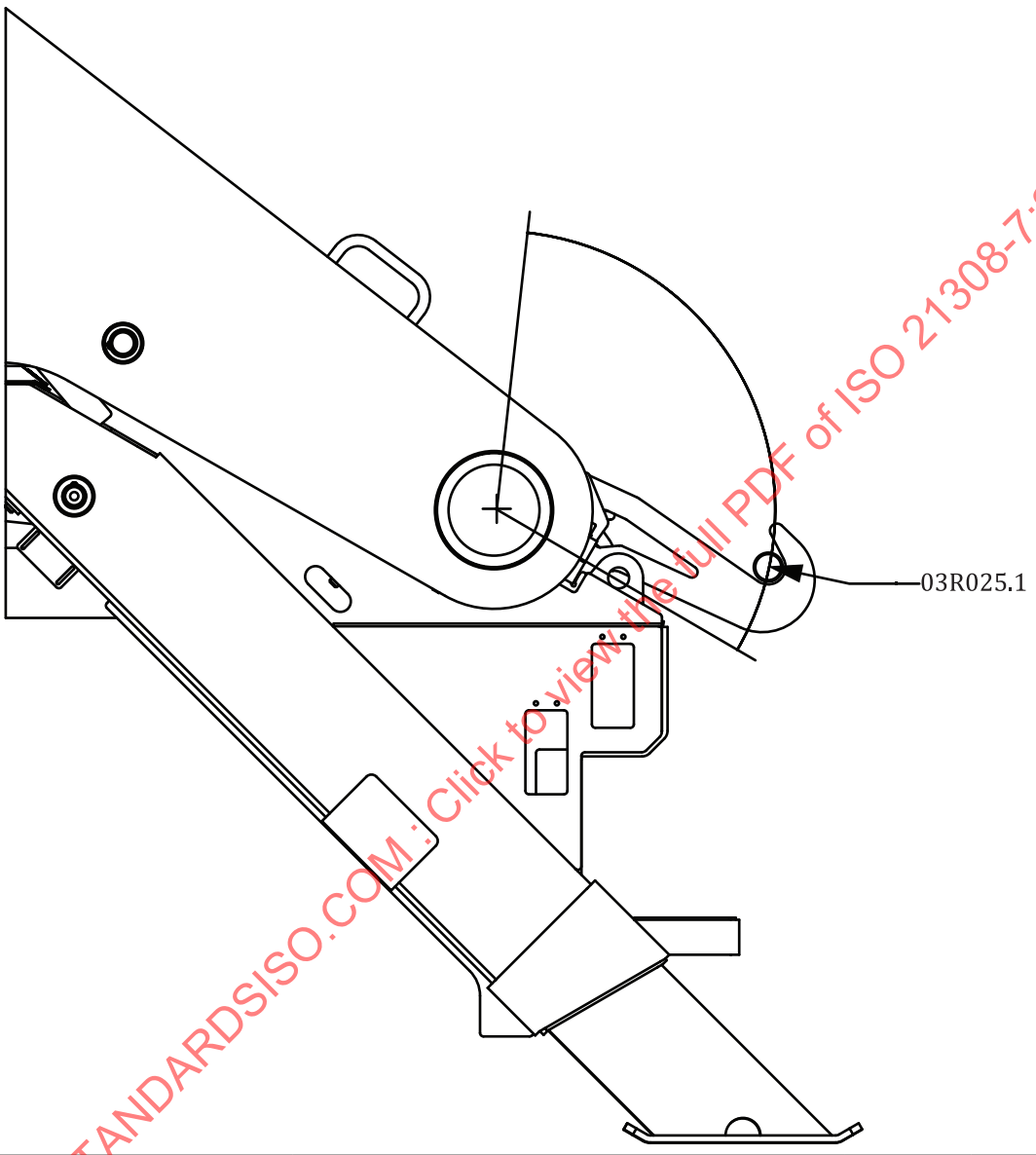
BEP-code	Assignment	Description	Unit	Presented in
BEP-03H022	Height to load bed	Vertical distance between mounting plane and load bed.	mm	2D, 3D, TD
BEP-03H023	Clearance of side rails	Vertical distance between mounting plane and lower plane of the side rail or platform.	mm	2D, 3D, TD
BEP-03W020	Width between main arms	Minimum horizontal distance between main arms.	mm	2D, 3D, TD
BEP-03W021	Width between lifting brackets	Minimum horizontal distance between the lifting brackets.	mm	2D, 3D, TD



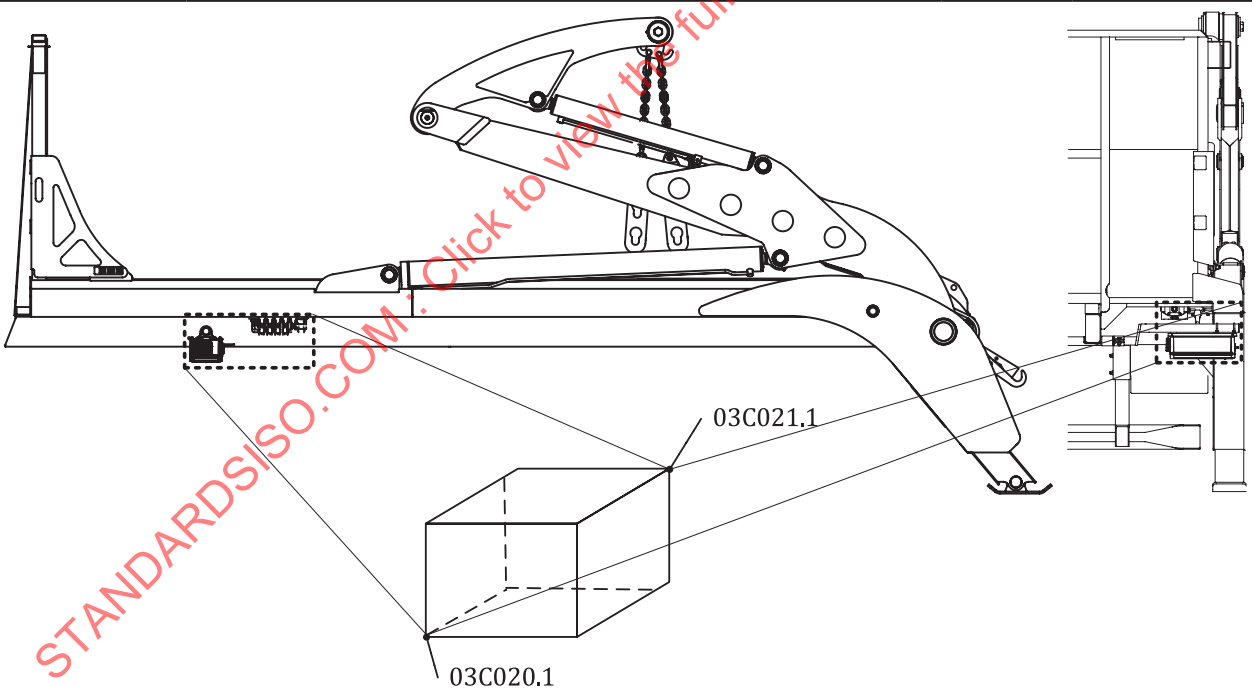
BEP-code	Assignment	Description	Unit	Presented in
BEP-03W022	Overall width	Distance between the leftmost point and the rightmost point of the skip loader.	mm	2D, 3D, TD
BEP-03W023	Platform width	Maximum width of platform to be used by the bottom of container.	mm	2D, 3D, TD
BEP-03W025.n	Position of n-th tipping hook	Distance between n-th tipping hook and centre-line of the skip loader. NOTE If value is 0 then only one tipping hook exists, positioned in the centre.	mm	2D, 3D, TD



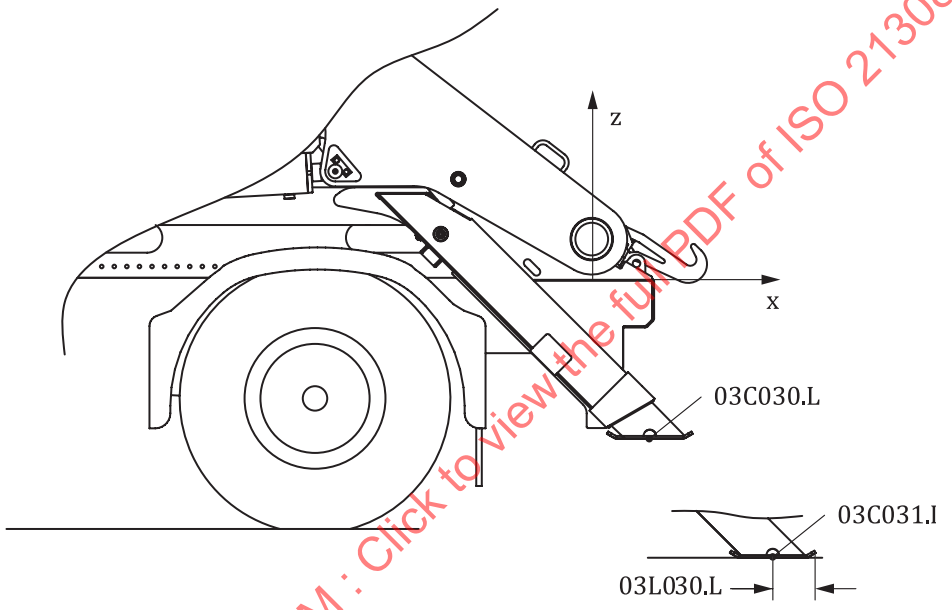
BEP-code	Assignment	Description	Unit	Presented in
BEP-03R025.n	Radius of n-th tipping hook	Radius of the n-th hook measured from the tipping hook pivot point. NOTE The limits of the radius shown in the illustration do not imply actual angular limitations.	mm	2D, 3D, TD



BEP-code	Assignment	Description	Unit	Presented in
BEP-03C020.p	Clearance box p, first corner	Coordinate (x, y, z) of first corner of enclosing box p that must be kept clear for interfering parts of the skip loader. NOTE 1 The boxes can be given in any order. NOTE 2 Any two corners of a space diagonal can be chosen. NOTE 3 General sign conventions for coordinate systems are applied. NOTE 4 .p can be omitted if there is only one box.	mm	2D, 3D, TD
BEP-03C021.p	Clearance box p, second corner	Coordinate (x, y, z) of second corner of enclosing box p that must be kept clear for interfering parts of the skip loader. NOTE 1 The boxes can be given in any order. NOTE 2 Any two corners of a space diagonal can be chosen. NOTE 3 General sign conventions for coordinate systems are applied. NOTE 4 .p can be omitted if there is only one box.	mm	2D, 3D, TD

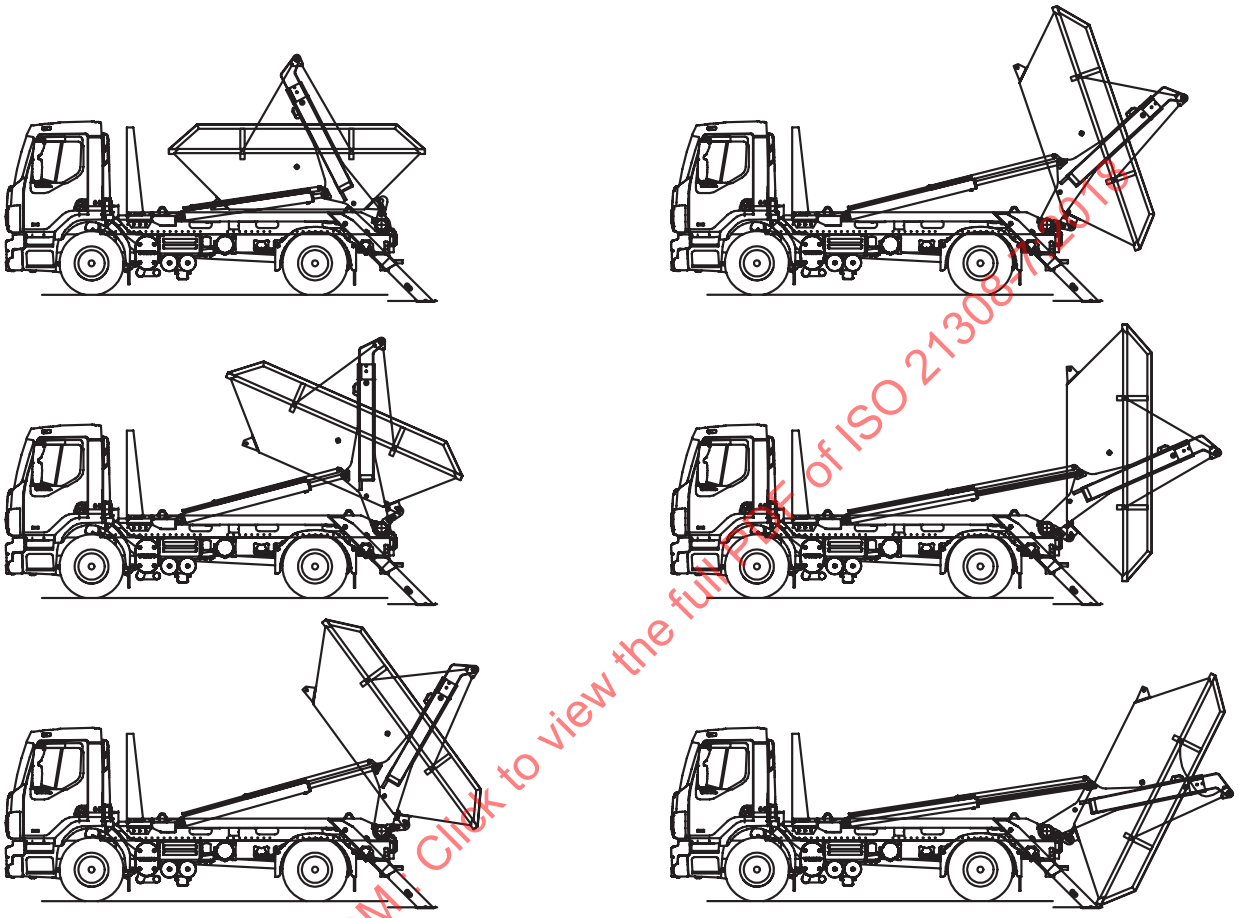


BEP-code	Assignment	Description	Unit	Presented in
BEP-03C030.s	Stabilizer position, retracted	Coordinate (x, z) of stabilizer touch-down point in transport position. NOTE .s can be omitted if the position is the same on left and right side. In this case the left side is specified.	mm	2D, 3D, TD
BEP-03C031.s	Stabilizer position, extended	Coordinate (x, z) of stabilizer touch-down point in maximum extended position. NOTE .s can be omitted if the position is the same on left and right side. In this case the left side is specified.	mm	2D, 3D, TD
BEP-03L030.s	Stabilizer foot rearmost distance	Horizontal distance between the stabilizer touch-down point and the rearmost point of the stabilizer foot/roller/plate.	mm	2D, 3D, TD

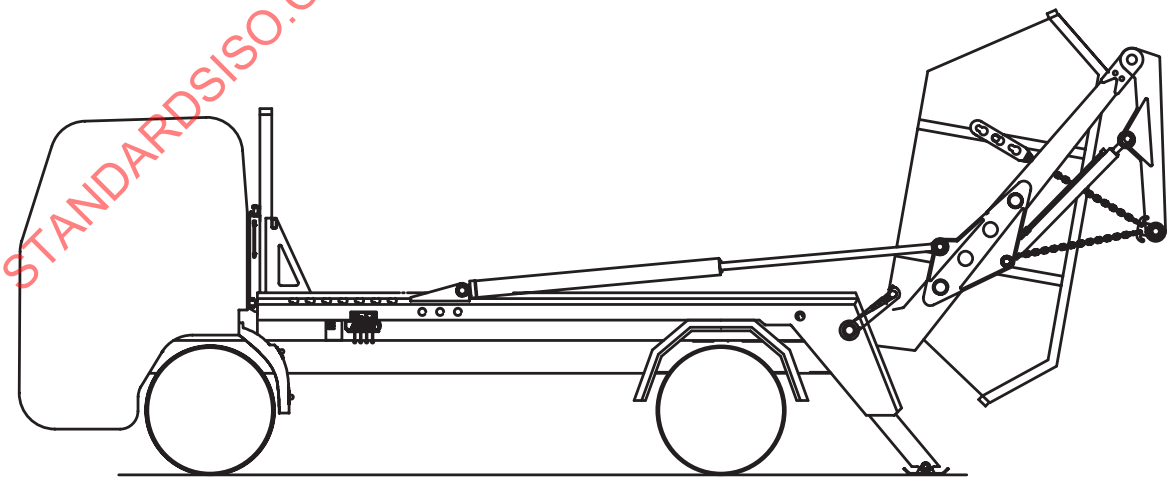


5.2.2 Tipping position

BEP-code	Assignment	Description	Unit	Presented in
Tipping principle positions are shown below as illustration only. BEP codes are not considered necessary for these positions.				



Tipping position sequence example with extension arm

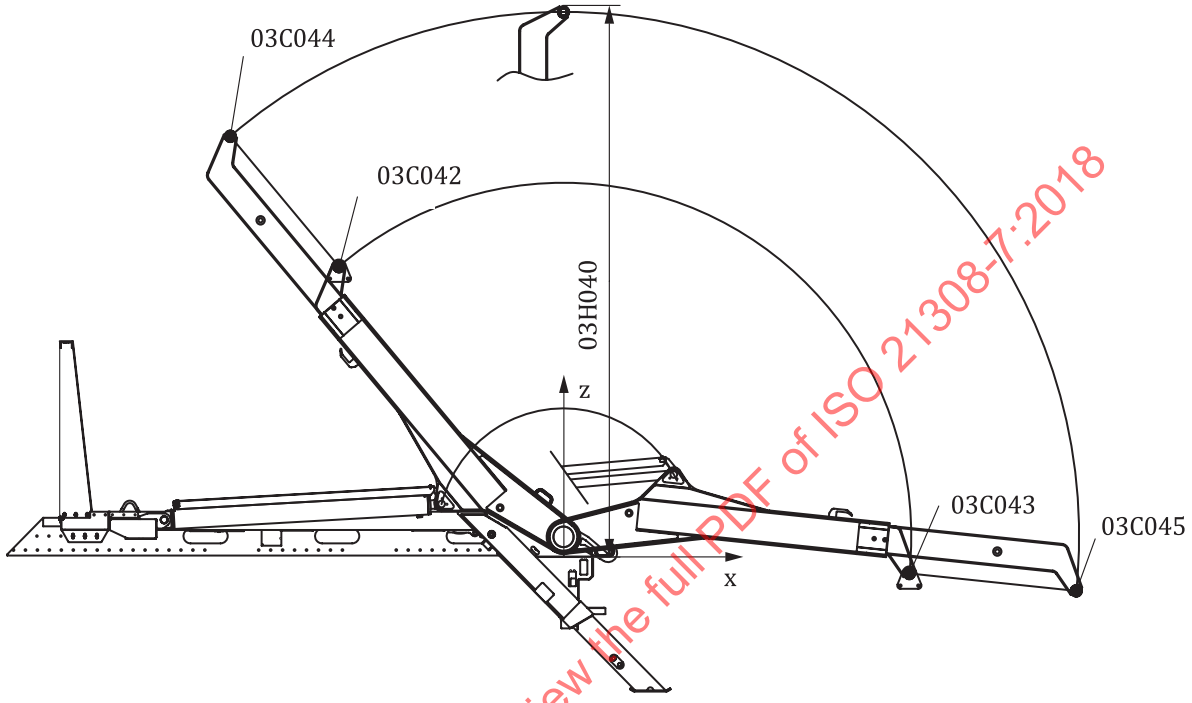


Tipping position example with articulation arm

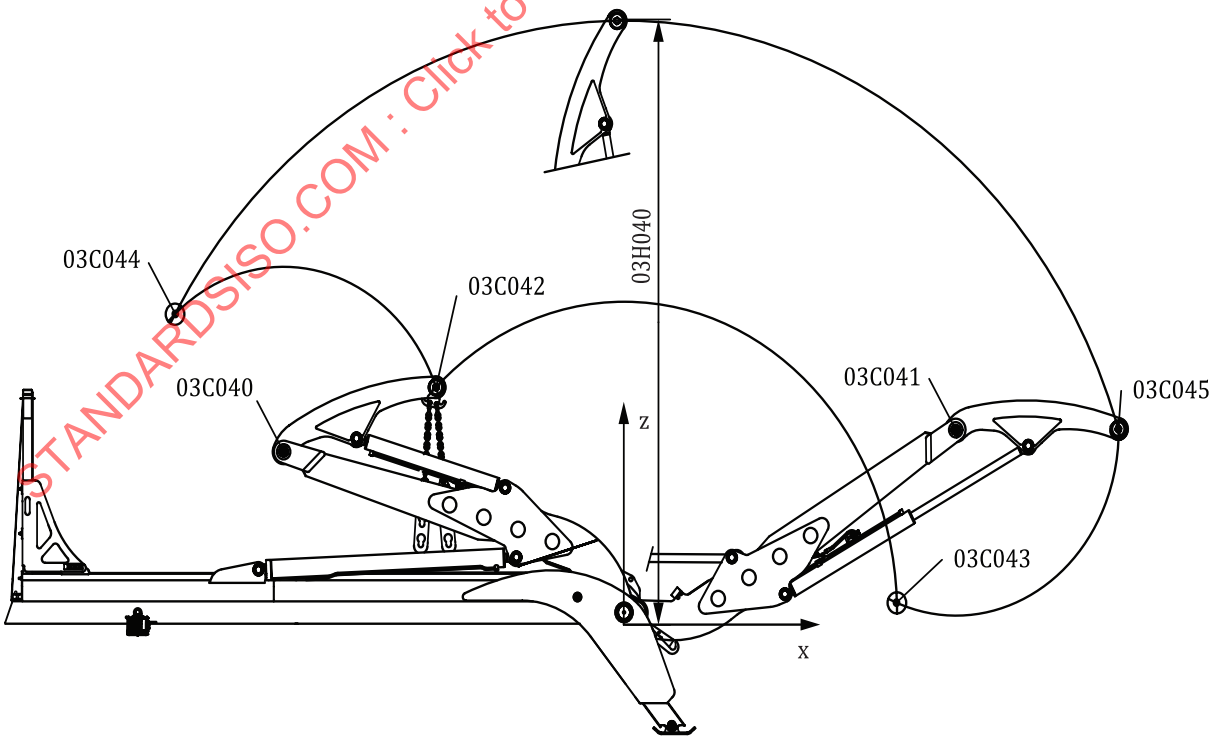
5.2.3 Loading/unloading position

BEP-code	Assignment	Description	Unit	Presented in
BEP-03C040	Articulation arm pivot point, highest angle	Location of articulation arm pivot point at the highest possible angle of the main arm with regard to the x axis. NOTE 1 Applies to articulated designs only. NOTE 2 Angle 0° is along the x axis, angle 90° is along the z axis, measured counter-clockwise.	mm	2D, 3D, TD
BEP-03C041	Articulation arm pivot point, lowest angle	Location of articulation arm pivot point at the lowest possible angle of the main arm with regard to the x axis. NOTE 1 Applies to articulated designs only. NOTE 2 Angle 0° is along the x axis, angle 90° is along the z axis, measured counter-clockwise.	mm	2D, 3D, TD
BEP-03C042	Chain point location, highest angle	Location of chain point at the highest possible angle of the main arm with regard to the x axis. NOTE 1 In case of telescopic arm, the arm is in retracted position. NOTE 2 In case of articulation arm, the arm is at minimum articulated angle. NOTE 3 Angle 0° is along the x axis, angle 90° is along the z axis, measured counter-clockwise.	mm	2D, 3D, TD
BEP-03C043	Chain point location, lowest angle	Location of chain point at the lowest possible angle of the main arm with regard to the x axis. NOTE 1 In case of telescopic arm, the arm is in retracted position. NOTE 2 In case of articulation arm, the arm is at minimum articulated angle. NOTE 3 Angle 0° is along the x axis, angle 90° is along the z axis, measured counter-clockwise.	mm	2D, 3D, TD
BEP-03C044	Chain point location, highest angle, extended position	Location of chain point at the highest possible angle of the main arm with regard to the x axis in its extended position. NOTE 1 In case of telescopic arm, the arm is in its most extended position. NOTE 2 In case of articulation arm, the arm is at minimum articulated angle. NOTE 3 Angle 0° is along the x axis, angle 90° is along the z axis, measured counter-clockwise.	mm	2D, 3D, TD
BEP-03C045	Chain point location, lowest angle, extended position	Location of chain point at the lowest possible angle of the main arm with regard to the x axis in its extended position. NOTE 1 In case of telescopic arm, the arm is in its most extended position. NOTE 2 In case of articulation arm, the arm is at maximum articulated angle. NOTE 3 Angle 0° is along the x axis, angle 90° is along the z axis, measured counter-clockwise.	mm	2D, 3D, TD

BEP-code	Assignment	Description	Unit	Presented in
BEP-03H040	Maximum overall height of arm system	Vertical distance between mounting plane and the highest possible point of the skip loader arm system.	mm	2D, 3D, TD

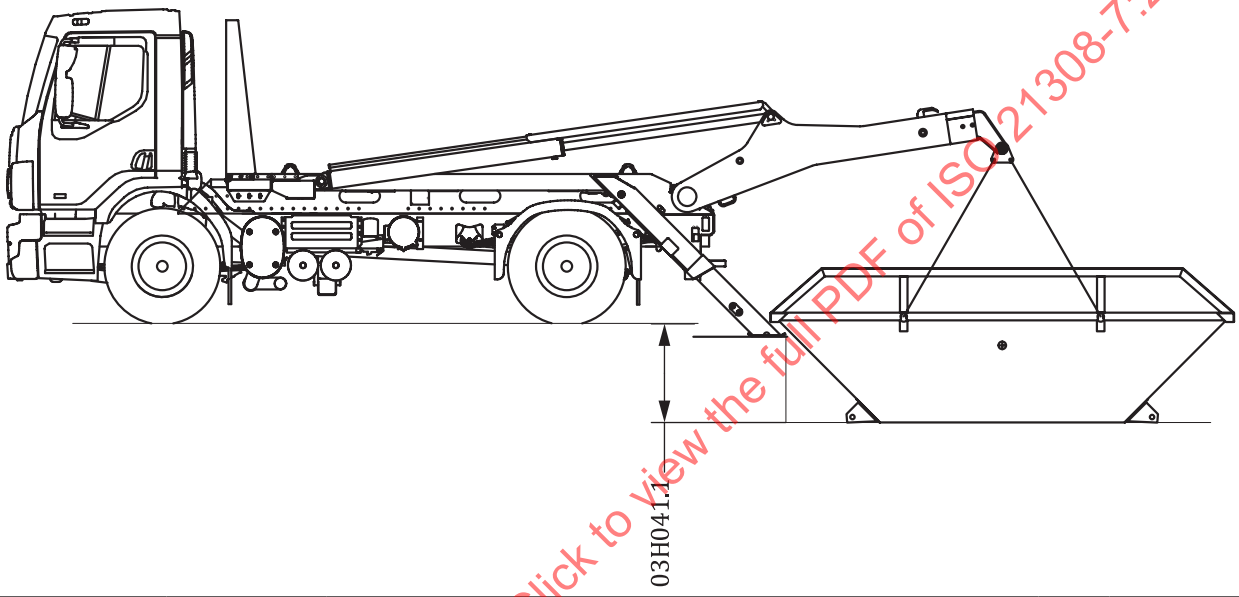


Movement coding for skip loader with extension arm



Movement coding for skip loader with articulation arm

BEP-code	Assignment	Description	Unit	Presented in
BEP-03H041.p	Maximum pit depth for container p	Vertical distance between ground level of vehicle and the ground level of container p. This code can only be given for a complete project with skip loader on a specified vehicle and must consider the following parameters: — Specific type of container — Container load — Chain length NOTE The conditions are given by the manufacturer.	mm	2D, 3D, TD

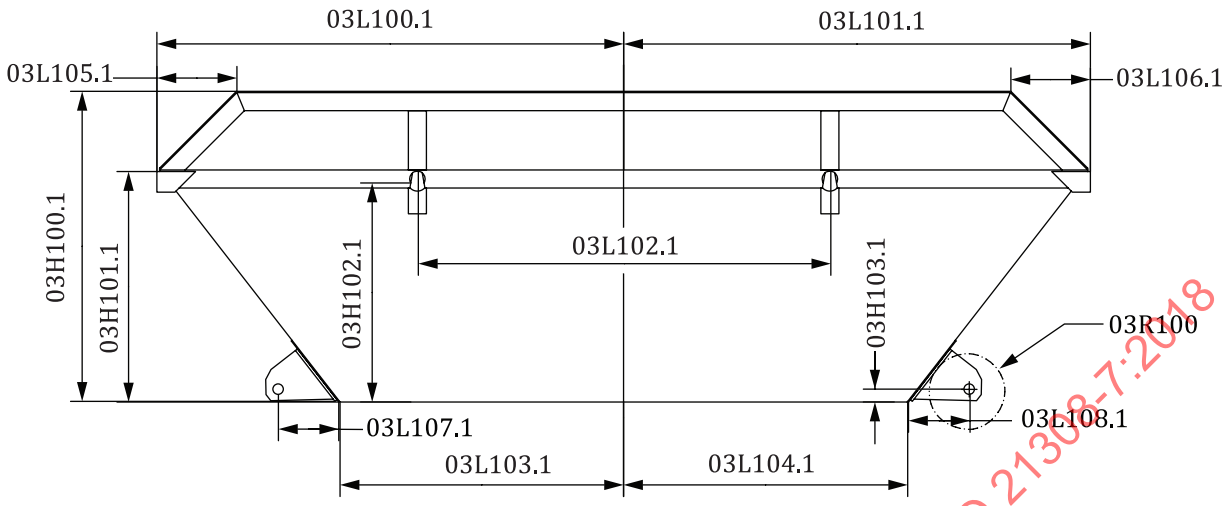


6 Coding of container dimensions and features necessary for the handling

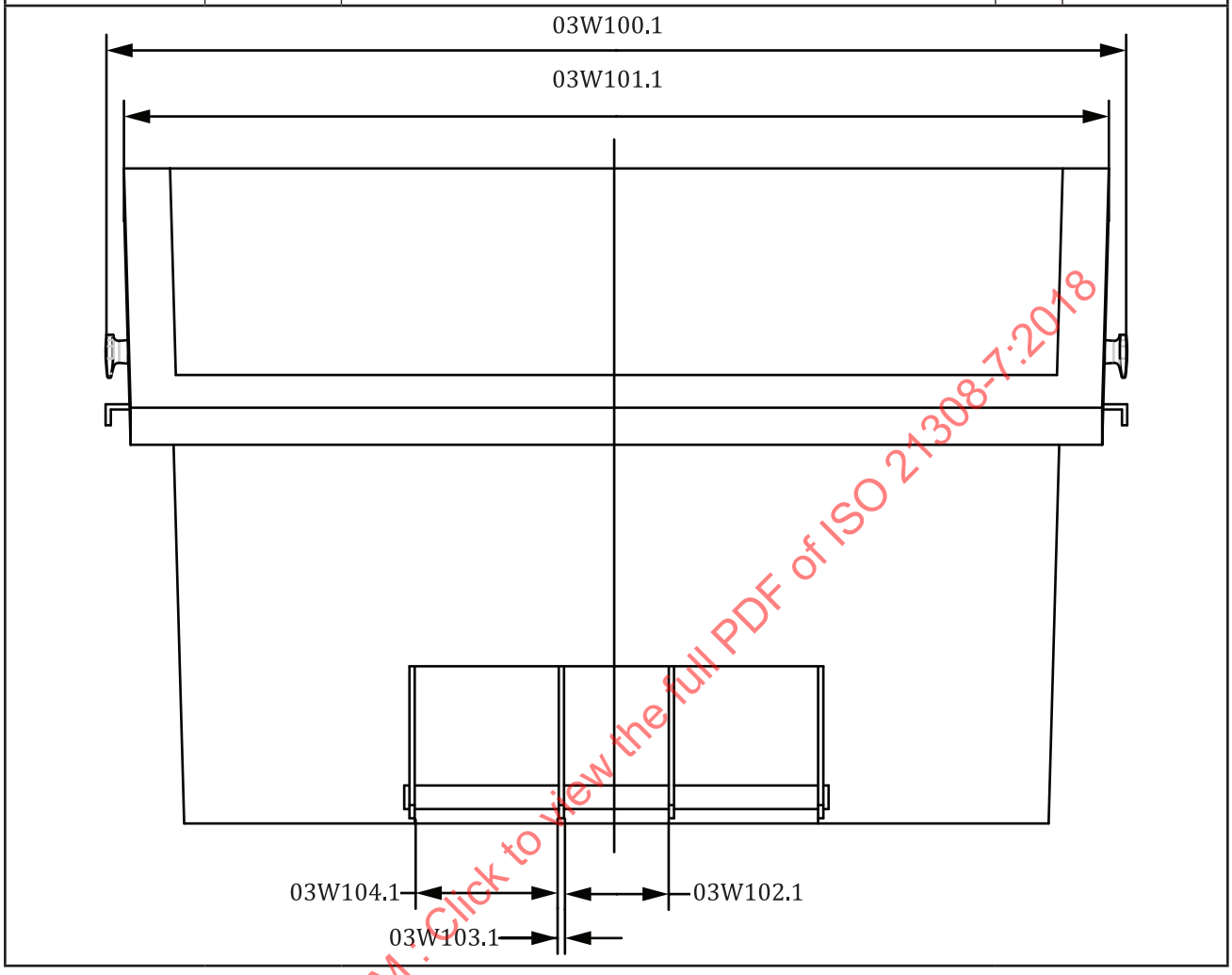
NOTE 1 Only main dimensions are considered in the coding of skip containers.

NOTE 2 An overview of container dimension standards and specifications is given in Annex B.

BEP-code	Assignment	Description	Unit	Presented in
BEP-03L100.p	Frontmost edge	Horizontal distance between attachment centreline and the frontmost edge of the container.	mm	2D, 3D, TD
BEP-03L101.p	Rearmost edge	Horizontal distance between attachment centreline and the rearmost edge of the container.	mm	2D, 3D, TD
BEP-03L102.p	Chain attachment spacing	Horizontal distance between left hand chain attachment and the right-hand chain attachment.	mm	2D, 3D, TD
BEP-03L103.p	Ground plate frontmost edge	Horizontal distance between attachment centreline and the frontmost edge of the container ground plate.	mm	2D, 3D, TD
BEP-03L104.p	Ground plate rearmost edge	Horizontal distance between attachment centreline and the rearmost edge of the container ground plate.	mm	2D, 3D, TD
BEP-03L105.p	Left hand ground overhang	Horizontal distance between the highest plan and the leftmost edge of the container.	mm	2D, 3D, TD
BEP-03L106.p	Right hand ground overhang	Horizontal distance between highest plan and the rightmost edge of the container.	mm	2D, 3D, TD
BEP-03L107.p	Tipping bar position, left	Distance between the left tipping bar and the outer edge of the container.	mm	2D, 3D, TD
BEP-03L108.p	Tipping bar position, right	Distance between the right tipping bar and the outer edge of the container.	mm	2D, 3D, TD
BEP-03H100.p	Container height	Vertical distance between ground plane and the highest plane of the container.	mm	2D, 3D, TD
BEP-03H101.p	Height at outer edge	Vertical distance between ground plane and the outer edge of the container.	mm	2D, 3D, TD
BEP-03H102.p	Chain attachment height	Vertical distance between ground plane and the chain attachment point.	mm	2D, 3D, TD
BEP-03H103.p	Tipping bar height	Vertical distance between ground plane and the tipping bar.	mm	2D, 3D, TD
BEP-03R100.p	Tipping bar clearance radius	Clearance radius around the tipping bar.	mm	2D, 3D, TD

BEP-code	Assign-ment	Description	Unit	Presented in
				
BEP-03W100.p	Outer width incl. chain at-tachments	Container outer width including the chain attachment points.	mm	2D, 3D, TD
BEP-03W101.p	Outer width excl. chain at-tachments	Container outer width excluding the chain attachment points.	mm	2D, 3D, TD
BEP-03W102.p	Width of centre tip-ping bar	Width of centre tipping bar of container p.	mm	2D, 3D, TD
BEP-03W103.p	Mounting plate thick-ness	Thickness of tipping bar mounting plate of container p. NOTE The mounting plates are mounted symmetrically in relation to the centreline.	mm	2D, 3D, TD
BEP-03W104.p	Width of outer tip-ping bar	Width of outer tipping bar of container p. NOTE The two outer tipping bars are mounted symmetri-cally in relation to the centreline.	mm	2D, 3D, TD

BEP-code	Assign-ment	Description	Unit	Presented in



7 Coding of masses

7.1 Mass point in transport position

BEP-code	Assignment	Description	Unit	Presented in
BEP-03M001.p	Mass point, transport position	Mass point of the skip 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